



Suzanne LaFrance, Mayor

# **2025 Stormwater Outreach Public Education and Involvement APDES Permit No. AKS-052558**

## **MUNICIPALITY OF ANCHORAGE WATERSHED MANAGEMENT PROGRAM**

Prepared for:

Municipality of Anchorage  
Watershed Management Services

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## Introduction

Anchorage Waterways Council (AWC) is responsible for the outreach and education sections of the APDES AKS-05258 2020-2025 permit for the Municipality of Anchorage (MOA) and Alaska Department of Transportation and Public Facilities (AKDOT). These sections are: Part 3.6.1 — “Public Education and Involvement” and Part 3.6.3 — “APDES Annual Meeting”. This is the Year 5 report for the current permit period.

Public education and outreach on stormwater are accomplished through a variety of avenues: tabling opportunities and events, social media, e-newsletters, lectures/presentations, publications, and regular TV/radio/news media.

## Public Education and Involvement Outreach

AWC promotes public education on stormwater by focusing on a variety of topics that affect water quality. The primary issues have been, and continue to be: pet waste; waterfowl feeding; invasive species; yard treatments; disposal of green waste; snow melt products and snow removal; residential vehicle repairs and car washing; plastics; monofilament fishing line; lead fishing weights; hazardous waste and materials; trash and litter; and illegal dumping into storm drains.

### Scoop the Poop Day, April 26, 2025, and July 12, 2025

AWC’s Scoop the Poop (STP) Campaign provided information and STP-related items (brochures, stickers, pet waste bags, etc.) at its Annual ‘Scoop the Poop Day’, which was held at University Lake Dog Park and Connors Bog Dog Park. This year’s 4-hour event was staffed by volunteers from AWC and MOA staff, AWC board members, and several dog park users who handed out buckets, shovels, gloves, and bags to scoopers. Turnout for this event increases annually with over 100 eager volunteers at each park, many of them showing up even before setup has begun!

A second STP day was added on July 12 at South Anchorage Sports (Off-leash) Dog Park. Several park users participated in the cleanup event, which was staffed by an AWC board member, a volunteer and E.D. Vangie Wight who focused on outreach efforts.

### 41<sup>st</sup> Annual Creek Cleanup, May 15-26, 2025, and Flotilla 4, May 17, 2025

In spring 1984, the recently formed AWC held a small Creek Cleanup on Chester Creek. From this humble beginning, the event has continued annually for 40 years. Over that period, it’s estimated that over 25,000 volunteers have turned out to clear 250+ tons of trash from hundreds of stream miles and lakes in the Anchorage bowl. The spring 2025 Creek Cleanup continued again with 40+ cleanup teams that fanned out to Ship, Chester, Fish, Campbell, Little Campbell, and Furrow creeks as well as Westchester Lagoon, Potter Marsh, and Waldron, University, and Reflection lakes (Fig. 2). Teams were formed from environmental and engineering firms, recreational groups, churches, NGOs, schools, municipal, state and federal employees, medical staff, neighborhood groups, families, and individuals. Flotilla 4 attracted over 50 kayakers who paddled across Westchester and Eastchester lagoons as well as Cheney, DeLong, Jewel, Sand, Sundi, and Taku lakes.



Figure 1 2025 Flotilla logo (MOA Parks and Recreation)



### Reading Rendezvous, May 17, 2025

AWC has been participating in Reading Rendezvous since 2022, and it continues to have a receptive and diverse audience. Organized by the Anchorage Public Library and the Alaska Center for the Book, its goal is to provide children and families with reading materials and healthy activities. The event is held on the grounds of the Loussac Library. AWC hosted a booth that brought fun and education together for hundreds of attendees (total event tally is 1,980). It had interesting macroinvertebrate coloring pages, an interactive water quality trivia game, and Scoop the Poop info. Reading Rendezvous is an excellent opportunity for us to interact with the broader community and share what AWC is all about.

### Potter Marsh Day, May 31, 2025

Potter Marsh Day is always an exciting family-friendly nature celebration in late May or early June, and traditionally AWC uses hands-on activities with benthic insects to explain their use in determining water quality. A special emphasis is also placed on the Scoop the Poop program—again trying to encourage youngsters to clean up after their dogs. Kaitlan McLallen, AWC’s outdoor educator, oversaw this event. Approximately 300 children and adults visited AWC’s station, which focused on AWC’s Scoop the Poop and Loons, Line, and Lead (detailed below) programs.

### Spruce Seedling Reforestation, August 2, 2025

Anchorage Waterways Council (AWC) received 360 spruce seedlings through a grant from the [Community Forestry Program](#). A group planting was held on Saturday, Aug. 2, from 1 pm-3 pm. Twenty-five volunteers showed up as well as AWC staff and assistant volunteer coordinator (MOA Parks and Rec) Brandon Haslett. All 360 seedlings were planted during that time. The area encompassed Waldron Pond and Campbell Creek Trail between the Old Seward Hwy and Lake Otis. Afterwards, several of the neighbors who planted continued over the latter part of summer to water and check out the seedlings' progress.

### Loons, Line, and Lead Program

In Spring 2025, the “Loons, Line and Lead” (LLL) program began its fourth year with funding from the U.S. Fish and Wildlife Service (U.S.F.W.S.) and the Alaska Community Foundation (ACF). The primary partners are U.S.F.W.S. Migratory Birds, ACF, Bird TLC, and AWC. The 2025 intern was a UAA student who was assisted by a volunteer high school intern. Over the summer, all monofilament recycling bins in Anchorage and one in Girdwood were checked, cleaned up, repaired, and fishing line and tackle were collected on a regular basis. Two new bins were provided to MOA Parks and Recreation to replace those on Eagle River and Mirror Lake.

There were several outreach opportunities to share information on the impact of monofilament and lead tackle on wildlife—especially loons, and this was done jointly with AWC staff Kaitlan McLallen. About 700 packets of non-lead fishing weights were given out to anglers, and approximately 15 miles of fishing line and 1/2 lb. of weights and tackle were collected from all bins. Outreach materials, educational packets<sup>1</sup> that include non-toxic sinkers, stickers, and other info, were shared at events, such as Flyfishing Film Festival at Beartooth Theater Pub, Bike to Work Day, Potter Marsh Discovery Day, Alaska Zoo’s Family Fun Day, and the ADF&G Information Center in Anchorage, as well as during lake visits while servicing recycling bins. Social media campaigns also amplified the messages about the dangers of lead tackle and discarded fishing line.

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<sup>1</sup> Resources and more can be viewed on the [Love A Loon](#) website.



Figure 3 Monofilament recycling bins in Anchorage and Girdwood, 2025

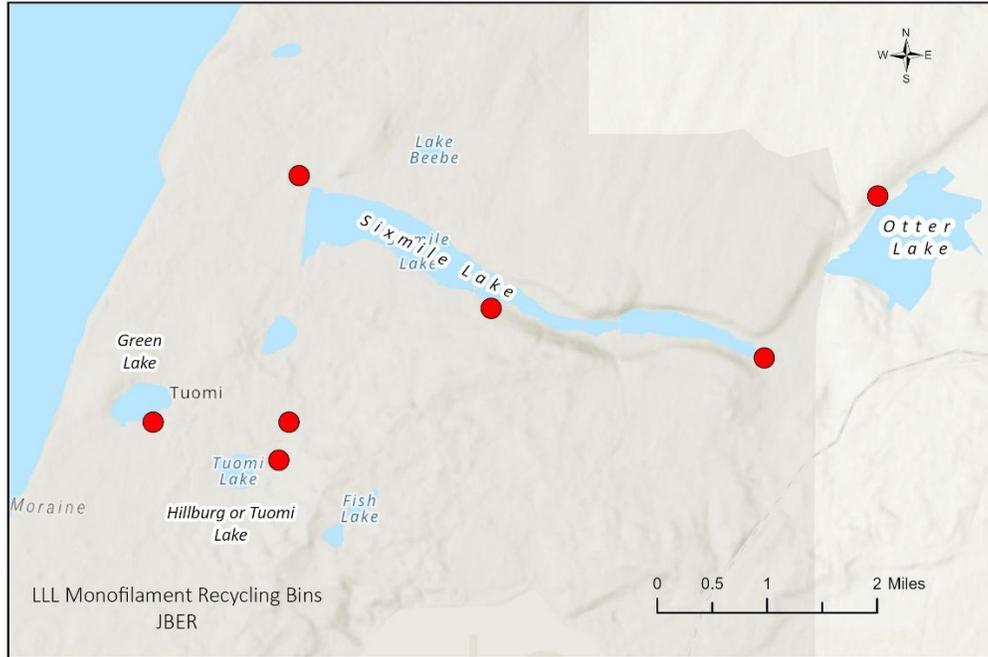


Figure 4 Monofilament recycling bins on JBER, 2025

### Creeks as Classrooms

Begun in 2008, AWC’s [“Creeks as Classrooms”](#) (CAC) focuses primarily on outdoor experiential learning for youth (K-12). With the hiring of AWC’s new Outdoor Educator, Kaitlan McLallen, in late 2024, AWC has considerably expanded the program during 2025. A major emphasis is on macroinvertebrates that are useful as indicators of healthy water. Additionally, students are provided information on monofilament fishing line and hazards of using lead fishing tackle and cleaning up after pets (Scoop the Poop). Approximately 2,700 youth participated in CAC during 2025, up from ~2,000 the previous year. It has been funded primarily by ConocoPhillips. AWC also partners with other programs, such as [Schools on Trails](#) which is overseen by the Anchorage Park Foundation.



Figure 5 Students from Scenic Park Elementary, “Schools on Trails” day, Sept. 24, 2025

## Issue Response

### Citizen Reporting

AWC continued to respond to concerns by residents during 2025. Besides phone or email, there is a “Citizen’s Reporting Form” on our [website](#) which provides a place to report problems or concerns along Anchorage’s creeks and lakes. We respond to those that we can, and, for those we can’t, the appropriate local or State department is contacted and the citizen is given that information. There were five major concerns reported. These include excessive trash along South Fork Chester Creek west of Muldoon as well as at Northwood Pond; a tree limb blockage over a culvert on Little Campbell Creek east of Nathan Drive; possible blockage of N. Fork Little Campbell Creek near E. 68<sup>th</sup> and Elmore; and concern about some issues along Eklutna Lake Trail where work had been performed without SWPPP notification and adequate BMPs. Details are in Appendix A.

### Neighborhood Creek Campaigns

During this five-year APDES contract period, AWC focused on contacting property owners who had a creek adjacent to their property. AWC has found that providing targeted information on being responsible creek neighbors gives some guidance on situations for concern. In 2022, AWC focused on Middle Fork Chester Creek. The following year, coverage expanded to Chester Creek in the Valley of the Moon neighborhood, south shore of Westchester Lagoon, and South Fork Chester Creek from University Lake to Muldoon. During 2024, informational letters were sent to several hundred homeowners along the main stem of Little Campbell Creek, North Fork Little Campbell Creek, and South Fork Little Campbell Creek. Little Campbell Creek actually runs through or as a divider between the yards of several residential and business properties (Fig. 6).

In 2025, AWC focused on the businesses that flank North Fork and South Fork Little Campbell Creek. Many of these businesses involve vehicle repairs, equipment storage (Fig. 7), and small-scale manufacturing, which means the potential for runoff of oil, vehicle fluids, stockpiles, and other potential contaminants. A new information sheet was developed with input from the MOA’s Watershed Management Services containing advice on BMPs and ways to minimize impacts to Little Campbell Creek. See Appendix A for a copy of the letter, BMP flyer, and maps of the areas covered.



Figure 6 North Fork Little Campbell Creek running through Crazy Cat Rescue’s property at 1153 E. 72<sup>nd</sup>



Figure 7 Storage property on E. 71<sup>st</sup> and North Fork Little Campbell Creek

### 6PPD Quinone Update August 6, 2025

The 6PPD Quinone working group met in August and has a new lead person, Rachel Newell, from the DEC's Water Quality Standards. The meeting included a report from the American Tire Manufacturing Association which is a consortium of 36 manufacturers. The discussion provided information about seven possible substitutions for 6PPD quinone that are currently being studied. A summary on the use of 6PPD by tire manufacturers can be found at: <https://www.ustires.org/6ppd-tire-manufacturing>.

Another presentation was made by UAA chemist Brian DiMento, Ph.D. who has been collecting water samples right after rainfall. During 2025, he was able to get 65 samples from Ship, Chester, and Campbell creeks. Unfortunately, there is currently no funding for his research which is definitely hampering collection activities. Even so, two storm drains from Chester Creek that enter the New Seward, an area of high traffic volume, were found to have above lethal concentrations in their runoff. It appears that dilution from the creek is keeping samples from Chester Creek below lethal levels. The working group will reconvene in 2026 with updates.

### Electrical conductivity (EC) sampling

AWC volunteer monitors have sampled for EC along Chester Creek since 2019 as part of a long-term research project at University of Alaska Fairbanks. The goal of the project has been to identify the impact of meltwater on water quality due to common winter street treatments. As our AWC monitors collect samples only on the fourth Sunday of each month, regardless of rain or snow events, Dr. Birgit Hagedorn, an AWC board member, needed to collect additional samples during rain and snow melt events. These data, combined with that from AWC monitors, were compiled into the final

report, THE EFFECT OF WINTER STREET TREATMENT ON CHESTER CREEK WATER QUALITY DURING SNOW MELT EVENTS, which is included in Appendix A.

## Outreach Methods

### Media

There were two news stories in 2025, one in the Anchorage Daily News and the other in Alaska's News Source, KTUU, about AWC's 41<sup>st</sup> Annual Creek Cleanup.

<https://www.adn.com/alaska-news/anchorage/2025/05/01/anchorage-trash-cleanup-season-is-here-heres-how-you-can-help/>

<https://www.alaskasnewssource.com/2025/05/16/creek-cleanup-begins-anchorage/>

### Newsletters

AWC sent out nine newsletters during this period that announced upcoming events, discussed its various programs, and provided a wrapup of its events. All 2025 *Streamline* issues are in Appendix B. Current readership continues to increase with about 300 from the direct email using Constant Contact. The newsletters are also posted on [Facebook](#) where another several hundred readers receive them.

### Social Media

AWC continues to distribute the majority of its outreach information through social media and its digital newsletter, *Streamline*. As social media remains the primary channel through which the public prefers to receive information, AWC focuses its outreach efforts on platforms, such as Facebook and Nextdoor.com, in addition to *Streamline*. The organization's two Facebook accounts now have more than 1,200 followers. During this contract year, AWC posts reached 5,032 recipients. This represents a significant decrease from previous years, when paid advertising was utilized. Unfortunately, paid advertising on Facebook, while extending AWC's reach, it openly invites malicious comments and other problems so it was suspended indefinitely.

### Videos

In 2022, AWC commissioned the creation of a one-minute video, [Let's Talk About Poop](#), as part of the strategy to incorporate more social media outreach. The following year, a second short video, [CRITICAL](#), was created with an emphasis on stormwater runoff pollution. Both have been well-received. However, in keeping with the fast-paced changes by social media users, especially a very small window of time to capture a viewer's attention, a new series of four short videos was created in 2025. These run about 15 seconds and are oriented portrait style to be viewed optimally on a smart phone.

They are titled:

1. [Small Acts](#)
2. [One Ton](#)
3. [450 Years!](#)
4. [Don't Feed the Birds](#)

Additionally, the two original videos were redone in the shorter format. One, “CRITICAL”, is final, and the other, “Let’s Talk About Poop”, will be finished in late January 2026. All videos be used in social media campaigns as well as being placed on the AWC website [anchoragecreeks.org](http://anchoragecreeks.org).

### APDES Annual Meeting

On March 4, 2025, AWC presented at the APDES Annual Meeting. The topic was “2024 Watershed Perception Survey”. A copy of the presentation is in Appendix C.

## Conclusion

AWC is very encouraged that its activities and messaging over this 5-year period are resonating with residents. One of the primary campaigns AWC focuses on is cleaning up trash and pet waste. At AWC outreach events, it’s becoming more common for the attendees to be well-acquainted with cleaning up pet waste—especially children! Anchorage residents show their care and enthusiasm by turning out in high numbers for cleanup events, such as Creek Cleanup and Scoop the Poop Day. They are also demonstrating their concern for the impact of monofilament fishing line and helping to reforest areas that have been impacted by tree removal necessitated by the spruce bark beetle.

Even so, there are other larger problems that face Anchorage and other urban areas. The impact of 6PPD quinone runoff on waterways and chemical road treatments in northern regions are two examples. These are difficult to mitigate in terms of personal responsibility other than bringing awareness to the impacts of gardening and yard treatments, vehicle maintenance, etc. Getting the message out is a continual process, and AWC will continue using what is working while also pursuing new methods.

## APPENDIX A – Issue Response

## Citizen Reporting

### 1. SF Chester Creek –Debarr and Muldoon area, April 18, 2025

**Message:** If possible, could someone come to help clean up the creek located at 1400 Muldoon Rd. Creekview Plaza apartments behind Crispy Cream and Starbucks on Muldoon / Debarr. I reside at the above address in apt 206 and will try to clean up as much as I can however i am legally disabled and cannot get down the steep hills to get the garbage and large items out of the creek. Ducks & Geese frequent this creek as well as nesting here. It's in desperate need of clean up basically the wildlife (ducks, geese, seagulls otters & other feathery friends are swimming in filth. I have hung garbage bags all winter out by creek and continue to hang bags. People littering & high winds have blown garbage around & into the water. I clean up cigarette butts, fast food packaging, paper and other random pieces of garbage every day In my attempts to making it a cleaner, safer & more inviting place for the wildlife I am pushing myself to hard there's just too much garbage that's out of reach for me. I attempted to reach out to Parks & Recreations as I believe some of the property by the bridge, creek & benches to be Municipality of Anchorage property no one has returned my calls. I can help with cleanup just can't do it alone without risking injury to myself. It would be greatly appreciated by the ducks, geese & myself if you could lend a helping hand. I can be reached at (907)570-6697 (text or call Cat) or by email at the following... [kiticatmeow67@yahoo.com](mailto:kiticatmeow67@yahoo.com). Thank you for your time & efforts. Best Regards, Cathy Michalake

**AWC Response:** AWC took photographs to determine the extent of the debris and brought the cleanup request to the its Board to determine whether an in-house group cleanup could be organized. Our annual May creek cleanup was gearing up and the MOA's APDES team leader reached out, indicating they might be interested in assembling a team. We felt this could be a good opportunity for our group and MOA to work together; however, follow-up coordination did not move forward this season. We will reexamine this location in spring 2026 to determine whether a group cleanup can be organized. Historically, this site experiences an annual buildup of trash that is blown into the area.



### 2. Northwood Pond, July 2, 2025

**Message:** My family and I live on Melvin Avenue, a few hundred feet from Northwood Pond. As the attached photos show, this wonderful amenity is in terrible condition this summer. It is covered with brown scum, so much scum that there is only one mature duck (with 5 babies) in residence. Normally the duck population would be at least a dozen this time of year. In addition, the pond is littered with debris, such as the shopping cart shown in one of the photos, and trash is scattered on the bank. If you can help get the pond cleaned up and made into the neighborhood asset it has always been, please do.

**AWC response:**

As our annual spring creek cleanup took place in May, we did not have any volunteers available to respond to this request. We offered to supply cleaning material to the resident; however, no response was received. The Municipality of Anchorage (MOA) was informed of the situation via email.



**3. Little Campbell Creek – Area of E. 68th Avenue and Elmore Road, August 14, 2025**

**Message:** A resident living near the intersection of E. 68th Avenue and Elmore Road contacted the Anchorage Waterways Council regarding a ditch near Little Campbell Creek that appeared to be clogged.

**AWC response:** The following day, a member of the Board of Directors, Bob Shipley, visited the site and took two photographs. His assessment indicated that there was visible flow in the creek, the water was relatively clear, and there did not appear to be a condition that required immediate attention at that time.

The homeowner adjacent to the creek was contacted and informed of the findings. She was advised that everything appeared to be in good condition and was encouraged to contact the Anchorage Waterways Council again if any further issues arise.



#### 4. Eklutna Lake Trail, September 25, 2025

**Message:** Shaun Sexton wrote: The photos are representative, to a degree, of the damage that resulted from trail “improvement” work performed in late summer and early fall 2024. Miles of trail and roadside land surface was stripped to topsoil and vegetative cover during the work. No SWPPP has been identified by me or the ADEC. No evidence of any effort to revegetate is obvious. The work was performed under a grant from the State of Alaska in the amount of around \$200K. Work was performed by a contractor from Fairbanks. Best Management Practices for storm water pollution prevention and trail construction and maintenance were not employed at numerous applicable locations. This is a bad precedent and example.

I have hundreds of photographs taken since last fall on a number of dates. Happy to share them on a thumb drive if you are interested.

**AWC response:** The Municipality of Anchorage (MOA) was notified October 30, 25, and I followed up by contacting the party concerned through both phone calls and email correspondence.



#### 5. Little Campbell Creek at Nathan Drive, October 26, 2025

**Message:** AWC monitor reported: There were a couple of small tree branches/limbs lying across the northern culvert on the upstream side of Nathan. I attempted to remove them, but the water flow was too strong for me to do so safely. At this time, the water is flowing well; however, these culverts have a history of becoming blocked and causing flooding.

**AWC response:** Following previous flooding events, the city removed a significant amount of brush and trees on both sides of the street. This work has greatly improved access and has resulted in noticeably less debris entering the creek over the past couple of years.



## Little Campbell Creek Business Outreach



Anchorage Waterways Council  
P.O. Box 241774  
Anchorage, AK 99524  
(907) 272-7335  
[www.anchoragecreeks.org](http://www.anchoragecreeks.org)

October 11, 2025

Dear Little Campbell Creek neighbor,

Anchorage is a very unique place to have a business. Besides being Alaska's major urban center, its local waterways play host to a variety of wildlife and fish, including 5 species of Pacific salmon and several species of trout.

Anchorage Waterways Council's work focuses on keeping local creeks and lakes healthy for all to use and enjoy, which is why we would like your help. I'm contacting you because South Fork of Little Campbell Creek is adjacent to your commercial property, and it's imperative that its neighbors understand more about it and help us make sure it is protected.

Here are a few interesting facts:

- Little Campbell Creek encompasses about 24 miles of stream habitat.
- Its North Fork begins in Far North Bicentennial Park and the South Fork near the Glen Alps/Flattop Mountain trailhead; they join just west of the Old Seward Highway before entering Campbell Creek near Nathan Drive.
- Overall, the creek contributes about 26% -- 50% of the flow to the main Campbell Creek watershed, making it the largest sub-watershed.
- Juvenile coho (silvers) and chinook (kings) rear in Little Campbell Creek, and sockeye (reds) have been known to spawn there as well. Dolly Varden and other trout also inhabit the creek.

Surface runoff from stormwater and onsite faucets and hoses carry pollutants, such as vehicle drips, industrial chemicals, trash, and yard debris into the nearest waterway or storm drain, and storm drains themselves direct UNTREATED runoff into the nearest creek. Bottom line: what's on the ground, washes down...into the nearest waterway.

I'm including some information that we hope you'll consider in order to help Little Campbell Creek be a healthy waterway for its aquatic inhabitants as well as for the enjoyment of all. Please share with your staff.

If you'd like to know more about local waterways and our work, please visit our website at [www.anchoragecreeks.org](http://www.anchoragecreeks.org) or contact us to do a site visit. We're the only organization dedicated to caring exclusively for local waterways, which we have been doing for over 40 years.

Sincerely,

Cherie Northon, Ph.D.  
[cherie@anchoragecreeks.org](mailto:cherie@anchoragecreeks.org)



## BMPs to Protect Little Campbell Creek

Businesses play an important role in keeping our creeks clean and healthy by protecting water quality, preventing erosion, and supporting fish and wildlife habitat.

**The 'Upstream Effect':** what you do on your property impacts Little Campbell Creek downstream. Its lower reaches are important for rearing juvenile salmon, such as this juvenile chinook that was collected about a ¼ mile downstream (west) from Old Seward Hwy. Juveniles spend up to three years in Little Campbell Creek before they migrate out to sea.



Rocks and woody debris provide habitat for macroinvertebrates (aquatic insects) that are food for fish, birds, and other creek inhabitants. They, like juvenile salmon, can be greatly affected by runoff from your property.

Following are some suggestions that can reduce your impacts on the creek and its inhabitants:

- Vehicles, trailers, and equipment should be parked on pavement as far away from the creek as possible.
- Piles of soil, gravel, lumber, materials, and chemicals should also be located away from the creek on paved or gravel areas.
- Be vigilant and clean up any spills, leaks, or litter promptly.
- Manage stormwater runoff (rain and snowmelt) so it drains away from the creek. Runoff can carry vehicle fluids, detergents, soil, and other undesirable pollutants that severely impact aquatic life.
- Protect and preserve shrubs and trees along the banks as they stabilize the banks and also provide shade to keep the water cooler.
- Consider adding straw **wattles** to direct runoff away from the creek.

By adhering to these recommendations, you are helping to keep special waterways healthy and enjoyable by all and essential for the critters that inhabit them.



these

### Questions or need help?

Anchorage Waterways Council  
[awc@anchoragecreeks.org](mailto:awc@anchoragecreeks.org) 907 272-7335

Municipality of Anchorage, Watershed Management, BMP information  
C.J. Weed [charles.weed@anchorageak.gov](mailto:charles.weed@anchorageak.gov) 907 343-8008

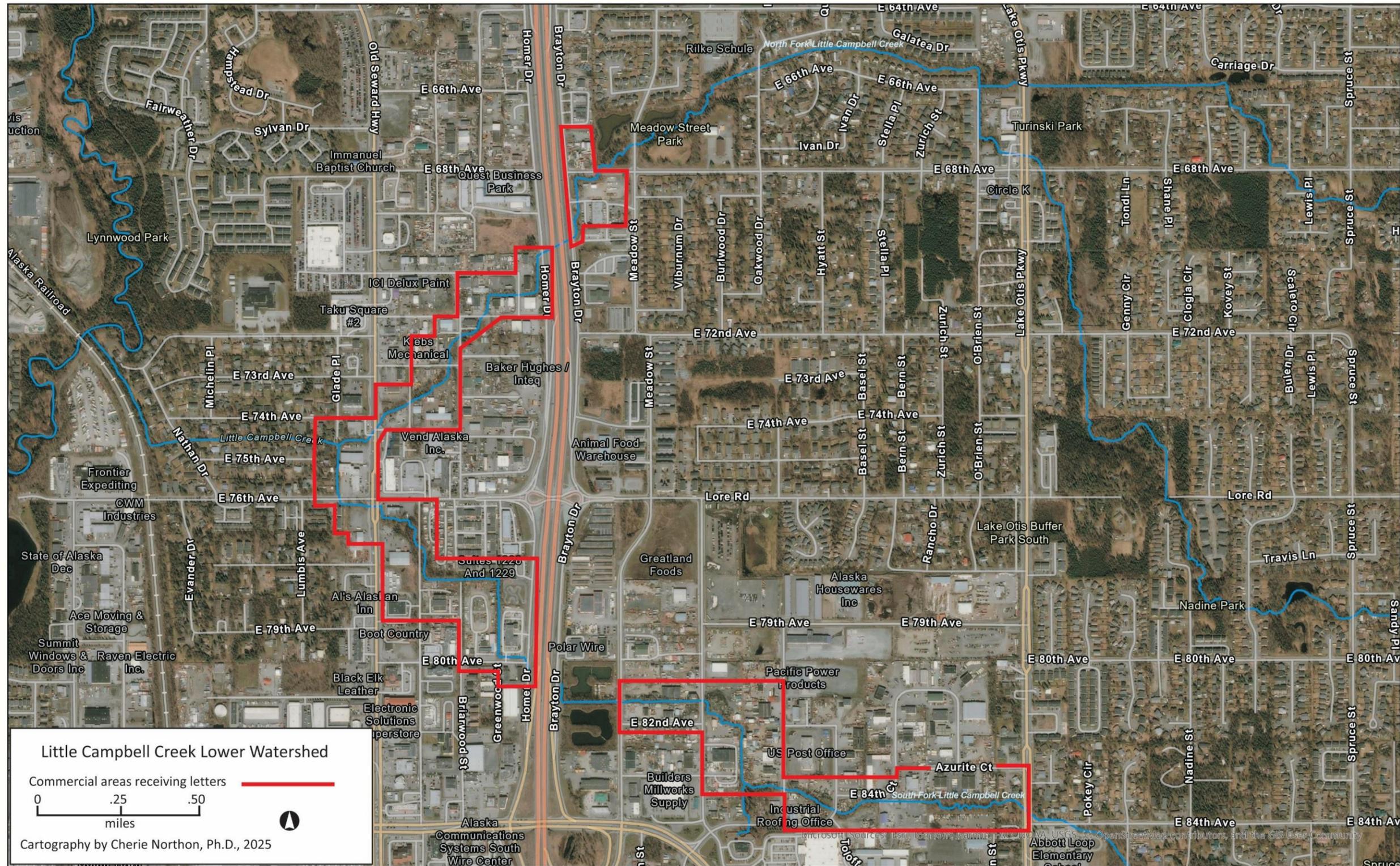


Figure 8 Little Campbell Creek Business Area Outreach

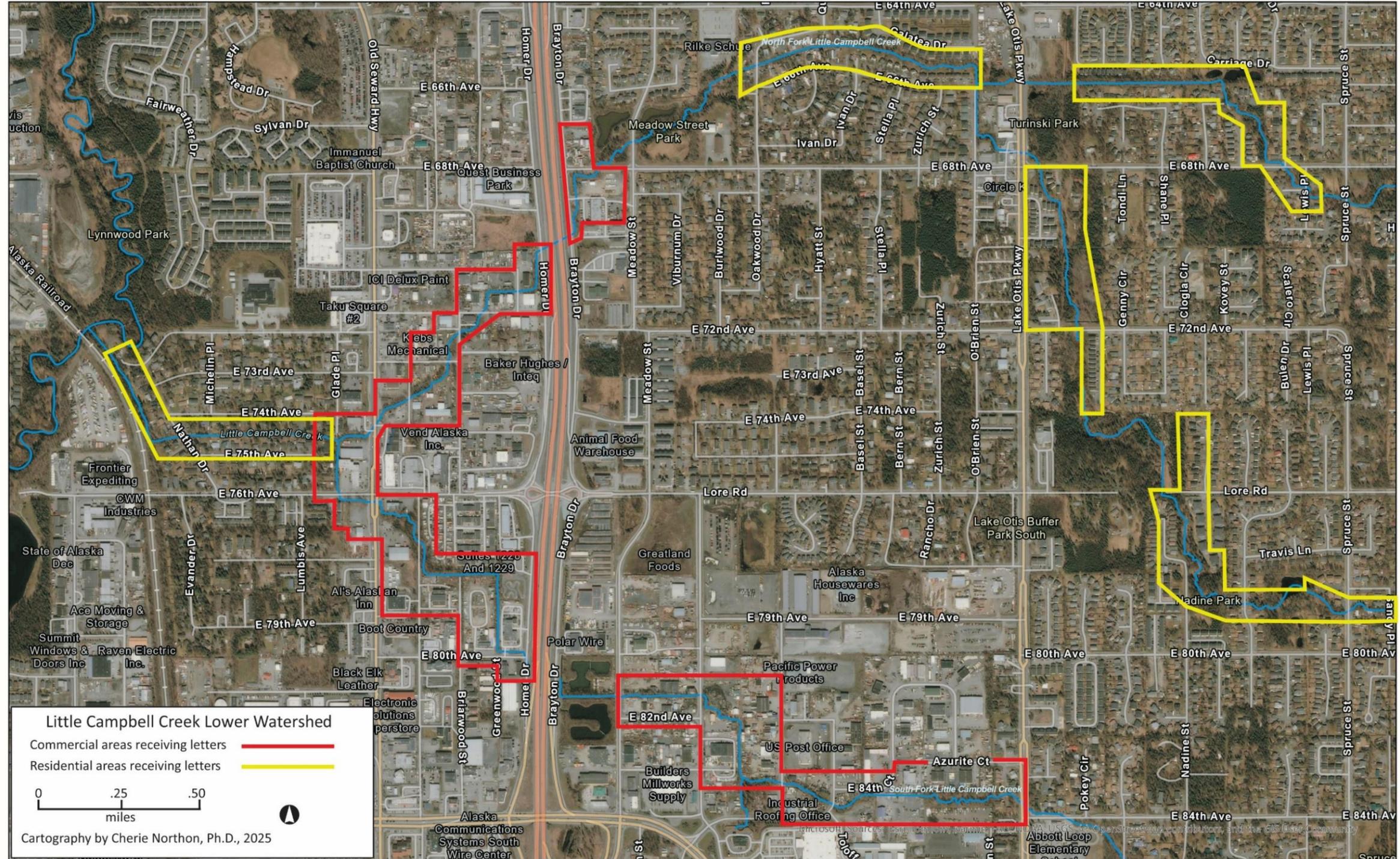


Figure 9 Little Campbell Creek Business and Residential Areas Outreach

## The Effect of Winter Street Treatment on Chester Creek Quality During Snow Melt Events

# THE EFFECT OF WINTER STREET TREATMENT ON CHESTER CREEK WATER QUALITY DURING SNOW MELT EVENTS

NNA Track 1 project: “*Collaborative Research: Arctic Urban Risks and Adaptations (AURA): a co-production framework for addressing multiple changing environmental hazards*”,



Birgit Hagedorn

Sustainable Earth Research LLC

with contributions from

Cherie Northon and Thomas Eley

Mapping Solutions

September 2025

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## SUMMARY

Water quality parameters for temperature, electrical conductivity, dissolved oxygen, pH, and turbidity and ion activity for calcium, chloride, and magnesium were measured during a period of five winters at eight locations along Chester Creek that flows from the Chugach Mountains east of the Municipality of Anchorage through the Municipality to the west into Knik Arm. The goal of the project was to identify the impact of meltwater on water quality due to common winter street treatments.

Each year had its unique conditions. Melt events occurred when air temperature reached above freezing which were sometimes accompanied by rain events that enhanced snowmelt. Melt events throughout the season varied between four and nine with no considerable trend over the duration of the project. Maximum snowpack due to record snowfall occurred in winter 2022/2023 and 2023/2024.

Electrical conductivity, which measured the total ion concentration in the water, and turbidity, which measured the concentration of particles, showed the major impact on water quality during melt events. Both parameters can be related to street treatments with salt/deicer and sand/gravel which are used on streets, parking lots, and walkways to reduce hazardous conditions, and both parameters generally increase from the east to the west as the creek runs through the Municipality. The highest electrical conductivity and turbidity were measured in the Middle Fork of Chester Creek at the Northern Lights location and directly in storm drainages at the Seward Highway location. The electrical conductivity correlated well with chloride concentration--a major compound of deicing agents and salts. This supports the assumption that the increase in electrical conductivity is due to street treatments.

The total amount of ions, derived from electrical conductivity, is related to the area of each sub basin upstream from each sampling location, and indicates that the sub basin of the Seward Highway sampling location contributes fewer total ions to the creek per sub basin area than other sub basins.

Comparing the measured values to water quality standards for aquatic life and propagation (*18 AAC 70 Water Quality Standards, March 2020*), the electrical conductivity should not exceed 1,500  $\mu\text{S}/\text{cm}$ , and this value was only exceeded once on March 26, 2021 in the Middle Fork. Turbidity should not exceed background values by more than 10%. Background values for the sampling locations derived from times before freezing and in the absence of rain range from 0.7 to 5.17 NTU from east to west. Values measured during melt events and summer rain events frequently exceeded this water quality standard.

# 1 INTRODUCTION

This monitoring project was conducted as part of the NNA Track 1 project: “Collaborative Research: Arctic Urban Risks and Adaptations (AURA): a co-production framework for addressing multiple changing environmental hazards”, with the aim to evaluate the impact of snowmelt on creek water quality due to winter street treatment. The hypothesis of the project was that with a changing climate, winter melt events will increase. The goal of this monitoring project was to establish a baseline of how melt events impact urban creek water quality and how they may relate to storm water basins and residential/industrial use of the area.

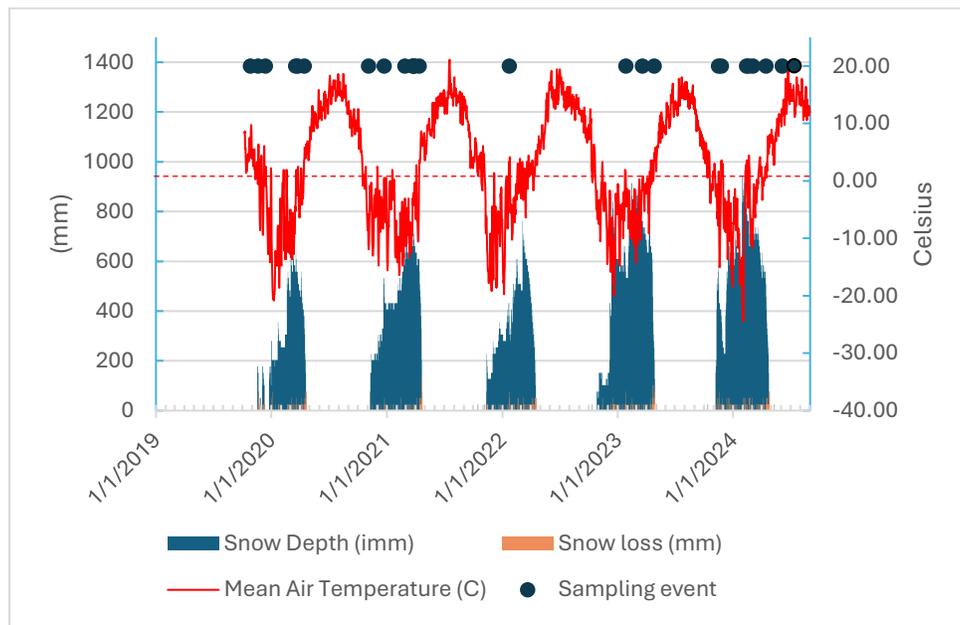
The monitoring was performed between October 1, 2019, and September 30, 2024, which included a one year no-cost extension. The monitoring was performed on urban Chester Creek (CC) which originates in the foothills of the Chugach Mountains east of the Municipality of Anchorage (MOA) and drains into Turnagain Arm (Cook Inlet) to the west. The creek consists of a South Fork, Middle Fork and North Fork. The South Fork enters the Municipality east of Chanshtnu Park in Muldoon (sampling point Turf Ct) and is joined by its northern branch north of Muldoon Road (sampling point Burger Fi). The Middle Fork originates in Russian Jack Park. This fork runs underground for some distance and merges with the South Fork at Tikishla Park (Airport Heights). The Middle Fork was sampled at Northern Lights sampling point. The North Fork originates south of Merrill Field and 15<sup>th</sup> Ave. and joins the South Fork Branch at Eastchester Park. The total length of Chester Creek is 21 miles and its catchment area is about 80.3 km<sup>2</sup> (<https://storymaps.arcgis.com/stories/97f06fa6e00a4785af53514e1fb83bd1>Chester Creek Stormwater Masterplan, accessed 9/15/2025) and average annual discharge was  $3.1 \times 10^7$  m<sup>3</sup>/yr during the duration of the project (USGS Chester C St. at Arctic Boulevard at Anchorage AK - USGS-15275100, accessed 9/15/2025). The creek stays mostly open throughout the winter but occasionally parts of it can be covered by ice and snow making it inaccessible for sampling. Locations Muldoon Elementary school and Turf Ct were frozen most of the time and the flow at Muldoon Elementary School was so low that this sampling location was dismissed after winter 2019/2020.

Figure 1 shows the map from Chester Creek with sampling points and stormwater nodes which represent a manhole (e.g. stormwater intake point). The color coding relates to stormwater manholes for the downstream sampling location and therefore outlines the stormwater sub basin. Photographs from each sampling location are displayed in the Appendix Figure A2.

The creek receives stormwater mostly from residential areas except for the medical campuses from Providence and Alaska Native Hospital and the University of Alaska Anchorage (sampling point Mallard Lane) and from larger parking areas around Fred Meyer and Safeway/Carrs grocery stores (sampling point Seward Highway).

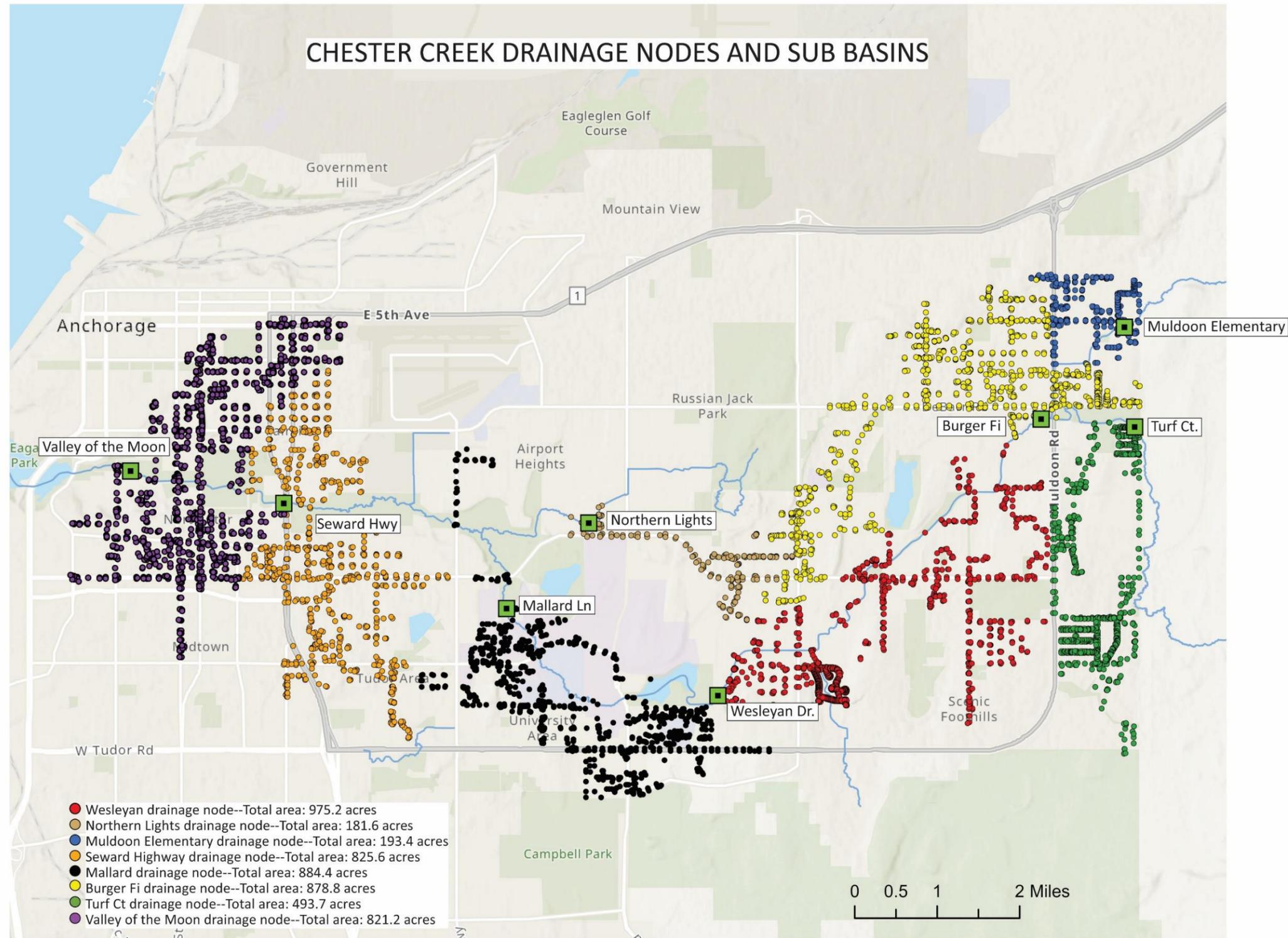
The MOA and Alaska Department of Transportation and Public Facilities (AKDOT) use gravel and gravel mixed with salts and a variety of deicing agents, while residents and smaller businesses use mostly salt to prevent formation of ice on streets and walkways. Most forms of the salts are chloride based, but the liquid salts can also contain other mostly organic based ingredients which would not contribute to the parameter monitored in this project.

Climate data displayed in Figure 2 are derived from <https://akclimate.org> station ID USW00026451 (accessed September 8, 2025). The major snowmelt typically started at the end of March and lasted until mid-April. Smaller snowmelt events occurred when the air temperature reached positive temperature which was on some occasions also accompanied by rain. Winter 2022/2023 and 2023/2024 reached record snowfall and one major melt event occurred in February 2023 as can be seen in higher snow accumulation in Figure 2. In general, the last two winters had fewer melt events than the former three winters, and due to the high snowpack in the last two winters smaller melt events did not affect creek water quality much because the meltwater was trapped within the snowpack.



**Figure 2.** Climate data for the sampling period. Shown are mean air temperature, snow depth and snow loss. Also shown are times of sampling events.

# CHESTER CREEK DRAINAGE NODES AND SUB BASINS



**Figure 1:** Stormwater intake nodes that drain into Chester Creek. Color coding indicates intake nodes upstream from sampling locations. Sub basin areas are calculated as areas between sampling points and are upstream for each location.

## 2 RESULTS

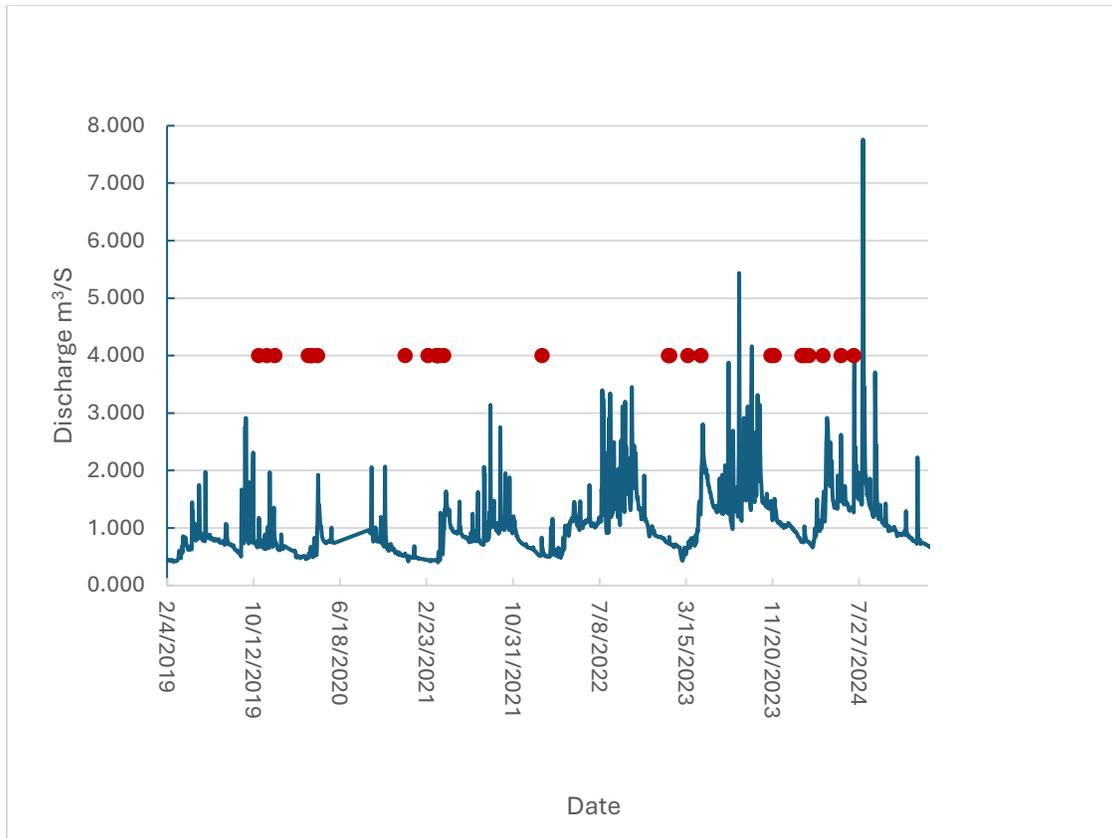
### 2.1 Methods

Samples were collected during winter months from October 2019 to July 2024. Eight sample locations were selected along the creek based on major stormwater inputs. In addition, storm water was directly sampled at two locations at the Seward Highway. Water quality parameter Temperature, Specific Electrical Conductivity (EC) ( $\mu\text{S}/\text{cm}$ ), Dissolved Oxygen ( $\%$ ,  $\text{mg}/\text{Kg}$ ), and pH were analyzed using a YSI 556 multimeter and Turbidity (NTU) was analyzed with a Lamotte 2022 turbidity meter. Both instruments were calibrated for each parameter before each sampling event. In addition, samples were collected and analyzed for Chloride, Calcium, Magnesium, and Sodium using ion specific electrodes and each probe was calibrated with zero and 100  $\text{mg}/\text{L}$  solutions. Sampling was performed when air approached temperatures above freezing and/or during winter rain events. In addition, two samples were collected during summer rain events on June 5<sup>th</sup>, 2024, and July 12<sup>th</sup>, 2024, and three samples were collected during winter without melting on October 27<sup>th</sup>, 2019, December 13<sup>th</sup>, 2019, and November 4<sup>th</sup>, 2020, to establish baselines. Table A1 in the appendix lists days of sampling, with air temperatures, precipitation (cumulative 48 hours before sampling), snow depth and calculated amount of snow melt (cumulative 48 hours before sampling). Table A2 lists water quality parameter for each location and sampling event.

### 2.2 Discharge and Climate

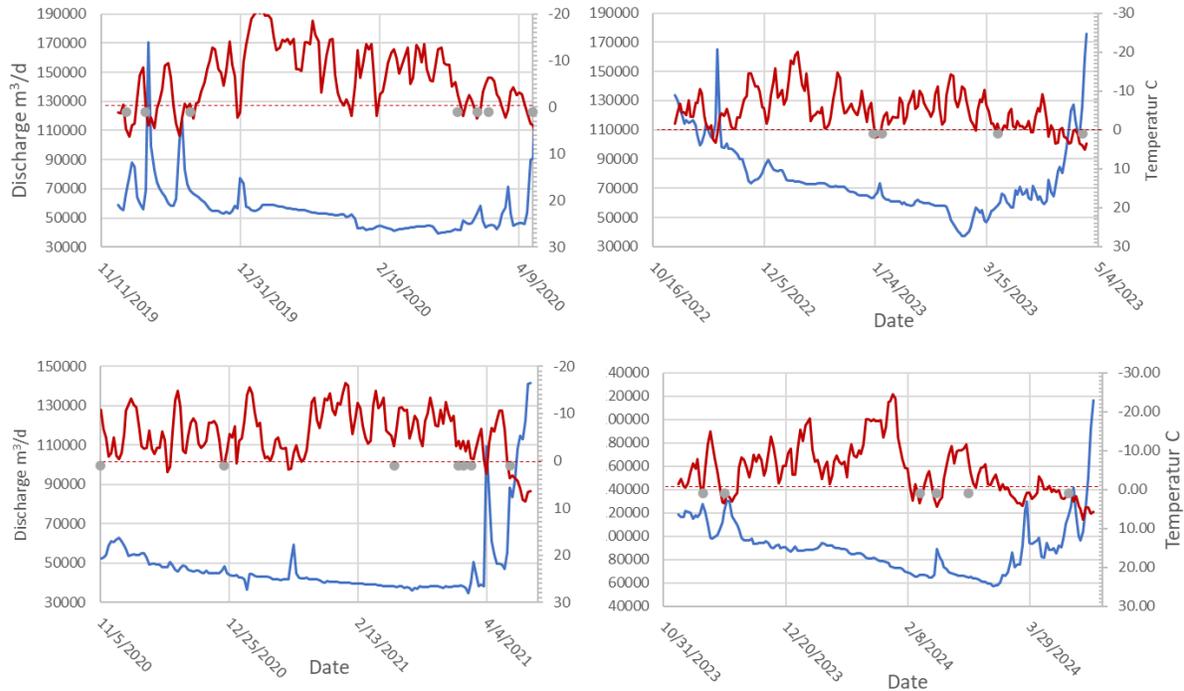
Figure 3 displays discharge ( $\text{m}^3/\text{s}$ ) from the years 2019 through 2024 together with air temperature and sampling events.

The total annual discharges were  $2.4 \times 10^7 \text{ m}^3$  (2019),  $1.6 \times 10^7 \text{ m}^3$  (2020),  $2.6 \times 10^7 \text{ m}^3$  (2021),  $3.7 \times 10^7 \text{ m}^3$  (2022),  $4.2 \times 10^7 \text{ m}^3$  (2023),  $4.1 \times 10^7 \text{ m}^3$  (2024). The low discharge for 2020 is related to missing values from June 3 to September 9. During winter, discharge increases when air temperature is above and remains above freezing for at least 2 consecutive days. Such melt events occurred eight times in 2019/20, four times in 2020/21, nine times in 2021/22, seven times in 2022/23 and five times in 2023/24, without an increasing or decreasing trend over these few years.



**Figure 3:** Discharge (m<sup>3</sup>/s) and sampling events. The gauge was replaced in 2020, and data between June 3<sup>rd</sup> and September 9<sup>th</sup> are missing. Therefore the recorded discharge for 2020 has a low bias.

Figure 4 shows the winter discharge and air temperature for winters 2019/2020, 2020/2021, 2022/2023 and 2023/2024. The most pronounced increase in discharge occurs when air temperature is above freezing and is accompanied with rain such as in November 2019 and at the end of the season as can be seen for all years.



**Figure 4:** Winter discharge (blue) and air temperature (red) for four winter sampling periods. Air temperature above freezing initiates increase in discharge indicating input of snow melt.

### 2.3 Water Quality and Chemistry

The most pronounced changes in the water quality parameters and chemistry during melt events are observed as an increase in electrical conductivity (EC), chloride concentration and turbidity. The pH in Chester Creek is very constant around 7 but decreases below 7 and down to 6.2 usually during major melting at the end of the season in April indicating the effect of pH from snow being in equilibrium with atmospheric CO<sub>2</sub> (~5.4 pH).

Figures 5A and 5B show box graphs of EC and turbidity measurements for each location as a box graph over the entire duration of the project. For comparison, values collected during two summer rain events (red boxes) and baseline winter values collected during times where air temperature was below freezing (no melt, blue boxes) are also shown. As seen in Figure 5A, EC is highest during melt events compared to no melt events and increases from Turf Ct in the east to Valley of the Moon in the west. Such increase can also be observed for summer rain events, but EC is lower than it is during winter melt events reflecting the influence of road treatment on water quality. Chloride concentrations are well correlated with EC for winter melt events as shown in Figure 6 which further supports that the increase of EC is related to street treatments. EC in the storm drainages at the Seward Highway (“small storm drainage and Black Sabbath”) have very high EC

(e.g.  $\sim 15,000 \mu\text{S}/\text{cm}$ , Black Sabbath,  $9,500 \mu\text{S}/\text{cm}$ ) with higher EC values and a wider variation, in the Black Sabbath than the small drainage. The Northern Lights location, which samples the Middle Fork of Chester Creek, has generally high EC with a maximum value of  $1,700 (\mu\text{S}/\text{cm})$ , compared to other sampling locations. The sub basin samples road runoff from Northern Lights Blvd., which is a main arterial road in Anchorage, may contribute to the high salt content.

Turbidity (Figure 5B) is high during melt events compared to no melt events in winter and shows an increase, but less pronounced than EC, from east to west. The sources for turbidity are dust collected over the season in the snow pack and fines from the sand applied to streets and sidewalks. In addition, it can also derive from exposed soil surfaces via surface runoff and that may be a larger contribution to turbidity during summer rain events. High values (outliers) indicated as dots above the boxes in both graphs are related to data during final melt in late March and beginning of April. The Middle Fork sampled at Northern Lights has higher turbidity than all other locations with a maximum value of 145 NTU. This may be due to it being channeled underground for some distance and deteriorating pipes and/or the influence of the Northern Lights Blvd.

The small storm drainage from Seward Highway which directly drains the highway has very high turbidity (max 2,000 NTU) while the Black Sabbath (max 198 NTU) which drains a larger area mostly from the south of Chester Creek has moderate turbidity compared to the small storm drainage but still higher than the turbidity measured in the creek.

The Middle Fork sampled at Northern Lights had overall high EC and turbidity. This branch is channeled underground for a longer distance and receives stormwater directly from Northern Lights Blvd. which is one of the arterial roads in Anchorage. While the catchment area north of Northern Lights Blvd is mostly residential, the high EC and turbidity may be related to a degrading pipe when the creek runs underground.

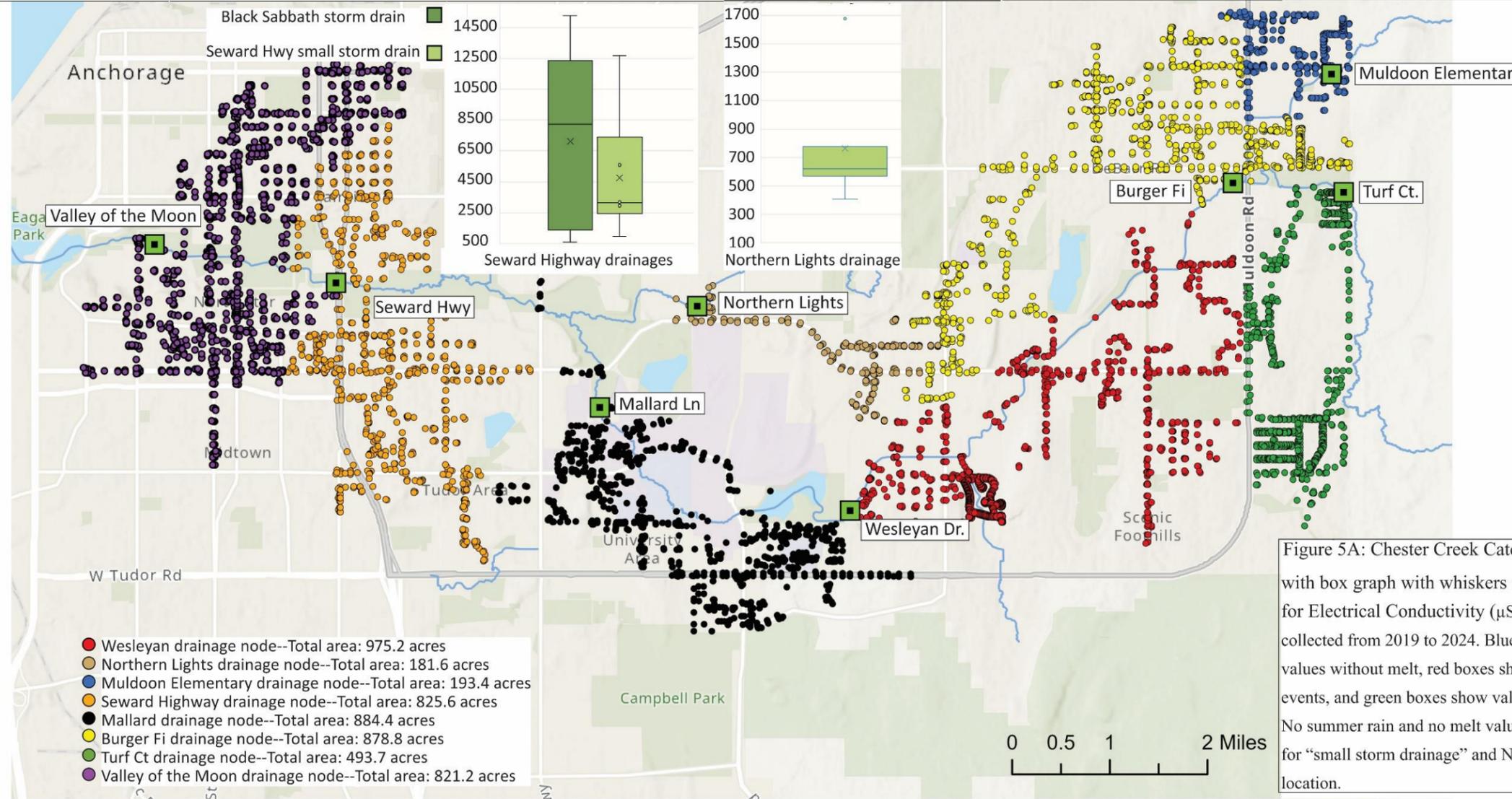
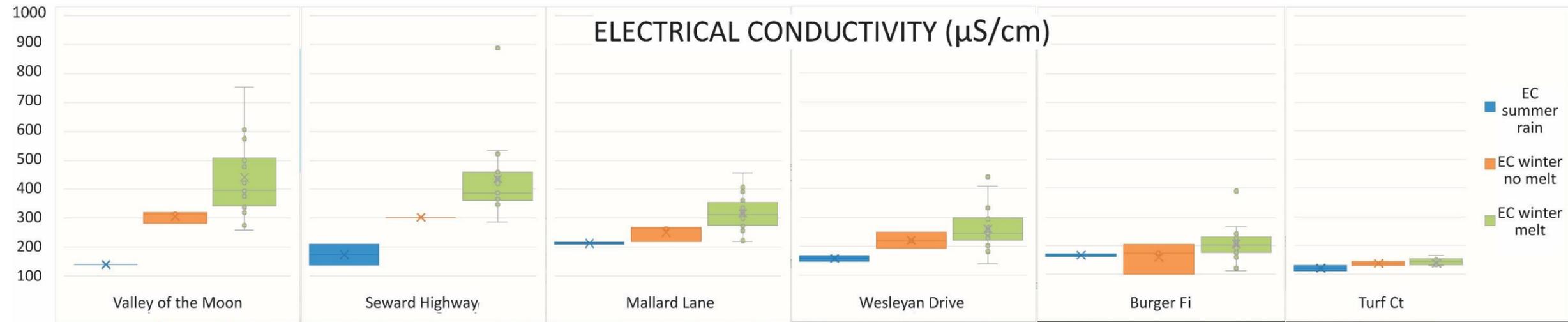


Figure 5A: Chester Creek Catchment map with box graph with whiskers for each location for Electrical Conductivity ( $\mu\text{S}/\text{cm}$ ). Data were collected from 2019 to 2024. Blue boxes show winter values without melt, red boxes show summer rain events, and green boxes show values for melt events. No summer rain and no melt values were collected for "small storm drainage" and Northern Lights location.

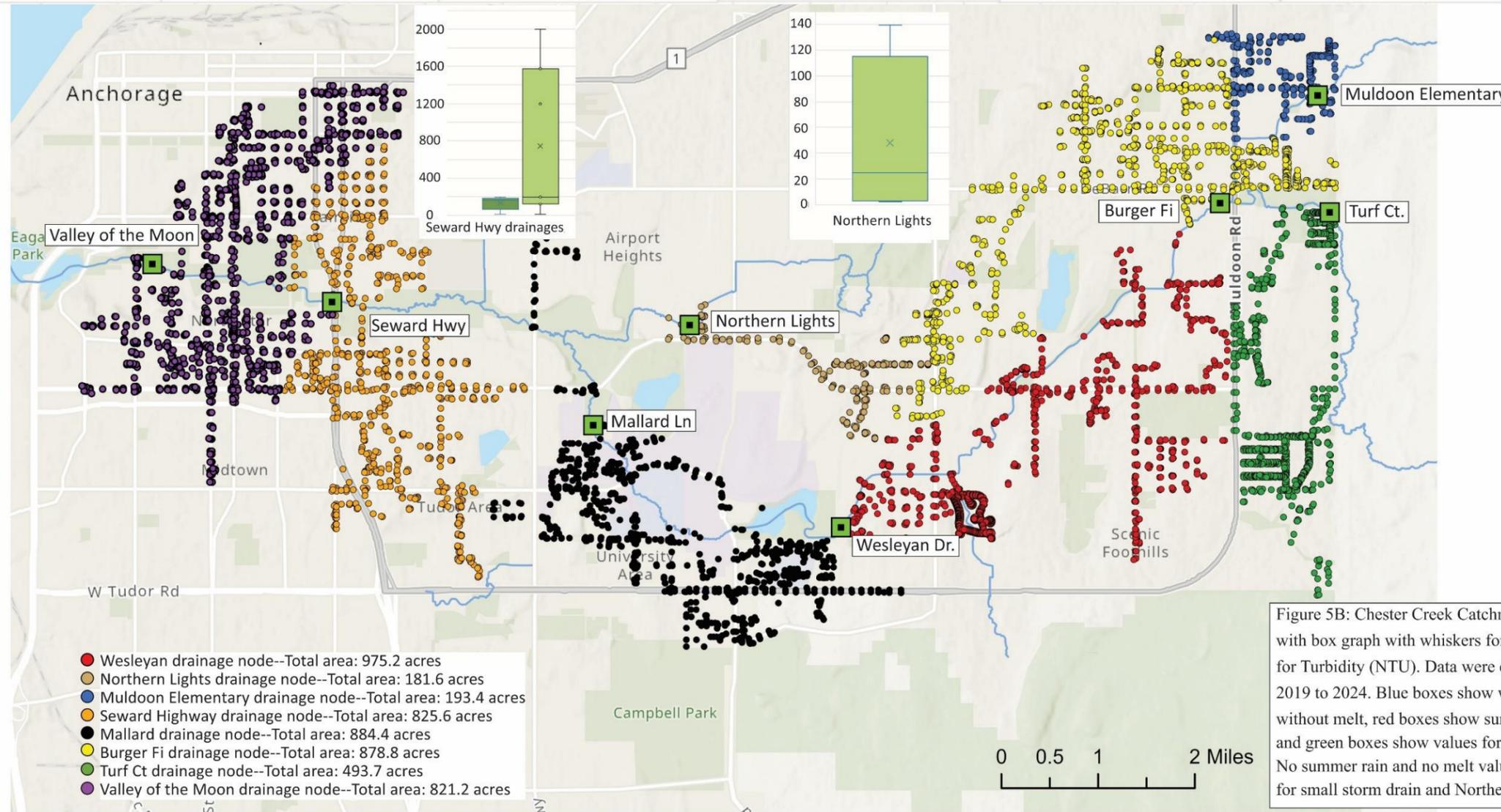
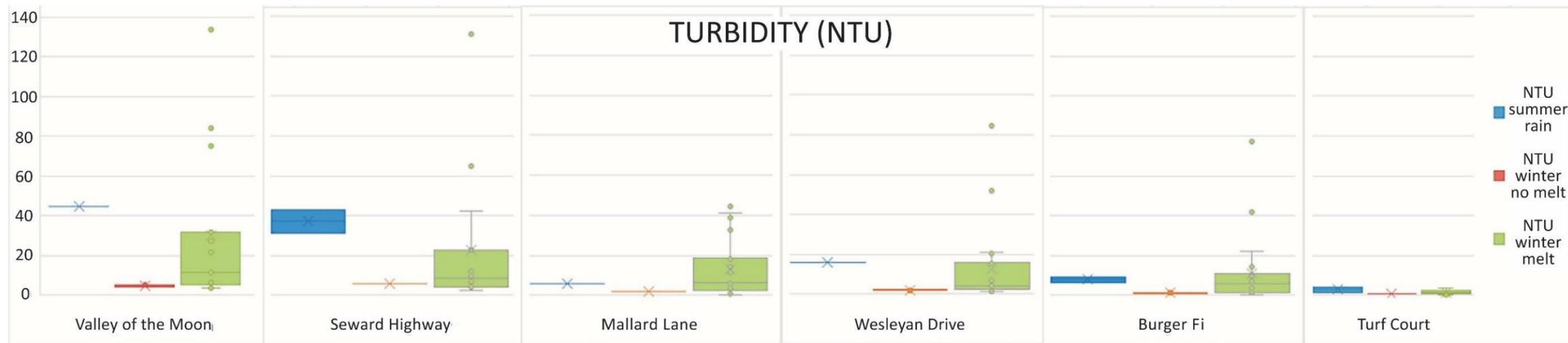
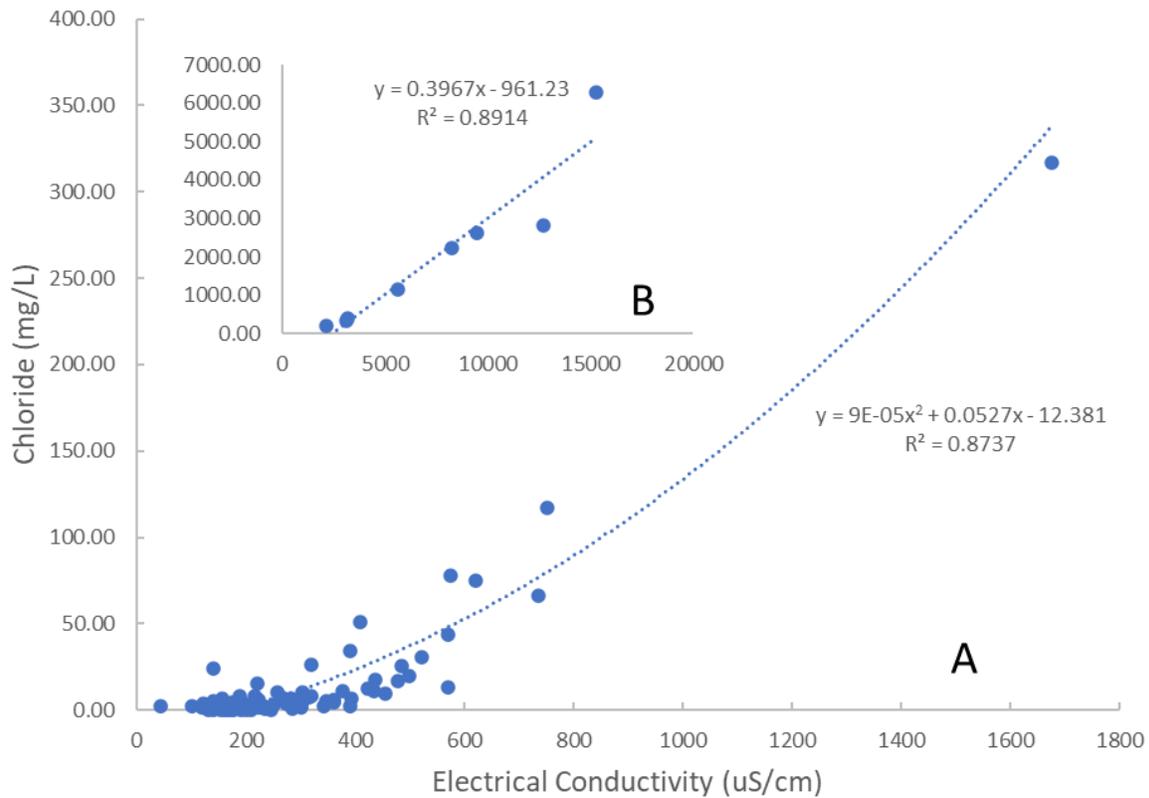


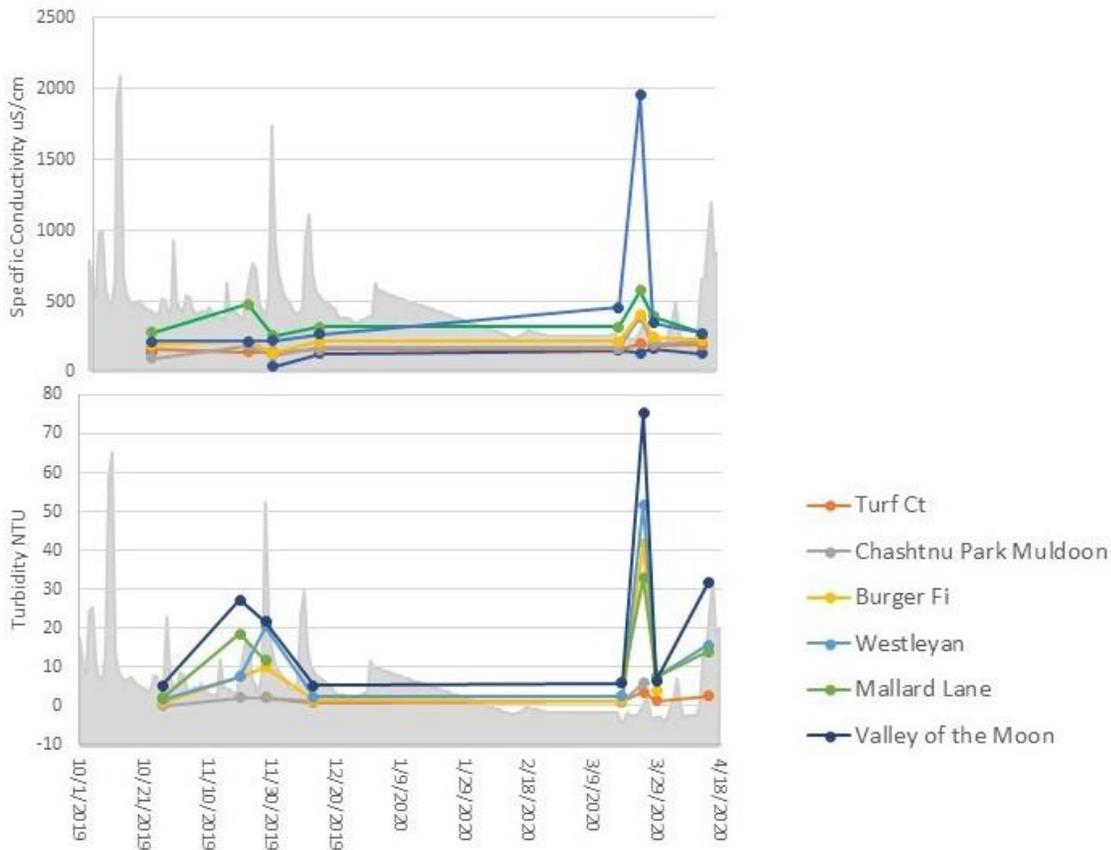
Figure 5B: Chester Creek Catchment map with box graph with whiskers for each location for Turbidity (NTU). Data were collected from 2019 to 2024. Blue boxes show winter values without melt, red boxes show summer rain events, and green boxes show values for melt events. No summer rain and no melt values were collected for small storm drain and Northern Light locations.



**Figure 6:** A: Chloride versus EC, B: Chloride versus EC for storm drainages. Chloride is well correlated with EC and reaches very high values in storm runoff.

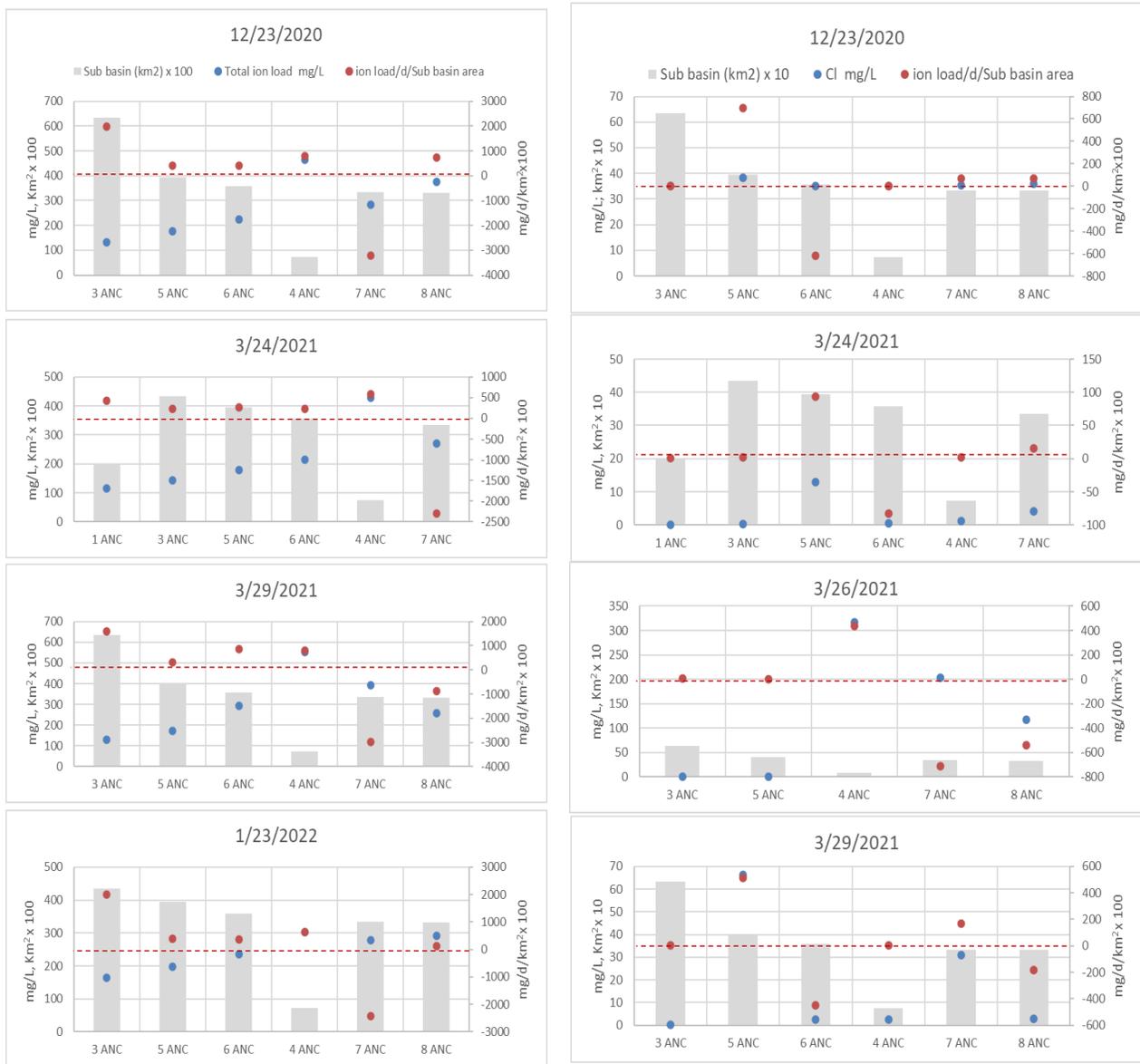
Figure 7 shows EC and Turbidity concentrations in winter 2019/2020 for each sampling location and how both parameters are related to progressing melting. Also shown is daily discharge in  $m^3/d$  to show the effect of melting on creek runoff. EC reaches the highest concentration during the onset of melt and decreases with progress of melting (November and March/April). Solutes are mobilized from the snow pack during early melt increasing EC and rapidly leach out. Increasing discharge then dilutes solutes and concentration decreases. Turbidity remains elevated throughout the melt period indicating that dust trapped in the snowpack during winter is not released preferentially.

Additional detailed graphs for EC and Turbidity for each sampling period and location are in the appendix Figure A1.



**Figure 7:** EC (upper figure) and turbidity (lower figure) for season 2019 – 2020. EC and turbidity strongly increase at the beginning of melt. While EC stays low when melt progresses, turbidity has a second peak.

Observing the total salt concentration contributed to the overall chemistry at the creek from each subbasin (see Figure 1 and Table A2) is shown in Figure 8. To calculate the EC in mg/L, a factor of 0.75 was used typical for freshwater. For calculating the mg ions (chloride, Cl) per catchment area per day ( $\text{mg}/\text{m}^2/\text{d}$ ), we used the total discharge  $\text{m}^3/\text{d}$  from the USGS gauge west of the Valley of the Moon and calculated it for each subbasin as a fraction of the total discharge based on the fraction of subbasin to total basin area ( $\sum$ subbasins). To calculate the ion and Cl discharge for each subbasin, we subtracted the amount of ions from the upstream area from the measured ion concentration. If sampling could not be done for a sub basin at that event, the area of that sub basin was added to the next one that could be sampled. As an example, if Turf Ct and Muldoon Elementary School were frozen and the first sampling point was at Burger Fi, the sub basins from Muldoon Elementary School and Turf Ct were added to the one for Burger Fi. In this context we assumed that sub basin is equal to the catchment area.



**Figure 8.** On the right: sub basin area, total ion concentration, and ion load per day per sub basin; on the left sub basin area, Cl concentration, and Cl load per day per sub basin. Negative values for ion load are an artefact from the calculation and indicate a dilution due to lower ion input from the sub basin compared to the former one. See text for discussion.

While total ion concentration is increasing throughout the Municipality, each sub basin has its unique characteristic of how many ions are released from it. The sub basin for the Northern Lights (4 ANC) sampling point always has a high EC and that is also reflected in its ion load per sub basin. The Seward Highway sampling point (7 ANC) usually has higher EC concentrations than for the upstream sampling point at Mallard Lane (6ANC), but the total ion load for that sub basin

is lower than for Mallard Lane and Northern Lights together, which is indicated in its negative value for ion load. This indicates that the sub basin for Seward Highway contributes less salt to the creek despite the high salt content observed in the Seward Highway storm drainages. The total ion load increases again at the to the Valley of the Moon site (8 ANC) sub basin again indicating a higher salt load. The upstream Seward Highway sub basin is mostly residential but also has contributions from large parking areas at Safeway/Carrs and Fred Meyer stores. Both are treating their parking area with a liquid deicer which may have alternatives to Chloride or metal ions and will not increase the EC.

## 2.4 Water Quality Standards

Comparing the measured values to water quality standards for aquatic life and propagation (18 AAC 70 Water Quality Standards, March 2020), the electrical conductivity should not exceed 1,500  $\mu\text{S}/\text{cm}$ , and this value was only exceeded once on March 26, 2021 in the Middle Fork. Turbidity should not exceed background values by more than 10%. Background values for the sampling locations, derived from times before freezing and in absence of rain, range from 0.7 to 5.17 NTU from east to west.

## 3 CONCLUSIONS

The study shows the impact of street treatment during winter times in the Municipality of Anchorage on the urban Chester Creek. The most noticeable impact is from increase in total ion load, measured as electrical conductivity and in dust, measured as turbidity. The increase in ion load is related to salts and increase in turbidity to gravel and sand application. More insights for each sub basin were derived from calculating ion load per sub basin to identify areas with higher impact on water quality. The highest input was from a small sub basin at the Middle Fork of Chester Creek and may be related to it being channeled underground. The lowest ion load per day per was observed at the Seward Highway sub basin.

Turbidity values exceed water quality standards during most melt events while EC is still within regulatory limits during these events.

This project would have benefitted by measuring water discharge at each sampling point and using data loggers for water quality parameter at each location. Application of data logger create denser data sets which give additional insights how salt and dust input relates to progress of melting events and would permit some statistical evaluation.



## APPENDIX

### A1. Climate and Water Quality Data and detailed Graphs

**Table A1** Climate data during sampling events

Date	Temperature (°C)			Precipitation/ melt (mm)			
	Maximum	Mean	Minimum	Precipitation	Snowfall	Snow depth	Snowmelt
10/27/2019	9.4	6.4	3.3	2.21	0	0	0
11/20/2019	9.4	4.7	0	0.74	0	147	24.5
11/27/2019	6.7	0.3	-6.1	1.23	0	49	0
12/13/2019	0.6	-0.8	-2.2	0	0	0	24.5
3/18/2020	-0.6	-2.5	-4.4	5.88	2.45	612.5	24.5
3/25/2020	6.1	2.5	-1.1	0	0	490	49
3/29/2020	-1.7	-6.4	-11.1	0	0	465.5	24.5
4/14/2020	8.3	3.9	-0.6	4.41	0	318.5	49
11/4/2020	-7.8	-11.9	-16.1	0	0	0	0
12/23/2020	2.2	0.6	-1.1	4.41	22.05	441	73.5
2/27/2021	-1.7	-3.1	-4.4	3.68	14.7	612.5	24.5
3/24/2021	1.1	-4.2	-9.4	2.45	26.95	637	24.5
3/26/2021	0	-4.2	-8.3	3.43	0	686	0
3/29/2021	2.8	-0.6	-3.9	0.49	4.9	637	49
4/13/2021	6.7	3.6	0.6	0.49	0	539	49
1/23/2022	7.2	3.1	-1.1	2.21	0	294	122.5
1/27/2023	-0.6	-1.9	-3.3	0	0	514.5	122.5
3/20/2023	2.8	-1.7	-6.1	0.74	0	735	0
4/27/2023	7.8	3.9	0	0	0	196	98
11/16/2023	5	1.7	-1.7	2.21	0	490	73.5
11/25/2023	6.1	3.6	1.1	2.21	0	343	49
2/13/2024	6.1	3.6	1.1	0	0	759.5	49
2/20/2024	7.2	4.4	1.7	0	0	686	49
3/4/2024	-5	-6.9	-8.9	0	0	686	0
4/14/2024	4.4	1.1	-2.2	0	0	490	49
Summer sampling							

Date	Temperature (°C)			Precipitation/ melt (mm)			
	Maximum	Mean	Minimum	Precipitation	Snowfall	Snow depth	Snowmelt
6/5/2024	13.9	11.4	8.9	8.58	0	0	0
7/12/2024	17.2	14.2	11.1	0	0	0	0

Notes:

Snowmelt: calculated from difference in snow depth (mm) (not water equivalent).

Snowfall: snow accumulation (mm) not water equivalent.

Precipitation: total precipitation (mm) as water equivalent.

Highlighted cells indicate average temperature is above freezing

**Table A2** Water quality data.

Location	Sample Loc #	Date	EC	EC storm	Turbidity	Turb storm	T	pH	D0
			µS/cm	µS/cm	NTU	NTU	°C	%	
Muldoon Elementary School	001 ANC	10/27/19	216		0		2.8	6.25	
Boston Street	01ANC	10/27/19	184		0.02		2.86	6.196	
Turf Ct	1 ANC	10/27/19	144		0.74		3.1	6.523	
Chashtnu Park Muldoon	4 ANC	10/27/19	161				3.39	6.301	
Wesleyan	4 ANC	10/27/19	194		1.8		3.69	5.72	
Burger Fi	5 ANC	10/27/19	100		0.78		3.42	6.78	
Mallard Lane	6 ANC	10/27/19	220		2.11		3.57	6.44	
Valley of the Moon	8 ANC	10/27/19	282		5.17		4.58	6.52	
Muldoon Elementary School	001 ANC	11/20/19	168		0.78		-0.5	7.76	
Chashtnu Park Muldoon	4 ANC	11/20/19	142		2.17		1.78	7.64	
Wesleyan	4 ANC	11/20/19	217		7.58		2.75	7.34	
Burger Fi	5 ANC	11/20/19	188		7.5		1.84	7.54	
Mallard Lane	6 ANC	11/20/19	220		18.5		2.94	7.51	
Valley of the Moon	8 ANC	11/20/19	478		27.3		3.53	7.56	
Muldoon Elementary School	001 ANC	11/27/19	120		0.39		-0.69	7.32	
Turf Ct	1 ANC	11/27/19	43		2.04		-0.37	7.373	
Chashtnu Park Muldoon	4 ANC	11/27/19	118		2.17		1.78	7.64	
Wesleyan	4 ANC	11/27/19	139		20.4		1.16	6.704	
Burger Fi	5 ANC	11/27/19	121		9.94		0.33	7.195	
Mallard Lane	6 ANC	11/27/19	223		11.6		1.49	6.702	
Valley of the Moon	8 ANC	11/27/19	258		21.7		1.56	6.87	
Turf Ct	1 ANC	12/13/19	131		0.96		0.07	6.94	
Wesleyan	4 ANC	12/13/19	220		2.35		1.41	7.08	

Location	Sample Loc #	Date	EC	EC storm	Turbidity	Turb storm	T	pH	D0
			µS/cm	µS/cm	NTU	NTU	°C		%
Burger Fi	5 ANC	12/13/19	174		1.49		0.52	7.03	
Mallard Lane	6 ANC	12/13/19	268				1.28	7.13	
Valley of the Moon	8 ANC	12/13/19	320		5.24		1.61	7.2	
Turf Ct	1 ANC	3/18/20	156		1.07		0.58	6.38	
Chashtnu Park Muldoon	4 ANC	3/18/20	167		1.1		0.76	6.72	
Wesleyan	4 ANC	3/18/20	217		2.62		1.52	7.24	
Burger Fi	5 ANC	3/18/20	175		1.2		0.95	7.1	
Mallard Lane	6 ANC	3/18/20	456		5.83		0.43	7.24	
Valley of the Moon	8 ANC	3/18/20	319		5.81		1.37	7.37	
Turf Ct	1 ANC	3/25/20	140		3.58		1.27	6.602	
Chashtnu Park Muldoon	4 ANC	3/25/20	202		5.88		1.22	6.712	
Wesleyan	4 ANC	3/25/20	409		51.8		1.78	6.891	
Burger Fi	5 ANC	3/25/20	390		41.8		1.35	6.843	
Mallard Lane	6 ANC	3/25/20	1957		32.9		1.22	6.905	
Valley of the Moon	8 ANC	3/25/20	575		75.3		1.69	6.978	
Turf Ct	1 ANC	3/29/20	166		1.3		-0.56	7.192	
Chashtnu Park Muldoon	4 ANC	3/29/20	189		1.82		0.49	7.252	
Wesleyan	4 ANC	3/29/20	245		7.55		0.21	7.09	
Burger Fi	5 ANC	3/29/20	201		3.75		0.51	7.118	
Mallard Lane	6 ANC	3/29/20	348		7.6		1.11	7.01	
Valley of the Moon	8 ANC	3/29/20	394		6.58		1.06	6.58	
Turf Ct	1 ANC	4/14/20	132		2.53		1.73	6.4	
Chashtnu Park Muldoon	4 ANC	4/14/20	197		10.32		2.04	6.6	
Wesleyan	4 ANC	4/14/20	231		15.6		3.42	6.8	
Burger Fi	5 ANC	4/14/20	222		22		2.69	6.8	
Mallard Lane	6 ANC	4/14/20	273		13.9		2.53	6.9	
Valley of the Moon	8 ANC	4/14/20	276		31.7		3.39	6.9	
Wesleyan	4 ANC	11/4/20	250		1.66		1.02	7.13	85
Mallard Lane	6 ANC	11/4/20	264		1.67		1.31	7.33	86.7
Seward Highway	7 ANC	11/4/20	303		5.58		1.1	7.47	89.9
Valley of the Moon	8 ANC	11/4/20	314		4.24		0.7	7.48	96
Burger Fi		11/4/20	203		1.08		0.9	7.5	88
Wesleyan	4 ANC	12/23/20	235		1.25		2.27	7.31	95.3
Northern Light	5 ANC	12/23/20	620		4.56		5.26	7.15	93.5
Mallard Lane	6 ANC	12/23/20	300		1.5		1.34	7.45	89.8
Seward Highway	7 ANC	12/23/20	377				2.13	7.86	94.2

Location	Sample Loc #	Date	EC	EC storm	Turbidity	Turb storm	T	pH	D0
			µS/cm	µS/cm	NTU	NTU	°C	%	
Black Sabbath	7.1ANC	12/23/20	8227	8227	8.3	8.3	4.58	6.57	84
SHWY small storm drain	7.2 ANC	12/23/20	3088	3088		2000	1.87	7.55	89
Valley of the Moon	8 ANC	12/23/20	500		5.3		2.23	7.65	95
Burger Fi		12/23/20	178		1.37		1.45	7.65	97.7
Turf Ct	1 ANC	2/27/21	141		0.78		0.53	6.92	109.7
Wesleyan	4 ANC	2/27/21	203		1.22		1.99	7.08	101
Northern Light	5 ANC	2/27/21	570		2.44		4.83	7.14	95.5
Seward Highway	7 ANC	2/27/21	438		3.92		1.66	7.48	99.8
Valley of the Moon	8 ANC	2/27/21	486		5.35		0.57	7.36	97
Burger Fi		2/27/21	160		1.56		0.91	6.95	107
Turf Ct	1 ANC	3/24/21	153		0.64		1.1	7.05	118
Wesleyan	4 ANC	3/24/21	238		3.91		1.45	7.12	102.8
Northern Light	5 ANC	3/24/21	571		24.8		4.74	7.03	97.8
Mallard Lane	6 ANC	3/24/21	285		3.25		0.77	7.33	103
Seward Highway	7 ANC	3/24/21	362		9.58		1.68	7.54	101.4
Black Sabbath	7.1ANC	3/24/21	2127	2127	198	198	2.69	6.84	89
SHWY small storm drain	7.2 ANC	3/24/21	3166	3166		1579	0.95	6.27	94.6
Burger Fi		3/24/21	191		5.61		0.85	6.96	103
Wesleyan	4 ANC	3/26/21	246		2.21		2.16	7.38	108
Northern Light	5 ANC	3/26/21	1677		139		4.17	7.15	98.4
Seward Highway	7 ANC	3/26/21	889		13.9		1.99	7.49	105
Black Sabbath	7.1ANC	3/26/21	15272	15272	172	172	3.91	6.45	104
SHWY small storm drain	7.2 ANC	3/26/21	5617	5617		195	1.15	6.78	95.5
Valley of the Moon	8 ANC	3/26/21	753		12.98		1.86	6.97	113
Burger Fi		3/26/21	208		5.84		1.33	7.31	105
Wesleyan	4 ANC	3/29/21	228		1.75		2.53	7.52	110
Northern Light	5 ANC	3/29/21	736		115		4.64	7.11	100.7
Mallard Lane	6 ANC	3/29/21	391		6.43		1.53	7.52	108
Seward Highway	7 ANC	3/29/21	522		8.28		2.1	7.77	108
Black Sabbath	7.1ANC	3/29/21	9499	9499	113	113	3.94	6.42	112
SHWY small storm drain	7.2 ANC	3/29/21	12693	12693		122	0.52	6.82	111
Valley of the Moon	8 ANC	3/29/21	342		3.74		2.03	7.27	111
Burger Fi		3/29/21	172		1.55		1.5	7.5	108
Wesleyan	4 ANC	4/13/21	301		16.3		3.53	6.83	106
Burger Fi	5 ANC	4/13/21	240		7.32		2.06	6.77	106
Mallard Lane	6 ANC	4/13/21	362		44.3		2.59	6.98	99.2

Location	Sample Loc #	Date	EC	EC storm	Turbidity	Turb storm	T	pH	D0
			µS/cm	µS/cm	NTU	NTU	°C		%
Seward Highway	7 ANC	4/13/21	435		64.7		3.51	7.13	99.2
Black Sabbath	7.1ANC	4/13/21	595	595	162	162	3.66	6.31	102.3
SHWY small storm drain	7.2 ANC	4/13/21	967	967		1196	3.77	5.64	96.3
Valley of the Moon	8 ANC	4/13/21	422		84.1		3.65	7.01	99.6
Turf Ct	1 ANC	1/23/22							
Wesleyan	4 ANC	1/23/22	265		2.81		2.09	7.48	
Burger Fi	5 ANC	1/23/22	218		2.91		1.78	7.21	144
Northern Light	5 ANC	1/23/22	405		3.27		4.61	17.87	157
Mallard Lane	6 ANC	1/23/22	313				1.43		152
Seward Highway	7 ANC	1/23/22	372		3.93		1.96		152
Valley of the Moon	8 ANC	1/23/22	388		3.4		1.93		144
Turf Ct	1 ANC	1/27/23	146		0.42		1.5	5.5	98.1
Wesleyan	4 ANC	1/27/23	183		2.82		2.58	6.5	96.2
Burger Fi	5 ANC	1/27/23	112		1.53		2.17	6.7	95
Mallard Lane	6 ANC	1/27/23	287		2.24		1.55	6	92.9
Seward Highway	7 ANC	1/27/23	460		7.15		2.48	7.1	103
Valley of the Moon	8 ANC	1/27/23	508		11.5		2.49	6.4	97.9
Turf Ct	1 ANC	3/20/23	150		0.24		0.99	7.1	99
Wesleyan	4 ANC	3/20/23	269		3.09		2.55	8	103
Burger Fi	5 ANC	3/20/23	233		14			5.5	100.4
Mallard Lane	6 ANC	3/20/23	320		18.1		1.65	8.2	99.5
Seward Highway	7 ANC	3/20/23	421		42.3		2.71	8.3	102
Valley of the Moon	8 ANC	3/20/23	606		85.6		2.69	8.3	130.9
Turf Ct	1 ANC	4/27/23	136		2.65		4.19	4.78	95.5
Wesleyan	4 ANC	4/27/23	295		6.74		5.13	5.01	142
Burger Fi	5 ANC	4/27/23	226		7.65		4.26	5.17	105
Mallard Lane	6 ANC	4/27/23	324		4.81		4.52	6.02	138
Seward Highway	7 ANC	4/27/23	348		8.41		5.52	5.98	129
Valley of the Moon	8 ANC	4/27/23	339		11.4		5.62	6.39	178
Burger Fi	5 ANC	11/16/23	241		7.14		2.32	6.78	100
Mallard Lane	6 ANC	11/16/23	302		2.65		2.76	7.11	113
Seward Highway	7 ANC	11/16/23	286		12.1		2.86	7.3	103
SHWY small storm drain	7.2 ANC	11/16/23	2932	2932		8.31	3	7.65	92
SHWY small storm drain	7.2 ANC	11/16/23	2932	2932		8.31	3	7.65	92
Turf Ct	1 ANC	11/25/23	131		0.52		0.84	7.95	128.4
Wesleyan	4 ANC	11/25/23	245		1.36		1.89	7.99	111.7

Location	Sample Loc #	Date	EC	EC storm	Turbidity	Turb storm	T	pH	D0
			µS/cm	µS/cm	NTU	NTU	°C		%
Burger Fi	5 ANC	11/25/23	177		0.23		1.4	7.81	98.8
Mallard Lane	6 ANC	11/25/23	257		0.37		1.65	8.07	108
Seward Highway	7 ANC	11/25/23	353		2.58		2.63	8.3	106.7
SHWY small storm drain	7.2 ANC	11/25/23				118			
SHWY small storm drain	7.2 ANC	11/25/23				118			
Valley of the Moon	8 ANC	11/25/23	376		4.65		2.71	8.42	109
Wesleyan	4 ANC	2/13/24	246		2.43		2.15	7.08	103
Burger Fi	5 ANC	2/13/24	204		2.29		1.35	6.8	94.1
Mallard Lane	6 ANC	2/13/24	279		0.45		1.11	7.14	102
Seward Highway	7 ANC	2/13/24	367		5.22		1.23	6.74	104
Wesleyan	4 ANC	2/20/24	441		20.7		1.91	6.94	104
Burger Fi	5 ANC	2/20/24	179		14.3		1.43	7.1	112
Northern Light	5 ANC	2/20/24	777		48.1		4.65	8.04	94.3
Mallard Lane	6 ANC	2/20/24	407		38.8		1.4	8.29	97.4
Seward Highway	7 ANC	2/20/24	535		22.4		2.22	8.35	107
Valley of the Moon	8 ANC	2/20/24	606		31.5		2.24	8.56	97.7
Wesleyan	4 ANC	3/4/24	333		84.7		2.46	7	98.3
Burger Fi	5 ANC	3/4/24	265		77.1		2.35	7.02	104
Mallard Lane	6 ANC	3/4/24	324		41.1		2.42	7.2	95.8
Seward Highway	7 ANC	3/4/24	369		131		2.52	7.08	96.4
Valley of the Moon	8 ANC	3/4/24	384		134		2.6	6.97	91.2
Turf Ct	1 ANC	4/14/24	151		1.5		1.09	6.73	101
Wesleyan	4 ANC	4/14/24	302		4.15		2.67	7.05	92
Burger Fi	5 ANC	4/14/24	230		2.8		2.09	6.88	105
Mallard Lane	6 ANC	4/14/24	335		3.82		2.88	7.32	129
Seward Highway	7 ANC	4/14/24	387		4.2		3.21	7.36	110.6
Valley of the Moon	8 ANC	4/14/24	397		3.92		3.31	7.47	99.1
Turf Ct	1 ANC	6/5/24	112		4.31		7.06	6.5	84.1
Wesleyan	4 ANC	6/5/24	168		15.8		8.73	6.88	87.2
Burger Fi	5 ANC	6/5/24	162		9.38		7.56	6.6	86.5
Mallard Lane	6 ANC	6/5/24							
Seward Highway	7 ANC	6/5/24	211		31.2		10.77	7.01	111
SHWY small storm drain	7.2 ANC	6/5/24	104	104		120	13.33	6.79	116
SHWY small storm drain	7.2 ANC	6/5/24	104	104		120	13.33	6.79	116
Turf Ct	1 ANC	7/12/24	130		1.24		8	6.93	123
Wesleyan	4 ANC	7/12/24	149		15.7		10.61	7.06	112

Location	Sample Loc #	Date	EC	EC storm	Turbidity	Turb storm	T	pH	D0
			µS/cm	µS/cm	NTU	NTU	°C		%
Burger Fi	5 ANC	7/12/24	171		6.18		8.63	6.82	133
Mallard Lane	6 ANC	7/12/24	218		5.57		11.8	7.47	118
Seward Highway	7 ANC	7/12/24	137		43.1		12.11	6.97	100
SHWY small storm drain	7.2 ANC	7/12/24							
Valley of the Moon	8 ANC	7/12/24	140		44.5		12.2	6.84	83

Notes:

EC: Electrical Conductivity (µS/cm)

Turbidity (NTU)

DO: Dissolved Oxygen (%)

Storm: storm drainages

**Table A3:** Water Quality, Discharge and calculated total ion, and ion load per day per sub basin.

Location	Sample Loc #	Date	EC	discharge m3/d	Sub basin in (m2)	fraction of sub basin	Total ions mg/L	Total ions mg/d	Total ions mg/L/m2	ion load/d/Sub basin area
Muldoon Elementary School	001 ANC	10/27/19	216	62862	7.8E+05	0.04	162.00	389.19	2.1E-04	389.19
Turf Ct	1 ANC	10/27/19	144	62862	2.0E+06	0.10	108.00	662.34	5.4E-05	662.34
Burger Fi	3 ANC	10/27/19	100	62862	3.6E+06	0.17	75.00	818.74	2.1E-05	-2128.72
Wesleyan	5 ANC	10/27/19	194	62862	3.9E+06	0.19	145.50	1762.58	3.7E-05	854.04
Mallard Lane	6 ANC	10/27/19	220	62862	3.6E+06	0.17	165.00	1812.70	4.6E-05	214.23
Valley of the Moon	8 ANC	10/27/19	282	62862	3.3E+06	0.16	211.50	2157.51	6.4E-05	474.35
Muldoon Elementary School	001 ANC	11/20/19	168	66775	7.8E+05	0.04	126.00	321.55	1.6E-04	321.55
Burger Fi	3 ANC	11/20/19	188	66775	5.6E+06	0.27	141.00	2553.61	2.5E-05	271.66
Wesleyan	5 ANC	11/20/19	217	66775	3.9E+06	0.19	162.75	2094.29	4.1E-05	1901.27
Mallard Lane	6 ANC	11/20/19	220	66775	3.6E+06	0.17	165.00	1925.55	4.6E-05	26.26
Valley of the Moon	8 ANC	11/20/19	478	66775	7.4E+06	0.36	358.50	8649.34	4.8E-05	4668.47

Location	Sample Loc #	Date	EC	discharge m3/d	Sub basin in (m2)	fraction of sub basin	Total ions mg/L	Total ions mg/d	Total ions mg/L/m2	ion load/d/Sub basin area
Turf Ct	1 ANC	11/27/19	43	68977	2.0E+06	0.10	32.25	217.02	1.6E-05	217.02
Burger Fi	3 ANC	11/27/19	121	68977	4.3E+06	0.21	90.75	1326.27	2.1E-05	854.95
Wetleyan	5 ANC	11/27/19	139	68977	3.9E+06	0.19	104.25	1385.73	2.6E-05	179.45
Mallard Lane	6 ANC	11/27/19	223	68977	3.6E+06	0.17	167.25	2016.16	4.7E-05	759.45
Valley of the Moon	8 ANC	11/27/19	258	68977	7.4E+06	0.36	193.50	4822.38	2.6E-05	654.20
Turf Ct	1 ANC	12/13/19	131	69221	2.0E+06	0.10	98.25	663.50	4.9E-05	663.50
Burger Fi	3 ANC	12/13/19	174	69221	4.3E+06	0.21	130.50	1913.96	3.0E-05	472.99
Wesleyan	5 ANC	12/13/19	220	69221	3.9E+06	0.19	165.00	2201.02	4.2E-05	460.21
Mallard Lane	6 ANC	12/13/19	268	69221	3.6E+06	0.17	201.00	2431.60	5.6E-05	435.51
Valley of the Moon	8 ANC	12/13/19	320	69221	7.4E+06	0.36	240.00	6002.46	3.2E-05	975.40
Turf Ct	1 ANC	3/18/20	156	41582	2.0E+06	0.10	117.00	474.63	5.9E-05	474.63
Burger Fi	3 ANC	3/18/20	175	41582	4.3E+06	0.21	131.25	1156.34	3.0E-05	125.55
Wesleyan	5 ANC	3/18/20	217	41582	3.9E+06	0.19	162.75	1304.14	4.1E-05	252.41
Mallard Lane	6 ANC	3/18/20	456	41582	3.6E+06	0.17	342.00	2485.33	9.6E-05	1302.62
Valley of the Moon	8 ANC	3/18/20	319	41582	7.4E+06	0.36	239.25	3594.45	3.2E-05	-1543.70
Turf Ct	1 ANC	3/25/20	140	52833	2.0E+06	0.10	105.00	541.21	5.3E-05	541.21
Burger Fi	3 ANC	3/25/20	390	52833	4.3E+06	0.21	292.50	3274.28	6.7E-05	2098.90
Wetleyan	5 ANC	3/25/20	409	52833	3.9E+06	0.19	306.75	3123.15	7.8E-05	145.08
Mallard Lane	6 ANC	3/25/20	1957	52833	3.6E+06	0.17	1467.75	13552.35	4.1E-04	10720.00
Valley of the Moon	8 ANC	3/25/20	575	52833	7.4E+06	0.36	431.25	8232.17	5.8E-05	-19785.84
Turf Ct	1 ANC	3/29/20	166	44517	2.0E+06	0.10	124.50	540.71	6.2E-05	540.71
Burger Fi	3 ANC	3/29/20	201	44517	4.3E+06	0.21	150.75	1421.89	3.5E-05	247.59
Wesleyan	5 ANC	3/29/20	245	44517	3.9E+06	0.19	183.75	1576.35	4.7E-05	283.10

Location	Sample Loc #	Date	EC	discharge m3/d	Sub basin in (m2)	fraction of sub basin	Total ions mg/L	Total ions mg/d	Total ions mg/L/m2	ion load/d/Sub basin area
Mallard Lane	6 ANC	3/29/20	348	44517	3.6E+06	0.17	261.00	2030.58	7.3E-05	601.01
Valley of the Moon	8 ANC	3/29/20	394	44517	7.4E+06	0.36	295.50	4752.92	4.0E-05	554.91
Turf Ct	1 ANC	4/14/20	132	91235	2.0E+06	0.10	99.00	881.19	5.0E-05	881.19
Burger Fi	3 ANC	4/14/20	222	91235	4.3E+06	0.21	166.50	3218.54	3.8E-05	1304.81
Wesleyan	5 ANC	4/14/20	231	91235	3.9E+06	0.19	173.25	3046.04	4.4E-05	118.68
Mallard Lane	6 ANC	4/14/20	273	91235	3.6E+06	0.17	204.75	3264.69	5.7E-05	502.26
Valley of the Moon	8 ANC	4/14/20	276	91235	7.4E+06	0.36	207.00	6823.55	2.8E-05	74.17
Burger Fi	3 ANC	11/4/20	203	53322	6.3E+06	0.31	152.25	2512.11	2.4E-05	2512.11
Wesleyan	5 ANC	11/4/20	250	53322	3.9E+06	0.19	187.50	1926.69	4.8E-05	362.22
Mallard Lane	6 ANC	11/4/20	264	53322	3.6E+06	0.17	198.00	1845.15	5.5E-05	97.85
Seward Highway	7 ANC	11/4/20	303	53322	4.1E+06	0.20	227.25	2411.77	5.6E-05	310.43
Valley of the Moon	8 ANC	11/4/20	314	53322	3.3E+06	0.16	235.50	2037.78	7.1E-05	71.39
Burger Fi	3 ANC	12/23/20	178	48186	6.3E+06	0.31	133.50	1990.54	2.1E-05	1990.54
Wesleyan	5 ANC	12/23/20	235	48186	3.9E+06	0.19	176.25	1636.63	4.5E-05	396.97
Mallard Lane	6 ANC	12/23/20	300	48186	3.6E+06	0.17	225.00	1894.78	6.3E-05	410.53
Northern Light	4 ANC	12/23/20	620	48186	7.3E+05	0.04	465.00	804.07	6.3E-04	804.07
Seward Highway	7 ANC	12/23/20	377	48186	3.3E+06	0.16	282.75	2222.79	8.5E-05	-3201.53
Valley of the Moon	8 ANC	12/23/20	500	48186	3.3E+06	0.16	375.00	2932.29	1.1E-04	721.34
Turf Ct	1 ANC	2/27/21	141	38157	2.0E+06	0.10	105.75	393.67	5.3E-05	393.67
Burger Fi	3 ANC	2/27/21	160	38157	4.3E+06	0.21	120.00	970.16	2.8E-05	115.21
Wesleyan	5 ANC	2/27/21	203	38157	3.9E+06	0.19	152.25	1119.53	3.9E-05	-2023.98
Northern Light	4 ANC	2/27/21	570	38157	7.3E+05	0.04	427.50	585.38	5.8E-04	585.38
Seward Highway	7 ANC	2/27/21	438	38157	3.3E+06	0.16	328.50	2044.98	9.8E-05	-1564.09
Valley of the Moon	8 ANC	2/27/21	486	38157	3.3E+06	0.16	364.50	2257.00	1.1E-04	222.91

Location	Sample Loc #	Date	EC	discharge m3/d	Sub basin in (m2)	fraction of sub basin	Total ions mg/L	Total ions mg/d	Total ions mg/L/m2	ion load/d/Sub basin area
Turf Ct	1 ANC	3/24/21	153	38157	2.0E+06	0.10	114.75	427.17	5.7E-05	427.17
Burger Fi	3 ANC	3/24/21	191	38157	4.3E+06	0.21	143.25	1158.12	3.3E-05	230.41
Wesleyan	5 ANC	3/24/21	238	38157	3.9E+06	0.19	178.50	1312.55	4.5E-05	259.20
Mallard Lane	6 ANC	3/24/21	285	38157	3.6E+06	0.17	213.75	1425.41	6.0E-05	235.07
Northern Light	4 ANC	3/24/21	571	38157	7.3E+05	0.04	428.25	586.41	5.8E-04	586.41
Seward Highway	7 ANC	3/24/21	362	38157	3.3E+06	0.16	271.50	1690.15	8.1E-05	-2306.44
Burger Fi	3 ANC	3/26/21	208	38402	6.3E+06	0.31	156.00	1853.74	2.5E-05	1853.74
Wesleyan	5 ANC	3/26/21	246	38402	3.9E+06	0.19	184.50	1365.37	4.7E-05	210.91
Northern Light	4 ANC	3/26/21	1677	38402	7.3E+05	0.04	1257.75	1733.29	1.7E-03	1733.29
Seward Highway	7 ANC	3/26/21	889	38402	3.3E+06	0.16	666.75	4177.27	2.0E-04	-4858.60
Valley of the Moon	8 ANC	3/26/21	753	38402	3.3E+06	0.16	564.75	3519.37	1.7E-04	-635.64
Burger Fi	3 ANC	3/29/21	172	40114	6.3E+06	0.31	129.00	1601.24	2.0E-05	1601.24
Wesleyan	5 ANC	3/29/21	228	40114	3.9E+06	0.19	171.00	1321.89	4.3E-05	324.67
Mallard Lane	6 ANC	3/29/21	391	40114	3.6E+06	0.17	293.25	2055.85	8.2E-05	857.04
Northern Light	4 ANC	3/29/21	736	40114	7.3E+05	0.04	552.00	794.62	7.5E-04	794.62
Seward Highway	7 ANC	3/29/21	522	40114	3.3E+06	0.16	391.50	2562.16	1.2E-04	-2969.55
Valley of the Moon	8 ANC	3/29/21	342	40114	3.3E+06	0.16	256.50	1669.71	7.7E-05	-878.79
Burger Fi	3 ANC	4/13/21	240	88300	4.3E+06	0.21	180.00	3367.56	4.1E-05	3367.56
Wesleyan	5 ANC	4/13/21	301	88300	3.9E+06	0.19	225.75	3841.39	5.7E-05	778.49
Mallard Lane	6 ANC	4/13/21	362	88300	3.6E+06	0.17	271.50	4189.73	7.6E-05	706.00
Seward Highway	7 ANC	4/13/21	435	88300	4.1E+06	0.20	326.25	5733.68	8.0E-05	962.20
Valley of the Moon	8 ANC	4/13/21	422	88300	3.3E+06	0.16	316.50	4535.13	9.5E-05	-139.71
Turf Ct		1/23/22		57481	2.0E+06	0.10		0.00	0.0E+00	
Burger Fi	3 ANC	1/23/22	218	57481	4.3E+06	0.21	163.50	1991.23	3.8E-05	1991.23
Wesleyan	5 ANC	1/23/22	265	57481	3.9E+06	0.19	198.75	2201.55	5.0E-05	390.46
Mallard Lane	6 ANC	1/23/22	313	57481	3.6E+06	0.17	234.75	2358.21	6.6E-05	361.64
Northern Light	4 ANC	1/23/22	405	57481	7.3E+05	0.04	303.75	626.56	4.1E-04	626.56
Seward Highway	7 ANC	1/23/22	372	57481	3.3E+06	0.16	279.00	2616.39	8.4E-05	-2433.52

Location	Sample Loc #	Date	EC	discharge m3/d	Sub basin in (m2)	fraction of sub basin	Total ions mg/L	Total ions mg/d	Total ions mg/L/m2	ion load/d/Sub basin area
Valley of the Moon	8 ANC	1/23/22	388	57481	3.3E+06	0.16	291.00	2714.38	8.8E-05	111.93
Turf Ct	1 ANC	1/27/23	146	65063	2.0E+06	0.10	109.50	695.05	5.5E-05	695.05
Burger Fi	3 ANC	1/27/23	112	65063	4.3E+06	0.21	84.00	1157.97	1.9E-05	-351.53
Wesleyan	5 ANC	1/27/23	183	65063	3.9E+06	0.19	137.25	1720.87	3.5E-05	667.66
Mallard Lane	6 ANC	1/27/23	287	65063	3.6E+06	0.17	215.25	2447.56	6.0E-05	886.92
Seward Highway	7 ANC	1/27/23	460	65063	4.1E+06	0.20	345.00	4467.62	8.5E-05	1680.22
Valley of the Moon	8 ANC	1/27/23	508	65063	3.3E+06	0.16	381.00	4022.68	1.1E-04	380.10
Turf Ct	1 ANC	3/20/23	150	58214	2.0E+06	0.10	112.50	638.93	5.6E-05	638.93
Burger Fi	3 ANC	3/20/23	233	58214	4.3E+06	0.21	174.75	2155.41	4.0E-05	767.81
Wesleyan	5 ANC	3/20/23	269	58214	3.9E+06	0.19	201.75	2263.31	5.1E-05	302.90
Mallard Lane	6 ANC	3/20/23	320	58214	3.6E+06	0.17	240.00	2441.73	6.7E-05	389.15
Seward Highway	7 ANC	3/20/23	421	58214	4.1E+06	0.20	315.75	3658.44	7.7E-05	877.68
Valley of the Moon	8 ANC	3/20/23	606	58214	3.3E+06	0.16	454.50	4293.58	1.4E-04	1310.75
Turf Ct	1 ANC	4/27/23	136	125234	2.0E+06	0.10	102.00	1246.22	5.1E-05	1246.22
Burger Fi	3 ANC	4/27/23	226	125234	4.3E+06	0.21	169.50	4497.55	3.9E-05	1791.06
Wesleyan	5 ANC	4/27/23	295	125234	3.9E+06	0.19	221.25	5339.58	5.6E-05	1248.92
Mallard Lane	6 ANC	4/27/23	324	125234	3.6E+06	0.17	243.00	5318.45	6.8E-05	476.03
Seward Highway	7 ANC	4/27/23	348	125234	4.1E+06	0.20	261.00	6505.59	6.4E-05	448.66
Valley of the Moon	8 ANC	4/27/23	339	125234	3.3E+06	0.16	254.25	5167.02	7.7E-05	-137.18
Burger Fi	3 ANC	11/16/23	241	127191	6.3E+06	0.31	180.75	7113.87	2.9E-05	7113.87
Mallard Lane	6 ANC	11/16/23	302	127191	3.6E+06	0.17	226.50	5034.78	6.3E-05	1016.96
Seward Highway	7 ANC	11/16/23	286	127191	3.3E+06	0.16	214.50	4451.03	6.4E-05	-249.01
Turf Ct	1 ANC	11/25/23	131	121810	2.0E+06	0.10	98.25	1167.58	4.9E-05	1167.58
Burger Fi	3 ANC	11/25/23	177	121810	4.3E+06	0.21	132.75	3426.10	3.1E-05	890.40

Location	Sample Loc #	Date	EC	discharge m3/d	Sub basin in (m2)	fraction of sub basin	Total ions mg/L	Total ions mg/d	Total ions mg/L/m2	ion load/d/Sub basin area
Wesleyan	5 ANC	11/25/23	245	121810	3.9E+06	0.19	183.75	4313.31	4.7E-05	1197.16
Mallard Lane	6 ANC	11/25/23	257	121810	3.6E+06	0.17	192.75	4103.29	5.4E-05	191.59
Seward Highway	7 ANC	11/25/23	353	121810	4.1E+06	0.20	264.75	6418.61	6.5E-05	1745.57
Valley of the Moon	8 ANC	11/25/23	376	121810	3.3E+06	0.16	282.00	5574.26	8.5E-05	340.98
Burger Fi	3 ANC	2/13/24	204	66531	6.3E+06	0.31	153.00	3149.81	2.4E-05	3149.81
Wesleyan	5 ANC	2/13/24	246	66531	3.9E+06	0.19	184.50	2365.48	4.7E-05	403.86
Mallard Lane	6 ANC	2/13/24	279	66531	3.6E+06	0.17	209.25	2433.01	5.8E-05	287.77
Seward Highway	7 ANC	2/13/24	367	66531	4.1E+06	0.20	275.25	3644.79	6.8E-05	873.95
Burger Fi	3 ANC	2/20/24	179	88789	6.3E+06	0.31	134.25	3688.46	2.1E-05	3688.46
Northern Light	4 ANC	2/20/24	777	88789	7.3E+05	0.04	582.75	1856.80	7.9E-04	1429.04
Wesleyan	5 ANC	2/20/24	441	88789	3.9E+06	0.19	330.75	5659.27	8.4E-05	-4311.82
Mallard Lane	6 ANC	2/20/24	407	88789	3.6E+06	0.17	305.25	4736.65	8.5E-05	-395.69
Seward Highway	7 ANC	2/20/24	535	88789	3.3E+06	0.16	401.25	5812.35	1.2E-04	1390.62
Valley of the Moon	8 ANC	2/20/24	606	88789	3.3E+06	0.16	454.50	6548.62	1.4E-04	767.25
Burger Fi	3 ANC	3/4/24	265	64819	6.3E+06	0.31	198.75	3986.37	3.1E-05	3986.37
Wesleyan	5 ANC	3/4/24	333	64819	3.9E+06	0.19	249.75	3119.65	6.3E-05	637.04
Mallard Lane	6 ANC	3/4/24	324	64819	3.6E+06	0.17	243.00	2752.71	6.8E-05	-76.46
Seward Highway	7 ANC	3/4/24	369	64819	4.1E+06	0.20	276.75	3570.34	6.8E-05	435.41
Valley of the Moon	8 ANC	3/4/24	384	64819	3.3E+06	0.16	288.00	3029.34	8.7E-05	118.33
Turf Ct	1 ANC	4/14/24	151	117163	2.0E+06	0.10	113.25	1294.49	5.7E-05	1294.49
Burger Fi	3 ANC	4/14/24	230	117163	4.3E+06	0.21	172.50	4282.14	4.0E-05	1470.82
Wesleyan	5 ANC	4/14/24	302	117163	3.9E+06	0.19	226.50	5113.96	5.7E-05	1219.22
Mallard Lane	6 ANC	4/14/24	335	117163	3.6E+06	0.17	251.25	5144.59	7.0E-05	506.78
Seward Highway	7 ANC	4/14/24	387	117163	4.1E+06	0.20	290.25	6768.36	7.1E-05	909.44
Valley of the Moon	8 ANC	4/14/24	397	117163	3.3E+06	0.16	297.75	5661.04	9.0E-05	142.60
Turf Ct	1 ANC	6/5/24	112	226498	2.0E+06	0.10	84.00	1856.15	4.2E-05	1856.15

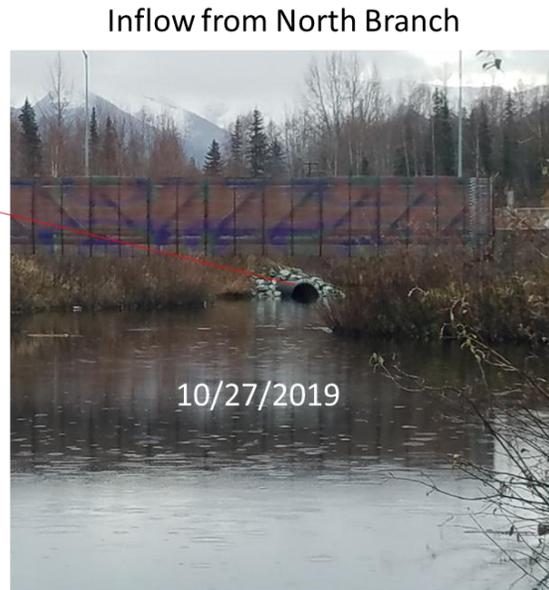
Location	Sample Loc #	Date	EC	discharge m3/d	Sub basin in (m2)	fraction of sub basin	Total ions mg/L	Total ions mg/d	Total ions mg/L/m2	ion load/d/Sub basin area
Burger Fi	3 ANC	6/5/24	162	226498	4.3E+06	0.21	121.50	5830.73	2.8E-05	1799.61
Wesleyan	5 ANC	6/5/24	168	226498	3.9E+06	0.19	126.00	5499.65	3.2E-05	196.42
Mallard Lane	6 ANC	6/5/24		226498	3.6E+06	0.17				
Seward Highway	7 ANC	6/5/24	211	226498	4.1E+06	0.20	158.25	7133.96	3.9E-05	7133.96
Turf Ct	1 ANC	7/12/24	130	109825	2.0E+06	0.10	97.50	1044.66	4.9E-05	1044.66
Burger Fi	3 ANC	7/12/24	171	109825	4.3E+06	0.21	128.25	2984.28	3.0E-05	715.53
Wesleyan	5 ANC	7/12/24	149	109825	3.9E+06	0.19	111.75	2365.09	2.8E-05	-349.21
Mallard Lane	6 ANC	7/12/24	218	109825	3.6E+06	0.17	163.50	3138.15	4.6E-05	993.27
Seward Highway	7 ANC	7/12/24	137	109825	4.1E+06	0.20	102.75	2245.97	2.5E-05	-1327.91
Valley of the Moon	8 ANC	7/12/24	140	109825	3.3E+06	0.16	105.00	1871.31	3.2E-05	40.10

## A2. PHOTOGRAPHS FROM SAMPLING LOCATIONS

### Turf Ct, Muldoon



# Burger Fi Muldoon



# Wesleyan Drive



Manholes at Wesleyan Dr



# Mallard Lane



# Northern Lights



# Seward Highway



# Storm Drainage Seward Highway Small Storm Drain



# Seward Highway Storm Drain Black Sabbath



# Valley of the Moon



### A3. WATER QUALITY GRAPHS

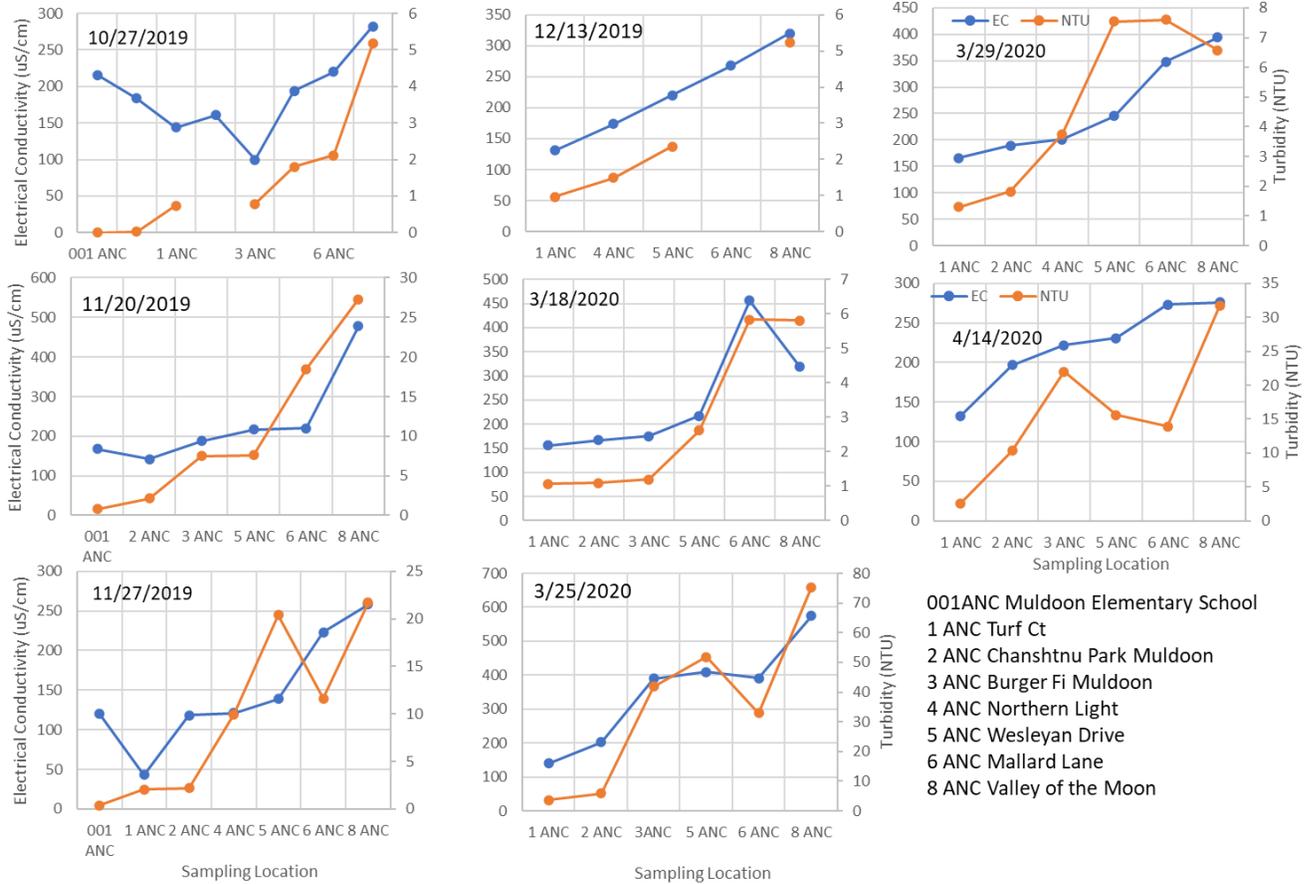


Figure A1: EC (blue) and Turbidity (orange) winter 2019/2020.

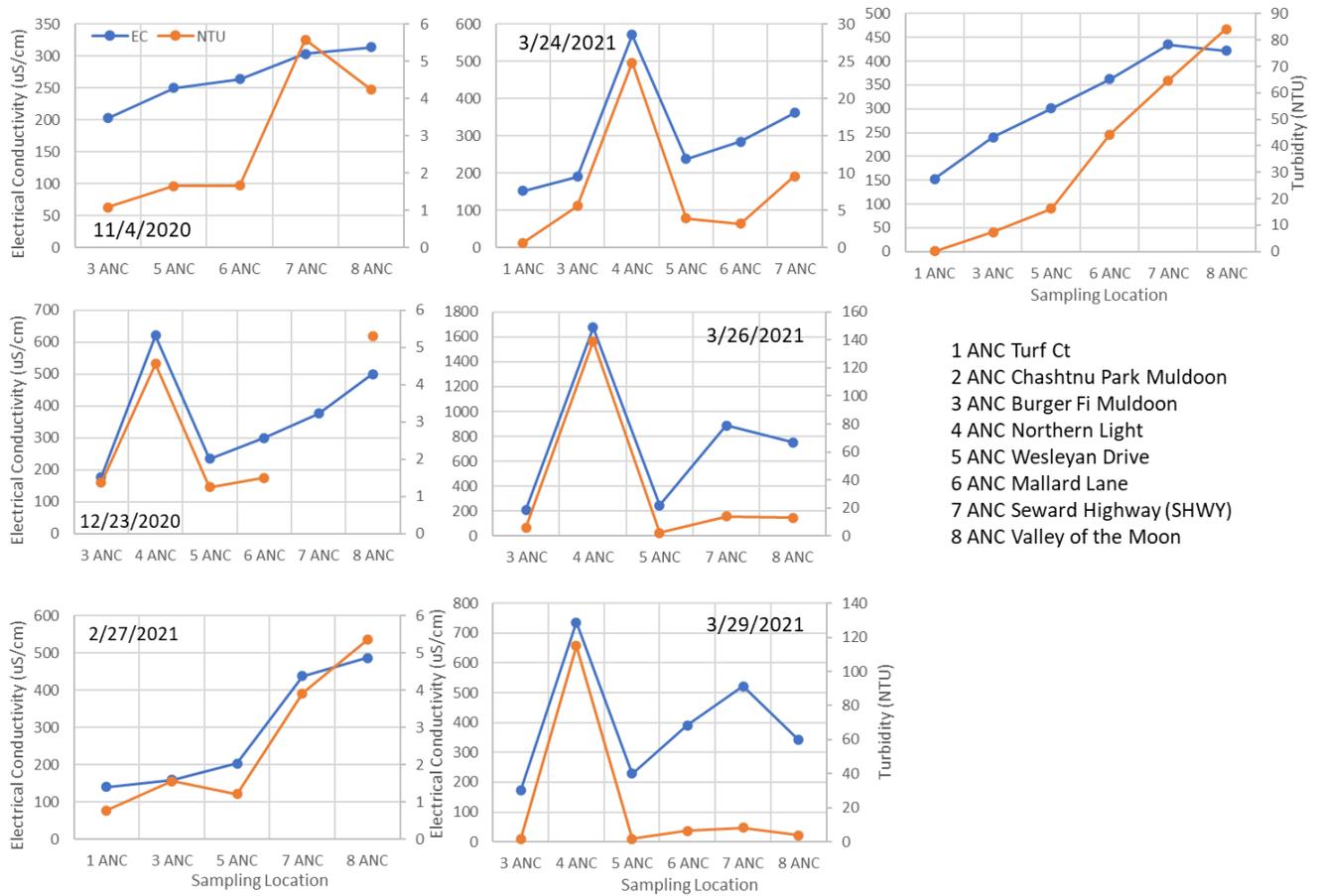


Figure A2: EC (blue) and Turbidity (orange) winter 2020/2021.

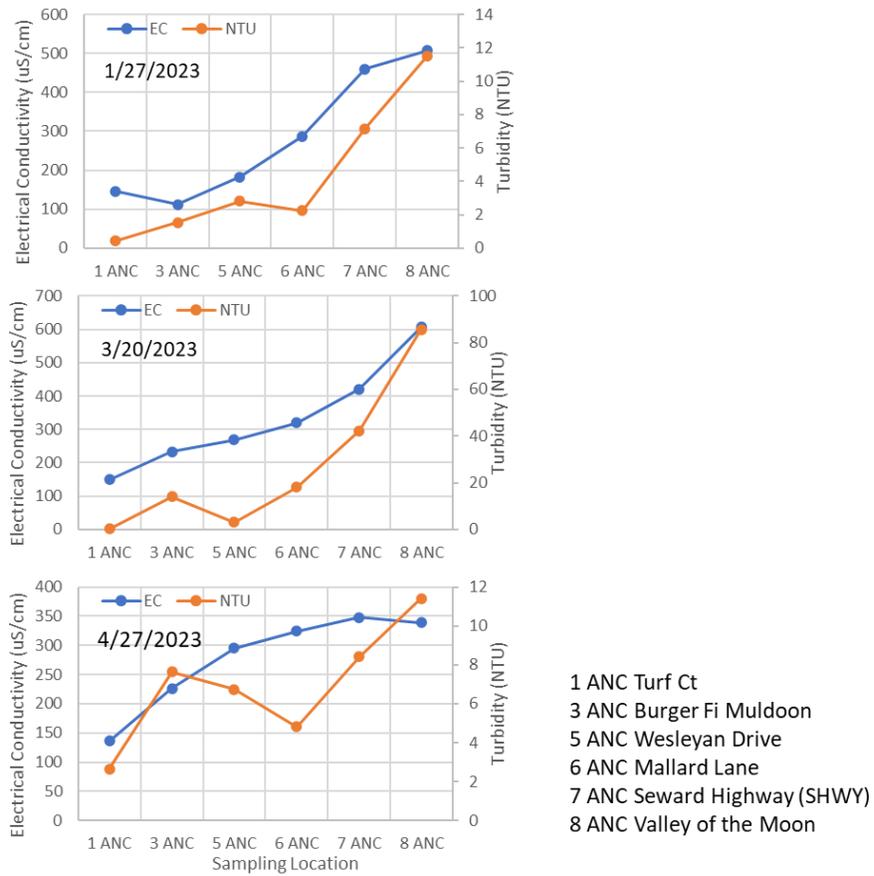


Figure A3: EC (blue) and Turbidity (orange) winter 2022/2023.

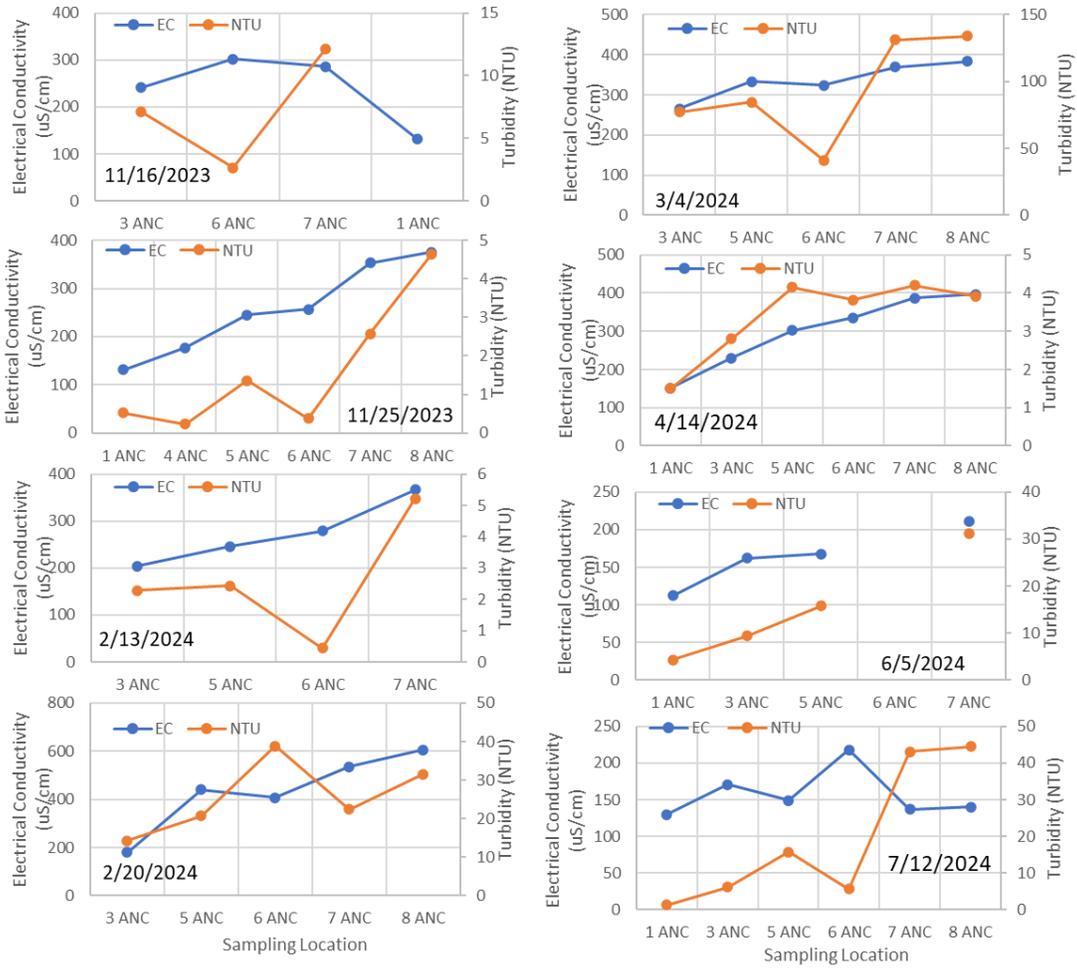


Figure A4: EC (blue) and Turbidity (orange) winter 2023/2024.

## APPENDIX B – *Streamline* Newsletters

*Streamline* – February 2025

*Streamline* – March 2025

*Streamline* – April 2025

*Streamline* – May 2025

*Streamline* – June 2025

*Streamline* – July 2025

*Streamline* – August 2025

*Streamline* – September/October 2025

*Streamline* – November/December 2025



## Anchorage Waterways Council - *Streamline*

February 2025



Thom Eley and Cherie Northon at the site of the fin whale, Nov. 2024

### Changes

My last newsletter in 2024 chronicled our Fall Open House where stories were swapped and 40 years of action were celebrated. Some of AWC's founding members joined past and current board and organizational members, staff, and water quality monitors to relive the organization's humble beginnings and to celebrate the many accomplishments that their foresight and diligence achieved.

Like all things, "change is the only constant" (paraphrased from Greek philosopher Heraclitus of Ephesus), and 2025 is no exception. I have decided to step back and let some younger blood oversee this great organization. My role will continue in the background for a while as I work on a few projects that are important for AWC's ongoing work and future. Thom Eley, AWC's research biologist and education director, will also be turning over his responsibilities.

Before I elaborate on staff changes, I'd like to take a stroll back along memory lane. In 2010, AWC abruptly found itself in place that looked to be its demise. The AWC board terminated the Bragaw St. office lease, staff

were let go, and a gradual shut-down began. At that time, I'd been working on AWC projects as a consultant so it did not outright affect me. The board asked me to step in and help wind things down on a day-to-day basis, and I agreed. One complication remained however--an important project with the Alaska Department of Environmental Conservation (DEC) was only halfway completed and needed work that summer.

In 2008, DEC had awarded AWC a grant, effective 2009, to sample Jewel Lake for fecal coliform over the next two years to try to remove it from the EPA's "[Impaired Waters](#)" list, which is not a good place to be found if you're a waterbody. With 2010 sampling still pending, Thom Eley and I agreed to complete it over the summer. We collected 100 fecal coliform samples and evaluated the entire shoreline over the summer and completed the report. And today, Jewel Lake is off the "Impaired Waters" list! (Read [Jewel Lake's story](#))



Thom Eley collecting water samples on Jewel Lake, 2010 (C. Northon)

From that humble beginning, my 15-year tenure with AWC commenced, and, as is readily apparent, AWC did not cease to exist. Fortunately, AWC had a very active and involved board that jumped right in and continued to meet and strategize. Soon, an opportunity for a summer intern arose, the potential for new projects began to emerge, and I was hired as the executive director. Thom Eley joined me to oversee the monitoring program and continue AWC's outreach program with youth. The key funding component was a 5-year contract with the [Municipality's Watershed Management Services \(WMS\)](#) to do outreach and stormwater education regrading local waterways.

The contract that has helped sustain AWC is known as the [Alaska Pollutant Discharge Elimination System](#) or APDES, and it has helped to sustain AWC along with our mission "*to promote the prevention of further environmental degradation; and the protection, restoration, and enhancement of waterways, wetlands, and associated uplands within the Municipality*". AWC is right now completing its third 5-year APDES contract with the MOA and looks forward to beginning its fourth contract in September 2025.

Much of what you've read in this newsletter over time emanates from AWC's role in fulfilling the APDES contract. It has allowed AWC to bolster its [Scoop the Poop program](#), respond to [issues](#) affecting local waterways, and focus in and educate on problems involving [non-point source](#)

[pollution](#). These are addressed in several programs, such as [Loons, Line, and Lead](#), [6PPD Quinone](#), and [stormwater education](#).

Critical funding from [Matson](#) and [ConocoPhillips Alaska](#) was also received to continue AWC's coveted [Annual Creek Cleanup](#) event and to enhance our [Creeks as Classrooms](#), an outdoor experiential program for students. Lastly, AWC's long-standing [Citizens' Environmental Monitoring Program](#) (CEMP) has held steady since 1998 when board Member Bob Shipley collected the first samples. Its support is entirely from our membership and the volunteers who monitor year-round.

Thom and I would like to express our gratitude for the many years of kindness and encouragement that we have received in our AWC roles. We've met so many wonderful people, made innumerable friends, and enjoyed the support of highly committed members and board directors. This all made many challenging situations so much easier. Lastly, I would like to thank my colleague and friend Vangie Wight who has been at my side for almost the entire time. No job has been too big or too small for her. She and I have made a pretty good team plowing through a variety of issues and tasks. I couldn't be leaving AWC in better hands. Thank you all....Cherie & Thom

P.S. Unlike many, Thom and I are not leaving Alaska.

---

### Vangie Wight - Executive Director



Vangie Wight

As of February 2025, I will have been employed with AWC for 13 years, primarily part-time while also managing my family business since 1996. Even so, I feel as though I have gained full-time experience. While many of my responsibilities focus on administrative tasks, there have been many opportunities to participate in various projects and programs.

I have a strong passion for nature and enjoy projects that allows me to spend time outdoors. In 2013, I worked on a two-year grant that involved identifying and evaluating over two hundred park and trailhead sites which resulted in the installation of one hundred new Mutt Mitt stations across Anchorage. I have many opportunities to engage with the community

through various activities, including creekside classes, fundraisers, and tabling events.

For the past 12 years, I have served as the coordinator for two of our annual events: Scoop the Poop Day and Creek Cleanup, both of which I find to be rewarding community outreach programs. I have also worked on numerous campaigns to share watershed information with thousands of Anchorage residents. At the end of 2024, I began overseeing CEMP, our water quality monitoring program. As I take on more leadership responsibilities in 2025, I look forward to collaborating with our AWC board members as we shape and implement our future goals for our local watersheds....Vangie

### Kaitlan McLallen - Outdoor Educator and more



Kaitlan collecting macroinvertebrates in Campbell Creek (C. Northon)



Salmonberry campers exploring the world of macroinvertebrates (C. Northon)

I have been an outdoor educator working within AWC's Creeks as Classrooms program for a little over a year. In that time, I have had the opportunity to interact with over 250 students, as well as many chaperones and teachers. Serving as a guide while they explore the world of macroinvertebrates and learn about their significance within stream ecosystems has been very rewarding. I have been a part of some incredible moments, from young students excitedly exclaiming that they found a stonefly to parents and teachers searching through samples right alongside the students. My biggest hope is that through working with AWC, I can help encourage genuine interest and promote stewardship to others within our community.

This year, I am excited to be involved with AWC in a greater capacity, such as writing some of the newsletters and taking part in various events like Potter Marsh Day and Creek Cleanup. I will also be actively updating

AWC's Facebook page. My goal is to bring more attention and community engagement to AWC's various critical programs. Of course, I will also continue working with the Creeks as Classrooms program, educating students about macroinvertebrates, water quality, and hopefully sparking interest and passion for the great outdoors... Kaitlan

---

## Memberships and Donations

Why not start off 2025 with an AWC annual membership? If you want to help us be advocates for local creeks and lakes in the Anchorage watershed and join an active community of like-minded citizens and businesses--we'd love to have you. Your annual support makes a tremendous difference to a small non-profit like AWC. Our memberships start at \$30 for an entire year! Click the link below for a full breakdown of our popular contribution choices.

[Pick, Click, Give](#) is another great way to help fund our programs. The annual support from PCG has covered the yearly expenses for our [Loons, Line, and Lead](#) program. If you want to help us prevent unnecessary injury and death from monofilament fishing line and lead sinkers, please select us as one of your PCG choices by March 31.



Join or Donate

Contact: 907 272-7335 or [awc@anchoragecreeks.org](mailto:awc@anchoragecreeks.org)  
Follow us on Facebook: [AnchorageWaterways](#) and [ScoopThePoopAnchorage](#)

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## Anchorage Waterways Council - Streamline

March 2025

### GREETINGS AWC COMMUNITY

I am pleased to be working alongside our nine dedicated board members. They are a committed team focusing on the health of our watershed. Kaitlan McLallen and I look forward to staying connected with you through this newsletter, Streamline. As Cherie did before us, we will share updates on our work, keep you in the loop of upcoming events, and provide insights into our watershed, including Anchorage's 26 municipal creeks and our local lakes. What a great time to start! With spring right around the corner, we have events coming soon!



Vangie Wight - Executive Director

### UPCOMING EVENTS

#### **Scoop the Poop Day: Save the Date**

Our annual *Scoop the Poop Day* is scheduled for **Saturday, April 26, 2025, 11AM to 3PM** at *University Lake* and *Connors Bog* parks. This event is an opportunity for volunteers to clean along the trails and tromping grounds of two off-leash dog parks. We have slots for **12 volunteers** to help distribute cleaning supplies for two or four hour shifts. It's a nice way to support your community while enjoying a few hours outside after a long winter.

Visit our *webpage* for further details and sign-up information if you would like to hand out supplies. If you are interested in cleaning, no sign up necessary. We will have updates in April on our *Facebook page* and our

website, [anchoragecreeks.org](http://anchoragecreeks.org). You can also e-mail us, [awc@anchoragecreeks.org](mailto:awc@anchoragecreeks.org) if you have questions.

### We Hope to See You There

Whether you're handing out supplies or joining us to help clean, we appreciate your involvement. Together, we can enhance the cleanliness and appeal of our parks, making them more inviting for everyone.

### Creek Cleanup

This is a multi-day event coming mid-May, signups start in early April. For event information follow our [Facebook page](#), scroll through our [website](#), or contact us [awc@anchoragecreeks.org](mailto:awc@anchoragecreeks.org).

### Flotilla

#### May 17, 2025, 9AM Supply Pickup at Cuddy Park and 10AM-1PM Event

Grab your canoe, kayak, raft, inflatable tube, or waders and join Anchorage Parks and Recreation, Anchorage Park Foundation, Anchorage Waterways Council, and Team Orange for our annual lake cleanup!



### WHAT'S IN THE NEWS (LETTER)

I (Kaitlan McLallen) am the newest member of the Anchorage Waterways Council team. This year, I am excited to be more involved with different elements of AWC, including the newsletters. Moving forward my goal is to share monthly newsletters so that you can stay up-to-date and informed on all the incredible things and exciting events AWC is doing. I also hope to shine the spotlight on the various people and programs that make up AWC. Thank you for your continued interest and support, I look forward to seeing what this year brings.



### APDES PROGRAM

As most of you know, I've (Cherie Northon) stepped back from many of the duties that an Executive Director oversees in order to gain a bit more time for other activities in my personal life. My AWC involvement now focuses almost entirely on overseeing the APDES program that has been very beneficial for expanding our outreach while improving and maintaining the health of local waterways. My new title is "APDES Director". But what the heck does APDES stand for anyway? The **A**laska **P**ollutant **D**ischarge **E**limination **S**ystem!

Simply put, it's a program that began on the federal level in the Environmental Protection Agency (EPA) under the 1972 Clean Water Act (CWA) where permits are issued for discharging pollutants into U.S. waterways. The permits set parameters for the amounts and types of

pollutants that can be discharged. In Alaska, these permits are known as APDES permits and are overseen by the Alaska Department of Environmental Conservation (ADEC) for the EPA.

One example of these discharges is the wastewater from the Asplund Wastewater Treatment Facility which has its own APDES permit with standards to meet. The Municipality (MOA) and the Alaska Department of Transportation and Public Facilities (AKDOT&PF) also share an APDES permit for discharging pollutants, mainly consisting of stormwater runoff, into local waters. This permit is administered by the MOA's Watershed Management Services (WMS) and encompasses discharges from its storm sewer system and other pollutant sources throughout the borough.

There are several entities involved in helping the MOA meet its APDES permit requirements. One such is *HDR*, an environmental consulting firm, that does water monitoring at storm drain outfalls and pesticide screening in lakes. Public outreach and education are another requirement of the permit which AWC fulfills. Many of the campaigns that we do, especially those focusing on Scoop the Poop and stormwater education, are entirely funded by our APDES contract. Permits run for 5-year periods, and the current one, our third, expires later this summer. My work will involve closing up this contract period and developing the scope of work for the next five years.



## MEMBERSHIPS AND DONATIONS

Starting at the low entry level of \$30.00 for a full year, you can support your waterways with an AWC membership! If you want to help us in advocating for local creeks and lakes in the Anchorage watershed and join an active community of like-minded citizens and businesses--we'd love to have you. Your annual support makes a tremendous difference to a small non-profit like AWC. Click the link below for a full



## PICK.CLICK.GIVE

You have until March 31, 2025 to donate through *Pick.Click.Give*.

Follow the [link](#) to donate

Another great way to help fund our programs. Your support through the PCG donation option has covered the yearly expenses for our Loons, Line, and Lead program. If you want to help us prevent unnecessary injury and death from monofilament fishing line and

breakdown of our popular contribution choices.

Join or Donate

lead sinkers, please select us as one of your PCG choices by March 31.



### Donate through Fashion Impact

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## Anchorage Waterways Council - *Streamline*

April 2025

Kaitlan McLallen, Editor



A helpful reminder at Connors Bog Park

## Scoop The Poop, Creek Cleanup and More!

With the start of "our snowy" spring comes the first of AWC's exciting events for this year.



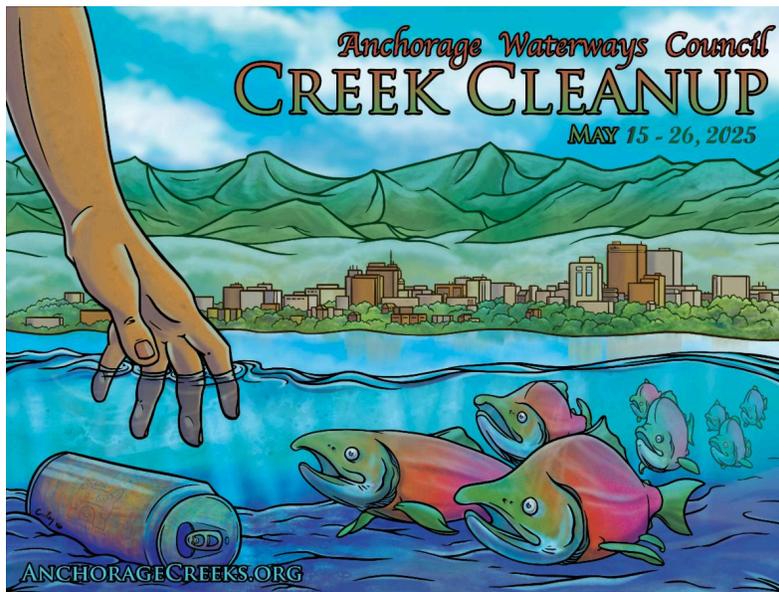
### **Scoop the Poop Day**

Saturday, April 26, 11am - 3pm

University Lake and Connors Bog dog parks  
no signup necessary

Come on out and join others who care about clean lakes and creeks! Bags, buckets and other supplies are provided by AWC. We all benefit from clean, poop free outdoor spaces. And, when we work together, we can make a huge impact. Thank you in advance to all who come and lend a hand, and thank you to the responsible pet owners out there who do their "dooty" and scoop the poop.

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Anchorage Waterways Council's  
**41st Annual Creek Cleanup**  
May 15-26

Signups are now open with a variety of locations and 12 cleanup days! If you would like to join us for Creek Cleanup, follow this [link](#) for more information and our signup page.

Thank you, to Matson's "*Caring for Alaska*" program and ConocoPhillips Alaska for continuing your generous funding for this popular program.



**Caring**  
for Alaska  

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**Matson.**





## Flotilla Cleanup

Saturday May 17  
10am - 1pm

The 4th annual paddler event to remove trash from local lakes and lagoons. Grab your canoe, kayak, raft, inflatable tube, or waders, and join us for a one-of-a-kind cleanup. Signup is now open. [\*\*Click here\*\*](#) for more information. For those who volunteer, a breakfast burrito and a t-shirt are included as a thank you for your support.

Supply pickup at Cuddy Park west entrance at 40th Ave., 9am

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## Reading Rendezvous

Saturday May 17  
12 pm- 4 pm

AWC will once again participate in the annual [\*\*Reading Rendezvous\*\*](#) at the Loussac Library. We will be sharing information on our local waterways and educating the public on simple actions we can take to keep our streams healthy. Hope to see you there.





March 22 - World Water Day

This year's theme for World Water Day was "Save Our Glaciers"

Glaciers are a critical component of Alaska's various watersheds and have a uniquely important role in the culture, economy, and health of all Alaskans. Glaciers are deeply intertwined with the history and culture of Native Alaskan communities, with many glaciers holding special spiritual significance. Glaciers are a huge draw and highlight to the millions of visitors from all around the world who come to Alaska hoping to see these magnificent ice formations for themselves. Of course, glaciers are also a critical source of drinking water for hundreds of thousands of Alaskans. Runoff from the Eklutna Glacier supplies the vast majority of Anchorage's public water supply. Alaska's glaciers are an integral part of our watersheds, our community and our lives. Their role deserves recognition on World Water Day and every day.

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## Creeks as Classrooms



Students try to identify macroinvertebrates found in a local stream

There are a lot of factors that contribute to stream health. Everything from temperature and pH to *E. coli* bacteria and pollution can have a profound impact on our local waterways. Understanding our relationship with these waterways is incredibly important in ensuring the long-term health of our streams. Of course, this can be a little bit confusing to those not familiar with the complexities of stream ecosystems. Fortunately, our streams have little helpers that paint a picture of overall stream health...

### Macroinvertebrates

Macroinvertebrates are small, spineless animals that are large enough to be seen with the naked eye. When discussing stream health, macroinvertebrates or "macros" often refer to a huge variety of aquatic insect larvae that are found within our streams. Some taxa of macroinvertebrates are indicators of healthy streams as they are intolerant to high amounts of pollution or unfavorable stream conditions. Finding these sensitive macroinvertebrates within a stream habitat is a good indication that the stream conditions are sufficient in supporting these more sensitive insects as well as other species of wildlife, such as salmon.

Macroinvertebrates offer a fun and engaging way to explore stream health. Anchorage Waterways Council's [Creeks as Classrooms](#) program brings the exciting world of aquatic insects and stream health to students.

Last year, as part of the Creeks as Classrooms program, Bob Shipley and I participated in many different education events focusing on the marvelous world of macroinvertebrates and water quality. We helped hundreds of students in many grade levels sample and identify macroinvertebrates and then relate what they found to overall stream health.

This year, Bob and I are excited to work alongside organizations, such as Alaska Geographic and the Anchorage Parks Foundation, and educate students about the importance of healthy stream ecosystems and the fascinating world of macroinvertebrates. Already this year, we've worked with dozens of students and anticipate working with hundreds more in the coming weeks and months.

### Marvelous Macroinvertebrates



Mayfly



Stonefly



Caddisfly

The mayflies, stoneflies, and caddisflies, also known as the EPT taxa (Ephemeroptera, Plecoptera, Trichoptera) are important indicators of overall stream health as they are sensitive to changes in stream conditions and pollution.

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Thank you to ConocoPhillips Alaska  
for continuing its generous funding for this popular program.



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## Anchorage Waterways Council - *Streamline*

May 2025

Kaitlan McLallen, Editor

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### A Scoop of Success at Scoop the Poop Day!

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Hobbes the dog encourages people to collect a bucket and shovel and participate in AWC's annual Scoop the Poop Event. His enthusiastic efforts were rewarded with tasty treats from Drool Central and plenty of well-deserved belly rubs.

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Despite the cool, gloomy weather, many people participated in our annual Scoop the Poop event at University Lake and Connor's Bog, and their efforts had a huge impact.

One of the most significant hazards of pet waste in our local parks is water pollution. When it's not properly disposed of, it can be washed into nearby streams, rivers, and lakes, carrying harmful bacteria, including *E. coli* and *Salmonella*. These pollutants pose serious health risks—not just to people and their pets, but to wildlife and the broader ecosystem. Clean, healthy water is essential for all life, and keeping it that way starts with us. By picking up after our pets, we're protecting our community, our environment, and the animals we share it with.



Thank you to everyone who came out to our annual Scoop the Poop Day at University Lake and Connors Bog. We all benefit from clean, healthy outdoor spaces. Because of the efforts of all those who decided to lend a hand, two of our beloved dog parks are starting the spring season on a good note.

## Anchorage Waterways Council's 41st Annual Creek Cleanup

Every year, teams of volunteers come together to participate in AWC's Annual Creek Cleanup, a vital event that aims to protect our waterways, preserve ecosystems, and foster a spirit of environmental stewardship. Our efforts not only enhance the aesthetic and ecological health of our local creeks but also serve as an opportunity for individuals to unite for a common cause.

The primary goal of the creek cleanup is to remove waste and debris that accumulate in and around creeks due to urban development, natural events, and human activities. These pollutants can include plastics, metals, organic waste, and even hazardous materials. Left unchecked, this debris poses threats to water quality, wildlife habitats, and the overall health of the ecosystem.





This year's Creek Cleanup was a huge success thanks to the awesome teams who were not afraid to get a little wet.



Together, Creek Cleanup teams removed more than 700 bags of litter in and around our local creeks—an estimated 15,000 pounds, or roughly 7 metric tons. That's about the weight of an adult male African elephant, the largest land animal on Earth, which can weigh over 14,000 pounds and stands 10 to 13 feet tall. This total does not include additional waste dropped off at the SWS transfer station or the bulky items detailed below. In addition to bagged litter, volunteers pulled a wide range of large and unusual debris from the creeks, including car batteries, pallets, computer equipment, a cot, an office chair, a snow blower, and over 1,000 pounds of shopping carts—and much more.

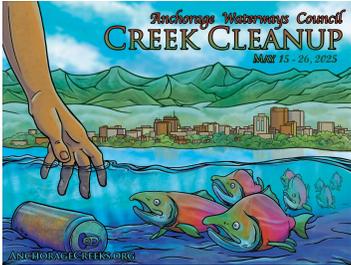


Huge thank you to everyone who participated in this year's Creek Cleanup!!!



Thank you to Matson's *"Caring for Alaska"* program and ConocoPhillips Alaska for continuing your generous funding for this popular event.

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Reading Rendezvous



Anchorage Waterways Council hosted a booth at the annual Reading Rendezvous event at the Loussac Library. More than 2,000 people attended this free, family-friendly event. Our booth had a fun tablecloth coloring station as well as coloring page handouts for the kids. Visitors to AWC's booth also enjoyed fun, interactive, and informative trivia questions. All in all, Reading Rendezvous was a really fun event, and we are excited to participate again next year!

## Flotilla Cleanup



In collaboration with Anchorage Parks and Rec, the Anchorage Park Foundation, and Team Orange, we kicked off the 3rd Annual Flotilla lake cleanup. Litter that makes its way into our local lakes often finds itself far beyond the reach of most cleanup efforts. Fortunately, with an incredible fleet of floaters, we are able to make a noticeable dent in the hazardous litter that pollutes our lakes.

## June 15th - Summer Family Fun Day at the Alaska Zoo

Need an idea of a fun, unique activity to do on Father's Day? Consider attending a fun-filled event at the Alaska Zoo. There will be food trucks, live music and a car show. Anchorage Waterways Council and many other organizations will also be there with fun activities for the whole family. Hope to see you, 12-6pm!

For more information about this event, [click here](#).

the Alaska ZOO  
Conservation • Education • Community

# SUMMER Family Fun Day

JUNE 15<sup>TH</sup>, FATHER'S DAY, 12-6PM AT THE ZOO

**DADS FREE**

**LIVE MUSIC  
CAR SHOW  
FOOD TRUCKS**

SPONSORED BY: **ConocoPhillips**  
Alaska

CAR SHOW BY: **Antique Auto Mushers**  
Since 1961 of Alaska

FOOD & DRINKS FOR SALE BY: **KONA ICE**, **HIGH FIVE SANDPIPS**, **KAPE ESPRESSO TAVO**

COMMUNITY PARTNER BOOTHS BY: **Make-A-Wish** ALASKA AND WASHINGTON, **Camp Fire** Alaska, **Girls on the Run**, **THE WATERSHED**, **KONG & ASSOCIATES**, **Habitat for Humanity** Anchorage, **BIRD TLC**, **Alaska Geographic**, **ANCHORAGE WATERWAYS COUNCIL**

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## Anchorage Waterways Council - *Streamline*

June 2025

Kaitlan McLallen, Editor

### A Look at Loons Line and Lead

Fishing is a cherished Alaskan pastime, a way to connect with nature, enjoy the great outdoors, and put food on the table. Unfortunately, the gear we use can have unintended consequences, especially when lead tackle and fishing line are left behind in aquatic ecosystems. These materials pose serious risks not only to the health and well-being of wildlife, but also to the balance of aquatic ecosystems as a whole.



Lead is a heavy metal widely used in fishing sinkers, jigs, and other tackle due to its low cost and malleability. However, lead is also highly toxic, and its presence in aquatic environments can have devastating effects. When fishing tackle is lost or abandoned, it often remains in the

water or along the shoreline, where it can be ingested by birds, fish, and other wildlife. Waterfowl are particularly vulnerable as they often mistake small lead sinkers for pebbles, which they naturally consume to aid in digestion. Once ingested, lead poisoning can occur, causing neurological damage, impaired motor function, and eventually death.



Loons are especially affected by lead as they swallow their fish whole, which means that they automatically consume any lead sinkers attached to their prey. The loon's powerful gizzards, organs that break down their food, are strong enough to dissolve ingested lead sinkers, so the toxic metal rapidly disperses throughout their bodies. Alarmingly, it only takes one lead sinker to kill a loon. Studies show that lead poisoning is a leading cause of mortality among loons and other aquatic birds, with an estimated 16 million birds dying from lead poisoning in the US each year.



Fish, too, are at risk. Lead tackle can fragment and pollute the sediment, exposing benthic organisms that are consumed by fish. Over time, these toxins bioaccumulate, moving up the food chain, potentially affecting human health as well.



While lead tackle poses toxicity issues, abandoned fishing lines create a different kind of hazard—entanglement. Monofilament and braided fishing lines are incredibly durable, often taking hundreds of years to decompose. When left in streams, these materials become silent, deadly traps for wildlife



A loon with fishing line wrapped around its bill

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Fortunately, there are some easy and effective ways we can help keep our aquatic ecosystems healthy and reduce the harmful impact from

abandoned fishing gear. Picking up broken and abandoned line and tackle, even if it is not your own, is a simple action that can have a huge impact on our local waterways. To reduce the harmful impact of lead tackle, replace it with non-toxic alternatives. Fishing tackle made from materials such as tungsten, steel, tin, and bismuth is available at local retailers, such as Sportsman's Warehouse, Bass Pro Shops, and B&J Sporting Goods. These non-toxic alternatives are functionally the same as their lead counterparts, with the added benefit of not causing lead poisoning to Anchorages' beloved birds.



To help tackle (pun intended) the issue of abandoned fishing line and lead tackle, [Anchorage Waterways Council](#) (AWC), in partnership with [Bird Treatment and Learning Center](#) (Bird TLC) and U.S. Fish and Wildlife Service (USFWS), created Loons, Line and Lead (LLL). The program raises awareness about the hazards of lead tackle and monofilament fishing line, as well as the installation and upkeep of monofilament recycling bins at fishing spots throughout Anchorage.

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scroll to the [Monofilament Recycling Bins Location Map](#)

# Monofilament Recycling Bins, Anchorage Bowl, December 2023



These unassuming white bins are the perfect place to safely discard any fishing line or tackle you come across. If a designated bin isn't available, please pack it out and dispose of it properly at home or in a suitable waste container.



AWC's Kaitlan McLallen with volunteer Sam Heinrich assist Loons Line and Lead intern Charly Morton in the removal and sorting of all materials deposited in a monofilament recycling bin at Cheney Lake.

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The beauty and health of our stream habitats depend on the choices we make. While lead tackle and abandoned fishing line may seem like minor issues on their own, their cumulative impact is significant. By switching to non-toxic alternatives and embracing responsible fishing practices, we can help ensure our waterways remain vibrant ecosystems teeming with life.



The LLL program is proudly supported by the Alaska Conservation Association with generous donations from the Jean Tam and Scott Christy Legacy.

For more information or to donate to this program, [click here](#)

**Saturday, July 12, 11am-2pm**

**We've arranged an extra cleanup this year!**

**Scoop the Poop Day**

**South Anchorage Sports Park---Off-Leash Dog Area**



Love walking your dog at the park? Help keep it clean and safe for everyone—two-legged and four-legged alike!

Join Anchorage Waterways Council for a productive day at this Off-Leash Dog Area. Volunteer an hour (or more!) helping us clean up and keep this a great space for all our furry friends to enjoy.

We'll provide gloves, trowels, buckets, and bags—just bring your enthusiasm and love for the park!

Questions, email us, [vangie@anchoragecreeks.org](mailto:vangie@anchoragecreeks.org)

**Summer Family Fun Day at the Alaska Zoo**

On Father's Day, AWC and several other organizations hosted booths at the zoo's first *Family Fun Day* event of the summer.



Couldn't make it to the last event? No worries!

**July 20, 12-6pm**

We'll be back. Join us for hands-on activities, educational booths, and summer fun for the whole family!  
We hope to see you there!



Enjoy a fun Summer Family Fun Day at the Zoo!  
Sponsored by ConocoPhillips Alaska

**JULY 20TH**  
12-6PM AT THE ALASKA ZOO

Kona Ice, High Five Hand Pies and  
Kape Espresso Tayo Zoo Coffee Shop.

Live Music 12-2pm Power Play  
Live Music 4-6pm Sergio Castillejo,

Crafts and games on the lawn.  
Trail Talks at 1pm, 3pm and 5pm  
Petting Zoo open from 1-3pm.  
Cotton candy for sale.

[www.alaskazoo.org](http://www.alaskazoo.org)

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## Anchorage Waterways Council - *Streamline*

July/August 2025

Kaitlan McLallen, Editor

### A Word on Water Safety

Water environments can be unpredictable and hazardous. Sudden weather changes, exposure, hypothermia, poor decisions, strong currents, submerged obstacles, equipment failure, or simply overestimating one's swimming abilities can quickly turn a leisurely outing on Alaska's waters into an emergency. Alaska has the highest rate of drowning deaths per capita in the United States. This is due to a combination of factors, notably cold water and the behavior of those who drown, with many not wearing life jackets or being under the influence of alcohol.



This summer, there has been a notable uptick in fatal drowning incidents, with 4 fatal drownings occurring in just one weekend this July. Following these tragedies, multiple agencies addressed the public. Austin McDaniel, with the Department of Public Safety, stated in an interview for Your Alaska Link, "9 out of 10 of the fatal drownings that we see in Alaska involve people not wearing a life vest." Lt. Ralf Lysdahl of the Alaska Wildlife Troopers echoed the statement during a recent interview with Alaka's News

Source, "Unfortunately, people not wearing their life jackets for the most part, it seems to be most of the reoccurring theme when we have fatalities across the state."

I personally have lost a family member to drowning. When I was young, my grandfather drowned in 6 Mile Creek. He was an experienced and avid outdoorsman, and his sudden death was devastating for my family. I share this because far too many Alaskans share this story; far too many Alaskans have lost loved ones on our waters. The importance of water safety cannot be overstated, and in truth, many of the drowning deaths that occur could likely have been avoided if proper precautions were taken.



## The Importance of Personal Flotation Devices

One of the most important things that you can do to stay safe on the water is wear a life jacket, also known as a personal flotation device (PFDs). PFDs are designed to keep individuals afloat and their airways above water even in the event of exhaustion, injury, or unexpected immersion. Despite their proven effectiveness, far too many people venture onto the water without wearing one. There are many types of life jackets, each designed with specific uses in mind, such as near-shore or sporting activities. Please ensure that when out on the water, you not only have a Coast Guard-approved life jacket but one that is well-fitted and well-suited for your chosen water activity.



### TYPE I

In open waters where rescue efforts can take some time, these life jackets are mostly intended for use.



### TYPE II

These work especially well in still waters offshore when a prompt rescue is likely.



### TYPE III

PFDs of Type III are adaptable and suitable for a variety of water sports, including rafting.



### TYPE IV

Type IV PFDs differ; meant for throwing to someone, not wearing like other categories.



### TYPE V

For whitewater rafting, Type V PFDs are manufactured and they offer the fit, functionality, and safety features.

## How Do Life Jackets Save Lives?

### Automatic Flotation:

Life jackets are made from buoyant materials that do not absorb water. When worn, they lift and support the wearer's body, keeping the mouth and nose clear of the water surface—even if the wearer is unconscious or unable to swim.

**Visibility:** Most life jackets are brightly colored with reflective strips, making it easier for rescuers to spot someone in the water, especially in low-light conditions or rough seas.



## Kids Don't Float - So Give Them Something That Does

Alaska has thousands of miles of coastline, lakes, and rivers. This abundance of water creates a significant risk, particularly to children who may be unprepared for the hazards posed by cold and unpredictable waters. In response to Alaska's High child and youth drowning rate the Kids Don't Float program was launched in Homer in 1996.



The program's name, "Kids Don't Float," is both a literal and symbolic reminder that children cannot rely on their bodies alone to keep them safe in water. It emphasizes the need for flotation devices and proper safety measures. Today, the Kids Don't Float program includes an education program and life jacket loaner boards. The loaner board system helps remove financial and logistical barriers, ensuring that safety equipment is readily available to anyone who needs it.



A Kids Don't Float life jacket loaner board at Goose Lake in Anchorage

While out examining a life jacket loaner board at Goose Lake, I happened to run into Pete from Alaska Pack Raft School, who expressed that additional safety precautions, such as helmets, dry suits, proper water safety training, and swift water rescue skills, are invaluable when adventuring on Alaska's waters.



Dry suits are designed to keep water out even in the event of complete submergence.



Life jackets save lives, but even wearing one does not protect you from Alaska's cold waters. Average water temperatures in the summer is only about 50 degrees F. In our frigid waters, it can take less than an hour of exposure to develop hypothermia.

## Understanding Cold Water: Why It Is Dangerous

### **Cold Water Shock and Loss of Breath:**

Sudden immersion in cold water can cause an involuntary gasp reflex, leading to inhalation of water and potential drowning.

**Rapid Loss of Muscle Control:**

Cold water affects muscle and nerve function, making it difficult to swim, hold onto objects, or keep your head above water.

**Hypothermia:**

Prolonged exposure causes the body's core temperature to drop, impairing mental and physical function and eventually leading to unconsciousness or death.

**Impaired Judgement:** Cold water can cloud thinking and reduce the ability to make rational decisions during an emergency.



## Key Safety Tips for Cold Water Environments

**Always Wear a Life Jacket:**

A properly fitted, Coast Guard-approved life jacket is the single most effective piece of safety equipment for cold water activities.

**Dress Appropriately:**

Wear layers made of synthetic materials, wool, or wetsuits/drysuits that insulate when wet. Avoid cotton, which loses its insulating value when soaked.

**Never Go Alone:**

Whenever possible, swim, paddle, or boat with a companion and always let others know your plans and expected return time.

**Avoid Alcohol:**

Alcohol impairs judgement and increases the risk of hypothermia and accidents. Additionally, it is illegal to operate a boat while under the influence of alcohol.



## Responding to Cold Water Emergencies

### If You Fall In:

#### **Don't Panic:**

Try to control your breathing and keep your head above the water.

#### **Signal for Help:**

You will only have a few minutes before the cold water impacts your muscle control. It is important to secure and use any personal locator devices at this time. If you see someone, wave your arms and shout if you can, but avoid excessive movement that wastes energy and body heat.

#### **Conserve Energy:**

Assume the HELP position (Heat Escape Lessening Posture) by drawing your knees to your chest and wrapping your arms around your legs, or huddle with others to conserve body heat.

#### **Stay With the Boat:**

If you fall from a boat, try to climb back in or stay nearby where you're more visible to rescuers.

### If You Witness Someone in Trouble:

#### **Call for Help Immediately:**

Alert emergency services and give precise information about the location.

#### **Reach, Throw, Don't Go:**

If possible, use a stick, rope, or flotation device to help remove someone from the water. Do not enter the water yourself unless absolutely necessary and you are well-equipped and trained.

#### **Hypothermia First Aid:**

Remove any wet clothing and replace it with warm, dry clothes. Warm the center of the body first (chest, neck, head, and groin) and, if possible, provide warm beverages if the person is conscious and alert.



Alaska's vast waters provide countless opportunities for recreation and adventure. However, it is vital to understand the risks involved and prepare adequately. **Always wear a life jacket**; it is one of the most effective ways to protect yourself and your loved ones. It is not a sign of weakness or inexperience, but a smart and responsible choice that often means the difference between life and death. Dress appropriately and carry proper safety equipment such as first aid supplies, a personal locator, and extra non-cotton layers. **ALWAYS** let others know when you are going out onto the water, where you are going, and when you expect to return, even if it is just a short swim at a local lake. It is vital to understand the hazards of Alaska's frigid waters and the signs and symptoms of cold water shock and hypothermia. Please ensure that you are well-equipped and prepared before venturing out onto Alaska's waterways. Accidents can and do happen, but when proper safety measures are taken, devastating outcomes can often be avoided.

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## Anchorage Waterways Council - *Streamline*

June 2025

Kaitlan McLallen, Editor

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### August Event - Plant Spruce Tree Seedlings

Here's a unique opportunity for helping to maintain healthy waterways!

AWC has received 360 white spruce seedlings from *DNR's Community Forestry Grant program* to plant in our greenbelts and creek areas. Planting them will help to replace beetle-killed trees with a native species.

One of the effects of decreased forest cover and climate change is an increase in waterway temperatures. Warmer water temperatures put stress on fish and benthic fauna especially by reducing dissolved oxygen levels. And, with the warmer temperatures Anchorage has had in the past few weeks--it's pretty evident that hiking, biking, jogging or walking under trees is MUCH more comfortable than in the direct sun! Fish think so too!

**When:** Saturday, August 2, 1 pm - 3 pm

**Where:** Bancroft Park at Campbell Creek (*see map*)

**What:** limited number of shovels, gloves, trowels and buckets will be provided. If you can, please bring your own tools as well as drinking water.

**Questions:** *cherie@anchoragecreeks.org*



Spruce seedlings are approximately 18" tall including their roots.

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## MEMBERSHIPS AND DONATIONS

Starting at the low entry level of \$30 for a full year, you can support your waterways with an AWC membership! If you want to help us in advocating for local creeks and lakes in the Anchorage watershed and join an active community of like-minded citizens and businesses--we'd love to have you. Your annual support makes a tremendous difference to a small non-profit like AWC. Click the link below for a full breakdown of our popular contribution choices.



[Join or Donate](#)

[Donate through FashionPact](#)



In July of 2021 *FashionPact* launched its first thrift boutique that raises funds for non-profits. Since then, AWC has been the recipient of over \$3,000 dollars. This is revenue from the donation of goods by AWC supporters as well as those purchasing items who designate AWC as the recipient.

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Visit our website

Contact: 907 272-7335 or [awc@anchoragecreeks.org](mailto:awc@anchoragecreeks.org)  
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## Anchorage Waterways Council - *Streamline*

September/October 2025

Kaitlan McLallen, Editor

### Invasive Mussels: a small shell with a huge impact

Invasive species are no strangers to Alaska. Bird vetch, European bird cherry, and starlings are just a few examples of invasive species that continue to thrive within our state. Unfortunately, once an invasive species takes hold, eliminating it becomes nearly impossible. This is why preventing invasive species from making their way into our state and local ecosystems is crucial.



European starlings are now a well-established and abundant invasive species in Alaska.



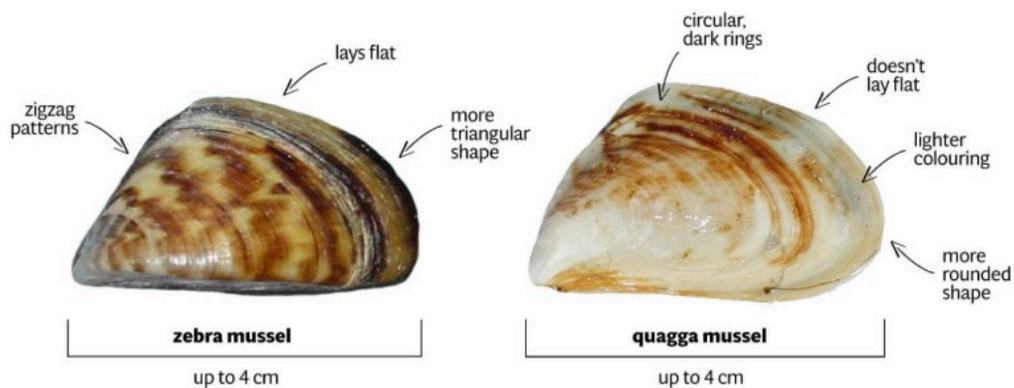
The European bird cherry, first introduced as a popular ornamental tree, is now taking over and outcompeting local vegetation.

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There are other invasive species that pose a serious threat should they make their way into Alaska's vast waterways. Zebra (*Dreissena polymorpha*) and quagga (*Dreissena bugensis*) mussels, collectively known as *dreissenid* mussels, are tiny freshwater bivalves that are considered one of the most notorious aquatic invasive species worldwide. Native to Europe, these tiny mussels were accidentally introduced to the United States via the discharge of ballast water in the 1980s. These freshwater mussels dramatically alter ecosystems, quickly forming dense colonies once established. They filter feed and attach to a wide range of surfaces, including rocks, cement, ropes, docks, boats, aquatic plants, and other mussels. Their establishment in non-native waters continues to have a profound ecological, economic, and infrastructural impact.



Zebra mussels are small, typically measuring 2–5 centimeters, with distinctive zigzag striped shells. They attach to hard surfaces using byssal threads, forming dense colonies on rocks, boats, docks, and even other aquatic organisms. Each female can produce up to a million eggs per season, contributing to rapid population growth. These mussels quickly outcompete other native species for space and resources.



Quagga mussels are typically about the size of a fingernail, ranging from 0.8 to 1.6 inches (2–4 cm) in length. They have a distinctive shell pattern that is often striped, though it can also be pale or nearly solid in color. Quagga mussels are similar in appearance to the closely related zebra mussel, but can be differentiated by their more rounded shells and ability to inhabit soft, sandy, or muddy substrates in addition to hard surfaces.



## Ecologic Impact

- **Biodiversity Loss:** Zebra and Quagga mussels outcompete native bivalves, often leading to their decline or local extinction. Their dense colonies alter habitat structure and reduce available food for indigenous species.
- **Food Web Disruption:** By filtering vast quantities of plankton, these mussels increase water clarity but deprive zooplankton, fish larvae, and other organisms of essential food sources, thereby altering aquatic food webs.
- **Habitat Modification:** Their prolific colonization can change substrate composition and facilitate the growth of nuisance algae, with cascading effects on the entire ecosystem.

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## Economic and Infrastructure Impact

- **Damage to Infrastructure:** Zebra mussels clog pipes, water intakes, hydroelectric facilities, and irrigation systems. Their presence necessitates costly maintenance, repairs, and cleaning efforts.
- **Economic Losses:** The U.S. alone spends hundreds of millions of dollars annually on managing invasive mussel infestations.
- **Impacts on Recreation and Fisheries:** Mussel encrustations on boats, docks, and beaches reduce recreational value and can harm local fishing industries by disrupting native fish populations.
- **Boating and Fishing:** Infestations damage boat motors, anchors, and equipment, while also threatening fish stocks that sustain commercial and sport fisheries.



Decontamination of boats with hot water away from local waterbodies is crucial in preventing further spread of invasive mussels.

## Prevention is Key!

What you can do to keep Alaska's waters safe from these harmful invaders:

1. Thoroughly inspect and clean all Watercraft and Equipment. Remove any visible plants, mud, or animals. Use high-pressure water (away from local waterbodies) and let everything dry completely for at least five days before use in another waterbody.
2. Ensure that all water has been drained from all equipment properly. Drain all water from motors, live wells, bilges, and bait buckets on land, away from the water. This prevents mussel larvae, which are microscopic, from being transported between water bodies.
3. Never dump aquarium water anywhere it could flow into local waterways. As an alternative, aquarium water can provide good nutrients for house plants; any liquid left should be disposed of down the toilet.
4. Properly dispose of aquatic plants. Allow aquatic aquarium plants to dry up completely before sealing them in a ziplock bag and disposing of them. Zebra mussels have been discovered on store-bought aquarium plants.
5. Educate others—family, friends, and fellow anglers—about the dangers of invasive mussels and the importance of preventive measures. The more people know, the better protected Alaska's aquatic ecosystems will be.
6. Stay informed about Alaska's aquatic regulations, inspection programs, and decontamination stations. Comply with all rules related to boating and fishing in the

state.

7. Report Sightings: If you suspect you have found an invasive mussel or its larvae, report it immediately to Alaska's Department of Fish and Game or local conservation authorities. Early detection is key to controlling their spread.



The underside of a zebra mussel-infested boat motor at the Alcan Land Port of Entry watercraft inspection and decontamination station.

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## Partnering to Protect Alaska's Lakes from These Invasive Mussels

Currently, these invasive mussels have not yet established themselves in Alaska's waterways. However, the risk is real. These mussels have been detected on used boat hulls crossing the border on the Alcan Highway. Fortunately, they were discovered before the contaminated boats reached our local waters. Research and education efforts are underway across the country in an attempt to stop the spread of these aquatic invaders.

In summer 2025, Anchorage Waterways Council (AWC) was among the organizations that participated in an ongoing study conducted by the University of Alaska Fairbanks (UAF) aimed at identifying lakes at risk of invasive mussel establishment based on water chemistry. One of the main limiting factors for mussel establishment is dissolved calcium concentration. AWC board member Birgit Hagedorn oversaw the Council's involvement with this study, and I (Kaitlan McLallen) conducted testing at 4 local Anchorage sites: Cheney Lake, Westchester Lagoon, Sand Lake, and Lake Hood, which was completed at the end of September. The collected samples were sent to UAF for analysis (results pending).

Through studies like this and other research, monitoring and education efforts, we hope to ensure that our waterways remain free from the devastating impacts of these invasive mussels.



Watercraft inspector physically inspects kayaks for aquatic invasive species at Alcan Land Port of Entry watercraft inspection and decontamination station.

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The establishment of invasive quagga and zebra mussels has far-reaching consequences for aquatic ecosystems, economies, and communities. Their ability to rapidly colonize new habitats, alter food webs, and cause structural and environmental damage makes them one of the most problematic invasive species in North America. Ongoing efforts to monitor, prevent, and control their spread are essential to protect native biodiversity and minimize negative impacts from these tiny invasive invaders.

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**Alaska is one of only five western states not infested with invasive dreissenid mussels! lets make sure we keep it that way!**



## MEMBERSHIPS AND DONATIONS

Support your local waterways with an AWC membership starting at just \$30 a year! Join a passionate community of citizens and businesses dedicated to protecting creeks and lakes across the Anchorage watershed. Your annual contribution makes a big impact for a small nonprofit like AWC. Explore all our membership options and find the one that's right for you—click the link below!



Join or Donate

## Donate through FashionPact



In July 2021, FashionPact launched its first thrift boutique to raise funds for local non-profits. Since then, AWC has received over \$5,000 in proceeds generated through donations of goods from AWC supporters and purchases made by shoppers who designate AWC as the recipient organization.

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## **Anchorage Waterways Council - *Streamline***

November/December 2025

Kaitlan McLallen, Editor

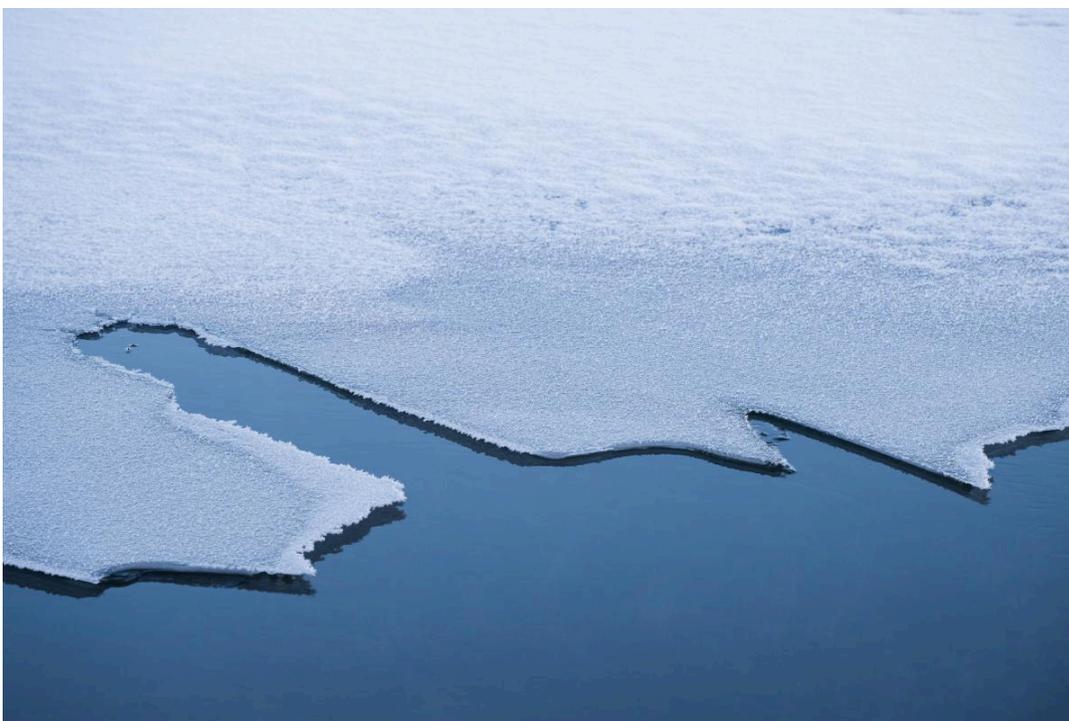
### **Season Greetings from Anchorage Waterways Council**

**Thank you for another successful year, and for the continued support of our members, donors, volunteers, board, and the entire community whose support makes our mission possible.**

Anchorage's winter wilderness offers countless ways to enjoy outdoor adventures, from ice skating and ice fishing to cross-country skiing, hiking, and more. Along with these opportunities come unique water-related hazards. Frozen lakes, rivers, and creeks can be deceptive: thin ice, hidden currents, and icy waters pose serious risks. Checking ice conditions and staying aware of the water beneath the snow are essential steps to staying safe. Respecting frozen surfaces, staying on solid ice, avoiding fragile edges, and following marked paths also helps protect the waterways themselves and the wildlife that depend on them.



Traveling across Anchorage's frozen waterways during winter can be tempting, but without proper precautions, such journeys carry risks of serious injury or death.



### **Unpredictable Ice Thickness**

One of the greatest risks to those looking to enjoy Anchorage's frozen water sources is that ice thickness can vary dramatically, even within short distances. Factors such as water currents, snow cover, underwater springs, inflow and outflow points, and recent temperature changes can create weak spots and affect how and where ice forms. Ice may appear solid, but be dangerously thin just a few feet away.

### **Changing Weather and Temperature**

Anchorage's weather can change rapidly, affecting ice stability. Warmer temperatures, rain, and sunny days can weaken ice, while snow cover can insulate and slow the

freezing process. Thaws, even brief ones, can compromise ice strength and make previously safe routes hazardous.

## Hidden Hazards

Snow can conceal cracks, pressure ridges, open water, or slushy areas. These hazards may not be visible until it is too late.

## False Sense of Security

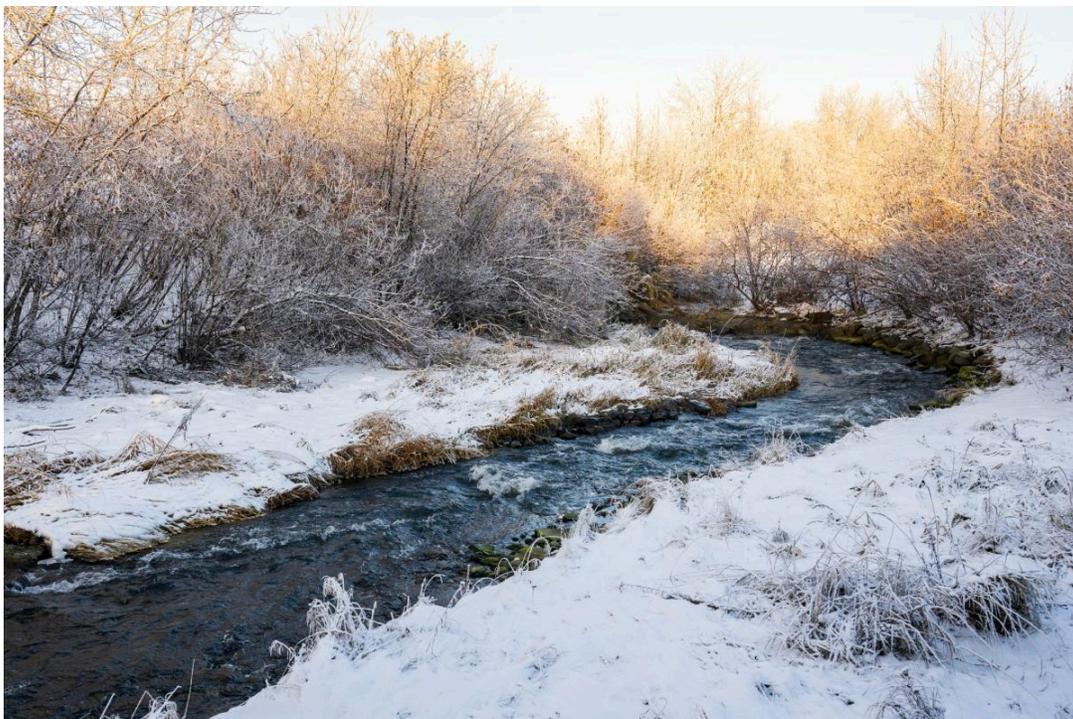
The presence of other people on the ice or visible marks from previous activity can create a false sense of safety. Unfortunately, ice can weaken quickly due to warming temperatures, rain, or shifts in water levels. Even ice that was safe yesterday may not be safe today, making it critical to check conditions each time before stepping onto a frozen lake.

## Cold Water Shock and Hypothermia

Many frozen creeks and lakes in Anchorage are located in areas with limited cell service and few people nearby. If an accident occurs, help may not arrive quickly. Falling through ice into frigid temperatures can cause cold water shock, triggering a sudden, involuntary gasp that increases the risk of drowning. Hypothermia can develop within minutes, causing confusion, weakness, and eventually unconsciousness. Survival rates drop rapidly in cold water, making self-rescue skills, proper preparation, and caution essential for anyone venturing onto frozen waterways in Anchorage.

## Difficulty in Rescue

Rescuing someone who has fallen through ice is extremely challenging and dangerous for both the victim and would-be rescuers. Ice around the break is usually fragile, and approaching it can result in additional people falling through. Emergency responders are trained for these situations, but response time is critical. Carrying safety equipment can make a difference, but prevention is always best.



## Safety Recommendations

- Travel with companions and carry safety equipment such as ice picks, a throw rope, and flotation gear.
- Stay on established trails and avoid unfamiliar areas, especially near inlets, outlets, and pressure ridges.
- Be prepared for emergencies with warm clothing, communication devices, and knowledge of self-rescue techniques.
- Never assume ice is safe based on appearance or past experience; conditions can change rapidly.
- When in doubt, don't go out.



Anchorage is a haven for outdoor winter recreation. Understanding the risks and hazards on and around water is critical. Go out prepared and well-equipped. Stay cautious on the ice, and remember that no adventure is ever worth compromising your safety. Enjoy the magic of Anchorage's winter creeks and explore them safely.



## **A HUGE THANK YOU TO ALL OUR 2025 Pick.Click.Give. DONORS!**

We are truly honored that you chose our organization as your Pick.Click.Give. recipient. For 42 years, we've been dedicated to protecting our creeks and promoting a thriving ecosystem. Your generosity helps us continue this vital work, safeguarding local habitats, and fostering a healthy, vibrant community.

We are deeply grateful for your support.

*[How to Pick.Click.Give](#)*

## MEMBERSHIPS AND DONATIONS

Protect the creeks, lakes and rivers in the Anchorage watershed by becoming an AWC member starting at just \$30 a year!

Join a dedicated community of neighbors and local businesses working together to keep our waterways healthy.

Even a small annual contribution makes a big difference for a nonprofit like AWC. Consider a one-time donation if you prefer. Explore our membership options and choose the one that's right for you. Click the "Join or Donate" button below, or mail a contribution.

**\$30-\$99 Waterway Watcher**  
**\$100-\$249 River Keeper**  
**\$250-\$499 Habitat Protector**  
**\$500-\$999 Watershed Steward**  
**\$1,000+ President's Circle**

**And don't forget: your membership is tax-deductible, making it a great way to give back before the end of the year.**

Join or Donate



## Donate through FashionPact



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Shop or donate at the store  
on the corner *E. 68th and Lake Otis Pkwy* or *221 E. Dimond Blvd.*  
You'll be glad you did!

## Upcoming event at FashionPact

Dec. 13th 2-5pm

*E. 68th and Lake Otis Pkwy location only*

### **Free Pictures with Santa**

Anyone can bring their camera and their kids, pets, or friend group to snap some sweet pics with Santa. We'll provide a backdrop and a person to take pictures. Click the link for details.

Visit our website

Contact: 907 272-7335 or [awc@anchoragecreeks.org](mailto:awc@anchoragecreeks.org)  
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## APPENDIX C – APDES Presentation - March 4, 2025

# 2024 WATERSHED PERCEPTION SURVEY

Prepared for the Municipality of Anchorage,  
Watershed Management Services  
APDES Permit AKS-052558

March 4, 2025

By Cherie Northon, Ph.D.  
Anchorage Waterways Council



## WHAT? WHEN? WHY?

- The Watershed Perception Survey seeks to measure the changes in awareness and behavior by Anchorage's residents in regard to the impact of stormwater on local waterways.
- AWC completed its first survey in 2010 as the baseline.
- It's the final product from each five-year contract period for AWC's education program whose goal is to reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts.

# HOW?

- The 2010 survey questions were partially based on a 1996 survey titled, *Campbell Creek Watershed Education Program Initial Assessment of Public Perceptions* which was compiled by Hellenthal & Associates.
- The objective was to try and make a comparison of the perceptions, actions, interests, and responsiveness of Anchorage citizens 14 years later and to identify issues that should be included in the current public education program.
- Survey Monkey is the current platform used. Alaska demographics have necessitated ~384 responses needed for a 95% +/- 5 confidence level for all surveys accomplished.
  - 2010 - 497 respondents
  - 2014 – 681 respondents
  - 2020 – 450 respondents
  - 2024 – 380 respondents

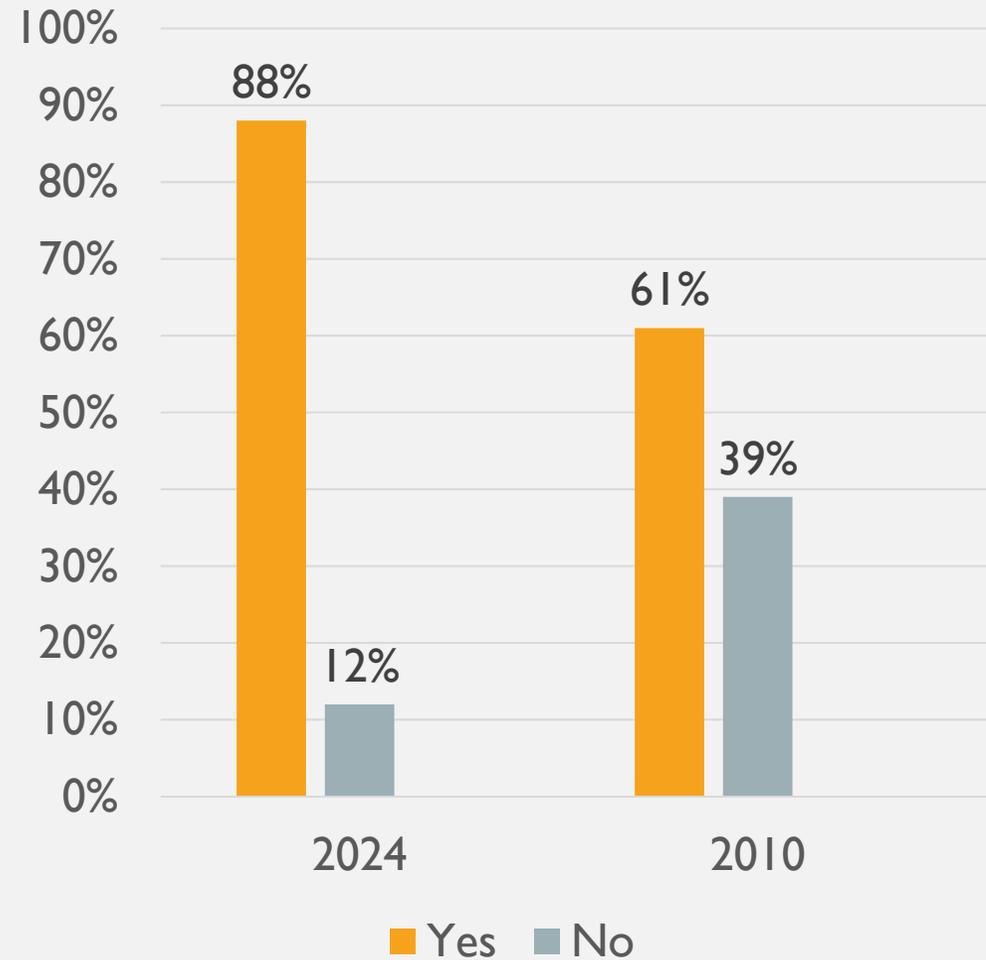
# COMPOSITION

- ~ 40 questions
- Single answer and true/false
- Multiple choice
- Ranked choice
- Open-ended
- Demographics
- Average time was ~20 minutes for completion

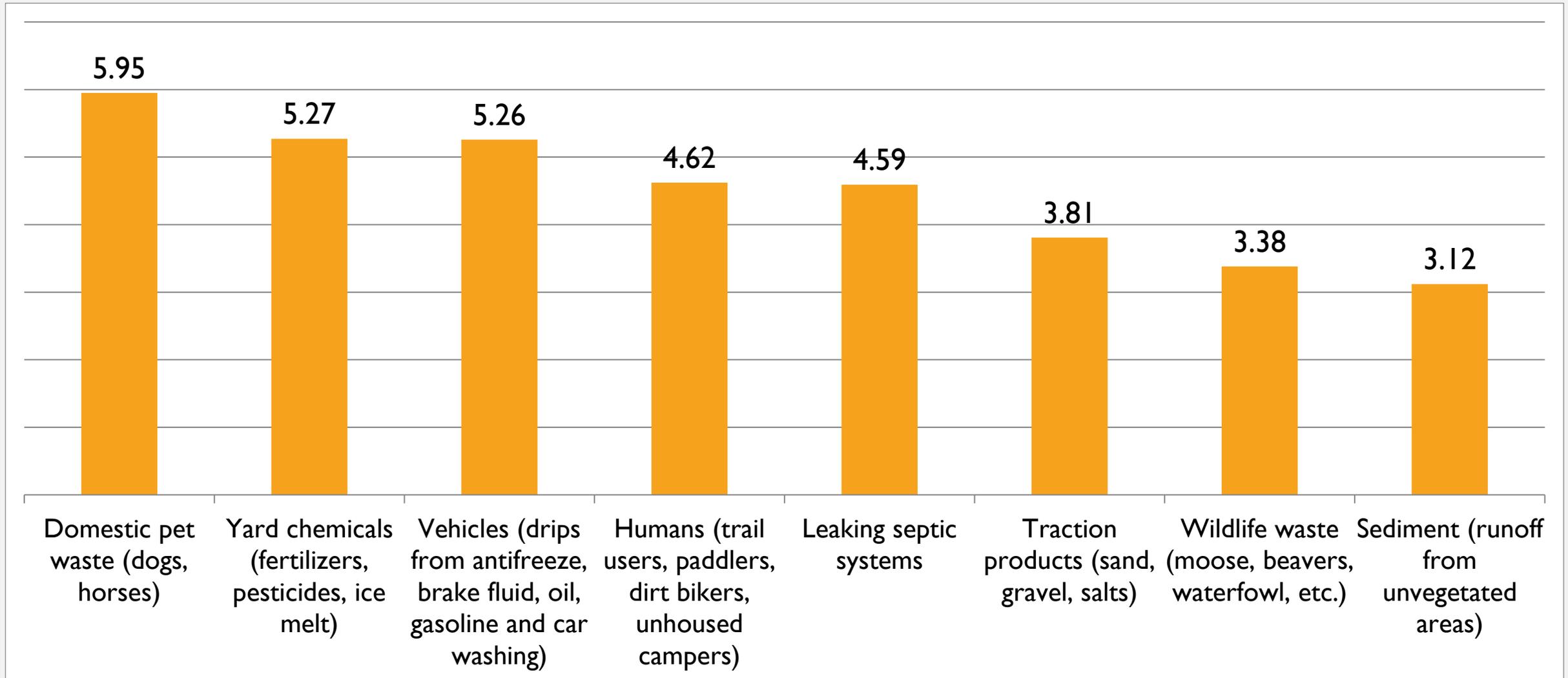
# QUESTION'S OBJECTIVES

- Targeted questions:
  - To gauge the respondent's **understanding** of watersheds, stormwater terminology, and best practices
  - To elicit information on the respondent's **actions**, such as cleaning up pet waste, use of yard chemicals, and volunteerism/involvement in environmental organizations
  - To understand how respondents **use** their local waterways, e.g. swimming, fishing, and enjoying nature
- Opinions:
  - The state of local waterways and the responsibility for their health
  - Perceived biggest threats to waterways
  - Actions to be taken for problem solving, such as how to get people to pick up their pet's waste
- Educational questions:
  - Monofilament recycling and lead toxicity
  - Organizations working to improve Anchorage's overall environment

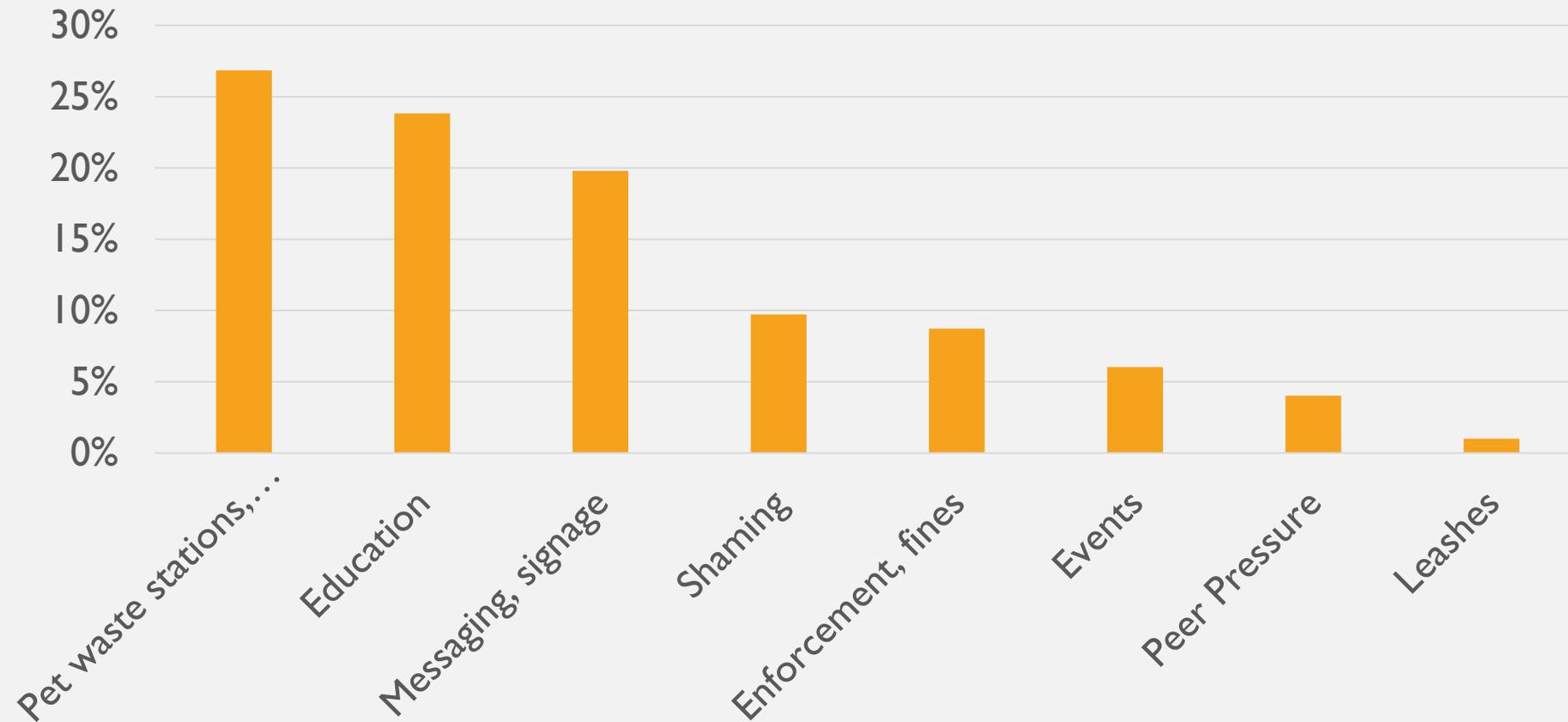
# Do you live in a watershed?



# Please rank the BIGGEST threats to water quality in Anchorage's creeks.



# Besides code enforcement/fines, how can we encourage dog owners to pick up their pet's waste?



## OPEN-ENDED RESPONSES

- ‘Start in elementary school with facts and responsibility, it’s too late by the time adults own a dog’
- ‘Education that shows specifics of how bacteria/disease affects THEM directly so they get grossed out, like bacteria on our kids when they play in the water.’
- ‘Put them in stocks? Shoot them! Shame them!’
- ‘Poop in their yard!’
- **General messaging:** kindness, rewards, reenforcing the positive

# OVERALL IMPRESSION

- Slight uptick in respondents' thoughts about waterway quality improving since 2020
- Really good articulation about terminology and concepts:
  - Green infrastructure—rain gardens, permeable pavement, etc.
  - Vegetative buffers
  - Reduction of yard chemicals, e.g. ice melt, fertilizers, and herbicides
- Those “always” picking up their pet waste when they're out remains the same as 2020.
- **Education** figures prominently among the answers.
- It's getting difficult to find people who want to spend ~20 minutes taking a survey, so some alterations need to be considered before the next one.
- AI answers were used in some places.

## AI AND BOTS

What is the most important action that you could take to improve water quality in local creeks, rivers and lakes?

- We have implemented the river and lake chief system and explored replicable and extendable governance models for key river basins under the model of "taking the leadership of the general river chief and joint management of river chiefs at all levels and relevant departments", as shown in the successful governance case of Xiaoxi River Basin in Central urban area of Longyan.
- 不要乱丢垃圾

The final Watershed Perception Survey report should be finished by the end of March, and it will be placed on the AWC website:

[anchoragecreeks.org](http://anchoragecreeks.org)

Questions?

Thank you!

