



*Mat-Su Basin Salmon Habitat Partnership Summer Site Tour
August 23, 2022*

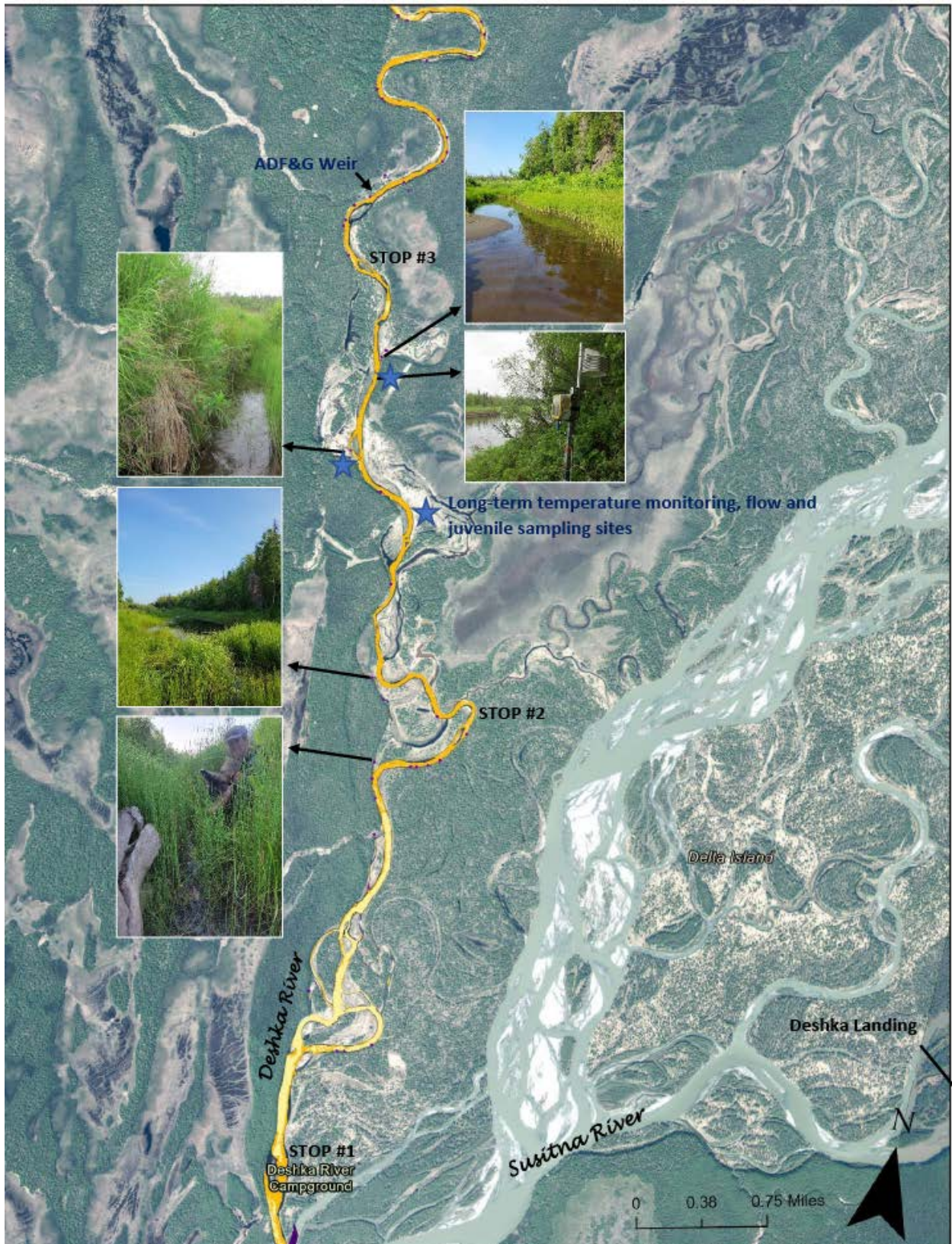
Salmon Habitat in a Warming Climate: Spotlight on the Deshka River

The Deshka River hosts one of the most productive fisheries in the Matanuska-Susitna Basin. It is also among the warmest salmon systems in the Mat-Su with summer water temperatures regularly exceeding thresholds considered stressful for salmon. This year's tour will highlight collaborative science occurring on the Deshka River to provide community leaders with current information on stream temperature and potential impacts to salmon and their habitat in the Mat-Su – both today, and in the future.

Thank you to the generous supporters of this year's site tour: Trident Seafoods, Cook Inlet Aquaculture Association, Cook Inletkeeper, Trout Unlimited, Susitna River Coalition, U.S. Fish and Wildlife Service, FishHound Expeditions and Chickaloon Village Traditional Council. Primary operations support for the Mat-Su Basin Salmon Habitat Partnership comes from the National Fish Habitat Partnership, Bureau of Land Management and Trout Unlimited.

Special thanks to our boat operators: Drill Team 6 Fishing Excursions, Fishtale River Guides, Drifterz Paradise, Berg's Frontier Fishing Guides, FishHound Expeditions and U.S. Fish and Wildlife Service.

2022 Deshka River Site Tour – Map



2022 Deshka River Site Tour - Itinerary

NOTE: *Itinerary times are estimates, and tour stop locations may be adjusted due to high water or safety concerns.*

8:00 am Vans depart Anchorage; 9:00 am Van departs Palmer

10:00 am Deshka Landing

- Welcome & Tour Focus (*Jessica Speed, Mat-Su Salmon Habitat Partnership Coordinator, Trout Unlimited*)
- Overview of Salmon Management on the Deshka River (*Samantha Oslund, Alaska Department of Fish and Game*)

11:15 am Boats Depart Deshka Landing

11:45 am Stop #1 – Mat-Su Borough Campground, Deshka and Susitna River Confluence

- Traditional Dena'ina Use of the Deshka River (*Kevin Toothaker, Knik Tribal Council, Fran Seger-Boss, Knik Tribal Council and Chickaloon Village Traditional Council*)
- A Commercial Sportfishing Perspective on Stream Temperature and the Deshka River (*Andy Couch, Fishtale River Guides*)

12:15 pm Depart for Stop #2

12:45 Stop #2 – LUNCH

1:15 pm

- Predicting Changes in the Abundance and Distribution of Thermally Suitable Habitat for Deshka River Chinook and Coho Salmon (*Dan Rinella, U.S. Fish and Wildlife Service*)
- Mapping Stream Temperature Across the Deshka and Identification of Cold- Water Refugia (*Sue Mauger, Cook Inletkeeper*)

2pm Depart for stop #3

2:15 pm Stop #3

- Stream Discharge Collection Efforts in the Deshka River Watershed (*Franklin Dekker, U.S. Fish and Wildlife Service*)
- Susitna Basin Recreational Rivers Management Plan Revision – An Update (*Shelby Burrridge/ Rob Earl, Alaska Department of Natural Resources*)

3 pm Return to Deshka Landing

3:40 pm Deshka Landing

- Final conclusions and wrap up for the day

2022 Deshka Site Tour – Presentation Abstracts

Overview of Salmon Management on the Deshka River

Samantha Oslund, Alaska Department of Fish & Game

The Deshka River is a clearwater tributary that drains 1,700 square kilometers that feeds into the Susitna River. The upland habitat is roughly 54% forest habitat and 40% lowland wetlands. The elevation ranges from 400 m at the headwaters to 20 m where it meets the Susitna River. The river is primarily low gradient, of which over 70% is 1% gradient or less (Shaftel ET AL. 2020). The water body is cataloged for all five species of salmon and includes spawning habitat for Chinook and coho salmon. Habitat concerns for the Deshka River includes habitat connectivity via a handful of culverts with a rating for inadequate fish passage, Northern Pike presence, stream temperature monitoring, and pollution from hydrocarbons in the lower reaches of the river.

A weir has been in operation on the Deshka River since 1995 to count annual runs of Chinook and coho salmon. The weir is installed at river mile 7 in late May, ahead of the Chinook run, and is pulled by Mid-September after the finish of the coho salmon season. A secondary objective of the project is to estimate the age, sex, and size composition of the spawning escapements. This data has been used to generate a return per spawner profile for the Chinook stock and is the basis of the current Chinook salmon escapement goal and a major part of the annual Chinook forecast. An escapement goal is also in place for coho salmon based solely on weir counts. During the season, daily counts are used to assess run strength and produce projections of escapement; emergency orders are sometimes issued to boost sport harvest on years of high run strength or to restrict harvest on years of low abundance if escapement goals are projected to be missed.

Shaftel, R., L. Jones, S. Mauger, and D. Merrigan. 2020. Stream Temperature Models and Applications in the Anchor, Kenai and Deshka River Watersheds. A report submitted to the U.S. Fish and Wildlife Service on behalf of the Mat-Su Basin Salmon Habitat Partnership and the Kenai Peninsula Fish Habitat Partnership. Alaska Center for Conservation Science, UAA, Anchorage, AK and Cook Inletkeeper, Homer, AK. 41 pp.

Traditional Dena'ina Use of the Deshka River

Kevin Toothaker, Knik Tribal Council

Fran Seger-Boss, Chickaloon Village Traditional Council/ Knik Tribal Council

The Deshka River and its watershed is an area rich with Indigenous history. The Deshka's productive waters have sustained the Dena'ina for generations. Kevin Toothaker leads cultural and educational project with the Knik Tribe, and Fran Seger-Boss is an archaeologist who works with both the Knik Tribe and Chickaloon Village Traditional Council. Their presentation will give a glimpse of the significance of the Deshka for Alaska's first peoples.

Note: The below detailed summary was provided following the site tour. Kevin Toothaker gave a brief background history of the Dene and their rich heritage in the Mat-Su valley. He presented a map illustrating the extensive Dene settlements in the region and highlighted the numerous archaeological villages that once thrived along the Deshka River. Their lives were primarily supported by the rich anadromous fish runs on the /Deshka during the fall and winter. The Dene people would start early in

the Spring drying and smoking fish in preparation for the long winters. Women would pick and dry berries during late summer and early fall for winter use. Each extended family would have a queshka/chief who oversaw the preparations and distribution of the community resources ensuring everyone got an equal amount of food. Kevin shared a calendar that demonstrates the importance of year round food gathering be it fishing, hunting, snaring etc.. All months relate to various hunting and gathering activities throughout the year. Each month's name illustrates an activity or observance highlighting that month. The names for various months differ between the Ahtna Dene and the Dena'ina Dene, due to subtle differences in regional temperatures. The Ahtna observances and activities are a little later than those in the more southern Dena'ina areas.

Fran Seager-Boss described the importance of caching food for the winter. Digging cache pits for food was a technological revolution that occurred approximately 1000 years ago. A combination of an abundance of fish and the ability to store them, enabled the Dene to create housing and settlements the remains of which can be found all over the Valley. Cache pits were dug from 3-6 feet deep with widths and diameters equal to the depths. In the Upper Cook Inlet region they were completely lined with large sheets of birch bark generally glued together with a fish roe paste to keep moisture from spoiling the food. A layer of moss was placed to line the pit and insulate the food. Women were responsible for filling the caches by layering the fish. Greens were placed in the base of the lined pit then a layer of dried/smoked fish and then a layer of fresh greens, (fireweed was often used for that purpose), then another layer of fish and greens all the way to the top. The top was covered with birch bark, often weighted with rocks ultimately covered with spruce boards. Caches were often put in a central location within a village. There generally were a series of large caches with a buffer between each cache to keep spoilage from seeping into an adjacent cache. Adjacent to and above the series of large caches often times were smaller caches created for dried berries. Stinky head pits (a delicacy of rotted fish heads) were generally kept outside a village site and were much smaller in size. Some houses had separate smaller caches for personal use.

Figure 1: Cache pit

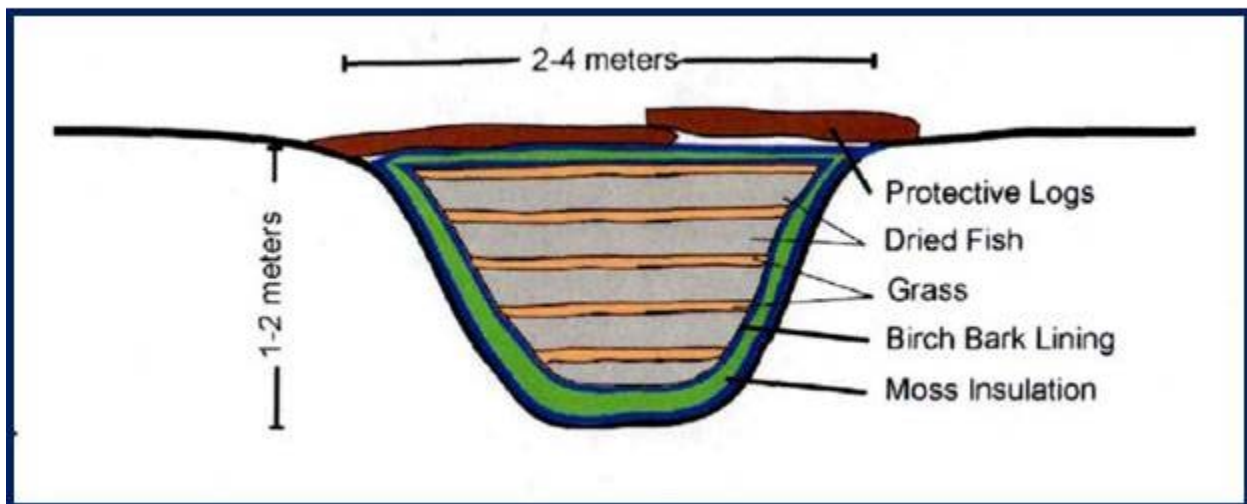
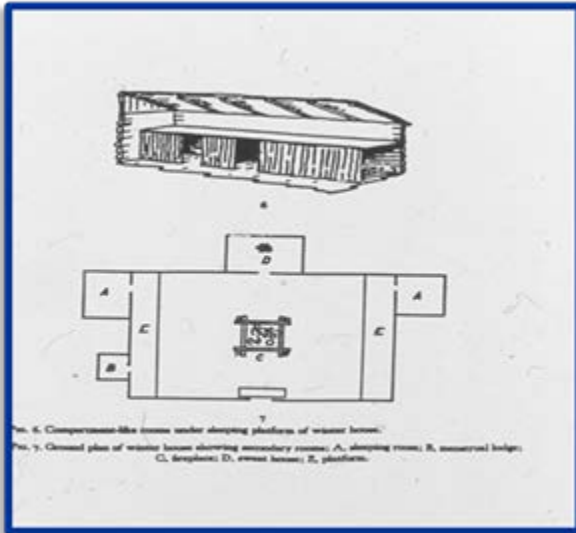


Fig.2. Dena'ina house interior with sleeping bench against the wall & main room with small additional rooms and central hearth. Most upper Cook Inlet houses only have one separate room used as a sweat house.



Sportfishing Perspective on Stream Temperature and the Deshka River

Andy Couch, Fishtale River Guides

The Deshka River is in the upper echelon of Northern Cook Inlet's king salmon streams and is the most productive of the clearwater tributaries of the Susitna River. While guide Andy Couch recommends the Knik River (Eklutna Tailrace) boat fishery for anglers who want to an opportunity to harvest and eat a king salmon, the Deshka and Little Susitna River are prized for the opportunity to catch larger chinook in a more remote setting with less fishing pressure. From spending thousands of days on the water, Andy Couch has observed changes in Mat-Su Valley streams firsthand. His perspective gives insight into the tangible economic and cultural value salmon continue to play in the Mat-Su in the 21st century.

Predicting Changes in Abundance and Distribution of Thermally Suitable Habitat for Deshka River Chinook and Coho Salmon

Dan Rinella, U.S. Fish & Wildlife Service

Recent research shows that the Deshka River is among the warmest of Cook Inlet's salmon streams and suggests that warm summer temperatures negatively impact the survival of juvenile Chinook Salmon rearing in this and other streams around the region. Management actions to minimize the effects of warming, however, are limited by a poor understanding of both their thermal requirements and the extent and distribution of thermally suitable habitats. To help close these gaps, we are monitoring the distribution of juvenile salmon throughout the growing season across the Deshka River watershed.

These data, when combined with output from a spatially explicit watershed temperature model based on data from our ongoing Deshka River temperature network, will allow us to define the temperature range used by juvenile Chinook and Coho salmon rearing in the Deshka River watershed (i.e., their thermal niches). Additional modeling will estimate how the extent and distribution of thermally suitable habitat has changed over time, how it will change in the future, and the degree to which it correlates with past salmon run strength. This information can guide conservation and fishery management actions by identifying key rearing areas for juvenile salmon, prioritizing areas for conservation actions that maintain cool water and habitat connectivity, predicting the effects of warming on future salmon production, and reserving instream flow in key tributaries. This work may also feed into fishery management by informing pre-season forecasts and spawning escapement goals.

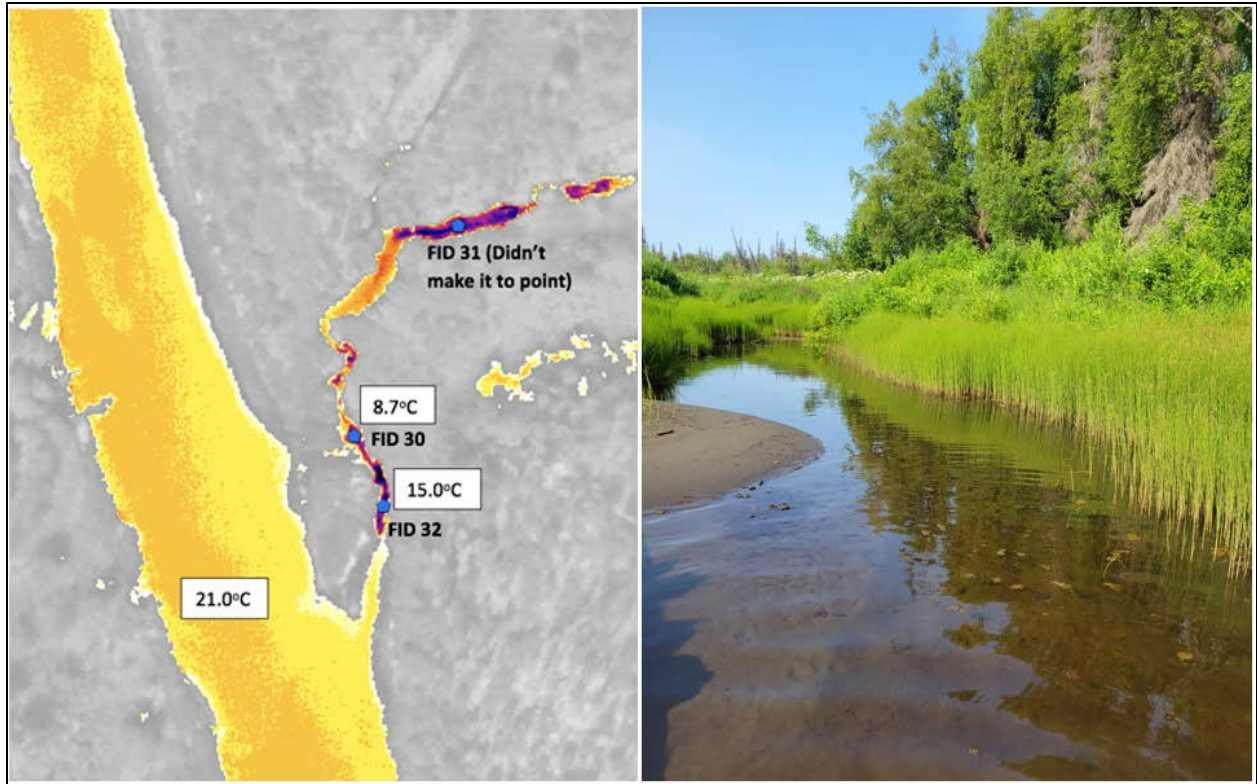
Mapping Stream Temperature Across the Deshka and Identification of Cold-Water Refugia

Sue Mauer, Cook Inletkeeper

In 2017, Cook Inletkeeper and the U.S. Fish & Wildlife Service began a 5-year effort to map the spatial heterogeneity of water temperature within the Deshka River watershed. We are intensively monitoring year-round water temperature at more than 60 sites with clusters of data loggers at 20 major tributary junctions.

In July 2020, with funding through the Alaska Sustainable Salmon Fund, Cook Inletkeeper acquired thermal imagery for 32 miles of the Deshka River starting from the confluence of Moose and Kroto creeks upstream and ending at the confluence with the Susitna River. This infrared technology is an effective method for mapping small-scale temperature patterns in streams. The TIR imagery provides a snapshot of stream temperatures at the time of the airborne survey. And although temperature values change year-to-year, groundwater-fed cool water refugia remain persistent over time. In addition to providing cold water in the summer, these groundwater areas are relatively warm in the winter, creating ice-free nooks for overwintering juvenile salmon.

With 2' x 2' resolution thermal data and a map of discrete cold-water refugia, we have an excellent opportunity to implement strategic conservation actions with public land managers and private landowners to ensure the Deshka River remains a salmon stronghold into the future.



Thermal imagery (left) with corresponding field photo (right) showing cold-water habitat (in purple) along the main channel of the warmer Deshka River (yellow). (Imagery by NV5 Geospatial. Photo by Cook Inletkeeper.)

Stream Discharge Collection Efforts in the Deshka River Watershed

Franklin Dekker, U.S. Fish and Wildlife Service

The Deshka River watershed has an outsized importance for Mat-Su Basin salmon and differs hydrologically from other rivers in the basin with its absence of snowy mountain headwaters. Streamflow in the low-lying watershed is characterized by peak flows that occur at spring breakup or during late summer and fall storms. Low flows occur in the winter months, but in recent years, 2019 and 2022, volumes were considerably low for a long period between May and July. These hydrologic extremes can result in salmon population responses for years afterwards. To better understand streamflow in the watershed the U.S. Fish and Wildlife Service partnered with Alaska Department of Fish and Game (ADF&G) to collect streamflow on 16 tributaries to Kroto and Moose Creek, and Deshka River beginning in 2017. Flow measurements have been correlated to the Mat-Su Salmon Habitat Partnership funded USGS Kroto Creek gage at Oilwell Road to extend their records. As a result of this effort ADF&G's Instream Flow Program has used streamflow data collected to apply for several instream flow



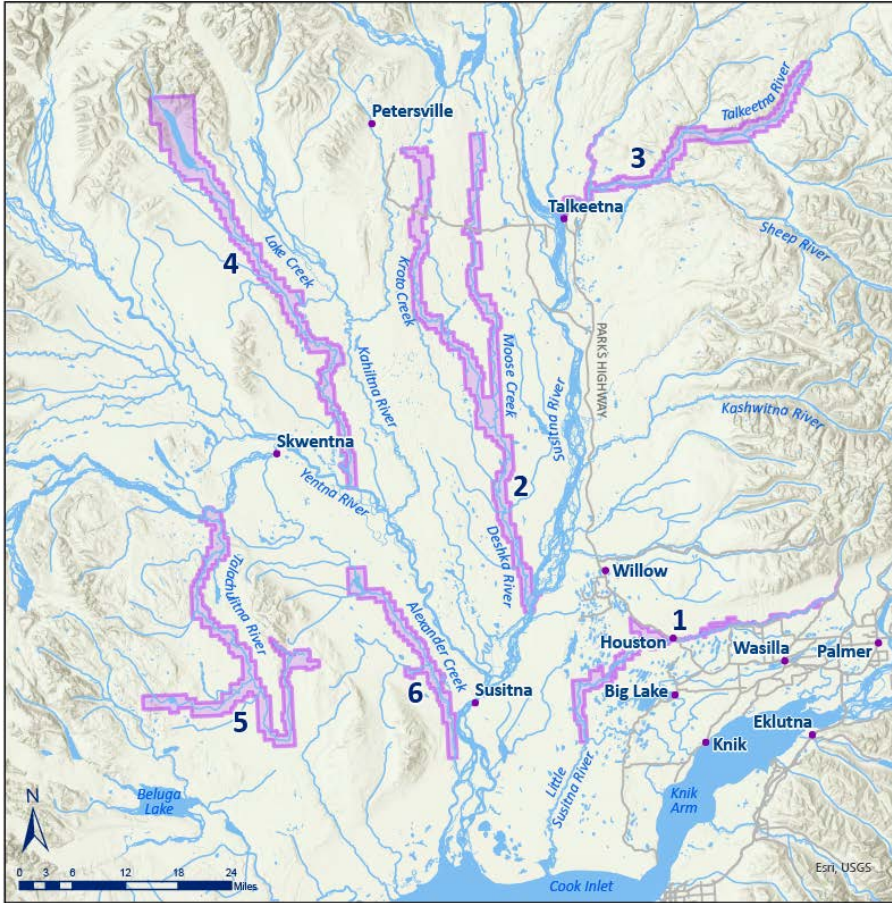
reservations of water for Pacific salmon in the Deshka River watershed. Instream flow water reservations are a legal right secured through Alaska Department of Natural Resources (ADNR) to maintain a certain quantity of water in a stream for a purpose that benefits fish and wildlife such as salmon migration, spawning and rearing. As ADNR reviews future consumptive water use applications in a waterbody with an instream flow reservation they have a quantified value of water to consider and maintain for salmon. The current streamflow study in the Deshka tributaries builds on an earlier instream flow water reservation ADF&G applied for in 1991 for the Deshka River when it was gaged by USGS between 1978 to 1986. Additional analysis of flow data from the 16 tributaries is ongoing with an aim to further characterize landscape controls on stream flows in the Deshka watershed to aid temperature models, conservation and further the understanding of hydrology on small Alaskan streams.

Susitna Basin Recreational Rivers Management Plan Revision – An Update

Shelby Burrige and Rob Earl, Alaska Department of Natural Resources

In Spring of 1988, the Recreation Rivers Act passed designating six, mile-wide river corridors: Alexander Creek, Deshka River (Kroto Creek / Moose Creek), Lake Creek, Little Susitna River, Talachulitna River and Talkeetna River. The first management plan for the recreation rivers was adopted in 1991. The management plan describes how the Department of Natural Resources (DNR) will manage approximately 243,000 acres of state-owned land along 460 river miles within the Susitna Basin. The plan does not make management decisions for private, native or borough lands.

Much has changed in the 30 years since the first plan was adopted. In November, the Governor reconstituted the 13-member Susitna Basin Recreation Rivers Advisory Board. With the Board's assistance, DNR has started the process to revise the management plan to update resource information and address changing recreational and economic use. A robust public process will be employed to gather information and create a shared vision for future management of the Recreation Rivers. To join the mailing list for updates, please email recreationrivers@alaska.gov.



SUSITNA BASIN RECREATION RIVERS MANAGEMENT UNITS

1. Little Susitna River
2. Deshka River
(Kroto Creek / Moose Creek)
3. Talkeetna River
4. Lake Creek
5. Talachulitna River
6. Alexander Creek



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Created: December 2021
 SB, DNR, DMLW, RALDS
 Projected Coordinate System: NAD 1983
 UTM Zone 6 North



Save the Date!

The 15th Annual Mat-Su Salmon Science & Conservation Symposium is scheduled for November 14 and 15, 2022 at the Palmer Depot! Look for registration to open soon at MatSuSalmon.org



The Mat-Su Salmon Partnership formed in 2005 to address increasing impacts on salmon habitat from human use and development in the Mat-Su Basin. Modeled after the National Fish Habitat Partnership, this coalition of now over 65 organizations uses a collaborative, cooperative, and non-regulatory approach. The Matanuska-Susitna Basin Salmon Habitat Partnership supports abundant wild salmon and healthy habitat that coexist with vibrant communities. 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.

Learn more about the Partnership at www.matsusalmon.org and follow us on Facebook!