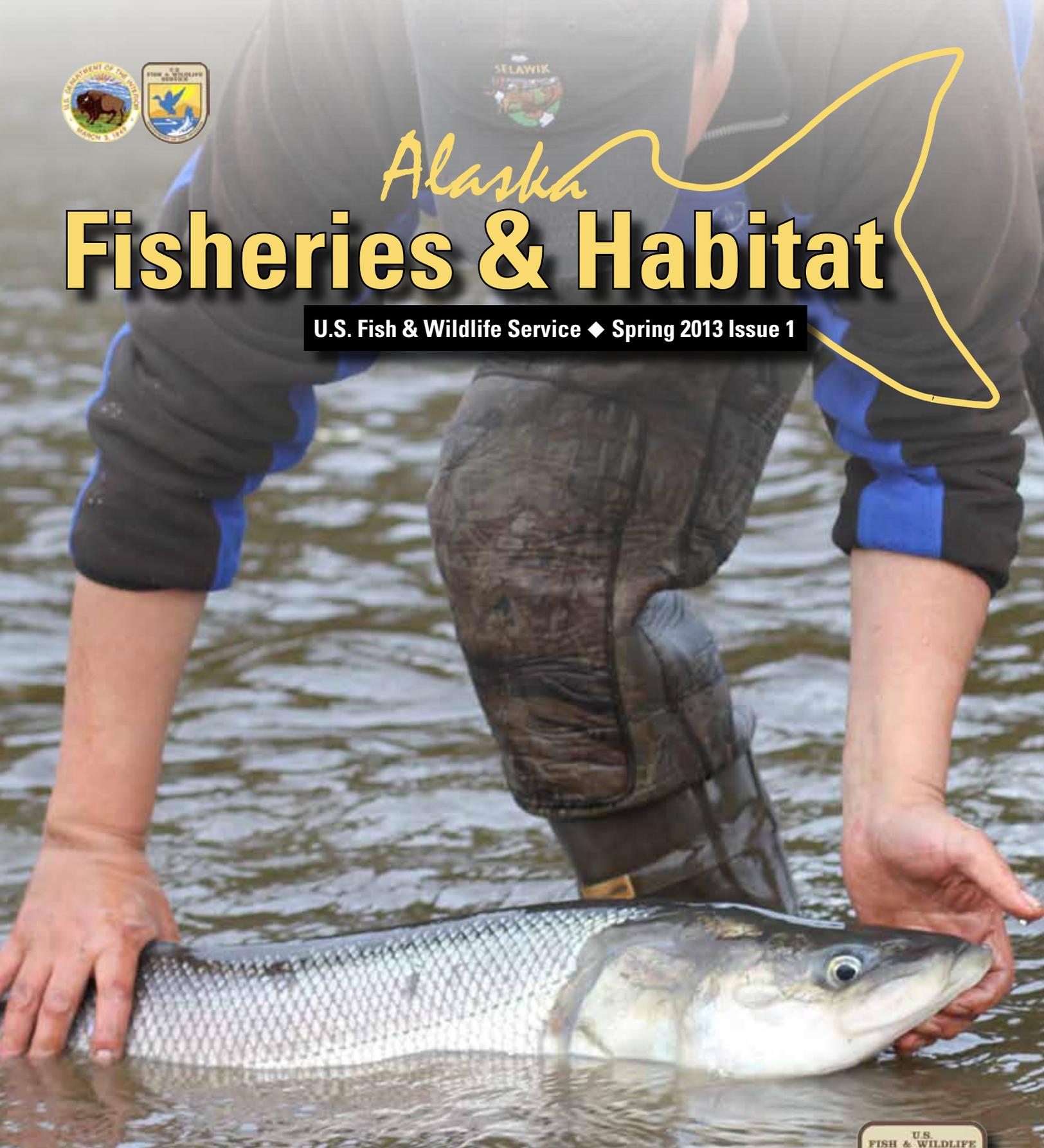




Alaska Fisheries & Habitat

U.S. Fish & Wildlife Service ♦ Spring 2013 Issue 1



U.S. Fish and Wildlife Service Mission:

Working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people



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<https://www.facebook.com/USFWS.AK.Fisheries.Habitat>





In Alaska, Service employees are devoted to habitat conservation partnerships, research, education, and monitoring. This bi-annual publication showcases the innovative, collaborative, and enthusiastic ways we deliver on-the-ground conservation and, more importantly, why that conservation matters.

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Front Cover: Frank Berry, Jr. releases a Selawik River sheefish. **Above left:** juvenile salmon schooling at the confluence of the Russian and Kenai Rivers. Katrina Mueller/USFWS

▶ *Contact Katrina Mueller with comments or questions, or if you'd like to subscribe to Alaska Fisheries & Habitat News!*
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Timothy Jennings
 Assistant Regional Director,
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 U.S. Fish & Wildlife Service, Region 7

Alaska is a special place. For the residents who, after long cold winters, shed their parkas, put on their hip boots, and head to their favorite fishing grounds to fill the freezer and continue long-standing subsistence traditions, or enjoy catch-and-release fly fishing...and for visitors who come here from all over the world hoping to catch a king or silver salmon or watch bears, migratory birds, and other abundant wildlife.

Covered with literally millions of pristine lakes, rivers, streams, wetlands, and estuaries, Alaska abounds with fish and wildlife. Its intact landscapes form the foundation of the fisheries that feed our nation—from the Bering cisco in New York City restaurants to the King salmon in Seattle’s Pike Place Market to the Copper River and Bristol Bay sockeye salmon in the seafood section of your local grocery store.

Alaska’s abundant variety of Pacific salmon and whitefish species are uniquely important to sustaining the Alaskan way of life and its economy. Alaska Natives rely on these fish for food and to sustain their traditions and quality of life. They have been listening to what fish and wildlife have been telling them for centuries—respect and care for fish and wildlife and they will provide for the needs of Alaska families and communities, now and in the future. Many

Alaskans have jobs that are directly or indirectly related to the state’s robust fisheries. Conserving Alaska’s rich mosaic of intact, functional aquatic habitats goes hand-in-hand with conserving Alaska’s fish and the contributions they make to the state’s economy, subsistence activities, and diversity.

While Alaska is fortunate not to have any of its fish listed under the Endangered Species Act, it is by no means immune to the stressors and rapid landscape changes that are impacting native fish elsewhere. Habitat degradation, fragmentation, and loss are the leading threats to North America’s native freshwater and diadromous fish species— approximately 40% are imperiled. Climate change, habitat fragmentation, and invasive species are already changing the vast Alaska landscape that shapes the diversity of habitats from which our incredibly valuable fisheries originate.

In partnership with Alaska Native organizations, local and state governments, Fish Habitat Partnerships, our Refuges, and others, we have been working for many years to conserve fisheries and the habitats that support self-sustaining populations of native fish and wildlife. The strength of our programs lies in our staff’s expertise and ability to work with others to achieve conservation results, build local conservation capacity, and bring a strategic focus to projects that protect and restore priority habitats. Intact watersheds, good water quality, and robust fisheries attract tourists, create jobs, sustain our cultural legacy, and support businesses, all of which contribute to the state’s economy and to residents’ quality of life.

Going forward, we will continue to work closely with others to refine our conservation objectives in order to target our funding and staff time around those activities that will help conserve habitat conditions necessary for self-sustaining populations of migratory fish and other priority species.



- 12,000+ rivers and more than 3 million lakes.
- over half of the U.S. coastline and two-thirds of its total wetland acreage.
- sport anglers spent \$1.4 billion in 2007 and supported over 16,000 jobs.
- the value of salmon at Alaska docks in 2012 exceeded \$500 million.

Fish-friendly culverts keep fish habitat and communities connected, **no matter what the weather!**

WIN-WIN!



For fish, swimming under a road needs to be as easy as swimming through other non-impacted stream reaches. Habitat through fish-friendly “stream simulation” culverts is engineered to mimic the natural stream channel and promote fish passage!

Culverts channel streams under roads. We drive over dozens every day and don’t think much about them until there’s a problem—a washout, frost heave, or...blocked fish migration!

While Alaska is known for extreme weather, Southcentral Alaska was hit particularly hard last fall with heavy rains, strong winds, and widespread flooding.

“ the fish passage culverts definitely lowered the potential for failure on many roads during these last floods ”

—Jim Jenson, Mat-Su Borough Director of Operations and Maintenance

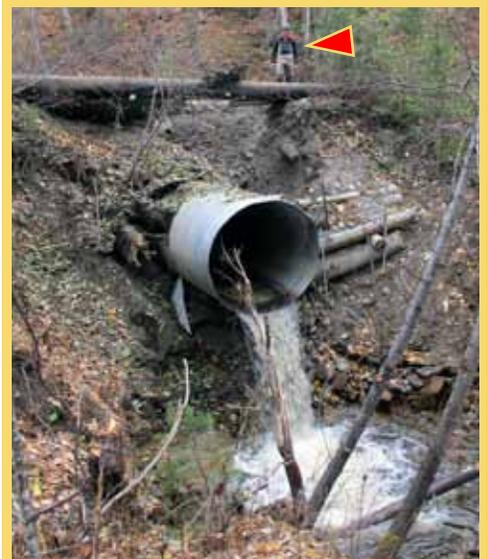
Flood waters overtopped many roads, resulting in closures, erosion, culvert damage, and at least five undersized crossings becoming overwhelmed and carried downstream.

But the 80+ road-stream crossings fitted with larger, fish-friendly

structures in the Matanuska-Susitna Borough survived the flood with flying colors. These enhancements are the result of investments and leveraging of Service funds/staff time into partnerships and projects that improved fish passage where roads intersected anadromous waters (those that support fish like salmon that return to their freshwater birthplace to spawn).

This recent flood event showed that road-stream crossings designed to let juvenile salmon move freely among important rearing habitats not only boost fish production, but are also immensely valuable from a road maintenance and public safety perspective!

USFWS Hydrologist/Fish Passage Engineer Bill Rice passes through a fish-friendly culvert in Wasilla, Alaska. K.Mueller/USFWS



Bill surveys a fish passage barrier and road maintenance nightmare from a road that crosses Coal Creek. K.Mueller/USFWS



Our Fish Passage Program partnered with the Mat-Su Borough to replace a 5 ft round culvert on Colter Creek with this fish-friendly 14 ft arch culvert following the 2006 floods. K.Mueller/USFWS



Learn more about our Alaska Fish Passage Program!

<http://alaska.fws.gov/fisheries/restoration/passage.htm>

AIS INVASION!

Aquatic Invasive Species (AIS) are those non-native plants and animals that, once introduced to a waterbody, quickly become widespread and cause harm to economies, environments, and/or human health.

A dense infestation of non-native *Elodea* in Chena Lake near Fairbanks, Alaska.

Did you know? Annually, AIS cost the U.S. tens of billions of dollars in damages and control

They hitchhike into Alaska via the pet trade and school aquaria kits; on marine debris/litter; in the ballast water of ships; and embedded in the soles of boots and on angling and hunting gear. Once here, they're introduced into new waters by our boats and trailers, floatplanes, all-terrain vehicles, pets, outdoor gear, or by aquarium owners with good intentions. From *Elodea* to zebra mussels, the arrival and spread of AIS is almost always at the expense of native species and associated goods and services.

Fortunately, Alaska's aquatic invaders are (so far) still fairly well-contained. There is still a short window of opportunity to avoid the overwhelming economic and ecological impacts AIS have caused elsewhere—but *only if we coordinate a very rapid response to prevent their spread.*

In Alaska, our Invasive Species Program focuses on:

- 1) preventing AIS from entering Alaska and becoming established,
- 2) detecting and responding rapidly to those invasives that do, *and*
- 3) building awareness about AIS.

We do this via funding, technical expertise, and coordination support. For example, we're currently:

- coordinating early AIS detection and rapid response efforts,
- providing funding to the Alaska Department of Fish and Game to carry out their Aquatic Nuisance Species Management Plan,
- funding nearly a dozen coastal Alaska communities to set traps for European green crabs and settling plates for invasive tunicates that may be brought to Alaska by shipping traffic,
- facilitating development of a statewide communication strategy, *and*
- working with partners and other Service Programs to build awareness about and to eradicate or control AIS.

Did you know? After habitat loss, invasive species are considered the second biggest threat to native species.



Learn more about our Invasive Species Program!

<http://alaska.fws.gov/fisheries/invasive/index.htm>



■ **ELODEA** is believed to be Alaska's first non-native aquatic plant.

■ **EXTREMELY invasive:** survives under ice/spreads by tiny fragments introduced by boats, trailers, float planes, equipment, and school/home aquariums.

■ **15 confirmed infestations** in Anchorage, Fairbanks, Cordova, and Kenai Peninsula waters.

■ **Shown to degrade salmon and grayling habitat.** Also fouls boat propellers and float plane rudders, and impedes boat launching, navigation, and fishing.

ELODEA



YOU CAN HELP!

■ **Support eradication efforts and educate yourself and others about invasive species.**

■ **Teachers, students, aquarium hobbyists:** don't let it loose!

■ **Boaters:** carefully inspect and remove any visible aquatic plants/fragments from your boat and trailer before leaving waterbody.

■ **Float planes:** *Before entering the aircraft* remove visible plants and pump water from floats. *Before takeoff* don't taxi through heavy plant growth; raise and lower rudders. *After takeoff* raise and lower rudders to free plant fragments while over the waters you are leaving or over land.

■ **Report sightings:** Note location (GPS or mark on map) and water depth/clarity. Take a specimen (photo at a minimum). Take as much of the entire plant as you can (including the tiny flower on a long thin stalk if present). Put in a zip lock bag, book, or wax paper and store in a cool place. **Call 1-877-INVASIV.**

Nurturing Capacity for Conservation

Alaska's Fish Habitat Partnerships are part of a national network of voluntary, place-based collaboratives working to protect, restore, and enhance the Nation's native fish and aquatic resources.

Recognized Alaska Fish Habitat Partnerships

1. Mat-Su Basin Salmon Habitat Partnership
2. Southwest Alaska Salmon Habitat Partnership
3. Kenai Peninsula Fish Habitat Partnership

Alaska's Newest Candidate Partnership

4. Southeast Alaska Fish Habitat Partnership



WHY are Fish Habitat Partnerships critical? Intact habitat *is* the foundation of healthy, robust native fish populations. In Alaska, our Fish Habitat Partnerships cover several distinctly unique regions for good reason: habitat loss is currently the leading cause of native freshwater fish extinctions in the U.S. Although much of Alaska still has intact habitats, the risk of losing key habitats in areas with increasing human population and/or development pressures is very real. Proactive actions, and the strength of public/private partnerships, will ultimately decide the future suitability and quality of Alaska's habitats and dictate the resiliency of associated fisheries.

What are Alaska Fish Habitat Partnerships doing to move the conservation needle?

- growing locally-relevant technical capacity and expertise to maximize on-the-ground conservation results,
- identifying and supporting projects that conserve priority habitats across Alaska's massive landscape,
- leveraging resources to match federal funding initiatives, *and*
- providing a local and active forum for information exchange.

CONNECT with Alaska's Fish Habitat Partnerships:

Mat-Su: www.matsusalmon.org; <https://www.facebook.com/MatSuSalmon>

Southwest: www.swakcc.org

Kenai: www.kenaifishpartnership.org

Southeast: www.seakfhp.org

Other relevant sites:

National Fish Habitat Partnership: www.fishhabitat.org

Western Native Trout Initiative: www.westernnativetrout.org

Coordinator Corner



**SOUTHEAST ALASKA
FISH HABITAT
PARTNERSHIP**

The Southeast Alaska Candidate Fish Habitat Partnership seeks to foster cooperative fish habitat conservation in freshwater, estuarine and marine ecosystems across the southern panhandle of Alaska with a focus on the waters of the Alexander Archipelago.



Deborah Hart,
Southeast Alaska Fish Habitat
Partnership Coordinator

Like so many other places in Alaska, the southern panhandle is a unique and special place filled with many small vibrant communities with economies and ways of living linked closely to surrounding natural resources. Our communities share a deep relationship rooted in the bounties of intact and productive fish habitat.

While overall salmon and other fish populations remain strong here, localized declines and areas facing habitat degradation spurred the formation of the Southeast Alaska Fish Habitat Partnership, currently a "candidate" partnership under the National Fish Habitat Partnership architecture.

To date, most regional fish habitat conservation and restoration efforts in Southeast Alaska have been conducted unilaterally by large organizations such as the U.S. Forest Service or through small collaborative efforts with non-governmental organizations working with agency partners. Our newly formed partnership intends to build on these efforts by providing a framework for improved information sharing, developing regional conservation priorities, funding coordination and interagency/partner cooperation.

Making great strides over this last year our partnership is well on its way to building a strong network of regional partners, completing a regionally focused conservation action plan and providing facilitation services to partners and Southeast communities. Our partners share a belief that many benefits result when multiple partners come together to share resources, align strategic actions, and speak with a united voice about the conservation and value of productive and intact fish habitats at both local and regional scales. The success of our efforts relies on the breadth and common focus of our partners. —**Deborah Hart, SEAFHP Coordinator**

Selawik Sheefish

Murky Future in a Changing Climate?



Feature

Did you know? In the Inupiaq language of Northwest Alaska, "Selawik" means "place of sheefish."

Why Sheefish?

Sheefish are one of the most important food fishes in Northwest Alaska's Kotzebue region: they are caught and used year-round for subsistence in Kotzebue, Noorvik, Kiana, Ambler, Kobuk, Shungnak, Selawik, and other regional villages. Snapshot estimates of regional subsistence harvests are 10,000–20,000 fish annually.

Sometimes referred to as the *Tarpon of the North*, sheefish are also a much sought-after trophy sportfish due to their large size and fighting spirit. Sport harvest in Northwest Alaska averaged 1,000 sheefish annually from 2001–2010. Between 1967–2004, commercial harvests in the Kotzebue region winter fishery have varied widely from 19 to 4,000 fish annually.

Sheefish from the Selawik and Kobuk Rivers make up these mixed stock subsistence, commercial, and sport fisheries.

Range

Sheefish are found in many of the Arctic and sub-Arctic waters of Asia and North America. Selawik River-origin sheefish spend their entire life within the Selawik River and the Selawik Lake/Hotham Inlet estuary system. Selawik sheefish have been captured as far west as the nearshore waters of Kotzebue Sound. They overwinter in Selawik Lake and the brackish waters of Hotham Inlet and spawn in the upper reaches of the Selawik River.

Spawning

Only two sheefish spawning grounds are known to exist in Northwest Alaska: in the upper Selawik and upper Kobuk Rivers. The Selawik River spawning grounds are located entirely within the Selawik National Wildlife Refuge. Adult sheefish may spawn every year or skip years to rebuild sufficient energy reserves to spawn again.

In spring, mature sheefish begin a prolonged migration up the Selawik River. Nonspawning adults and immature sheefish remain in the lower river system and estuary. By late September/early October, would-be spawners have congregated. They broadcast their eggs and milt over gravelly areas before ice-up and immediately migrate downstream to their overwintering grounds. Meanwhile, fertilized eggs settle into the spaces between gravels to mature. Hatching is believed to occur in late winter or spring and larvae are carried downstream with spring floods.

Murky Waters?

In the spring of 2004, a large area of thawed permafrost slid and carried tundra and sediment into the normally clear Selawik River approximately 30 river miles upstream of the sheefish spawning grounds.

Did you know? Sheefish were identified by Congress as a species of interest in the Selawik National Wildlife Refuge (encompasses over 2 million acres).

Below: A mature Selawik River female is released by Service crew member Bill Carter. USFWS



Adult males caught in the Selawik River typically range from 2-3 feet in length and weigh 6-17 pounds. Females are larger, reaching lengths of nearly 4 feet and weighing 11-22 pounds.

Did you know? During the last 50 years, Alaska has seen some of the most rapid warming on earth. Impacts already being documented include thawing permafrost, eroding shorelines, and loss of sea ice.

The size of this “thaw slump” has continued to grow each year, resulting in large quantities of silt eroding into the river and creating highly turbid water in the summer months. At times, turbidity from the slump has extended over 100 miles downstream. When freezing temperatures resume in fall, the slump emits less sediment and water clarity improves.

The impact to the Selawik River aquatic community is unknown. Research in other areas has shown negative impacts from the silting of spawning habitat, especially for fish species that require gravel substrates. One concern for Selawik sheefish is that silt entering the river from the slump may fill in the spaces between streambed gravels that developing eggs need to overwinter successfully.

The Question: *Is the silt input from the slump impacting the Selawik River sheefish population?*

Methods

Given logistical challenges of sampling juvenile sheefish, the best way to begin answering this question was to assess the age structure of adult male spawners at the Selawik spawning grounds and estimate total spawner abundance.

Collecting age samples

After arriving at the Selawik population’s spawning grounds (an adventure in itself, see page 10), a crew consisting of Selawik residents and Service technicians/biologists catch adult sheefish with rod and reel. The fish are reeled in quickly and sex is determined by external characteristics. Female sheefish are

Long-lived! Sheefish, the largest member of the whitefish sub-family, don’t typically mature until 8-12 years old. Capable of living for 30+ years, the oldest Selawik River sheefish aged to date was 41!



At times, the Selawik River is very turbid from increased slump thawing. Steve Hildebrand/USFWS

Since 2004, thawing permafrost has resulted in more than 760,000 cubic yards of sediment/tundra entering the Selawik River. That’s enough dirt to fill the Rose Bowl stadium almost two times. Or, roughly the same volume of dirt contained in 38,000 loads from a 20 cubic yard dumptruck!

immediately released unless mortally hooked. Males are weighed, measured, then dispatched prior to otolith (inner ear bone) extraction for ageing. Their fillets are hung to dry (protected from predators by an electric fence) and transported to the Selawik community for subsistence purposes.

For statistical purposes it is critical to obtain otoliths from 200 male sheefish per year, for three years, to help document the slump’s impact on future spawners whose age coincided with its inception and silt deposition over time.

Counting Sheefish

After age sampling, the crew moves their camp just below the spawning area, deploys an imaging sonar unit (much like a doctor’s ultrasound) in the river, and waits for the sheefish that have spawned to head back downstream to the wintering grounds. Fish are digitally recorded as they pass the sonar unit 24 hours/day for about two weeks and then counted back at the Fairbanks Field Office.



Magnified cross section of a sheefish otolith (inner ear bone). Ageing fish using otoliths is similar to ageing a tree by counting its rings. **Inset:** Two otoliths from a male sheefish (actual size).

Community Involvement and Benefits

During development of the Selawik Sheefish study plan, Fisheries staff consulted directly with the Native Village of Selawik. They attended council meetings and presented how the project sought to address changes in the Selawik River that were of concern to Selawik residents, the Fairbanks Field Office, and the Selawik National Wildlife Refuge.

Staff explained to community members that obtaining otoliths from male sheefish had the major disadvantage of being lethal to the fish (due to their long lifespan, non-lethal methods like scale analysis cannot be used to accurately age sheefish). But advantages of the method included accurate ageing and that meat from these fish would in fact be saved and given to Selawik residents. The Selawik Village council considered the study's implications for this important subsistence resource and approved the project.

Preliminary Results & Next Steps

In 2011, otoliths from 193 males and seven females were collected. These fish ranged in age from 9-30 years with an average was 19.6 years. Spawner abundance was estimated at approximately 21,000 fish with the sonar. In 2012, otoliths were collected from 196 males and four females. Analysis of data from the 2012 field season is underway. The next two years of data collection for this study, and a complimentary set of age data being collected in cooperation with the Alaska Department of Fish and Game on the Kobuk River, will help bring clarity to this issue. Stay tuned!

This project is funded through the Federal Subsistence Management Program, Fisheries Resource Monitoring Program.



Learn more about our Alaska Fisheries Program!

<http://alaska.fws.gov/fisheries/fish/index.htm>



Bottom Left: Selawik resident and crew member Patrick Foster reels in a sheefish. Dan Prince/USFWS



Crew member Dan Prince weighs a male sheefish. K.Mueller/USFWS



Project lead Ray Hander takes a length measurement. K.Mueller/USFWS



Sheefish fillets that have been drying on fish racks are boated downriver to the Native Village of Selawik for subsistence purposes. K.Mueller/USFWS

Uniquely Alaska LOGISTICS



The Selawik River. K.Mueller/USFWS



Transferring gear at the Selawik airport. K.Mueller/USFWS



Almost to upper campsite. K.Mueller/USFWS

Like most of Alaska's river systems, the Selawik is not accessible by road. It meanders from its origins in the Purcell Mountains through the heart of Selawik National Wildlife Refuge in an extremely remote area of Northwestern Alaska. Snowmachine, airplane, and boat are the only viable transportation options.

Getting There: Advanced planning, meticulous organization, and partnerships are the key to all remote field projects. With the arrival of our fisheries crew in Kotzebue, it takes well over a week to organize and move fuel and gear to our upper campsite (~150 river miles upriver from the Native Village of Selawik). It takes roughly seven hours to reach the uppermost campsite by boat and then roughly a day to set up camp. Refuge staff provide critical support including boats, aircraft, daily safety contacts, and lodging. We contract with the Native Village of Selawik for sampling assistance, transportation of supplies upriver, and transportation of sheefish meat back to the community.

Self-Sufficiency: In September and October, temperatures can range from 5 to 50°F with any combination of rain or snow so we must always be ready to take on the elements. We must also be prepared for wildlife encounters (e.g., grizzly bears and moose), flooding, and boat/equipment repair.

Food and Field Gear: We air freight over a ton of field gear and groceries from the Refuge headquarters in Kotzebue to Selawik. Gear is moved by ATV from the airport to Refuge and Selawik contract boats. We need enough food and cooking fuel to feed 3-8 people for 4-6 weeks.

Water: We draw water from the river via a solar powered pump. We then filtered it and store it in containers at camp.

Shelter: Includes the Selawik National Wildlife Refuge bunkhouse in Kotzebue, a Refuge cabin 60 miles upriver from Selawik, and tents beyond that.

Fuel: Approximately 850 gallons are required to safely and efficiently transport our crew and gear between the Village of Selawik and several sheefish sampling sites (fuel in Selawik is \$7/gal).

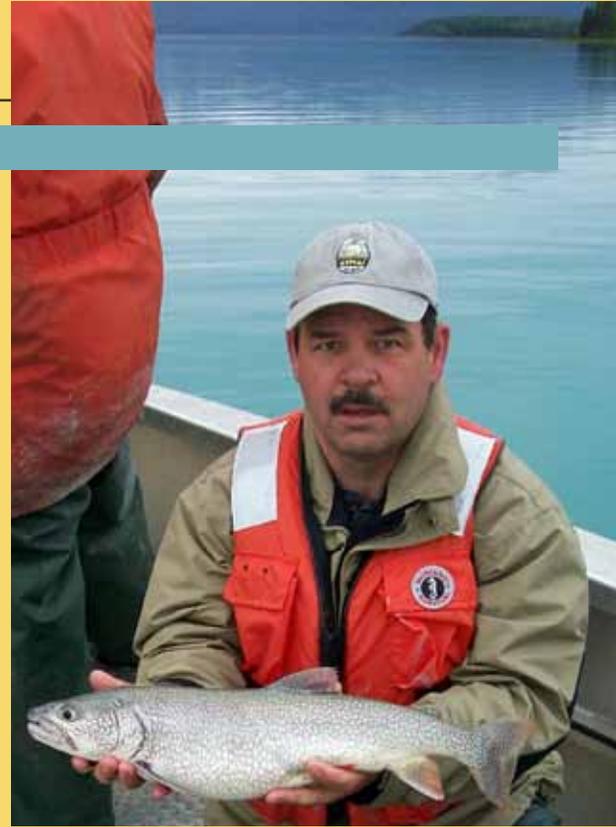
Waste Management: All non-burnable waste is back-hauled to Selawik for proper disposal.

Essential camping items include zero degree sleeping bags, sleeping pads, and breathable/fire-resistant wall tents for cooking and drying our clothes. D.Prince/USFWS



DOUG PALMER, Field Supervisor - Kenai Fish & Wildlife Field Office

The Service has been my home for the past 31 years. For the first six, I worked as a fishery biologist on the Columbia River investigating predation on juvenile salmon and steelhead during their downstream migration. Working with the tremendous fishery resources in Alaska was always a professional goal of mine, so in 1988 I accepted a fishery biologist job in Fairbanks and spent three years conducting coastal fisheries studies within the Arctic National Wildlife Refuge. My experience in Fairbanks was great except this interior Alaskan town was too far from the ocean which led me to the Kenai Field Office for the remainder of my career. As a field fishery biologist, I was involved with the development and execution of many fishery investigations but the most enjoyable and interesting were the telemetry studies I conducted on rainbow trout and Dolly Varden in the Kenai River watershed. These ground-breaking studies added tremendously to our understanding of critically-important spawning, rearing and overwintering habitats. I have spent the final years of my career with the Service as field supervisor for our Kenai Field Office working with a dedicated staff and managing a diverse program of work. My career with the Service has been wonderful—certainly not because the issues were always fun, but because of the incredibly diverse landscapes I experienced and the privilege of knowing and working alongside so many dedicated folks for whom I have infinite respect and admiration.



ROD SIMMONS, Alaska Fisheries Program Coordinator - Alaska Regional Office

Twenty eight years ago I won the lottery! I was hired straight out of graduate school and have worked in Alaska for the Service ever since. My career ranged from conducting fishery field projects in remote portions of the Yukon River to eventually coordinating the Service's entire Alaska Fisheries Program. In my view, there is no place like Alaska to live, work, and find opportunities to contribute to a conservation legacy where, at a landscape level, fish populations and their habitats are still reasonably intact. That said, we should stay vigilant to keep Alaska's fishery resources on a sustainable trajectory. I leave the Service and the Alaska Fisheries Program knowing there's a great bunch of dedicated professionals hell-bent on sustaining Alaska's fisheries. It has been a great ride and I look forward to enjoying Alaska on a full-time basis.



DAVE DAUM, Fisheries Biologist - Fairbanks Fish & Wildlife Field Office

Dave started his career with the Service in 1982 in Fairbanks as a seasonal fisheries technician, where he would later master all aspects of sonar fishery techniques. His interest in quantifying salmon and whitefish returns led him to develop a video recording system for monitoring these runs at fishwheels in the Alaska portion of the upper Yukon River. Due to his early involvement with fishery investigations on the North Slope, he also pioneered a comprehensive interactive fish and limnology database that will serve as a foundation for future fishery studies across this region. The culmination of his career was marked by a ground-breaking investigation on Yukon River Chinook salmon that described the ecology of juveniles in the Alaska portion of the upper river and determined that adults were spawning over 1,200 river kilometers upstream.



Mat-Su Salmon

A Decade of Strategic Habitat Conservation

Did you know? An average of over 50,000 coho salmon are harvested by anglers in the Mat-Su Borough* every year, supporting the region's largest recreational fishery.



Coho salmon that have returned to spawn in Mat-Su waters are followed closely by hungry Dolly Varden char. Jeff Anderson/USFWS

Why Mat-Su?

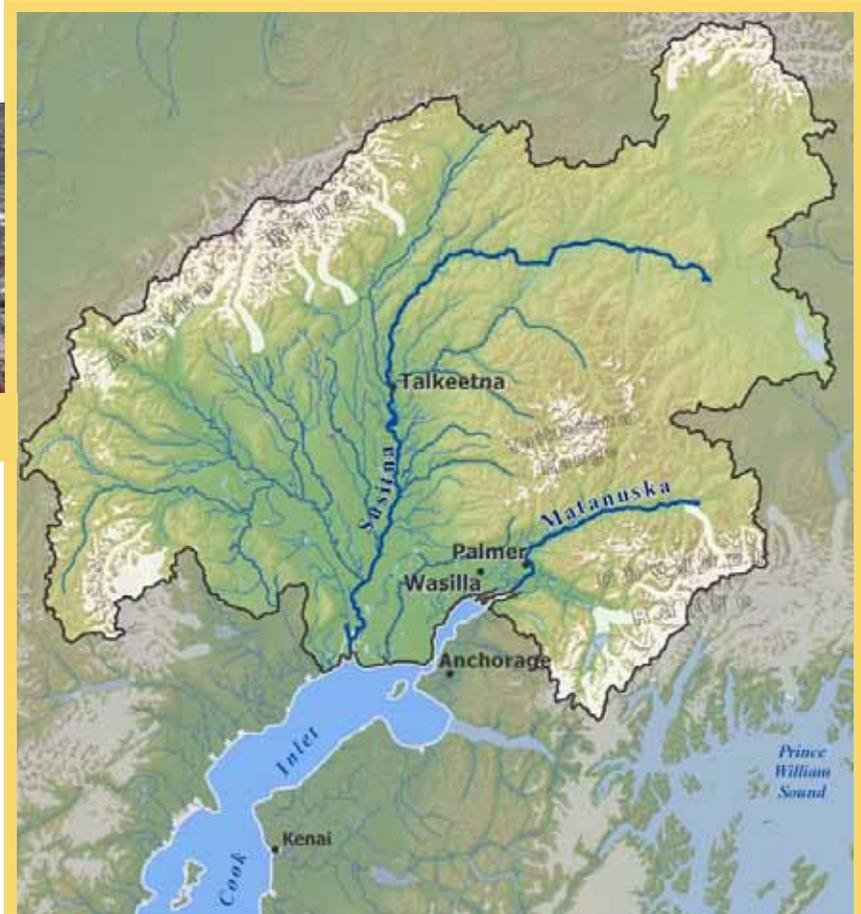
The Matanuska-Susitna Basin is a special place where vibrant communities and resilient wild salmon are closely linked. In fact, it's nearly impossible to imagine life in this region without salmon. Each summer, millions surge up the mighty rivers to spawn in a vast web of interconnected lakes and tributaries. Returning salmon bring an annual influx of nutrients to the region's ecosystems. They feed our communities and the local economy too.

Signs of Stress

Although there are currently no Threatened or Endangered fish in Alaska, salmon populations in the basin are showing signs of stress. In fact, six are currently designated as "stocks of concern" by the State of Alaska. Failing to meet escapement

goals for each of the last four years also means that Little Susitna River coho salmon qualify for stock of concern status. Associated sportfishing closures and restrictions

on commercial fishing in Cook Inlet have raised concern among anglers, businesses, fisheries managers, and other stakeholders.



The basin drained by the Matanuska and Susitna Rivers covers approximately 24,500 square miles—roughly the combined size of Vermont, New Hampshire, and Massachusetts!

BY THE NUMBERS

SPORTFISH ECONOMY
of the MAT-SU BOROUGH*

- 1,900:** jobs supported
- \$15,000,000:** amount of state and local taxes generated annually
- \$64,000,000:** amount of personal income for people who work in the Mat-Su Borough.
- \$113,000,000:** average amount anglers spend annually on sportfishing goods and services.

Sources: ISER 2009; ADFG 2012

*In Alaska, Boroughs are the local government equivalent to a County.

While there continues to be much debate about the reason(s) for the declines, it is known that habitat loss and fragmentation associated in part with urbanization is a primary driver in the decline of freshwater fish nationally. Urbanization and related stressors are at play in the Mat-Su Basin, particularly in the Palmer-Wasilla core area.

For example, increased road construction typical of urban growth often results in poor fish passage where roads cross streams. Of the nearly 700 road-stream crossings that have been surveyed in the Borough as of 2012, at least 65% present full or partial barriers between salmon and their spawning/nursery habitats.

Now home to over 90,000 people, the Borough's human population has nearly doubled in the past 20 years. It's Alaska's fastest growing region and one of the fastest growing communities in the country. One scenario in the Borough's build-out projections anticipates 400,000 residents by 2060!

New roads, homes, schools, soccer fields, and shopping centers signal a new chapter for this region. Mat-Su's increasing population will continue to put pressure on the region's salmon and water quality, requiring strategic actions to protect important spawning and rearing habitat for salmon.

Salmon: Catalyst for Conservation

The Anchorage Field Office, in partnership with the Alaska Department of Fish and Game (ADFG), The Nature Conservancy (TNC), and others, have invested in conservation work in Mat-Su for many years. However, until very recently there was very little capacity and no coordinated effort to strategically conserve (and, where needed, restore) salmon habitat here.

That changed with the formation of the National Fish Habitat Partnership (NFHP) in 2006. With it, the Service, ADFG, and TNC saw the opportunity to leverage past efforts and catalyze diverse interests around salmon—and the conservation of their habitat—with formation of the Mat-Su Basin Salmon Habitat Partnership.

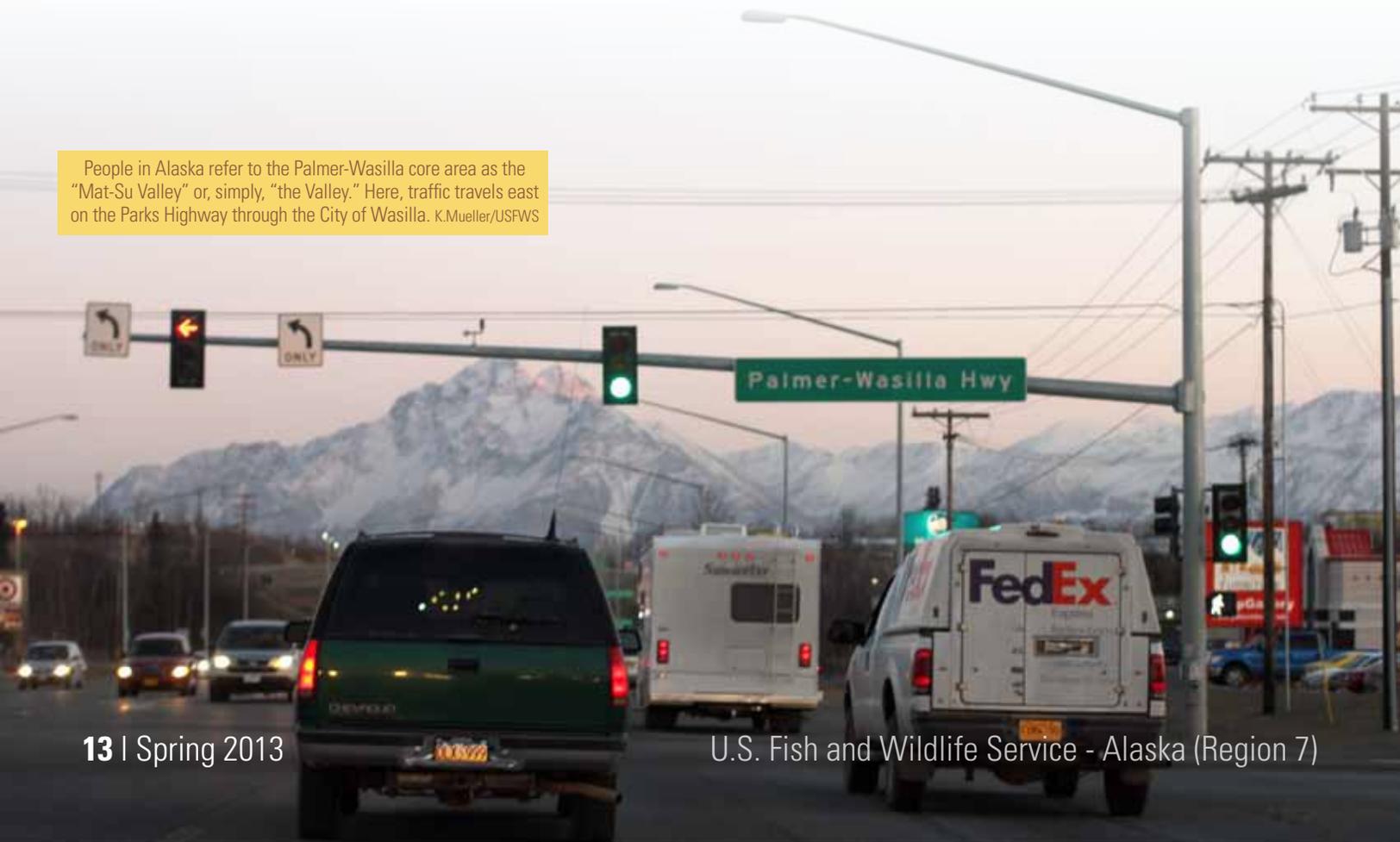


In 2008 the **Mat-Su Basin Salmon Habitat Partnership** was born—the first of three Alaska partnerships to be formally recognized by the National Fish Habitat Partnership's (NFHP) Board of Directors to date and one of the first designated nationally.

Its vision—*thriving fish, healthy habitats, and vital communities in the Mat-Su Basin*—embraces NFHP's mission to protect, restore, and enhance the nation's fish and aquatic communities through partnerships.

 www.matsusalmon.org

People in Alaska refer to the Palmer-Wasilla core area as the "Mat-Su Valley" or, simply, "the Valley." Here, traffic travels east on the Parks Highway through the City of Wasilla. K.Mueller/USFWS



Strategic Habitat Conservation

A vast landscape and incomplete information about salmon habitat distribution begs the question: Where will limited resources have the biggest impact on the conservation of salmon in the Mat-Su Basin?

To be strategic, the Partnership developed a Strategic Action Plan using TNC's Conservation Action Planning (CAP) process. CAP includes elements similar to the Service's Strategic Habitat Conservation (SHC) business model:

Biological Planning

First, the Partnership identified their priorities: all five species of Pacific salmon and the coarse landscape features (e.g., lowlands west of the Susitna River) that support the ecological processes, landforms, and vegetation that interact to shape salmon habitat.

Next, the Partnership identified what stressors had the greatest potential to negatively impact or pose a threat to salmon and their habitat in the basin.

The Mat-Su Partnership currently focuses on addressing these threats to salmon and their habitat:

- alteration of riparian areas
- filling of wetlands
- impervious surfaces (e.g. parking lots)
- stormwater runoff
- septic systems
- poor fish passage at roads
- loss/alteration of water flow/volume
- northern pike

Partnership actions moving the needle towards conserving priority species and habitats:

- voluntary conservation easements
- fitting road-stream crossings with channel-spanning structures
- re-vegetating denuded riparian areas
- submitting nominations to the State's anadromous waters catalog
- tracking fish populations to pinpoint key habitats for conservation

The Partnership then set measurable objectives to address those threats and identified what specific actions would help meet the objectives and lead to the conservation of salmon and priority habitats.

Conservation Design

Gathering baseline data about fish habitat use and developing tools to help guide project selection are important prerequisites to prioritizing on-the-ground projects. To this end, partners have invested energy into inventorying and mapping fish distribution and habitat use in vulnerable areas. Land use planning projections and broader threats assessments likewise inform project design and delivery. These upfront

investments really pay off when it comes time to choose where to put projects on-the-ground. Habitat restoration projects are then designed and implemented using accepted state-of-the-practice techniques.

Conservation Delivery

The beauty of a formal partnership like this lies in its ability to leverage the resources of its many partners (like staff time and expertise, funding, and equipment). Partners have, for example, mapped and assessed the *entire* current universe of road-stream crossing structures in Mat-Su (~700) and removed 81 fish passage barriers in the past decade.

Conservation Design Fish:

55 millimeter long juvenile coho salmon

(ACTUAL SIZE)

K. Mueller/USFWS



Why design road-stream crossings to pass juvenile coho?

- ◆ This low performance swimmer wouldn't win any sprinting, endurance, or jumping contests against adult salmon or resident char!
- ◆ Of all the salmon, coho spend the longest time in freshwater as juveniles and use nearly all accessible waterbodies in a watershed before migrating to sea.

The connectivity needs for other fish are better met if restoration designs meet the needs of juvenile coho.



Chum salmon in Swiftwater Creek, Wasilla. K. Mueller/USFWS

Tracking Success and Adapting

So, how do we know if a conservation action has the intended positive impact? State-of-the-practice habitat restoration techniques mimic natural conditions. For example, habitat under roads is engineered to simulate the stream's natural channel and, as such, should provide comparable swimming conditions. Presence of fish upstream after project completion further confirms adequate passage and project success.

The Partnership adapts as new information is gathered. To this end, the Partnership sponsors an annual Salmon Science and Conservation Symposium with 100+ attendees. Here partners share new information about salmon and their habitat. Presentations span a wide range of topics, from fish passage to green infrastructure planning.

The Partnership is also updating its Strategic Action Plan to reflect changes in the status of salmon populations and their habitats, and to document achievements toward plan goals over the last five years. The updated plan will address new stressors including invasive species, climate change, large scale development projects, and riparian habitat alteration from all-terrain vehicles.

The whole is greater than the sum of its parts!

In the last six years, with substantial support from the U.S. Fish and Wildlife Service, the Partnership has invested and leveraged several million dollars from federal and non-federal sources into actions benefiting salmon and their habitat. These investments have resulted in partnership recognition for good science and on-the-ground results. The Partnership and its members have

received multiple awards including the 2008 U.S. Department of the Interior Cooperative Conservation Award, NFHP's 2012 Scientific Achievement Award, and the 2012 Coastal America Partnership Award.

The Partnership has also catalyzed establishment of a Great Land Trust presence in Mat-Su and a Borough commitment to share the costs of fish passage improvement projects.

While significant progress is being made, some salmon stocks are still not meeting the State's escapement goals. This underscores the challenge the Partnership and others have in identifying and addressing the root cause(s) for low returns. It also reinforces the importance of the Mat-Su Partnership and the national network of Fish Habitat Partnerships.



Learn more about our Habitat Conservation Partnerships Programs!

<http://alaska.fws.gov/fisheries/restoration/index.htm>

The **Partners for Fish and Wildlife (PFW) Program** celebrated its 25th National Anniversary in 2012. The Alaska PFW Program & Coastal Program 2012-2016 strategic plans are now online: <http://alaska.fws.gov/fisheries/restoration/index.htm>

Secretary of the Interior Ken Salazar designated Alaska's Kenai River to be part of part of **America's Great Outdoors Rivers Initiative** in 2012



The children's TV show **Aqua Kids** shadowed Service employees & partners last July/August. Alaska episodes began airing in early 2013 and are available on YouTube and Vimeo.

The Nature Conservancy's **Corinne Smith** was awarded NFHP's Scientific Achievement Award at the 2012 Mat-Su Salmon Science and Conservation Symposium in November 2012.

The Mat-Su Valley Coastal Conservation Partnership Team received the 2012 **Coastal America National Partnership Award** in February 2013 for its collaborative efforts to conserve coastal habitats.

Invasive aquatic plants in the genus **Elodea** have been confirmed in 15 Alaska waterbodies as of early 2013.



Our Anchorage and Kenai Field Offices welcomed two **Student Conservation Association interns**, Adriana Amaya (left) and Ben Schubert, in January 2013.

Visit our youtube channel to see how Alaska staff connected people with nature and engaged Alaska's youth in the Great Outdoors in 2012: <http://youtube.com/rtBt3hhRI0c>

The Service and ADFG co-hosted a free two-day **fish passage workshop** in Anchorage in March 2013 with over 40 attendees. Inquire with Katrina Mueller about upcoming workshops: katrina_mueller@fws.gov / (907) 786-3637.

The **Kenai Peninsula Fish Habitat Partnership** held a two-day science symposium and introduced their new Conservation Action Plan in April 2013.

Momentum is building to create a coalition of property owners, businesses, NGOs and governments to protect, enhance, and benefit from the Chena River. The 2013 **Chena River Watershed Summit** took place May 1st.



K-12 Teachers/Students: entries for Wildlife Forever's **State-Fish Art Contest** are due March 31st annually. http://alaska.fws.gov/fisheries/fish/contest_art.htm

Our Juneau Field Office's Habitat Restoration Program will be receiving an Alaska Chapter of the American Society of Landscape Architects **GreenBelt Award** in mid-May 2013.

2013 **Weed Smackdown** events are scheduled for June 8 in Anchorage, June 15 in Fairbanks, and June 29 in Homer!

Spotlight on Technology



For over a decade, our Kenai Office has been pioneering cutting-edge video technology to improve fisheries management decisions. Incorporating underwater video systems into monitoring and assessment projects at weirs has become an important tool allowing resource managers to do more with less.

Significant cost savings

Footage of fish passing through the chute can be compressed using motion detection software. Staff can review 24 hours of fish passage in roughly 2.5 hours.

Improved accuracy

Artificial lighting makes recording of fish migrations 24 hours a day, seven days a week possible (even during spring run-off or rain events that increase water turbidity). This translates into more accurate escapement estimates and monitoring of previously undocumented populations (e.g., steelhead trout in the Funny River).

Better for fish

Clear footage lets us determine sex ratios for each species, or the contributions of hatchery and wild salmon without handling the fish.

Reduced carbon footprint

Microwaving video signals from multiple remote locations to one receiving point reduces power requirements at remote sites and minimizes travel to each location.

VIDEO SYSTEM COMPONENTS & OPERATION



- fish passage chute and weir
- underwater video camera and lights mounted in a sealed camera box filled with clear water.
- digital video recorder with motion detection software
- microwave equipment to transmit video signals from remote locations
- solar modules and thermoelectric generators for power generation
- willing landowner and partners!

A resistance board weir consists of an array of rectangular panels made of evenly spaced PVC pickets aligned parallel to the direction of flow. The upstream end of each panel is hinged to a rail that is anchored to the substrate and the downstream end of the panel is lifted above the surface by a resistance board that planes upward in flowing water. When all components are installed, migrating fish are channeled through a narrow passage chute in front of the video box. Visit our USFWS Alaska YouTube channel to see a weir being constructed!



Land Use Planning & Salmon

Sandwiched between rugged coastal mountains and the Pacific Ocean, Southeast Alaska—including Alaska's State Capital and second largest city (Juneau)—is accessible only by air or sea.

If you travel 10 miles northwest from downtown Juneau you'll find yourself in the Auke Lake watershed, home to one of only three sockeye salmon populations accessible to visitors from the Juneau road system. Prior to the mid-1970s, an annual average of more than 7,000 sockeyes returned to this watershed to spawn. Since the 1980s, adult returns have been stable, but at reduced levels.

The Auke Lake telemetry project builds on initial assessments conducted by the National Marine Fisheries Service (NMFS) to:

- identify and map essential sockeye staging and spawning habitat within Auke lake and its tributaries, *and*
- identify and document sockeye spawning distribution and habitat use throughout the entire watershed.

2012 data show that returning adults used lake habitat up to 45 days before spawning. Tagged sockeye were documented using four discrete staging locations along the west and north shores. Spawning was documented in both the lake and a previously undocumented inlet stream. High use habitats—some in close proximity to areas of proposed development—were identified and mapped. This study will continue in the summer of 2013. Collaborators include NMFS and the University of Alaska, Southeast with support from the Alaska Sustainable Salmon Fund.

Right: GPS locations of radiotagged sockeye salmon in Auke Lake and inlet streams in 2012.

The Auke Lake shoreline is believed to provide important spawning and staging habitat for sockeye salmon. Today, approximately 50% of Auke Lake's shoreline has been developed.

To avoid further reduction in the capacity of Auke Lake watershed to provide quality habitat for locally-important sockeye salmon, our Juneau Field Office first partnered with the Juneau Watershed Partnership to complete the Auke Lake Watershed Assessment and Watershed Action Plan. In 2012, we began tracking the habitat use and movements of adult sockeye salmon to document the importance of Auke Lake spawning and staging areas using radio telemetry. In combination, the outcomes of these projects will inform future land use planning decisions about what habitats are most important to protect and restore as different development scenarios are considered.



Reconnecting with the Chena River

K.Mueller/USFWS

The 100 mile long Chena River flows through the heart of Fairbanks near its confluence with the Tanana River (a major tributary to Yukon River). Roughly the combined size of Maryland and New Jersey, the land area drained by the Chena River is home to approximately 100,000 people today—making it the most heavily-populated and developed area in northern Alaska.

In the early 1900s, Fairbanks residents valued the Chena primarily as a transportation corridor for stern wheelers and water source for gold mining operations. However, it also supports incredible fisheries. Chena River Chinook salmon make up the second-largest annual run in U.S. waters of the Yukon River. This stock is important to subsistence and

commercial users in the lower Yukon River and supports one of the few road-accessible salmon sport fisheries in interior Alaska. Today, river- and fishing-related tourism and recreation supported by the Chena provide substantial benefits to visitors and residents alike.

To help conserve the river for years to come and foster stewardship of its fisheries, our Fairbanks Field Office has been teaming up with local businesses, Chena riverfront landowners, and a variety of other partners (e.g., Fairbanks Soil and Water Conservation District, Alaska Departments of Fish and Game/ Natural Resources, Army Corps of Engineers, and Wounded Warriors).



In 2012, our Fairbanks office partnered with the Tanana Valley Watershed Association for year two of a citizen science project on the Chena River. This project seeks to build community awareness and stewardship of the River and its fish community. Participating youth and families use minnow traps to sample juvenile anadromous and resident fish in different sections of the River from May through October. Captured fish are identified to species, tallied, and released. Families report the best part of the project is getting outside each week and seeing children learn how to handle fish.

PREVENTING EROSION

Originally a pump station which provided water for hydraulic mining operations near town, Fairbank's Pump House Restaurant was facing an eroding bank just upstream from its summertime deck. Our Fairbanks office partnered with the landowner to develop an erosion control plan that incorporated natural bank stabilization techniques. Enhancing the Chena's native streamside vegetation not only reduces erosion, but also benefits juvenile salmon and other native fish and retains the customers' visual connection to the river.

USFWS / K. Mueller



Vegetated banks provide habitat for fish and wildlife, and benefit landowners by preventing land loss in a way that's aesthetically-pleasing.



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Riverboat Discovery, a family-owned and operated business, provides boat tours of the Chena River and educates its passengers about the river's history and its value to early settlers. Unfortunately, the Discovery's use of thrusters for docking was causing erosion at its mooring site (left).



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With input and funding support from our Fairbanks Field Office, the owners elected to use a fish-friendly alternative to traditional metal sheet piling to prevent further erosion: locally acquired spruce tree root wads (left). Root wads not only prevent erosion from the thrusters, but also reduce winter ice scour and provide habitat for juvenile Chinook salmon and other riverine species. Interpretive signs will educate visitors about the value of their fish-friendly choice and the importance of conserving Chena River's Chinook salmon fishery.

Left: Bioengineering is a great alternative to traditional bank stabilization techniques that use metal sheet piling or riprap. Partially submerged root wads buried deep in the bank address erosion issues and also provide great habitat for juvenile fish like Chinook salmon (below).

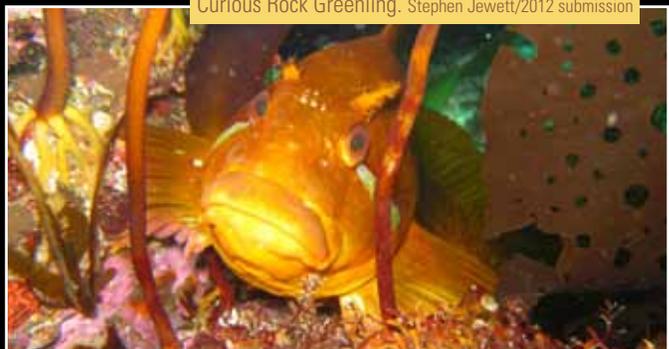


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ALASKA FISH & FISHERIES: Your Point of View!

Help celebrate and build appreciation for Alaska's fish by sharing your fish photos! In particular, we are looking for photos that capture seasonal behaviors/habitats/life cycle stages of fish; fish underwater/held partially submerged; and Alaska's unique fisheries. Contact Katrina Mueller (katrina_mueller@fws.gov / (907) 786-3637) or visit our "Fish From Your Point of View" webpage for details: http://alaska.fws.gov/fisheries/fish/contest_photo.

Curious Rock Greenling. Stephen Jewett/2012 submission



Deck Boss. John Matzick/
2012 submission



Keeping Subsistence Alive Through our Children.
Rae Belle Whitcomb/2011 submission



Kenai River sockeyes.
Kentaro Yasui/2011 submission



Dip netters at the mouth of the Kasilof River.
Caz VanDevere/2012 submission

