Eddies

Reflections on Fisheries Conservation

Eddies

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On the Cover
Elder native Yupik woman sits in front of drying salmon. Photo by Kevin G. Smith, AlaskaStock.com.

Departments

Features

Craig Springer/USFWS

Read about Rio Grande cutthroat trout in "Caring for Mother-Earth" on page 16.

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people.

CONSERVING AMERICA'S Fisheries
U.S. Fish & Wildlife Service

Headwaters

Walking the Walk with Tribes for Conservation

By Gary Frazer

USFWS

Commitment, continuity and communication: please pardon the pedestrian alliteration, but these three words best describe the relationship that the U.S. Fish and Wildlife Service's Fisheries Program has with Native Americans.

First, commitment; tribal governments and the U.S. Fish and Wildlife Service own common commitments to fisheries conservation. Like the Service's mission statement says in so many words, we work with people in conservation for the benefit of people. Sovereign tribal governments and the U.S. government have compelling interests in promoting healthy waters and the well-being of fisheries, be they cutthroat trout streams on an Indian reservation in the West, or a lowland warmwater fishery used by Native Americans in the South. Quality fisheries benefit the well-being of people and economies, and you, the reader, are our clientele.

Owing to our commitments to fisheries conservation, we have over the years continued our relationship with numerous tribal governments, and their people. Many of our 65 Fish and Wildlife Conservation Offices work alongside tribal biologists in managing fisheries, or quite literally, next to one another on the bow-rail of an electrofishing boat.

Chris Kitcheyan speaks to the heart of the matter in his story, "Caring for Mother-Earth." Kitcheyan, a White Mountain Apache, is a fish biologist with our New Mexico Fish and Wildlife Conservation Office, fully immersed in managing the first trout in the New World ever mentioned in writing, the Rio Grande cutthroat trout. Kitcheyan cuts to the quick as to the "why" of conservation – it's ultimately for his committed beliefs that he cares so much for a rare trout.

Ron Skates is a Cheyenne River Sioux, and supervisor of our Montana Fish and Wildlife Conservation Office. He writes in "Trout on Tribal Lands" about his work with bull trout and cutthroat trouts, and the biological diversity on the Blackfeet and Crow reservations. On the back cover, Skates reminds us in summary form of the essential continuity of relationships with Native Americans, and what that continuity can keep for one and all. Reduced to metrics of money spent and money gained, Skates' graphic shows what just one National Fish Hatchery that produces fish for tribes does for the economy. The return on investment is enviable. A number of our 70 National Fish Hatcheries are landed on Indian reservations, like Alchesay-Williams Creek on the Fort Apache Indian Reservation in Arizona. We've continued to operate there since 1938.

The fact that you are reading these words speaks to our every desire to communicate our fisheries conservation work to, and with, Indian tribes. It may go without saying, but communication is essential to effective conservation. Communications that build and maintain relationships between people is the best form of outreach that exists.

I hope that you enjoy this edition of *Eddies*, as we head into volume two. There's much to learn about our work with tribes of course, but be sure to read Henry Quinlan's installment of "American Fishes," this one on the brook trout. We've added a new column, too; if you like Antiques Road Show, you'll enjoy "From the Attic." Archivist, Randi Smith, at D.C. Booth Historic National Fish Hatchery will show off some of the collectibles and eccentricities that speak to a 138-year history of fisheries conservation in the U.S. Fish and Wildlife Service. That "attic," by the way, is actually a climate-controlled basement museum.

Gary Frazer is the Assistant Director for Fisheries and Habitat Conservation in Washington, DC.

Colorado River Indian Tribes grow endangered fishes

Lynn Starnes/USFWS

Bonytail, perhaps the most imperiled fish in North America, is raised in ponds owned by the Colorado River Indian Tribes.

Achii Hanyo, formerly a commercial hatchery owned by the Colorado River Indian Tribes (CRIT) near Parker, AZ, grows endangered native Colorado River fishes. CRIT allows the U.S. Fish and Wildlife Service to raise two endangered species: the bonytail and the razorback sucker. Small fish come from Willow Beach and Dexter National Fish Hatcheries in AZ and NM. Each year, Achii Hanyo yields up to 7,000 bonytail 12 inches long, and 500 razorback sucker that grow to 20 inches. These fish are harvested in December and stocked in various sites along the Colorado River. They are grown to large sizes before stocking to better face the perils of introduced predatory fish. The bonytail, a member of the minnow family, may be the most imperiled fish in North America. This partnership with CRIT helps us move these fishes toward recovery. ✦ Angela Baran

Restoring sturgeon, restoring ancient culture

The livelihood of Wisconsin's oldest human inhabitants revolved around an ancient fish. But an entire generation of these indigenous people has recently lived without their "brother," the lake sturgeon. They have lived without the ceremonies, the circumstance and tradition of harvest – without the sustenance and delicacy of the flesh – and without the clan. Fifty years after a dam was built on the Upper Wolf River, the lake sturgeon ceased to exist on the Menominee Indian Reservation. Another 50 years passed before some lake sturgeons came back to the Menominee people, and with them have come the related traditions.

Menominee tribal elders who remembered and had practiced the sturgeon traditions wanted the sturgeon back on the Reservation. Annual trap-and-transport efforts by the La Crosse Fish and Wildlife Conservation Office, the Wisconsin Department of Natural Resources, and the Menominee Indian Tribe have restored a small population of sturgeon in Reservation waters of the Wolf River. And that has restored a tradition of harvest, albeit small, and part of that tradition includes dance and smoked or baked fish as had been done for generations past. More lake sturgeon restoration work is planned. ✦ Ann Runstrom

Ann Runstrom/USFWS

Biologists from the Menominee Tribe and the USFWS release a lake sturgeon.

Measuring mercury, growing gar

Fish accumulate mercury, people eat fish, and mercury hurts people. The Miccosukee Tribe of Indians of Florida wants fish without mercury for a sustainable use, be it for angling or for traditional cultural use. Bowfin, Florida gar, largemouth bass, and several sunfish species partly constitute the traditional diet of the Miccosukee people. The U.S. Fish and Wildlife Service awarded the Miccosukee a Tribal Wildlife Grant to measure mercury levels in fish and sediments, restore a 2.6 mile-long canal, and to develop a fishery management plan. Part of the plan includes the U.S. Fish and Wildlife Service's South Florida Fisheries Resources Office lending its technical expertise in habitat restoration. Welaka National Fish Hatchery will stock fishes used by the Tribe. But that takes some up-front work.

John Galvez/USFWS

Florida gar will be raised at Welaka National Fish Hatchery for the Miccosukee Tribe.

Hatchery techniques for Florida gar and bowfin are untried. Once habitat is restored, the hatchery's work will be monitored for success.✦ John Galvez

FEATURED FACILITY

Columbia River Fisheries Program Office

Where: Vancouver, Washington
When: Established 1973

The CRFPO was established to provide technical support to Columbia River tribes to ensure their fair share of fish harvest following landmark fishing-rights court cases. The office has since evolved to provide broader science-based support for fisheries on federal and tribal trust lands. Biologists tag more than 28 million fish a year to assess hatchery practices on salmon survival and determine how these fish contribute to tribal and non-tribal fisheries.

The CRFPO biologists explore the spectacular rivers throughout the Pacific Northwest to count fish and track fish movement with state-of-the-art technology. Sophisticated streamflow and fish population models assess the condition of fish populations and their habitats. The resulting data provide the USFWS and tribal partners with science-based information to make complex fisheries management decisions. ✦ Howard Schaller

Howard Schaller/USFWS

Biologists from the Columbia River Fisheries Office use a backpack electrofisher to tease fish out of cover.

Putting the trout back into Trout Creek

Henry Quinlan/USFWS

Brook trout are back in Trout Creek on the Onieda Indian Reservation in Wisconsin.

Place names are the biography of the land. Trout Creek on the Oneida Indian Reservation near Green Bay, WI once harbored native brook trout. But poor land use practices caused sediment to fill the creek. The brook trout population waned. The name of the creek was for a time a quaint anecdote of history – but not anymore. After a decade of watershed improvements by Oneida Indians, trout habitat has been re-established, and it's time to bring the fish back. Toward that end, the Wisconsin Department of Natural Resources gathered some 5,000 fertilized brook trout eggs last fall from fish in nearby Ash Creek. The eggs incubated at Genoa National Fish Hatchery. The young will be about two inches long when they go into their namesake waters, probably in June. Genoa's manager, Doug Aloisi said he expects 3,500 fish to be stocked. The endeavor will be repeated for at least two more autumns, with the intent of introducing multiple age-classes of fish. That will further ensure a successful reintroduction, returning a native trout to Native American lands. ✦ Craig Springer

Marking fish en mass

The Columbia River Fisheries Program Office is in the business of marking fish. Each year biologists assist the Yakama, Nez Perce, Umatilla, and Warm Springs tribes by marking or tagging about 4,000,000 Chinook and coho salmon. The fish are stocked in the Yakima, Wenatchee, Clearwater, Walla Walla, and Hood rivers as part of salmon restoration programs. Another 24 million fish get tagged at other hatcheries. When fish are re-captured later the tags provide information critical to fisheries managers. Under several 1850s United States treaties, Columbia River treaty tribes have rights to harvest half of the surplus of fish destined to pass through their historic fishing areas. Marked fish and the data they yield help determine if this allocation goal is being achieved. ✦ Howard Schaller

Jesse Rivera/USFWS

Tiny tags inserted in fish yield important data.

Fish are on the move in the White Earth Reservation

A fish passage structure built below the dam at Many Point Lake on the White Earth Reservation in Minnesota has fish on the move. Large rocks and boulders were placed in the river below the dam to elevate the river bottom and to lessen the steepness of the ascent fish make up stream. That allows them to pass over the dam. Three weirs built with big boulders create shallow pools and eddies, dissipating stream-flow energy. Boulders were also placed at river's edge to stabilize the banks where willows and grasses were planted for the same purpose. This "fish ladder" was a product of cooperative work between the White Earth Natural Resources Department, La Crosse Fish and Wildlife Conservation Office, the Boy Scouts of America, and Minnesota Department of Natural Resources. It was paid for by a U.S. Fish and Wildlife Service grant to the White Earth NRD to further lake sturgeon management—opening access to more habitats. Two days of work by many people will provide fish habitat for many years. ✦ Scott Yess

Scott Yess/USFWS

Late in the day, project done, fish habitats connect.

FROM THE ATTIC

Notes from D.C. Booth Historic National Fish Hatchery and Archives

If I say "fish" and "dish," the next thought might be "batter-fried." Most people don't think of dishes when they think of fisheries conservation work, but there is an association.

In our museum collection, you will find several dozen dishes adorned with fish, emblazoned with "USBF" on a blue flag. It stands for the U.S. Bureau of Fisheries, as the U.S. Fish and Wildlife Service was called prior to 1939. But why on dishes – was this a case of extravagant government waste? Not really. Fishery facilities all over the U.S. were operated by groups of single men, often in remote locations. To make life a little easier, hired cooks fed them. Employees were charged to participate in the mess. Dishes were needed. Marking the dishes probably helped keep the dishes from being stolen. They weren't fine china but sturdy, restaurant-grade dishes.

Randi Smith

This china set fed fishery workers circa 1910.

Today, the surviving dishes are collector's items. Some of the dishes were ordered to be destroyed when they were no longer needed. We don't know how many were produced over the years, but we do know that at least two companies made them at least three different times.

Unfortunately, each dish was not "tagged before release." What looks like the oldest dish in our collection was produced by Shenango China, New Castle, PA. It has the most detailed fish image. Buffalo China, of Buffalo, NY, made the next group after 1915. The fish is less detailed and looks like a trout. The last design has a different fish with no details.

Fisheries workers a century ago ate off of blue-flag plates, platters, custard cups, bowls, and drank from cups and saucers, mugs, and milk pitchers. Apparently the crews weren't big tea drinkers, as no teapots have been found. ✦ Randi Smith

Pioneers

By John Bryan

Wes Orr

Courtesy Wes Orr

Wes Orr stands on a prehistoric buffalo jump above Ennis National Fish Hatchery, Montana.

Courtesy Wes Orr

Wes Orr retired from the USFWS, only to continue working in fish culture, raising westslope cutthroat trout for Sun Ranch in Montana.

If you've caught a rainbow trout in the last few decades, there's a good chance it was courtesy of the work of Wesley Orr. For 27 years, Orr pioneered procedures in the U.S. Fish and Wildlife Service that changed the way rainbow trout eggs are produced and distributed. "Wes Orr's legacy is the production of millions of disease-free, high-quality, catchable trout – keeping recreational anglers happy," says Greg Kindschi, former director of the Fish Techology Center in Bozeman, Montana.

Born in 1940 in South Dakota, Wes Orr grew up fishing and hunting in the Black Hills. Throughout high school he worked at the former McNenny National Fish Hatchery in South Dakota, feeding fish, cleaning raceways, mowing lawns, spawning fish, and delivering trout for stocking. He liked the work.

After earning a degree in Fisheries Science from Colorado State University, he went to work full-time for the U.S. Fish and Wildlife Service: first at South Dakota's Gavins Point National Fish Hatchery, and then in Alabama, Ohio, and Iowa. But it was his 27 years at the Ennis National Fish Hatchery in Montana (1973-2000) that defined his enduring contributions to the profession. He developed a broodstock program that provided over 30 million rainbow trout eggs per year to hatcheries throughout the country. Orr and his staff, under the guidance of the fish genetics lab at the University of Montana, developed spawning protocols to reduce inbreeding and maintain genetic health in the six strains of rainbow trout at the hatchery.

"I watched Wes provide leadership in broodstock programs throughout the United States," says Steve Brimm, longtime fisheries professional including 11 years as Director of the D.C. Booth Historic National Fish Hatchery. "He was always looking at the next level of science, and was one of the first to get involved with genetics."

Orr grew up in Spearfish, South Dakota, where his father first ran a bowling alley, then became a plumber, and then bought a hardware store out of which he ran the plumbing business while Wes' mother ran the store. Wes' parents didn't have much time, but they loved to fish, and they passed it on to Wes. He cast his first fly when he was 5 and began tying flies at 12.

"Wes is a really good fisherman, and he can handle a fly rod," says Dennis "Andy" Anderson. A fish pathologist, Anderson worked for 27 years at the Fish Health Center at Fort Morgan, Colorado – the Center that was in charge of inspecting broodstock programs in eight states including the one at Ennis that Wes directed. "Wes was an innovator in ways to incubate eggs and keep them clean and trouble free," says Anderson. "He also developed new ways to pack and ship eggs so they would get to folks exactly when they needed them. It's crucial that eggs be shipped when they are at the right stage of development."

Building on information available from the scientific literature, Orr developed systems to breed a variety of strains of rainbows that spawn from June through February. He also developed a system for rapid incubation followed by chilled water that could hold the eggs back for an additional 60 days before shipment. Fisheries professionals from many states as well as from New Zealand, Japan, Canada, Mexico, Norway,

Iceland and elsewhere visited Ennis where they saw these innovations.

Wes Orr's most enduring contribution to fisheries? "Probably the work we did in preserving the genetics of all the strains of rainbows we had at the hatchery," says Orr. "It was his innovations in incubating, packing, shipping and timing. Wes modernized it, and others picked up on it," says Anderson.

After his retirement in 2000, Orr agreed to help restore native westslope cutthroat trout in the streams of the privately owned Sun Ranch. "When Lewis and Clark came through there were accounts of westslopes," says Orr. "But they've been replaced by non-native species and influenced by habitat degradation."

Orr helped convert an old log cabin into a hatchery and built a three-acre brood pond. Eggs taken from wild populations have been hatched and grown in the pond for a source of future broodstock. The program is now supported by several public and private organizations, and is used to restore westslope cutthroat populations throughout the area including Yellowstone Park.

"The westslope cutthroat is the ultimate species in clear, pristine, mountain streams," says Kindschi. "They spawn at five years of age or at six or seven inches long; the females can be only four or five inches long. They are one of our best indicators of water quality of high mountain streams. Wes Orr may now be the best westslope cutthroat culturist in the nation."

Wes and his wife Diane – a retired postal employee - continue to live in Ennis where Wes is actively involved in the community including Lions International, Boy Scouts, and church work. The Orrs have a cabin in the mountains where they can catch trout all year. Their two sons are in the outdoors: one a U.S. Forest Service employee and custom knife maker in Bozeman, and the other a volcanologist in Hawaii.

"Wes continues to be highly sought after for consultation," says Kindschi. "In this business there are always new issues, new diseases, and never a dull moment. Wes Orr would be one of the first persons to call."

"He's the best I ever worked for," says Brimm. "He is among the elite of coldwater fisheries professionals. I learned immediately from Wes that fish culture is not a nine-to-five job; it's a lifestyle. You have to work with fish according to their schedules: 4:00 A.M., all night, whenever. Wes has a strong professional ethic and treats people with respect. And he has always made certain to have time to focus on his family and keep that his priority."

"He is among the elite of coldwater fisheries professionals. I learned immediately from Wes that fish culture is not a nine-to-five job..."

What about the future – the issues 50 years from now? "Water quality and quantity will be a big issue," says Orr. "Non-harvest, catch-and-release fisheries will be the norm."

Wes' home is a quarter-mile from the Madison River, and although he laments that the neighborhood is now "solid houses," he interrupts our telephone interview to describe what he sees just a few feet from his window: "Two nice bucks (mule deer), just standing there chewing their cud." ✦

Courtesy Wes Orr

Wes Orr shows off a shipment of fish, destined for military lands.

By Henry Quinlan

Brook Trout

Joe Tomelleri

As the vast glaicers retreated, brook trout followed along on the cold-water fringe. Today they naturally occur in cold Applachian waters, and through the Great Lakes tributaries, and were introduced into western waters.

Perhaps no other fish has so defined eastern North America and influenced our western cultural interest in angling more than the brook trout. For 250 years, the brook trout has been a favorite of anglers. Trout angling as we know it today is rooted in techniques and equipment developed in pursuit of this fish.

Daniel Webster wouldn't have it any other way that arguably the most famous fish ever caught was the brook trout that he angled in 1827. As a U.S. Senator from Massachusetts, Webster was one of the most prominent figures of his time. From his boyhood days to the end of his life, brook trout fishing was his passion. Webster's passion became an obsession after he learned of a behemoth brook trout that plied the mill pond waters of what is now Brookhaven, New York.

As the story goes, Webster, who had heard tell of the monster brook trout four years before was informed of its presence in the mill pond while attending church service. The church was within eyesight of the water in which the trout swam. He promptly departed in the middle of the service to fish. Shortly thereafter, the members of the congregation and even the minister trickled out of church to observe his efforts. It was only after the initial excitement had waned and some had given up and left, that the fishing took a most historic turn. After a tremendous swirl and near miss, Webster quickly recast his flies slightly further toward the bank of the mill pond. What followed, Nathaniel Currier (Currier & Ives) memorialized in an art print.

The subsequent battle between man and fish became a spectator event. The spectators' initial involvement was as mere observers taking in the scene, but when Webster won the battle and held the fish for all to see, the crowd erupted into a cheering section. This fish was reported to have weighed 14 ½ pounds, which would qualify it as the largest brook trout ever caught, even to this day.

The brook trout, large and small, is one of the most beautiful fish in the world. Its light spots and worm-like vermiculated markings on the dark-

olive back and sides are highlighted by the brilliant red spots surrounded by blue halos along its sides. The orange belly and fins contrast with the white leading edge of fins, outlined in black. But the brook trout is more than just another pretty fish.

Native to eastern North America, brook trout historically ranged throughout the Appalachian Mountains as far south as Georgia, northward along the Atlantic seaboard from New England to the northernmost reaches of Canada. From there they range westward to the shores of Hudson Bay and eastern Minnesota, and southward to the Great Lakes states. Brook trout have been introduced well outside their native range, sometimes to the detriment of the native fishes in the western United States.

Commonly called "speckled trout" or "brookies" in inland waters, the typically larger brook trout moving between freshwater streams and the brackish coastal waters of the New England states and northward though Canada are referred to as "salters," while those occupying the freshwater shorelines of the upper Great Lakes are known as "coasters." The Latin name, *Salvelinus fontinalis*, translates closely into "little salmon of the springs," so named for its dependence upon clean, cold water seeping through the stream bottom needed for spawning. The springs provide stable temperature and flow for eggs to develop and hatch in an otherwise harsh and variable environment.

The extensive geographic range of this species is the result of geology more so than an indication of an inherent tolerance and adaptability. During the Wisconsin glacial period which ended 10,000 years ago, brook trout inhabited the icy cold waters at the fringes of the immense ice sheets that covered the eastern third of the North American continent. As the glaciers retreated, the brook trout followed.

Owing to their existence in cold, clear unproductive waters, brook trout are not finicky eaters. The diet of brook trout includes nearly any organism found in, or along the water's edge. This propensity to eat whatever is available is the primary reason the brook trout is a relatively easy quarry for anglers. Brook trout will rise to a dry fly or attack a sinking wooly bugger, and readily hit a spinner, plug, or spoon. But perhaps what has made the brook trout such a common target for so many is their undeniable attraction to the simplest of live baits.

Unregulated fishing, logging, and poor land use practices in past centuries, and competition with introduced trout and salmon has dramatically reduced brook trout abundance, as well as their range. Stocking was initially seen as the answer to the decline and millions of trout were reared and stocked. However, due to use of inappropriate hatchery stocks ill-adapted to local environments and the damaged habitats they were put into, stocking did not solve the problem.

Today, many agencies and non-governmental organizations are working cooperatively to protect and restore coldwater habitats critical to brook trout. Two notable partnerships are the Eastern Brook Trout Joint Venture and Driftless Area Restoration Effort, both recognized partnerships by the National Fish Habitat Action Plan (See *Eddies* Summer 2008). In addition to habitat restoration and conservative harvest regulations, hatcheries use localized stocks and integrate conservation genetic principles, increasing the potential for stocking success. In suitable habitats, stocking of hatchery-reared brook trout is an important management tool to re-establish and maintain brook trout populations throughout their native range. ✦

When not playing hockey, Henry Quinlan has handled a coaster or two as a fish biologist for the Ashland Fish and Wildlife Conservation Office on the Wisconsin shore of Lake Superior.

By Ron Skates

Trout on Tribal Lands

Yellowstone and westslope cutthroats, and bull trout benefitting from tribal fisheries management in Montana

Fishing and hunting opportunities provided by Indian tribes in Montana are boundless. The landscape is as diverse as anywhere in the country. In Montana, you will find high mountain alpine terrain with majestic peaks that level out into the rolling hills and the vast areas of prairie grasslands.

As a further measure of that diversity, the many beautiful rivers and streams flow either west to the Pacific Ocean, southeast to the Gulf of Mexico, or northeast toward the great Hudson Bay in Canada. The prairies harbor lakes and ponds that provide excellent fishing as well. Nature separated these flows in different directions, and nature filled them with their own fishes. Nature provides some of the best fishing found anywhere in the world on Indian lands in Montana.

Ron Skates/USFWS

A bull trout from Boulder Creek on the Blackfeet Reservation, Montana.

What nature doesn't provide is helped along by the Montana Fish and Wildlife Conservation Office (MTFWCO) in Bozeman. Much of what this office does centers on providing fisheries technical services to seven Indian reservations in Montana. These reservations encompass over 7,000,000 acres.

The MTFWCO is one of the largest tribal assistance programs in the U.S. Fish and Wildlife Service. Biologists work with the tribes to assist them in a wide variety of projects.

MTFWCO biologists wade knee-deep in restoration efforts for populations of important fishes on Indian lands, like the bull trout – a species listed as "threatened" under the Endangered Species Act, and close kin of the brook trout and Dolly Varden. Bull trout have been extensively studied for several years on the Blackfeet Reservation in the St. Mary River drainage. We have assessed the stream fish communities and monitored the status and distribution of the bull trout, trying to better understand what limits its numbers. A special rule in the Endangered Species Act fortunately allows limited sport fishing for the threatened bull trout. Were it listed as "endangered," that would be another matter.

From the technical assistance and information provided by the MTFWCO, the Blackfeet Tribe decided to close commercial fishing for lake whitefish on the lower St. Mary Lake and thus reduce associated adverse effects on bull trout. The Tribe has lowered bull trout harvest by implementing catch-and-release regulations. Toward habitat conservation for bull trout, the Blackfeet Tribe works with the Bureau of Reclamation to manage flows below Lake Sherburne so as to protect spawning and rearing habitat – trying to get the right flows at the right places – when the trout need them.

Protecting fish by angling regulations and conserving habitat is meaningless if fish are lost to irrigation, only to dry out in a field. MTFWCO biologists have worked with the Bureau of Reclamation to design an elaborate fish screening system in the St. Mary Canal to keep fish where they belong – in the water. Congress supports the project.

The westslope cutthroat trout is another fish we work with. MTFWCO biologists have implemented a fish stocking program on the lower St. Mary drainage and the Creston National Fish Hatchery provides westslope cutthroat to bolster the St. Mary's population and enhance fishing opportunities.

This year we will be increasing our studies on Yellowstone cutthroat trout on the Crow Reservation. The Crow have received a Tribal Wildlife Grant from the U.S. Fish and Wildlife Service to study the venerable trout. The MTFWCO and the Tribe will assess populations of this native trout throughout the Bighorn Mountain range on the Reservation. The Tribe is eager to conserve Yellowstone cutthroat trout and was the first to sign onto the statewide "Conservation Agreement for Yellowstone cutthroat trout in Montana." The goals under the agreement are to maintain, secure and enhance existing populations where possible; continue to survey

Ron Skates/USFWS

Trout waters on the Blackfeet Reservation.

waters to discern their distribution, abundance, and genetic status; and seek collaborative opportunities to restore or expand these trout populations in other areas of the Reservation. This may include stocking fish.

The benefits of currently stocking fish on Indian lands in Montana alone generate over 250,000 angler-days per year. Money spent by anglers provides significant revenues to the tribes and local economies and the people of Montana, both on and off Indian lands. In fact, the bulk of the Indian recreational fisheries are enjoyed by non-tribal members. Historically many of the plains tribes were hunters and depended upon big game for their sustenance, rather than fish. Now their interest in fish is a different matter.

Today many of these increased recreational fishing opportunities in Montana and beyond are a direct result of the tribes and the U.S. Fish and Wildlife Service working together with several other partners to restore native fish species, and to stock waters which were essentially void of fish. Perhaps the most significant impact of increased revenues to the tribes has been their ability to establish their own Fish and Wildlife Departments that oversee the conservation, protection and preservation of their vital natural resources. Fishing provides employment to many tribal members, thereby reducing the overall unemployment rates, which typically are higher than the national average.

A tribal leader, Earl Old Person, Chief of the Blackfeet Nation, once said, "Come to our lands. Enjoy the many opportunities we have and get to know our people and our culture, and hence we can get to know you. And remember if you need to talk to the Creator while you're here, it's just a local call." ✦

Ron Skates is the supervisor of the U.S. Fish and Wildlife Service's Montana Fish and Wildlife Conservation Office in Bozeman, Montana. He's a member of the Cheyenne River Sioux Tribe.

By Art Broncheau

A Journey of Man and Salmon

My grandmother used to tell me, "Always remember where you come from, because if you forget – you will get lost." My life has been like that of the salmon – I knew I was supposed to live in another place, but along the way I got lost in a dark ocean. If I was to survive, I needed to find my true home. But it was a long and hazardous journey.

I am *Nimi'ipuu* . . . a Nez Perce. I was born and raised on the Oregon Umatilla Reservation. I learned the importance of salmon to the Nez Perce people from my grandfather and uncles by fishing on the Columbia River at the historic Celilo Falls. The Dalles Dam flooded that place in 1957. Monuments there now mark the inundated villages, the gathering places and the lost way of life.

I remember the aroma of the fish, the sounds of roaring falls and the busy camps where hundreds of Indian families from different tribes came and fished. I often started school a month late because of our traditional cycles of salmon fishing, huckleberry gathering, and deer hunting.

My mother – also *Nimi'ipuu* – shared with me stories of her childhood in the Clearwater River region of Idaho, about the Nez Perce culture, my family history, and our traditions. After high school, I continued my education in Kansas, and then moved to San Francisco in 1967. In two years there, I experienced a very different world of discordant political groups, war protests, hippies and First Amendment free-speech exercised. Much of the time I felt like I was swimming around, not belonging to any one group or movement. Like the young salmon in the sea, I was unaware at the time that I was growing and learning from these experiences, being nurtured and surviving.

Susan Sawyer/USFWS

Art Broncheau takes pause while working at the Kooskia National Fish Hatchery, Idaho.

Yet these were some of the darkest years of my life. Many of my "brother fish" didn't survive their journey, and those who did wear deep scars, much like the battered adult salmon returning from their ocean life today. I knew I had to swim out of this ocean and find a better world. I needed to find my home, my mother's birthplace on the Clearwater River.

On my way home, I stopped once again to continue my schooling, as I had promised my grandmother years before. I entered the University of Oregon, earning a degree in sociology. I also had a baby girl to care for, which gave my life new purpose. I worked as a counselor and social worker because I felt it was my turn to help others, after having others pity and help me through my journey. Little did I know that my social work was preparing me for work in fisheries conservation.

The final bend in the river of my homeward journey began in 1997 when I came to work in Idaho as a field tech with the Nez Perce Tribal Fisheries Department. A year later, I transferred to the Coho Restoration Project on the Clearwater River, first at Idaho Fish and Game Department's Clearwater Hatchery, and then across the river at Dworshak National Fish Hatchery.

USFWS

A ripe coho salmon set to be spawned at Kooskia NFH.

coho salmon had been declared extirpated from Idaho in 1986, and the Nez Perce Tribe wanted to bring these fish back. Salmon are sacred and salmon mean life for the Nez Perce people – if we lose them, we are lost as a people, a nation. This was our chance now to help the fish find their own way home.

A cooperative agreement with the Nez Perce Tribe and Dworshak National Fish Hatchery makes possible the training of tribal fish culturists to rear coho salmon. The fish taught us a lot those first years. I figured if I could find my way back to the Clearwater after so many years away in the ocean, maybe the coho had a chance to come back home, too.

Through the Snake River Basin Adjudication of 2007, the Nez Perce Tribe assumed management of the Kooskia National Fish Hatchery. I finally reached my home here last spring after a long journey.

Kooskia National Fish Hatchery sits on the site of the historic Chief Looking Glass village. In the 1870's hundreds of *Nimi'ipuu* lived peacefully here to avoid conflicts with the U.S. Army. Just as Chief Looking Glass kept his people safe, it is my job now to keep the young salmon safe. I pray to the Creator daily for strength in my legs, arms, and mind and for good health so that I can do my job well. When I'm at work on the ponds, I listen to the whispering winds in the trees. I look to the hills above the hatchery and hope the ancient ones are proud of what I'm doing to conserve our fisheries and preserve our Nez Perce past.

To me, the future of the coho salmon is full of hope. The U.S. Fish and Wildlife Service and Nez Perce Tribe work well together for the future of fisheries in the Clearwater Basin. The trays inside Kooskia National Fish Hatchery are filled with fertile eggs in the fall, hatching salmon fry in the winter, and outside the ponds are full of smolts preparing for their own long journey to the ocean in the spring.

My purpose now is to keep the fish cycle connected with nature for as long as I can. I have come full-circle in my own life's journey, and like the fish spawning the next generation in the streams, I have years of knowledge for younger generations to learn. In conserving coho salmon, I can slow down. Think. Live. Like my grandmother told me to, I never forgot where I came from, it just took me a little longer to find my way home. ✦

Art Broncheau is a member of the Nez Perce Tribe and a fish culturist at Kooskia National Fish Hatchery on the Clearwater River in Idaho.

Susan Sawyer/USFWS

Waist deep in a raceway at Kooskia NFH, writer Art Broncheau has come full circle back to home.

"Always remember where you come from, because if you forget – you will get lost."

By Chris "Dinger" Kitcheyan

The Ping P'aa, or "mountain fish" to the Santa Clara Pueblo Indians is the Rio Grande

Caring for Mother-Earth

Restoring the Rio Grande cutthroat trout on Native American land

A cool breeze hushes over the pine trees that surround me. Horseflies do their best to drain my blood. There are no sirens, no cars to be heard. No airplanes split the sky. I'm standing at Tskiumuu Pond on the lands of the Pueblo of Santa Clara. Santa Fe, New Mexico is the closest town of any substantial size, and it is an hour away. The Pueblo is an Indian community, so named by the Spanish. These sedentary Native Americans were well-rooted in their *pueblos*, Spanish for "towns," by the time they arrived here in the 1500s. The Spanish were the first to document trout in the New World by the written word in 1539. It was a Rio Grande cutthroat trout chronicled not far from this place.

And that is why I am here – for these trout. I'm with biologists from the Pueblo of Santa Clara and the Southwest Tribal Fisheries Commission. We laugh and joke and tease one another as we ready ourselves to gather up Rio Grande cutthroat trout with backpack shockers that stun the fish in streams feeding Tskiumuu Pond. We need to collect more than 100 Rio Grande cutthroat trout that will make their way to the Mescalero Tribal Fish Hatchery on the Mescalero Apache Indian Reservation. Without hesitation, I made a quick claim to

Michael Graybrook

cutthroat trout, the first trout in North America mentioned in writing.

everyone that I wanted my crew to survey the Turkey Creek headwaters.

Over the last two years, I have caught cutthroats below the confluence of Turkey and Santa Clara creeks, and the Santa Clara Creek headwaters. This time I wanted to lay eyes on Turkey Creek, upstream of the confluence. My crew and I hiked up to the confluence and turned on the electrofisher. The vegetation along the stream banks was lush, overhanging logs and branches covered sections of the stream making great habitat for trout, but making it difficult to collect them with nets. Within the first mile we captured cutthroat trout of various sizes in pools and bank undercuts. But after that mile, no more trout were seen.

What a better place for contemplation than flowing water? That is what I did. I sat down along the stream bank, contemplating the long walk back to the truck with our cutthroat trout. I enjoyed the view, especially Tsi Kumu Mountain, named for the glossy-black obsidian rocks that cover it. I was taken by how similar the area is to my home, the Fort Apache Indian Reservation in Arizona where my tribe, the White Mountain Apaches, reside. The similarity made me nostalgic.

This work this day on the bright-red Rio Grande cutthroat trout reminded me of the research I'd done on the lemony-yellow Apache trout when I was a graduate student at the University of Arizona. Like the Apache trout, the Rio Grande cutthroat trout has been hit by habitat loss, hybridization, predation, and competition with non-native trout. Federal, state, and private organizations in New Mexico have taken the lead to protect the Rio Grande cutthroat trout. But despite there being much cutthroat habitat on tribal lands, tribal participation has been lacking because of bad experiences in the past: miscommunication, and lack of trust that comes with broken promises. Indian Tribes often hesitate to collaborate with the federal government on conservation because of the potential consequences the Endangered Species Act may have on tribal sovereignty and our way of life.

Although the White Mountain Apache Tribe and Pueblo are two different tribes, I believe Indians share the same beliefs, to act as guardians of Mother-Earth. I thank the Creator for allowing us to be placed on Mother-Earth. Natural resources are the basis of who we are as Indian people, and I believe they must be preserved for current – and future generations.

My own tribe began conserving the Apache trout about 60 years ago. The Pueblo of Santa Clara began evaluating the fish populations in the Santa Clara Creek drainage in 1997. Pueblo biologists informed the Tribal Council that native cutthroat trout populations were declining and management actions were needed to protect them.

The Pueblo people believe the Rio Grande cutthroat trout has inhabited Santa Clara Creek since time immemorial. Endemic people have an endemic word for an endemic trout: in the *Kha P'o Tewa* language, the cutthroat trout is Ping P'aa, or "mountain fish." The trout has been a substantial food source and its usage can be traced back to when their people resided at their ancestral home in the nearby Puye Cliffs. The Rio Grande cutthroat trout is a very important part of the religion and culture to the Pueblo.

Chris Kitcheyan/USFWS

Scenic overlook of Tsi Kumu Mountain on the Santa Clara Pueblo.

Angela James/USFWS

Mescalero Tribal Fish Hatchery Biologist (left to right), Kai-T Bluesky, and New Mexico FWCO biologists Stephanie Coleman, Dustin Myers, and Chris Kitcheyan place cutthroat trout into holding cages at Tskiummu Pond before the arrival of the distribution truck.

Dustin Myers/USFWS

Michael Montoya adding stress coat and salt into the distribution tank before transporting Rio Grande cutthroat trout to the Mescalero Tribal Fish Hatchery.

In 2007, the U.S. Fish and Wildlife Service awarded the Pueblo a Tribal Wildlife Grant to restore Rio Grande cutthroat trout in the Santa Clara Creek drainage. Now, the Pueblo and New Mexico Fish and Wildlife Conservation Office where I'm employed work side-by-side. The Pueblo has sought assistance from Trout Unlimited, the New Mexico Department of Game and Fish, and the U.S. Forest Service. They support trout conservation, but the Pueblo is the primary caretaker – Native people conserving native Rio Grande cutthroat trout on Native American land.

The wind pulled a pinecone from a ponderosa and it hit me on the head. I realized we still needed to return downstream. In all we collected 126 trout that will become part of a broodstock at the Mescalero Tribal Hatchery. They will be used to expand the fish's range.

At the end of the day, I reflect on the scenery and the people around me. I am proud to say that both tribal and non-tribal entities can unite as one to work together to protect our fisheries. As a White Mountain Apache and a U.S. Fish and Wildlife Service biologist, it is very rewarding to bring together my American Indian beliefs, my work experiences, and science to assist the American Indian Tribes to conserve the Rio Grande cutthroat trout. ✦

Chris "Dinger" Kitcheyan is a fish biologist at the U.S. Fish and Wildlife Service's New Mexico Fish and Wildlife Conservation Office in Albuquerque, providing fisheries technical assistance to 22 Indian tribes. Kitcheyan is a member of the White Mountain Apache Tribe.

By Speros Doulos

Supporting Tribal Life on the Columbia River

Speros Doulous/USFWS

Salmon returning to Little White Salmon National Fish Hatchery are the target of these anglers, fishing in Drano Lake, Washington.

Pacific salmon have always been an integral part of Indian life in the Columbia River Basin. The Columbia River Treaty Tribes understood that their very existence depended on the Columbia River Basin's natural resources, and that most important were the salmon that returned to the rivers and streams.

Speros Doulos/USFWS

Larry Leighton (l) and Pat Cushman net coho salmon at Willard National Fish Hatchery for later release into Columbia River tributaries.

Prior to the arrival of white settlers, Chinook salmon returned to the Columbia River Gorge tributary streams in very large numbers. One of these tributaries in Washington, the Little White Salmon River, was selected as a site for a new hatchery given the abundant supply of salmon that returned to that river. William Ravenal, in his 1898 report to the U.S. Fish Commissioner, stated that "During the season, the salmon appeared in such large numbers below the rack that the Indians often speared two and three at one cast of the spear."

And so, the Little White Salmon National Fish Hatchery began in 1898 producing the quinnat, or Chinook salmon, so revered by Yakama people. Located within the ceded area of the Confederated Tribes and Bands of the Yakama Indian Nation, the hatchery produced Chinook salmon to reinforce the Tribe's right under an 1855 treaty to fish at "usual and accustomed" places. Today, in conjunction with Willard National Fish Hatchery located five miles upstream of the senior Little White Salmon facility, the Little White Salmon/Willard National Fish Hatchery Complex maintains a strong partnership with the Yakama Nation to produce fish for tribal harvest, and to support salmon restoration efforts by tribes within the Columbia River Basin.

Perhaps most notable of these restoration efforts are those by the Yakama Nation to reintroduce Mid-Columbia River coho salmon. Willard National Fish Hatchery raises these coho salmon. It's done in partnership with the Yakama Nation in a cost-share agreement with the goal of

reintroducing extirpated coho salmon to the Wenatchee River Basin in north-central Washington.

By agreement, the Yakama Nation provides 60 percent of the costs to operate the Willard National Fish Hatchery; the U.S. Fish and Wildlife Service contributes the remaining 40 percent via Mitchell Act funds administered by NOAA-Fisheries.

Initially, lower Columbia River-stock coho from Willard National Fish Hatchery were used for the reintroduction effort with the hope of transitioning to a more locally adapted fish stock in the future. This came to fruition when sufficient adult coho returned to the Wenatchee River. Collected at Dryden Dam by Yakama Nation biologists, fertilized eggs derived from these fish are now transferred to Willard National Fish Hatchery where they are hatched and the fish reared over an 18-month period. At that point, the coho salmon are transferred back to the wild within the Wenatchee and Methow river basins by the tribe.

This partnership exemplifies the use of science to transition to locally adapted fish stocks – stocks that are less of a risk to harmfully interact with naturally spawning salmon, especially those protected under the Endangered Species Act. Coho salmon are returning to the waters of north-central Washington with the wise use of a hatchery in combination with tribal fish and habitat restoration.

Adult fish returning to Drano Lake at the mouth of the Little White Salmon River serve another example of a successful fisheries conservation partnership. We produce one million spring Chinook and two million upriver bright fall Chinook at the Little White Salmon/Willard National Fish Hatchery Complex each year. We release them into the Little White Salmon River and Drano Lake. When these fish return later in life, imprinted upon and returning to the hatchery, they provide anglers a fish for sport and Native Americans a fish to harvest by gillnet. The Drano Lake salmon fishery concentrates angling and tribal harvest on a hatchery-produced stock where otherwise there might be wild-hatched or federally protected salmon killed in the nearby mainstem Columbia River. In 2009 another two and a half million upriver bright fall Chinook and nearly another two million Tule fall Chinook will be released at the Little White Salmon facility. When they return, they will provide even greater tribal harvest and angling opportunities.

The Yakama Nation has benefitted from large surpluses of upriver bright fall Chinook returning upstream. The U.S. Fish and Wildlife Service and Yakama Nation agreed to spawn additional fish, to provide four and half million additional eggs to the Yakama Nation Klickitat Hatchery. Managed as a natural spawning area, tribal hatchery facilities on the Klickitat River lack the infrastructure necessary to adequately collect adult fall Chinook.

Salmon produced at the Little White Salmon/Willard National Fish Hatchery Complex are critical for the U.S. Fish and Wildlife Service to meet its tribal trust responsibility and to reaffirm treaty-granted tribal fishing rights. The Columbia River treaty tribes have fought hard to preserve their right to fish in usual and accustomed areas. Drano Lake and the Little White Salmon River are one of those areas. The close partnership with the Yakama Nation helps maintain an integral part of tribal life – salmon harvest.

Margaret Saluskin of the Yakama Nation eloquently captured the essential nature of salmon to Native Americans: "Salmon was presented to me and my family through our religion as our brother. The same with the deer. And our sisters are the roots and berries. And you would treat them as such. Their life to you is just as important as another person would be." ✦

Speros Doulos is the manager of the Little White Salmon/Willard National Fish Hatchery Complex in the Columbia River Gorge of Washington.

Speros Doulos/USFWS

Tribal fishermen harvest spring Chinook salmon returning to the Little White Salmon National Fish Hatchery. More than 3,300 salmon were harvested in the Drano Lake tribal gillnet fishery during 2008.

By Brian Winnestaffer

Exiled Salmon Return Home

Moose Creek restoration ends decades-long hiatus

Jessica Dryden/Chickaloon Village

Formerly exiled, Chinook salmon migrate back into new habitat, opened up after habitat was restored in Moose Creek, on the Chickaloon Village, Alaska.

Railroads like straight tracks. Rivers, they like curved courses. Both conserve energy, and both came into conflict with each other a century ago in the home waters of the Chickaloon Native Village, Alaska. And the Chinook, coho and chum salmon suffered for it.

Few people alive today were witness to events of history in the early 20th century. But eyewitnesses tell stories, and oral histories passed along among the Chickaloon people tell a different account of the salmon fishery on Moose Creek that we know today.

That salmon fishery was recently confined to the first three miles of Moose Creek above where it joins the Matanuska River. Yet, Chickaloon oral histories relate something much different. Village elders say that their parents told of a thriving salmon fishery that ran the length, about seven miles or so, of Moose Creek.

Something happened. As streams run their course, they tend to bend and turn at their lower ends. It's a physical matter of conserving energy within a water course. A waterway's meanders are an expression of energy. At the turn of the 20th century, the railroad needed to get to coal in mountains above Moose Creek, and the railroad had to essentially *get by* Moose Creek. The rail builders did that by straightening the creek with earthen levies. One-hundred year-old hand-drawn maps reveal the extent to which they went to move the creek, to eventually move the coal. The creek's energy formerly expressed in its bends and turns had to be expressed elsewhere. Artificially straightened streams move quicker downhill and will

quickly erode. That's what Moose Creek did – it scoured to bedrock to create a natural-looking 10-foot-tall bedrock barrier that fish could not swim over three miles from its mouth. It looked natural, but it was completely caused by man.

The historic salmon fishery fed mining camps and Native people, but the barrier caused the salmon to play out upstream. The coal played out 25 years ago, but an unnatural Moose Creek remained, and the native salmon run remained blocked from miles of former spawning habitat.

But that has changed, thanks to a partnership with the U.S. Fish and Wildlife Service and the Chickaloon Village. In 2005, we set about fixing the fishery. We wanted to restore fish passage around the barrier waterfall, and reestablish the original meanders. Our first step was to build a half-mile long road on the old railroad bed to get to the site. Trees and brush that we had to clear, we set those aside to put into the creek to create habitat for aquatic bugs and fish later.

It was heavy machinery that destroyed salmon habitat, and now it was a bulldozer that would recreate it. We constructed the new channel to former conditions, trying to recreate an historic meander. Using trees removed, we put them back in the creek in log piles intended to create diversity in stream flow and diversity in fish habitat. We also used boulders to direct flow to the same effect – to create a diversity of habitats in the creek. Large boulders, randomly scattered in the creek, were placed there to simulate natural creek conditions – to create a "roughness" in the stream, again, to create a diversity of habitats. Since young salmon need slow water to grow in, off-channel pools were built to connect with the main channel where fish can pass the year-round.

Bulldozers, as you might imagine, are messy. As a final step in the first

Brian Winnestaffer/Chickaloon Village

What looks natural, is an artificial barrier created when Moose Creek was re-routed for the railroad.

Mary Price/USFWS

Mary Price/USFWS

Heavy equipment re-routed Moose Creek a century ago: today, they put the parts back together for the salmon.

Jessica Dryden/Chickaloon Village

A volunteer helps biologist Brian Winnestaffer capture migrating salmon.

Mary Price/USFWS

It's a boulder, and it's fish habitat. Migrating salmon find respite in the eddies made behind boulders in streams.

Mary Price/USFWS

A recently restored meander in Moose Creek.

round of river restoration, exposed soils were re-planted with local felt-leaf willow clippings, some native transplants, and a seed combination of annual and perennial grasses. About 9,000 willows and a local native seed combo of fireweed, cow parsnip, and rose were planted to hold the banks together. It worked. Two months later as waters rose from heavy rains, the creek crested its banks. The thin root masses of the grasses held the thin topsoil on the newly sculpted floodplain. The willows worked to slow flow, strain sediment and debris from the high waters on the floodplain, building stream banks and lessening soil erosion.

This work created 2,100 feet of new channel characterized by slower flows that fish need, connected without barriers to the larger Matanuska River downstream. But the real measure of success came a month later when fish biologists counted 215 spawning Chinook salmon upstream of the restoration site. Several Chinook salmon were seen as far as five miles upstream of the former fish barrier. This many fish far exceeded expectations.

The following summer of 2006, the Chickaloon Native Village and the U.S. Fish and Wildlife Service created another 1,350 feet of new channel from formerly straightened stream that had three partial fish passage barriers. The newly restored habitat was designed to retain spawning gravels. Many of the same type of log and rock structures were used here, too, to create diversity in the stream and habitats. The log-jams created in the restoration project provide great refuge for juvenile fish and fish of any age and size looking for slower water velocity during a flood.

Only two months after work was completed on Moose Creek, a large flood came through. The work withstood the ravages of the high

Mary Price/USFWS

Woody debris and grasses planted on the banks held this restored bank in place during hard floods.

Jessica Dryden/Chickaloon Village

You'd smile, too. Brian Winnestaffer, biologist for the Chickaloon Village, hoists a 40-pound Chinook salmon from Moose Creek.

water. The new fish habitat remained in place.

The Chickaloon Native Village and the U.S. Fish and Wildlife Service will monitor both project sites for at least five more years. But we already know this: the Moose Creek Fish Passage Restoration Project has been a huge success, connecting fish to habitat, and we are pleased to have completed such a remarkable project. ✦

Brian Winnestaffer is a fish biologist for the Chickaloon Village of the Athabascan Nation near Sutton, Alaska.

USFWS

What was straight and narrow is now wide and meandering, as it should be. A restored Moose Creek benefits fish and the people of the Chickaloon Village.

By Lawrence S. Buklis

Fish is Food

Federal Subsistence Fisheries Management in Alaska

USFWS

A gill net is set on the Kuskokwim River, Alaska, as part of a fisheries field project.

Alaska Natives have fished, hunted, and gathered wild foods as an essential part of their way of life for thousands of years. Products of nature form the basis for cultural and spiritual traditions. Fishing, hunting and gathering binds the inter-generational culture. Fish is food to rural Alaskans. Providing for subsistence uses of fish and wildlife by rural Alaskans on federal public lands in Alaska is an essential task of the U.S. Fish and Wildlife Service.

Alaska Natives retained title to the land during the period of Russian occupation from the mid-1700s to the mid-1800s, through the influences of the Gold Rush, then World War II defense development, and eventual Alaska statehood in 1959. But in the decade after statehood, state land selections and proposed public and private development had raised concerns among Alaska Natives as to the security of their ancestral lands.

The Alaska Native Claims Settlement Act of 1971 sought to resolve Native land claims, and clear the way for state land selections to develop oil. Aboriginal title and hunting and fishing rights were extinguished in exchange for a land and monetary settlement. To avoid the pitfalls of the reservation system, the new law created Native village and regional corporations; Alaska Natives were the corporate shareholders.

What the 1971 law lacked in addressing subsistence use of natural resources, the 1980 Alaska National Interest Lands Conservation Act (ANILCA) made up for in a comprehensive piece of legislation that designated over 104 million acres as new or expanded

conservation lands. It specifically addressed subsistence management on federal lands in Alaska. To rectify shortcomings in the 1971 law, ANILCA stated that " . . . to fulfill the policies and purposes of the Alaska Native Claims Settlement Act and as a matter of equity, it is necessary for the Congress…to protect and provide the opportunity for continued subsistence uses on the public lands by Native and non-Native rural residents." It should be noted that in its development, ANILCA allocated priority on an ethnic (Native) basis. However, testimony from the state of Alaska concerning inability to implement such a priority under the state constitution prompted shifting to an ethnically neutral formulation with the rural priority.

The federal subsistence management program is responsible for fisheries primarily in inland navigable waters that flow through or adjoin federal public lands in Alaska. Bear in mind that roughly 60 percent of Alaska is designated as federal public land. The state of Alaska manages commercial and sport fisheries on all waters throughout the state, as well as state-defined subsistence fisheries on the 40-percent non-federal lands. From 1980 through late 1989, the state managed a unified program in compliance with federal requirements. However, in 1989 the Alaska Supreme Court ruled in *McDowell v. State* that the rural priority violated Alaska constitutional provisions for the common use of natural resources. That, and subsequent rulings have led to the present dual federal-state management system.

It is estimated that subsistence fishers, hunters, and gatherers harvest over 40 million pounds of wild foods a year in rural Alaska, with fish accounting for about 62 percent of the total. About 230 pounds of food per person per year is derived by subsistence harvest in rural Alaska. Fished are harvested with a variety of gear based on traditional practices: gill nets, dip nets, seines, fish wheels, rod and reel, spears and jigs. Subsistence fishing for salmon is intensive during the summer as the fish migrate to freshwater spawning grounds. These are the largest fisheries of their kind in the world. The Yukon River flows 1,200 miles through interior and western Alaska from its source in Canada, over 1,300 households harvest about 50,000 Chinook salmon and over 150,000 chum salmon by gill net and fish wheel per year. In six villages near Kotzebue in northwest Alaska, 470 households harvest over 50,000 whitefish and 10,000 sheefish a year. One of these villages of about 100 households takes nearly 11,000 char a year to feed their families.

The U.S. Fish and Wildlife Service's Office of Subsistence Management provides technical fisheries management support. Our fishery monitoring program draws upon science-based methods and traditional ecological knowledge in support of subsistence fishery management—fisheries that remain vital to Alaska's rural residents who have relied on these resources for centuries. ✦

Lawrence S. Buklis is Fisheries Division Chief, Office of Subsistence Management for the U.S. Fish and Wildlife Service in Anchorage, AK

USFWS

Checking and mending a gill net before being used again on the Kuskokwim River.

By Mark Brouder

Casting Light Upon the Waters

Mark Brouder/USFWS

Walleye, named for their vitreous eyeball, reflect light in the shallows at night. That's how Native people caught them, by fire light.

Charlie Rasmussen/GLIFWC

Tribal fish biologists cast light from the bow of an electrofishing boat, catching walleye for population estimates, Lac du Flambeau, Wisconsin.

Over 150 years ago, Ojibwe Indians set out on northern Wisconsin lakes at night in birch bark canoes to spear walleye. Their torches cast light upon waters. The fish's eyes reflected in the light, making them easier to spear in the shallow waters during the spring spawning season. When French settlers witnessed this traditional fishing activity in the open waters flecked by firelight, they named the area *Lac du Flambeau*, or Lake of the Torches. The Lac du Flambeau people are now one of six bands of northern Wisconsin's Lake Superior Chippewa.

As the population of the United States increased largely due to European immigration, the Chippewa Indians were forced to cede more and more of their traditional homelands through treaties to the federal government. More than a century went by before tribes sought to have their treaty rights upheld in court. However, during this time, tribal members continued to hunt and fish off-reservation, but were arrested or cited for violating state regulations. In the winter of 1974, two brothers, Fred and Mike Tribble, and members of the Lac Courte Oreilles Tribe, contested the notion that the state of Wisconsin had the authority to prevent them from spearing off-reservation. It was their belief that tribal members reserved the right to hunt and fish by treaty on land ceded to the federal government. The Tribble brothers notified the Wisconsin Department of Natural Resources of their intent to spear. The two brothers were promptly arrested after spearing their fish. This action led to what became known as the Voigt Case, named after the former Wisconsin DNR Director, Lester Voigt.

Together, the six Chippewa Bands joined the challenge. In 1983, the U.S. Court of Appeals determined that much like landowners may choose to retain mining rights after the sale of land, the Chippewa retained the rights to hunt, fish, and gather throughout the lands ceded in 1837 and 1842.

Many non-Indians were upset with the Voigt decision. Hysteria, violence, and racial tension became commonplace, especially at boat landings where anti-spear fishing groups would converge to protest the traditional Chippewa practice. Hostility hit a fevered pitch in the late 1980s. Recognition of traditional Indian spear fishing rights and a healing of the wounds of prejudice did not happen overnight. Time and a firm commitment on the part of tribal governments, law enforcement agencies, and the state of Wisconsin, as well as efforts from grassroots treaty-rights support groups were

vital to the gradual reduction of ill-will during this unsettled time. Moreover, it was crucial to produce evidence either confirming or refuting accusations that traditional spear fishing harmed walleye populations.

During the height of the spear fishing controversy in 1990, Congress directed that a committee made up of tribal, state, and federal agency officials determine the status of the northern Wisconsin fishery in the ceded territory. In April 1991, the committee's report titled "Casting Light Upon the Waters" stated that the fishery was healthy and unharmed from spearing. The committee had another charge: to develop fish population assessment capabilities – capabilities that would generate a fish population database to help manage the walleye fishery in ceded territory, and to inform the public on the status of the fishery.

Toward that end, a Joint Fishery Assessment Committee made up of tribal, state, and federal biologists developed standard methods to annually assess adult spawner abundance each spring; conduct creel surveys throughout the fishing season; and estimate juvenile walleye that survived into the fall. Data from these surveys provide a very clear picture of the health of the walleye population through the seasons and are used to calculate the number of harvestable walleye.

These surveys are intensive. Since 1991, biologists have completed over 1,000 adult walleye population estimates in the ceded territory waters; an average of 50 estimates per year. During that same time period, 3,700 fall juvenile surveys have been completed; an average of 220 per year. Based on the results of these surveys, biologists determined that for every walleye harvested by tribal members during the spring spearing season, 10 more walleyes are harvested by non-tribal members by hook and line during the regular fishing season. Another statistic is revealing; the Chippewa speared walleye from an average of 144 lakes per year whereas non-tribal anglers harvested walleye from an average of 859 lakes per year.

Years of collecting these data by the Joint Fishery Assessment Committee have proven that spear fishing is not harming the walleye fishery of waters in the ceded territories of northern Wisconsin. The ability of the Joint Fishery Assessment Committee to measure and monitor the walleye fishery was, and remains, instrumental in setting minds at ease. Solid population data have removed tensions between tribal and non-tribal anglers, and the misperceptions of the effect of traditional tribal spearing on the valuable fishery enjoyed by so many in the ceded territories of northern Wisconsin.

Each spring, shortly after the ice has melted on lakes within the ceded territories, the U.S. Fish and Wildlife Service's Ashland Fish and Wildlife Conservation Office, and the Great Lakes Indian Fish and Wildlife Commission assemble a crew of biologists to assess adult walleye spawner abundance. For five weeks their boats outfitted with electrofishing gear will cast their own light upon the water, as they work the shallow waters for walleye well into the night. ✦

Mark Brouder is the supervisor of the Fish and Wildlife Conservation Office located on the south shore of Lake Superior in Ashland, Wisconsin.

Charlie Rasmussen/GLIFWC

Native Americans spear walleye like their ancestors did, and for much of the same purpose— food.

Meanders

By Patrick Durham

Being of a Place

On the sandy beach of what is today known as Moreton Bay on Australia's eastern shore, a group of Aboriginal men of the Quandamooka people sit and talk among themselves. One man spies a shoal of sea mullet edging its way along the shore and signals its approach to the others. In unison they stand, gather their spears and dip nets, and begin a dance of survival that has taken place since time began.

Forming a human weir in the warm shallow water they slap the surface with their spears to call their partners to the dance. Almost immediately a small pod of dolphins approach and herd the sea mullet, or *nandacall* as the Quandamooka know them, into the trap. The men stir the sand with their feet to deter the fish from passing while the dolphins seal their retreat.

In the ensuing flurry of motion, men scoop nets full of sea mullet while the dolphins, fearless of their human partners, struggle to keep their prey entrapped. In an instant, the sea mullet disperse and regroup beyond the trap to continue on their way. Meanwhile, their less fortunate numbers are piled into baskets to feed the Aborigines of this place.

Calling to each dolphin by name, which they know by their individual marks, the men praise them for their hard work and serve them a fair share of the catch on the ends of spears. Young dolphin and Aborigines alike learned this dance from their parents since time immemorial, perhaps from as much as 40 millennia past. The last eyewitness accounts of this amazing partnership were recorded in the 1870s as the indigenous Quandamooka were dispossessed of their home lands and their culture. The people are still there and although they no longer fish with the dolphins, they know that they are of this place.

There is much to think about in this story: colonialism, culture, survival and the melding of a people to a place – and I do hope that you will think deeply about these things. But my purpose here is to demonstrate the difference between our modern understanding of the natural world and what the Quandamooka people understood of their world in times past.

Until recently, academic circles and natural resource management professionals counted indigenous natural history as anecdotal, as simply stories to be heard. However, as global environmental conversation has shifted from consumption to conservation, an effort to acquire and incorporate ancient traditional know-how into the modern body of knowledge and management techniques has emerged. Traditional environmental knowledge describes the special observations and deep adaptations that indigenous people have made in their historic home place. Whether a scientist, policy maker, or outdoors enthusiast, I think we all recognize something magical in the primal understanding of fish, birds and mammals, and their habitats that indigenous people have.

What we cannot do, however, is to use traditional knowledge to define us. The Quandamooka, as have all

indigenous people, evolved in place. They are a part of its natural history. Their knowledge and life ways define them as a crucial element in nature. *They and the dolphins catch fish together, and it has always been so.*

The Native people in America have many similar stories. In the Pacific Northwest elders watch the flight paths and timing of birds returning from the sea to predict the time and location of a Pacific herring spawn. *This has always been so.*

A traditional whaling captain from the Native Village of Barrow, Alaska, is respectful of the spirit of the whale and knows that in taking its life, he is giving life to his people – *and it has always been so.*

The creation stories of the indigenous people of the Northeast and Great Lakes describe how the terrestrial world came to be on the back of a great turtle. Its long life and resilience provide a firm foundation for the world of the Chippewa, Ojibwa and Penobscot, the Huron, Mohawk, Seneca, and Cayuga. It is those same life-history qualities that scientists today cite regarding the turtle as an indicator species that helps them in determining the health of a place. For Native people, *this too has always been so.*

I was born in South Carolina, and I know well the pine-hardwood forests and black-water swamps that my grandfather loved. The "Low Country," as we call it, means very much to me and perhaps one day I will die there. It is my story and I do not exist without it – but I am not its story. The history of an indigenous people is a synonymy with the natural history of their home place. It is the people's stories, customs and ceremonies that make natural history fascinating and germane to the human experience.

Consider now the differences between *being from a place – and being of a place* as they relate to fisheries conservation. Being from this place, we restore and protect habitat, battle invasive plants and animals, regulate bag limits, establish conservation areas and so forth. We do this to correct mistakes and ensure that our natural world is a better and safer place in the future. I am glad for my children that we do these wonderful things and I gain great personal and professional satisfaction from helping in the ways that I do. A passion for nature helps to define who I am but I do not help to define nature.

Those that are of a place define nature. Native Americans conserving fisheries, stewarding the land, are bringing to life again the stories of their people. Being created of a place makes one part of that place. Taking care of that place is natural *and it has always been so.* ✦

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"Native Americans conserving fisheries, stewarding the land, are bringing to life again the stories of their people."

Eddies

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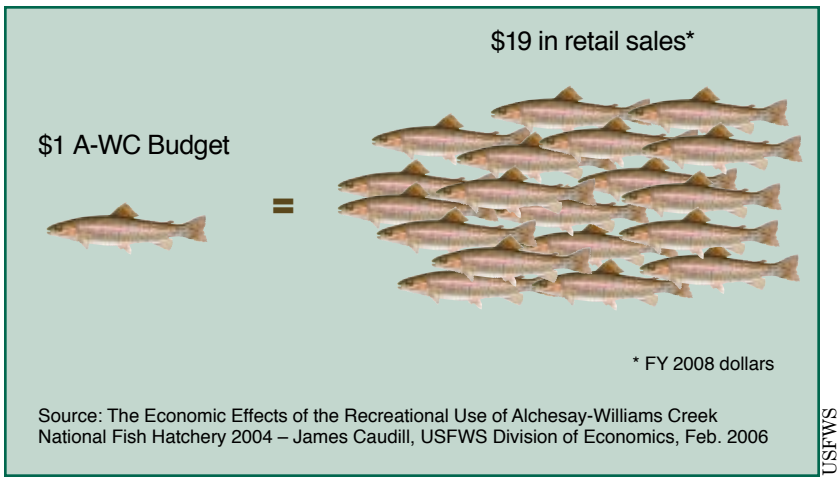
Spring 2009

Native Relationships

For generations, Native Americans have developed lifestyles, cultures, religious beliefs and customs centered on their relationships with fisheries and wildlife. Nature provided these – food, shelter, tools, and trade goods. Fisheries continue to provide sustenance, cultural enrichment for Native Americans, as well as help maintain tribal social structure and stability by permitting gainful employment in traditional and desirable occupations. In more recent times, with assistance from U.S. Fish and Wildlife Service, tribes have developed and expanded their fish and wildlife management programs, thereby increasing economic and social opportunities. Revenues generated through recreational and commercial fishing on Native American lands have helped to support numerous tribal governments. These situations have benefitted fish, wildlife, habitat and people, Native American and otherwise. ✦ Ron Skates



USFWS

Every dollar spent raising trout at Alchesay-Williams Creek National Fish Hatchery, stocked on Indian lands in the Southwest, generates $19 dollars in retail sales.