



Matanuska-Susitna Basin Salmon Habitat Partnership

Site Tour, August 22, 2023

Using Big Lake as a case study, we will be learning about some of the challenges and solutions to maintaining water quality and the integrity of fish habitat while growth continues in this recreational hotspot for fishing and watersports.

8:30 am van departs Sears Mall in Anchorage, 9:20 am van departs Wasilla Park and Ride on Trunk Rd.

10 am Cloudy Lake at N. Phillips Drive

- Welcome and tour focus (*Jessica Speed, Partnership Coordinator, Trout Unlimited and Matt LaCroix, U.S. Environmental Protection Agency*)
- Science informing conservation: What we know about fish movement and habitat needs (*Franklin Dekker, U.S. Fish and Wildlife Service*)
- Mat-Su Borough fish passage program and fish friendly culvert replacement at Cloudy Lake (*Cole Branham, Mat-Su Borough and Kyle Albert, HDL Engineering Consultants*)

11 am Little Meadow Creek at Big Lk Rd. and Parks Highway intersection, 10911 Big Lake Rd. (Park at Napa Auto Parts)

- Denai'ina cultural history and connection to salmon in Big Lake drainage (*Kevin Toothaker, Knik Tribe and Fran Seger-Boss, Chickaloon Village Traditional Council*)

11:45am Big Lake South State Recreation Site, 4678 S Big Lake Rd

- Water quality in the Big Lake system (*Ashley Oleksiak, Alaska Department of Environmental Conservation*)
- Riparian areas 101 and cost share program (*Amy LaBarre, Alaska Department of Fish and Game*)

12:20pm – 12:50 pm Jay Nolfi Fish Creek Park, 4132 S Casey Dr. - LUNCH

12:50-1:15 pm Jay Nolfi Fish Creek Park

- Fish resources and fishing opportunities supported by the Big Lake drainage (*Alaska Department of Fish and Game*)

1:45 pm Flat Lake Boat Launch, end of S. Purinton Pkwy

- Current study: Potential shoreline erosion from boat wakes (*Elias Wilson, Alaska Department of Fish and Game/University of Alaska Fairbanks*)
- Aquatic invasive species in the Big Lake system and potential impacts to salmon and their habitat (*Mat-Su Salmon partners*)
 - What is Elodea and why is it a concern? (*Jillian Jablonski, Tyonek Tribal Conservation District/Mat-Su Elodea Taskforce*)
 - Treating Elodea in Big Lake (*Dan Coleman, Alaska Department of Natural Resources*)
 - Community involvement and perspective on Elodea and aquatic invasive species in Big Lake (*Terry Gorlick, Big Lake Community Council*)

- Northern pike and keeping new aquatic invasive species out of Mat-Su waters (*Parker Bradley and Krissy Dunker, Alaska Department of Fish and Game*)

2:45 pm Final conclusions and wrap-up for the day

3pm Vans Depart for Wasilla and Anchorage, arriving approximately 4pm to Trunk Rd. Park and Ride and 5 pm Anchorage.

2023 Big Lake Drainage Site Tour – Presentation Abstracts

Science informing conservation: What we know about fish movement and habitat needs

Franklin Dekker, U.S. Fish and Wildlife Service

The culvert replacement at the outlet of Cloudy Lake is the latest in a long effort to improve fish passage in the Big Lake watershed. Between Cloudy Lake and Cook Inlet there are 9 road or railroad crossings, 4 of those crossings were fish passage projects between 2014 – 2018. Cloudy Lake was selected for replacement after those downstream projects opened salmon passage up to the lake and based on the lake's productivity and potential to provide overwinter habitat. Juvenile coho trapping in Cloudy Lake prior to culvert replacement yielded a high catch per unit effort compared to other near-by lakes. (U.S. Fish and Wildlife Services' (USFWS) 2014 juvenile coho PIT tag study by USFWS fisheries biologists showed that juvenile coho utilize the entire watershed from natal redds in Fish Creek to miles upstream for overwintering in the Meadow Lakes area. Cloudy Lake wasn't identified as an overwintering lake in the PIT tag study because the severity of the old culvert barrier prevented juvenile from reaching the lake, but juvenile salmon did overwinter in the unnamed wetland and lake 0.5mi downstream.

Mat-Su Borough fish passage program and fish friendly culvert replacement at Cloudy Lake

Cole Branham, Mat-Su Borough

Kyle Albert, HDL Engineering Consultants

Fish passage has been a long-term focus for restoration activities in the Mat-Su Borough for over 15 years. Alaska Department of Fish and Game (ADFG) has assessed over 580 crossings on fish-bearing streams, with about 70% having some barrier to fish movement. Over 100 culverts have been replaced in the Mat-Su Borough with roads or bridges through the program, most on Borough-owned roads.

The old culvert for Cloudy Lake at Phillips Drive was undersized and in poor condition. Flow velocities were excessive for fish passage due to the steep outlet channel and a lack of stream substrate in the pipe. Mat-Su Borough contracted HDL to perform the survey, design, and permitting of a new large-diameter crossing culvert and stream channel. The new channel was realigned to lower the flow velocity to passable levels. Root wads, revegetated banks, and rock features were included in the design to enhance habitat quality through the crossing.

This project saw nearly instant success. Within weeks of construction, Coho salmon were passing through the culvert and spawning in the new channel. Juvenile salmon were observed in the new channel one year

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Thriving fish, healthy habitats, & vital communities in the Mat-Su Basin

later. Removal of this barrier provided access to potential overwintering habitat in Cloudy Lake at Phillips Drive and resulted in at least 0.93 miles and 37 lake acres of upstream habitat re-opened to juvenile salmonid movement.

Denai'ina cultural history and connection to salmon in Big Lake drainage

Kevin Toothaker, Knik Tribe

Fran Seger-Boss, Chickaloon Village Traditional Council

Big Lake and its watershed is an area rich with Indigenous history. Big Lake's productive waters have sustained the Dena'ina for generations. Kevin Toothaker leads cultural and educational project with the Knik Tribe, and Fran Seger-Boss is an archaeologist who works with Chickaloon Village Traditional Council. Their presentation will give a glimpse of the significance of the Big Lake drainage for Alaska's first peoples.

Water quality in the Big Lake system

Ashley Oleksiak, Alaska Department of Environmental Conservation

The Nonpoint Source Water Quality Section within the Alaska Department of Environmental Conservation (DEC) works to protect Alaska's waters from nonpoint source pollution and restore polluted waters to a healthier condition. This small team works on internal monitoring projects and manages grants awarded to local groups for the implementation of best management practices (BMPs), watershed planning, waterbody monitoring, and outreach and education efforts. In the early 2000s, as development in the Big Lake area and recreational traffic on the lake were on a rise, community members reached out to DEC with concerns about water quality. In 2004, DEC began a water quality monitoring effort to assess a broad suite of parameters. For the most part, the lake was healthy, but petroleum hydrocarbon levels were elevated. Additional studies in 2005, 2009, and 2014 confirmed that the petroleum hydrocarbon levels in Big Lake exceeded Alaska's Water Quality Criteria and that the highest levels of hydrocarbons were present in high boat traffic areas such as marinas and boat launches and on high boat traffic days such as weekends, good weather days, and holidays. Identifying motorized watercraft as the major source of this pollution, DEC and community members began a targeted outreach campaign focusing on clean boating on Big Lake from 2012-2014. Big Lake was also included in larger clean boating outreach efforts for the Susitna Valley and Cook Inlet watershed from 2015-2017. Although DEC has not collected water quality data in Big Lake since 2014, we continue to encourage boaters to maintain their engines, clean up spills, and use fuel-efficient four stroke motors.

Riparian areas 101 and cost share program

Amy LeBarre, Alaska Department of Fish and Game

Most people understand healthy river systems are important for strong and healthy salmon and resident species populations. Nevertheless, it is important to ensure that clean, healthy rivers don't stop at the water's edge. In fact, protecting, managing, and maintaining healthy streambanks and adjacent riparian corridors are critical components to the overall health of a river system. Vegetation along streambanks

helps keep stream water clean by filtering out sediment and pollutants from surface and storm runoff, stabilizes streams from excessive erosion, helps maintain water temperatures, and provides protection and food for juvenile fish. Since riparian corridors are so important, the Alaska Department of Fish and Game (ADF&G) has a Streambank Rehabilitation and Restoration Program, commonly known as the Cost-Share Program, that helps Alaskans maintain and protect healthy riparian corridors along their streambanks. This is a partnership with the U.S. Fish and Wildlife Service (USFWS) that provides private landowners and public land managers with technical expertise and funding to stabilize and rehabilitate streambanks using fish-friendly techniques to maintain access, while protecting water quality and fish and wildlife habitat.

The Cost-Share Program got started in 1995 when ADF&G partnered with the USFWS to start implementing rehabilitation projects on private land and public lands and hosting Streambank Rehabilitation and Education Workshops on the Kenai Peninsula. The Cost-Share Program was so successful that it was expanded to include projects in the Mat-Su Valley in 2007 and the Fairbanks area in 2008. To date, the Cost-Share Program has installed 78 projects in the Mat-Su.

The overarching goal of the Cost-Share Program is to sustain and improve fish habitat. There are several objectives that help the program reach the goal: removing harmful structures such as jetties, bulkheads, and riprap from waterbodies; maintaining and protecting healthy riparian corridors and fish habitat; and stabilizing and rehabilitating habitat that has already been damaged.

Fish resources and fishing opportunities supported by the Big Lake drainage

Alaska Department of Fish and Game

Big Lake is well known for its unique population of Arctic Char. This is a resident population meaning they do not migrate to the ocean and reside year-round within the lake. Char spawn in late fall and many of the larger fish retain brilliant yellow and orange coloration well into the winter months, which is when these fish are targeted by anglers. Ice fishing is very popular amongst residents of the lake and neighboring community. The main impetus for catching these fish is in the photo opportunities. In years past, ice fishing derbies have been common, promoting catch-and-release practices so as not to overexploit the population. Even still, the numbers of large char have declined through the years leading ADF&G to only allow strictly catch-and-release practices at present. Big Lake supports about 5,500 angler-days of fishing effort annually to catch 1,500 Arctic Char and 4,000 Rainbow Trout.

Invasive northern pike are also present in Big Lake, especially near the outlet of Meadow Creek. Archery that targets pike with bow and arrow is becoming more popular on the lake during early spring when pike are congregated in shallow weedy areas to spawn. In May of 2022, a family brought in a large cooler to our office in Palmer and asked me to weigh a fish they had just caught. To my surprise it was a 28 ½ pound northern pike that went 48 ½ inches in length and broke the world record for largest pike by bow and arrow. The young girl who shot it was all smiles. Needless to say, we gave her a trophy fish certificate. Pike in the Matsu area rarely exceed 15 years of age. This pike was large for its size at age 10.

Big Lake is a large producer of sockeye salmon and small producer of coho salmon. Big Lake drains into Knik Arm by way of Fish Creek. On most years, enough sockeye have returned to allow for a personal use dipnet fishery to occur. Locals enjoy the opportunity to fill their freezers with a winters supply of fish and many folks comment to us that they much prefer to harvest these salmon near their homes vs traveling all the way to the Kenai River. The recent 5-year average harvest was 25,000 salmon in this fishery. In 2022, about 37,500 salmon were harvested and we anticipate this level of harvest again in 2023 as this year's fishery took place over about the same number of days (roughly a 10-day fishery). The recent 5-year average spawning escapement for sockeye salmon, as enumerated by fish weir, is about 74,000 fish. We project the final escapement for the 2023 season will be about 44,000 sockeye, near the upper end of the escapement goal, which is a range of 15,000 – 45,000 fish.

Fish Creek supports a relatively small sport fishery that primarily targets coho salmon. This has traditionally been a weekend only fishery that begins with a Youth-Only fishery during the first weekend in August. The fishery for anglers of all ages takes off beginning the second weekend of August and proceeds through early September. About 2,300 coho salmon are harvested annually.

Current study: Potential shoreline erosion from boat wakes

Elias Wilson, Alaska Department of Fish and Game/University of Alaska Fairbanks

Over the past decade landowners on Big Lake have reported a significant increase in wake boat use on the lake. In order to understand and better understand the impact, if any, of such an increase in use on erosion along the lakeshore this study will measure the rate of erosion around the lake as well as quantifying wake frequency and intensity. The suspended sediment associated with increased erosion poses potential issues for salmon, particularly lake spawning sockeye, and as such it is crucial to collect data that forms a more complete picture of human impacts on the sediment suspension and deposition process. This study will also seek to update our understanding of habitat use by salmon in Big Lake and provide data that could inform future management actions to protect key salmon habitat while also continuing to provide recreation opportunities for all use groups.

In addition to assessing potential impacts on salmon habit and informing resource managers, the data supplied by this project will also allow local property owners to have a clearer understanding of the degree to which erosion may impact the ways in which they use their land. As this issue may be impacting both public resources, our fish and waterways, and private property value in the local community, the results of this study should be of interest to community leaders and average residents alike.

Funding for this study comes from a partnership between the U.S. Geological Survey Cooperative Extension at the University of Alaska Fairbanks, the U.S. Fish and Wildlife Service, and the Alaska Department of Fish and Game. We have received permission from a combination of private and government landowners to place low impact equipment on their property and we continue to seek additional bank access sites to expand the study sample size.

Aquatic invasive species in the Big Lake system and potential impacts to salmon and their habitat

What is Elodea and why is it a concern?

Jillian Jablonski, Tyonek Tribal Conservation District

Elodea is Alaska's only known aquatic invasive plant. In the Mat-Su, Elodea can be found in Alexander, Sucker, and Big Lakes. Elodea can result in the degradation of salmon habitat through various mechanisms, such as through the loss of spawning habitat. The Mat-Su Elodea Task Force is comprised of more than 50 representatives from state and federal agencies, tribes, nonprofits, and land-owners with the goal of supporting regional Elodea outreach, survey, and eradication efforts within the Mat-Su. Through our efforts, the Mat-Su Elodea Task Force strives to keep Mat-Su waters free of Elodea and increase awareness of this harmful invasive plant, thereby conserving important salmon habitat.

Treating Elodea in Big Lake

Dan Coleman, Alaska Department of Natural Resources

Dan Coleman will be discussing the history of the Elodea infestation in the Big Lake region, how the state of Alaska has responded, and the outlook for future treatments and containment efforts going forward.

Community involvement and perspective on Elodea and aquatic invasive species in Big Lake

Terry Gorlick, Big Lake Community Council

Effectively addressing aquatic invasive species (AIS) can only be done in partnership. Terry Gorlick of Big Lake Community Council (BLCC) will offer a community perspective about AIS and talk about some of BLCC's recent involvement in Elodea efforts in the area.

Northern Pike and keeping new aquatic invasive species out of Mat-Su waters

Parker Bradley and Krissy Dunker, Alaska Department of Fish and Game

Northern pike are not native to southcentral Alaska. Since their illegal introductions began in the late 1950s, they have become the most destructive invasive species to this region. Northern Pike have been present in Big Lake for several decades. The deep water and habitat complexity in Big Lake have fortunately kept pike from becoming the dominant species, which is unfortunately the scenario in multiple upstream locations that provide better habitat conditions for pike. There are currently seven known pike-infested waterbodies upstream in Meadow Creek (West Beaver, Beaverhouse, Gerry, Lynda, Stepan, Big Beaver, and Blodgett Lakes), though there are likely several more. In most of these lakes, pike just recently became established in 2020. Northern pike thrive in shallow weedy waters, and the habitat conditions in many of the upstream lakes are ideal for pike. As a result, the pike have been able to completely take over and displace all other species, which includes all trout and salmon. Lakes that used to support rearing coho salmon for hundreds, maybe thousands of years, no longer do, and this

change to the fish communities has happened in less than five years. Most of the anadromous habitat upstream in Meadow Creek is for rearing coho which are exceptionally vulnerable to pike predation and are at risk of localized extirpation. Pike still do not occupy all available habitat in the drainage, but unfortunately, we do not have the tools necessary to prevent them from spreading into those areas. We're pursuing research that will hopefully get us to the point of being able to stop their spread through open systems like this. But until then, the pike will continue to spread, and we will continue to see the loss of anadromous habitat within the Meadow Creek drainage and the greater southcentral region.

To avoid a similar scenario as northern pike throughout Southcentral Alaska, we've begun preliminary early detection monitoring for invasive dreissenid mussels (zebra and quagga mussels). These mussels can grow very densely covering everything in the water from shorelines, docks, boats, water intakes, etc. with some densities documented as high as 700,000 individuals per square meter. In addition to being a nuisance to water body users, each mussel can filter up to 1 L of water per day. A large population of dreissenid mussels can consume significant amounts of phytoplankton which has dire impacts on aquatic food chains. The good news is that these invasive mussels are not known to be present in Alaska. The bad news is that they could be transported to Alaska attached to or within trailered watercraft traveling from infested water bodies in the Lower 48, where management of these mussels costs millions annually. It only takes one mussel to start a new population. The U.S. Fish and Wildlife Service runs a watercraft inspection and decontamination station at the border during the summer months where all watercraft entering the state are examined for aquatic invasive species. If mussels, plant material, or other invasive species are found, the watercraft are decontaminated with pressured hot water. Boaters everywhere can do their due diligence by cleaning, draining, and drying their boats and gear as a best practice to avoid accidental transport of aquatic invasive species. Data from the Fish and Wildlife inspection station show that Big Lake is the most popular destination for boats coming across the border, making this the highest risk water body. Given this, Big Lake, as well as other lakes around Southcentral AK, are being sampled for water chemistry parameters such as dissolved calcium, to determine the lake's suitability for mussel establishment. In addition, we're deploying settling plates in area lakes to look for physical evidence of mussels themselves. This is a new project for the department. The objective is to find presence of zebra and quagga mussels early, which would allow ADF&G and partners to quickly contain the problem and prevent spread of invasive mussels throughout the state. Preventing the introduction of these mussels is imperative because currently, there are limited management options. If introduced, zebra and quagga mussels have the potential to surpass northern pike as the most destructive invasive species in the state.

Save the Date!

The 16th Annual Mat-Su Salmon Science & Conservation Symposium is scheduled for November 13 and 14, 2023 at the Palmer Depot! Look for registration to open soon at www.matsusalmon.org



The Mat-Su Salmon Partnership formed in 2005 to address increasing impacts on salmon habitat from human use and development in the Mat-Su Basin. Modeled after the National Fish Habitat Partnership, this coalition of now over 65 organizations uses a collaborative, cooperative, and non-regulatory approach. The Matanuska-Susitna Basin Salmon Habitat Partnership supports abundant wild salmon and healthy habitat that coexist with vibrant communities. Because wild salmon are central to life in Alaska, the partnership works to ensure quality salmon habitat is safeguarded and restored. This approach relies on collaboration and cooperation of diverse stakeholders.

Learn more about the Partnership at www.matsusalmon.org and follow us on Facebook!