



Mat-Su Salmon Science & Conservation Symposium

**Making the Invisible Visible:
Unraveling Freshwater Mysteries through Science & Storytelling**

17th annual

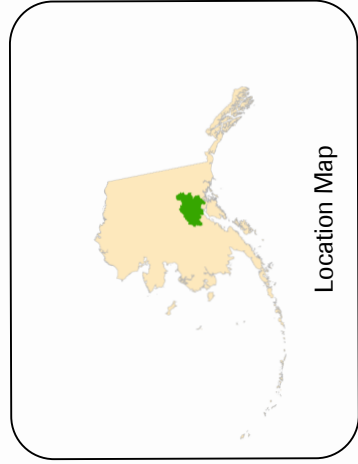
November 18-19, 2024
Palmer, Alaska

hosted by

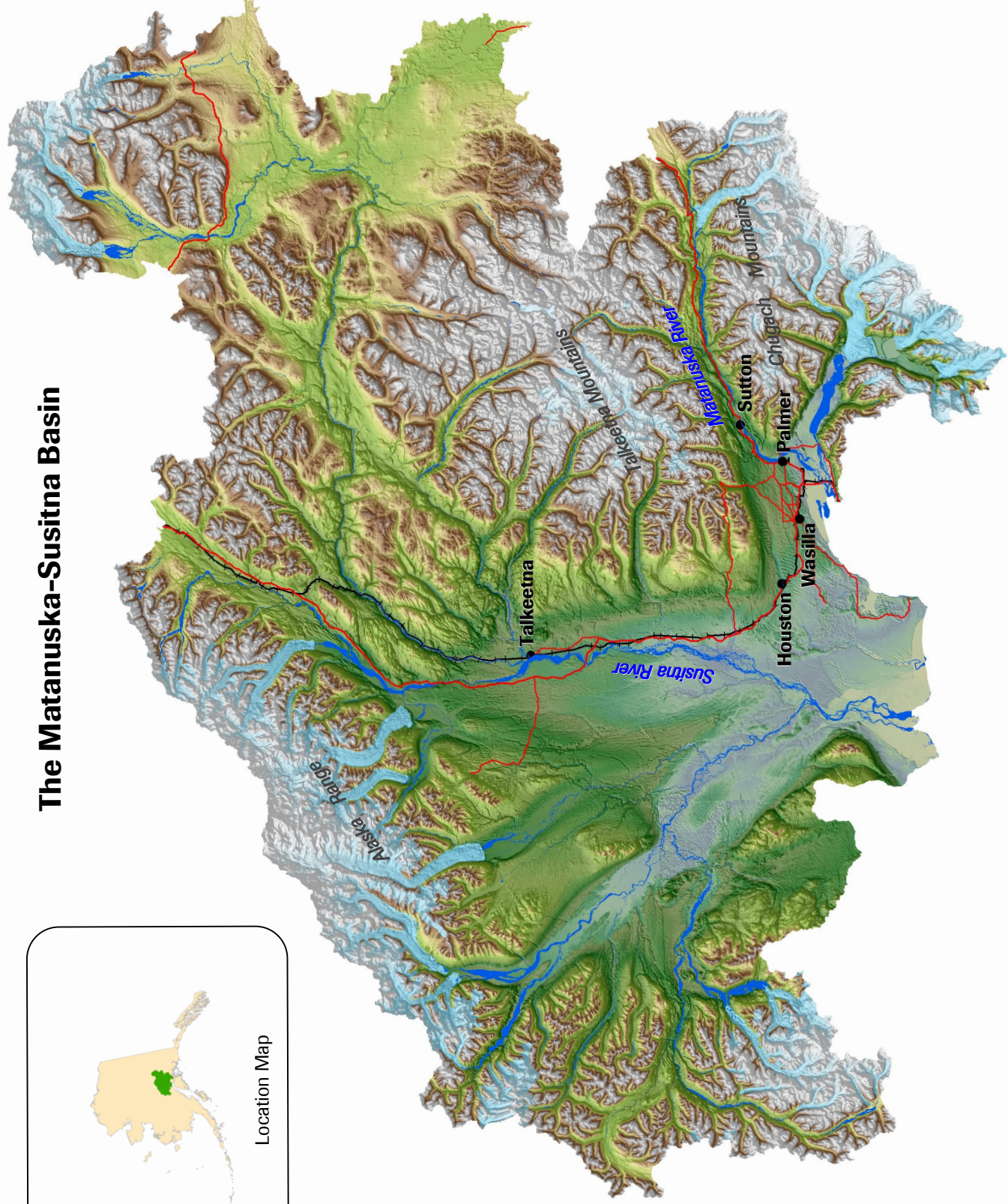
Mat-Su Basin Salmon
Habitat Partnership

**Mat-Su
salmon**
PARTNERSHIP

The Matanuska-Susitna Basin



Location Map





Welcome, and thanks for caring about salmon!

Welcome to the 17th annual Mat-Su Salmon Science & Conservation Symposium, hosted by the Mat-Su Basin Salmon Habitat Partnership.

This year's theme, Making the Invisible Visible: Unraveling Freshwater Mysteries through Science and Storytelling, will unfold with the help of four keynote presenters. On Monday, founder and director Jeremy Monroe and natural history photographer David Herasimtschuk of Freshwaters Illustrated will share how they work to conserve freshwater worlds through visual storytelling.

On Tuesday, we'll learn about a true science mystery. In 2020, Dr. Jenifer McIntyre of Washington State University, and colleagues, discovered that acute die-offs of coho in roadway-impacted watersheds in Puget Sound can be blamed on a novel chemical called 6PPD-quinone, one of the most acute toxicants known to science, that leaches from vehicle tires. Dr. McIntyre will illuminate the history of 6PPD-quinone, state of the science for understanding its toxicity, and regulatory actions to address the issue. Dr. Patrick Tomco, Professor of Chemistry and Director of the Applied Science, Engineering and Technology Lab at UAA, will provide important updates on 6PPD-quinone here in Alaska. A panel presentation will follow that focuses on 6PPD-quinone in the Mat-Su and what we can do about it.

This year's symposium covers a broad range of topics related to salmon habitat, reflecting diverse areas of expertise held by Partnership members. We will have presentation blocks on Indigenous salmon stewardship, fish and habitat assessment, aquatic invasive species, salmon habitat restoration, fish passage, human use, policy, and climate change.

Additionally, we are excited for the poster session introducing us to additional science, conservation, and policy efforts and the people behind those projects. Enjoy a special art display from Palmer High School students. A data transfer session will continue discussions from previous Symposiums that speak to the challenges of ensuring that current salmon science can inform community decision makers.

For almost two decades, this two-day forum has enabled the fluid exchange of ideas about salmon science and conservation between peers and diverse stakeholders. The need is great to not only increase our scientific knowledge of salmon and their habitat, but to translate and share it by way of impactful and clear storytelling in order to reach those making decisions that impact our world.

Whether you join for all or part of these two days of programming—including an evening social and acoustic jam at Feather & Flour, open to all—we're glad you're here.

Special thanks to the Symposium Planning Committee and to our supporters for making this event possible. Please enjoy, learn, and leave inspired to continue your good work till we meet again.

On behalf of the Steering Committee, thank you,

Jessica Speed
Coordinator, Mat-Su Basin Salmon Habitat Partnership



Mat-Su Basin Salmon Habitat Partnership Steering Committee

Maija DiSalvo, Unaffiliated
Theo Garcia, Knik Tribe
Marc LaMoreaux, Native Village of Eklutna
Emily Mailman, National Oceanic and Atmospheric Administration
Michael Mazzacavallo, Alaska Department of Fish and Game
Anna Senecal, U.S. Fish and Wildlife Service
Laurie Stuart, Tyonek Tribal Conservation District
Marykate Swenarton, Trout Unlimited
Matthew Varner, Bureau of Land Management

Symposium Planning Committee

Mike Campfield, Mat-Su Borough
Nate Cathcart, Alaska Department of Fish and Game
Theo Garcia, Knik Tribe
Andrea James, Chickaloon Village Traditional Council
Libby Kugel, Great Land Trust
Erin Larson, Alaska Center for Conservation Science - University of Alaska Anchorage
Ashley Oleksiak, Alaska Department of Environmental Conservation
Jessica Speed, Trout Unlimited (Partnership Coordinator)
Andy Wizik, Tyonek Tribal Conservation District

Thank you to Symposium Volunteers!

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Cody Jacobsen	Andrea James
Erin Larson	Matt Varner
Anna Senecal	Sue Mauger
Jackie McConnell	Nicole Swenson
Daniel Rinella	Nelli Williams
Margaret Stern	Maija DiSalvo
Laura Eldred	Mike Daignault
Nate Cathcart	Matt LaCroix
Emily Mailman	Kevin Keith
Anna Petersen	Duncan Green
Marykate Swenarton	



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Learn more about the Partnership and Symposium on the Mat-Su Salmon Partnership website at matsusalmon.org and follow us on Facebook!



Cover photo: David Herasimtschuk • Freshwaters Illustrated.



Mat-Su Basin Salmon Habitat Partners

*Representative on Steering Committee

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Community and Economic Development
Alaska Department of Environmental
Conservation
*Alaska Department of Fish and Game
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U.S. Geological Survey
U.S. Forest Service, Chugach National
Forest
Valley Community for Recycling Solutions
Wasilla Soil and Water Conservation District



Monday November 18, 2024

Palmer Community Center (Depot), 610 S. Valley Way, Palmer

8:30 Registration

9:00 Symposium Welcome

Nelli Williams (Director, Trout Unlimited Alaska, Mat-Su Basin Salmon Habitat Partnership
Fiscal Sponsor)

Stephanie Nowers (Assembly Member, Matanuska-Susitna Borough)

9:30 Virtual Keynote Address: *Exploring and Sharing Freshwater Worlds Through Visual Storytelling* – Jeremy Monroe and David Herasimtschuk, *Freshwaters Illustrated*

Introduction: Nate Cathcart (Alaska Department of Fish and Game)

10:30 Networking Break

11:00 Stewardship and Salmon Habitat Conservation in the Matanuska Watershed

Moderator: Erin Larson (Alaska Center for Conservation Science, University of Alaska Anchorage)

Integrating Traditional Ecological Knowledge with Modern Science for Salmon Conservation: A Case Study from the Chickaloon Village Traditional Council • Cody Henrikson (Chickaloon Village Traditional Council).

Salmon Through Time: Chickaloon Native Village Fisheries Research in the Matanuska Watershed • Ben Americus (Chickaloon Village Traditional Council)

From Barriers to Solutions: Capacity Building for Fish Passage Restoration • Andrea James (Chickaloon Village Traditional Council)

11:45 Noticing and Celebrating Incremental Change

*Making the Invisible Visible: An Intentional Practice of Noticing *and Celebrating* Incremental Change* • Anna Senecal (U.S. Fish and Wildlife Service)

12:00 LUNCH

12:45 Fisheries Research

Moderator: Dan Rinella (U.S. Fish and Wildlife Service)

Salmon Spawning in Sixmile Lake, JBER Alaska • Mitchell Paisker (U.S. Fish and Wildlife Service)

The Future is Jawless: Entering the Golden Age of Lamprey Research in Alaska • Nate Cathcart (Alaska Department of Fish and Game)

1:15 Fish and Habitat Survey's and Assessments and Aquatic Invasive Species

Tyonek Tribal Conservation District Watershed Monitoring Updates: AWC Additions, Habitat Assessments, and Invasive Species Surveys • Andrew Wizik (Tyonek Tribal Conservation District)



ADNR Elodea Control Projects Updates in South Central Alaska – Passing of the Torch, Looking to the Future • Cody Jacobson (Alaska Department of Natural Resources)

1:45 Poster Session & Art Showcase

Moderator: Margaret Stern (Susitna River Coalition)

Poster authors and artists from Palmer High School will be on hand to answer questions about their work.

Lake Creek Chinook Sonar • Stephen Dotomain (Alaska Department of Fish and Game)

Distribution of 6PPD-Quinone and Tire Wear Particles in Snowmelt, Soil, and Stream Water in Southcentral Alaska • Brian DiMento (University of Alaska Anchorage)

Overview and Future of Cost Share work in the Mat-Su • Joe Lyon (U.S. Fish and Wildlife Service), Jessica Johnson and Grace Fahrney (Alaska Department of Fish and Game)

Water and Fish on Cottonwood Creek • High School Ecology Class (Knik Charter School)

Tracking Water Temperature, Thermal Stress, and Chinook Salmon Spawning Success in the Deshka River • Bailey Korkoske (U.S. Fish and Wildlife Service)

Monitoring Paralytic Shellfish Poisoning (PSP) in Alaska: A Statewide Initiative Led by the Knik Tribe • Jackie McConnell (Knik Tribe)

Structural Setbacks from Waterbodies in the Mat-Su Borough: Recommendations for the Co-existence of Development and Clean Water • Kendra Zamzow (Chickaloon Village Traditional Council)

Multimedia Salmon Art Showcase • Palmer High School students

2:15 Break

2:30 Habitat Restoration

Moderator: Matt Varner (Bureau of Land Management)

NOAA Habitat Restoration in Alaska through the Bipartisan Infrastructure Law & the Inflation Reduction Act • Emily Mailman (National Oceanic and Atmospheric Administration)

Mat-Su Borough Fish Passage Program 2024 • Michael Campfield (Mat-Su Borough)

3:00 Tidbits

Moderator: Ann Marie Larquier (Alaska Department of Fish and Game)

Please sign up at the registration desk to present a 3-minute project summary or announcement. If you have a slide or two to project (maximum two slides), please load them by the end of lunch.

3:15 Science to Conservation Outcomes: Data Transfer

Moderator: Mike Daigneault (U.S. Fish and Wildlife Service)

The session continues discussions from previous Symposiums identifying challenges of transferring salmon science to local decision makers. We'll highlight some key statewide databases, showcase how to bring these to your desktop, and explore existing web mappers that weave Mat-Su data together.

4:15 Announcements & Adjourn

Mike Campfield (Mat-Su Borough)



4:30 Evening Social & Music Jam

Feather & Flour, 927 S. Cobb Street, Palmer

Come visit with colleagues and listen to or play music by joining an acoustic open music jam. We'll have a few guitars and upright bass to share, otherwise bring your own instrument and join us. Everyone is welcome. Local Palmer musician Aspenyarrow will kick off the jam by sharing a few tunes, including an original salmon themed song! Music is scheduled to begin at 5 pm. The Mat-Su Salmon Partnership is providing appetizers, and a cash bar will be available till 7:30, when the social ends.

Tuesday November 19, 2024

Palmer Community Center (Depot), 610 S. Valley Way, Palmer

8:30 Registration

9:00 Symposium Welcome

Maija DiSalvo (Member, Mat-Su Basin Salmon Habitat Partnership Steering Committee)

9:15 Keynote Address: Novel Tire-derived Toxicant 6PPD-quinone: Discovery, State of Science, and Regulation – Dr. Jenifer McIntyre, Washington State University

Moderator: Anna Senecal (U.S. Fish and Wildlife Service)

10:15 Networking Break

10:45 Keynote Address: Update on the Status of Our Knowledge About 6PPD-quinone in Alaska – Dr. Patrick Tomco, University of Alaska Anchorage

Moderator: Anna Senecal (U.S. Fish and Wildlife Service)

11:15 6PPD-quinone and the Mat-Su: Panel Discussion

Moderator: Laura Eldred (Alaska Department of Environmental Conservation)

What next? This session will bring in additional panelist perspectives to help us learn more about 6ppd-quinone in the Mat-Su and what partners and the Partnership can do about it.

Panelists:

- Matthew LaCroix (U.S. Environmental Protection Agency)
- Terri Lomax (Alaska Department of Environmental Conservation)
- Jenifer McIntyre (Washington State University)
- Alex Strawn (Matanuska-Susitna Borough)
- Patrick Tomco (University of Alaska Anchorage)

12:00 LUNCH

1:00 Fish, Politics and Policy

Peter Micciche (Board Member, National Fish Habitat Partnership/Mayor, Kenai Borough)

Moderator: Emily Mailman (National Atmospheric and Oceanic Agency)



1:15 Policy, Human Use and Habitat

Waterbody Setbacks in the Matanuska-Susitna Borough: A Year Later. Process Status and Changes Proposed by the Waterbody Setback Advisory Board • Matthew LaCroix (U.S. Environmental Protection Agency)

Effects of Watercraft Wakes on Shoreline Erosion, and Potential Impacts for Salmon at Big Lake, Alaska • Eli Wilson (University of Alaska Fairbanks)

Industrialization of the West Su Drainage • Margaret Stern (Susitna River Coalition)

2:00 Tidbits

Moderator: Andrea James (Chickaloon Village Traditional Council)

Please sign up at the registration desk to present a 3-minute project summary or announcement. If you have a slide or two to project (maximum two slides), please load them by the end of lunch.

2:30 Networking Break

2:45 Mat-Su Fish & Wildlife Commission Update

Gabe Kitter (Mat-Su Fish and Wildlife Commission)

3:00 Mat-Su Salmon in a Warming World

Moderator: Rebecca Shaftel (Bureau of Land Management)

Deshka River Temperature Monitoring and Salmon Studies • Daniel Rinella (U.S. Fish and Wildlife Service)

The Effects of Heat Stress on Juvenile Chinook and Coho Salmon Growth in the Deshka River • John Hermus (University of Alaska Fairbanks)

Juvenile Salmon Distribution and Body Condition: The Influence of Thermal Regimes in the Little Susitna Watershed • Erin Larson (Alaska Center for Conservation Science, University of Alaska Anchorage)

The Next Water Temperature Action Plan: Building on a Decade of Collaboration and Strategic Actions • Sue Mauger (Cook Inletkeeper)

4:00 Conclusions

Sue Mauger (Mat-Su Basin Salmon Habitat Partnership Science and Data Committee member, Cook Inletkeeper)

4:15 Adjourn



About the Keynote Speaker

Jeremy Monroe

Jeremy Monroe founded Freshwaters Illustrated to create more imagery and stories that carry the beauty, biodiversity and value of freshwater ecosystems. For over 20 years, these stories have been helping to connect learners of all kinds to the intricacy, wonder and needs of rivers, lakes and wetlands. Monroe has degrees in Aquatic Ecology and Fishery Biology from Colorado State University and works with a talented group of visual artists and communicators to craft stories that are as immersive and inspiring as they can be.



David Herasimtschuk

David Herasimtschuk is an award-winning natural history photographer, cinematographer and visual storyteller. He is the visual force in Freshwaters Illustrated imagery, stories and films.



Herasimtschuk's images combine his biological sensibility with a keenly artistic eye and give intimate perspectives on the little-known aquatic and amphibious life of fresh waters. He has traveled the world to work on and document biological research and conservation, and his images have been published in National Geographic, BBC World, National Wildlife, High Country News, Biographic, National Parks and many others. He has a degree in Wildlife and Fishery Biology from Colorado State University.

Exploring and Sharing Freshwater Worlds Through Visual Storytelling

Freshwaters Illustrated creates films and imagery exploring biodiversity, science, conservation, and culture. As biologist-storytellers, we have produced over 40 films and thousands of photographs documenting freshwater ecosystems across North America and beyond, and we will share approaches, examples, and lessons from our mission-driven work.

Contact

Jeremy Monroe
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David Herasimtschuk
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Freshwaters Illustrated
P.O. Box 921
Corvallis, Oregon 97339
freshwatersillustrated.org



About the Keynote Speaker

Dr. Jenifer McIntyre

Dr. Jenifer McIntyre is an associate professor of aquatic toxicology at the Washington State University's School of the Environment. She is passionate about science that effects change. Her B.Sc. (1997) in environmental biology at Queen's University led to the ban of a pulp mill effluent used as a road dust suppressant. Her M.S. (2004) from the University of Washington (UW) on contaminant bioaccumulation led the Washington State Department of Health to issue a fish consumption advisory for Lake Washington. Her Ph.D. (2010) research at UW on olfactory neurotoxicity of copper in coho salmon helped pass legislation in Washington and California that phases out metals in brake pads. In 2020, Dr. McIntyre and colleagues discovered a novel chemical leaching from vehicle tires that is one of the most acute toxicants known to science, explaining acute die-offs of coho salmon in roadway-impacted watersheds. She currently focuses on the ecotoxicology of urban stormwater runoff and the biological effectiveness of green stormwater infrastructure.



Novel Tire-derived Toxicant 6PPD-quinone: Discovery, State of Science, and Regulation

Decades of study into annual pre-spawning mortalities of coho salmon in the Puget Sound region led to the recent discovery of a novel, tire-derived contaminant now called 6PPD-quinone. Identified as one of the most acutely toxic chemicals known to aquatic life, researchers around the world are racing to uncover the toxic mode of action, what other species are vulnerable, whether humans are sensitive, and what we can do about the problem. In this presentation, I will review the history of 6PPD-quinone, the state of the science for understanding its toxicity, and regulatory actions to address the issue.

Contact:

Jenifer McIntyre, Ph.D.
Washington State University | School of the Environment
Puyallup Research & Extension Center
Washington Stormwater Center
(253) 445-4650
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About the Keynote Speaker

Dr. Patrick Tomco

Dr. Patrick Tomco of University of Alaska Anchorage is a Professor of Chemistry and Director of the Applied Science, Engineering and Technology (ASET) Lab. Dr. Tomco has a Ph.D. in Agricultural and Environmental Chemistry from University of California, Davis, and Bachelor of Science in Environmental Chemistry from University of Nevada, Reno. He is a 3rd generation Alaskan. His research interests involve contaminant fate/transport, environmental toxicology, and environmental remediation in high-latitude regions.



Update on the Status of Our Knowledge About 6PPD-Quinone in Alaska

Several recent and ongoing studies in Southcentral Alaska will be discussed relating to the occurrence of 6PPD-quinone and sublethal toxicity towards Alaskan salmon. Analytical challenges and knowledge gaps will be presented. Recent laboratory tests involving sublethal exposures with coho, sockeye, and chinook will be discussed, including: species-specific thermal tolerance, metabolic performance, and cardiac physiology. Tire wear particle analysis will also be discussed.

Contact

Patrick Tomco, Ph.D.
Professor of Chemistry
Director, ASET Laboratory
Director, Alaska INBRE Research Analytics Core
University of Alaska Anchorage
907-786-1260



Presentation Abstracts

Presentation abstracts are ordered as listed in the agenda.

**denotes poster*

Integrating Traditional Ecological Knowledge with Modern Science for Salmon Conservation: A Case Study from the Chickaloon Village Traditional Council

Cody Henrikson (Chickaloon Village Traditional Council)

The Chickaloon Village Traditional Council (CVTC) integrates Traditional Ecological Knowledge (TEK) with contemporary scientific research to protect and restore salmon populations and their habitats in the Nay'dini'aa Na'Kayax (Chickaloon region). As part of the Ahtna Athabascan Tribe, CVTC draws upon thousands of years of indigenous ecological knowledge, particularly in the sustainable management of salmon resources. TEK plays a key role in understanding salmon behavior, run timing, and harvest strategies, fostering a conservative approach to resource management aimed at ensuring sustained yields.

Salmon Through Time: Chickaloon Native Village Fisheries Research in the Matanuska Watershed

Ben Americus (Chickaloon Village Traditional Council)

Chickaloon Native Village's traditional territory spans hundreds of miles of boreal forests teeming with wildlife, snow-capped mountains with glaciers and rivers with salmon. Traditionally utilized salmon runs have been affected by habitat degradation from development and regional phenomena like unfavorable marine conditions. Chickaloon Village Traditional Council employs fisheries staff to help protect, enhance, and restore these culturally important salmon populations. In this presentation, we describe three research projects from summer, 2024. Much of our work is focused at Tsidek'etna "Grandmothers' Stream", known presently as Moose Creek (near Palmer). The traditional name originates from a historical abundance of salmon that allowed easy fishing by Elders of the community. The habitat quality of Tsidek'etna was severely degraded by coal mining and railway development in the early 1900s. To understand pre-mining salmon diversity, we are using sedDNA to identify ancient salmon markers from soil cores. To protect salmon habitat and at-risk populations, we are collaborating with the Alaska Department of Fish and Game to expand the Anadromous Waters Catalog and Baseline Genetics Collections. To assess the habitat quality of Tsidek'etna prior to future restoration work, we are using the Stream Quantification Tool. Together, these works provide insight into salmon historical abundances, current populations, and restorations opportunities for the future.

From Barriers to Solutions: Capacity Building for Fish Passage Restoration

Andrea James (Chickaloon Village Traditional Council)

Chickaloon Native Village is an Ahtna Dene Tribe that has stewarded the Matanuska-Susitna Valley of Southcentral Alaska for the past 10,000 years. Fish, and specifically salmon, are critically important sources of food and cultural well-being for Chickaloon Native Village and many people in Alaska. Salmon resilience is dependent upon habitat availability, quality, and connectivity. Loss of habitat connectivity, due to impassable culverts, destruction of wetland areas, and increased infrastructure have contributed to declining salmon populations in the



Matanuska-Susitna Valley. Chickaloon Native Village was awarded Bipartisan Infrastructure Law (BIL) funding through the NOAA Restoration Center's Restoring Tribal Priority Fish Passage through Barrier Removal Program to develop a Tribal Fish Passage Program. This program is working to increase Tribal capacity to implement fish passage restoration actions in the state of Alaska by providing free Tribal training opportunities in fish passage and habitat restoration. In addition to trainings, Chickaloon Native Village is hosting quarterly, virtual Alaska Tribal Fish Passage Working Group meetings that are a resource for Tribal entities in Alaska to learn about upcoming fish passage related trainings, current and future funding opportunities, and to voice questions and concerns regarding project planning or implementation. Finally, Chickaloon Native Village is replacing one to two culverts on a culturally significant tributary of the Matanuska River, in the Tribe's traditional territory. This presentation will highlight some courses provided and encourage Tribal engagement in fish habitat restoration, as well as encourage Agency and NGO collaboration with Tribal entities throughout the United States.

Making the Invisible Visible: An Intentional Practice of Noticing **and Celebrating** Incremental Change

Anna Senecal (U.S. Fish and Wildlife Service)

Our work is complex. The problems and opportunities that motivate us are fueled by passion rather than personal gain and they are all encompassing. These are big picture issues that we have little – or no—control over. Directing climate change, restoring and protecting stream flows, grappling with species invasions, understanding and undoing the Salmon crisis. These are just a few of our passion projects that link to value systems and underscore self worth, personal identity, connection to culture and hope for the future. It can be hard to recognize progress when the question is unclear or overly complex. But progress is made nonetheless. Acknowledging incremental successes on large complex problems is, in itself, an act of making the seemingly invisible (progress) seen.

Please join me in an interactive presentation where we'll step through a series of Menti-facilitated questions together to identify the core of the work that we do, why it matters, and how we continue to meaningfully benefit the aquatic ecosystems and communities we touch.

Salmon Spawning in Sixmile Lake, JBER Alaska

Mitchell Paisker (U.S. Fish and Wildlife Service)

In 2020, USFWS and the DoD identified three areas of research necessary to better understand Sockeye and Coho salmon production in JBER watersheds: water temperature regimes, predation on juvenile salmonids, and spawning habitat availability. We developed research projects to address each, with overarching objectives to 1) characterize year-round temperature regimes of salmon bearing streams and lakes on JBER and determine if they exceed tolerable or optimal ranges for different life stages of Pacific Salmon, 2) determine the proportion of rearing salmonids in the diets of invasive Northern Pike and stocked Rainbow Trout in Sixmile Lake, and 3) determine the preferred spawning habitat of Sockeye and Coho salmon and estimate availability in Sixmile Lake. To answer objective three properly, during the summer and fall of 2021-2023, we utilized fish counts from a weir at the outlet of Lower Sixmile Lake and a video weir at the junction of Upper and Lower Sixmile lake to determine the rough percentage of fish utilizing each lake. Additionally, we conducted redd surveys every week to locate spawning



activity, habitat usage and redds along the shorelines. Using abiotic data collected at each redd, we have been able to determine optimal spawning habitat for Sockeye salmon within the Sixmile Lake system.

The Future is Jawless: Entering the Golden Age of Lamprey Research in Alaska

Nate Cathcart (Alaska Department of Fish and Game)

Pacific lamprey *Entosphenus tridentatus* is a species of greater conservation need in Alaska - the northern extent of its range. However, we lack basic natural history information (e.g., distributions, life stage phenology) about Pacific lamprey here despite them sharing habitats and similarities in their life histories with Pacific salmon. This lack of knowledge is concerning as their range-wide conservation needs become more urgent in the face of intensifying anthropogenic activity. Understanding the distribution and ecology of Pacific lamprey is paramount for conserving habitats that support them and associated anadromous fishes such as Chinook salmon and steelhead. Since 2022, we have worked to study this species better and now a new grant to Knik Tribe provides an opportunity to enhance the quantity and quality of lamprey research in Alaska. Collectively, we aim to identify the distribution of Pacific lamprey and describe critical parts of their life-histories, such as larval rearing strategies and spawning migrations. With a focus on watersheds in southcentral Alaska, including the Mat-Su Valley, we share our progress, our plans, and ways you can get involved. Establishing where, when, and how Pacific lamprey use Alaskan waters are the first steps toward protecting this cryptic, understudied anadromous fish.

Tyonek Tribal Conservation District Watershed Monitoring Updates: AWC additions, habitat assessments, and invasive species surveys

Andrew Wizik (Tyonek Tribal Conservation District)

During the summer of 2024, TTCD staff completed work supported by MSSHP, AKSSF, and USFWS, to monitor stream temperatures and habitat conditions, determine the extent of anadromy, and survey for invasive species in the Chuitna watershed and the upper reaches of the Mat-Su Valley. From May-October 2024, TTCD conducted anadromous fish surveys resulting in 11 nominations for new anadromous streams and one new anadromous lake. Additionally, at eighteen habitat and temperature monitoring sites, TTCD has completed a second year of continuous stream temperature monitoring and habitat assessments at sites relevant to subsistence resources of the Tebughna people and the District. Hourly temperature data are shared annually with AKTemp and AWC additions have been shared with the Alaska Department of Fish and Game.

ADNR Elodea Control Projects Updates in South Central Alaska – Passing of the Torch, Looking to the Future.

Cody Jacobson (Alaska Department of Natural Resources)

Elodea (Elodea spp., Common waterweed) is Alaska's first invasive submersed freshwater aquatic plant that has been identified in several areas of the state including: Copper River Delta, Interior, Kenai Peninsula, and the Matanuska-Susitna (Mat-Su) Valley. In the Mat-Su, Elodea has been found within the Alexander Creek drainage that encompasses Alexander Lake,



Alexander Creek, and the Sucker Lakes complex. Elodea has also been found established and spreading in the Big Lake system including Big Lake, Mirror Lake, and Flat Lake. Elodea was also recently discovered in 2023 in Lower Six Mile Lake on Joint Base Elmendorf-Richardson, Anchorage and in Crescent Lake on the Kenai Peninsula. This presentation will provide an overview of the 2024 field season of herbicide control and containment efforts conducted by the Alaska Department of Natural Resources throughout these watersheds along with challenges faced in the fight against this pervasive aquatic plant that threatens critical salmon rearing habitat throughout Alaska.

Elodea is a highly invasive aquatic plant in Alaska that can significantly degrade critical habitat for salmon, other aquatic species, and impede navigability of waterways. Eight years ago, in the Mat-Su, a four-hectare patch of Elodea was first discovered in Alexander Lake within the Alexander Creek drainage in the Susitna River Basin. Elodea was also discovered in the Sucker Lake complex a few miles to the southwest. Both Alexander Lake and Sucker Lakes are very shallow soft bottom lakes with ideal conditions for the growth of aquatic plants. Elodea rapidly spread throughout the systems and for a period encompassed the entirety of both lake systems. Due to ongoing systemic herbicide applications by ADNR, only approximately 80 to 100 hectares of Elodea remain in Alexander Lake and approximately 40 hectares in the Sucker Lakes complex. The drainage is extensive and hydrologically dynamic, making Elodea eradication in this system a highly technical, expensive, extremely complex, and difficult endeavor. Preventing the distribution and establishment of this invasive species across the Central Region of Alaska is imperative in removing an extreme vector and preventing this invasive from spreading across the entire State.

Lake Creek Chinook Sonar*

Stephen Dotomain (Alaska Department of Fish and Game)

The Alaska Department of Fish and Game, Division of Sport Fish, has implemented a sonar project at mile 4.5 of Lake Creek, for the purpose of estimating passage of Chinook salmon. Beginning in 2022, with great support from the local fishing community, staff from the Palmer ADF&G office set out to explore the use of ARIS sonar technology to estimate the daily upstream passage of Chinook salmon and estimate the length of each fish counted. Lake Creek is a large tributary of the Yentna River and is approximately 9 miles east of Skwentna, AK. With Lake Creek being a swift and bouldery watershed, a weir was not feasible, and the ARIS sonar has proven successful in estimating passage during the run for the past three years. This assessment of escapement increases our knowledge of this salmon population and helps to manage this valuable fishery inseason. Further, this project provides valuable data that increases the accuracy of our run reconstruction model which estimates the escapement for the entire Yentna River.

Distribution of 6PPD-Quinone and Tire Wear Particles in Snowmelt, Soil, and Stream Water in Southcentral Alaska*

Brian DiMento (University of Alaska Anchorage)

Tire wear particles (TWPs) and their leachates have emerged as a significant source of environmental pollutants. A tire additive of particular concern is 6PPD-quinone (6PPDQ), which is formed when the antidegradant 6PPD reacts with ozone in the air. 6PPDQ has been shown to



be acutely toxic to coho salmon, which can be found in the Mat-Su Basin. This project aims to build analytical capabilities to further our knowledge on the environmental fate and distribution of these pollutants in Southcentral Alaska, where salmon populations are heavily relied on for both commercial and subsistence purposes. Pyrolysis gas chromatography-mass spectroscopy (Py-GC/MS) will be used to identify and quantify TWPs, while 6PPDQ is typically concentrated through solid phase extraction and quantified using liquid chromatography triple quadrupole mass spectroscopy (LC-MS/MS). Snow dump sites were examined as a potential point source for both TWPs and 6PPDQ by collecting environmental samples of three different sample matrices. Snow samples were taken during the snowmelt season, water samples were acquired from runs produced from the snow thaw, and soil samples were collected from the soil surface. Additionally, to further establish the spatial extent and temporality of TWPs and 6PPDQ in the area, stormwater drains and salmon-bearing streams were examined over the spring and summer of 2024. The results from this study may ultimately be used for the assessment of targeted mitigation strategies, while also informing decisions made in regard to the conservation of Alaskan salmon populations.

Overview and Future of Cost Share work in the Mat-Su*

Joe Lyon (U.S. Fish and Wildlife Service), Jess Johnson (Alaska Department of Fish and Game), Grace Fahrney (Alaska Department of Fish and Game)

The Mat-Su Cost Share program, also known as the Streambank and Shoreline Rehabilitation and Protection Program, is a partnership between Alaska Department of Fish and Game, United States Fish and Wildlife Service, nonprofit organizations, private landowners and local governments. The program provides financial incentives and educational outreach to private landowners to sustain and improve salmon habitat. To date, the program and its partners have constructed/completed over 900 streambank and shoreline rehabilitation projects, primarily using rootwads, brush layers, cabled spruce trees, elevated light penetrating walkways and native riparian vegetation planting. Since its 2007 inception, the Cost Share program has completed many of the highest priority and easy-to-do streambank and shoreline restoration projects in the Mat-Su. We propose to have a QR code on our poster linked to a poll to solicit audience input about the future of cost share work in the Mat-Su, how to improve it and how to reach a wider audience.

Water and Fish on Cottonwood Creek*

High School Ecology Class (Knik Charter School)

The purpose of this project is to monitor the temperature, pH, turbidity, and dissolved oxygen levels of the water in Cottonwood Creek and to compare our data to historical data to determine if the creek can sustain healthy salmon populations. We are learning about the lifecycle of salmon and salmon habitat through the Salmon in the Classroom curriculum, and we are participating in the Climate Change and My Community: Water and Fish Project through the IARC Arctic and Earth SIGNs Program at UAF.

Our hypothesis is that if the water temperature is between 5° C and 9°C, the pH levels between 6.0 and 8.5, and the dissolved oxygen levels are above 8-9g/mL for adults or above 11g/mL for developing eggs, then the creek is healthy enough to sustain and rear salmon.



We collected our data according to the GLOBE Hydrosphere Protocols for water temperature, pH, turbidity, dissolved oxygen, air temperature, surface temperature and cloud cover. We collected data for 7 weeks in the Spring of 2024, and 7 weeks this Fall 2024. We then compared our data from the Spring with our data from the Fall.

We found that the water temperatures, pH levels and dissolved oxygen levels were all within the range for healthy salmon population in the Spring; however, in the Fall the water temperature and dissolved oxygen levels were not. We are in the process of comparing our data to historical stream data for Cottonwood Creek. By looking at our results, we are concerned that Cottonwood Creek is too warm in the early Fall months to keep developing salmon eggs viable.

Tracking Water Temperature, Thermal Stress, and Chinook Salmon Spawning Success in the Deshka River*

Bailey Korkoske (U.S. Fish and Wildlife Service)

Summer water temperatures in the Deshka River often reach levels regarded as harmful to migrating and spawning Chinook Salmon (*Oncorhynchus tshawytscha*), and previous research has linked warm temperatures in this and other lowland Cook Inlet streams with reduced productivity. We initiated a multi-year study in 2023 to (1) track the thermal experience of individual Chinook Salmon during migration and spawning and (2) explore relationships among water temperature, biochemical indicators of heat stress (HSP70 protein), and spawning success. To achieve these goals, each year we implanted 49 temperature-archival radio tags in pre-spawn females at the Deshka River weir and collected muscle biopsies from each of these fish for analysis of HSP70 protein. Paired with four tracking flights spanning late July to early September to monitor locations and mortality status, we conducted float trips throughout the spawning period to recover the temperature-archival radio tags, determine the spawning success (i.e., egg retention) of any dead salmon still bearing tags, and opportunistically survey gamete retention in untagged carcasses. Water temperatures, which we have monitored year-round at 85 sites across the Deshka River watershed since 2017, remained relatively cool (<20°C) throughout the migration and spawning periods in 2023, though were warmer in 2024. We recovered 80% of the 98 temperature-archival radio tags, indicating the feasibility of recovering a relatively large subsample and allowing us to reconstruct the thermal experience of these individuals. Of the 78 recovered tags, 22 were obtained from carcasses which we examined for egg retention. Egg retention >25% was observed in one of 22 tagged carcasses (5%) and 3 of 44 untagged female carcasses (7%) examined opportunistically.

Monitoring Paralytic Shellfish Poisoning (PSP) in Alaska: A Statewide Initiative Led by the Knik Tribe*

Jackie McConnell (Knik Tribe)

The Knik Tribe is leading a statewide project to monitor Paralytic Shellfish Poisoning (PSP) across Alaska. Paralytic Shellfish Toxins (PSTs), which are produced by the marine dinoflagellate *Alexandrium*, bioaccumulates in shellfish and other marine organisms. These toxins then move up the food chain and can reach humans and other animals including salmon, posing a serious risk to coastal and riverine resources.



This project aims to enhance the understanding of PSP prevalence in Alaska's shellfish and other marine species, while also exploring the potential contamination of salmon, an integral species to local ecosystems and economies. Samples are collected from multiple locations across Alaska, including the Mat-Su, Lake Iliamna, SE Alaska, and the Yukon and Kuskokwim rivers. Results revealed that some salmon samples contained detectable levels of PST, with a few cases even exceeding the U.S. Food and Drug Administration (FDA) safety limits. These findings highlight the importance of broadening PSP monitoring efforts beyond shellfish to other marine organisms, like salmon, that are widely consumed by local populations.

The project's findings are essential for developing early warning systems and public health measures to protect communities from PSP risks. It provides a valuable resource for tribes, regulatory agencies, and public health officials in managing and mitigating PSP. By partnering with local communities and using community-based monitoring, the Knik Tribe aims to build a sustainable PSP surveillance framework to ensure food safety, raise awareness, and support informed decision-making.

Structural Setbacks from Waterbodies in the Mat-Su Borough: Recommendations for the Co-existence of Development and Clean Water*

Kendra Zamzow (Chickaloon Village Traditional Council)

Since 1973, the Matanuska-Susitna Borough (MSB) has required structures to be set back from water bodies, usually by 75 feet. In 2023, an ordinance was proposed to the MSB Assembly to repeal the setback if certain engineering specifications were met. Due to public comment, the Assembly did not vote on the proposed ordinance, and convened a Waterbody Setback Advisory Committee (WSAB) to provide recommendations. The WSAB has finalized their recommendations and is taking public comment. They will review public comments and revise their draft ordinance prior to submitting the ordinance and an associated resolution to the Assembly. This poster provides information on the WSAB recommendations.

NOAA Habitat Restoration in Alaska through the Bipartisan Infrastructure Law & the Inflation Reduction Act

Emily Mailman (National Oceanic and Atmospheric Association)

The Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA) present a once-in-a-generation opportunity for the National Oceanic and Atmospheric Administration (NOAA) and partners to continue working towards supporting fisheries, threatened species, and coastal communities. The BIL and IRA will provide an unprecedented \$1.4 billion in funds directed towards habitat restoration, conservation, and resilience efforts. NOAA will be working with our partners to provide technical assistance via four funding competitions: Fish Passage, Tribal Fish Passage, Transformational Habitat Restoration, and Tribes and Underserved Communities. NOAA has funded 214 awards totaling \$985 million, with 16 awards, receiving approximately \$41.5 million in funding, taking place across Alaska. NOAA anticipates the third and final round of funding opportunities will be released this fall through early winter. As the agency looks forward to the final round of funding, the Alaska Restoration Center is eager to share partner successes from across the state.



Mat-Su Borough Fish Passage Program 2024

Mike Campfield (Mat-Su Borough)

This presentation will provide an overview of the Mat-Su Borough Fish Habitat Restoration and Fish Passage programs and gives an update on the status of fish passages in the Mat-Su in general. We will discuss specific fish passage projects completed in the last two years, with a focus on the Settler's Bay Drive culvert replacement that was completed in 2024. We will also preview some of the upcoming projects that are in design and talk about the partnerships that are developing as we look to the future of restoration projects.

Science to Conservation Outcomes: Data Transfer Session

This session continues discussions from previous Mat-Su Symposiums identifying challenges of transferring salmon science, like thermal imagery (Sue Mauger, Cook Inletkeeper) to local decision makers. Partners will highlight key statewide databases related to partnership priorities: Anadromous Waters Catalog (Kevin Keith, ADF&G), Fish Passage (Michael Mazzacavallo, ADF&G), Exotic Plants (Anjanette Steer, UAA ACCS), Water Temperature (Marcus Geist, UAA ACCS), and Water Quality (Amber Crawford, ADEC); share tips and tricks for bringing these to your desktop with AK Mapper (Colton Percy, ADF&G); and explore existing web mappers that compile statewide data: Alaska Lake Vulnerability, Stream Gages, or Mat-Su data: ORV Crossings (Marcus Geist, UAA ACCS). Finally, using an online voting tool and moderator (Mike Daignault, U.S. Fish and Wildlife Service), we'll solicit feedback from the Partnership about other data sets that need better access by the public and decision makers and how we might accomplish this together.

Waterbody Setbacks in the Matanuska-Susitna Borough: A Year Later. Process status and changes proposed by the Waterbody Setback Advisory Board

Matthew LaCroix (Environmental Protection Agency)

The Matanuska-Susitna Borough's Waterbody Setback Advisory Board (WSAB) spent the past year discussing whether to propose changes to MSB code regarding waterbody setbacks. The WSAB has identified potential changes to Borough code at 17.02, 17.55, 17.65, and 17.80 and has drafted ordinance language to effect those changes. The public will be given an opportunity to review and comment on the changes proposed by the WSAB. The 2024 Mat-Su Salmon Science & Conservation Symposium will likely occur during the 60-day public review period. This presentation by the Partnership's WSAB representative will provide an overview of the proposed changes to help Partnership organizations and the public understand them. The presentation will include background on why the Assembly convened the WSAB to consider changes to Borough code. The public review process for the proposed changes will also be discussed, including how to submit comments to the Borough.



Effects of Watercraft Wakes on Shoreline Erosion, and Potential Impacts for Salmon at Big Lake, Alaska.

Eli Wilson (University of Alaska Fairbanks)

This talk will describe current progress of a study that aims to quantify boat wake-caused erosion in Big Lake, which arose from concerns raised by community members and resources managers about large boat wakes affecting shorelines around the lake. Throughout the summer of 2024 we measured the rate of shoreline erosion, boat wake frequency and boat wake size at various sites around the lake, in addition to collecting an array of water quality data. Sediments suspended in the water column during the erosion process, by boat wakes or otherwise, can settle on top of spawning gravel and in sufficient quantities can smother incubating eggs and reduce access to that habitat in the future. Thus, this study has worked to supplement past sockeye salmon (*Oncorhynchus nerka*) spawning survey data with new surveys to provide an accurate picture of current habitat use and provide stakeholders with knowledge of areas where human activity may be impacting the spawning habitat of these fish. Through this study, we hope to provide information necessary for local policy makers and resource managers to efficiently manage the interaction between humans and fish habitat at Big Lake.

Industrialization of the West Su Drainage

Margaret Stern (Susitna River Coalition)

The Susitna River Coalition (SRC) is a grassroots organization in Talkeetna, Alaska, dedicated to engaging and educating residents of the Susitna Valley on issues related to habitat health and water quality. The proposed West Susitna Industrial Corridor poses significant risks to the Susitna Drainage, with the potential to impact both water quality and salmon habitat. This 100-mile mining access road would traverse a previously roadless area to end at the Estelle mining district in the Alaska Range. Additional projects are already being explored along the road route with proposals including coal mining, large-scale timber harvesting, carbon sequestration, and pipeline construction. As a whole, these activities have the potential to fundamentally alter the landscape, turning it into a hub for resource extraction. The Susitna River Coalition stresses the need for careful consideration of proposed watershed project impacts as a whole to ensure long-term economic and ecological health.

Mat-Su Fish & Wildlife Commission Update

Gabe Kitter (Mat-Su Borough)

In 2007, the Matanuska-Susitna Borough Fish & Wildlife Commission (FWC) was formed to represent the interests of the Borough in the conservation and allocation of fish, wildlife, and habitat. Since then, the FWC and MSB have directed more than \$20 million in Borough, State, and Federal funding towards improving fisheries research, management, and fish passage. The FWC has successfully advocated for the formation of the MSB Waterbody Setback Advisory Board to protect crucial fish habitat, works annually to secure funding for weirs and scientific research/studies, and contributed to the creation, regulation, and maintenance of the Conservation Corridor in Cook Inlet, allowing more salmon to return to their natal streams to spawn. Commissioner Gabe Kitter will provide an update on the FWC's recent engagement efforts and upcoming activities of interest.



Deshka River Temperature Monitoring and Salmon Studies

Daniel Rinella (U.S. Fish and Wildlife Service)

A primary goal of the Anchorage Fisheries Branch is to understand how Alaska's rapidly changing climate will affect salmon habitat and the productivity of salmon populations. One focus has been the Deshka River, where historically large Chinook and Coho salmon runs have recently collapsed. Since 2017 we have monitored year-round water temperature at 80 sites across the watershed and have used these data to build a model that allows precise and continuous estimates of water temperature across the entire stream network, including forecasting and hindcasting based on inputs of air temperature and precipitation. This temperature network has been the backbone of research into habitat use, growth, and heat stress in juvenile Chinook and Coho salmon; the thermal experience and spawning success of adult Chinook Salmon; and current and future salmon predation by invasive Northern Pike. This presentation provides an update into these projects and gives a preview of thermal habitat maps for key salmon life stages.

The Effects of Heat Stress on Juvenile Chinook and Coho Salmon Growth in the Deshka River

John Hermus (University of Alaska Fairbanks)

Warming climate and several declining salmon returns across the state of Alaska have led to an increased concern about the future of Alaskan salmon populations. This study considers sublethal effects of warm freshwater temperatures during juvenile rearing of two co-occurring Pacific Salmon species by linking water temperatures to growth rates. Juvenile growth of Pacific Salmon plays a key role in their success because individuals that enter the ocean at larger sizes and have higher survival rates. We hypothesized that Alaska's warmest freshwater temperatures already impair the growth of juvenile Pacific salmon due to direct effects of heat stress or indirectly via increased metabolic rates that exceed consumption. We sampled juvenile Chinook and Coho Salmon in the Deshka River, one of the warmest rivers in Alaska, where summer water temperatures routinely exceed 20°C. During the summers of 2019 to 2022 juvenile salmon were trapped at pre-established temperature monitoring stations throughout the Deshka River watershed. Of these fish, a subset was lethally-sampled to obtain otoliths for daily growth analysis, stomachs for fullness, and muscle tissue for heat stress determination. These data provide a natural experimental window into juvenile salmon growth in some of Alaska's warmest waters. Such information will allow us to identify key water temperature thresholds associated with low habitat suitability to help inform future management and conservation efforts in a warming world.

Juvenile Salmon Distribution and Body Condition: The Influence of Thermal Regimes in the Little Susitna Watershed

Erin Larson (Center for Conservation Science, University of Alaska Anchorage)

Stream temperature has been monitored year round since October 2019 at 26 sites, generating 5 years of data across sites in the watershed. Some of these sites have faced challenges with lost loggers or high water conditions preventing logger retrieval. Mean summer temperatures have averaged from 5.7°C to 16.6°C across monitoring sites, with higher water temperatures in



the tributaries. To leverage this long term temperature dataset, sampling of juvenile salmon began in the summer of 2022, with minnow traps deployed in early summer and early fall at each site. Juvenile salmon are identified and length and weight measurements are recorded, with a subsample of coho and Chinook at each site kept as voucher specimens for further analysis and identification from USFWS partners. Typically, coho have been the dominant salmon species caught, with a few Chinook and sockeye at certain sites. Juvenile salmon lengths are highly variable across the early summer and early fall sampling events, with a wider range of fork lengths found during the early summer sampling, likely due to the presence of multiple cohorts prior to outmigration. Typically fewer fish are caught during the fall sampling, likely due to that smolt outmigration, and more fish are captured in the tributaries than in the mainstem. This combined temperature-salmon dataset provides important baseline information and provides the framework for assessing future impacts from climate change or development.

The Next Water Temperature Action Plan: Building on a Decade of Collaboration and Strategic Actions

Sue Mauger (Cook Inletkeeper)

Cook Inletkeeper wrote the first Stream Temperature Action Plan in 2012, following years of collaboration and coordinated conversations, to identify the highest priority actions for the next 5-10 years that would lead to greater protection of Alaska's wild salmon habitat as thermal change continues. By implementing priority actions in data collection, protection, and research in the Cook Inlet watershed and throughout Alaska, we hoped to gauge the health of salmon habitats and facilitate the development of management responses to improve watershed resilience to climate change. Much has been accomplished since 2012. With new partners, more data, and a growing understanding of Alaska's freshwater thermal condition, it's time to do a strategic assessment of what still needs to be done. A workshop hosted by UAA Alaska Center for Conservation Science in February brought together the water temperature community to build the next statewide water temperature action plan. A working group is now drafting the new plan, which will include priority goals for water temperature research and management and actions that can be implemented over the next 10 years.



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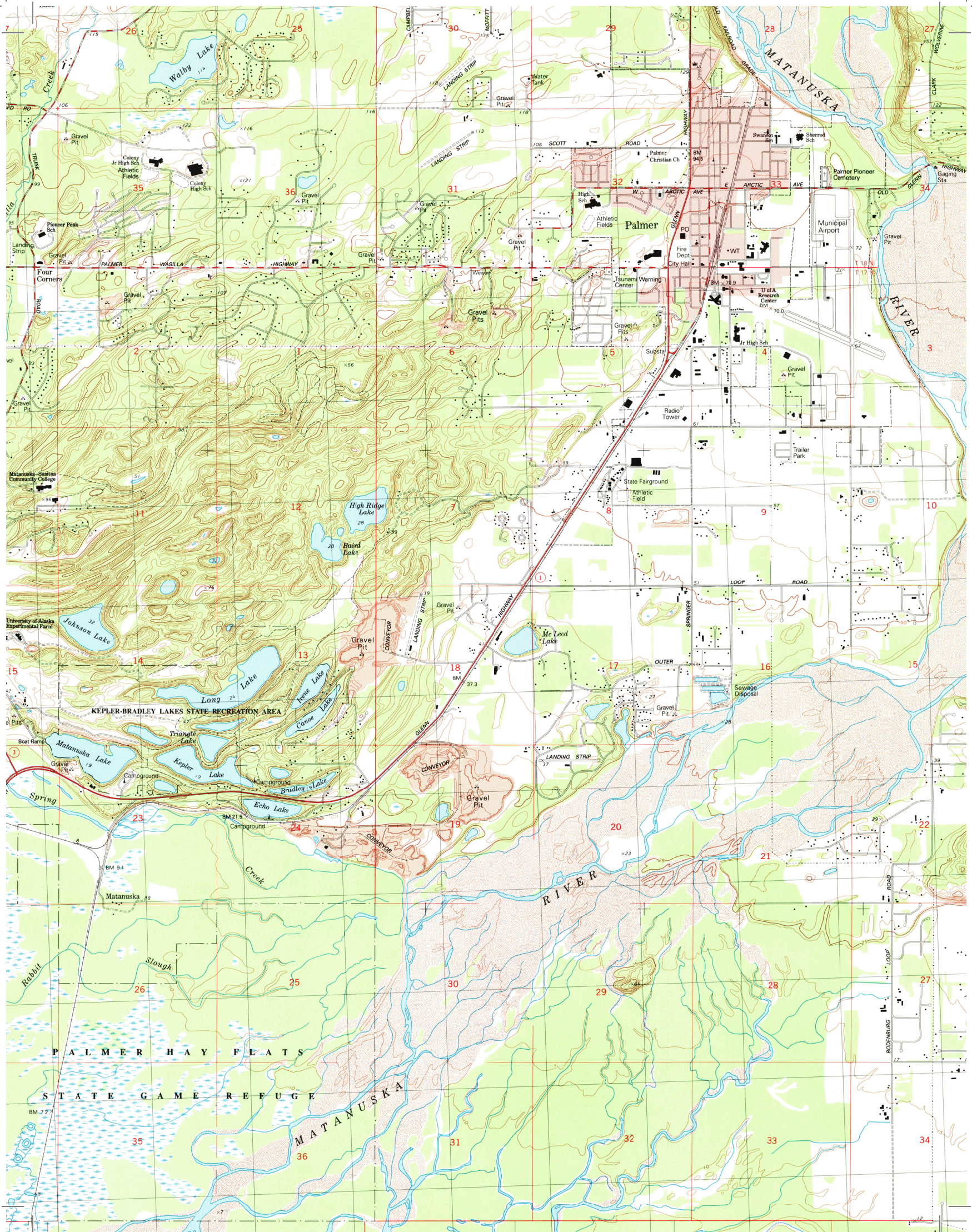
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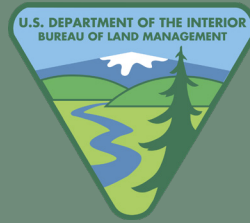


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