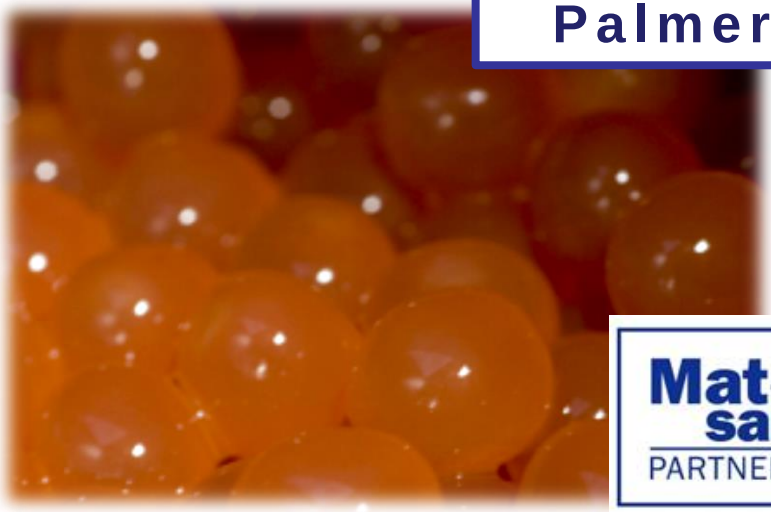
2015
MAT-SU SALMON SCIENCE & CONSERVATION SYMPOSIUM

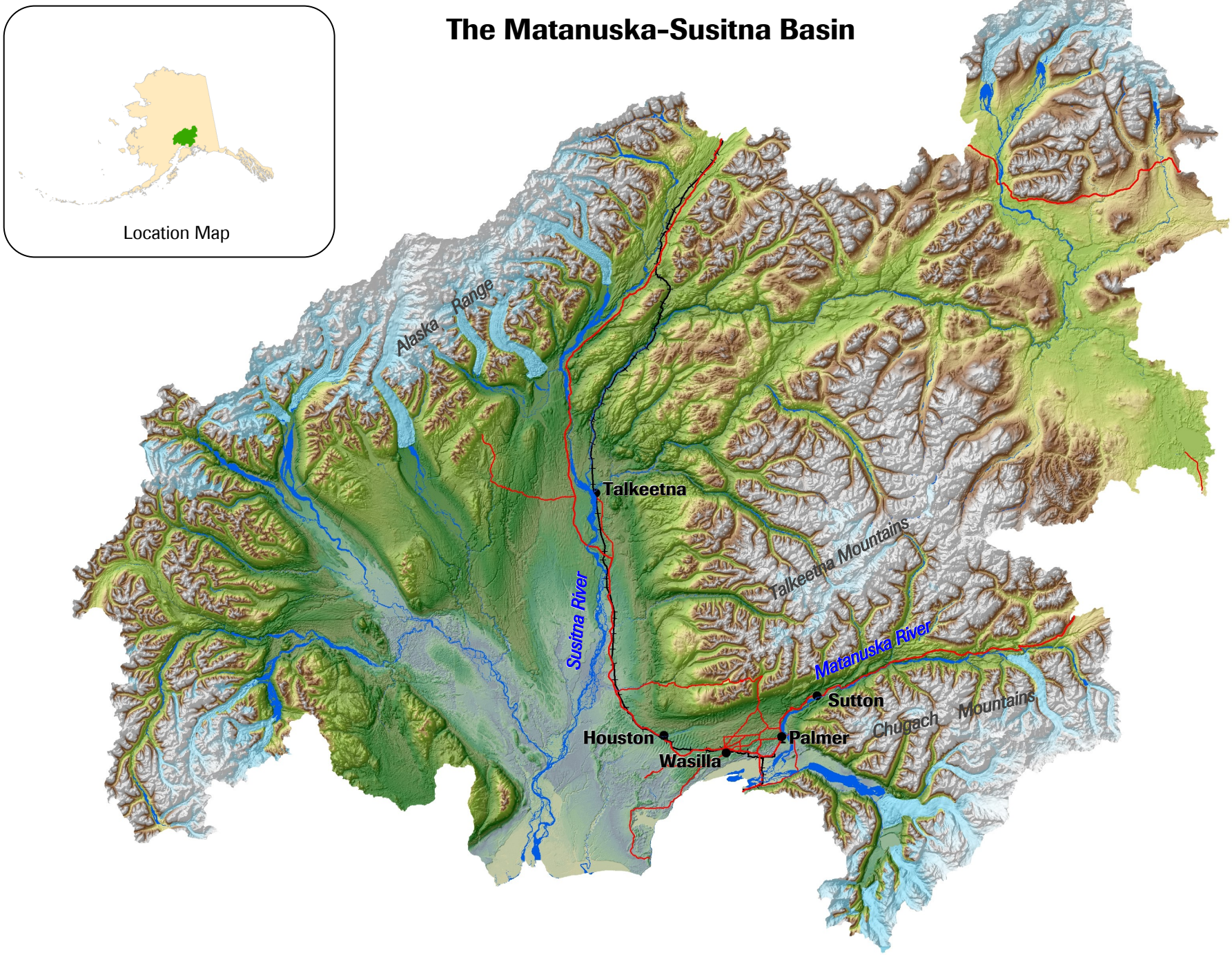
The Wonder of Salmon

November 18-19
Palmer, Alaska



Mat-Su salmon PARTNERSHIP

The Matanuska-Susitna Basin



Welcome to the 8th annual

Mat-Su Salmon Science and Conservation Symposium

Hosted by the Mat-Su Basin Salmon Habitat Partnership

Thank you for attending the 8th annual Mat-Su Salmon Symposium. We're glad you're here to share information and exchange ideas about salmon science and conservation in the Mat-Su Basin. We have an exciting line-up of presentations this year, including a handful of short films, and are delighted to have Richard Nelson as our keynote speaker. He is a cultural anthropologist, award-winning author, radio producer and natural sounds recordist. He produced *Encounters*, a public radio program about the natural world and was Alaska's Writer laureate. His current endeavor is the online project *SalmonWorld*. Richard will be sharing two talks: the first on how he has used multiple mediums of written word, sound and film to communicate the miracle of salmon; and the second, an evening presentation, will explore the natural history of salmon and why these amazing creatures are so vitally important to Alaskans.

Although the Mat-Su is vast and communities varied, salmon are the point where everyone connects. They fuel our economy, ecology and culture. They also feed local families. This year's Symposium theme is 'the wonder of salmon.' By working together and recognizing that we each have a role – as students, teachers, scientists, managers, landowners, fishermen, developers, and industry – we all can contribute in positive ways to a future where salmon continue to thrive in the Mat-Su.

The Partnership believes that thriving fish, healthy habitats and vibrant communities can co-exist in the Mat-Su Basin. Thank you for your part in keeping wild salmon abundant in the Mat-Su today and into the future.

Special thanks to the Symposium Planning Committee, this year's presenters, moderators and collaborators, and to our Symposium supporters.

We hope you enjoy this year's event!

Mat-Su Basin Salmon Habitat Partnership Steering Committee:

Jessica Speed, The Nature Conservancy, Partnership Coordinator
Erika Ammann, NOAA Fisheries
Frankie Barker, Mat-Su Borough
Lee Stephan, Native Village of Eklutna
Roger Harding, Alaska Department of Fish and Game
Jon Gerken, U.S. Fish and Wildlife Service
Christy Cincotta, Tyonek Tribal Conservation District
Corinne Smith, The Nature Conservancy
Arni Thomson, Alaska Salmon Alliance
Jessica Winnestaffer, Chickaloon Village Traditional Council

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Symposium Planning Committee:

Erika Ammann, National Oceanic and Atmospheric Administration
Polly Bass, University of Alaska, Mat-Su College
Jon Gerken, U.S. Fish and Wildlife Service
Susie Hayes, Alaska Department of Fish and Game (retired)
Catherine Inman, Mat-Su Conservation Services
Katrina Mueller, U.S. Fish and Wildlife Service
Terry Nininger, Mat-Su Borough Fish and Wildlife Commission
Kim Sollien, Great Land Trust
Jessica Speed, The Nature Conservancy, Partnership Coordinator
Jessica Winnestaffer, Chickaloon Village Traditional Council

Cover photos (clockwise from top) by: Corinne Smith, Jessica Winnestaffer, Bridget Besaw

Mat-Su Basin Salmon Habitat Partners

** Steering Committee Members*

Alaska Department of Commerce, Community and Economic Development
Alaska Department of Environmental Conservation
****Alaska Department of Fish and Game***
Alaska Department of Natural Resources
Alaska Department of Transportation & Public Facilities
Alaska Center for the Environment
Alaska Outdoor Council
Alaska Pacific University
Alaska Railroad Corporation
****Alaska Salmon Alliance***
Alaska Trails
AlaskaChem Engineering
Alaskans for Palmer Hay Flats
Aquatic Restoration & Research Institute
Bureau of Land Management
Butte Area Residents Civic Organization
****Chickaloon Village Traditional Council***
City of Palmer
ConocoPhillips Alaska, Inc.
Cook Inlet Aquaculture Association
Cook Inletkeeper
Eklutna Tribal Conservation District
Environmental Protection Agency
Envision Mat-Su
Fishtale River Guides
Glacier Ridge Properties
Great Land Trust
HDR Alaska, Inc.
Knik River Watershed Group
Knik Tribal Conservation District
Matanuska River Watershed Coalition
****Matanuska-Susitna Borough***
Mat-Su Anglers
Mat-Su Conservation Services
Mat-Su Trails and Parks Foundation
Montana Creek Campground

**** National Marine Fisheries Service***
National Park Service
****Native Village of Eklutna***
Natural Resources Conservation Service
Palmer Soil and Water Conservation District
Pioneer Reserve
Pound Studio
SAGA
Sierra Club
Sustainable Design Group
The Conservation Fund
****The Nature Conservancy***
The Wildlifers
Three Parameters Plus, Inc.
****Tyonek Tribal Conservation District***
United Cook Inlet Drift Association (UCIDA)
United Fishermen of Alaska
Upper Susitna Soil & Water Conservation District
U.S. Army Corps of Engineers
****U.S. Fish and Wildlife Service***
U.S. Geological Survey
U.S. Forest Service, Chugach National Forest
Wasilla Soil and Water Conservation District

Mat-Su salmon PARTNERSHIP

The Matanuska-Susitna Basin Salmon Habitat Partnership believes that thriving fish, healthy habitats, and vital communities can co-exist in the Mat-Su Basin. 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 to get results.

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

Wednesday November 18, 2015

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

8:30 Registration

9:00 Symposium Welcome

Erika Ammann (Mat-Su Basin Salmon Habitat Partnership Steering Committee member, National Oceanic and Atmospheric Administration)

Gary Harrison (Chief, Chickaloon VillageTraditional Council)

Tom Brookover (Director, Alaska Department of Fish and Game, Division of Sport Fish)

9:20 Keynote Address: *Telling the Story: Communicating the Miracle of Salmon* – Richard Nelson

Introduction by Sierra Doherty (Alaska Department of Fish and Game)

10:15 Networking Break

10:45 Mapping Water & Salmon Resources & Their Economic Value

Moderator: Kim Sollien (Great Land Trust)

Mat-Su Basin NHD Update: Lessons Learned – Andy Robertson (Saint Mary's University of Minnesota)

Salmon Habitat Mapping for Landscape-scale Planning in the Matanuska-Susitna Basin – Christine Woll (The Nature Conservancy)

The Economic Value of Salmon Habitat in the Mat-Su – Corinne Smith (The Nature Conservancy)

The Economic Geography of Salmon: A Conceptual Framework and Preliminary Characterization of the Spatial Distribution of Economic Values Associated with Salmon in the Mat-Su Basin Alaska – Davin Holen (Cultural Research North)

The Return on Investment of Mat-Su's Open Space – Maya Kocian (Earth Economics)

12:00 LUNCH

1:00 Communicating the Wonder of Salmon through Film

Moderator: Katrina Mueller (U.S. Fish and Wildlife Service)

Enjoy fish and fish habitat related short films!

Baby Salmon Live Here (Pat Race/The Salmon Project)

King Maker in Chickaloon Village (The Salmon Project/Great Land Trust)

Spring to Fall: A Season with Salmon (US Fish and Wildlife Service)

King Maker in Hatcher Pass (The Salmon Project/Great Land Trust)

Hidden Treasure (Liz McKenzie/ SalmonWorld/ The Salmon Project)

1:30 Hydropower & Salmon

Moderator: Matthew LaCroix (Environmental Protection Agency)

Eklutna Dam Removal Project – Brad Meiklejohn (The Conservation Fund)

Riparian Instream Flow Study for the Susitna-Watana Hydroelectric Project – Michael Mazzacavallo (R2 Resource Consultants)

2:00 Tidbits

Moderator: Catherine Inman (Mat-Su Conservation Services)

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 2 slides), please load them by the end of lunch.

2:30 Break

2:45 Planning & Prioritization

Moderator: Laura Eldred (Alaska Department of Environmental Conservation)

Tyonek Area Watershed Action Planning – Christy Cincotta (Tyonek Tribal Conservation District)

Cold Water Habitat Use by Juvenile Salmon Directing Conservation in the Big Lake Basin – Sue Mauger (Cook Inletkeeper)

Prioritizing Riparian Habitat: an Update of on- the-Ground Conservation – Tess Frenchik (Great Land Trust)

Efforts to Prioritize Fish Passage Barrier Removal and Instream Flow Reservations in the Mat-Su Basin – Franklin Dekker (U.S. Fish and Wildlife Service)

Using Construction Opportunities to Increase Green Infrastructure – Cindy Gilder (Alaska Department of Environmental Conservation)

4:00 Announcements & Adjourn for Daytime Portion of Symposium

Arni Thomson (Alaska Salmon Alliance)

4:05– Evening Social & Poster Session

6:00 Palmer Community Center (Depot), 610 S. Valley Way, Palmer

Jessica Speed (Mat-Su Basin Salmon Habitat Partnership Coordinator, The Nature Conservancy)

Come visit with your colleagues and our keynote speaker. Poster authors will be on hand to answer questions about their projects and are encouraged to stay with their posters for the first half hour of the evening social. The Mat-Su Salmon Partnership is providing appetizers from Turkey Red and a cash bar will be available.

Mapping of Mat-Su's 35 Highest Priority Water Bodies – Louisa Branchflower (Palmer Soil and Water Conservation District)

Mat-Su NHD Update Map – Jim DePasquale (The Nature Conservancy)

Site Selection, Operating and Maintenance of Fish Wheels for Salmon Capture in the Susitna River Drainage – Stephen Dotomain (Alaska Department of Fish and Game)

Early Detection of Elodea (Elodea nuttallii and E. canadensis) in Matanuska-Susitna Basin Waters – Emily Heale (Cook Inlet Aquaculture Association)

Susitna River Bering Cisco – Jon Gerken (U.S. Fish and Wildlife Service)

Baby Salmon Live Here – Kim Sollien (Great Land Trust)

Lake Habitats and Life History Strategies among Coho Salmon Oncorhynchus kisutch in the Big Lake Watershed, Alaska – Caroline Walls (U.S. Fish and Wildlife Service)

6:30– 7:30 Evening Public Presentation: *The Miracle of Salmon* – Richard Nelson

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

Jessica Speed (Mat-Su Basin Salmon Habitat Partnership Coordinator, The Nature Conservancy)

Vern Halter (Mayor, Matanuska-Susitna Borough)

Everyone is welcome to come hear Richard Nelson talk about the Miracle of Salmon in our backyard!

Thursday November 19, 2015

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

8:30 Registration

9:00 Symposium Welcome

Roger Harding (Mat-Su Basin Salmon Habitat Partnership Steering Committee member, Alaska Department of Fish and Game)

Lee Stephan (Mat-Su Basin Salmon Habitat Partnership Steering Committee member, President, Native Village of Eklutna)

9:15 Water Quality & Flows for Salmon

Moderator: Franklin Dekker (U.S. Fish and Wildlife Service)

The Effects of Land Use and Climate Change on Lake Water Quality in the Matanuska-Susitna Valley, Alaska – Matt McMillan (Alaska Pacific University)

Analyzing Peatland Discharge to Streams in an Alaskan Watershed: An Integration of End-member Mixing Analysis and a Water Balance Approach – Mike Gracz (Kenai Watershed Forum)

Fish Passage Design: Meadow Creek – Heidi Robuck (DOWL)

10:00 Aquatic Invasive Species *Elodea*

Moderator: Lisa Ka'aihue (Cook Inlet Aquaculture Association)

Invasive Elodea: Management Actions in Alaska and the Future of the Mat-Su – Heather Stewart (Department of Natural Resources)

Expert Probability Elicitation Through Adaptive Choice: The Risk of Elodea Spp. for Salmonid Persistence in Alaska – Tobias Schwoerer (Institute of Social and Economic Research)

10:30 Networking Break

11:00 Mat-Su Salmon Partnership Accomplishments & Priorities

Moderator: Frankie Barker (Matanuska-Susitna Borough)

Progress of the Mat-Su Basin Salmon Habitat Partnership: 2014-2015– Jessica Speed (Mat-Su Salmon Partnership, The Nature Conservancy)

Index Watersheds: Tracking Change Within and Across the Mat-Su Basin – Jeff Davis (Aquatic Restoration and Research Institute)

Prioritizing Conservation Strategies of the Partnership – Corinne Smith (The Nature Conservancy)

12:00 King Makers

There are "King Makers" Among Us – Kim Sollien (Great Land Trust)

12:15 LUNCH

1:15 Tracking & Monitoring Fish

Moderator: Brian Winnestaffer (Chickaloon Village Traditional Council)

Fish Tracker: A GIS Tool for Analyzing Radio-tagged Fish Migration – Gayle Neufeld (Alaska Department of Fish and Game)

Seasonal Movements and Habitat Use of Rainbow Trout (Oncorhynchus mykiss) in the Susitna River Basin, Southcentral Alaska – Jeff Falke (U.S. Geological Survey)

Monitoring Juvenile Salmon in Mat-Su Basin Streams – Jeff Davis (Aquatic Restoration and Research Institute)

2:00 Tidbits

Moderator: Kendra Zamzow (Center for Science in Public Participation)

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2:30 Networking Break

3:00 Chinook Salmon Studies

Moderator: Jon Gerken (U.S. Fish and Wildlife Service)

Inriver Run Abundance of Chinook Salmon, Susitna River, 2014 – Pete Cleary (Alaska Department of Fish and Game)

Spawning Distribution of Susitna River Chinook Salmon in 2014 – John Campbell (Alaska Department of Fish and Game)

Northern Cook Inlet Chinook Salmon Marine Harvest – Adam St. Saviour (Alaska Department of Fish and Game)

3:45 Conclusions

Moderator: Sue Mauger (Cook Inletkeeper)

4:00 Adjourn

Presentation and Poster* Abstracts

Arranged in alphabetical order by presenter last name.

Louisa Branchflower, Palmer Soil and Water Conservation District

**Mapping of Mat-Su's 35 Highest Priority Water Bodies*

Palmer Soil and Water Conservation District have completed compiling two datasets of geomorphic and riparian habitat information for the highest priority waterbodies in the Matanuska Susitna Basin. 35 of highest priority water bodies were selected based on biological value and vulnerability from human development by experts within the Mat-Su Salmon Partnership. These datasets will be available to be used by other professionals to assist with future salmon habitat restoration and conservation projects. The datasets were created by compiling the known existing USFWS, PSWCD and Wasilla SWCD GPS-captured field data from the last 10 years as well as with updated orthometric-photo evaluated data using the most current (2011-12) LiDAR and imagery data acquired by the Matanuska Susitna Borough.

John Campbell, Alaska Department of Fish and Game

Spawning Distribution of Susitna River Chinook Salmon in 2014

In 2014, the Alaska Department of Fish and Game conducted Chinook salmon assessment projects on the Susitna River. A major component of these studies was determining Chinook salmon movements and spawning distribution throughout the drainage. During May and June of 2014, 659 Chinook salmon received radio-tags on the mainstem Susitna River and 296 Chinook salmon were radiotagged on the Yentna River. All radiotagged fish were tracked over time using a series of stationary scanner-recorder sites and bi-weekly aerial surveys.

Each radiotagged fish was assigned to one of 13 possible fates, and putative spawning locations were determined for every fish that made upstream progress after being tagged. These spawning locations were used in conjunction with the abundance estimate to estimate the number of Chinook salmon in each of the major tributaries of the Susitna and Yentna Rivers. The major spawning locations in the mainstem Susitna River were the Deshka River (21%), Chulitna River (24%), Talkeetna River (21%), East Side tributaries (22%), and Susitna River above the Chulitna confluence (10%). The major spawning locations in the Yentna River were Lake Creek (24%), Yentna River mainstem (20%), Skwentna River (19%), Kahiltna River (18%), and Talachulitna River (8%).

Christy Cincotta, Tyonek Tribal Conservation District

Tyonek Area Watershed Action Planning

TTCD is committed to a locally driven, cooperative approach to protecting natural resources. In the past four years, TTCD has worked cooperatively with the Native Village of Tyonek, the Tyonek Native Corporation, the US Fish & Wildlife Service, the AK Department of Fish & Game, USDA Natural Resources Conservation Service, and many others in order to strategically work towards removing barriers to fish passage on the west side of the Cook Inlet. In 2014, TTCD began developing a Watershed Plan to address other threats to salmon such as pike and invasive plants. The Tyonek Area Watershed covers all waterways from Nikolai Creek to Beluga River on western Cook Inlet. The overall goal of this plan is to provide a framework to restore, enhance, and protect the freshwater systems in this area. The project includes the following objectives: 1. Monitor the overall health of the Tyonek Area Watershed, 2. Identify current and future threats to the health of the Tyonek Area Watershed, 3. Work with landowners to address current watershed issues (i.e. pike, fish passage, invasive plants, etc.) and 4. Develop best practices to maintain watershed health. This presentation will cover TTCD's progress on the Tyonek Area Watershed Action Plan and progress to date to address threats to salmon habitat.

Pete Cleary, Alaska Department of Fish and Game, Division of Sport Fish

Inriver Run Abundance of Chinook Salmon, Susitna River, 2014

In 2014, an inriver run of 90,492 Chinook salmon ≥500 mm mid-eye fork length, was estimated for the Susitna River drainage using mark-recapture techniques. Tagging was conducted during May and June on the Mainstem Susitna at river mile 34 and at Yentna river mile 6. On the mainstem Susitna River, radio tags were used for mark-recapture abundance estimation and 659 radio tags deployed. Recapture data was collected using stationary receivers adjacent to the Deshka River and Montana Creek weirs. At the Deshka weir, 13,908 Chinook salmon were counted, of which 125 were radiotagged. At the Montana Creek weir, 1,212 Chinook salmon migrated passed the weir, 15 of which were radio tagged. The Susitna River inriver run for Chinook salmon ≥500 mm mid-eye fork length was estimated at 68,225 fish (95% CI 54,473 – 94,240). Model fitting included adjustments for size bias and tagging-induced delay.

On the Yentna River, two fish wheels and gill nets were used for tag deployment (river mile 6) and recovery (river mile 18). At the tag deployment site, 1,281 dart and 296 radio tags were deployed, while 2,308 Chinook salmon were captured at the tag recovery site, 59 of which were dart-tagged. The Yentna River inriver run estimate for Chinook salmon ≥500 mm mid-eye fork length was 22,267 fish (95% CI: 17,466 – 28,701). Model fitting included adjustments for tagging-induced delay and varying handling effects.

Jeff Davis, Aquatic Restoration and Research Institute

Index Watersheds: Tracking Change Within and Across the Mat-Su Basin

The 2013 update to the Strategic Action Plan of the Mat-Su Basin Salmon Habitat Partnership Objective 1.5 is the selection of index watersheds as locations for long-term monitoring of relationships between salmon and habitat health, and changes in salmon distribution and abundance or habitat health due to human activities including climate change. The objective is to select at least 3 watersheds by 2016. Strategic Action 1.5.1 identifies criteria that will be used to select index watersheds, and Strategic Action 1.5.2 is the development of study plans to be implemented within these watersheds. This presentation will update the partnership on the approach and progress to date on the selection of index watersheds and provide an opportunity for partnership members to provide comments.

Jeff Davis, Aquatic Restoration and Research Institute

Monitoring Juvenile Salmon in Mat-Su Basin Streams

The distribution and relative abundance of juvenile Chinook and coho salmon were monitored in 13 tributary locations representing 3 different stream types (upland, lake/stream, and wetland) in 2013 and 2014. Juvenile salmon were sampled in the spring, summer, and fall of 2013 and summer of 2014 using 20 baited minnow traps within 200 m sampling units. Stream water temperature was measured hourly at each sampling site and dissolved oxygen, pH, specific conductivity, and turbidity were measured concurrent with fish sampling. Juvenile Chinook salmon were present only in the upland streams sampled and their relative abundance was highest in 2014. Juvenile coho salmon were present in all stream types but more abundant in wetland streams than upland streams. Juvenile coho salmon relative abundance was highest in 2014. The relative abundance of juvenile Chinook and coho salmon was lowest in 2013 when compared to previous data collected from 2008 through 2014. Upland steams were colder with water temperatures never exceeding 20°C and lake/stream systems warmest often exceeding 20°C. Juvenile coho salmon relative abundance was negatively correlated with dissolved oxygen reflecting their preference for wetland stream types and fork lengths were positively related to maximum water temperatures.

Franklin Dekker, U.S. Fish and Wildlife Service

Efforts to Prioritize Fish Passage Barrier Removal and Instream Flow Reservations in the Mat-Su Basin

The Mat-Su Basin Salmon Habitat Partnership Strategic Action Plan set goals of developing prioritizations for two important efforts, the restoration of barriers to fish passage and the establishment of instream flow reservations. In the past year, the U.S. Fish and Wildlife Service (USFWS) and other partners have been working toward completing prioritizations for both these areas. The data and methods USFWS used to prioritize fish passage sites included the Alaska Department of Fish and Game's (ADF&G) culvert assessment database, developing a restoration cost estimate to replace each barrier and quantifying benefits to salmon by measuring miles of upstream habitat above each barrier. Out of the total population of 573 Mat-Su Basin fish passage sites in the ADF&G database, 478 sites were anadromous, and 288 were classified as salmon barriers according to their fish passage rating. We found a minority, less than 60 barriers, accounted for 75% of the total miles upstream of barriers. Barriers were ranked by miles of habitat upstream and by cost-benefit ratios. The top 15 barriers accounted for 146 miles of upstream habitat and we estimated it would cost approximately $4.2 million for restoration of those barriers. To prioritize waters for instream flow reservations, a list of 36 priority streams were ranked by their accessibility for gaging and by their biological value and vulnerability to development based on the Partnership's Salmon Watersheds in the Mat-Su Basin: A Map Atlas to Prioritize Conservation and the ease of access for gaging. The final instream flow reservation prioritization will help inform stream gaging decisions in the coming years as gaging on all current priority streams will be completed in 2017.

Jim DePasquale, The Nature Conservancy

**Mat-Su NHD Update Map*

The Mat-Su update to the USGS National Hydrographic Database, which will be complete by December, 2015, will double the number of mapped streams in the Mat-Su basin as well as measurably increase the accuracy of the stream maps. This poster/map will demonstrate the newly mapped water bodies as well as describe, through text and graphics, the process of updating the National Hydrographic Database and its applicability.

Stephen Dotomain, Alaska Department of Fish and Game, Division of Sport Fish

**Site Selection, Operating and Maintenance of Fish Wheels for Salmon Capture in the Susitna River Drainage*

The Alaska Department of Fish and Game, Division of Sport Fish, has been using fish wheels for mark and recapture studies on the Susitna River drainage since 2006. The original Susitna fish wheels were designed after fish wheels used on other rivers. With the usage of the fish wheels some modifications took place to accommodate the Susitna River and the fish species targeted, as the efficient operation of fish wheels is essential for this mark recapture study. Some modifications included basket design, weir design, boom log length and type, and two basket and three basket configurations. Fish wheels require constant adjustment for the optimum fish capture rates. The type of adjustment a fish wheel relies upon are the site location, depth and type of basket, boom length, and speed of fish wheel. In some cases gill nets are used in conjunction with fish wheels to collect samples from Chinook salmon that are not susceptible to fish wheels. Fish wheels are a great tool to use for a mark recapture study when used efficiently.

Jeff Falke, U.S. Geological Survey, Alaska Cooperative Fish and Wildlife Research Unit
Kevin Fraley, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks
Richard Yanusz, Alaska Department of Fish and Game, Division of Sport Fish
Sam Ivey, Alaska Department of Fish and Game, Division of Sport Fish

Seasonal Movements and Habitat Use of Rainbow Trout (Oncorhynchus mykiss) in Susitna River Basin, Southcentral Alaska

Potamodromous Rainbow Trout are an important ecological and recreational resource in Alaska rivers, and increased human development, hydroelectric projects, and climate change threaten their populations. We used aerial telemetry tracking to characterize seasonal movements and habitat use of these fish across a complex 31,221 km2 Southcentral Alaska riverscape during 2003-2004 (N=148) and 2013-2014 (N=82). We found that most trout overwintered in mainstem habitats near tributary mouths from November-April. After ice-out in May, trout ascended tributaries up to 51 km to spawn, and afterward moved downstream to intercept egg and flesh subsidies provided by spawning salmon in July and August. Trout transitioned back to mainstem overwintering habitats at the onset of autumn when salmon spawning waned. Among tributaries where trout were initially tagged, fidelity back to those streams from overwintering sites to spawn and rear varied. However, we found little difference in overall movements and habitat use for a subset of fish for which sex was determined using genetic analysis. As most trout undertake extensive movements and make use of a variety of seasonal habitats to compete their life histories, it will be critical to take a broad-scale approach to their management in light of anticipated future land use and climate change.

Tess Frenchik, Great Land Trust

Prioritizing Riparian Habitat: An Update of on the Ground Conservation

The Mat-Su Borough has thousands of healthy salmon streams. In order to sustain existing salmon runs and support the resurgence of damaged runs Great Land Trust, with input from many members of the Mat-Su Salmon Partnership, local fishing guides, and tribal governments, has prioritized land parcels along 35 priority water bodies throughout the Mat-Su. Using existing GIS data and input from partners, we identified over 1000 parcels that provide important spawning, rearing, and overwintering habitat for salmon. Starting in 2009, and updated in 2014, this prioritization has helped Great Land Trust and partners conserve over 7,700 acres of land and 39 miles of salmon streams. These lands are forever protected under conservation easements and are annually monitored by Great Land Trust staff.

Cindy Gilder, Alaska Department of Environmental Conservation

Using Construction Opportunities to Increase Green Infrastructure

Using Green Infrastructure is an effective way to manage storm water, improving water quality. This presentation will provide information on how the Fairbanks Green Infrastructure Group collaborated with the Cushman and Barnett Streets improvement project to increase the number of Green Infrastructure projects. The presentation will cover information on the composition of the group and the outreach conducted, including the techniques used to help convince the adjacent business owners to change how storm water was managed on their property. Actual on-the-ground projects will be show cased.

Mike Gracz, Kenai Watershed Forum

Analyzing Peatland Discharge to Streams in an Alaskan Watershed: An Integration of End-member Mixing Analysis and a Water Balance Approach

Peatlands are the dominant landscape element in many northern watersheds where they can have an important influence on the hydrology of streams. However, the capacity of peatlands to moderate stream flow during critical dry periods remains uncertain partly due to the difficulty of estimating discharge from extensive peat deposits. We therefore used two different approaches to quantify diffuse pore water contributions from peatlands to a creek within a small watershed in Southcentral Alaska. A sensitivity analysis of a water budget for a representative peatland within this watershed during a dry period showed that a substantial surplus of pore water may remain available for subsequent discharge after accounting for water losses to evapotranspiration. These findings were supported by End-Member Mixing Analysis (EMMA), which indicated that 55% of the stream flow during a dry period originated from the near-surface layers of peatlands within the watershed. Contributions from peatlands to stream flow in northern coastal regions may therefore provide an important buffer against the potentially harmful effects of changing climatic conditions on commercially important fish species.

Emily Heale, Cook Inlet Aquaculture Association

**Early Detection of Elodea (Elodea nuttallii and E. canadensis) in Matanuska-Susitna Basin Waters*

Cook Inlet Aquaculture Association surveyed 11 lakes in the Mat-Su Basin in 2014 and 2015 for the presence of Elodea—Alaska's first invasive aquatic water weed. By detecting this invasive species at an early stage, it may be possible to avoid full infestations of lakes. Aquatic invasive plants have been shown to be devastating to native fish and plant populations. With early detection and quick action the cost of removal efforts are greatly diminished. This poster provides an overview of survey methods, the outreach component, and results for 2014 and 2015.

Davin Holen, Cultural Research North

The Economic Geography of Salmon: A Conceptual Framework and Preliminary Characterization of the Spatial Distribution of Economic Values Associated with Salmon in the Mat-Su Basin, Alaska

Production of wild salmon is a service provided by naturally occurring ecosystems in Alaska that supports a wide range of economic, social and cultural values for people. The range of benefits that people derive from salmon can be measured in various ways, and accounting of these values represents a flow of services to society. Within salmon producing landscapes, other activities such as urban or resource development also benefit society yet may temporarily or permanently alter the capacity for salmon production, and thus affect the flows of salmon ecosystem services to people in the future. A challenge for Alaska in the future is to meet society's goals for growth and resource development in ways that also meet society's goals for sustainability, diversity and abundance of wild salmon. The purpose of this project is to help improve information on the economic contribution of salmon to the people of Alaska, with specific focus on the spatial distribution and relative valuation of salmon stocks that support sport, commercial and subsistence fisheries to inform land use and resource planning. This project compiled available data on economic measures of consumptive use of salmon in the Matanuska-Susitna Basin, including sport fishing, commercial and subsistence harvest. We defined economic values to include market and non-market net benefits related to commercial, sport, and subsistence fisheries for salmon species from anadromous streams in the Matanuska and Susitna River basins. We categorized stakeholders in these fisheries into Mat-Su residents, other Alaska residents, and participants from outside Alaska within the U.S. and other countries. The goal is to understand the economic geography of salmon, and not necessarily a full accounting of the absolute magnitude of specific economic flows. That is, we were more interested in the relative distribution of economic values provided by salmon than the absolute value of those contributions.

Maya Kocian, Earth Economics

The Return on Investment of Mat-Su's Open Space

Community assets such as trails, parks and public open space provide numerous benefits of both economic and social value. These assets provide recreation opportunities for residents, helping people to stay healthy and happy. Investing in the protection of public open space is critical to strengthening the places and amenities that make the Mat-Su a great place to live and work. This presentation summarizes the economic analysis of the return on investment of the Mat-Su Borough's open space and trails. Both social and economic benefits are covered in this presentation. Social benefits encompass recreation, tourism, human health, public safety, subsistence, and cultural benefits. Economic benefits include those from businesses, tax revenues, and taxpayer savings. Finally, the presentation also discusses the role healthy open space has in providing a natural, protected area for salmon to thrive.

Sue Mauger, Cook Inletkeeper

Cold Water Habitat Use by Juvenile Salmon Directing Conservation in the Big Lake Basin

The Big Lake basin contains some of the highest biological value watersheds in the Susitna Valley and supports sport and personal use salmon fisheries. Yet stream temperatures within the Big Lake basin have been documented to be above thresholds known to be stressful to salmon and are sensitive to climate change impacts. We used thermal infrared (TIR) imagery collected along 50 river miles within the Big Lake basin to identify 36 significant cold water inputs that may act as "thermal refugia" for migrating adults and rearing juvenile salmon. Using the TIR to guide site selection, we developed a study plan to determine if Coho salmon preferentially select cold-water habitats for summer rearing. Cook Inletkeeper and U.S. Fish and Wildlife Service biologists conducted fish and macroinvertebrate sampling, habitat assessments, and temperature surveys at three sites within the Big Lake basin during monthly sampling events from July – October, 2015. Cold water influenced reaches were compared to control reaches at each site to observe measurable differences in fish use between habitats. We will provide Great Land Trust a parcel-level prioritization of key habitats based on the thermal imagery as well as fish abundance data. Linking spatially-explicit temperature information with fish use data is a big step forward in our efforts to identify and protect key thermal refugia that may help support healthy, sustainable salmon populations in the Big Lake basin.

Michael Mazzacavallo, R2 Resource Consultants

Riparian Instream Flow Study for the Susitna-Watana Hydroelectric Project

Alaska Energy Authority (AEA) has recently completed a third field season for the riparian instream flow study sampling program for Susitna-Watana Hydroelectric Project. The overall goal of the riparian instream flow study was to provide a quantitative, spatially explicit model to predict potential impacts to downstream floodplain vegetation from project operational flow modification of natural Susitna River flow, sediment, and ice regimes. Major objectives which included: delineation of sections of the Susitna River with similar environments, vegetation, and riparian processes, termed riparian process domains (RPDs), characterize seed dispersal and seedling establishment groundwater and surface water hydroregime requirements, characterize the role of river ice in the establishment and recruitment of dominant floodplain vegetation, characterize the role of erosion and sediment deposition in the formation of floodplain surfaces, soils, and vegetation, and characterize natural floodplain vegetation groundwater and surface water maintenance hydroregime. This presentation will review the primary objectives of the riparian instream flow study, summarize the work that has been completed to date and provide results of preliminary analyses.

Matthew McMillan, Alaska Pacific University
Michael G. Loso, Alaska Pacific University
Roman Dial, Alaska Pacific University
Jason Geck, Alaska Pacific University
James DePasquale, The Nature Conservancy

The Effects of Land Use and Climate Change on Lake Water Quality in the Matanuska-Susitna Valley, Alaska

The Matanuska-Susitna Valley (Mat-Su) in south central Alaska is a rapidly developing region with a high density of lakes and wetlands. Population density ranges from 2 – 1200 people per square mile across the 12,000 km^2 area. The Core Area of the Mat-Su has over 400 lakes and many shorelines have private residential property on individual well and septic systems. Water quality in lakes is a growing concern due to rapid land use change, a changing climate, highly variable lake-groundwater flow, and little knowledge of these relationships at catchment scales. The assessment of the most important factors determining water quality is the first step in evaluating lake change in the context of future land use and climate change.

Brad Meiklejohn, The Conservation Fund

Eklutna Dam Removal Project

The Conservation Fund, the Native Village of Eklutna and the Eklutna Corporation have begun work to remove the lower Eklutna River dam. Built in the 1920's, this 60 foot concrete dam was abandoned in the 1950's and is a barrier to five species of salmon that spawn in the Eklutna River system. The ultimate goal of the dam removal project is to restore fish passage all the way to Eklutna Lake.

John Gerken, U.S. Fish and Wildlife Service
Randy Brown, U.S. Fish and Wildlife Service
Katrina Mueller, U.S. Fish and Wildlife Service

**Susitna River Bering Cisco*

The Bering Cisco (*Coregonus laurettae*) is an anadromous whitefish endemic to Alaska. There are only three known spawning populations worldwide and these occur in the Yukon, Kuskokwim, and Susitna Rivers. In the marine environment, the Susitna River population has been documented in northern Cook Inlet and is abundant to the south along the west side of Cook Inlet at least into Kamishak Bay. In freshwater, Bering Cisco were first documented in the Susitna River and their spawning area in the mainstem generally identified in the early 1980s after the initiation of fisheries research associated with the original Susitna River hydroelectric proposal. In 2010, the U.S. Fish and Wildlife Service and Alaska Department of Fish and Game revisited the spawning area and confirmed their presence via electrofishing. Because the spawning area is localized to the Susitna's mainstem, Bering Cisco eggs incubating in the gravel along the mainstem would experience predicted changes in temperature, substrate composition, and flow associated with dam construction and operation upstream should it occur; and the impact of dams on anadromous fish species and is increasingly well-documented across the U.S. and elsewhere in the world. A more in-depth telemetry study of Bering Cisco spawners could improve understanding of spawning needs and distribution in the Susitna River mainstem as the spawning area appears to be fairly confined/localized and vulnerable to habitat disturbance.

Gayle Neufeld, Alaska Department of Fish and Game

Fish Tracker: A GIS Tool for Analyzing Radio-tagged Fish Migration

A Chinook salmon telemetry project to determine abundance and spawning distribution took place in the Susitna River and its tributaries during summer 2014. Data collected included 2,531 fish tag records, 880,425 records from stationary radio receiver/logger sites located throughout the study area, and 4,302,477 aerial tracking telemetry records. In order to easily extract the appropriate data from an overwhelming amount of information, we developed a fish tracking tool for ArcGIS. By using a set of pre-established criteria based on telemetry signal strength and the pattern of fish locations over time, we were able to assign a final (putative spawning) location to each fish.

Andy Robertson, Saint Mary's University of Minnesota GeoSpatial Services

Mat-Su Basin NHD Update: Lessons Learned

Encompassing over 20,000 lakes and thousands of miles of streams and rivers, the Matanuska-Susitna basin is a community rich in aquatic resources. However, current mapping of surface hydrography and associated floodplains and watersheds is inadequate to support critical needs in community and development planning, flood mapping and public safety as well as recreational, commercial and subsistence use of Mat-Su freshwater resources.

In recent years, significant investments have been made in the Mat-Su basin to secure high resolution topographical data and aerial photography, largely through the Mat-Su LiDAR and Orthoimagery project and the Alaska Statewide Digital Mapping Initiative. These projects make available, for the first time, highly detailed topographic information which can be used to map hydrogeomorphic conditions at a fine scale over the 25,500 square mile basin.

The Mat-Su hydrographic mapping program consisted of two phases; a modeling phase and a validation phase. The modeling phase employed newly-available LiDAR and IfSAR elevation data to create an elevation-derived, synthetic network of hydrologic flowlines, or streams. The validation phase consisted of a photogrammetric review of modeled streams coupled with field observations to ensure that the hydrography best reflected actual ground conditions. Once validated, the Mat-Su stream network was conflated to the NHD and AK Hydro data schemas following USGS specifications. Staff at Saint Mary's University of Minnesota conducted the hydrography validation phase of this undertaking. This presentation will focus on lessons learned when validating hydrography over such an extensive project area.

Heidi Robuck, DOWL

Fish Passage Design: Meadow Creek

As one of the fastest growing regions in the state and country, the Mat-Su Borough (MSB) is an important focus for rehabilitating fish habitat and correcting human impacts on salmon populations. The Mat-Su Basin covers 24,500 square miles and is home to all five anadromous salmon species as well as rainbow trout, Dolly Varden char and Arctic grayling. Urban development, specifically roads, has cut off access to miles of vital habitat and in some cases destroyed fish habitat completely. Restoring access to these blocked waterways is essential to preserving and growing fish populations in the Mat-Su Basin. Fish passage at road crossings can be improved by replacing barrier (e.g., undersized, perched, etc.) culverts with larger, embedded culverts or bridges using stream simulation methodology. The success of stream simulation design relies heavily on the ability to incorporate natural sediment transport and channel function into the design while adequately providing for low-flow and flood-flow conditions. Design alternatives must also consider long-term maintenance needs, safety concerns, and potential site impacts over the design life of the project. The MSB, along with United States Fish and Wildlife Service (USFWS) and Alaska Department of Fish and Game (ADF&G), has partnered with engineers at DOWL to improve fish passage at fifteen road-stream crossings in the Mat-Su Borough where existing culverts have become barriers to fish migration, each of which has had unique challenges and site constraints. The largest fish passage culvert DOWL has designed to date was constructed this past summer (2015) on Meadow Creek at Big Beaver Lake Road in Big Lake, AK. The crossing at Meadow Creek was identified by the USFWS and ADF&G as an impediment and barrier to upstream fish migration. The project at Meadow Creek replaced two 6-foot diameter corrugated steel pipes with a 32-foot span by 10-foot rise structural plate steel box culvert with headwalls and wingwalls. Toewood bank reconstruction was used in the design to provide additional aquatic habitat near the culvert. Shortly after construction, numerous spawning sockeye salmon were observed upstream of the new culvert.

Tobias Schwoerer, Institute of Social and Economic Research

Expert Probability Elicitation Through Adaptive Choice: The Risk of Elodea Spp. for Salmonid Persistence in Alaska

Invasive species management is often challenged by the lack of appropriate data related to an invader's effect on local ecosystems. Often, managers must rely on their own judgment instead of following a data-driven approach. These circumstances can result in lack of action, poor decisions, wasted money, or ineffective responses. Expert knowledge can help in these data poor situations even though it is no panacea for physical on the ground data collection. When decisions are time-sensitive, the benefits of integrating probabilistic expert knowledge into decision analysis are widely recognized. Most subjective probability assessments rely on direct encoding of probabilities, often subject to heuristics and bias. In addition, experts often require specific training enabling them to translate their knowledge into probabilistic terms. These techniques can lack rigor in data collection and analysis. An alternative method, using choice modeling, is grounded in economic theory and widely applied in understanding and predicting human behavior. This research illustrates how choice modeling can be used to indirectly estimate and analyze probabilistic expert belief and account for uncertainty in individual judgment through Bayesian hierarchical estimation of individual utilities. In addition, the multi-attribute nature of choice-based elicitation simulates the variability of real-world environmental conditions requiring experts to think in evaluative ways across alternative states of nature. The resulting expert data allows for the derivation of marginal components of risk that can inform localized decision analysis accounting for variability in conditions across landscapes. This data-driven approach also provides rigorous statistical aggregation techniques across the expert pool.

Corinne Smith, The Nature Conservancy

The Economic Value of Salmon Habitat in the Mat-Su

In resource extraction, a dollar value of the removed resource is quantifiable but the value of the land or water that provided it is usually ignored. For example, in Alaska, a salmon caught by a fisherman has a market value, but what is the value of waters it was caught in? What about the lands beside those waters that provide nutrients, shade, and rearing habitat for young salmon? As the number of people living in and visiting the Mat-Su grows, land and water use decisions will be critical. How do we manage the growth in such a way that fish can thrive in healthy habitats and continue to contribute to our economy and Alaska lifestyle? In considering salmon habitat to be a community asset, we can begin the process of placing a value on it. In the past few years, several economic studies have quantified multiple ways that the lands and waters in the Mat-Su salmon ecosystem have value. These values are based on the contribution to the fishing industries, residents' desire to live near lakes and streams, interest in protecting salmon for future generations, and the generation of ecosystem services like flood control and water purification. Knowing the economic value of the lands and water that comprise salmon habitat can help decision makers and land managers to make balanced decisions about development around that habitat.

Corinne Smith, The Nature Conservancy

Prioritizing Conservation Strategies of the Partnership

In 2008, after an 18-month long process, the Mat-Su Salmon Partnership completed its first Strategic Action Plan. The intent of the plan is to identify long-term goals, strategies, and voluntary actions that the Partnership and others can undertake to conserve salmon habitat. In 2013, the Partnership reviewed the plan and expanded the suite of conservation strategies to address additional potential threats to salmon habitat. Now the Partnership is prioritizing those conservation strategies to inform the use of resources, in particular the grant funds received through the National Fish Habitat Partnership. The Steering Committee will establish priorities based on two reviews: an assessment of potential threats by the Science and Data Committee and feedback from partners and participants at the Mat-Su Salmon Symposium. The Science and Data Committee will rank the two components of potential threats -- stresses and sources of stresses. A stress is a process or event with direct negative impacts on salmon or salmon ecosystems. Stresses are ranked based on the severity of impact and geographic scope of damage expected within 10 years. Stresses can have multiple sources. Sources of stresses are ranked based on relative contribution to each stress and irreversibility. These rankings across multiple stresses are combined for an overall ranking of each threat. At the symposium, partners and participants will identify the conservation strategies that they think are most critical for addressing threats to salmon habitat. The Steering Committee will finalize priorities this winter and review priorities on a regular basis.

Kim Sollien, Great Land Trust

**Baby Salmon Live Here Project*

DID YOU KNOW? Baby salmon live all around us. Keep your eyes peeled - Great Land Trust and the Mat-Su Salmon Partnership have partnered with the Mat-Su Borough to install 35 Baby Salmon Live Here signs at priority stream crossings in the Mat-Su Valley! Using GLT's Salmon Prioritization, we chose important stream crossings that were hidden from view or unidentified. Our goal is to educate residents and visitors about the local waterways that flow throughout the Valley, providing important freshwater habitat for baby salmon and to spread the word about taking care of them. Learn more at babysalmon.org and sponsor a sign by making a $150 donation at greatlandtrust.org.

Kim Sollien, Great Land Trust

There are "King Makers" Among Us

This presentation will celebrate and crown four community members for the actions they have taken to enhance, restore, and conserve important salmon habitat in the Mat-Su.

Jessica Speed, Mat-Su Basin Salmon Habitat Partnership, The Nature Conservancy

Progress of the Mat-Su Salmon Partnership, 2014 – 2015

Formed in 2005 to address increasing impacts on salmon habitat from human use and development, the Partnership has brought together a diverse group of 60 organizations and individuals. All are bound by the belief that thriving fish, healthy habitats and vibrant communities can co-exist in the Mat-Su. We are part of a broader network of fish habitat partnerships across the U.S. and one of four partnerships in Alaska.

In 2014 and 2015, partners made significant collective progress toward the goals of the Partnership's Strategic Action Plan. We gained five new Partnership members and ranked as one of the top fish habitat partnerships in the country in a national performance evaluation. Conservation of intact habitats for salmon is a top priority. Great Land Trust and partners protected nearly 1,000 acres of priority habitat for salmon. Other organizations have moved toward instream flow water reservations on Moose, Kashwitna, and Little Willow Creeks. Partners expanded scientific knowledge with significant updates to stream mapping across the Basin to a national standard; identification of juvenile salmon distribution, abundance and important overwintering areas; and assessment of resiliency of salmon in a changing climate through stream temperature monitoring and identification of cold water refugia. The Mat-Su Borough and other partners restored fish passage at over 10 barriers, opening approximately 30 miles of upstream habitat and Alaska Department of Fish and Game and U.S. Fish and Wildlife Service are restoring shoreline habitat with landowners through a cost share program. Partners are working on two aquatic invasive species: the eradication of *Elodea*, a plant first discovered in the Mat-Su in 2014 and the containment of invasive pike. Partners have been educating community members about salmon and the Partnership with the annual Mat-Su Salmon Symposiums, a Partnership site tour in 2015, the *Kingmaker* campaign, *Clean Boating*, *Baby Salmon Live Here*, and *Septic Smart*. Mat-Su Salmon partners will continue working together to ensure healthy, abundant salmon runs in the Mat-Su Basin into the future.

Adam St. Saviour, Alaska Department of Fish and Game

Northern Cook Inlet Chinook Salmon Marine Harvest

Chinook salmon are harvested in mixed stock fisheries of Upper Cook Inlet (UCI). The primary purpose of the Chinook salmon marine harvest project is to estimate the stock-specific harvests of Chinook salmon from the Tyonek subsistence fishery and the Northern District commercial set gillnet fishery to improve understanding of stock productivity. Stock-specific harvests will be estimated by collecting and analyzing genetic tissue samples from fish caught in these fisheries 2014 through 2016. Mixed stock analysis techniques will be used to assign proportions of harvest by time and area to four genetic reporting groups (UCI Northwest, Susitna-Matanuska, Knik-Turnagain, and Kenai Peninsula). Age, sex, and length data will be collected from sampled fish and summarized. In compliment with the mark recapture project and inriver harvest data, this project will provide comprehensive run estimates for Susitna River Chinook salmon. This information will be used to reconstruct the full Chinook salmon run for the Susitna and Yentna Rivers for the first time.

Heather Stewart, Department of Natural Resources

Invasive Elodea: Management Actions in Alaska and the Future of the Mat-Su

Invasive species threaten to change Alaska despite our geographic isolation, relatively cold climate, and extensive undeveloped landscape. With this change comes unprecedented alteration in habitats, loss of biodiversity, and not yet quantified impacts to native salmon populations. Prevention, management, and eradication of invasive species have been identified as important priorities by local, state and national governments. In 2015, the Alexander Creek and lake system was added to the National Fish Habitat Partnership's list of "waters to watch" as a result of the dual impact of Northern Pike and Elodea and its impact on the watershed. Elodea is Alaska's first submerged aquatic invasive plant species. In optimal growing conditions, Elodea is able to form dense single-species stands and becomes a dominant species in water up to 2m deep, while reducing temperature and oxygen concentrations, and increasing sedimentation. Studies have shown that Elodea's aggressive growth and vegetative propagation is responsible for the loss of aquatic habitat biodiversity, displacing rare and aquatic species, and degrading salmon spawning grounds. To date, Alaska has 22 known waterbodies infested with Elodea, including Alexander Lake. Management practices in Alaska have had varied strategies and results. The herbicide treatments on the Kenai Peninsula in 2014 have preliminary been proven effective for achieving eradication; one of the three treated waterbodies has no detected Elodea in 2015. Three of Anchorage's lakes were first treated with herbicides during the 2015 field season. Lake Hood was treated with herbicides 43 days after Elodea was discovered in 2015, a testament to the success of early detection and rapid response. Future treatments of the Fairbanks area and the Matanuska-Susitna's Alexander Lake are scheduled for 2016. Efforts to implement a Statewide Elodea Eradication Plan with stakeholders are currently ongoing.

Caroline Walls, U.S. Fish and Wildlife Service
Jonathon Gerken, U.S. Fish and Wildlife Service
Joshua Ashline, U.S. Fish and Wildlife Service
Mark Willette, Alaska Department of Fish and Game
Bob DeCino, Alaska Department of Fish and Game
Suresh Sethi, U.S. Fish and Wildlife Service

**Lake Habitats and Life History Strategies among Coho Salmon Oncorhynchus kisutch in the Big Lake Watershed, Alaska*

The U.S Fish and Wildlife Service has been studying the life history of juvenile Coho Salmon *Oncorhynchus kisutch* in the Big Lake Watershed since 2009. Findings from previous studies suggest that some lakes within the system support overwintering juvenile Coho Salmon populations, while others do not. In 2015, the USFWS and ADFG sampled ten lakes within the watershed, with the objective of identifying the limnological, geomorphic, and biological attributes of lakes that support overwintering populations of juvenile Coho Salmon. Presented here are preliminary biological findings. Between June and October 2015 each lake was sampled bi-monthly with a fine-mesh fyke net. A total of 1,947 juvenile Coho Salmon were captured in 90 fyke net sets. Juvenile Coho Salmon were captured in all ten study lakes; however, catch per unit effort varied between lakes (0.011-2.459 juvenile Coho Salmon per hour soak time). Relative abundance of three fork length size classes (≤ 99mm, 100mm-159mm, ≥160mm) varied by lake and through time. Fork length measurements ranged from 38mm–340mm. Approximately 78% (*n=89*) of all Coho Salmon ≥160mm were captured during the last month of sampling. Of these fish, ~67% (*n= 60*) were sexually mature. These sexually mature Coho Salmon exhibited different physical characteristics from both non-sexually mature juveniles and jacks that were captured. Observational evidence suggests that the sexually mature Coho Salmon were non-anadromous and spawning: many had tattered caudal fins and small reds were observed. The presence of these fish suggests multiple life history strategies are occurring among Coho Salmon within the Big Lake Watershed: non-anadromous, jacks, and anadromous.

Christine Woll, The Nature Conservancy
David Albert, The Nature Conservancy
Lee Benda, Terrainworks Inc.
Dan Miller, Terrainworks, Inc.

Salmon Habitat Mapping for Landscape-scale Planning in the Matanuska-Susitna Basin

Landscape-scale planning and prioritization for sustainable development, conservation, and restoration activities requires spatially explicit, landscape-scale information on the distribution and abundance of resources. Likewise, landscape-scale planning that seeks to prioritize protection of salmon habitats and salmon populations seeks spatially explicit information detailing the quality and quantity of these habitats and the distribution of fish abundance by species and life stage. To supplement the state of Alaska's Anadromous Waters Catalog (AWC) as a datasource for landscape-scale planning, we sought to better understand and describe the distribution and relative abundance of salmon and their habitats in the Matanuska-Susitna basin. This project compiled the best available spatially explicit information on salmon habitat and salmon abundance by species and life stage for the entire Mat-Su basin, including a synthesis of previously completed studies enumerating adult salmon spawning patterns. It also seeks to improve understanding of juvenile salmon rearing habitats by using locally derived salmon-habitat relationships and a NetMap terrain model to propose a qualitative model predicting distribution and relative abundance of coho, Chinook, and sockeye salmon rearing habitats across the Mat-Su Basin. Results showcase the diversity of habitats likely utilized by salmon throughout the basin, the abundance and locations of streams likely to produce anadromous fish that are currently not listed in the AWC, and research needs still required to properly document habitat use by all species and life stages. The results of this work are currently undergoing formal review by local stakeholders and being aligned with relevant, institutionalized datasets to support use of these new data in landscape-scale planning and prioritization efforts.

Keynote Speaker

Richard Nelson

Richard Nelson has spent most of his life in Alaska, working as a cultural anthropologist, award-winning author, radio producer, and natural sounds recordist. His books include *Hunters of the Northern Ice, Make Prayers to the Raven, Shadow of the Hunter, Patriotism and the American Land* (with Barry Lopez and Terry Tempest Williams), and two award-winning books about the natural world—*Heart and Blood: Living with Deer in America,* and *The Island Within*. He produced *Encounters*, a weekly public radio program about the natural world and was Alaska's Writer laureate. Richard's current endeavor is *SalmonWorld*, an online project that explores the miracle of salmon and our human relationship to them.

Abstracts

Telling the Story: Communicating the Miracle of Salmon

(Keynote presentation)

Two of the most basic human needs are food and stories…and for many Alaskans this leads directly to salmon. For thousands of years, people throughout Alaska have depended on salmon to sustain their lives and communities, so these fish have always been a major topic of discussion—in fishing camps, in homes, in meetings and councils and capitols. Today, we're aware that many salmon populations outside of Alaska have seriously declined, so it's more important than ever to educate ourselves about these fish; to carefully manage our fisheries and protect essential salmon habitat; and to share as widely as possible what we've learned. In other words, we need to tell the story of salmon, in ways that will reach people of all backgrounds, throughout Alaska and beyond. Over the past fifty years, Richard Nelson has been exploring the connections between people and the natural environment in Alaska. To communicate what he's learned, Richard has worked in writing, radio production, natural sounds recording, and documentary film. In this presentation, Richard will talk about ways of reaching people with information about Alaska's traditions, ways of life, environment, and resources. And he will explain his emphasis on celebration, inspiration, and education to motivate people's support for things that matter in our world.

The Miracle of Salmon (Wednesday evening public presentation)

Each year, millions of salmon throng into the rivers, streams, and lakes throughout Alaska. People in almost every community have access to salmon, and even young school children learn to recite their names—king...silver…sockeye…chum…pink. Salmon played a key role in Alaska becoming a state in 1959, and they remain vital to our economy, our communities, our cultural traditions, and our ways of life. A marvel of evolution, salmon in every run are genetically adapted to the conditions of their spawning stream. They are also an ecological keystone, providing nutrients that enrich whole environmental systems. While most Alaskan salmon are thriving, we can learn important lessons from the declines and extinctions of salmon almost everywhere else. When fishing and habitat are managed wisely, salmon may be the ultimate sustainable natural resource, capable of bringing nutritious food to our homes and millions of dollars to our economy—literally forever. From an economic perspective, wild salmon may be the world's most perfect business model: Nature provides the necessary infrastructure, we invest nothing in the wild production system, and every year we harvest an enormously valuable resource. In this sense, our spawning streams might be called an "environmental bank," and the salmon are "nature's capital." The only requirement is that we treat this remarkable system carefully and gratefully receive the amazing gift of salmon.

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