

Matanuska-Susitna Basin Salmon Habitat Partnership

Site Tour, August 22, 2017

Montana Creek Drainage

Culvert Restoration Site

Buddy Creek

Presenter: Gillian O'Doherty (Alaska Department of Fish & Game)

Project Description: This project replaced an undersized culvert battery that was identified by the Alaska Department of Fish and Game (ADF&G) as a barrier to juvenile salmon. It was also a low



flow barrier to adult salmon. Buddy Creek supports spawning and rearing populations of Chinook, coho and pink salmon and rainbow and Dolly Varden trout. Chums have also been observed in Buddy Creek.

ADF&G used PIT tags to monitor the movement of juvenile fish through the culvert before and after replacement and is analyzing that data for impacts to juvenile fish movement. Preliminary results indicate a substantial improvement in the range of flows over which the culvert is passable to juvenile fish as well as a marked increase in the total number of fish passing the culvert.

Undersized culverts

Buddy Creek is an important overwintering area of Montana Creek salmon so improved access to upstream habitat is predicted to improve smolt production for this system.

Presenter: Jeff Davis (Aquatic Restoration and Research Institute)

Project Description: The Aquatic Restoration and Research Institute (ARRI) is a non-profit stream and water quality research organization located in Talkeetna, Alaska. In 2014 ARRI opened the Susitna Salmon Center, a salmon education center, in downtown Talkeetna. ARRI, with support provided through the Mat-Su Salmon Habitat Partnership and others, has been monitoring



Taking juvenile salmon measurements

juvenile salmon and resident fish in streams throughout the Matanuska-Susitna Borough since 2001. Concomitant with fish monitoring ARRI also measures stream physical, water quality, and biotic habitat characteristics. Juvenile salmon monitoring provides a baseline measure of the relative abundance of juvenile salmon and resident fish.

Differences in the relative abundance of juvenile salmon have been used to document the effects of invasive species like northern pike, urban development, and migration barriers at road crossings. Relationships between the relative

abundance of juvenile salmon and stream classification types and characteristics at multiple scales provides information on habitat selection by salmon species and life stages. Streams within the Matanuska-Susitna Borough provide a wide range of stream types including large and small glacial streams, low sloped wetland streams, small and large upland streams, and lake/stream complexes. Juvenile Chinook and Coho Salmon, that rear for one or more years in fresh water, are distributed throughout these stream types; however, relative abundance and growth rates vary due to differences in water temperature, food availability, stream size, and competition.

Presenter: Joe Klein (Alaska Department of Fish & Game)



Winter stream discharge measurements - all in the name of science!

and connectivity. Describing the seasonal and long-term characteristics is needed to quantify instream flows and effects from climate change.

Project Description: Salmon need sufficient water of good quality to sustain healthy populations. Instream flows are needed to ensure fish passage and connectivity to spawning and rearing habitats. One of the biggest threats to salmon is loss or degradation of habitat. Protecting instream flows on anadromous streams and lakes is a conservation strategy for the Partnership.

Hydrology is a central character of rivers and is inter-related to the geomorphology, biology, water quality

Partner organizations have a cooperative program to collect streamflow data and file reservation of water applications to protect fish habitat. Collecting streamflow data continues to be the limiting factor toward filing reservations and protecting flow regimes to sustain healthy salmon habitats.

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

Project Description: Across Mat-Su and Cook Inlet, the Big Lake watershed is unique in that it has a huge network of small creeks and wetlands that intersect a relatively dense network of roads and culverts that pass water under those roads. It is rated extremely high for both biological value and vulnerability to development and is among the top conservation priorities for the Mat-Su



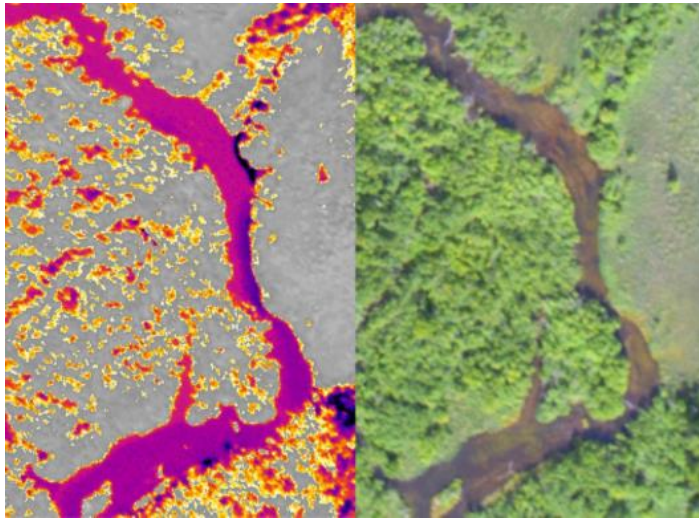
A juvenile Coho Salmon

Basin Salmon Habitat Partnership and its partners, including the U.S. Fish and Wildlife Service. This project provides an unprecedented look at the impacts of road crossings within a wetland-dominated watershed which are common in Alaska. It also improved our understanding of the seasonal movement patterns and habitat preferences of juvenile Coho Salmon, as well as their growth rates in different habitats. Key findings to date include: longer freshwater residency times for juveniles than expected (up to 4 years); extensive movement even by young-of-year salmon, often

in synchronous pulses; existence of only five dominant overwintering areas in the entire drainage (particularly lakes in the upper reaches of the watershed); active movement of juvenile salmon under ice; culverts previously thought to provide adequate fish passage are barriers when ice freezes inside. This information fed into a barrier prioritization framework that allows for optimal mitigation actions given limited restoration budgets (publication forthcoming in the journal *Landscape Ecology*).

Presenter: Sue Mauger (Cook Inletkeeper)

Project Description: As water temperatures get warmer in many of Alaska’s lowland streams in the years ahead, protecting and restoring groundwater connections, which support cold-water refugia and over-wintering habitat, will increase resilience to changing temperature patterns. Using thermal infrared imagery collected along 50 river miles within the Big Lake basin by the U.S. Fish and Wildlife Service, Cook Inletkeeper identified 32 significant cold-water inputs that may act



Thermal infrared imagery (left), with corresponding aerial image(right), showing cold water inputs (purple) to the mainstem of Fish Creek (pink).

as “thermal refugia” for migrating adults and rearing juvenile salmon. We sampled sites in Fish, Herkimer and Lucille creeks to determine if Coho Salmon preferentially use cold-water habitats for summer rearing. Our results reinforce the value of groundwater-fed habitats and offer insight for targeted protection of salmon habitat within the Big Lake basin. Road crossings can impede fish passage into more thermally suitable habitat. Small tributaries may become increasingly important as cold-water refugia; improving fish passage to colder upstream habitat, like Lucille Creek, could be a key metric for prioritizing restoration projects or designing new stream crossings.

Presenters: Jim Jenson (Mat-Su Borough) and Trent Liebich (U.S. Fish and Wildlife Service)

Project Description: Fish Passage has been a focus for restoration in the Mat-Su Borough (MSB) for over 15 years. To date, nearly 100 culverts that impede fish passage have been replaced, mostly on Borough-owned roads. This fish-friendly road-stream crossing where Meadow creek



Meadow Creek at Beaver Lake Road – before



Meadow Creek at Beaver Lake Road – completed

intersects Beaver Lake Road is a great example of the working relationship between the MSB, Alaska Department of Fish and Game, the Mat-Su Basin Salmon Habitat Partnership, and the U.S. Fish and Wildlife Service. Through prioritization efforts this undersized culvert was identified by ADF&G as a significant barrier to juvenile salmon on this major tributary to Big Lake.

In 2015 we worked together to replace this barrier with a fish friendly design that restored access to 9 miles of stream and 128 acres of lake habitat. In addition to these biological benefits, we’re seeing tremendous improvements in flood conveyance as a result of these newer fish friendly design standards -- during the severe flooding in 2012 we did not lose a single fish-friendly culvert to washout. Through a continued working relationship we hope to further this successful model of providing road-stream crossings that benefit the fish that are so important to Alaskans and visitors and that are responsive to our infrastructure needs and public safety.