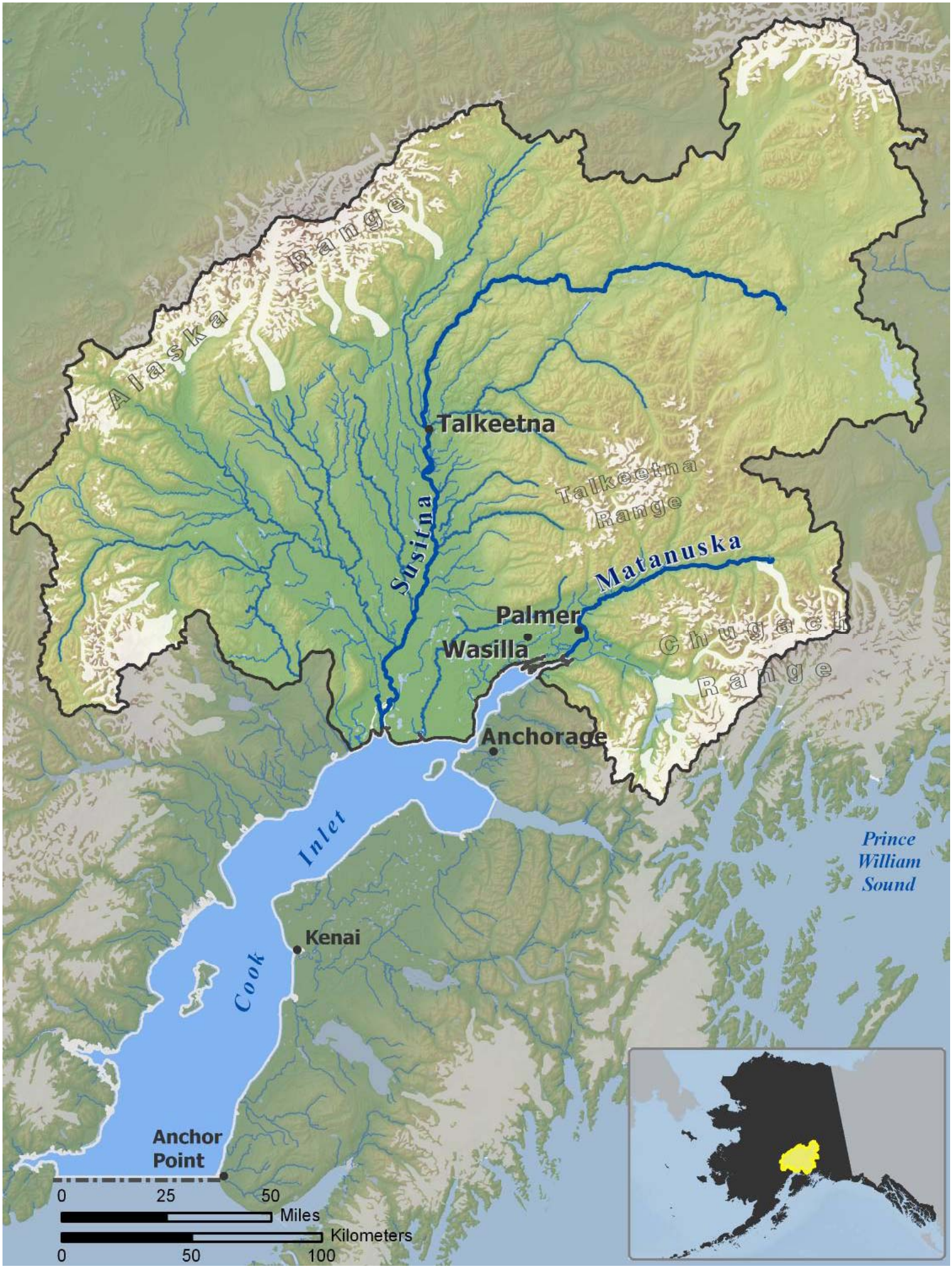
2013 Mat-Su Salmon Science & Conservation Symposium

Healthy Salmon, Healthy Communities

November 13 – 14, 2013

Palmer, Alaska

Mat-Su salmon PARTNERSHIP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The Mat-Su Basin Salmon Habitat Partnership
welcomes you to the 6th annual
Mat-Su Salmon Science and Conservation Symposium!

Thank you for joining us to share your work, learn about other research and projects, and discuss the future of wild salmon and salmon habitat in the Matanuska- Susitna Basin.

The Mat-Su Salmon Partnership formed in 2005 to address increasing impacts on salmon habitat from human use and development. Since the Partnership's formation, it has brought together a diverse group of now over 50 members. They represent local businesses, federal, state, tribal and municipal governments, fishing interests, landowners, and the non-profit community. **The Partnership believes that thriving fish, healthy habitats and vibrant communities can co-exist in the Mat-Su Basin.** Our approach emphasizes collaboration, cooperation, and getting things done.

We are part of a broader network of fish habitat partnerships across the U.S. and one of four Alaska partnerships under the National Fish Habitat Partnership, whose mission *is to protect, restore and enhance the nation's fish and aquatic communities through partnerships that foster fish habitat conservation and improve the quality of life for the American people*. The history of salmon in other parts of the world indicates that salmon cannot persist in their full abundance unless stakeholders work together to protect salmon habitat. *Thank you for your part in keeping wild salmon abundant in the Mat-Su for generations to come.*

We'd like to extend a special thank you to our symposium supporters and the Symposium Planning Committee for their help in making the Mat-Su Salmon Symposium possible.

We hope you enjoy the Symposium!

Mat-Su Salmon Partnership Steering Committee:

Laura Allen, Upper Susitna Soil & Water Conservation District
Frankie Barker, Mat-Su Borough
Jeff Davis, Aquatic Restoration & Research Institute
Roger Harding, Alaska Department of Fish & Game
Bill Rice, US Fish & Wildlife Service
Eric Rothwell, NOAA Fisheries
Corinne Smith, The Nature Conservancy
Kim Sollien, Great Land Trust
Jessica Winnestaffer, Chickaloon Village Traditional Council
Jessica Speed, Partnership Coordinator

www.matsusalmon.org

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Symposium Planning Committee:

Jessica Speed, Partnership Coordinator
Frankie Barker, Mat-Su Borough
Amber Bethe, Alaska Department of Fish and Game
Catherine Inman, Mat-Su Conservation Services
Colin Kikuchi, U.S. Geological Survey
Katrina Mueller, U.S. Fish and Wildlife Service
Corinne Smith, The Nature Conservancy
Kim Sollien, Great Land Trust
Jessica Winnestaffer, Chickaloon Village Traditional Council
Chuck Kaucic, Wasilla Soil and Water Conservation District

Cover background photo by Jeremiah Millen

Mat-Su Basin Salmon Habitat Partners

** Steering Committee Members*

Alaska Dept of Commerce, Community & Economic Development
Alaska Dept of Environmental Conservation
**** Alaska Dept of Fish & Game***
Alaska Dept of Natural Resources
Alaska Dept of Transportation & Public Facilities
Alaska Center for the Environment
Alaska Outdoor Council
Alaska Pacific University
Alaska Railroad Corporation
Alaska Salmon Alliance
AlaskChem Engineering
Alaskans for Palmer Hay Flats
****Aquatic Restoration & Research Institute***
Bureau of Land Management
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HDR Alaska, Inc.
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Matanuska River Watershed Coalition
****Matanuska-Susitna Borough***
Mat-Su Anglers
Mat-Su Conservation Services
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United Fishermen of Alaska
United Cook Inlet Drift Association
****Upper Susitna Soil & Water Conservation District***
US Army Corps of Engineers
****US Fish & Wildlife Service***
US Geological Survey
USDA Forest Service
Wasilla Soil & 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.

November 13, 2013

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

8:30 Registration

9:00 Symposium Welcome

Jessica Winnestaffer (Mat-Su Salmon Partnership Steering Committee Member, Chickaloon Village Traditional Council)

Patricia Wade (Tribal Citizen, Chickaloon Village)

Schawna Thoma (State Director, Office of U.S. Senator Mark Begich)

9:35 Keynote Address: Ecosystem Services, Healthy Communities, Healthy Economies – David Batker (Earth Economics)

Introduction by David Wigglesworth (US Fish & Wildlife Service)

10:35 Networking Break

11:00 Mat-Su Salmon & Habitat: Their Value & Management

Moderator: Corinne Smith (The Nature Conservancy)

The Natural Economy of Alaska's Matanuska-Susitna Basin - Maya Kocian (Earth Economics)

A Contingent Valuation of Ecosystem Services in the Mat-Su: Local Willingness to Pay For Conservation and Access to Recreation - Toby Schwörer (Institute of Social & Economic Research)

Understanding Conflict in the Context of Sustainability in Cook Inlet Salmon Fisheries – Hannah Harrison (Alaska Salmon Alliance)

A Watershed Perspective on Salmon Production in the Mat-Su Basin – Catherine Cassidy (United Cook Inlet Drift Association)

Where Have All the Salmon Gone? – Howard Delo (Mat-Su Borough Fish & Wildlife Commission)

12:15 LUNCH

1:00 Interactive Session with David Batker

Moderator: David Wigglesworth (US Fish & Wildlife Service)

An interactive session with David Batker to discuss how salmon and their habitat contribute to the Mat-Su economy.

2:00 Tidbits

Moderator: Bill Rice (US Fish & Wildlife Service)

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.

2:15 Poster Session

Poster authors will be on hand to answer questions about their project.

Instream Flow Protection in the Mat-Su Basin – Thomas Cappiello (Alaska Department of Fish & Game)

Neptun: Testing of an Electric Fish Barrier as a Useful Tool for Trapping Northern Pike – Amy Shaw & Matt Smukall (Cook Inlet Aquaculture Association)

The Economic and Social Consequences of Closures and Changes in Salmon Sport Fisheries– Stian Stensland (University of Alaska Fairbanks)

Enhancing Salmon Through Beaver Dam Surveying – Lisa Ka'aihue (Cook Inlet Aquaculture Association)

Contribution of Ecosystem Services to Residential Property Values in Alaska's Matanuska-Susitna Borough - Matthew Berman and Jeffrey Armagost (Institute of Social & Economic Research)

Salmon Carcasses and Stream Productivity – Hannah Ramage (Aquatic Restoration & Research institute)

Leaf Decomposition as a Potential Indicator of Stream Ecosystem Health and Salmon Condition – Hannah Ramage (Aquatic Restoration & Research Institute)

Effects of Habitat Variation on Salmon Populations in the Mat-Su Valley – Hannah Ramage (Aquatic Restoration & Research Institute)

Chinook Salmon Enhancement Efforts in Moose Creek – Jessica Winnestaffer (Chickaloon Village Traditional Council)

Shell Lake Salmon Rehabilitation Project – Nathan Weber (Cook Inlet Aquaculture Association)

Assessment of Available Coho Salmon Spawning Habitat Upstream of Perched Culverts in the Matanuska-Susitna Rivers Basin – Betsy McCracken (US Fish and Wildlife Service)

Impacts of Off-Road Vehicle (ORV) Stream Crossings: Changes in Turbidity, Sediment Distribution, and Management Issues – Scott Graziano (Alaska Pacific University)

NetMap in Alaska: A Community Based Environment Analysis System– Lee Benda (Earth Systems Institute)

2:45 Susitna River Salmon Studies

Moderator: Matthew LaCroix (Environmental Protection Agency)

Ecological Risk Assessment of Large-Scale Hydropower on Pacific Salmon Populations within the Susitna River - Joe Miller (Anchor QEA)

An overview of the Fish and Aquatics Study Program for the Susitna-Watana Hydroelectric Project - MaryLouise Keefe (R2 Resource Consultants)

Chinook Salmon above Devils Canyon on the Susitna River, a Sink or Self-Sustaining Population - Bryan Nass (LGL Alaska Research Associates Inc.) and Chris Habicht (Alaska Department of Fish & Game)

Winter Study of Juvenile Anadromous and Resident Fishes in the Susitna River - David Roon (R2 Resource Consultants)

Juvenile Salmon Winter Habitat Associations in the Susitna and Talkeetna Rivers- Hannah Ramage (Aquatic Restoration & Research Institute)

4:00 Announcements & Adjourn
Jessica Speed (The Nature Conservancy)

4:15- Social Hour
6:00 Palmer Community Center (Depot), 610 S. Valley Way, Palmer
Come visit with your colleagues and meet David Batker. The Mat-Su Salmon Partnership is providing appetizers, and a cash bar will be available.

November 14, 2013

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

8:30 Registration

9:00 Salmon Habitat Conservation & Restoration

Moderator: Frankie Barker (Mat-Su Borough)

Prioritizing Riparian Habitat Protection and Restoration: What Strategic Habitat Conservation Looks Like on the Ground - Meg Perdue (US Fish & Wildlife Service)

King Makers- Leaving a Legacy of Wild Salmon for Future Generations- Kim Sollien (Great Land Trust)

Overview of Assessments& Impacts to Riparian Habitats in the Mat-Su Basin - Elizabeth Benolkin (US Fish & Wildlife Service)

Wasilla Soil & Water Conservation District Summer 2013 Field Operations on Big Lake, Cottonwood Creek, & the Little Su River: Assessment, Recording, Evaluation, Reporting, Plan for Action! - Chuck Kaucic & Joseph Phillips (Wasilla Soil & Water Conservation District)

Septic Smart – Cottonwood Creek – Catherine Inman (Mat-Su Conservation Services)

10:15 Networking Break

10:45 Potential Threats to Salmon: Climate Change & Invasive Pike

Moderator: Jonathon Gerken (US Fish & Wildlife Service)

Impacts of Variable Glacier Coverage on Downstream Fluvial Discharge: a Case Study from the Eklutna Basin - Mike Loso (Alaska Pacific University)

Landscape Controls on Stream Temperature and Thermal Sensitivity: Assessing Climate Change Impacts in Mat Su Salmon Streams- Sue Mauger (Cook Inlet Keeper)

Invasive Northern Pike Suppression on Alexander Creek (A Salmon Restoration Project) - David Rutz (Alaska Department of Fish & Game)

11:30 Mat-Su Salmon Partnership

Where the Partnership Has Been – a Look at Partnership Successes and Challenges in the Last Five Years - Bill Rice (US Fish & Wildlife Service)

Where the Partnership Is Headed – the Partnership Strategic Action Plan Revision - Corinne Smith (The Nature Conservancy)

12:30 LUNCH

1:15 Open Space Discussion Groups

Moderator: Kim Sollien (Great Land Trust)

Discussion topics stem from proposals received before the Symposium, and include some subjects intended to assist in the final stages of updating of the Salmon Partnership Strategic Action Plan. Additional ideas can be suggested on the signup sheet at the registration desk during the symposium. At 1:45 you will have the option of changing groups and discussing another topic. Topic numbers will be placed on tables.

1. Impacts of Beaver Dams in Combination with Invasive Northern Pike
2. Data Gaps and Research Needs for Mat-Su Salmon and Salmon Habitat
3. Identifying and Evaluating Funding Mechanisms for Ecosystem Services
4. Methods to Enable Smaller Partner Organizations to Actively Participate in the Implementation of the Partnership Strategic Action Plan
5. Salmon Mapping Tools for Conservation and Resource Planning in the Mat-Su Basin
6. Balancing Our Salmon Resource with Large-scale Resource Development
7. Motorized Off-road Recreation & Salmon
8. Outreach Strategies for the Mat-Su Salmon Partnership

2:15 Networking Break

2:30 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.

2:45 Mapping Streams & Fish

Moderator: Roger Harding (Alaska Department of Fish & Game)

A Collaborative Approach to Creating, Updating, and Managing Alaska Hydrography Datasets- Branden Bornemann (Kenai Watershed Forum) & Becci Anderson (US Geological Survey)

Upper Cottonwood Stream Mapping - Louisa Branchflower (Palmer Soil & Water Conservation District)

Juvenile Coho Salmon Overwintering Habitat in Blodgett Lake, Alaska - Jonathon Gerken (US Fish & Wildlife Service)

Effectiveness of Low-effort, Single-pass Backpack Electrofisher Use for Estimation of Juvenile Coho Salmon Abundance in Alaskan Headwater Streams - Kevin Foley (US Fish & Wildlife Service)

3:45 Conclusions

David Wigglesworth (Regional Coordinator Habitat Restoration Partnerships, US Fish & Wildlife Service)

4:00 Adjourn

Presentation and Poster* Abstracts

Arranged in alphabetical order by presenter last name

Jeffrey Armagost, Institute of Social and Economic Research
Matthew Berman, Institute of Social and Economic Research

Contribution of Ecosystem Services to Residential Property Values in Alaska's Matanuska-Susitna Borough

The Mat-Su Borough has in recent years been the fastest-growing area in Alaska, with its population more than doubling since 1990. It is also the site of forests, wetlands, public parks, numerous lakes, and popular salmon streams. Some Alaskans have raised the question of how much the remaining undeveloped land, recreational opportunities, and other amenities in the borough contribute to its economy. One measure of that contribution is how much more people are willing to pay for property close to natural amenities. In this analysis, Matthew Berman and Jeffrey Armagost of ISER estimate that natural amenities—mainly salmon streams and lakes but also public parks and other protected areas—contribute roughly 37% of the total $7 billion in appraised value of vacant land and residential property in the Mat-Su Borough. The analysis is based on characteristics of residential parcels (both vacant land and land with cabins or houses) sold in the borough in 2009 and 2010. The researchers found:

- Fronting on a salmon stream can add 70% to the price of a property, compared with a similar property elsewhere. Being within a quarter mile of a salmon stream can add more than 50% to what the price would otherwise be.
- Properties with lakefront can be 75% more valuable than they would otherwise be, but simply being close to a lake (within a quarter mile) adds only about 20% to the price.
- Parks or other open space adjacent to a property may add about 17% to the sales price. But the researchers note that the value added might actually be more, because the existing methods of estimating the value of open space are imprecise when applied to the currently available data.

Lee Benda, Earth Systems Institute

NetMap in Alaska: A Community Based Environment Analysis System

NetMap is an environment analysis and decision support system that includes a terrain model (Digital Landscape) where all terrestrial and riverine surfaces are characterized and connected along physically and biologically relevant pathways. Digital Landscapes are coupled to a set of 75 user-friendly analysis tools operating in ESRI ArcMap (10.x) and displayed in online tools designed to support resource use planning, watershed restoration and conservation (www.netmaptools.org). NetMap has been involved in a series of analyses in Alaska: (1) Copper River (with Ecotrust) for building a Chinook habitat model, (2) Tongass National Forest for

analysis of estuaries, aquatic habitats, roads, riparian management and climate change, (3) Southeast Alaska (Sealaska) in support of forest management planning and research, (4) Chugach National Forest for forest planning and climate change analysis, and (5) Arctic-Yukon-Kuskokwim ecosystem (Nome River) for modeling coho spawning and rearing habitats in streams that freeze in winter. In a NetMap Digital Landscape, an attributed and routed analytic stream layer is derived from flow accumulation using available DEMs; 'drainage wings' connect the segmented fluvial network (~100 m) to the terrestrial environment facilitating information transfer across them. Data and analysis tools cover a broad range of topics including fluvial processes, fish habitat, floodplain delineation, slope stability, road impacts, riparian management and climate change. NetMap can be used with higher resolution IfSAR DEMs (5 m) in the Mat-Su and other watersheds in Alaska and can be merged with available sub meter LIDAR to create detailed stream networks and valley floor topography. NetMap's analytic stream layer could be used to update the NHD+, and data transfer between the NHD and NetMap's analytic stream layer, and vice versa, will provide value added to each and strengthen both.

Elizabeth (Libby) Benolkin, US Fish and Wildlife Service

Overview of Assessments and Impacts to Riparian Habitats in the Mat-Su Basin

The US Fish and Wildlife Service and partners have been working to inventory, assess and restore riparian impacts in the Mat-Su Borough (MSB). In 2012, the Great Land Trust (GLT) completed a parcel prioritization which identified important spawning, rearing, and overwintering habitat for salmon within 24 priority water bodies in the MSB. One of the objectives in the Mat-Su Salmon Partnership strategic action plan is to restore 5% of priority riparian habitats that have been altered by 2015. Guided by the prioritization and action plan goal, a number of specific projects to meet that objective have been conducted and are ongoing. These efforts include field surveying and mapping shoreline and stream bank impacts and identifying and implementing on-the-ground restoration projects with private landowners on Big Lake, Wasilla Creek, Cottonwood Creek, and portions of the Little Susitna River to improve salmon habitat. Other efforts involve a GIS-based exercise to compile existing riparian habitat impact data (maps, field data) and to document and map riparian impacts within the other 24 priority water bodies identified by the GLT. These efforts directly address strategic actions within the Mat-Su Salmon Strategic Action Plan to conserve and restore riparian areas that provide valuable salmon habitat in the MSB and will contribute to the objective of restoring 5% of priority habitats by 2015.

Branden Bornemann, Kenai Watershed Forum
Rebecca (Becci) Anderson, US Geological Survey

A Collaborative Approach to Creating, Updating, and Managing Alaska Hydrography Datasets

The National Hydrography Dataset (NHD) in Alaska was mapped at 1:63,360 scale from USGS Historical Topographic Maps, and the data contains errors including streams outside of their channels, misrepresentations of flowlines in braided streams, and incorrectly disconnected streams. There is a predominant need in the state to correct these issues and improve the NHD in Alaska. Throughout Alaska, there are disparate hydrography datasets held by various entities. In the past this data has not been coordinated and has been diverging further over time. Although there is no state agency in Alaska directly responsible for hydrography mapping in Alaska, the Alaska Hydrography Technical Working Group was recently formed to foster collaboration and coordination between entities in the state. This group seeks to work with partner entities in their local areas to make data improvements where they are the most knowledgeable, have the highest investment and have committed and established coordination relationships. The group is also fostering the adoption of the AK Hydro model, an Alaska-specific implementation of the NHD that can be edited using tools native to ArcGIS. This presentation will give an overview of the agencies involved in this process, the motivations driving the interest and need for this resource, and what objectives are being met to meet the principal goal of updating the NHD in Alaska.

Louisa Branchflower, Palmer Soil and Water Conservation District

Upper Cottonwood Stream Mapping

With the support and funding of the US Fish & Wildlife service (USFWS), Palmer Soil and Water Conservation District (PSWCD) staff have mapped Upper Cottonwood Creek with a Trimble GPS unit to verify stream location, collect geomorphic and habitat information, and identify restoration opportunities. Type of data collected includes stream channel width and depth, substrate size, floodplain width, invasive plant infestations, riparian vegetation, degree and kind of human modifications, and photos. Wasilla Creek and lower Cottonwood Creek were mapped similarly over the last 2 years by Palmer SWCD and Fish & Wildlife personnel. Wasilla and Cottonwood Creek are both highly urbanized salmon habitat in the Matanuska Susitna basin and information will be used by project partners to reach out to landowners along creek-front property with the hope of increasing awareness, support, and interest in participating in any future restoration efforts. Over the next year, USFWS and Palmer SWCD intend to expand this mapping work to incorporate the identified high priority water bodies and identify restoration opportunities to aid in the Mat-Su Salmon Partnership's goal of restoring 5% of altered salmon habitat by 2015. Fish and Wildlife service has also included funding to survey many of the popular road accessed lakes in the Mat- Su valley for Elodea, a waterweed found to be deleterious to freshwater habitats. About 65 lakes in the Mat-Su borough have been surveyed by Soil and Water Conservation Districts, and no Elodea has yet been found. Elodea has been found in lakes in Anchorage, and it is important that high-risk lakes in the Mat-Su basin continue to be monitored on a regular basis.

Thomas Cappiello, Alaska Department of Fish and Game

Instream Flow Protection in the Mat-Su Basin

Instream flow protection is one of the priority actions identified in the Mat-Su Basin Salmon Conservation Partnership (Partnership) Strategic Action Plan. Instream flow protection is needed to support salmon habitat and the fluvial processes that maintain this habitat. Salmon life history stages such as migration, spawning, egg incubation, and rearing have adapted to natural and seasonal water quantities and patterns in rivers and lakes. Under Alaska's Water Use Act, a reservation of water is a water right to maintain or leave sufficient amounts of water in a river or lake for one or more of the following four purposes: protecting fish & wildlife habitat, migration, and propagation; protecting navigation & transportation; recreation & park purposes; water quality and sanitation. The Alaska Department of Natural Resources administers these water rights and requires 5 years of data to establish reserved water amounts. These data can also be useful to scientists and natural resource managers for making informed decisions regarding water developments and land-use practices that are sustainable. The Alaska Department of Fish and Game (ADF&G) has been filing reservations in the Mat-Su Basin using existing data since 1988. The formation of the Partnership in 2008 has enabled ADF&G to leverage its capacity to acquire additional data and continue filing reservations on priority salmon streams. This poster provides an update on the ongoing efforts and reservations that have been filed in the Mat-Su Basin by ADF&G and other Partnership members.

Catherine Cassidy, United Cook Inlet Drift Association

A Watershed Perspective on Salmon Production in the Mat-Su Basin

The commercial fishing industry is a concerned stakeholder regarding the health of the salmon resources in Cook Inlet. For more than twenty years fisheries managers have been restricting saltwater fisheries in Cook Inlet in an effort to increase salmon escapements into the Mat-Su Basin. Research evidence has been accumulating during this time showing that declines in salmon production are the result of compromised freshwater habitat. The science has largely been ignored while the focus on fishing harvest of Mat-Su salmon has overshadowed the real problems threatening these stocks.

The United Cook Inlet Drift Association recently produced a document, "A Watershed Perspective on Salmon Production in the Mat-Su Basin," that is a compilation of the empirical threats to the salmon and salmon habitats in the Mat-Su.

The Mat-Su Basin Salmon Habitat Partnership's focus on habitat conservation, rather than fishery management allocation, is right on target. Scientific data is currently available to inform conservation efforts. The Partnership is in a unique position to forge a stronger connection between the science and salmon resource health. It is in the commercial fishing industry's direct interest to support this effort. The industry has already been addressing the situation by helping to fund and direct Cook Inlet Aquaculture Association projects that have included salmon enhancement, habitat restoration, beaver dam mitigation and pike eradication in the Mat-Su

Basin. We are seeing now an increased interest and political will to examine new approaches and secure funding for salmon habitat rehabilitation. These initiatives need to be supported and projects need to be implemented before we lose the harvestable surpluses of salmon that provide so much economic and cultural benefit for all user groups.

Howard Delo, Mat-Su Borough Fish & Wildlife Commission

Where Have All the Salmon Gone?

The Mat-Su Borough Fish and Wildlife Commission prepared a presentation in 2012 to educate legislators about the nature of the Cook Inlet salmon fishery, the causes for salmon declines in Upper Cook Inlet and to provide suggestions for improvement based on changes in fishery management. They recommended that the Upper Cook Inlet commercial fishery be restructured to be similar to the Bristol Bay fishery with discreet harvest areas that would allow for the mixed stocks of Upper Cook Inlet salmon to pass through the central inlet. They also have been advocating to have more research resources dedicated to genetic sampling and data collection of the mixed salmon stocks in Upper Cook Inlet to better inform fishery management.

Kevin Foley, US Fish and Wildlife Service

Effectiveness of Low-effort, Single-pass Backpack Electrofisher Use for Estimation of Juvenile Coho Salmon Abundance in Alaskan Headwater Streams

Without fully understanding the effectiveness of capture methods, the use of techniques with low or inconsistent sampling efficiency could lead to erroneous estimates of abundance, particularly when sampling efficiency varies over a range of habitat types. Although an increase in sampling intensity can improve sampling efficiency and estimator precision, its cost can limit a study's spatial extent. A low-effort approach may be preferred for landscape scale studies of fish distribution and abundance; however, this requires information on whether the low-effort sampling is vulnerable to habitat-mediated bias and imprecision of the estimator. To determine how habitat features affected sampling efficiency of juvenile coho salmon Oncorhynchus kisutch in headwater streams of the Little Susitna drainage, Alaska, we validated low-effort backpack electrofishing methods with closed population mark-recapture sampling. We found that habitat characteristics, such as stream size and density of wood debris, had no measurable or consistent effect on sampling efficiency within the range of conditions present in these headwater systems, and single-pass catch explained 94.8% of the observed variation in log-transformed mark-recapture estimates. This suggests that low-effort methods in headwater streams of the Little Susitna River can approximate actual fish numbers without accounting for habitat covariates that may influence sampling efficiency, and the advantage of sampling a greater spatial extent may sufficiently offset any concerns over low estimator precision.

Jonathon Gerken, US Fish and Wildlife Service

Juvenile Coho Salmon Overwintering Habitat in Blodgett Lake, Alaska

Juvenile coho salmon Onchorhyncus kisutch migration to Blodgett Lake and its use as an overwintering area is an important life history component within Big Lake, Alaska. In 2011 and 2012, approximately 6,300 juvenile coho salmon were implanted with passive integrated transponder (PIT) tags to identify migration pathways, habitat use, and overwintering locations. Approximately, 10% (n=616) of all tagged fish were detected at a fixed antennae array located downstream of Blodgett Lake. Fish entered Blodgett Lake predominantly in September and departed in May to smolt. Regardless of the juvenile coho salmon age, once a fish entered into Blodgett Lake they resided there until smolting. The goal of this presentation is to understand the importance of Blodgett Lake in maintaining a healthy salmon community in Big Lake, Alaska.

****Scott Graziano, Alaska Pacific University***

Impacts of Off-Road Vehicle (ORV) Stream Crossings: Changes in Turbidity, Sediment Distribution, and Management Issues

Off-road vehicle (ORV) use is a popular activity in Alaska. In many cases, ORVs provide an efficient and effective method of transportation for recreational activities such as hunting and fishing. Due to Alaska's dense surface hydrology, it is inevitable that ORV users will encounter streams to cross along the journey. This project explored the effects a stream crossing can have, using measurable attributes—turbidity and sediment distribution. Turbidity is easily measured in the field, capturing immediate impacts of an ORV crossing event. Increased turbidity levels can affect aquatic life ranging from negative impacts on primary production to decreased predator avoidance by juvenile salmon. Crossing sites can alter sediment size distributions in the reach immediately downstream, thus changing the natural streambed composition. Managing ORV stream crossings is a difficult task, but can be done using turbidity standards as an avenue. In addition to the impacts on turbidity and sediment distribution, new management approaches were examined to determine feasibility in real-life applications.

Hannah Harrison, Alaska Salmon Alliance

Understanding Conflict in the Context of Sustainability in Cook Inlet Salmon Fisheries

Cook Inlet and Kenai River salmon fisheries are Alaska's most prolific shared salmon resource accessible by the road system. For many decades, sport, commercial, and personal use fishers have utilized salmon returning to the Kenai River as a means of supporting recreational pursuits,

fishing livelihoods, access to local fish consumption, and the cultural impact of this resource on the small coastal communities of the Kenai Peninsula. Conflict has long been an underlying theme of this maximally allocated fishery as different user groups vie for catch allocation, access to fish, and engage in political maneuvering through advocacy groups and the Alaska Board of Fisheries process. This study uses an ethnographic approach to identifying points of conflict between user groups as described by resource users, and frames those conflicts within Redpath et. al.'s sustainability framework. Kenai River fisheries, though prolific, have begun to show signs of stress through a weakening of the King salmon (Oncorhynchus tshawytscha) run, prompting an intensification of conflict within the region. This study aims to understand this conflict and identify how it may impact the long term economic, biological, social, and cultural sustainability of this fishery for the Kenai Peninsula region.

Catherine Inman, Mat-Su Conservation Services

Septic Smart – Cottonwood Creek

Cottonwood Creek (seven miles downstream of the Parks Highway) is currently listed as an impaired waterbody by the State of Alaska for excess fecal coliform bacteria – an indicator of possible human sewage pollution. To help address this problem, the Alaska Department of Environmental Conservation (ADEC) is teaming up with the Mat-Su Resource Conservation and Development Council (Mat-Su RC&D,) and local outreach contractor Mat-Su Conservation Services (MSCS,) over the next year on a project focused on septic systems in the Cottonwood Creek watershed. This project will work with homeowners, local engineers, and septic system pumping businesses to develop a pumping co-operative to share costs: one street with several home septic systems can be inspected/serviced at once at reduced rates. The project will also provide useful information for homeowners with septic systems on ways to reduce the potential for polluting the environment. This pilot project invites landowners to increase property values, lower septic system costs, and improve water quality on Cottonwood Creek

****Lisa Ka'aihue, Cook Inlet Aquaculture Association***

Enhancing Salmon Through Beaver Dam Surveying

The Cook Inlet Aquaculture Association has historically recognized the importance of maintaining and improving salmon habitat and natural salmon populations. Although the Association operates hatcheries, salmon enhancement has also occurred without releasing a single fish. One important activity is the annual surveying of key streams for beaver dam activity that jeopardizes the upstream migration of adult sockeye salmon. When a beaver dam is identified as impeding salmon migration, a temporary opening of the beaver dam is created. Several key streams in the Susitna River watershed have been surveyed for beaver dams. An overview of this important habitat work will be presented in this poster.

Chuck Kaucic, Wasilla Soil and Water Conservation District
Joseph Phillips, Wasilla Soil and Water Conservation District

Wasilla Soil and Water Conservation District Summer 2013 Field Operations on Big Lake, Cottonwood Creek, & the Little Su River: Assessment, Recording, Evaluation, Reporting, Plan for Action!

In conjunction with the USFWS & various partners, a trained Wasilla Soil & Water Conservation (WSWCD) crew conducted on-water field operations along three systems in the Mat Su Valley: Big Lake, Cottonwood Creek, and the middle section of the Little Su River this past summer. Primary components consisted of assessing/classifying lake and stream banks riparian areas for potential restoration projects in 2014. Sites were measured, recorded, GPS identified and evaluated for restoration opportunities. Community meeting presentations and property owner contacts significantly increased awareness. The session will provide Symposium attendees a brief review of the process and a summary of results in relation to achieving/exceeding goals established in the Mat Su Salmon Strategic Action.

MaryLouise Keefe, R2 Resource Consultants

An Overview of the Fish and Aquatics Study Program for the Susitna-Watana Hydroelectric Project

Alaska Energy Authority (AEA) is currently completing a second field season of the fish and aquatics sampling program for Susitna-Watana Hydroelectric Project. The three-year study program encompasses 13 studies that vary from short term desk top analyses to complex three-year field efforts with the overall goal of describing the baseline characteristics of fish and their habitats. Major objectives include: documenting seasonal fish distribution and relative abundance within various habitats, documenting fish movements and migration patterns, mapping and characterizing aquatic habitat types, characterizing the river's aquatic productivity, evaluating existing barriers to fish migration and assessing the feasibility of both downstream and upstream fish passage at the proposed dam. The results of the Fisheries Program studies will be integrated with data and models developed from parallel study programs including Instream Flow, Groundwater, Ice Processes, Stream Geomorphology and Water Quality. Once integrated, these models will be used to evaluate both existing conditions and the effects of project operations on fish and aquatic habitats of the Susitna River aquatic ecosystem.

Maya Kocian, Earth Economics

The Natural Economy of Alaska's Matanuska-Susitna Basin

The Matanuska-Susitna Borough's open space (including its rich salmon and wildlife habitat as well as its agricultural heritage) is vulnerable to residential, commercial, and natural resource development because of its reputation as the fastest-growing community in Alaska. The ecosystems of the Mat-Su, some of which have already been lost to other land use activities, generate a suite of important ecosystem services, including water regulation, recreational opportunities and habitat for wildlife. In addition to human and environmental health benefits, these services provide tremendous economic value to local and regional economies.

Earth Economics conducted an Ecosystem Service Valuation (ESV) of the Mat-Su Basin. The ESV used GIS data to identify nine land cover types present in the Mat-Su, and the Benefit-Transfer method to value thirteen ecosystem services in those land cover types. Values which fit the criteria for transfer were drawn from Earth Economics' database of published, peer-reviewed ecosystem service valuation studies. Values for land cover types were obtained by adding the values for every ecosystem service valued in that land cover. Total annual flow of value in the Mat-Su consisted of the summation of the value for all land covers. Asset value was calculated as a net-present value over 100 years using both a 0% and 3% discount rate.

This talk will go over the methodology used in the economic analysis and explore how valuing ecosystem services can inform planning decisions.

Michael Loso, Alaska Pacific University

Impacts of Variable Glacier Coverage on Downstream Fluvial Discharge: a Case Study from the Eklutna Basin

Eklutna Lake receives most of its water from glacier runoff, and supplies both drinking water (~80% of the city's supply) and hydropower (10-15%) to the municipality of Anchorage. The lake and upstream rivers support no anadromous fish runs, but recent concurrent monitoring of glacier mass balance and fluvial discharge provides valuable insights into the comparative hydrologic regimes of modestly (East Fork, 12.2% glacier cover) and heavily (West Fork, 46.4% glacier cover) glaciated river basins. Over five years of monitoring by Alaska Pacific University students and faculty, Eklutna Glacier has lost a glacier-wide average of 85 cm thickness, augmenting direct runoff in the West Fork Eklutna River. In the warm and relatively dry summer of 2009, for example, over 33,000 acre-feet of runoff to Eklutna Lake was derived directly from "mining" of glacier ice. Along with presumably higher rates of initial abstraction in the more heavily vegetated East Fork, this phenomenon explains our observation of 68% higher specific discharge in the glacial West Fork. The difference is greatest in warm years with more negative glacier mass balances, however, suggesting that southcentral river basins with substantial glacier cover are among the most vulnerable to significant changes in the rates and temporal patterns of fluvial discharge under conditions of climatic warming. This result has significant implications for habitat protection efforts in a warming arctic.

Sue Mauger, Cook Inletkeeper

Landscape Controls on Stream Temperature and Thermal Sensitivity: Assessing Climate Change Impacts in Mat Su Salmon Streams

We implemented a Stream Temperature Monitoring Network for Mat Su salmon streams during open-water periods from 2008-2012. We logged continuous water and air temperatures at 21 non-glacial salmon streams to characterize current water temperature profiles and identify watershed characteristics that make streams more sensitive to climate change impacts. The vast majority of streams consistently exceeded Alaska's water temperature criteria set for the protection of fish especially in 2009, the warmest year of the study period. Our modeling efforts indicated that large watersheds with low slope and low elevation were inclined to have the warmest temperature profiles and were the most sensitive to increasing air temperature. Linking our models to climate change scenarios suggests that by 2099 salmon populations in 43% of the streams - characterized as warm systems (July average temperature >13^{o}C) with high sensitivity (>0.75) - will experience increased thermal stress associated with greater incidence of disease and susceptibility to predation and pollution, populations in 10% of the streams will experience more moderate stress, and populations in 47% of the streams will see no significant impact. Results from this 5-year study provide a framework for future monitoring efforts to track climate change impacts and can help the Mat Su Partnership prioritize streams for research, restoration and protection efforts to ensure Mat-Su basin wild salmon endure as thermal change continues.

****Betsy McCracken, US Fish and Wildlife Service***

Assessment of Available Coho Salmon Spawning Habitat Upstream of Perched Culverts in the Matanuska-Susitna Rivers Basin

The poster submittal will describe a 2013 field season study that addresses the Mat Su Salmon Partnership's recommendation to prioritize culvert replacements based in part, on empirical fish habitat metrics (Mat-Su Salmon Passage Improvement Plan, 2011). During the 2013 field season the USFWS began a pilot study to assess coho salmon spawning habitat in five Susitna River lowland tributaries. Because these tributaries are long-standing ADFG coho spawning index streams, we refer to these streams as "validation streams". We used a systematic sampling design to collect habitat metrics in the validations streams, including substrate composition, bankfull channel width, channel depth, stream gradient, potential for vertical hydraulic gradient (VHG) and hydraulic conductivity. We also began collecting habitat metric data in streams assessed by the ADFG to be culvert-barriers to adult coho salmon passage. We refer to these passage barrier streams as "impact streams". Lastly, we began coho spawning survey efforts in the validation streams to correlate coho spawning site selection with associated habitat metrics. With consecutive years of coho spawning survey data, we will assess coho spawning habitat as a predictive measure of available spawning habitat in impact streams. Through this project we hope to gain empirical information on relevant habitat conditions that support coho populations in the Mat-Su Basin. Project scope, habitat data collection methodologies, and preliminary coho salmon spawning survey information from the Susitna River tributaries will be presented.

Joe Miller, Anchor QEA

Ecological Risk Assessment of Large-Scale Hydropower on Pacific Salmon Populations Within the Susitna River

Anchor QEA is conducting an environmental risk assessment (ERA), on behalf of The Nature Conservancy, to consider the effects of the proposed Susitna-Watana project on Pacific salmon populations within the Susitna Watershed. Specifically, the ERA will examine how project construction and operations affect biological and physical processes that shape habitat attributes and, ultimately, influence the abundance, productivity, diversity, and spatial structure of salmon populations. The ERA will incorporate different hypothetical operational scenarios and consider the contributions of climate change. The presentation will describe the methods used to conduct the ERA as well as progress made to date.

Bryan Nass, LGL Alaska Research Associates Inc.
Chris Habicht, Alaska Department of Fish and Game

Chinook Salmon Above Devils Canyon on the Susitna River, a Sink or Self-sustaining Population?

The Alaska Energy Authority conducted a radio-telemetry study of Susitna River adult Chinook salmon in 2012 and 2013 to characterize habitat use, including for any fish migrating above Devils Canyon (river mile or RM 155-165). Fish were captured and tagged near RM 34 and RM 124 and implanted with esophageal radio tags (794 fish in 2012 and 1,301 in 2013). Tagged fish were tracked using an array of fixed telemetry receivers and extensive aerial surveys. Tagged fish approached and to varying degrees of success attempted to navigate three suspected impediments within the 10 miles of Devils Canyon (DC).

A very small portion of the radio-tagged Chinook salmon migrated through the final impediment of DC (12 tagged fish in 2012 and 3 in 2013); possibly representing fewer than 100 fish annually. Subsequent behavior of the tagged fish varied; some never moved above the proposed Watana Dam site at RM 187, some spawned in at least one tributary and then actively sought out tributaries below DC, and some roamed among mainstem locations only to eventually move into tributaries below DC. Successful spawning above Devils Canyon has been documented from related studies that found juvenile fish in these reaches.

With so few fish reaching the areas above DC and variable behavior of those that did, it is not clear whether these fish represent one or more self-sustaining populations or whether these fish represent populations originating from within or below DC. The origin of these fish has implications for impact assessment and fish passage considerations for the proposed Watana Dam. In this presentation we outline a framework and expected sources of data (including tissue samples from adult and juvenile fish), to address the question of whether fish found above DC represent a self-sustaining population(s) or a sink from populations within or below DC.

Meg Perdue, US Fish and Wildlife Service

Prioritizing Riparian Habitat Protection and Restoration: What Strategic Habitat Conservation Looks Like on the Ground

Being strategic about restoration and conservation efforts in an era of shrinking budgets and mounting environmental issues has even greater relevance today, more than five years after the initial adoption of the Mat-Su Partnership's Strategic Action Plan. Starting in 2009 The Great Land Trust, working with numerous members of the partnership, began to develop a list of priority parcels using ArcGIS mapping and the best available data to identify areas in the Mat-Su Borough most in need of conservation and protection. That process has continued to evolve as more data is gathered through partnership activities and discussions, and has led to the identification of 24 priority water bodies important for salmon spawning, rearing and overwintering habitat and vulnerable to human-induced habitat changes. Initial filters and six prioritization criteria were then applied to identify priority parcels adjacent to those water bodies. The USFWS and partners have used this series of prioritizations as the basis for identifying and collaborating on projects, several of which are identified here and will be described more fully in other presentations in this session. In addition, these prioritizations have led to establishing conservation easements on many thousands of acres with important salmon habitat and identifying many more thousands of acres that through future work including the King Makers project, will move the partnership towards accomplishing the Strategic Plan's goal of conserving 10% or more priority riparian habitats in long-term protective status.

Hannah Ramage, Aquatic Restoration and Research Institute

Juvenile Salmon Winter Habitat Associations in the Susitna and Talkeetna Rivers

Sport and personal use fishing for salmon is an important source of income and protein for people who live in the Upper Susitna River basin. This region is dominated by large glacial rivers including the Susitna, Talkeetna, and Chulitna Rivers. Juvenile Chinook and coho salmon have been shown to migrate out of natal tributaries to these large rivers for summer rearing and overwintering. However, little is known about juvenile salmon rearing and overwintering in glacial rivers or how characteristics of these habitats could be influenced by human activities. Juvenile salmon distribution during winter was investigated in the Susitna and Talkeetna Rivers. Monthly and seasonal habitat surveys and fish sampling were conducted from October through February within main channel, tributary mouth, mainstem backwater, and upland slough habitat types. Chinook and coho salmon were present at all sampling locations with the exception of an upland slough characterized by extremely low dissolved oxygen concentrations. The relative abundance of juvenile Chinook and coho salmon varied significantly among sampling locations. Chinook salmon tended to be more abundant in mainstem and side slough habitats while coho salmon tended to be more abundant in side slough and upland slough habitats, with equal use of tributary mouths. Based on comparisons between similar classified habitats, dissolved oxygen, specific conductivity, turbidity, water depth, water velocity, and woody debris could be influencing the distribution and relative abundance of juvenile salmon within tributary mouths and upland sloughs. Changes in coho fork length throughout the winter suggested winter growth that varied among habitat types and emigration under the ice during winter.

Hannah Ramage, Aquatic Restoration and Research Institute

Effects of Habitat Variation on Salmon Populations in the Mat-Su Valley

Multiple different physical and biotic variables can influence the distribution and abundance of rearing juvenile salmon among streams. Understanding those variables that affect rearing salmon distribution is necessary to protect salmon habitat and to ensure continued salmon production. Stream water temperatures are an important habitat variable and can influence juvenile salmon abundance and growth rates. Current climate models predict increasing water temperatures in southcentral streams. In order to investigate the influence of water temperature on salmon habitat we sampled the fish community of 12 streams within the Mat-Su valley representative of three different habitat types including wetland, upland, and lake-stream complex. Fish were sampled using minnow traps placed within an approximate 200 meter stream reach. All salmonids were identified to species, measured for fork length, and weighted. Catch per unit trap values were averaged to obtain relative abundance. Summer sampling events displayed a difference in relative abundance of coho salmon among stream types. A positive correlation existed between the relative abundance of coho salmon and the temperature of the stream at the time of sampling in the summer of 2013.The higher temperatures observed may be energetically ideal for fish metabolism. Condition factor can be used as an indicator of fish fitness and was calculated based on weight and length measurements. A negative correlation existed between the relative abundance and the condition factor of coho salmon likely due to competition among fish. This work demonstrates the need for future research on the influence of habitat variation on salmon populations.

Hannah Ramage, Aquatic Restoration and Research Institute

Leaf Decomposition as a Potential Indicator of Stream Ecosystem Health and Salmon Condition

Many streams are dominated by allochthonous input, relying on imported organic matter as a main energy source in place of photosynthesis. Fallen leaves are among the course particulate organic matter relied upon by streams that naturally accumulate and form packs. Upon entering the water, leaves subject to microbial conditioning, shredders, and currents, breaking down the leaf material into fine particulate organic matter. The rate of leaf pack material decomposition can serve as an estimate of the overall allochthonous input breakdown and can be used to gauge heterotrophic stream structure. In this study, leaf packs were constructed to mimic natural processes and placed in 4 streams in the Mat-Su Valley. Breakdown rates were calculated based on an exponential decay model in which the natural log of the percent of ash free dry mass leaf pack material remaining was plotted as a function of degree days. Additionally, fish were sampled using minnow traps placed within an approximate 200 meter stream reach containing the site of the placed leaf packs. All salmonids were identified to species and catch per unit trap values were averaged to obtain relative abundance. Breakdown rates among the streams was positively correlated with coho salmon relative abundance. Leaf decomposition may be used as an indicator of stream ecosystem health and can influence the food available for rearing salmon.

Hannah Ramage, Aquatic Restoration and Research Institute

Salmon Carcasses and Stream Productivity

Recent literature and studies on the ties between nutrient additions by salmon carcasses following spawning runs and freshwater stream productivity are reviewed. As anadromous salmon mature and grow in the ocean, they accrue biomass from the marine environment. When these populations return from the ocean to their natal streams seasonally to spawn, they act as vectors for the transport of large quantities of marine-derived nutrients into the freshwater ecosystem. Decaying carcasses post-spawn, leach carbon, nitrogen, and phosphorus, which can be taken up by primary producers, as well as provide a food source in the form of flesh and eggs. This influx of nutrients may be key to productivity in freshwater streams and to the survival of juvenile and resident salmonids, which overwinter shortly after the spawning runs. Studies have shown increases in biofilm mass and invertebrate density in response to salmon carcass additions. Juvenile salmonid growth rates and size have also increased in response to experimental carcass additions. In this way, salmon carcasses can be seen as a critical habitat component and management must consider basing escapement goals on meeting nutrient requirements for productive streams and for maintaining viable salmon populations.

William Rice, U.S. Fish and Wildlife Service

Where the Partnership Has Been – A Look at Partnership Successes and Challenges in the Last Five Years

Over the past six years, the MatSu Salmon Habitat Partnership has established itself as a recognized force in the state for habitat conservation and restoration, consistently ranking in the top National Fish Habitat Partnership (NFHP) Partnerships in the country. How did we start? What has the Partnership accomplished over its years in MatSu, and how does it all fit together? Starting with the early years of strategic action committees and landscape level planning through inventorying, restoration and outreach, the story of our Partnership's accomplishments and challenges will be told.

David Roon, R2 Resource Consultants

Winter Study of Juvenile Anadromous and Resident Fishes in the Susitna River

Winter is a critical period for fish survival in large glacial rivers. In attempt to better understand anadromous and resident fish communities and their habitat use during winter conditions, a pilot study was initiated on the Susitna River in the winter of 2013. This study was conducted in conjunction with an Instream Flow Study that installed temperature loggers to monitor intragravel temperatures in known spawning locations. Multiple fish sampling techniques were tested during three different sampling periods February to April, 2013 in the Whiskers Slough (RM 104) and Slough 8A (RM 128) study sites on the Susitna River. Methods were tested in under-ice and open water conditions and included minnow traps, beach seines, backpack electrofishing, angling, trotlines, setlines, and underwater video. A diversity of habitat types were sampled including main channel, side channel, side slough, upland slough, slough mouth, tributary mouth, tributary, and other off-channel habitats. Preliminary results indicate that 268 fish comprising 10 species were collected during these efforts. Minnow traps collected the greatest numbers of fish when placed under ice and in open water habitats while backpack electrofishing captured the greatest number of species in open water habitats. Trotlines were also effective at catching adult burbot in main channel ice-covered habitats. Side channel and side slough habitats supported high numbers of juvenile and adult fish. The 2013 Winter Pilot Study will inform more intensive winter sampling efforts during the winters of 2013/2014 and 2014/2015.

David Rutz, Alaska Department of Fish and Game

Invasive Northern Pike Suppression on Alexander Creek (A Salmon Restoration Project)

Northern Pike (Esox lucius) are non-indigenous to the Alexander Creek drainage and were thought to have been established through a series of illegal introductions in Alexander Lake in the early 1960's. The Alexander Creek drainage is a large river basin encompassing thousands of square miles. This system is a slow moving, low velocity meandering river system, with numerous tributaries and encompasses several shallow lakes and ponds, thousands of acres of adjacent wetlands and numerous side-sloughs and oxbow channels. To date, northern pike have expanded throughout the entirety of this drainage, and, as a result, native fish populations and sportfishing opportunities have eroded. Though indigenous populations of northern pike coexist with native salmonid populations in other Alaskan watersheds this is certainly not the case in Alexander Creek. ADF&G has completed the third year of what is expected to be a long-term project with the primary goal of suppressing invasive northern pike populations in the main channel of Alexander Creek, with the intent of replenishing depleted anadromous and resident fish populations and restoring sportfishing opportunities to this once very popular and productive system.. Throughout the first three years of this project, ADF&G also conducted a radio telemetry study to investigate movement patterns between Alexander Lake and the

mainstem of the creek. The results indicated minimal movement of adult pike between the lake and the creek, and the majority of pike emigrating out of Alexander Lake were caught in pike suppression gillents. The northern pike suppression project in Alexander Creek is the largest of its kind ever attempted in Alaska, and preliminary findings from the first three years of this project are encouraging.

Tobias Schwörer, Institute of Social and Economic Research

A Contingent Valuation of Ecosystem Services in the Mat-Su: Local Willingness to Pay for Conservation and Access to Recreation

Over the last two decades, the economic valuation of ecosystem services has become a common practice for incorporating the benefits human society derives from nature in land use decisions. The growth of urban landscapes is rapidly altering our planet and the ecosystems supporting human health and quality of life. The Matanuska-Susitna Borough (Mat-Su) is Alaska's fastest growing urban region. Its population more than doubled within the last two decades. Current land use decisions continue to convert open space to residential and other uses. Future land use decisions in the Mat-Su will affect the quality of life for its residents and economy in foreseeable ways as experienced in other regions of the U.S. that already went through some of these changes. This project used five focus groups across the Mat-Su to design a discrete choice questionnaire called Mat-Su 2040 Futures. The data collected was used to estimate the economic contribution of open space and its ecosystem services to the residents of the Mat-Su and focused on five environmental attributes that were of concern to focus group participants. The attributes include the conservation of farm land, salmon recovery, access to recreation, population growth, and the types of future job sectors. The analysis estimates willingness to pay for salmon recovery, conservation of farmland, and access to recreation. It further outlines the land use trade-offs residents of the Mat-Su are willing or not willing to undertake which serves as a valuable tool for regional planners and decision makers. This contingent valuation study will also inform future land use decisions elsewhere in Alaska where there is a need for a value assessment of ecosystem services.

Amy Shaw, Cook Inlet Aquaculture Association
Matt Smukall, Cook Inlet Aquaculture Association

Neptun: Testing of an Electric Fish Barrier as a Useful Tool for Trapping Northern Pike

Cook Inlet Aquaculture Staff field tested the Neptun electric fish barrier at Whiskey Lake, AK, for its potential use as a method of trapping invasive northern pike. Previous testing of the barrier in a lab setting supported data that suggests the Neptun can act as an effective barrier against fish movement. Because staff was testing the ability of the barrier to guide fish into a live box, the Neptun was set up in a slightly different configuration than it normally would be if it were acting solely as a fish barrier. Three lines of electrodes (1 negative and 2 positive, one on either side of the negative) with a live box on either end were set up on an angle across Whiskey Creek. The goal was to use the variation in the electric field to guide the northern pike into one live box or the other, where they would then be held until disposal. A total of 25 timed trials were conducted with 5 northern pike released above and 5 northern pike released below the barrier. Behavior was observed during each trial and visual observations of "pass" (swim through the field), "repel" (swam up to the field and turned away), "trap" (successfully funneled into a live box), and "stun" (fish was stunned from interaction with the barrier and subsequently floated out of the electric field) were recorded for each trial. Because fish under approximately 150 mm in length are not affected by the electrical barrier, northern pike at least 250 mm in length were used for the trials. Of the 330 total observations made, there were 98 "pass", 213 "repel", 12 "trap", and 7 "stun" records made. All observations reported are preliminary, with an in depth analysis of observations (video and PIT tag data) occurring during the winter months.

Corinne Smith, The Nature Conservancy

Where the Partnership Is Headed – the Partnership Strategic Action Plan Revision

In 2008 the Mat-Su Salmon Partnership completed a Strategic Action Plan to identify collaborative projects and other actions that will protect and restore important habitat for wild salmon in the Mat-Su Basin. In the last year, the partnership updated the plan to reflect changing conditions in the Mat-Su and the progress that has been made since the 2008 plan. As would be expected in a diverse partnership, there are many ideas about what the priorities of the Partnership should be, yet consensus on some areas exists: the greatest potential threat to salmon habitat in the Mat-Su Basin is still development due to population growth; science is a core need and tool for conserving salmon habitat; and protection of salmon habitat is a top priority. In the revised plan, the Partnership added five new human or human-induced activities that were not in the 2008 plan because of their growing potential to negatively impact salmon habitat: climate change; dams and hydroelectric projects; large mines; invasive aquatic species; and motorized off-road recreational activities. The revised plan has goals and strategies to 1) build the partnership; 2) address science needs for salmon and their habitat; and 3) prevent or minimize impacts from eleven human or human-induced activities.

Kim Sollien, Great Land Trust

King Makers - Leaving a Legacy of Wild Salmon for Future Generations

Great Land Trust (GLT) in partnership with the Salmon Project is launching a new campaign that highlights and celebrates the critical role of private landowners in salmon habitat conservation. We acknowledge as a small land trust, we cannot conserve all of the important salmon habitat in the Mat-Su but we can help many landowners understand how they can become better stewards of the salmon habitat they own.

The charisma and importance of salmon to people has led to salmon being labeled as the "King" of fish—we therefore are referring to those private landowners who have engaged in salmon habitat conservation and or restoration as "King Makers." During this presentation we will highlight the results of two focus group sessions and a 150 person phone survey related to salmon, some of the educational tools we have created to reach out to landowners and the ways we will be celebrating those landowners who have chosen to conserve and/or restore salmon habitat on their land. We believe by publically highlighting the habitat stewardship actions taken by landowners, their stories will inspire other landowners to take steps towards creating salmon sanctuaries on their property and becoming King Makers themselves.

****Stian Stensland, University of Alaska Fairbanks***

The Economic and Social Consequences of Closures and Changes in Salmon Sport Fisheries

Sport fishing for salmon is important culturally, economically and as a leisure activity. The annual run of salmon to rivers in Alaska or other parts of the world creates benefits and enjoyment for anglers, fishing tourism businesses and local communities. However, many countries and regions are experiencing low runs leading to closed fisheries, shortened seasons, and harvest limits. In Alaska there is great concern about the poor king salmon runs. Stakeholders somehow need to adapt to these changes. How do anglers behave and adapt to these changes when e.g. their local king salmon sport fishery closes or turns into catch & release only? What does it mean for local sportfishing businesses? Are they able to switch to a substitute species, site or fishing method? What are the financial and welfare losses to stakeholder groups? Such information is important to managers and policymakers. Results from a recent survey in Norway's Atlantic salmon fishery are presented. The parallel situation with declining stocks in Norway and Alaska are discussed and research needs for Alaska's salmon sport fisheries addressed.

Nathan Weber, Cook Inlet Aquaculture Association

Shell Lake Salmon Rehabilitation Project

Shell Lake, like many systems in the Susitna River watershed, has seen a dramatic decline in sockeye salmon production. Monitoring efforts have shown adult sockeye salmon returns deteriorated from 68,800 adult salmon in 2006, down to just 132 adult salmon in 2013. Freshwater production of sockeye salmon has also shown decline from 80,600 sockeye smolt in 2007, to only 5 sockeye smolt in 2013. This production failure was initially suspected as a result of invasive northern pike; however the recently documented parasitic infection, Loma Salmonae, have killed many pre-spawned adult sockeye salmon. In 2012, Cook Inlet Aquaculture Association began rehabilitation measures to prevent further salmon production loss by aggressive pike harvest, as well as a sockeye gamete collection to preserve the genetic integrity of the population. The resultant progeny, approximately 70,000 sockeye smolt will be re-introduced to the lake in 2014. Continuing efforts in salmon monitoring, pike control and adult fish passage will assist in the rehabilitation of Shell Lake sockeye salmon.

Jessica Winnestaffer, Chickaloon Village Traditional Council

Chinook Salmon Enhancement Efforts in Moose Creek

Chickaloon Village Traditional Council has conducted five years of Chinook salmon enhancement efforts in Moose Creek with the use of a moist air incubation system. This presentation will give a brief overview of the moist air incubation system, as well as summarizing the five years of Moose Creek efforts and known results.

Topical Discussions

These topics were proposed before the Symposium. Additional topics can be added for discussion during the Symposium; please suggest other topics on the signup sheet at the registration table. Topic numbers will be placed on tables. At a mid-point in the session you will have the option of changing groups and discussing another topic

1. Impacts of Beaver Dams in Combination with Invasive Northern Pike

Discussion Lead: David Rutz (Alaska Department of Fish & Game)

Although beaver dams do not negatively impact salmon returns on all salmon systems, there is evidence of salmonid populations negatively impacted by beaver dams on certain select systems. These are primarily systems that may or may not have been already negatively impacted by invasive northern pike populations and where outlet streams have low flow rates, and are choked with multigenerational beaver dams (huge long and tall dams). This scenario in many cases may impede or completely block adult salmon returns and resident fish spawning and seasonal migrations. There are other effects that exacerbate the impact on salmonids, and support a case for taking closer consideration of beaver dam removal coupled with beaver control programs on certain select systems. This group will discuss what types of systems are impacted, what are the impacts, how do we mitigate or treat these types of problems, and are the treatment costs worth the efforts and gains.

2. Data Gaps and Research Needs for Mat-Su Salmon and Salmon Habitat

Discussion Lead: Frankie Barker (Mat-Su Borough)

The Mat-Su Borough's Fish and Wildlife Commission was successful in getting funds for fisheries research and fish passage ($2.5M) from the state legislature. The FWC will be hiring a consultant to put together a fisheries research program with the first step being to identify data gaps for Upper Cook Inlet. This discussion group could help to develop the process, methods and content of the data gap study.

4. Identifying and Evaluating Funding Mechanisms for Ecosystem Services

Discussion Lead: Maya Kocian (Earth Economics)

Implementation of restoration and conservation plans and projects requires substantial funding, and the lack of dedicated funding mechanisms slows progress. There are existing funding mechanisms for ecosystem services around the world that provides revenue over time to fund conservation projects. The challenge is to identify which one will work best in the Mat-Su. The goal of the discussion will be to identify and describe three to five potential funding mechanisms that may be applicable to the area, and then select one to two mechanisms for in-depth analysis.

5. Methods to Enable Smaller Partner Organizations to Actively Participate in the Implementation of the Partnership Strategic Action Plan

Discussion Lead: Catherine Inman (Mat-Su Conservation Services)

The Mat-Su Salmon Partnership was developed as a grass-roots organization bringing the knowledge and experience of local citizens together with local, state, and federal governments, non-governmental organizations, and business to identify threats to salmon. Partners have helped to develop strategic actions that can be implemented to address these threats, and tools to evaluate the effectiveness of these

actions toward protection of salmon and their habitats. However, local citizens, and small local groups, may find it difficult to identify strategic actions that can be implemented or monitoring that can be conducted by non-professionals. The objective of this focus group would be to review the current Action Plan revisions to identify areas where local citizens and small NGOs can become more active participants in the Mat-Su Salmon Partnership.

6. Salmon Mapping Tools for Conservation and Resource Planning in the Mat-Su Basin

Discussion Lead: Dave Albert (The Nature Conservancy)

With new availability of high resolution digital elevation data and imagery for large areas of Alaska, we now have the opportunity to improve mapping of salmon habitat to support conservation and resource planning. Mat-Su LiDAR and Alaska Statewide Digital Mapping Initiative (SDMI) now provide these data for the Mat-Su basin. In this session, we would like to present a watershed mapping platform called NetMap, discuss potential applications, and solicit feedback for interest in a collaborative salmon mapping initiative for the Mat-Su basin.

7. Balancing Our Salmon Resource with Large-scale Resource Development

Discussion Lead: Corinne Smith (The Nature Conservancy)

Alaska is a resource rich state and sometimes those natural resources overlap. Coal mines, large hydroelectric power, and expanding ports are all coming to the Mat-Su. These developments will intersect with salmon habitat and have the potential to alter water flows, degrade water quality, remove wetlands, and alter riparian areas. What role can the Mat-Su Salmon Partnership play in helping to make decisions about these large-scale resource development projects?

8. Motorized Off-road Recreation & Salmon

Discussion Lead: Chuck Kaucic (Wasilla Soil and Water Conservation District)

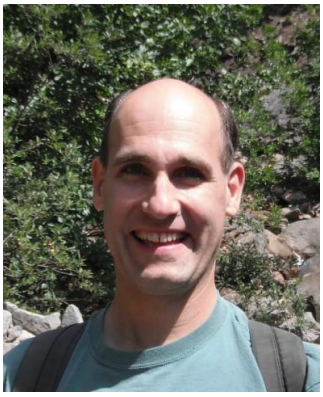
The Mat-Su is a recreational destination for locals, Anchorage residents, and tourists. Motorized off-road recreation is growing, and in some places, that sport has outpaced the infrastructure that would protect fish and wildlife habitat. How can the Mat-Su Salmon Partnership protect salmon habitat, including streams and wetlands, from inappropriate trail locations and use?

9. Outreach Strategies for the Mat-Su Salmon Partnership

Discussion Lead: Katrina Mueller (US Fish and Wildlife Service)

Outreach is a critical component of any conservation program. It can be used to generate awareness of and support for program activities and relevant issues, and strengthen engagement. How can the Mat-Su Salmon Partnership continue to raise its profile and effectively reach a broad segment of regional stakeholders about the partnership and the linkages between thriving fish, healthy habitats, and vibrant communities? What are current outreach gaps and opportunities of relevance to this partnership?

Keynote Speaker: David Batker



David Batker is the Co-founder and Executive Director of Earth Economics. He completed his graduate training in economics under Herman Daly, one of the world's foremost ecological economists. David has taught in the Training Department of the World Bank, and has worked for Greenpeace International, specializing in trade and international finance. He also worked for two years with the Rural Reconstruction Movement, a Philippine non-profit group dedicated to ecologically sound community-based development. David co-authored a book with John de Graaf, entitled What's the Economy for, Anyway?, which has ranked in the top ten economics and business books by the New York Book Review. His work with the Earth Economics team includes measuring the value of wetlands for hurricane buffering, developing new US account rules for water provisioned from ecosystems, counting natural capital as flood protections infrastructure in US flood planning, halting the export of hazardous wastes from rich to poor countries, expanding Mount Rainier National Park, advising the US government on greening 436,000 federal buildings, developing a practical web-based tool for valuing nature's benefits, setting up funding mechanisms for parks; conservation and restoration; identifying, valuing, mapping, and modeling ecosystem services. He has worked in over 40 countries and throughout the US.

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