

Chapter 1 : Westslope Cutthroat Trout - Montana Field Guide

A little bit old, but a very well written book on the author's quest for to catch all the North American trout and char, plus grayling. It is similar to Bob Willis' Trout Adventures of North America, and both authors come from similar backgrounds.

The text provides an historical profile of each fish along with personal reflections by the author. A must for the library of the recreational fisherman as well as those interested in ichthyology. In September, driving east from California to Colorado, I decided to stop in the desert to try to catch a native trout called the Humboldt cutthroat. I took Route 50 around Lake Tahoe and then into the desert wasteland, where the air hovered at around degrees. I spent the night in Elko, Nevada, lights flashing from casinos, the vibration of trucks on Route 80 shaking the water in the glass on my bedside table. Rabbitbrush was in flower along the dirt trails, mountains formed up ahead, and a plume of dust behind me obscured what had come before. Antelope congregated around a water hole. A golden eagle flew across the road. I hit a whip-poor-will with my car and stopped to look for it and lament its death. I was following a publication put out by the state of Nevada in the s, a survey of remaining populations of the native cutthroat trout in these upper tributaries. It looked as if the stream with the greatest abundance of fish was one called Wildcat Creek. I wondered if, some thirty years later, the fish were still there. I followed a topographical map to find it. His name was Bill Gibbs, and he owned the ranch through which Wildcat Creek ran. He was watching yearling cattle that would soon be brought along Route 80 to feedlots in Nebraska. I asked him if he knew about the trout in Wildcat Creek. Would he mind if I fished it? He pointed to where the creek was. It would be about a mile walk from the road, and I was welcome to fish it. I half expected to see a fallen angel crouched beside it. The willows along the bank had been charred black, but there was a small intermittent blue ribbon of water coursing through. It resembled a sliver of sky. And when I peered into the water through the tangle of burned brush, I saw fish, remarkable luminous trout, and not so small, considering that the creek was no more than three feet across in most places. I used only the top segment of my three-piece fly-fishing rod to dap a fly into small pools that I approached quietly and carefully. In short order I caught one. Then another, and another. I carefully laid them on my hat to take pictures and then let them go. I made sketches with graphite and colored pencil that might help me remember the pink, purple, and ochre hues that I would try to recreate in the studio. The trout I released were so eager to bite that I probably could have caught each one a second time. That evolution could produce such a fish, able to survive what nature had thrown at it for millennia, was remarkable. Continue Reading We sometimes, correctly, think of nature as fragile. I have described the trout this way, too, and it is indeed vulnerable to rapid alterations of its habitat by humans, from pollution, climate change, or drawing water for irrigation. But all I could think of at that moment was the resilience of nature, the relentlessness of these fish in holding on in an ecosystem that most would consider hostile. I walked back, parched and humbled, to my car, conflicted about having disturbed this place but elated over what I had witnessed. This, of course, was a personal experience that went beyond what a single name or even theory can impart. People called the fish in these upper tributaries the Humboldt cutthroat trout, related to a fish called the Lahontan cutthroat trout. Individuals argued over whether the Humboldt cutthroat should be given a subspecies name or not. Is it a subspecies? Is it distinct enough a population to be given species status? The question What is that? In the desert the only clear answer to me at that moment was: You can argue over what category an individual fish fits into and never come up with a definitive answer—this kind of argument might never be resolved. But one truth you cannot deny is that it exists. I believe that in the future we will no longer need to answer the question What category does that fish fit into—what family, order, genera, or even species? Rather, the relevant questions will be: What is it related to? What is its position in the history of life? How long ago did X separate from Y? I am not a taxonomist, one who spends his life trying to make sense of evolutionary history and then classify accordingly, though I admire that pursuit. My job is easy in comparison. I have set out to create a visual record of biological diversity. Instead of asking What is that? I am simply saying Here it is. Since the publication of the first edition of this book, great changes have taken place in the communication and collection, retention, and dissemination of information about trout and other creatures on the planet. Not

long ago, even as recently as the year , my friends and I planned expeditions by handwriting letters to knowledgeable people in far-off lands and occasionally trying to coordinate a phone call. At that time, if you wanted to learn about a fish like the Humboldt cutthroat trout, there was very little written information and few images available. You had to go see it yourself. The Internet has changed this. Personal blogs and Web sites kept by the trout-obsessed, mostly amateur anglers, contain hundreds of photos of native trout, often geo-referenced to the place where they were caught. Such aggregations of information are valuable growing catalogs of biological diversity thatâ€”in my opinion, as they accumulate with new knowledge of genetic relationships, behavior, and habitat requirementsâ€”will help the importance of certain taxonomic categories fade away. The arguments over what to call fish, I feel, will lose out to an interconnected, complex, reticulate story of life. More than sixty of the fish in this book represent diversity within a single speciesâ€”the brown trout, known by the Linnaean binomial *Salmo trutta*. By painting and presenting them here, I hope I have conveyed that the word speciesâ€”in the way it is used in public, conservationist, and even scientific circlesâ€”is insufficient to communicate biological reality. It all comes, I believe, from trying to define the undefinable. Naming is a necessary act in communicating about the natural world, and an essential part of being human, but it also has great limitations in expressing the real nature of realityâ€”which Darwin exposed to us with his account of the ever-evolving origins of species. Ours is a fluid, continuous, chaotic, and ever-changing world. One hundred and twenty watercolors hardly do justice to the diversity of trout of the world. This book is, of course, a fiction, as you could never build an aquarium large enough or nuanced enough to house all these fish, but here, within these few pages, we can gaze at a fraction of their beauty and see just what we are talking about when we warn that we may lose them. Unless there is an international concerted effort to save trout, we will be the last generation to see many of these fish alive in their native habitats. Their disappearance would not only be a physical loss but a loss to the human imagination.

Chapter 2 : Native Trout of Western North America - Robert J. Behnke - Google Books

There are six major species of trout native to North America. All of these species offer a distinct challenge, and they are all of interest to the angler.

Visit Website Did you know? According to the U. Census Bureau, there are about 4. The Inuit and Aleut had a great deal in common. Many lived in dome-shaped houses made of sod or timber or, in the North, ice blocks. They used seal and otter skins to make warm, weatherproof clothing, aerodynamic dogsleds and long, open fishing boats kayaks in Inuit; baidarkas in Aleut. By the time the United States purchased Alaska in , decades of oppression and exposure to European diseases had taken their toll: The native population had dropped to just 2,; the descendants of these survivors still make their home in the area today. In the Subarctic, travel was difficultâ€”toboggans, snowshoes and lightweight canoes were the primary means of transportationâ€”and population was sparse. In general, the peoples of the Subarctic did not form large permanent settlements; instead, small family groups stuck together as they traipsed after herds of caribou. They lived in small, easy-to-move tents and lean-tos, and when it grew too cold to hunt they hunkered into underground dugouts. Its inhabitants were members of two main groups: Iroquoian speakers these included the Cayuga, Oneida, Erie, Onondaga, Seneca and Tuscarora , most of whom lived along inland rivers and lakes in fortified, politically stable villages, and the more numerous Algonquian speakers these included the Pequot, Fox, Shawnee, Wampanoag, Delaware and Menominee who lived in small farming and fishing villages along the ocean. There, they grew crops like corn, beans and vegetables. Life in the Northeast culture area was already fraught with conflictâ€”the Iroquoian groups tended to be rather aggressive and warlike, and bands and villages outside of their allied confederacies were never safe from their raidsâ€”and it grew more complicated when European colonizers arrived. Meanwhile, as white settlement pressed westward, it eventually displaced both sets of indigenous people from their lands. The Southeast The Southeast culture area, north of the Gulf of Mexico and south of the Northeast, was a humid, fertile agricultural region. Many of its natives were expert farmersâ€”they grew staple crops like maize, beans, squash, tobacco and sunflowerâ€”who organized their lives around small ceremonial and market villages known as hamlets. Perhaps the most familiar of the Southeastern indigenous peoples are the Cherokee, Chickasaw, Choctaw, Creek and Seminole, sometimes called the Five Civilized Tribes, who all spoke a variant of the Muskogean language. By the time the U. In , the federal Indian Removal Act compelled the relocation of what remained of the Five Civilized Tribes so that white settlers could have their land. The Cherokee called this frequently deadly trek the Trail of Tears. Before the arrival of European traders and explorers, its inhabitantsâ€”speakers of Siouan, Algonquian, Caddoan, Uto-Aztecan and Athabaskan languagesâ€”were relatively settled hunters and farmers. After European contact, and especially after Spanish colonists brought horses to the region in the 18th century, the peoples of the Great Plains became much more nomadic. Groups like the Crow, Blackfeet, Cheyenne, Comanche and Arapaho used horses to pursue great herds of buffalo across the prairie. The most common dwelling for these hunters was the cone-shaped teepee, a bison-skin tent that could be folded up and carried anywhere. Plains Indians are also known for their elaborately feathered war bonnets. As white traders and settlers moved west across the Plains region, they brought many damaging things with them: With settlers encroaching on their lands and no way to make money, the Plains natives were forced onto government reservations. The Southwest The peoples of the Southwest culture area, a huge desert region in present-day Arizona and New Mexico along with parts of Colorado , Utah , Texas and Mexico developed two distinct ways of life. Sedentary farmers such as the Hopi, the Zuni, the Yaqui and the Yuma grew crops like corn, beans and squash. Many lived in permanent settlements, known as pueblos, built of stone and adobe. These pueblos featured great multistory dwellings that resembled apartment houses. At their centers, many of these villages also had large ceremonial pit houses, or kivas. Other Southwestern peoples, such as the Navajo and the Apache, were more nomadic. They survived by hunting, gathering and raiding their more established neighbors for their crops. Because these groups were always on the move, their homes were much less permanent than the pueblos. For instance, the Navajo fashioned their iconic eastward-facing round houses,

known as hogans, out of materials like mud and bark. Spanish colonists and missionaries had enslaved many of the Pueblo Indians, for example, working them to death on vast Spanish ranches known as *encomiendas*. The Great Basin The Great Basin culture area, an expansive bowl formed by the Rocky Mountains to the east, the Sierra Nevadas to the west, the Columbia Plateau to the north, and the Colorado Plateau to the south, was a barren wasteland of deserts, salt flats and brackish lakes. Its people, most of whom spoke Shoshonean or Uto-Aztecan dialects the Bannock, Paiute and Ute, for example , foraged for roots, seeds and nuts and hunted snakes, lizards and small mammals. Because they were always on the move, they lived in compact, easy-to-build wikiups made of willow poles or saplings, leaves and brush. Their settlements and social groups were impermanent, and communal leadership what little there was was informal. After European contact, some Great Basin groups got horses and formed equestrian hunting and raiding bands that were similar to the ones we associate with the Great Plains natives. California Before European contact, the temperate, hospitable California culture area had more peopleâ€”an estimated , in the midth centuryâ€”than any other. It was also more diverse: Its estimated different tribes and groups spoke more spoke more than dialects. Despite this great diversity, many native Californians lived very similar lives. They did not practice much agriculture. Instead, they organized themselves into small, family-based bands of hunter-gatherers known as *tribelet*s. Inter-tribelet relationships, based on well-established systems of trade and common rights, were generally peaceful. Spanish explorers infiltrated the California region in the middle of the 16th century. The Northwest Coast The Northwest Coast culture area, along the Pacific coast from British Columbia to the top of Northern California, has a mild climate and an abundance of natural resources. As a result, unlike many other hunter-gatherers who struggled to eke out a living and were forced to follow animal herds from place to place, the Indians of the Pacific Northwest were secure enough to build permanent villages that housed hundreds of people apiece. Those villages operated according to a rigidly stratified social structure, more sophisticated than any outside of Mexico and Central America. Goods like these played an important role in the *potlatch*, an elaborate gift-giving ceremony designed to affirm these class divisions. Most of its people lived in small, peaceful villages along stream and riverbanks and survived by fishing for salmon and trout, hunting and gathering wild berries, roots and nuts. In the 18th century, other native groups brought horses to the Plateau. In , the explorers Lewis and Clark passed through the area, drawing increasing numbers of disease-spreading white settlers. By the end of the 19th century, most of the remaining Plateau Indians had been cleared from their lands and resettled in government reservations.

Chapter 3 : Brook Trout: A Thorough Look at North America's Great Native Trout- Its History, | eBay

Atlantic Trout and Salmon. The genus Salmo is comprised of two species that are found in North America (one native and one introduced), as well as a number of other species and subspecies native to Europe, Africa and Asia.

Salmo trutta Introduction Brown trout are members of the Atlantic trout and salmon subgroup of the salmon family Salmonidae which also includes the Sevan trout, Ohrid trout, Adriatic trout, flathead trout and Atlantic salmon. Of these, only the Atlantic salmon is native to North America, the remaining species, including brown trout are Eurasian species. Considered the most valuable exotic fish introduced to North America, the brown trout is known by few other names, the most commonly used being the "German" brown, a reference to the dominant brood stock propagated in North America. The name trutta is Latin for trout. Brown trout have higher tolerance for warmer waters than either brook or rainbow trout.

Physical Description Within the few park streams inhabited by brown trout, individual fish typically range from 7 to 14 inches in total length with exceptional individuals approaching 20 inches. The largest brown trout in Virginia occupy large dam outflow habitats and large reservoirs where waters are cooler. The current state record specimen 14 pounds, 12 ounces was captured in the South Fork, Holston River in southwestern Virginia on May 24, Brown trout are tawny to olive brown dorsally to mid side, often with a brassy appearance. Sides grade from tan to yellow. Their back and sides are marked with olive brown to black spots. Their sides also marked with orange to red spots, some haloed with white to pale blue. Their undersides, including the lower jaw, are white to pearl. The dorsal fin is typically yellow-olive, marked with brown to black spots. Lower fins including the pectoral, pelvic and anal have white margins, paralleled just above by a dark zone and are otherwise yellow-olive to amber, sometimes yellow orange. Breeding males develop a long, hooked jaw and tend to brighten in overall coloration.

Life Span and Reproduction The life span of wild brown trout is variable depending on the size and condition of their habitat. Generally, brown trout have greater longevity than brook trout, averaging about five years. In many naturalized populations, some individuals reach ages in excess of 10 years. In most park streams, maturation age breeding occurs between 1 and 3 years. In Virginia streams, brown trout spawn in the fall, nearly overlapping the brook trout spawning season from October through November, sometimes extending into December. Typical water temperatures at the onset of spawning range from 6. Redds are typically excavated by females in gravelly transition zones between pool and riffle habitats. Spawning, incubation period and the timing of hatching are similar to those of the brook trout. Growth is defined by the quality and availability of forage and habitat also similar to the brook trout. In the few park streams that contain naturalized brown trout populations, juvenile browns reach sizes of four inches and greater by the end of their first summer. Hybridization with brook trout has been documented in every park stream containing cohabitant populations of both species. The progeny resulting from male brook trout and female brown trout are known generally as "tiger trout". Within the few park streams where both species coexist, tiger trout are occasionally encountered. Interestingly, tiger trout observations seem to occur during periods when the brown trout population is depressed creating conditions where female brown trout are more likely to be encountered and spawned by male brook trout. Reciprocal crosses between male brown trout and female brook trout have never been observed in the wild. These progeny, known as "leopard trout", have only been produced artificially among captives and are morphologically different in external comparison to tiger trout. Pink color indicating exotic species. Within the park, brown trout have successfully colonized the lower gradient reaches of the Rose and Hughes Rivers since initial stockings in the s and more recently have invaded upstream into Brokenback Run from its confluence with the Hughes. There is also a naturalized population of browns within a section of the Conway River that serves as a common boundary between the park and the Rapidan Wildlife Management Area, owned by Virginia. The magnitude of the population that persisted within the Thornton River from initial stocking in the s is unknown but that population apparently perished by about Brown trout are considered native in Iceland, Europe, western Asia and northwestern Africa. These highly adaptable trout have been extensively introduced and now occur on every major continent except Antarctica. Brown trout have been propagated within North America since the late s including the state of Virginia. The

most widespread introductions of brown trout into Virginia waters including streams that originate within the park occurred after Behavior In heavily fished waters, brown trout may become increasingly wary and nocturnal and very selective in which food items they will and will not respond to. Due to a combination of size and diet, brown trout often displace native brook trout where the two species overlap. They tend to dominate the best available habitat by either forcing brook trout from preferred habitat and, to an extent, by preying directly upon brook trout. Diet Brown trout feeding strategies and diet differ with respect to their size. Generally, brown trout less than 12 inches feed primarily on insects drifting freely within stream currents. Above 12 inches, brown trout diets shift to larger prey items including crayfish and other fish, including other trout. Other occasional prey items include mollusks, salamanders, frogs and small mammals. Ecosystem Role Because brown trout are large, non-native and a dominant predatory fish, they are a threat to native fish populations, particularly within the confines of small, mountain stream habitats. In turn, the smaller and intermediated sized brown trout are preyed upon by northern water snakes, mink, kingfishers, herons and the occasional otter within Shenandoah National Park. As is true for brook trout within park streams, the northern water snake is very likely responsible for a fairly high percentage of brown trout predation within the park. While conducting brown trout removals within Rose River in , the fish crew observed a large water snake in the process of engulfing an 8 to 9 inch brown trout that it had recently captured. Threats Brown trout are wily, large and highly prized game fish. Currently, the brown trout issue is confined to the lower reaches of three park streams. Brown trout have demonstrated the potential to displace brook trout from entire sections of those three streams. Like brook trout , brown trout are somewhat tolerant of acidified waters. Brown trout are also likewise subjected to sudden and sometimes dramatic changes in population as the result of severe flood and drought events. Freshwater fishes of Virginia. American Fisheries Society, Bethesda, Maryland.

Chapter 4 : Consent Form | Outdoor Life

The following is an excerpt on trout species of North America from the chapter "Selected Diversity of North American Trouts". In September, driving east from California to Colorado, I decided to stop in the desert to try to catch a native trout called the Humboldt cutthroat.

Taxonomy[edit] Most of the Mexican native trout are considered subspecies of the rainbow trout *O. Cope* in where he describes two specimens from Chihuahua as having the appearance of *Salmo purpuratus* a name sometimes incorrectly used for cutthroat trout *Oncorhynchus clarki*. Nelson with the U. Biological Survey led explorations into the Mexican mainland and Baja California peninsula to document flora and fauna. Evermann as a new species *Salmo nelsoni*, the Baja rainbow trout. Bureau of Fisheries began a series of explorations, and into the Rio Santo Domingo drainage in Baja California seeking to bring back live specimens of the Baja rainbow trout as hatchery stock and further study. Although live specimens reached U. It contains the first full color drawing of the Mexican golden trout. The specific name *chrysogaster* is derived from the Greek for "golden belly". In, fisheries biologist Robert J. He described a number of local forms of the Mexican rainbow trout primarily based on the river systems they occurred in. The authors, in discussing their findings, state: Clustering analyses of data from over genetic markers further indicates that there exist at least five major genetic lineages of native trout in Mexico. These clusters originated from at least two, and possibly three, separate colonization events of basins in Northwestern Mexico. The first event gave rise to *O.* Genetic similarity of the southern-most SMO populations with *O.* We also found significant divergence between native trout from the SMO and populations of the widespread *O.* The phylogeny of Mexican native trout is an unsettled science. Some studies suggest that the trout are descendants of the coastal rainbow trout *O.* Others have suggested a connection to the inland redband trout *O.* The first scientific collections of trout from Mexico were by Prof. Nathaniel Thomas Lupton in the early s. In, Ralph G. Miller an American researching Mexican ichthyofauna near El Salto collected the earliest surviving specimens of the Rio del Presidio trout which now reside in the Smithsonian Institution. Behnke, the Rio del Presidio trout were the southernmost natural distribution of any member of the family Salmonidae. The many forms of Mexican native trout are typically described by the river systems they occur in.

Chapter 5 : Native Trout Fly Fishing: Brook Trout

The native westslope cutthroat trout (named for the slash of red on its throat) is staging a comeback after decades of losing ground to its immigrant cousins in the Rocky Mountains.

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Chapter 6 : Native Trout Fly Fishing: Trout and Salmon Species

Native Trout of Western North America by Robert J. Behnke Monograph 6 This book results from almost four decades of research and practical experience with this.

Homesteading There are six major species of trout native to North America. All of these species offer a distinct challenge, and they are all of interest to the angler. But perhaps more importantly, these Native species belong in America. They are a natural and valuable part of our natural environment. Some folks are likely to shake their heads at one notable omission in this article: While brown trout are widely established throughout America, they are not native to our continent. Brown trout are originally a European species, transported to America many years ago. Rainbow trout Rainbow trout are probably the most common species of trout in North America. They are native to the Pacific coast states, western Canada, and Alaska. With that said, rainbows are found in streams across the nation, from British Columbia to Georgia. They are the most common hatchery fish, because they easily reproduce in captivity. Still, there are many truly wild and native populations, and those places often have the most interesting rainbow trout fishing. The Rainbow trout there grow to the five to fifteen pound range on the eggs and carcasses of the salmon that run in the stream. A close second would be the Klamath River in Oregon, with excellent runs of large sea-run rainbows, called Steelhead. They are sometimes referred to as the Rocky Mountain Trout, because that is where most of the cutthroat populations exist. There are also sea-run cutthroat in the Pacific Northwest and Alaska, but Cutthroat will always be associated with high mountain streams. The best cutthroat populations are often found in sections of stream that are too fast and too cold for other trout species, because they do not compete well with rainbow, brown, and brook trout. Cutthroat trout are renowned for their propensity to freely rise to dry flies, which makes them an excellent sport fish. There are many varieties of cutthroat trout, but the most common are the Yellowstone Cutthroat, the Snake River Cutthroat, and the Coastal Cutthroat. Brook trout have also been established in the Rocky Mountains, and are the predominant species in many if not most small western trout streams. They have gained ground in their non-native territory the Rocky Mountain west , and lost ground in the east, where they are native. The situation has progressed to the point that there are probably more brook trout fisheries in the Rocky Mountain West than the east. Still, the brook trout is a fine sport fish wherever it is found, and it will gladly rise to a dry fly or a small spinner. They generally do not grow large, and are usually not difficult to catch. Regis in Maine, and the upper Yaak in Montana. Bull Trout Not many people have heard of the Bull trout. The best populations are now found in Montana, British Columbia, and Alberta. There are several places where you can fish for Bull trout on a catch and release basis in Montana, but British Columbia offers by far the best fishing. Lake Trout Lake trout are a deep water fish, present in Glacial lakes and reservoirs throughout the northern portion of the continent. They are seldom in water deeper than 20 feet except during the spawn, when they come shallow and the fishing is best. They are best caught with spoons and jigs fished in deep water. They are a rare, beautiful high mountain fish. They live mostly in high altitude lakes and streams. They have also been transplanted with favorable results to high mountain lakes in Montana, Wyoming, and Colorado. Golden Trout are another rare species that should usually be released unharmed. They are simply too beautiful to be caught just once. All of these trout species are native to North America, and they are an important inhabitant in our streams. While some of these species may have more sporting value than others, it is important that we respect and work to protect all of them. Learn about places to fish, get great fishing tips, and get fishing gear tips at:

Chapter 7 : Trout Species of North America - Animals - GRIT Magazine

is particularly true for all native trout in western North America, where widespread introgression among nonnative and native species has often created hybrid swarms over extensive geographic areas resulting genomic extinction.

Poole By Robert M. Poole Smithsonian Magazine Subscribe August The immigrants, crowded into the damp hold of the German steamship Werra, were not particularly welcome when they made landfall in the United States on February 24. Xenophobic feelings were running high, with many Americans worried that the Europeans would displace residents already struggling to stay afloat. The critics were quite nasty about the newcomers, variously described as scaly, voracious, monstrous and homely. They stole food from natives. They had sharp teeth. They ate their young. They were greenish yellow with red spots. Specifically, the fish disembarking the Werra that February were trout-to-be in the form of 80, fertilized eggs from a hard-fighting strain of *Salmo trutta*, the European brown trout, which makes its first appearance in Roman literature about a. The consequences of its arrival are felt—on the riverbank, in public hearing rooms and in courthouses—to this day. Indeed, it is not too much of a stretch to suggest that the continuing story of trout in America—native and introduced, threatened and thriving—is a fair reflection of our own restless history, with its marathon migrations, its paroxysms of prejudice, its well-intentioned blunders and its reassuring urge to set those blunders right again. Before we get into that, let us return to the invasive species that launched this fish story. It began, suitably, with a fishing trip. Mather, a founding father of fish propagation in the New World, was determined to import brown trout to America. Some were allowed to develop into fry, others were dispatched to hatcheries in Caledonia, New York, and still others to the U. Fish Commission station in Northville, Michigan. They and their progeny, reinforced with shipments from Germany, England and Scotland, would be released into the rivers of their adoptive homeland and soon were thriving in streams from New England to the Rockies. They spawned; they grew fat; they ate their young; and, yes, they did exactly as the xenophobes predicted—they muscled aside the native brook trout of the East, beloved of Winslow Homer and Daniel Webster. Brown trout grew bigger than brookies, could withstand warmer water and were fiercely territorial, sending their homegrown cousins scoting upstream in search of new quarters. Not that there were many brook trout left to harass by the s. This was thanks not to *Salmo trutta* but to *Homo sapiens*. As cities and towns spread in the years following the Civil War, forests were felled for timber, rivers made into logging runs, towering hemlocks axed for tanneries and hardwoods ground up for distilling in acid factories. Brook trout, scientifically known as *Salvelinus fontinalis*—the "little salmon of the fountain"—had lost their fountains, the clear, cool, richly oxygenated waters they need to survive. By , Forest and Stream magazine reported little hope: Before the 20th century ran its course, brown trout had taken control of the Beaverkill River of New York, the Letort of Pennsylvania, the Pere Marquette of Michigan, the Madison of Montana and other waters soon to become legendary in the chronicles of American angling. In the years since, fishermen and fisherwomen have flourished with the brown trout. Today, although marginalized and reduced in number, the beleaguered brook trout hangs on in the East. The fish find refuge in the high, thin tributaries of the Catskills; in the secluded ponds of Maine and Michigan; and in the little rivers of the Blue Ridge and the Alleghenies. Thousands were scooped up and saved for hatcheries in the 19th century; these helped replenish Eastern streams and provided stock in places where brook trout had never lived before—where today they are cast, ironically, in the role of invaders, driving the natives before them. Whether a trout is a nuisance or a valued member of the community depends upon where you stand on the map. Of the four major trout species in the United States—rainbow, brook, cutthroat and brown—only the brown trout was introduced from abroad, but any of the four might be considered invasive when introduced into a new watershed. Thus, a rainbow trout *Oncorhynchus mykiss* transplanted from its native California to Virginia is regarded as a nonnative in its new home; by the same reasoning, an Eastern brook trout becomes a pest in Western streams. It has displaced resident trout from the small rivers and lakes of Montana, Colorado, New Mexico and other mountain states. Squeezed on one side by invasive brook trout, native cutthroats are also under challenge from rainbow trout, a cousin introduced from the Pacific Coast. Cutthroats comprise at least 13 separate subspecies,

each one fine-tuned by centuries of evolution for a particular nook or cranny of rugged mountain and desert living. Of these subspecies, two are extinct, two endangered and many others in trouble. When fast-acting piscicides such as antimycin or rotenone have done their work and dissipated, natives are reintroduced to the stream. Such poisoning and relocation programs have led, in part, to the recovery of many previously imperiled fish: The once-endangered Paiute cutthroat of California, likewise now listed as threatened, has returned in decent numbers, as have the Lahontan cutthroat of Nevada and the Bonneville cutthroat of the Great Basin. In the East, meanwhile, biologists at the Great Smoky Mountains National Park have begun poisoning some creeks to rid them of rainbow trout, imported from California in the s and thriving in the Smokies ever since. Perhaps the sweetest comeback belongs to the greenback cutthroat trout: They had never really left, of course, just disappeared from view for a few decades. From the tiny group of fish Behnke discovered in Como Creek, some 60 new greenback populations have been transplanted throughout the Rocky Mountain National Park and surrounding national forests, ensuring a secure future for the trout that almost got away. Behnke and I made a pilgrimage to the section of the Roosevelt National Forest where he rediscovered the greenbacks. We stood quietly among the aspens while peering into Como Creek, no more than three feet wide. One fish appeared as a shadow holding its place in the clear cold water, facing upstream. Bronze-sided and boldly spotted, it blended perfectly with the brown, pebbly creek bottomâ€”proof that some environmental disaster stories have happy endings. We spotted more fish as we worked our way downstream, stopping where the tiny creek disappears under a roadway. Behnke strained for a last look, pausing before he spoke: This happened for the best of motives: This long-accepted practice, thought to be modern, progressive and scientifically based, has only recently been questioned by biologists, conservation groups and game agencies concerned about the long-term health of trout populations. The plan, announced in March by the U. The project is modeled after the largely successful habitat restoration plan launched for waterfowl in the s. In some Western states and in most national parks, biologists and wildlife managers believe that the future health of trout populations will also be enhanced by less emphasis on hatchery-raised fish and more on habitat improvement. Hatchery trout, which still form the basis of state programs in much of the heavily populated East, are also expensive to raise and to transport to streams, where they are quickly caught by anglers or dispatched by other predators. Less than 1 percent of such fish survive from one season to the next, according to Behnke. We get bigger and better fish that way. They are more resistant to disease, and they survive longer. I plunked a fuzzy green fly made of feathers and synthetic yarn in that direction. It drifted down through the clear current, and a trout lunged for it. The fish weighed about three pounds, his butter-colored sides sprinkled with vermilion spots. We quickly returned him to the river, where, with a flick of his tail, he melted into the gloom. It was a brown trout. Though not native to Montana, he was as wild as a one-eyed jack, his ancestors having been born, bred and tested in the Madison over many generations. In that time the browns had taken over the province of westslope cutthroat trout, which were surviving in the river system but in smaller numbers than the now-dominant browns and rainbows. Which fish had the stronger claim? As we slid through the mountains, I posed this question to Grossenbacher: People come from all over to catch them. In question was whether the state, in partnership with Turner, could poison portions of the creek to kill nonnative brook trout, rainbows and hybrids and to create a reserve for a genetically pure strain of westslope cutthroat trout. A federal appeals court had ruled in favor of the restoration, and the poisoning had begun. For the moment, nobody proposes killing the huge population of nonnative fish that make the Yellowstone and Madison rivers so popular for fishermen. They might themselves be considered invasive, descending in large groups summer and fall, shuffling through the Bozeman airport with their rod tubes while gasping for oxygen in the thin mountain air. With part of the money Montana collects from such visitors, and with funds saved from closing most of its hatcheries, the state is emphasizing habitat improvement, so that its rivers will have cleaner water, less erosion, better spawning beds and better cover from streamside vegetationâ€”all of which make them more productive. Repairing a trout stream may involve nothing more elaborate than planting a few willows or cottonwoods to stabilize the banks, or fencing out cattle to keep them from trampling the shoreline and fouling the water. In other cases, where years of poor land use have seriously degraded a trout stream, more extreme fixes are required. That brought Ty Smith into the field. He sat at the controls of his BL Caterpillar, chewing

his way through a pasture near Ovando, Montana. The object of his attention was muddy, silt-laden Hoyt Creek, which looked more like a drainage ditch than a living stream. In a matter of weeks, cold, clear water would be flowing up from the underlying aquifer to Hoyt Creek, which would spill downstream and knit the tributaries together with the main river. That would provide new habitat for native westslope cutthroats and bull trout, both of which have been struggling. Like the ranchers and cowboys who settled this part of western Montana, young trout are programmed for traveling. Fish hatched in the tributaries of the Big Blackfoot would migrate to the main stem, establish residence and pioneer new sections of the watershed. If you built it, they would come, right to the spot where Ryen Aasheim now stood ankle deep in muck. The earliest, I think, was four months from the time we finished a project like this one. Rue, a big, bluff man with a gray mustache and an enthusiasm for trout, met me on a wooden footbridge spanning his creek. The water was muddy and sludgy, too warm for fish. It was pretty much dead when I came here in . Now Kleinschmidt Creek runs as clear and cool as the Montana air, cutting under banks deeply shaded by cottonwoods and native grasses. Rue was in particularly good humor because he had landed and released a inch cutthroat trout just the day before, a sign that the natives were returning. A lot happened between those two dates. Even stocked trout virtually vanished after , when Montana stopped dumping hatchery fish in the river. With almost nothing to catch, local anglers mourned and complained. But they did little to improve the situation until , when the Sunshine Mining Company spurred them to action with its plans for a new open-pit gold mine near Lincoln, where the river rumbles down from the Continental Divide. This led, in , to the first restoration efforts, which have continued in the years since, with more than 45 tributaries restored, 48 miles of stream channel reconstructed and access for migratory fish opened to miles in the river system. In the same period, some 2, acres of wetlands have been preserved, 2, acres of native grasslands put to rights and 93, acres of private lands placed in perpetual conservation easements. In addition, the community group Blackfoot Challenge has joined with the Nature Conservancy to purchase 88, acres of corporate timberlands and transfer the parcels to a variety of public and private interests. Perhaps the most unlikely player in this incongruent cast is Jim Stone, a second-generation rancher and chairman of the Blackfoot Challenge, which represents the disparate interests of those living in the watershed. But now I can seeâ€”damn! You get good water, you get good grass, you get good grass, you get good cows!

Chapter 8 : Mexican native trout - Wikipedia

Rainbow trout are probably the most common species of trout in North America. They are native to the Pacific coast states, western Canada, and Alaska. With that said, rainbows are found in streams across the nation, from British Columbia to Georgia.

For centuries before the discovery of rainbows, cutthroats, and brookies, when people went "trout" fishing, they went brown trout fishing. Today they can be caught in the Northeast, the Appalachians, the Upper Midwest, and the mountainous regions of the West. Young brown trout parr have dark narrow parr marks along the sides and some red spotting along the lateral line. In North Carolina, their sides are silvery or brownish yellow and bellies are white or yellowish; dark spots, sometimes encircled by a pale halo, are plentiful on the back and sides; spotting also can be found on the head and the fins along the back; rusty-red spots also occur on the sides; the small adipose or fatty fin in front of the tail has a reddish hue; They closely resemble Atlantic salmon and rainbow trout, but salmon have no red coloration on the adipose fin and rainbow trout have lines of black spots on the tail. Young brown trout parr have dark narrow Parr marks along the sides and some red spotting along the lateral line. Brown trout have a distinct preference for the slower pockets and sections of streams where the water is crystal clear and the current is moderate but offers easy access to food. However, they also require abundant cover and will seldom venture out hiding during period of bright sunlight. In addition, since they require slightly less oxygen than either Brooks or Rainbows, they can tolerate slightly higher water temperatures. In fact, they are commonly found in the lower sections of rivers and streams that are well beyond the tolerance range of either Brook or Rainbow trout. Brown trout consume a variety of aquatic and terrestrial insects as well as earthworms, snails, crayfish, salamanders, frogs, sculpins, dace, and even their own fry. All trout are opportunistic feeders, which means if a meal, such as a worm or a minnow or what is perceived by the trout as a meal, is usually eaten. Brown trout spawn in the fall and early winter October to February at the same time Brook speckled trout spawn, or later. The female uses her body to excavate a nest redd in the gravel. She and the male may spawn there several times. A 5 lb female produces about golden colored eggs that are 4 to 5 mm in diameter. Females cover their eggs with gravel after spawning and the adults return downstream. The eggs develop slowly over the winter, hatching in the spring. A good flow of clean, well-oxygenated water is necessary for successful egg development. After hatching, the young fish called alevins remain buried in the gravel and take nourishment from their large yolk-sacs. By the time the yolk-sacs are absorbed, water temperatures have warmed to 44 degrees to 53 degrees. The fish now known as fry emerge from the gravel and begin taking natural food. They mature in their third to fifth year and many become repeat spawners. Seldom longer than years in the wild.

Chapter 9 : Which Trout are Native to the Rockies? - Jake's Nature Blog

In , fisheries biologist Robert J. Behnke published *Trout and Salmon of North America* documenting a lifetime study of North American trout and salmon. In *Trout and Salmon of North America*, Behnke described two species of trout—the Mexican golden trout (*O. chrysogaster*) and the Mexican rainbow trout (*O. m. nelsoni* and *O. m. ssp*).

Observations spanning multiple months or years are excluded from time charts Migration Westslope cutthroat trout have three possible life forms, adfluvial migrates to lakes , fluvial migrates to rivers or resident stays in streams. All three life forms spawn in tributary streams in the springtime when water temperature is about 10 degrees C and flows are high with spring run-off. Habitat Spawning and rearing streams tend to be cold and nutrient poor. Westslope Cutthroat Trout seek out gravel substrate in riffles and pool crests for spawning habitat. Cutthroat trout have long been regarded as sensitive to fine sediment generally defined as 6. Although studies have documented negative survival as fine sediment increases Weaver and Fraley , it is difficult to predict their response in the wild McIntyre and Rieman This is due to the complexity of stream environments and the ability of fish to adapt somewhat to changes in micro-habitat Everest et al. Westslope Cutthroat Trout also require cold water, although it has proven elusive to define exact temperature requirements or tolerances. Likewise, cutthroat trout tend to thrive in streams with more pool habitat and cover than uniform, simple habitat Shepard et al. Juvenile cutthroat trout overwinter in the interstitial spaces of large stream substrate. Adult cutthroat trout need deep, slow moving pools that do not fill with anchor ice in order to survive the winter Brown and Mackay , Montana AFS Species Status Account. Food Habits Westslope cutthroat trout primarily are invertivores through most life-stages: Larger-aged fish greater than 12 inches may eat sculpin or other small aquatic vertebrates. Ecology Westslope Cutthroat Trout have three possible life forms, adfluvial migrates to lakes , fluvial migrates to rivers or resident stays in streams. All three life forms spawn in tributary streams in the springtime when water temperature is about 10 degrees Celsius and flows are high Liknes and Graham While resident fish spend their entire life in tributary streams, migratory life forms can travel several hundred kilometers as they move between adult and spawning habitat Montana AFS Species Status Account. In Montana, the maximum age of fish from 29 headwater streams was 8 years-old based on otoliths Downs Size at sexual maturity in these streams ranged from to millimeters in males and to in females Downs Female fecundity ranged from to eggs and was generally correlated with length Downs Management Management of this species involves protecting the population strongholds and making tough decisions on restoration priorities for the depressed populations. The State of Montana has altered fishing regulations to reduce fishing mortality. Montana has also developed a Conservation Agreement signed by nine government agencies and conservation groups Montana Department of Fish, Wildlife and Parks This agreement prioritizes protecting genetically pure populations first, then slightly introgressed populations. Recovering depressed populations will involve habitat restoration and removing non-native species. Research suggests that it is not a good idea to bolster populations with stocked fish from other watersheds due to considerable genetic variation between watersheds Leary et al. It will be especially challenging to recover migratory life forms. Governmental agencies will need to work together to share expertise, pool financial resources and monitor progress toward restoration of this species Montana AFS Species Status Account. Threats or Limiting Factors There are four primary reasons for the decline of this species. Cutthroat trout have declined due to sedimentation and warming water temperatures in streams due to poor grazing practices, logging, mining, agriculture, residential development. Loss of hundreds of stream miles of spawning habitat due to dewatering of streams for irrigation and barriers created by dams and road culverts. Brook trout, rainbow and brown trout outcompete juvenile cutthroat trout for food and dominate a stream. Westslope cutthroat trout readily hybridize with rainbow trout and other non-native cutthroat trout subspecies. Westslope cutthroat trout are highly susceptible to angling. Native trout of western North America. American Fisheries Society Monograph 6. Fall and winter movements of and habitat use by cutthroat trout in the Ram River, Alberta. Transactions of the American Fisheries Society 6: Age determination, growth, fecundity, age at sexual maturity, and longevity for isolated, headwater populations of westslope cutthroat trout. Thesis, Montana State University, Bozeman. Fine sediment and

salmonid production: Forestry and Fishery Interactions. University of Washington, Seattle, Washington. Lack of genetic divergence between westslope cutthroat trout from the Columbia and Missouri River drainages. Success of basibranchial teeth in indicating pure populations of rainbow trout and failure to indicate pure populations of westslope cutthroat trout. North American Journal of Fisheries Management Westslope cutthroat trout in Montana: American Fisheries Society Symposium 4: Conservation assessment for inland cutthroat trout. Montana Chapter of the American Fisheries Society species status accounts. Memorandum of understanding and conservation agreement for westslope cutthroat trout *Oncorhynchus clarki lewisi* in Montana. Fisheries habitat and fish populations.