2012 Mat-Su Salmon Science & Conservation Symposium

November 7 – 8, 2012


Alaska Range
Talkeetna
Talkeetna Range
Susitna
Matanuska
Palmer
Wasilla
Chugach Range
Anchorage
Inlet
Cook
Prince William Sound
Kenai
Anchor Point
0 25 50
Miles
Kilometers
0 50 100

Table of Contents

Symposium Planning Committee:

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

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Mat-Su Basin Salmon Habitat Partners

** Steering Committee Members*

AK Dept of Commerce, Community & Economic Development
AK Dept of Environmental Conservation
****AK Dept of Fish & Game***
AK Dept of Natural Resources
AK Dept of Transportation & Public Facilities
Alaska Center for the Environment
Alaska Outdoor Council
Alaska Pacific University
Alaska Railroad Corporation
AlaskChem Engineering
Alaskans for Palmer Hay Flats
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The Conservation Fund
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The Wildlifers
Three Parameters Plus, Inc.
United Fishermen of Alaska
****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 7, 2012

Central Mat-Su Public Safety Building, 101 W. Swanson Avenue, Wasilla

8:30 Registration

9:00 Welcome

Frankie Barker (Matanuska-Susitna Borough)

Tribal Welcome

Warren Keogh (Matanuska-Susitna Borough Assembly)

9:30 Keynote Address: Straight Talk About the Future of Salmon – Bob Lackey (Oregon State University)

Introduction by Katrina Mueller (US Fish & Wildlife Service)

10:30 Networking Break

11:00 Planning & Economic Valuation

Moderator: David Wigglesworth (US Fish & Wildlife Service)

Identifying Priority Management Information Needs via Landscape Conservation Cooperatives – John DeLapp (US Fish & Wildlife Service)

Build-out and Density Study- Emerson Krueger (Mat-Su Borough)

Strategic Conservation in the Mat-Su Borough – Kim Sollien and Phil Shephard (Great Land Trust)

Valuing Nature: What are Ecosystem Services Worth in the Mat-Su?– Corinne Smith (The Nature Conservancy)

Fiscal Analysis of Alternative Land Use Scenarios in the Mat-Su Borough – Steve Colt (Institute for Social & Economic Research)

12:15 LUNCH

1:15 Unpublished Lessons Learned from the Salmon 2100 Project – Bob Lackey

Moderator: Ann Rappoport (US Fish & Wildlife Service)

An interactive session with Bob Lackey to discuss lessons learned from the Salmon 2100 Project and their application in keeping abundant wild salmon returning to Mat-Su waters.

2:15 Tidbits

Moderator: Amber Bethe (Alaska Department of Fish & Game)

Please sign up at the registration desk to present a 3 minute project summary or announcement. If you have a slide or two to project (maximum 2 slides), please load them by the end of lunch.

2:30 Poster Session

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

Swiftwater Creek Cooperative ATV/ORV Outreach, Trail and Restoration Plan Pilot Project, Mat-Su Borough - Katrina Mueller (US Fish & Wildlife Service) and John Paszalek (Wasilla Soil & Water Conservation District)

Invasive Aquatic Weed "Attacks" in the Mat-Su Basin – Chuck Kaucic (Wasilla Soil & Water Conservation District)

Mat-Su Stormwater Assessment – Laura Eldred (Alaska Department of Environmental Conservation)

Great Land Trust Conservation Easements – Kim Sollien and Phil Shephard (Great Land Trust)

Matanuska Delta Salmon Counts – Ralph Hulbert (AlaskChem Engineering)

Wetlands and Climate of Cook Inlet Basin – Mike Gracz (Kenai Watershed Forum & University of Minnesota)

Habitat Variables and Their Effect Upon Single-pass Backpack Electrofishing Sampling Efficiency within an Alaskan Headwater System – Kevin Foley (University of Alaska, Fairbanks)

Little Su River Salmon Recovery Plan– Jack Harrison (Upper Cook Inlet Sportfish Association)

3:00 Hydrology & Wetlands

Moderator: Eric Rothwell (National Oceanic & Atmospheric Administration)

Shallow Groundwater in the Matanuska-Susitna Valley, Alaska – Colin Kikuchi (US Geological Survey) (*note: this presentation is 30 minutes*)

Rain, Snow, and Glacier Ice: Streamflow Drivers in the Susitna River Basin, Alaska – Janet Curran (US Geological Survey)

Wetland Classification and Mapping of Priority Matanuska-Susitna Borough Watersheds – Mike Gracz (Kenai Watershed Forum and University of Minnesota)

4:00 Announcements & Adjourn

4:00- Social Hour

6:00 Grape Tap, 322 Boundary St., Wasilla

Come visit with your colleagues and meet Bob Lackey. The Mat-Su Salmon Partnership is providing appetizers, and a cash bar will be available.

November 8, 2012

Central Mat-Su Public Safety Building, 101 W. Swanson Avenue, Wasilla

8:30 Registration

9:00 Stream & Fish Passage Restoration

Moderator: Catherine Inman (Mat-Su Conservation Services)

Status of Mat-Su Fish Passage Program – Bill Rice (US Fish & Wildlife Service)

The Assessment of Road Crossing Migration Barriers to Juvenile Pacific Salmon – Jeff Davis (Aquatic Restoration & Research Institute)

Inventory of Salmon and Off-road Vehicle Trail Distribution in the Knik River Public Use Area – Casey Smith (US Fish & Wildlife Service)

Off-road Vehicle (ORV) Stream Crossings in the Matanuska-Susitna Borough: Initial Findings of Impacts on Turbidity Levels and Channel Morphology – Scott Graziano (Alaska Pacific University)

Cottonwood Creek Mapping Project – Louisa Branchflower (Palmer Soil & Water Conservation District)

McRoberts Creek Fish Habitat Restoration and Trail Maintenance Project – Brian Winnestaffer (Chickaloon Village)

Streambank Restoration Successes Along Private Property on Wasilla & Little Meadow Creeks – Chuck Kaucic (Wasilla Soil & Water Conservation District)

10:45 Networking Break

11:15 Climate Change & Invasive Species

Moderator: Jeff Davis (Aquatic Restoration & Research Institute)

Stream Temperature Action Plan: Steps to Protect Alaska's Wild Salmon Habitat from the Impacts of Thermal Change – Sue Mauger (Cook Inletkeeper)

An Invasive Aquatic Plant, Elodea, Threatens Alaska's Fisheries and Aquatic Resources – Cecil Rich (US Fish & Wildlife Service)

11:45 Strategies of the Mat-Su Salmon Partnership

Corinne Smith (The Nature Conservancy)

12:00 LUNCH

1:00 Open Space Discussion Groups

Moderator: Sue Rodman (Alaska Department of Fish & Game)

Discussion topics stem from proposals received before the Symposium, and include some subjects intended to assist in the updating of the Salmon Partnership Strategic Action Plan. Additional ideas can be suggested on the signup sheet at the registration desk during the symposium. You may attend multiple discussion groups. Topic numbers will be placed on tables. There will be time for each group to report back to all participants.

1. Science Needs for Salmon Habitat Conservation
2. Outreach Tools for Fish Habitat Partnerships
3. Ensuring Fish Passage at Roads and Railroads
4. Conserving Priority Wetlands for Salmon
5. Invasive Species in Mat-Su Waters
6. Climate Change Impacts to Water Quality and Quantity
7. Motorized Off-road Recreation & Salmon
8. Thriving Fish and Growing Communities in the Mat-Su
9. Understanding and Protecting Ground and Surface Waters
10. Balancing our Salmon Resource with Large-scale Resource Development
11. Where Have All the Salmon Gone?
12. Importance of Overwintering Habitat for Juvenile Salmon

2:15 Networking Break

2:30 Tidbits

Moderator: Janet Curran (US Geological Survey)

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 Salmon Distribution & Habitat Use

Moderator: Doug McBride (US Fish & Wildlife Service)

Juvenile Salmon Use of Knik Arm Estuaries – Hannah Ramage (Aquatic Restoration & Research Institute)

Chinook Salmon Surveys in Northern Cook Inlet, 2000-2012 – Suzanne Hayes (Alaska Department of Fish & Game)

Migratory Pathways and Overwintering Habitat Use by Juvenile Coho Salmon in Big Lake, Alaska – Jon Gerken (US Fish & Wildlife Service)

Identification of Cold Water Inputs Utilization by Juvenile Coho Salmon in the Big Lake Watershed – Joshua Ashline (US Fish & Wildlife Service)

3:45 Conclusions

Cecil Rich (US Fish & Wildlife Service)

4:00 Adjourn

Presentation and Poster* Abstracts

Arranged in alphabetical order by presenter last name

Joshua Ashline, US Fish and Wildlife Service

Identification of Cold Water Inputs Utilization by Juvenile Coho Salmon in the Big Lake Watershed

The Fish and Wildlife Services Anchorage Field office is tracking the seasonal movements and habitats being utilized by juvenile coho salmon (Oncorhynchus kisutch) in the Big Lake watershed. During the summers of 2011 and 2012, over 5,000 juvenile coho salmon were tagged with Passive Integrated Transponder (PIT) tags to aid in tracking seasonal movements and habitat preferences. In an effort better understand the surface hydrology of the Big Lake watershed a Thermal Inferred Remote (TIR) sensing flight was conducted during the summer of 2011. This data set was used to find areas within the watershed which provide cooling inputs to main channels from tributaries, springs, and seeps. Preliminary results from the PIT tagging project show higher catch rates of juvenile coho in areas downstream of identified cooling inputs. Further investigation is needed to see if these areas provide critical rearing and overwintering habitats for juvenile coho.

Louisa Branchflower, Palmer Soil and Water Conservation District

Cottonwood Creek Mapping Project

Palmer Soil and Water Conservation District staff is mapping 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. Fish and Wildlife personnel mapped Wasilla creek in a similar manner last year. Wasilla and Cottonwood creek are both highly urbanized watersheds in the Matanuska Susitna basin and habitat information for both will be shared with other partners in the Salmon Partnership for future salmon habitat restoration and preservation projects and to reach out to stream front land owners with the hope of increasing support and interest in any future restoration efforts.

Steve Colt, University of Alaska Anchorage

Fiscal Analysis of Alternative Land Use Scenarios in the Mat-Su Borough

Different future land use patterns will likely have different fiscal effects on borough and state governments and taxpayers. Both the costs of public services (education, roads, water & sewer, fire & police) and the anticipated revenues from property and sales taxes are being estimated for 4-5 future MSB land use scenarios. This talk will present the preliminary findings and highlight remaining data gaps.

Janet Curran, US Geological Survey, Alaska Science Center

Rain, Snow, and Glacier Ice: Streamflow Drivers in the Susitna River Basin, Alaska

Selected streams in the Susitna River Basin have been gaged by the USGS intermittently over the past 60 years, resulting in records of daily discharge that range in length from less than 5 years to more than 50. A recent study seeking to extend the shorter records on the basis of the longer index stations examined the correlation of mean daily discharge at 14 streamgages. Highly correlated streamflow records occurred in streams that shared similar dates of breakup and similar patterns of the relative magnitude of snowmelt, glacier-melt, and rainfall peaks. Susitna River Basin streams dominated by glacier melt reached maximum mean daily discharges in July rather than in May or June as for snowmelt-dominated streams. Glacier cover alone, however, could not predict the relative strength of snowmelt and glacier melt as drivers of mean daily discharge in the glacial basins. Although all streams were influenced by snowmelt, rainfall generated large magnitude, short-term fluctuations during autumn months in selected streams. Understanding the relative effects of rain, snow, and glaciers on streamflow can aid understanding streamflow response to changes in climate patterns such as the Pacific Decadal Oscillation or loss of glaciers.

Jeff Davis, Aquatic Restoration and Research Institute

The Assessment of Road Crossing Migration Barriers to Juvenile Pacific Salmon

Road culverts can result in migration barriers to rearing juvenile Pacific salmon and resident fish. Most fish passage assessment methods use the degree of channel alteration to classify sites as a migration barrier, not a barrier, or unknown status. Sufficient work has not been conducted to determine the accuracy of these methods or to identify those parameters most effective for fish passage assessments. In order to improve upon assessment methods, we tested for relationships between commonly used physical characteristics—constriction ratio, culvert slope, difference between culvert and stream slope, and the presence of substrate—and culvert water velocities and velocities that exceeded the burst and sustained swimming speed of juvenile coho salmon. We used differences in the relative abundance of juvenile coho salmon above and below a crossing to identify migration barriers and tested for differences in stream and culvert characteristics, and water velocities, between sites with, and without fish differences. Constriction ratios, culvert slopes, and the difference between culvert and stream slopes were not related to measured culvert water velocities, and did not differ significantly between sites with velocities that exceeded fish swimming ability or differences in relative fish abundance. The absence of substrate within a crossing was a good indication of high water velocity, but substrate absence did not identify those sites with differences in fish abundance. Culvert perch heights and maximum flow time velocities were most effective at identifying migration barriers to juvenile Pacific salmon.

John A. DeLapp, US Fish and Wildlife Service

Identifying Priority Management Information Needs via Landscape Conservation Cooperatives

Landscape Conservation Cooperatives (LCCs) are applied conservation science partnerships between the U.S. Fish and Wildlife Service and other federal agencies, states, tribes, NGOs, universities and stakeholders within a geographically defined area. They are intended to be true cooperatives, formed and directed by their partner agencies and organizations, linking science with conservation actions to address climate change and other landscape scale stressors. LCCs complement and build upon existing science and conservation efforts – such as fish habitat partnerships and migratory bird joint ventures – as well as water resources, land, and cultural partnerships.

LCCs have two main functions: to provide and support the science and technical expertise needed to support conservation planning at landscape scales and to promote collaboration among their members in defining shared conservation goals. Twenty-two individual LCCs are working together nationwide to promote connections among conservation efforts across wide geographic and political boundaries. In Alaska, our five LCCs are working together to address our unique resource management information needs to better equip us in addressing our current and future conservation challenges.

LCCs bring a new level of scientific capability to the table that we and our partners will continue to draw upon as we develop landscape-scale conservation plans and strategies. Equally important, they promote the exchange of plans, coordination of activities, and leveraging of resources among our conservation partners so together we can create landscapes capable of supporting self-sustaining fish and wildlife populations for current and future generations.

****Laura Eldred, Alaska Department of Environmental Conservation (ADEC)***

Mat-Su Stormwater Assessment

The Alaska Department of Environmental Conservation (DEC), in partnership with the Aquatic Restoration and Research Institute (ARRI), conducted a 2-year study to examine the quality of stormwater runoff in three Mat-Su area streams and at known outfall locations. The information from this study can help policy makers ensure streams maintain the water quality needed for healthy abundant wild salmon. Stormwater runoff from roads and parking lots often ends up in our local streams, lakes and wetlands. This runoff can contain pollutants at unhealthy levels for fish and wildlife and can accumulate over time. Water quality results showed a trend towards decreasing water quality moving from headwaters to more urbanized downstream locations. Sediment quality demonstrated increased levels of metals, particularly copper and zinc, in areas receiving runoff. Reducing the amount of runoff and improving runoff quality before entering local waterways will better protect water quality and fish habitat.

This presentation will give an overview of the study objectives, methods, results and touch on a few activities taking place in the Mat-Su aimed at improving stormwater quality. Funding for this project was provided in part from the Alaska Sustainable Salmon Fund, the Mat-Su Salmon Partnership, the Kenai Watershed Forum, the Corp of Engineers, the ADEC and ARRI.

Kevin M. Foley, University of Alaska, Fairbanks.

Habitat Variables and their Effect Upon Single-pass Backpack Electrofishing Sampling Efficiency Within an Alaskan Headwater System

This work is part of a greater study in southcentral Alaska to gain a greater understanding of what habitat conditions affect and limit the distribution of juvenile coho salmon Oncorhynchus kisutch in high gradient headwaters of the Little Susitna River system. In this study, we determine how environmental variables affect low-effort sampling efficiency of juvenile coho salmon using battery-operated backpack electrofishers. Understanding how environmental factors influence sampling methods can provide fisheries managers with valuable insights and allow greater accuracy in calculating abundance estimates of fish populations. I used closed population, single event mark-recapture methods as a baseline measure of fish abundance to determine the efficiency of single-pass backpack electrofisher sampling of juvenile coho salmon. These values were then related to detailed measurements of habitat variables within stream reaches. Habitat features such as stream size and wood debris had no measurable effect on sampling efficiency along the range of observed conditions within these headwater systems. Electrofisher single-pass catch of mark-recapture reaches explained 94.8% of the observed variation within predictive models.

Jonathon Gerken, U.S. Fish and Wildlife Service

Migratory Pathways and Overwintering Habitat Use by Juvenile Coho Salmon in Big Lake, Alaska

Salmon migration, spawning, rearing and ultimately production within the waterbodies of the Matanuska-Susitna (Mat-Su) are dependent on connectivity of habitat. Approximately 78 culverts are present in the Big Lake drainage, with approximately 55 culverts (70%) assessed as potential fish passage barriers or partial barriers to juvenile salmon. In 2011, approximately 2,300 juvenile coho salmon Onchorhyncus kisutch were implanted with passive integrated transponder (PIT) tags to identify migration pathways, habitat use, and overwintering locations. Recapture events were composed of mobile tracking with minnow traps, the use of fixed antennae arrays, and capture in an ADF&G operated outmigrant fyke net. Approximately, 14% (n =332) tagged of the fish smolted in May - June of 2012. The goal of this paper is to elucidate the migratory pathways within the Big Lake drainage; identify two major overwintering areas; Blodgett Lake and Lucille Creek; and discuss differences between juvenile coho salmon cohorts in the context of growth, condition factor, migration rates, and habitat use.

Mike Gracz, Kenai Watershed Forum & University of Minnesota

Wetland Classification and Mapping of Priority Matanuska-Susitna Borough Watersheds

In order to adequately manage a resource for our mutual benefit, we need an inventory of the resource. For wetlands, an inventory of these important aquatic resources consists of mapping them. Because not all wetlands are the same, we require a naming scheme, or classification, to show their differences on the map. The National Wetlands Inventory (NWI) had mapped portions of the Matanuska-Susitna Borough, but those maps vary in quality and employed a national-level classification. Local experts and managers, including the former director of the NWI in Alaska, felt that this national-level classification did not adequately reflect the benefits provided to society by local wetlands, including supporting anadromous fish habitat. Therefore, beginning in 2007, priority watersheds of the Matanuska-Susitna Borough are being mapped using a classification developed for the Cook Inlet Basin that should be predictive of wetland function here. This presentation shows the maps (now covering much of the lowland area east of the Susitna River between Talkeetna and Chickaloon, south to Point MacKenzie) and the classification, and compares the maps to NWI. I also document the strength of the classification compared to NWI and another wetland classification used in the Northeastern US. Further, I briefly present ideas on how to apply the classification to functional assessment of wetlands. Functional assessment is an important procedure used to decide which wetlands could be developed, and what should be done to mitigate for any loss of benefits caused by their development.

**Mike Gracz, Kenai Watershed Forum & University of Minnesota*

Wetlands and Climate of Cook Inlet Basin

The wetland landscape is a critical component of the aquatic resources important for salmon, and this landscape is radically different in Cook Inlet Basin than the landscape found elsewhere in the Unites States. For example, freshwater wetlands cover 33% of the mapped area of the basin, while they cover only 1.9% of Washington State. Not only is wetland cover more extensive in Cook Inlet, but peatlands predominate, unlike in the remaining states where peatlands are rare. Further, wetlands in Cook Inlet Basin are relatively undisturbed by human activities. Therefore, wetland management in the Basin does not fit models used elsewhere. A new classification and map is presented as a first step in understanding the wetland landscape of Cook Inlet Basin. In addition to the shape of the landscape, climate also drives wetland processes, and climate diagrams are presented on the map. These diagrams along with the topography and wetland classification shown on the map elucidate patterns of wetland occurrence across the Basin. This map and classification have been informing wetland assessment and management in the Basin.

Scott Graziano, Alaska Pacific University

Off-Road Vehicle (ORV) Stream Crossings in the Matanuska-Susitna Borough: Initial Findings of Impacts on Turbidity Levels and Channel Morphology

The growing use of off-road vehicles (ORVs) is beginning to capture the attention of environmental managers. When an ORV trail passes through a stream, increased turbidity levels may threaten aquatic life and streambank integrity. A total of nine ORV crossings on two stream types in South-central Alaska were used to simulate crossing events while turbidity levels were logged. Further exploration of the data will provide a mathematical model of turbidity level response to an ORV crossing. Increased knowledge of turbidity level changes, paired with known detrimental impacts of excessive ORV traffic, will assist Alaska's environmental regulatory agencies in efforts to improve management of ORV stream crossings. Project findings will be distributed to the U.S. Fish and Wildlife Service, the Alaska Department of Fish and Game, the Alaska Department of Environmental Conservation, and the Matanuska-Susitna Borough.

Suzanne Hayes, Alaska Department of Fish and Game

Chinook salmon Surveys in Northern Cook Inlet, 2000 – 2012

This talk will feature an overview of surveys conducted to estimate the spawning populations of Chinook salmon in the Northern Cook Inlet Management area. Department of Fish and Game biologists fly helicopter surveys each year in July and August to obtain an index of Chinook salmon spawning in seventeen streams which have escapement goals.

**Ralph Hulbert, AlaskChem Engineering*

Matanuska Delta Salmon Counts

Volunteers have counted spawners in four unnamed side channels in the lower Matanuska since 2008. Latest and cumulative results will be presented along with trends and comparisons to adjacent streams counted by Alaska Department of Fish &Game.

Chuck Kaucic, Wasilla Soil & Water Conservation District

Streambank Restoration Successes Along Private Property on Wasilla and Little Meadow Creeks

In close partnership with public & private entities ie., USFWS, ADF&G Habitat, State Division of Forestry, Plant Materials Center, Rex Turner Construction, L N Real Estate, Tews, Inc., Spenard Builders Supply & the City of Houston, Wasilla Soil & Water Conservation District crews completed two stream bank restoration projects at minimal expense.

The session will showcase the unique characteristics involved in working with private land owners to build trust, gain permission, instill sound conservation practices & complete projects on their land. Project development, training, logistics/coordination, collaborative partner roles, volunteers/non-profit group involvement, & promotions will be highlighted.

Chuck Kaucic, Wasilla Soil & Water Conservation District

Invasive Aquatic Weed "Attacks" in the Mat-Su Basin

Submersed aquatic plants in the genus ELODEA are nonnative to Alaska. ELODEA survives freezing & can spread by fragmentation. These traits make it extremely invasive & will cause serious, irreversible harm to salmon & aquatic habitats if allowed to spread. ELODEA has been documented in Anchorage, Cordova & Fairbanks. During the summer of 2012, Wasilla Soil & Water Conservation crews surveyed area lakes to determine any presence of this highly invasive, hitchhiker.

Under the guidance of Dr. Cecil Rich, USFWS National Aquatic Invasive Species Program Coordinator, Anchorage Regional Office, a low-cost, aggressive program was established to systematically collect data to upload into existing data bases & support future treatment decisions.

This endeavor was a highly successful first-time project in the Wasilla area District. The presentation will cover: partners, training, logistics, equipment, assessment techniques, outreach & findings.

Colin Kikuchi, U.S. Geological Survey

Shallow Groundwater in the Matanuska-Susitna Valley, Alaska

The Matanuska-Susitna Valley is currently undergoing rapid population growth outside of municipal water and sewer service areas. In response to concerns about the effects of increasing water use on future groundwater availability, a study was initiated between the Alaska Department of Natural Resources (ADNR) and the U.S. Geological Survey. The objectives of the study were (1) to compile existing data, and collect new data to support hydrogeologic conceptualization of the study area, and (2) to develop a groundwater flow model capable of providing a scientific framework for analysis of regional-scale groundwater availability. To address the first study objective, lithologic data were retrieved from the ADNR Well Log Tracking System and used to construct a three-dimensional model depicting the distribution of different hydrogeologic units. Furthermore, groundwater budget components – including in-place recharge and groundwater-surface water interaction – were quantified using both measurement and modeling techniques. Finally, groundwater and surface-water monitoring stations were established to provide both continuous and periodic water-level data.

To address the second study objective, a steady-state groundwater flow model was developed to simulate regional groundwater flow patterns. The groundwater flow model boundaries were specified by physically meaningful hydrologic features based upon conceptualization of the groundwater system. The field data collected during the study – including 173 water level measurements and 18 measurements of streamflow gains and losses – were used to calibrate the groundwater flow model. Comparison of simulated and observed water levels and flows showed that the model accurately simulates important regional characteristics of the groundwater flow system. This model is therefore appropriate for studying regional-scale groundwater availability. Future studies may include the development of a transient groundwater flow model that is suitable for analysis of seasonal variability in hydraulic heads and flows.

Emerson Krueger, Matanuska -Susitna Borough

Build-out and Density Study

The 2012 Matanuska-Susitna Borough Density and Build-out Study represents a unique approach to estimating ultimate land absorption using current Alaskan land use practices. This approach respects the current semi-rural nature of the Borough and assumes that this density will be somewhat consistent into the future with a few exceptions acknowledging development realities. The model presented in this short overview predicts population and housing quantities at an undetermined date of "build-out" (when all land is absorbed) and creates a process for locating future public facilities.

Sue Mauger, Cook Inletkeeper

Stream Temperature Action Plan: Steps to Protect Alaska's Wild Salmon Habitat from the Impacts of Thermal Change

Cook Inletkeeper has developed a Stream Temperature Action Plan based on many multi-agency discussions in recent years and a decade of temperature monitoring experience. The purpose of the Stream Temperature Action Plan is to identify the highest priority actions for the next 10 years that will lead to greater protection of Alaska's wild salmon habitat as thermal change continues. By implementing these priority actions in data collection, protection, and research in the Cook Inlet watershed and throughout Alaska, we expect to achieve the following goals: 1) improve our understanding of current thermal regimes in Alaska's salmon streams; 2) refine data collection for fisheries management and modeling applications; 3) target cold water habitat protection efforts; 4) fill stream network data gaps; and 5) direct relevant fisheries and habitat research. Through collaboration and coordinated discussions, these priority actions can be strategically accomplished through Fish Habitat Partnerships, Landscape Conservation Cooperatives and other federal, state, Tribal and non-profit organizational efforts.

****Katrina Mueller, U.S. Fish and Wildlife Service***
John Paszalek, Wasilla Soil and Water Conservation District

Swiftwater Creek Cooperative ATV/ORV Outreach, Trail and Restoration Plan Pilot Project, Matanuska-Susitna Borough, Alaska

This 2-year pilot project uses pre-restoration outreach targeting the local all-terrain/off-road vehicle (ATV/ORV) community to initiate a cooperative restoration planning process that establishes how to best redirect trails and restore a 1,100 foot section of Swiftwater Creek degraded by heavy ORV use. Proposed accomplishments include 1) a method to conduct in-person surveys with users about fish IQ and valued ATV/ORV experiences; 2) active engagement by ORV users at aquatic outreach demonstration events; 3) a trail and restoration plan for Swiftwater Creek that retains valued ORV trail experience while restoring and protecting fish rearing habitat, 4) phase 1 of habitat restoration (restore 40 feet of ~250 degraded streambank within the restoration focus area).

Hannah Ramage, Aquatic Restoration and Research Institute

Juvenile Salmon Use of Knik Arm Estuaries

The Mat-Su Salmon Strategic Action Plan has listed the identification and mapping of salmon habitat in estuaries, nearshore, and open marine waters as a priority objective to be completed by 2012. However, to date, sampling has not been conducted to determine use of these habitats by rearing juvenile salmon. Estuarine wetlands are one of the most productive ecosystems and have been shown to be critical rearing habitat for juvenile Pacific salmon. Conditions in Cook Inlet estuaries are more extreme due to the cold turbid water, and high energy associated with huge tidal variations. These extreme physical conditions may affect the ability of juvenile salmon to access and use these productive habitats. Large tidal surges also cause access and sampling challenges. During the 2012 field season we conducted fish sampling and basic water quality measurements at multiple sampling locations in Palmer Slough, Cottonwood Creek, and O'Brien Creek. Sampling was conducted during high tides in July. Within the upper estuaries, characteristics of fish habitat included channels with low width: depth ratios, low water velocities, and cover from emergent aquatic and riparian vegetation. Turbidity and specific conductivity were elevated relative to clear-water conditions. Lower in the estuaries, cover was absent and turbidity and specific conductivity were high. Very few juvenile salmon were captured within these estuaries in July, and most fish were present within the area of mixing between fresh and marine waters. We anticipate that more frequent sampling from April through June will better document the use of these habitats by juvenile Pacific salmon.

William Rice, U.S. Fish and Wildlife Service

Status of Mat-Su Fish Passage Program

The Mat-Su fish passage program has been active for almost 15 years as a collaboration between the Borough and various agencies. Although policy and regulation by ADFG requires fish passage for new culverts or replacements, there exists a large legacy of past culverts that are undersized and barriers to salmon. Approximately 655 crossings exist with culverts in fish-bearing waters, with about 70% of them likely barriers to juvenile salmon or other fish species. In the past 15 years, over 80 culverts have been replaced in salmon streams for fish passage, some with private landowners but most on Borough roads, who have responsibility over the majority of culvert crossings. Fixing all barriers is estimated to take another 20-30 years at the current replacement rate. Cost of a replacement can vary dramatically depending on site characteristics and width of pipe, however, the capacity of partners to carry out projects is also a limiting factor. To increase effectiveness, efforts have been focused on key geographic areas of the Borough and on opening up entire mainstem and large tributaries.

Cecil Rich, U.S. Fish and Wildlife Service

An Invasive Aquatic Plant, Elodea, Threatens Alaska's Fisheries and Aquatic Resources

Until recently, Alaska has been considered to be free of the invasive aquatic plants that greatly impact freshwater resources in other areas of the world where they are not native. Since the discovery of Elodea in Chena Slough in Fairbanks in August 2010, it has been documented in Chena Lake in Fairbanks, Sand and Delong Lakes in Anchorage, Stormy Lake on the Kenai Peninsula, and Eyak Lake in Cordova. This presentation will describe the habitat requirements, identifying characteristics, and invasive traits of Elodea. We also summarize modes of introduction and documented impact on aquatic resources where it has spread outside its native range. Finally, we describe methods effective in the control and possible eradication of Elodea, initial efforts that have been taken to control the species in Alaska, and the need for a rapid response to prevent further spread.

Casey Smith, US Fish and Wildlife Service

Inventory of Salmon and off-road Vehicle Trail Distribution in the Knik River Public Use Area, 2012

Increasing human population and off-road vehicle (ORV) use in the Mat-Su Borough, and more specifically the Knik River area, has amplified the potential for impact on local salmon populations, raising concern by the fisheries and land managers that intense recreational use in this area could impact salmon production. The Anchorage Fish and Wildlife Field Office initiated this project to develop a simple method to assess ORV trails at stream crossings that is focused on potential impacts to anadromous fish habitat within the Knik River area. The spatial distribution of ORV trails was mapped using satellite imagery, photographic flights, and on-the-ground surveys to verify locations where ORV trails interacted with waters potentially bearing salmon. Thirteen such crossings were found and assessed. At each of the thirteen crossings assessed we collected seven basic attributes of the stream crossing (track type, stream bank impact width, trail impact width, trail surface/substrate, rutting, mud/muck, and trail grade), each of which was assigned a ranking weight developed by modifying an existing method for trail condition assessment (Meyer 2011). This system allowed us to rank each crossing relative to each other based on level of degradation. In addition to assessing stream crossings, we also noted areas where ORV's were driving along, in, and through anadromous waters, potentially causing the highest impact of ORV use on salmon populations. Results from this project will provide local land managers with information needed to prioritize areas of concern and make informed trail management decisions. Methodology developed during this project may be applicable elsewhere in south central Alaska where ORV use has degraded fish habitat.

Corinne Smith, The Nature Conservancy
Strategies of the Mat-Su Salmon Partnership

In 2008 the Mat-Su Salmon Partnership completed a Strategic Action Plan that identified the species and ecological systems that represent and encompass the biodiversity of salmon and salmon habitat in the Mat-Su and the stresses and potential threats to salmon and salmon habitat that were anticipated in the next 10 years were ranked. The Partnership selected eight focal issues to address plus three over-arching science strategies to increase our knowledge about the location and characteristics of salmon habitat in the Mat-Su. In the last five years, much has happened in the Mat-Su Basin, including continued population growth and several proposed large-scale resource development projects. Some salmon populations have been listed as Stocks of Concerns and the state has closed fisheries each summer. The Mat-Su Salmon Partnership has also been busy in the last five years addressing the strategies of the Strategic Action Plan. Given all these changes and activities, the Partnership began a process at the 2011 Mat-Su Salmon Symposium to scope the need to update the plan. To ensure that all partners had the opportunity to share their thoughts, an online survey was used to solicit opinions on the greatest threats to salmon habitat in the Mat-Su and the priorities of the Partnership. With that information and the progress that the Partnership has made toward the goals in the 2008 plan, the Partnership Steering Committee is proposing an update to the Strategic Action Plan. This presentation will outline the recommended process and new potential threats to consider.

Corinne Smith, The Nature Conservancy
Valuing Nature: What are Ecosystem Services Worth in the Mat-Su?

The fastest-growing community in Alaska, the Mat-Su Borough's population has doubled in the last 20 years and continued growth is expected for the foreseeable future, making the region's open space (including its rich salmon and wildlife habitat as well as its agricultural heritage) vulnerable to residential, commercial, and natural resource development. Already some places long used for recreation, farming, fishing, and hunting are no longer accessible or have been lost to other land use activities. While continued growth and development in the Borough is economically desirable for the community, the risk of neglecting to conserve open spaces—and the ecosystem and health services they provide—can be a costly oversight from both an economic and public health perspective. Open space provides ecosystem services and economic benefits to communities such as clean water for drinking and agriculture, local food production, flood control, and tourism and recreation opportunities. It also provides health services in the form of recreational activities like boating, fishing, hiking, and hunting, and mental health services through opportunities for reflection and rejuvenation in the outdoors. Across the country, communities like the Mat-Su are recognizing the importance of open spaces and spending significant resources to restore natural areas in order to capture the benefits of ecosystem services. Yet while there is substantial literature documenting the public health and economic values of open spaces in other parts of the world, there is little information specific to southcentral Alaska or the Mat-Su Borough. This project will help build a case for smarter growth and habitat protection in the Mat-Su Borough by providing: an economic justification for including protection of open spaces and ecosystem services as a key strategy of economic development; an assessment of values held by Mat-Su residents, which is essential for building an effective communications campaign and winning the hearts and minds of residents; and, explicit linkages to public health benefits to develop communications that resonate with non-conservation interest groups. The overall goal of this project is to quantify ecosystem services values in the Mat-Su Borough so residents and decision makers can make defensible decisions about growth and development—decisions that include conservation and protection of open space and the ecosystem services they provide.

Kim Sollien, Great Land Trust
Phil Shephard, Great Land Trust

Strategic Conservation in the Mat-Su Borough

Using geographic information system (GIS) mapping tools Great Land Trust (GLT) has had great success in identifying and prioritizing land parcels that have significant community and ecological values for conservation. Lands that rank highly for their conservation value include those that contain important moose habitat, wetlands important for drinking water supplies, stream corridors essential for salmon spawning and rearing, and parcels adjacent to or within protected areas that enhance public access.

This system of parcel evaluation and identification allows GLT to concentrate our conservation efforts on areas that contain the most critical habitats for wildlife and lands most valued by the community, leaving less sensitive areas open for appropriate development.

This presentation will highlight the various strategic conservation planning tools GLT has developed over the past three years and how we have used them to target and conserve almost 9000 acres of important estuarine, riparian, and wetland habitat throughout Southcentral.

****Kim Sollien, Great Land Trust***
Phil Shephard, Great Land Trust

Great Land Trust Conservation Easements

In the past 17 years Great Land Trust has conserved almost 9000 acres of land in southcentral Alaska including over 4300 acres of wetlands and 35 stream and river miles. Our poster highlights 24 of our completed conservation projects.

****Jack Harrison, Upper Cook Inlet Sportfish Association***

Little Su River Salmon Recovery Plan

Brian Winnestaffer, Chickaloon Village Traditional Council

McRoberts Creek Fish Habitat Restoration and Trail Maintenance Project

Chickaloon Native Village teamed up with the U.S. Fish and Wildlife Service, Mat-Su Trails Council, the Mat-Su Borough, and Alaska Department of Fish and Game, to rehabilitate an ATV trail that had eroded the banks of McRobert's Creek and caused half of the flow of the Creek to divert down the ATV trail. We worked with the State Department of Forestry's Intern Crew to rebuild the mangled stream bank with direction from USFWS and ADF&G. With willow brush layering, coir logs, and veg matting, we were able to direct most of the flow back into the original stream corridor.

The next step was to re-establish the old ATV trail onto higher ground and out of the new wetlands that were created because of the stream diversion. We rebuilt about 800' of trail and imported rock to harden the surface. A small culvert crossing was installed in a side-channel area and we created low hardened areas in the trail to handle sheet flow when things really get rocking out there during a flood.

The crossing over McRobert's Creek does have a bridge and we rebuilt the ramps to access this bridge. One problem with the bridge is that it is too narrow for large vehicles (trucks and jeeps) to cross it (which is illegal - but with no enforcement, people still do it).

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.

1. Science Needs for Salmon Habitat Conservation

Discussion Lead: Jeff Davis (Aquatic Restoration and Research Institute)

The Mat-Su Salmon Partnership has placed a priority on filling in science and data gaps about salmon and the habitats they use. Partners have made great progress in some areas, including mapping salmon distribution for the Anadromous Waters Catalog, measuring stream temperatures, and developing LiDAR data. What should the science priorities be in the next five years to fill in the knowledge and data gaps for estimating how human activities will impact salmon and their habitat? What science is needed to effect policies that will ensure healthy salmon populations into the next century?

2. Outreach Tools for Fish Habitat Partnerships

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/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 (at not just a regional, but also a state-wide and national level)? Bring your thoughts on these ideas and other outreach-related topics of relevance to the Mat-Su Salmon Partnership.

3. Ensuring Fish Passage at Roads and Railroads

Discussion Lead: Bill Rice (US Fish and Wildlife Service)

In 2008 the Mat-Su Salmon Partnership identified culverts that block salmon passage as a priority for replacement and prevention. Partners have replaced over 70 culverts that blocked migration of adult and juvenile salmon on Mat-Su streams. The transportation infrastructure in the Mat-Su is expanding with new neighborhoods throughout the borough and increased industrial development at Point MacKenzie. How can the negative impacts to salmon habitat by new and existing infrastructure be minimized?

4. Conserving Priority Wetlands for Salmon

Discussion Lead: Kim Sollien (Great Land Trust)

In the last few years, great strides have been made toward conserving wetlands that are important for salmon habitat. A multi-year mapping effort has improved our knowledge about the locations and characteristics of the Mat-Su's wetlands, the borough has recently approved a Wetlands Management Plan, and private and borough wetlands preservation banks protect important wetlands as others are developed. Development of subdivisions, commercial centers, roads, railroads, and coastal facilities will continue to result in the loss of freshwater and estuarine wetlands. What else can the Mat-Su Salmon Partnership do to ensure that priority wetlands for salmon are conserved as development continues in the borough?

5. Invasive Species in Mat-Su Waters

Discussion Lead: Cecil Rich (US Fish and Wildlife Service)

The Partnership focused on invasive northern pike in the 2008 Strategic Action Plan. Since then, an invasive aquatic plant – elodea – has arrived in southcentral and interior Alaska and threatens to radically change streams and lakes. How can the Mat-Su Salmon Partnership address the rising problem of invasive plants and animals in and around our waters?

6. Climate Change Impacts to Water Quality and Quantity

Discussion Lead: Sue Mauger (Cook Inletkeeper)

Climate change is predicted to affect temperatures, precipitation, and seasonal patterns throughout Alaska. For Mat-Su salmon, changes to water temperatures and flows could alter habitat. What does the Mat-Su Salmon Partnership need to know to better understand the potential impacts of climate change to salmon habitat? Can the Mat-Su Salmon Partnership mitigate or minimize those impacts?

7. 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?

8. Thriving Fish and Growing Communities in the Mat-Su

Discussion Lead: Frankie Barker (Mat-Su Borough)

The Mat-Su population continues to grow and the built environment increases along with it. Residential and commercial developments bring more impervious surfaces, which can create stormwater runoff. This runoff can carry pollutants into streams and lakes and alter natural water flows. The borough has drafted a Stormwater Management Plan to address regulatory requirements. What can the Mat-Su Salmon Partnership to ensure that stormwater runoff doesn't negatively impact salmon habitat?

9. Understanding and Protecting Ground and Surface Waters

Discussion Lead: Colin Kikuchi (U.S. Geological Survey)

Gaging of rivers and groundwater modeling have provided much needed information about ground and surface water in the Mat-Su Basin in recent years. Yet there is still more that we need to know to ensure that sufficient water quantities are available for salmon and people in the Mat-Su Basin. What steps can the Mat-Su Salmon Partnership take to protect water quantities in the Mat-Su?

10. 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?

11. Where Have All the Salmon Gone?

Discussion Lead: Larry Engel (Mat-Su Borough Fish and Wildlife Commission)

Coho and Chinook salmon returns were down in the Mat-Su and other parts of Alaska last year. The State of Alaska is proposing a research plan to understand Chinook declines throughout the state. How do Upper Cook Inlet Fisheries Management plans and policies affect salmon returns to Mat-Su streams and rivers?

12. Importance of Overwintering Habitat for Juvenile Salmon

Discussion Lead: Joshua Ashline (US Fish and Wildlife Service)

Chinook, coho, and sockeye salmon all spend at least one winter in freshwater before migrating to the ocean. Many studies suggest that overwintering survival of juvenile salmon is limited by the amount of available overwintering habitat. However little is known about the overwintering ecology and survival of juvenile salmon in ice covered ecosystems. What future research should be done to better understand the overwintering ecology of juvenile salmon in Alaska?

Keynote Speaker: Dr. Robert Lackey

Dr. Bob Lackey is professor of fisheries science and adjunct professor of political science at Oregon State University. In 2008 he retired from the Environmental Protection Agency's research laboratory in Corvallis where, over a 27 year career, he served in various senior science and leadership jobs. Since his very first fisheries job, mucking out raceways in a California trout hatchery, he has worked on an array of natural resource issues from various positions in government and academia. His professional assignments involved diverse aspects of natural resource management, but mostly you would find him working at the interface between science and policy. He has published over 100 articles in scientific journals and authored or edited 5 books. Dr. Lackey has long been an educator, having taught at 5 North American universities. He continues to teach a graduate course in ecological policy at Oregon State University. A U.S./Canada dual citizen, he was a Fulbright Scholar at the University of Northern British Columbia during the 1999-2000 academic year. Dr. Lackey holds a Doctor of Philosophy degree in Fisheries and Wildlife Science from Colorado State University and was selected as the 2001 Honored Alumnus by their College of Natural Resources. He is a Certified Fisheries Scientist and a Fellow in the American Institute of Fishery Research Biologists. In 2008 he was awarded the U.S. Environmental Protection Agency's highest honor — the Gold Medal — for exceptional contributions in strengthening the role of science in ecological policy.

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