Jordan Creek Water and Sediment Quality Monitoring

Field Report

March 2021

A Univ. of Alaska Southeast student collects water samples in Jordan Creek at the Jordan Ave. South sampling station in May 2019.

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Introduction

This field report presents the results of water and sediment quality monitoring conducted in the Lower Jordan Creek watershed by the Southeast Alaska Watershed Coalition (SAWC) from May 2019 to February 2021. Sampling methods and other information is provided in the *Jordan Creek Water and Sediment Quality Monitoring Quality Assurance Project Plan* (QAPP) dated April 2019. See Appendix A below for photographs of various aspects of the project.

Project Background

Jordan Creek is an anadromous stream located on the east side of the Mendenhall Valley of Juneau, Alaska. Jordan Creek was listed as an Impaired Waterbody by the State of Alaska in 1998 due to nonattainment of sediment, dissolved oxygen (DO), and residue (i.e., litter and other human-made debris) standards. Stormwater runoff from urban areas was identified as being the major source of pollutant delivery to the stream. The lower portion of the watershed (downstream of Egan Drive) is densely urbanized compared to the upper watershed, resulting in stream channelization, loss or impairment of wetland and riparian habitat, and increased stormwater runoff.

Water that flows quickly off impervious surfaces (i.e., roads, roofs, and parking areas) can mobilize and carry more sediments and pollutants, including heavy metals, total aquatic hydrocarbons (TAqH), nutrients, salts, and bacteria, than water that is slowed by vegetation and porous soils. In addition to physically slowing down the delivery of pollutants to streams, soil microbes and plants can metabolize or breakdown toxic chemicals, further reducing pollutant loads in streams. Relative to baseflow, during heavy rains a larger proportion of water entering streams has traveled overland across impervious surfaces, collecting sediments and pollutants along the way and causing elevated concentrations of these constituents in streams.

Fine sediment can dominate stream beds blocking the flow of oxygen to developing salmon eggs, clog the gills of rearing juvenile salmon or resident fish, disrupt visual feeding activity, and eliminate the living space for benthic invertebrates. Additionally, urban stormwater pollutants can affect the behavior, health, and survival of aquatic organisms directly (e.g. ammonia toxicity) and indirectly (e.g. copper alters salmon sense of smell and ability to avoid predators and find natal streams).

Jordan Creek has an approved Total Maximum Daily Load (TMDL) for interstitial dissolved oxygen and sediments (2009). However, little relevant data has been collected since the approval of the TMDL ten years ago, so we do not know if conditions have improved or deteriorated in the intervening time. Additionally, to our knowledge, no data related to urban stormwater pollutants, other than sediments, turbidity, pH, and DO have been collected, so the condition of the stream with respect to these constituents is unknown. Water and sediment testing are needed to evaluate the impact of stormwater on the stream, and whether the designated uses of Jordan Creek are being met.

This report presents the results of water and sediment quality monitoring conducted by SAWC in Lower Jordan Creek in 2019 and 2020. Monitoring results identified urban stormwater runoff as a likely source of pollutant transport to Jordan Creek. The most elevated (relative to the reference sampling station at Egan Drive) of these pollutants include the metals zinc, copper, and lead and polycyclic aromatic hydrocarbons (PAHs). These pollutants were associated with streambed sediment and often exceeded

levels that can adversely affect aquatic life. Therefore, our Jordan Creek action plan recommends site-specific stormwater best management practices (i.e., land management practices and infrastructure) that will reduce pollutant concentrations to levels that are safe for aquatic life.
For the purposes of this project, Lower Jordan Creek is defined as the reach of stream between Egan Drive and Yandukin Drive (Fig. 1).

Project Objectives

The objective of this project was to perform ambient water and sediment quality monitoring to determine concentrations of pollutants and characterize the spatiotemporal extent of the impacts of urban stormwater runoff in Jordan Creek. This monitoring will support efforts to address impairment and institute protection measures for Jordan Creek, including reduction of stormwater runoff. We met this objective by sampling for water and sediment quality during three (3) seasons over two (2) years, at sites along a gradient of suspected influence of urban stormwater inputs.
Information collected in this project was used to assess whether water quality standards (WQS) for interstitial DO and sediment, as well as a range of stormwater pollutants, including heavy metals, PAHs, nitrogen, and bacteria are being met. This allowed us to re(evaluate) the impairment status of Jordan Creek relative to these constituents. The spatiotemporal patterns of concentrations of constituents of concern provided information about how to prioritize stormwater reduction measures in the watershed.

Sampling Overview

SAWC monitored ambient water quality and sediment to determine the temporal and spatial extent and severity of urban pollutants, including metals of particular concern for fish health (cadmium, chromium, copper, lead, nickel, and zinc), polycyclic aromatic hydrocarbons (PAHs), fecal coliform, E. coli, dissolved organic carbon, settleable solids, total solids, ammonia, nitrate, hardness, major cations, major anions, alkalinity, and sulfide. Sediments were analyzed for metals, PAHs, and grain size distribution. Additionally, DO, turbidity, temperature, and specific conductance, and discharge was measured in situ.

Water and sediment monitoring was conducted at 3 locations in the stream over 2 years: 1. Upstream of Egan Drive; 2. Glacier Highway; and 3. Jordan Ave. South (Table 1, Fig. 1). The upstream site represents "reference" conditions with respect to urban pollutants, while sites 2 and 3 receive increasing amounts of runoff from the urbanized part of the lower watershed. The 3 stations establish a longitudinal transect to inform the spatial extent of impacts of urban runoff on sediment and water quality. Our original plan was to establish the most downstream sampling station near the Yandukin Drive crossing of Jordan Creek, the location of the most downstream stormwater system outfall to the stream. However, a beaver impoundment in this area required relocating the station upstream of the impoundment, where the south end of Jordan Ave. (i.e., the right-of-way) crosses the stream. Although this site was referred to as "Yandukin" throughout the project, including in notebooks, spreadsheets, progress reports, analytical reports, etc., we have changed the site name to Jordan Ave. South. This name change distinguishes the site from a sampling site recently established by ADEC downstream of Yandukin Drive (Fig. 1).

Table 1. Sample stations and geographic coordinates.

Station	lat/long (DD)
Egan Drive	58.366698, -134.577213
Glacier Hwy	58.362559, -134.581468
Jordan Ave. South	58.360140, -134.579782

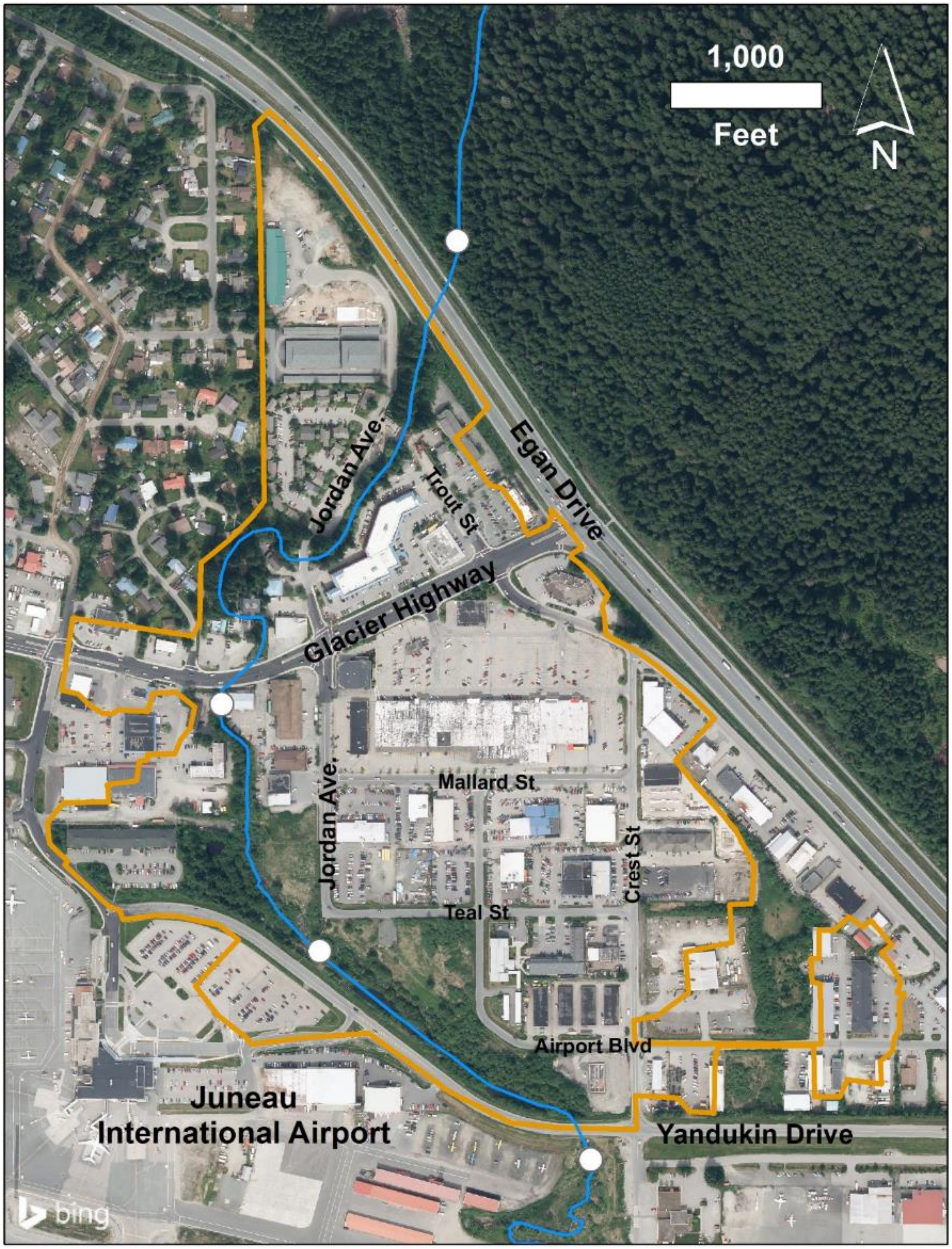

Fig. 1. The Lower Jordan Creek watershed (orange line) and 4 stream sampling stations indicated by white circles. Sampling stations at Egan Drive, Glacier Hwy., and Jordan Ave. South were established by SAWC and referenced in this field report. The Yandukin Drive station was established by ADEC in 2020.

Stream Water Quality

Physiochemical parameters

Several physiochemical parameters were measured at each sampling station on 8 dates between May 2019 and August 2020. Parameters were measured in situ by SAWC or analyzed by a commercial lab. Measurements are provided in Tables 2a-c.

Table 2a. Select physiochemical measurements from the Egan Drive sampling station. NM, not measured.

Date	5/30/19	8/26/19	10/24/19	11/6/19	3/17/20	5/19/20	7/30/20	8/2/20
Discharge (cms[1])	0.033	0.051	0.170	0.165	0.0643	0.269	NM	0.181
Dissolved oxygen (mg/L)	11.6	10.96	11.60	12.26	10.36	11.23	10.81	10.91
pH	7.06	6.68	6.86	6.68	7.63	8.48	6.81	7.01
Specific conductivity (µS/cm)	102.2	32.2	79.9	90.5	89.8	72.9	90.5	90.2
Water Temp. (C)	8.7	10.2	6.0	4.4	1.4	7.3	10.2	10.1
Turbidity (NTU[2])	1.17	1.46	1.12	1.31	1.78	3.61	0.98	1.31
Alkalinity (as CaCO3) (mg/L)	NM	22	30	34	33	24	NM	34
Ammonia Nitrogen (mg/L)	NM	< 0.02	< 0.02	0.035	0.021	< 0.02	NM	NM
Dis. Organic Carbon (mg/L)	NM	7.3	4.3	2.9	1.2	1.7	NM	1.7
Hardness (CaCO3) (mg/L)	NM	21	35	41	37	37	NM	43
Settleable Solids (ml/L)	NM	< 0.2	< 0.2	< 0.2	0.2	< 0.1	NM	NM
Total Nitrate + Nitrite (mg/L)	NM	< 0.02	0.25	0.23	0.21	0.23	NM	NM
Total Solids	NM	< 1	55	53	43	37	NM	45
Phosphorus (µg/g)	NM	1200	1761	1600	677	981	NM	NM
Chloride (mg/L)	NM	0.88	1.3	0.89	0.98	0.77	NM	0.66

[1]cubic meters/second, [2]nephelometric turbidity units

Table 2b. Select physiochemical measurements from the Glacier Hwy. sampling station. NM, not measured.

Date	5/30/19	8/26/19	10/24/19	11/6/19	3/17/20	5/19/20	7/30/20	8/2/20
Discharge (cms[1])	0.018	0.029	0.185	0.196	0.047	0.241	NM	0.159
Dissolved oxygen (mg/L)	11.09	10.86	11.74	12.43	11.27	12.82	11.02	10.96
pH	7.84	6.41	6.96	6.67	7.78	8.69	6.93	7.13
Specific conductivity (µS/cm)	104.2	24.6	78.4	90.5	95.5	74.8	91.4	89.3
Water Temp. (C)	9.9	10.5	6.0	4.3	1.2	6.9	10.4	10.7
Turbidity (NTU)	1.03	1.53	1.25	1.03	2.15	3.90	0.49	2.40
Alkalinity (as CaCO3) (mg/L)	NM	18	29	35	34	34	NM	34
Ammonia Nitrogen (mg/L)	NM	< 0.02	< 0.02	0.025	< 0.02	< 0.02	NM	NM
Dis. Organic Carbon (mg/L)	NM	8	4.4	3	1.3	1.6	NM	1.4
Hardness (CaCO3) (mg/L)	NM	21	35	41	35	37	NM	41
Settleable Solids (ml/L)	NM	< 0.2	< 0.2	< 0.2	< 0.02	< 0.1	NM	NM
Total Nitrate + Nitrite (mg/L)	NM	0.052	0.17	0.2	0.21	0.23	NM	NM
Total Solids	NM	11	67	42	43	37	NM	52
Phosphorus (µg/g)	NM	1670	1350	2420	1200	1640	NM	NM
Chloride		0.78	1.48	0.95	1.62	0.74		0.68

[1]cubic meters/second, [2]nephelometric turbidity units

Table 2c. Select physiochemical measurements from the Jordan Ave. South sampling station. NM, not measured.

Date	5/30/19	8/26/19	10/24/19	11/6/19	3/17/20	5/19/20	7/30/20	8/2/20
Discharge (cms[1])	0.014	0.028	0.372	0.167	0.047	0.187	NM	0.132
Dissolved Oxygen (mg/L)	10.93	10.70	11.66	12.50	11.56	11.43	11.16	10.62
pH	6.78	6.51	6.94	6.76	7.59	8.72	6.76	7.14
Specific Conductivity (µS/cm)	46.0	38.6	77.8	87.9	86.8	74.9	89.0	75.7
Water Temp. (C)	10.0	10.6	6.0	4.3	0.8	6.9	10.0	11.6
Turbidity (NTU)	0.85	1.52	1.23	0.94	1.84	2.84	0.41	10.36
Alkalinity (as CaCO3) (mg/L)	NM	18	29	34	33	32	NM	28
Ammonia Nitrogen (mg/L)	NM	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NM	NM
Dis. Organic Carbon (mg/L)	NM	8.1	4.2	3	1.2	1.4	NM	1.5
Hardness (CaCO3) (mg/L)	NM	21	34	41	35	37	NM	35
Settleable Solids (ml/L)	NM	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	NM	NM
Total Nitrate + Nitrite (mg/L)	NM	0.057	0.13	0.029	0.22	0.23	NM	NM
Total Solids	NM	3.9	51	42	47	39	NM	40
Phosphorus (µg/g)	NM	791	1250	946	908	1610	NM	NM
Chloride	NM	0.77	1.6	0.96	1.78	0.77	NM	0.61

[1]cubic meters/second, [2]nephelometric turbidity units

Bacteria

Water samples from each sampling station were analyzed for bacteria as an initial screening of bacteria levels (Tables 3 and 4). ADEC collected several water samples downstream of Yandukin Drive within a 30-day period in June and July 2020. Unlike our screening samples, the ADEC samples allow bacteria levels to be assessed relative to Alaska WQS.

Table 3. E. coli levels (MPN/100 ml) in water samples collected at 3 sampling stations in Jordan Creek on 7 dates between May 2019 and August 2020.

Date	5/30/2019	8/26/2019	10/24/2019	11/6/2019	3/17/2020	5/19/2020	8/3/2020
Sampling Station							
Egan Drive	10	1400	290	12	2	43	1400
Glacier Hwy.	12	1400	230	19	1	38	1600
Jordan Ave. South	12	1600	290	23	23	31	1700

Table 4. Fecal coliform levels (FC/100 ml) in water samples collected at 3 sampling stations in Jordan Creek on 7 dates between May 2019 and August 2020.

	Date						
Sampling Station	**5/30/2019**	**8/26/2019**	**10/24/2019**	**11/6/2019**	**3/17/2020**	**5/19/2020**	**8/3/2020**
Egan Drive	2	660	170	3	<2	62	970
Glacier Hwy.	8	1000	240	7	5	52	1200
Jordan Ave. South	2	980	260	13	12	28	1100

Interstitial Dissolved Oxygen

SAWC monitored interstitial DO concentrations at the 3 sampling stations. Per Alaska WQS, DO cannot be less than 5 mg/l to a depth of 20 cm in the interstitial waters of gravel used by anadromous and resident fish for spawning. Interstitial DO was measured in 3 PVC pipes (3.8 cm I.D. X 70 cm long) installed vertically in the streambed at each station. Pipes sampled interstitial water at a depth of 20-24 cm from the streambed surface. Interstitial water entered pipes through 24 6-mm diameter holes drilled into a 4 cm long section near the end of each pipe. Prior to each measurement, water was removed from the pipe to allow the pipe to fill with interstitial water from the adjacent streambed. No measurements were obtained at the Jordan Ave. South station on 9/19/2019. Results are presented in Table 5 and Fig. 2.

DO levels in the stream water column were always higher than levels measured in the pipes and exceeded the Alaska WQS of 7 mg/l for waters used by anadromous or resident fish. Interstitial DO was below the Alaska WQS of 5 mg/l in at least one pipe at each station and several pipes failed to refill with interstitial water. It is assumed that these pipes were embedded in sediment that had few or no interstitial spaces.

Table 5. Interstitial and stream water column DO concentrations (mg/L) at the 3 sampling stations. NM indicates no measurement was taken when the pipe failed to refill with interstitial water. Bold values are below the Alaska WQS of 5 mg/l.

Station/pipe	9/19/2019	11/6/2019	7/30/2020
Egan Drive			
pipe 1		**1.46**	**1.82**
pipe 2		7.82	5.40
pipe 3		5.54	6.30
stream		12.26	10.81
Glacier Hwy.			
pipe 1	5.30	**1.31**	NM
pipe 2	9.21	NM	**0.11**
pipe 3	7.40	**1.63**	9.40
stream	10.65	12.43	11.02
Jordan Ave. South			
pipe 1	8.61	9.90	3.66
pipe 2	8.60	9.29	9.98
pipe 3	5.75	6.14	**1.55**
stream	10.90	12.16	11.16

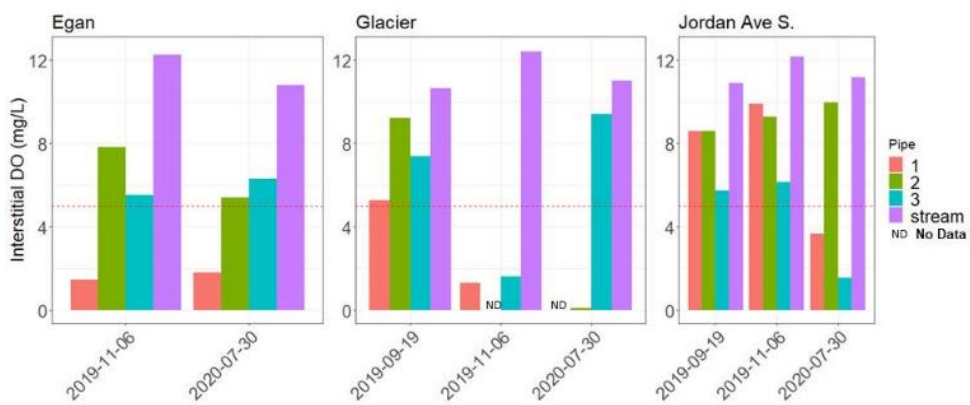

Fig. 2. Interstitial dissolved oxygen measured in 3 pipes at the Egan Drive, Glacier Hwy., and Jordan Ave. South sampling stations in Sept. and Nov. 2019 and July 2020.

Streambed Sediment Grain Size

Streambed sediment samples were collected at 3 sites at each of the 3 sampling stations on a single date. Samples were collected by inserting a 12.5 cm (inside diameter) plastic pipe into the streambed and removing sediment to a depth of 20. Each sample was dried and passed through a series of 16 standard sieves with mesh sizes ranging from 0.074 to 37.5 mm. The sediment retained by each sieve or that passed through the smallest sieve was weighed to the nearest 0.1 g. Grain size accumulation plots were created for each sample. The Alaska WQS establishes a maximum percentage of fine sediment allowed in gravel beds used by anadromous and resident fish for spawning. The 0.1 mm to 4.0 mm fine sediment range in gravel beds may not exceed 30% by weight (as shown in a grain size accumulation graph).

Grain size accumulation plots for sediment samples collected at the 3 sampling stations are showing in Fig. 3. The 30% weight standard is equaled or exceeded in 7 of the 8 samples, including in at least one sample from each station.

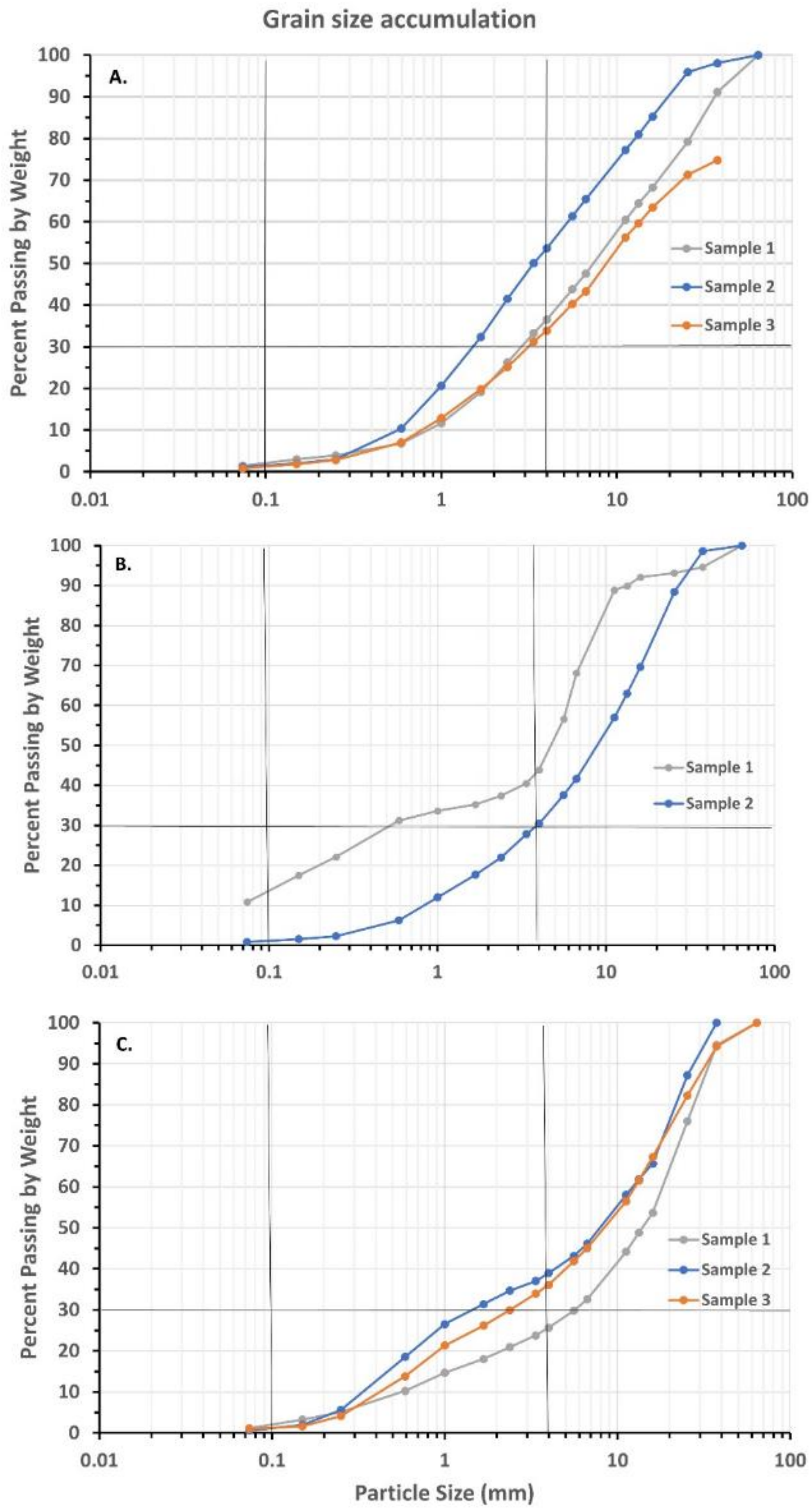

Figure 3. *Grain size accumulation plots from streambed sediment samples collected at Egan Drive (A), Glacier Hwy.(B), and Jordan Ave. South (C). Sample number refers to an individual sediment sample collected at each site.*

Sediment PAHs and Metals

Streambed sediment samples were collected from each sampling station on 5 dates between Aug. 2019 and May 2020 and analyzed for PAHs and several types of metals (Table 6 and 7). All individual PAH concentrations in Egan Drive sediment samples were below the detection limit. Total PAH concentrations exceeded the TEL (264.1 µg/kg) in one or more samples from each site. Relative to the reference site, PAH concentrations were elevated at both the downstream urban sites.

Table 6. Total polycyclic aromatic hydrocarbon (PAH) concentration (µg/kg) in streambed sediment samples collected in Jordan Creek at 3 sampling stations on 5 dates between Aug. 2019 and May 2020.

Sampling Station	8/26/2019	10/24/2019	11/6/2019	3/17/2020	5/19/2020
Egan Drive	244.8	201.6	320.0	87.0	377.6
Glacier Hwy.	1760.8	300.2	3992.5	719.5	1346.4
Jordan Ave. South	1201.7	320.0	1373.3	1029.3	1485.6

Among the metals that were found in streambed sediments, copper, lead, zinc, were most elevated at the two urban sampling stations relative to the reference station. Zinc concentrations in streambed sediments were at concerning levels at all sampling stations. Results are provided in Table 7.

Table 7. Concentrations of select metals in sediment samples from each of the 3 sampling stations on 5 dates between Aug. 2019 and May 2020.

Metal/sampling station	8/26/2019	10/24/2019	11/6/2019	3/17/2020	5/19/2020
Copper (µg/g)					
Egan Drive	32.6	16.0	31.5	16.9	32.0
Glacier Hwy.	60.3	48.1	70.0	48.6	71.0
Jordan Ave. South	25.7	57.1	36.1	43.6	69.6
Lead (µg/g)					
Egan Drive	8.6	3.3	8.2	< 1.0	9.4
Glacier Hwy.	27.0	19.9	35.0	12.2	30.1
Jordan Ave. South	19.3	34.4	31.1	23.9	68.5
Nickel (µg/g)					
Egan Drive	73.3	38.9	107.0	50.9	77.6
Glacier Hwy.	73.2	69.2	115.0	63.5	92.5
Jordan Ave. South	33.5	64.1	36.7	39.2	83.0
Zinc (µg/g)					
Egan Drive	99.5	55.3	132.0	55.1	91.9
Glacier Hwy.	232.0	174.0	291.0	155.0	231.0
Jordan Ave. South	114.0	221.0	170.0	176.0	309.0

Stormwater Water Quality

To better understand pollutant sources in the Lower Jordan Creek watershed, SAWC measured ambient water quality (Table 8), metal concentrations (Table 9), and bacteria (Table 10) in stormwater runoff collected from 5 stormwater outfalls (Fig. 4) at the beginning of a runoff event on August 2.

Physiochemical parameters

Table 8. Physiochemical parameters of water samples collected at 5 stormwater outfalls in the Lower Jordan Creek watershed on August 2, 2020.

	Outfall (time)				
Parameter	**3 (0820)**	**5 (0928)**	**6 (0844)**	**9 (0918)**	**10 (0904)**
Dissolved oxygen (mg/L)	9.27	9.52	9.94	9.64	9.68
pH	6.86	6.77	6.89	6.48	7.01
Specific conductivity (µS/cm)	27.16	10.84	11.93	9.52	19.26
Water Temp. (C)	15.84	15.54	15.6	15.67	15.36
Turbidity (NTU[1])	116.22	7.57	73.49	13.5	75.62
	(0805)	**(0915)**	**(0835)**	**(0835)**	**(0900)**
Alkalinity (as CaCO3) (mg/L)	18	26	4	2	8
Dis. Organic Carbon (mg/L)	8.6	1.1	0.98	1.9	1.6
Hardness (CaCO3) (mg/L)	29	5.7	11	85	19
Total Solids	120	37	62	34	68
Chloride	8.8	0.17	0.28	0.55	0.98

[1]nephelometric turbidity units

Metals

Table 9. Concentrations of dissolved copper, lead, nickel, and zinc in stormwater collected at 5 outfalls in the Lower Jordan Creek Watershed on August 2, 2020.

Metal/ outfall	Dissolved (µg/l)	Total (µg/l)
Copper (µg/g)		
3	6.84	10.4
5	0.86	1.14
6	2.74	4.76
9	1.92	3.4
10	30.0	39.8
Lead (µg/g)		
3	0.911	2.18
5	0.106	0.315
6	0.789	2.22
9	0.709	2.20
10	0.376	2.94
Nickel (µg/g)		
3	1.22	4.12
5	0.15	0.93
6	0.38	2.3
9	0.44	1.86
10	0.51	3.20
Zinc (µg/g)		
3	56.4	75.6
5	2.68	4.86
6	27.8	40.4
9	29.8	39.1
10	37.1	51.5

Bacteria

Table 10. Bacteria levels in water samples collected at 5 stormwater outfalls during a runoff event on August 3, 2020.

Outfall	Fecal coliform (FC/100 ml)	E. coli. (MPN/100 ml)
3	1800	2400
5	1200	1800
6	1000	1200
9	>2400	1000
10	>600	>2400

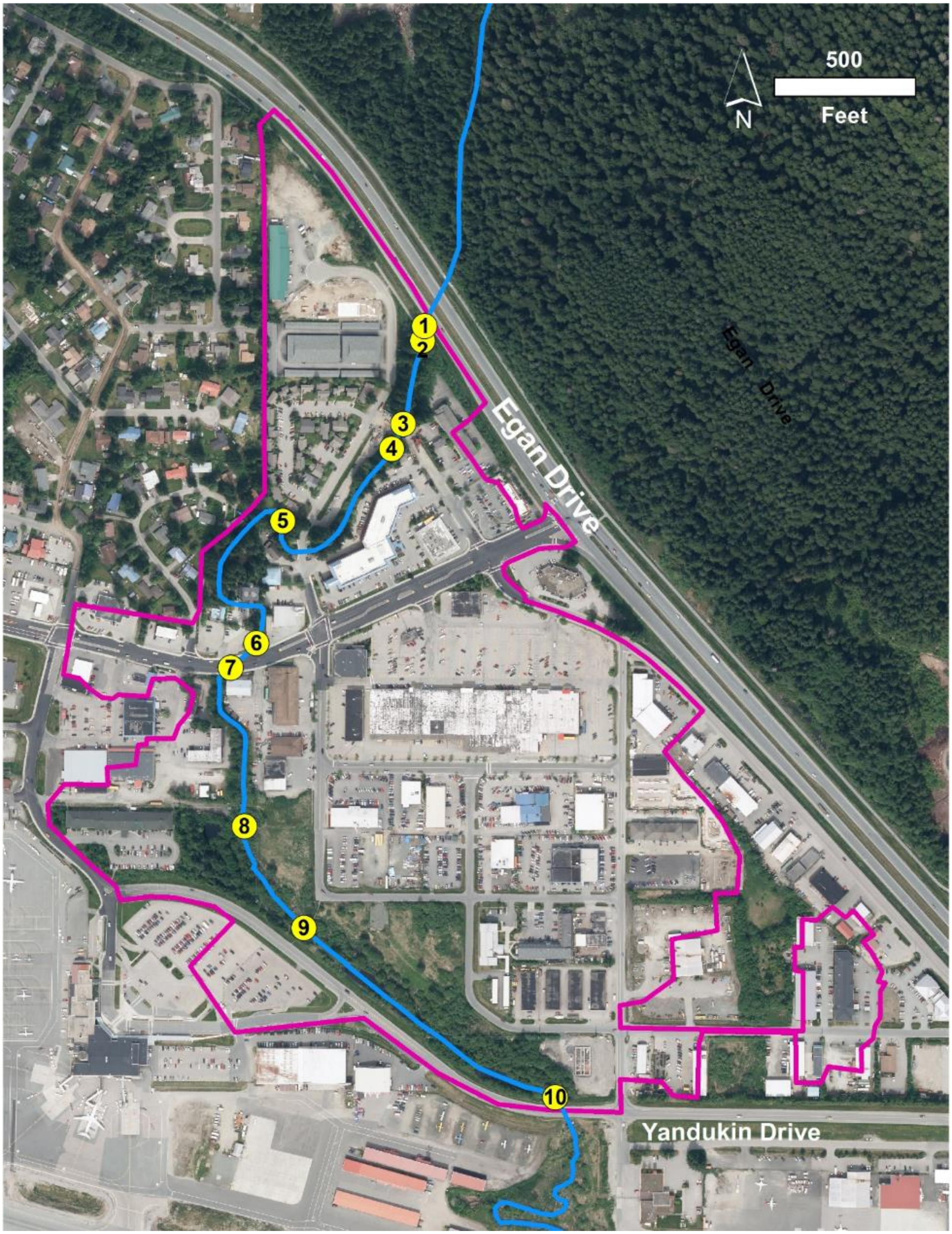

Figure 4. Stormwater outfalls in the Lower Jordan Creek watershed.

Stage-Discharge Relationship

Currently, stream stage height, but not discharge is being monitored by NOAA at the Jordan Ave. crossing of Jordan Creek. A sensor on the bridge measures water surface elevation every 15 minutes. To develop a stage height-stream discharge rating curve for this site, SAWC and UAS measured discharge immediately upstream of Jordan Ave. on 13 dates between May 2019 and August 2020. Stage ranged from 6.83 to 8.64 feet and discharge ranged from 0.11 to 34.05 cubic feet per second. Stage only explained 68% of the variation in discharge.

In response to large floods in lower Jordan Creek during the past few years, the Alaska Dept. of Transportation and Public Facilities contracted the United States Geological Service to install a new gage at the original site of a former gaging station immediately downstream of Egan Drive. This gage will provide real-time estimates of stream discharge and SAWC intends to use the data for future monitoring efforts.

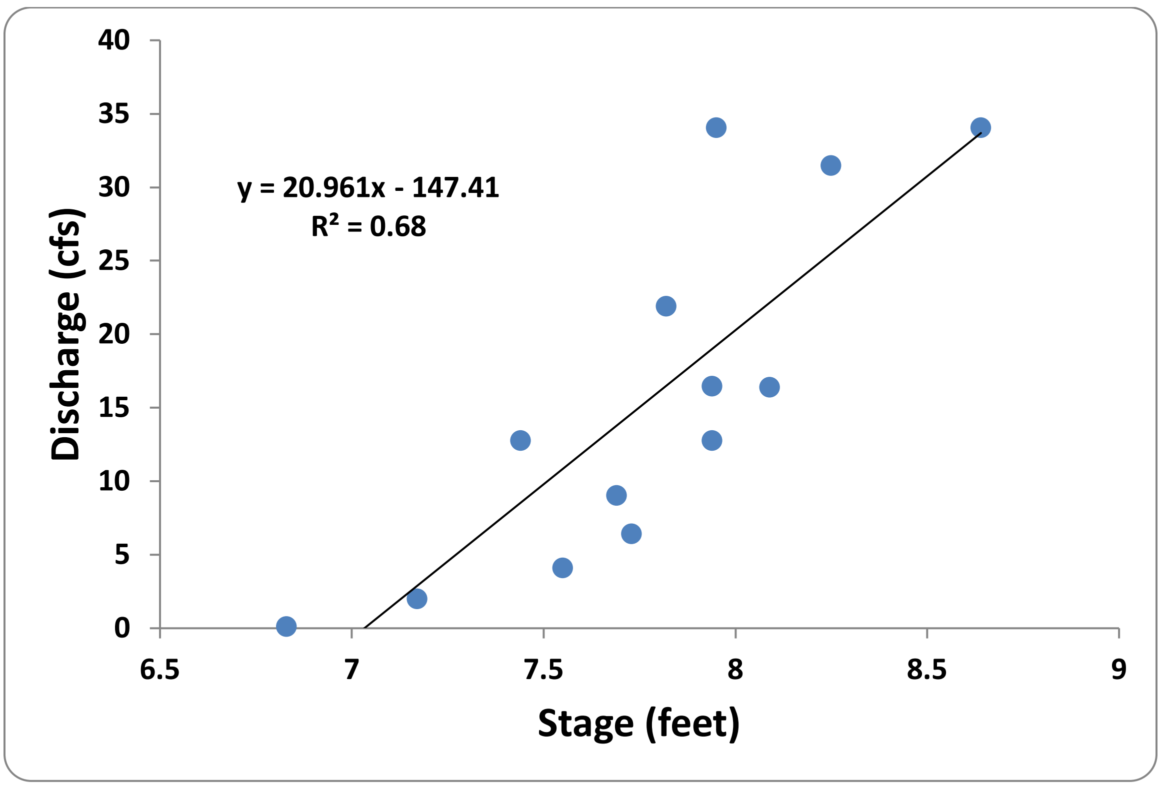

Figure 5. A rating curve for the Jordan Ave. stream height gage operated by NOAA.

Appendix A. Project photographs.

Sampling water at the Jordan Ave. South sampling station on May 30, 2019.

Measuring stream discharge at the Egan Drive sampling station on May 30, 2019

The Egan Drive sampling station without surface flow on July 9, 2019. Pipes are used to measure interstitial dissolved oxygen.

The Jordan Ave. South sampling station without surface flow on July 9, 2019.

Sampling water at the Jordan Ave. South sampling station on August 26, 2019.

The Glacier Hwy. sampling station without surface flow on July 9, 2019.

The Glacier Hwy. sampling station on August 26, 2019.

A PVC pipe used to measure interstitial dissolved oxygen at the Egan Drive sampling station on September 19, 2019.

The Egan Drive sampling station on October 24, 2019.

The Glacier Hwy. sampling station on October 24, 2019.

The Jordan Ave. South sampling station on October 24, 2019.

The Glacier Hwy. sampling station on November 6, 2019.

The Jordan Ave. South sampling station on November 6, 2019.

The Jordan Ave. South sampling station on March 17, 2020.

The Glacier Hwy. sampling station on March 17, 2019.

The Egan Drive sampling station on March 17, 2018. **The Egan Drive sampling station on May 9, 2020.**

Measuring discharge at the Glacier Hwy. sampling station on May 9, 2020.

The Jordan Ave. South sampling station on May 9, 2020.

The Glacier Hwy. sampling station on May 9, 2020.

Sampling water at the Egan Drive sampling station on August 2, 2020.

Measuring discharge at the Jordan Ave. South sampling station on August 2, 2020.

Measuring water quality parameters at the Trout Street ditch stormwater outfall (stormwater system 3) on August 2, 2020.

Measuring water quality parameters and collecting water sample at the stormwater system 10 outfall at Crest Street and Yandukin Drive on August 2, 2020.

Collecting a water sample at the stormwater system 5 outfall pipe on August 2, 2020.

Collecting a streambed sediment sample at the Glacier Hwy. sampling station on January 25, 2021.

Collecting a streambed sediment sample at the Jordan Ave. South sampling station on September 21, 2020.