2020 Annual Highlights

Water Quality Standards, Assessment, and Restoration Program

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

December 2020

This newsletter highlights projects designed to reduce the harmful effects of runoff pollution and to protect or improve water quality throughout Alaska.

In This Issue

Protecting & Improving Waters

By Terri Lomax

Terri Lomax enjoying an Alaskan river

My first memories are of Alaska. I was four the first time my family moved here. My father was in the Army and we were stationed at Fort Richardson. As we made many more moves over the years, I always knew I would eventually call this place home. I came back twice and finally settled here in 1999. Throughout the years I have had the special privilege of working all over this beautiful state in various DEC capacities. That's why I'm so proud to lead the Water Quality Standards, Assessment, and Restoration (WQSAR) Program. In this Program we are responsible for carrying out the Department's mission by establishing protective water quality standards, evaluating waterbodies against those standards, collecting water quality data, ensuring data is high quality, working with communities to address concerns, and helping home owners and small communities properly treat septic wastewater through plan reviews and approvals.

We have a wide range of projects but the overall goal is to ensure waterbodies are safe for drinking, recreation, harvesting of foods, and the growth of fish and invertebrates. While 2020 posed many challenges to carrying out our mission, we were still able to safely complete many projects. A common thread you will notice in the projects highlighted in this issue of the newsletter is partnerships. Without your help there is no way we could address concerns on a statewide or local scale.

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This year we worked with communities across the state to monitor waterbody health, develop restoration and protection plans, guide green infrastructure installations, and design wastewater treatment systems. In the coming year we will be starting a new cycle of community grants, finishing a second year of ports and southeast waterways sampling, updating our septic regulations, and continuing our support of community led watershed planning. We know you love Alaska as much as we do, we look forward to working with you on these efforts!

City of Homer Stormwater Improvements (Southcentral)

By Sarah Apsens

In 2019 and 2020 the City of Homer set out to compare the long-term cost of installing green infrastructure projects versus conventional stormwater management methods (such as curb, gutter, and pipes directing untreated stormwater to Kachemak Bay). To do this, the City first identified major watershed basins in the area. Next, runoff volumes were estimated according to current land use, soil type, and the extent of impervious surface coverage. With this information, they were able to estimate the amount of stormwater runoff under different rainfall scenarios. The cost of designing and installing green infrastructure versus conventional infrastructure required to handle peak stormwater runoff was then calculated.

The results of the cost comparisons? A difference of $21.4 million dollars!

That's right! Incorporating green infrastructure techniques and low impact development into stormwater mitigation planning would cost approximately $21.4 million dollars ***less*** than relying on conventional methods alone. Incorporating green infrastructure sites into the city's drainage plan had the added benefit of reducing polluted runoff from entering Kachemak Bay.

Newly installed green infrastructure project and interpretive sign at the entrance to the new Homer police station.

A rain garden and retention basin (types of green infrastructure) were also installed at the newly constructed City of Homer police station as part of this project. The rain garden and accompanying interpretative sign provide visitors with information on green infrastructure and how it helps improve water quality.

To learn more about this project visit the City of Homer webpage to view the Green Infrastructure Story Map. A video of the Homer police station and rain garden are also available. This project was funded by DEC through an Alaska Clean Water Actions grant.

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Interpretive sign installed at the Homer police station that describes the benefits of using green infrastructure techniques.

What is Green Infrastructure?

Green infrastructure is a cost-effective approach to land and water management that incorporates both the natural environment and engineered systems to provide clean water, conserves ecosystem values and functions, and provides a wide array of benefits to people and wildlife. Examples of green infrastructure include vegetated swales, rain gardens, retention areas, constructed wetlands, permeable pavers, tree wells and planters, and re-vegetation/rehabilitation efforts. DEC encourages the use of green infrastructure techniques for addressing site runoff and stormwater wherever feasible.

Improving Cottonwood Creek's Water Quality (Mat-Su)

By Laura Eldred

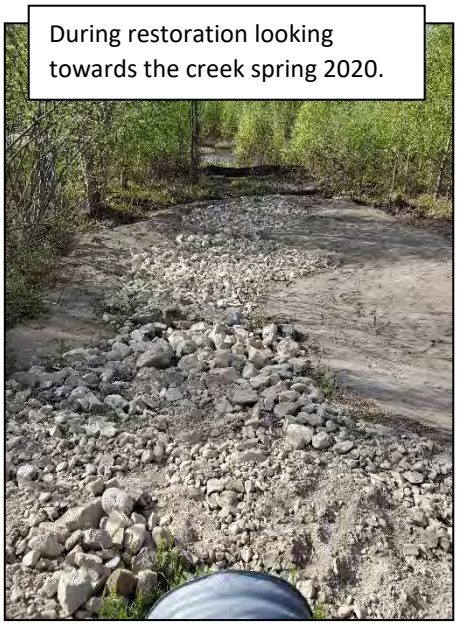
Imagine a drop a rain landing on a busy street, combining with thousands of other rain drops, washing chemicals, trash, and other pollutants off the road and down a ditch that empties into a salmon stream. That was the situation on Cottonwood Creek in Wasilla before completion of a project designed to slow down and clean up this polluted runoff water before it reaches the creek. Through DEC's Alaska Clean Water Action grant funds to the Sustainable Design Group, a two phase green infrastructure design and construction project was completed along Fern Street in Wasilla.

The site now consists of five engineered infiltration basins located within the City of Wasilla's Fern Street road right-of-way. These specially designed basins have mixtures of soil, sand, rock and native vegetation all designed to slow the runoff water, let it soak in and reduce the amount of pollution reaching Cottonwood Creek. As a bonus, the native vegetation looks nice and is good for local pollinators like butterflies and bees.

The site can treat thousands of gallons of stormwater that drains off of nearby Knik Goose Bay Road, local business parking lots, and Fern Street. The polluted stormwater flows through a series of ditches and culverts before reaching the new treatment site. Previously, this stormwater would drain into Cottonwood Creek, carrying pollutants with it. The state has listed Cottonwood Creek as a polluted (or water quality impaired) waterbody. Projects and activities that help reduce pollution to the creek, like this one, will help in its recovery.

Polluted stormwater draining into Cottonwood Creek before site restoration

During restoration looking towards the creek spring 2020.



After vegetation started establishing summer 2020

Many thanks go out to project partners including the Sustainable Design Group, MatSu Conservation Services, City of Wasilla, Exigo Specialty Contracting, and all the volunteers that shoveled topsoil and planted hundreds of native plants and willows. The site wouldn't be such a success without all your help!

Anchorage Streams Bacteria Sampling (Anchorage)

By Elizabeth Bishop

Anchorage is the most populated area in Alaska with roughly 40% of Alaska's entire population residing within the Municipality of Anchorage. As a result, urban and stormwater runoff has become more prevalent in Anchorage waterbodies. In the late 1990's and early 2000's several Anchorage streams were found to be polluted by fecal coliform bacteria and were included on Alaska's list of impaired waters. Waterbody recovery plans, called Total Maximum Daily Loads (TMDLs), were established for the impaired waterbodies beginning in 2004 to address the fecal coliform bacteria pollution. Follow up monitoring since then has been limited and it is unknown if the recovery plans have been effective at reducing bacteria pollution in the streams.

DEC water quality staff collecting a sample on upper Ship Creek in Anchorage.

In 2020 DEC water quality staff embarked on a project designed to investigate the current status of bacteria pollution in several Anchorage streams. The objective for this project was to determine if bacteria exceedances exist on the polluted waterbodies and to assess if other waterbodies within the Municipality are attaining Water Quality Standards for bacteria. The target bacteria types were fecal coliform and Escherichia coli (E.coli), which are indicator organisms that potentially more harmful bacteria are present. Nineteen streams and lakes were selected for bacteria monitoring during the summer of 2020, eleven of which are currently designated as impaired for bacteria. One to three monitoring locations were selected on each waterbody for a total of 32 monitoring locations.

Each monitoring location was sampled five times within a 30-day period during May and June. Water samples from all sites were analyzed by a local laboratory for fecal coliform bacteria and a subset of sites also included E. coli bacteria analysis. In an effort to identify potential bacteria sources, a few samples were sent to a laboratory to conduct microbial source tracking. Microbial source tracking looks for specific genetic markers in the bacteria to identify which type of animal it came from. This project requested analysis for bird, dog, and human genetic markers.

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Now that the first year of sampling is completed, water quality staff are evaluating the data and making plans to complete the second year of sampling in order to have enough data to make informed decisions for next steps. Data analysis will include comparing the laboratory results for fecal coliform and E.coli bacteria to the allowed limits in Alaska's Water Quality Standards and the microbial source tracking results will help us understand if the bacteria is from natural sources or human sources. A field report describing this past year's sampling results will be available in the spring 2021 and a final comprehensive report will be available on our website after completion of summer 2021 water sampling and data analysis.

Tackling the Invasive Plant Elodea in Interior Alaska (Interior)

By Morgan Brown

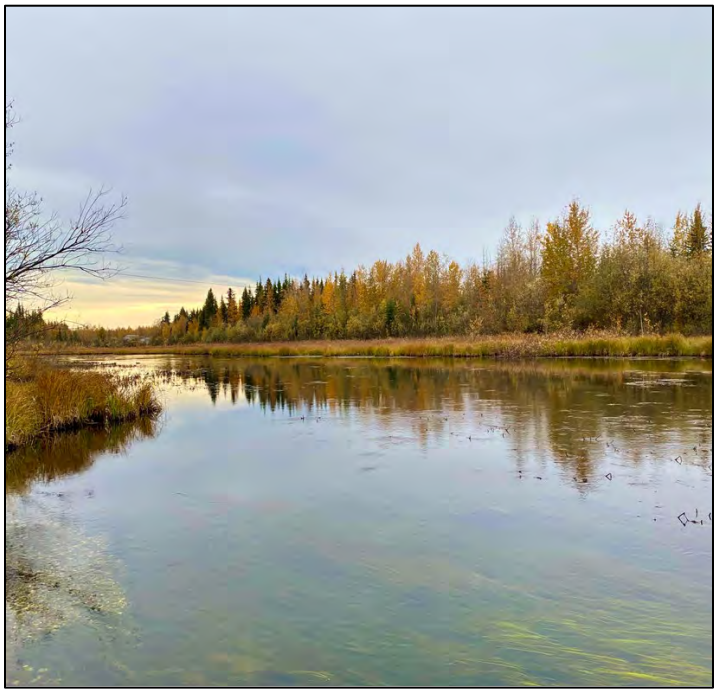
Ecosystems are made up of specific plants and animals that interact with each other and with their unique environment. Due to increased migration and land-use change by humans, many plants and animals have been transported larger distances on much smaller timescales than under natural conditions. When a species is living out of its native range, it is referred to as non-native or exotic. Exotic species can cause harm to the ecosystem by outcompeting native species for resources like nutrients or habitat, displacing native communities, or degrading natural ecosystem functions, when this occurs they are called **invasive species**. Though there are a number of invasive species throughout Alaska, there is only one submerged aquatic invasive plant that has made its way into our waterways, and it has the potential to greatly impact freshwater resources: *Elodea*.


Courtesy of Alaska Plant Material Center

Elodea, or waterweed, is a plant commonly used in fish aquariums. It grows in long tangled mats of stems and prefers shallow, slower moving waters that can be found in lakes and sloughs. It grows rapidly and can reproduce itself from a single fragment. This can rapidly lead to new infestations. Elodea mats may slow the flow of water, increase sedimentation, reduce biodiversity, and degrade fish habitat. They clog boat launches, float plane access, and subsistence hunting areas. Alaska Department of Natural Resources, the U.S. Fish & Wildlife Service, and others have worked to prevent its spread by encouraging boat, aircraft, or other users to check and decontaminate their vehicles and gear

thoroughly when moving between water bodies. However, for areas where Elodea has already established, more aggressive methods may be necessary.

The Fairbanks Elodea Steering Committee began a project in 2017 to explore one such method to eradicate Elodea from several waters in the interior using the aquatic herbicide fluridone. While mitigating the negative impacts of Elodea, the Committee must also be careful to ensure that there are no negative environmental impacts to the waterbodies by the herbicide. To account for this, the project includes water quality monitoring and macroinvertebrate and fish sampling to detect and document any measurable, multi-year change in water quality in conjunction with herbicide application.



Chena Slough water quality monitoring location.

In the summer of 2020 DEC water quality staff monitored water quality at four of the six sites treated for Elodea in 2020: Chena Lake, Chena Slough, Bathing Beauty Pond, and Birch Lake. Collected water quality measurements included: temperature, pH, dissolved oxygen, conductivity, and turbidity. Data collected from these monitoring efforts will be added to DEC's water quality database and compared with past and future monitoring data to evaluate potential impacts of the herbicide fluridone on the waterbodies. This project has the potential to provide a long-term solution to the challenge of Elodea infestation in waterways across the state while ensuring that human health and the environment are protected. Watch our website for the water quality report.

Looking for a water quality report? Visit:
http://dec.alaska.gov/water/water-quality/reports

Watershed Plans and Water Quality (Statewide)

By Chandra McGee

DEC's Nonpoint Source Section is excited to announce that we are focusing on more holistic watershed based plans instead of Total Maximum Daily Load (TMDL) planning documents for water quality recovery of polluted streams and lakes or as protection plans for healthy waters.

A watershed based planning effort is a holistic approach that provides an adaptive management process to both protect existing resources and also restore impacted areas. It is community driven and is effective in tying together various community objectives, such as managing stormwater runoff, improving water quality, protecting high value natural resources, and providing for public recreation.

Watershed planning team discussing Lake Lucile in Wasilla

A watershed plan will consider existing sources of pollution, water quality data, and watershed geographic and hydrologic characteristics. It will identify goals and associated actions to address watershed priorities which may include streambank restoration, flood mitigation, and improving water quality. It may also include actions needed to achieve compliance with federal and state permits. In Alaska, watershed based planning efforts include many stakeholders, such as state and federal agencies, local government, non-profits, tribes, private business owners, and interested community members.

Jordan Creek in Juneau

Community driven watershed based plans are being developed all across the state to address needs at the local level! A lake management plan was recently developed to address stormwater runoff pollution to Lake Lucile in Wasilla. The plan focuses on locations within the watershed to clean up the polluted runoff before it reaches the lake. Another plan is being developed in Ketchikan to address concerns about bacteria pollution on local beaches. The plan will provide stormwater and sewage management suggestions for reducing bacteria from diverse point and nonpoint sources. A third watershed based plan is being completed for Jordan Creek

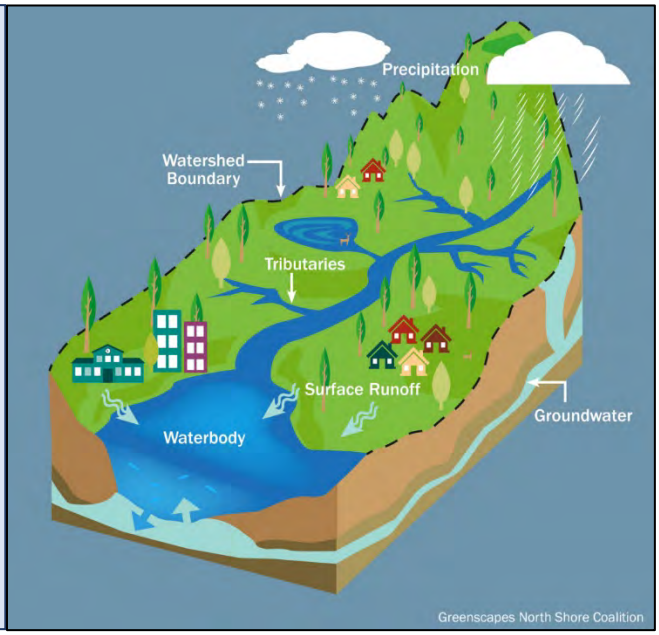
in Juneau to address stormwater runoff by identifying locations to implement best management practices to reduce polluted runoff from draining into Jordan Creek.

DEC's Nonpoint Source Section supports development of watershed based plans by providing funding support through the Alaska Clean Water Actions grant program as well as technical expertise. For more information on watershed based planning see: epa.gov/hwp

What is a watershed?

A watershed includes the land area that drains to one stream, lake or river. What happens on the land can affect the water quality of the receiving stream, lake or river. Every lake, stream, tributary, or river in Alaska has an associated watershed.

Planning at the watershed level is a good way to address multiple stresses that maybe affecting fish, wildlife, and our enjoyment of Alaska's waterways.



Items of interest!

- ✓ Check out the new Nonpoint Source Strategy for 2021 – 2025
- ✓ Watch for updates to the Onsite Disposal System (septic system) program including online submittals
- ✓ Alaska's Integrated Water Quality Monitoring and Assessment Report (Integrated Report) for 2020 and 2022 coming soon!

Summer of 2020 Presents a Unique Opportunity (Statewide)

By Brock Tabor

In 2020 the Water Quality Standards, Assessment and Restoration (WQSAR) program partnered with the Aquatic Restoration and Research Institute to collect water samples at select marine harbors across Alaska in the vicinity of cruise ship berths, traffic lanes, and concentrated boating areas. The data will be used to help understand background levels of certain pollutants known to be associated with cruise ship discharges. Although this work was planned prior to the COVID 19 pandemic, the limited number of sailings due to the pandemic provided a unique opportunity to collect water samples with little to no cruise ship activity for comparison to future years when increased ship activity is expected to return.

Water sampling was conducted at six or more sites within 16 ports from Nome to Ketchikan, and at 20 sampling sites distributed among major shipping lanes throughout southeast Alaska. At each shipping lane site and at sites within ports, water samples were collected and analyzed for fecal coliform and *Enterococci* bacteria, ammonia-N, copper, nickel, and zinc. Water temperature, pH, salinity, and dissolved oxygen were measured concurrent with water sampling at multiple water depths. Water sampling for fecal coliform and *Enterococci* bacteria in port sampling locations was repeated on four subsequent dates in order to obtain five samples within a 30-day period as required by WQSAR protocols.

Filtering a water sample for analysis as part of the marine water sampling project in 2020

Sampling results are currently being reviewed and evaluated against allowed pollutant limits in Alaska's Water Quality Standards. Preparations for the second summer of sampling are already occurring including discussions on sample site locations and timing. Once all the 2021 sampling is completed and results are analyzed, a final comprehensive project report will be posted to DEC's website.

Alaska Beach Monitoring Program (Southeast & Kenai Peninsula)

By Gretchen Augat & Sarah Apsens

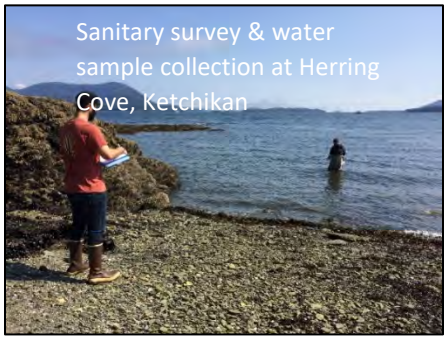

Collecting samples at Kenai South Beach

The Alaska Beach Program has engaged with coastal communities throughout the state for nearly 20 years. It started with the Beaches Environmental Assessment and Coastal Health (BEACH) Act amendment to the Clean Water Act in 2000. The BEACH Act is designed to protect human health and reduce the risk of water-borne illnesses at recreational beaches. DEC implements this Act by working with local partners to monitor bacteria and conduct sanitary surveys on recreational beaches, and by providing weekly updates on bacteria levels to the community.

In 2021, the program is developing a predictive model (EPA's Virtual Beach model). The model will use environmental data to predict bacteria levels, similar to a weather forecast, and will provide early and more frequent updates to support healthy recreation at local beaches. We plan to conduct periodic beach water sampling to strengthen and validate the model.

Outreach is another key component of the Alaska Beach Program. We strive to reach beachgoers with current and important information on beach recreation in their community. This year's outreach was improved by:

- ✓ New Beach Listserv to reach interested individuals more quickly with bacteria results and advisories
- ✓ More clear and easier to navigate Alaska Beach Program website
- ✓ New at-a-glance interactive web map showing red/green color coding and beach advisory details
- ✓ Weekly social media posts with direct links to local community events page
- ✓ Local radio reminders to explore the Alaska Beach website before beach going
- ✓ More detailed and comprehensive communication plan
- ✓ Sign posting and updated flyers at affected beaches using QR coding for quicker access to website and bacteria results map


Sanitary survey & water sample collection at Herring Cove, Ketchikan

The success of the Alaska Beach Monitoring Program is attributed to partnerships with the local communities. DEC gives a special shout out of thanks to all these essential partnerships and especially to the City of Kenai, Kenai Watershed Forum, Ketchikan Indian Community, Southeast Alaska Watershed Coalition, R&M Engineering Lab, City of Ketchikan, and Ketchikan Gateway Borough.

How Do We Collect Water Quality Information?

By John Clark

Conducting water quality monitoring is one of the important activities WQSAR accomplishes throughout the state. There are many different methods for collecting water samples and measuring water quality depending on the project objectives, data needs, and parameters being measured. In the summer of 2020, WQSAR staff utilized new multiparameter sondes to measure water quality from various streams throughout Alaska. A sonde is an instrument that can be placed in the stream to take measurements. There are different probes that can be installed on the instrument to measure water quality parameters such as pH, turbidity, dissolved oxygen, and water temperature. This leads to the name "multiparameter".

Multiparameter sonde collecting water quality readings in an Alaskan stream.

These types of instruments can be used in many different environmental conditions and can even be left in the water for months at a time all the while collecting water quality data. They have different settings including options for how often you want it to take water quality readings.

Another nice instrument feature is having a Bluetooth connection for simplified calibration, instant and accurate data collection readings, easy ways to view data being collected, and features for downloading the data in different file formats. This makes multiparameter sondes ideal for spot-checking water quality at many monitoring locations or for long-term monitoring at just a few locations.

After using them for a summer, this is what WQSAR water quality staff have to say:

"What I like about the multiparameter sondes is how stable their calibrations are, that you can capture windows of continuous data quite easily, and that they are pretty robust."

"They are generally easy to calibrate, I like that they connect through Bluetooth, and they seem to take good readings without a long wait to stabilize."

"Our project required reliable and consistent equipment performance throughout the state and in various environments. The multiparameter sondes fulfilled these requirements and were easy to deploy by regional staff, regardless of prior experience. Data downloading was readily accessible post sampling and easy to manipulate for analysis."

DEC water quality staff using a multiparameter sonde to collect water quality information

We look forward to continuing to use the multiparameter sondes for many monitoring projects to come.

As always, if you have questions on completing or implementing a water monitoring Quality Assurance Project Plan feel free to reach out to the DEC Quality Assurance Officer listed in the Contacts section.

As you can tell from this newsletter, we are a busy program accomplishing a variety of work. We invite you to get to know us better and support the work we do every day in keeping Alaska's waterways healthy. Visit: http://dec.alaska.gov/water/water-quality/ for more information.

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