

Field Report

Alaska Monitoring and Assessment Program

2019 Southeast Streams Survey

June 15 – August 12, 2019



Alaska Center for
Conservation Science
UNIVERSITY of ALASKA ANCHORAGE

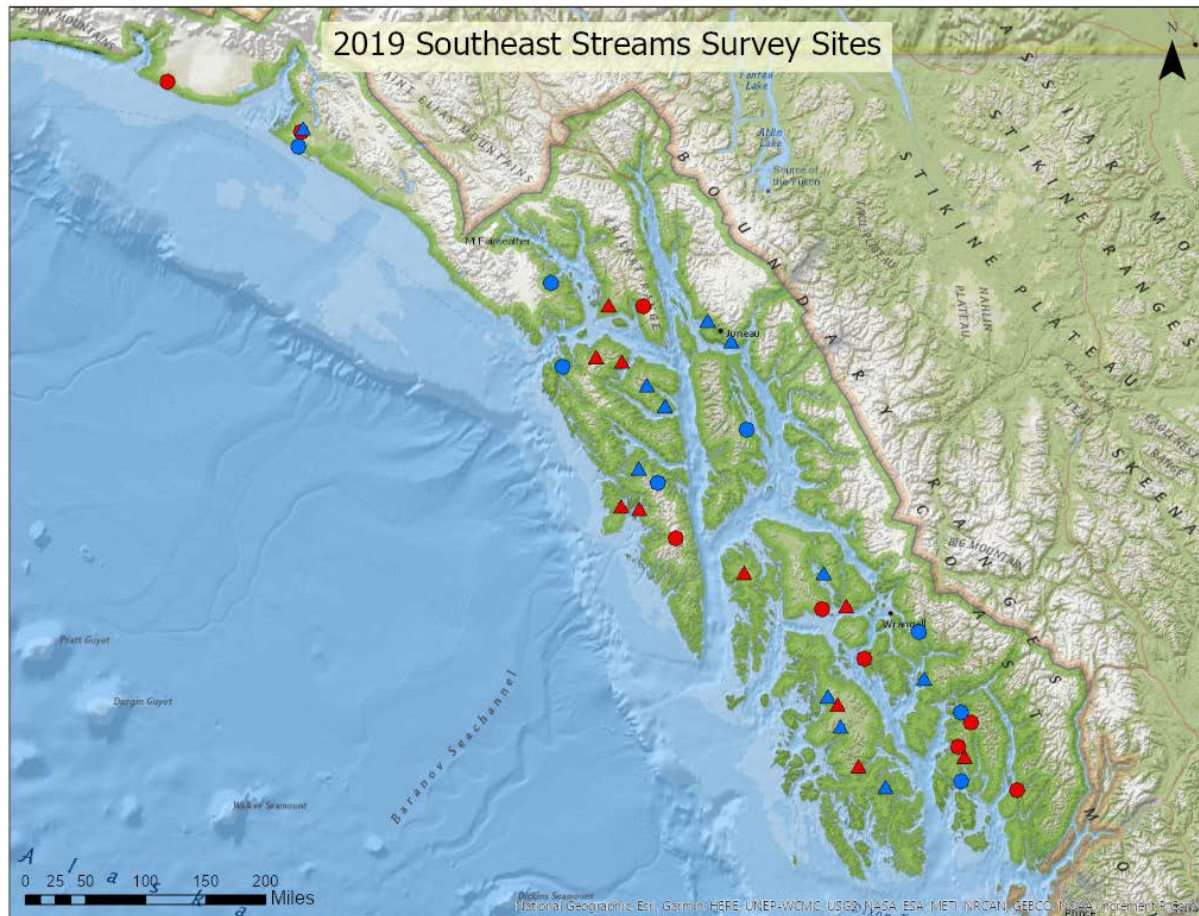


Figure 1. Small (blue; $n = 19$) and medium (red; $n = 19$) stream sites surveyed in 2019. Sites were accessed either by road (\blacktriangle ; $n = 21$) or by alternative means such as floatplane or helicopter (\bullet ; $n = 17$).

Acknowledgements

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AKMAP 2019 Southeast Streams Survey

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The Alaska Department of Environmental Conservation (DEC) established the Alaska Monitoring and Assessment Program (AKMAP) in 2004 to collect baseline data about Alaska's waters, identify water quality problems, and track improvement or decline of water quality. The program uses a statistical survey design to provide estimates of the spatial extent of water quality based on a variety of indicators including chemical contaminants, macroinvertebrate community structure, and water chemistry. Environmental managers use this information to support the protection and restoration of freshwater river and stream environments and mitigate damage to these ecosystems. The purpose of this project was to complete the third of a series of four aquatic resource surveys in Southeast Alaska including lakes (2017), rivers (2018), and coastal areas (2020).

EPA partners with states and Tribes to complete these National Aquatic Resource Surveys (NARS) to characterize the state of the nation's aquatic resources. NARS surveys are designed based on random sampling which is used in a variety of fields (e.g., health surveys or election polls) to determine the status of populations or resources using a representative sample of relatively few members or sites. Random surveys provide scientifically-defensible assessments of the nation's waters and can be used to track changes in condition over time.

Sites for this survey were selected using ArcGIS software. The sample frame was constructed with the National Hydrography Network for Southeast Alaska HUC 1901. Strahler stream order was assigned to the network using RivEx, an ArcGIS toolset, and orders 1-3 were retained for this survey. (Larger rivers were surveyed during the 2018 Rivers Survey.) Stream order is not perfect throughout the network, but well-represented in most cases. All network segments which overlapped with National Hydrography Dataset (NHD) waterbodies were removed.

For the purposes of this study, the target population included streams in Southeast Alaska that were above the head of salt and accessible by car, foot, boat, airplane or helicopter. Streams were selected randomly using a Generalized Random Tessellation Stratified (GRTS) survey design for a linear resource.

For random selection, streams sites were categorized as "road" (accessible by either car or ATV) or "other" (accessible by floatplane or helicopter), and "small" (equivalent to Strahler 1) or "medium" (equivalent to Strahler 2-3), for a total of 38 sites sampled (Fig. 1; Table 1). Sites pre-selected for sampling were dropped in the field when they were found to be dry or if they were not safely accessible. It



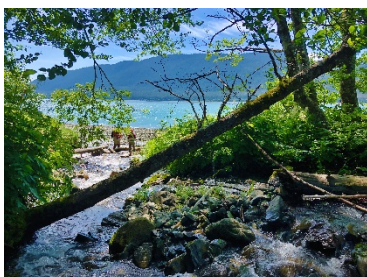
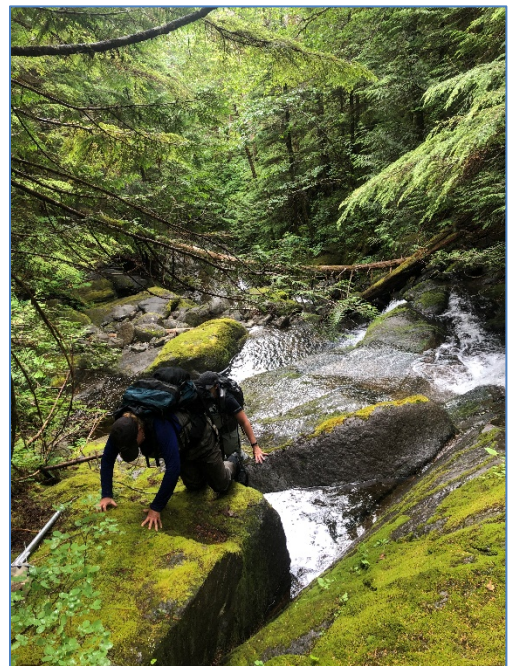
is important to note that 35 sites were dropped during this survey, many of them due to low-flow or dry conditions, and flow at sampled sites was often too low to be measured (Table 3). The period of July 17, 2018 – October 8, 2019 saw the longest duration of drought in Alaska (65 weeks), southeast Alaska experienced Extreme Drought conditions for the first time ever recorded (Drought.gov).

Each sampling team included two to three crew members, with two separate teams working concurrently throughout the summer. On arrival at the site, the stream was verified to be target – above the head of salt and with more than 50% continuous water.

Once the site was verified, the crew collected water, sediment, and biological samples according to National Rivers and Streams Assessment (NRSA) wadeable methods along a reach proportional to the width of the stream. (Fish tissue samples were not collected due to cost restrictions).

Physical habitat was surveyed at each of 11 transects spaced evenly throughout the sampling reach. The survey included assessments of riparian habitat, instream fish habitat, canopy cover, substrate, and human impacts.

- Water samples were collected from all sites. Samples were collected midstream at the center transect of each sampling reach unless access, flow, or other factors necessitated sampling from another location. Laboratory analyses were completed for dissolved metals, cations, nutrients, total suspended solids, acid neutralizing capacity, chlorophyll, and algal toxins. Enterococci samples were collected at the most upstream point of the sampling reach.
- Fine sediment (when available, see Table 2) was collected throughout the reach and homogenized. Sediment was analyzed for stable isotopes, total organic carbon, metals, and grain size.
- Biological samples included benthic macroinvertebrates and periphyton, and were composited from each of the 11 habitat transects unless substrate was unavailable or flow was too low to collect (Table 2). Benthic macroinvertebrates were collected using a D-frame kick net and by sampling a 1 square foot quadrat for 30 seconds. Periphyton was collected using a 12-cm² area delimiter and by scrubbing the surface area with a brush or collecting surface sediment if no coarse sediment was available. Macroinvertebrates and periphyton were preserved using ethanol and formalin, respectively.



Samples are currently being analyzed at various laboratories and complete results are expected in 2020. Data are available upon request.

The success of this project is attributed to the following personnel:

Sarah Apsens, DEC
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Morgan Brown, DEC
Terri Lomax, DEC
Brock Tabor, DEC
Meredith Witte, DEC
Dan Bogan, ACCS
Leslie Jones, ACCS
Dustin Merrigan, ACCS



Table 1. Sites sampled during the 2019 Southeast Streams Survey.

Monitoring Location ID	Latitude	Longitude	Date Sampled	Stream Size	Access
SE19_AK-10003	57.431	-135.4065	6/24/19	Small	Road
SE19_AK-10008	58.3751	-134.5792	6/20/19	Small	Road
SE19_AK-10011	57.1861	-135.6177	6/26/19	Medium	Road
SE19_AK-10015	57.169	-135.4014	6/25/19	Medium	Road
SE19_AK-10017	58.1165	-135.6102	8/9/19	Medium	Road
SE19_AK-10024	58.2447	-134.2927	6/21/19	Small	Road
SE19_AK-10038	57.8327	-135.0916	8/7/19	Small	Road
SE19_AK-10048	59.5663	-139.447	6/15/19	Small	Road
SE19_AK-10049	58.1465	-135.921	8/8/19	Medium	Road
SE19_AK-10060	58.472	-135.7692	8/11/19	Medium	Road
SE19_AK-10061	57.966	-135.3107	8/6/19	Small	Road
SE19_AK-10114	59.5376	-139.4692	6/16/19	Medium	Other
SE19_AK-10115	56.9697	-134.9608	6/24/19	Medium	Other
SE19_AK-10117	58.0762	-136.3232	6/22/19	Small	Other
SE19_AK-10118	59.8423	-141.0788	6/17/19	Medium	Other
SE19_AK-10129	58.4587	-135.3526	6/26/19	Medium	Other
SE19_AK-10130	59.4479	-139.5023	6/18/19	Small	Other
SE19_AK-10144	57.6743	-134.1081	6/21/19	Small	Other
SE19_AK-10149	58.6051	-136.4633	8/12/19	Small	Other
SE19_AK-10151	57.3313	-135.1777	6/25/19	Small	Other
SE19_AK-10223	55.7241	-132.9796	8/6/19	Small	Road
SE19_AK-10224	56.0467	-131.9724	7/10/19	Small	Road
SE19_AK-10225	56.7503	-134.1396	7/17/19	Medium	Road
SE19_AK-10226	55.5186	-131.485	7/16/19	Medium	Road
SE19_AK-10232	55.4545	-132.7623	8/2/19	Medium	Road
SE19_AK-10238	56.7483	-133.1832	7/13/19	Small	Road
SE19_AK-10239	55.8722	-133.0127	8/5/19	Medium	Road
SE19_AK-10240	55.3117	-132.4365	8/1/19	Small	Road
SE19_AK-10243	55.928	-133.1316	8/4/19	Small	Road
SE19_AK-10261	56.5303	-132.91	7/15/19	Medium	Road
SE19_AK-10331	55.7429	-131.4081	7/13/19	Medium	Other
SE19_AK-10337	56.3509	-132.0363	7/11/19	Small	Other
SE19_AK-10347	55.8106	-131.5293	7/11/19	Small	Other
SE19_AK-10353	56.172	-132.6922	7/9/19	Medium	Other
SE19_AK-10363	55.5788	-131.5638	7/14/19	Medium	Other
SE19_AK-10368	55.2826	-130.8538	7/9/19	Medium	Other
SE19_AK-10370	56.503	-133.2001	7/14/19	Medium	Other
SE19_AK-10384	55.3437	-131.5258	7/12/19	Small	Other

Table 2. Sediment and biological samples collected during the 2019 Southeast Streams Survey.

Monitoring Location	TOC	Metals	Grain Size	Stable Isotopes	Macroinvertebrates	Periphyton
SE19_AK-10003					✓	✓
SE19_AK-10008	✓	✓	✓	✓	✓	✓
SE19_AK-10011	✓	✓	✓	✓	✓	✓
SE19_AK-10015					✓	✓
SE19_AK-10017					✓	✓
SE19_AK-10024	✓	✓	✓	✓	✓	✓
SE19_AK-10038					✓	✓
SE19_AK-10048	✓	✓			✓	✓
SE19_AK-10049					✓	✓
SE19_AK-10060					✓	✓
SE19_AK-10061					✓	✓
SE19_AK-10114	✓	✓	✓	✓	✓	✓
SE19_AK-10115	✓	✓	✓	✓	✓	✓
SE19_AK-10117					✓	✓
SE19_AK-10118	✓	✓	✓	✓	✓	✓
SE19_AK-10129	✓	✓	✓	✓	✓	✓
SE19_AK-10130					✓	✓
SE19_AK-10144					✓	✓
SE19_AK-10149					✓	✓
SE19_AK-10151					✓	✓
SE19_AK-10223					✓	✓
SE19_AK-10224					✓	✓
SE19_AK-10225					✓	✓
SE19_AK-10226	✓	✓	✓	✓	✓	✓
SE19_AK-10232					✓	✓
SE19_AK-10238					✓	✓
SE19_AK-10239	✓	✓	✓	✓	✓	✓
SE19_AK-10240						✓
SE19_AK-10243	✓	✓	✓	✓	✓	✓
SE19_AK-10261					✓	✓
SE19_AK-10331	✓	✓	✓	✓	✓	✓
SE19_AK-10337	✓	✓	✓	✓	✓	✓
SE19_AK-10347					✓	✓
SE19_AK-10353					✓	✓
SE19_AK-10363	✓	✓	✓	✓	✓	✓
SE19_AK-10368	✓	✓	✓	✓	✓	✓
SE19_AK-10370					✓	✓
SE19_AK-10384					✓	✓

Table 3. Sites dropped during the 2019 Southeast Streams Survey.

Monitoring Location ID	Latitude	Longitude	Stream Size	Access	Reason
SE19_AK-10005	58.13986155	135.8747971	Small	Road	safety/access
SE19_AK-10013	58.07771834	-135.2169533	Medium	Road	Map error/wetland
SE19_AK-10028	59.52231376	-139.75253	Medium	Other	dry/not enough water
SE19_AK-10041	58.00664857	-135.0180966	Medium	Road	safety/access
SE19_AK-10044	59.51844113	-139.6236646	Small	Road	dry/not enough water
SE19_AK-10057	57.9864337	-135.0558174	Medium	Road	safety/access
SE19_AK-10069	58.02676638	-135.1901162	Medium	Road	safety/access
SE19_AK-10093	57.94635655	-135.0049219	Small	Road	safety/access
SE19_AK-10095	58.01787383	-135.0898013	Small	Road	safety/access
SE19_AK-10111	57.05510196	-135.8230067	Small	Other	safety/access
SE19_AK-10112	57.5106112	-135.6356268	Medium	Other	safety/access
SE19_AK-10121	58.86843433	-136.769811	Small	Other	dry/not enough water
SE19_AK-10140	58.52154637	-133.9884437	Small	Other	dry/not enough water
SE19_AK-10228	54.97515165	-132.9771039	Medium	Road	safety/access
SE19_AK-10233	56.67730144	-132.7314933	Medium	Road	dry/not enough water
SE19_AK-10241	56.76533326	-134.0982542	Medium	Road	dry/not enough water
SE19_AK-10248	55.47147439	-133.0348394	Small	Road	safety/access
SE19_AK-10252	55.70416158	-133.3310782	Small	Road	safety/access
SE19_AK-10268	55.71291446	-133.2204559	Small	Road	dry/not enough water
SE19_AK-10272	55.2230717	-132.5954843	Small	Road	safety/access
SE19_AK-10275	55.94648914	-133.0226356	Small	Road	safety/access
SE19_AK-10279	55.7394476	-132.6045777	Small	Road	safety/access
SE19_AK-10284	55.33108564	-133.3717806	Small	Road	safety/access
SE19_AK-10286	56.11058024	-133.2551713	Small	Road	dry/not enough water
SE19_AK-10289	56.57023629	-132.736751	Small	Road	Map error/wetland
SE19_AK-10307	56.62341957	-132.8487857	Small	Road	Map error/tidal
SE19_AK-10341	55.73117675	-132.1516516	Small	Other	safety/access
SE19_AK-10349	55.73117675	-132.1516516	Small	Other	dry/not enough water
SE19_AK-10352	55.33192966	-131.4770508	Medium	Other	dry/not enough water
SE19_AK-10355	55.57050105	-131.0295258	Small	Other	safety/access
SE19_AK-10359	55.37206293	-130.5645794	Medium	Other	safety/access
SE19_AK-10362	55.08982996	-132.4846274	Small	Other	safety/access
SE19_AK-10365	56.2990578	-131.9567558	Small	Other	Map error
SE19_AK-10372	54.75624439	-132.0843857	Small	Other	Map error
SE19_AK-10414	55.4103365	-133.010177	Small	Other	safety/access