

Great Rivers of the West: **WYOMING**



DREAMSTIME



WESTERN RIVERS
CONSERVANCY

Report prepared by Tim Palmer and Ann Vileisis



JIMMY SMITH

Grand Canyon in Yellowstone. Cover: Shoshone River.

Letter from the President

Rivers are the great treasury of biological diversity in the western United States. As evidence mounts that climate is changing even faster than we feared, it becomes essential that we create sanctuaries on our best, most natural rivers that will harbor viable populations of at-risk species—not only charismatic species like salmon, but a broad range of aquatic and terrestrial species.



That is what we do at Western Rivers Conservancy. We buy land to create sanctuaries along the most outstanding rivers in the West – places where fish, wildlife and people can flourish.

With a talented team in place, combining more than 150 years of land acquisition experience and offices in Oregon, Colorado, California, and Washington, Western Rivers Conservancy is well positioned to fulfill its mission in 11 western states.

Yet if we are to conserve the great rivers of the West, we need to know which rivers these are. To develop an inventory of the highest quality rivers, we turned to Tim Palmer—a noted author and photographer with 35 years of experience exploring hundreds of streams throughout the West.

The principal goal of the survey was to develop a list of the most outstanding natural rivers—the great rivers of the West. Criteria included free-flowing length, natural flow regime, water quality, biological health and habitat, ecological and regional diversity and recreational suitability, among other attributes. A committee of

noted scientists and other experts reviewed the survey design, and state-specific experts reviewed the results for each state.

The result is a state-by-state list of more than 250 of the West's outstanding streams, some protected, some still vulnerable. The Great Rivers of the West is a new type of inventory to serve the modern needs of river conservation—a list that Western Rivers Conservancy can use to strategically inform its work.

This is one of 11 state chapters in the report. Also available are a summary of the entire report, as well as the full report text.

With the right tools in hand, Western Rivers Conservancy is seizing once-in-a-lifetime opportunities to acquire and protect precious streamside lands on some of America's finest rivers.

This is a time when investment in conservation can yield huge dividends for the future. We invite you to join forces with us as we work to buy and conserve high-quality lands on the Great Rivers of the West. Please visit our website at www.westernrivers.org, or you may contact me at sdoroff@westernrivers.org or 503-241-0151 to learn more.

For Our Rivers,

A handwritten signature in blue ink, appearing to read 'Sue Doroff'. The signature is stylized with large, flowing loops.

Sue Doroff
President

Introduction

Great Land, Great Rivers

Rivers and streams may be the most valuable of all natural resources in the western United States. They provide for a wide range of human needs—everything from drinking water and recreation to hydroelectricity and agriculture. At the same time, they offer crucial habitat and migration routes for fish and wildlife—often in otherwise arid landscapes. Even more fundamentally, they sustain vital natural processes—the hydrologic cycle, the flow of groundwater, and the growth of forests—that nourish all of life.

An extraordinary network of rivers flows from mountaintops to deserts, lowlands, and seashores. Among thousands of streams, several hundred remain as exemplary natural waterways.

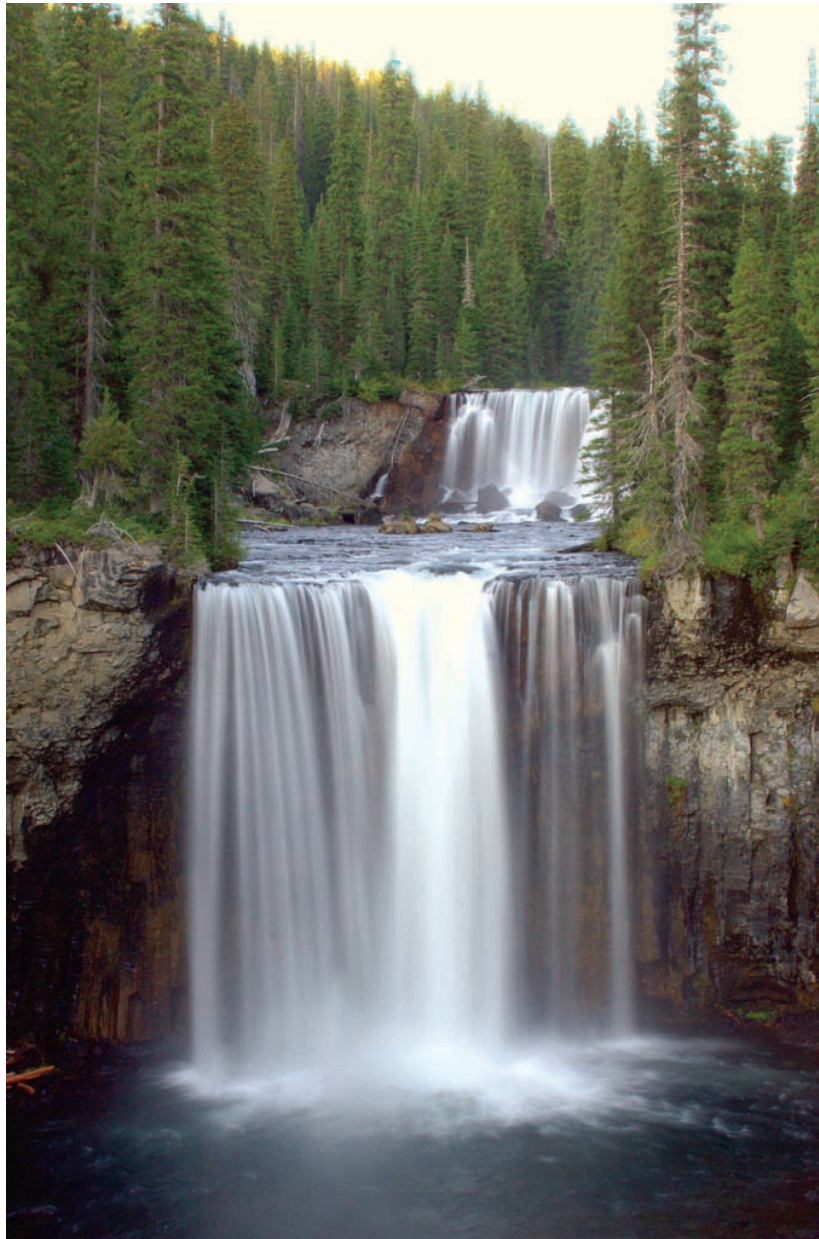
Bound for the Pacific Ocean, rivers of the coastal states flow through remarkably varied terrain—from high elevations to sea level, and through drylands as well as the greatest temperate rainforests on earth. In California, the Smith River is the only sizable undammed river in the state and still supports runs of wild salmon. In the Sierra Nevada, the Kings, North Fork of the Kern, and other streams flow magnificently from alpine headwaters to lower foothill elevations. In Oregon, the Elk and Illinois are criterion natural rivers of the Pacific Coast Range, and the Rogue is one of few rivers that winds without development or roads as it cuts through these far-western mountains. In Washington, an incomparable suite of still-wild rivers drops from towering Mount Olympus, and in the glacier-carved North Cascades, the Skagit and Sauk River systems are among the finest for salmon, steelhead, and deep forest frontage with long, free-flowing mileage.

In the Rocky Mountains, a few rivers remain with exceptionally long reaches of undammed, watery pathways through the rugged terrain, and others are critical to fish and wildlife even though they are shorter. The Salmon of Idaho, perhaps America's premier river for combined length and natural mileage, runs for more than 400



Lamar Buffalo in Yellowstone National Park

miles through a geographic maze of eight major mountain ranges and still supports one of the West's most notable runs of salmon. The Selway is even wilder, pulsing down from its headwaters in the Bitterroot Mountains. Montana has the forks of the Flathead—each remarkable for its clarity, beauty, and habitat of rare bull trout and wildlife including grizzly bears and wolves. The Yellowstone flows for more than 600 miles without large dams, its nature still largely intact from Rocky Mountain heights to the heart of the Great Plains. In Wyoming, rivers of the renowned Greater Yellowstone Ecosystem include outstanding tributaries to the upper Snake and its incomparable riparian corridor beneath the craggy peaks of the Teton. In Colorado, the Yampa has one of the finest cottonwood forests in the West and still supports endangered warm-water fishes



Bechler River Waterfall

BROTHER GRIMM

of the Colorado River basin.

The drylands and deserts also have their riverine highlights. The Green of Utah flows for nearly 400 miles with native fish habitat through spectacular canyonlands, and the Virgin River is centerpiece to Zion National Park and a greater region of redrock canyons. Nevada has mountain streams where the rare Bonneville and Lahontan cutthroat trout survive. New Mexico has the fabled Rio Grande and the still-wild upper Gila; Arizona has the biologically rich Verde and the one-and-only Grand Canyon of the Colorado River.

These are just a few of the rivers and tributaries that still flow with exceptional natural assets throughout the American West. Much of value remains, yet much of natural worth has been lost during the past two hundred years, and even some of the best-protected waterways are threatened by mismanagement, development, or pollution from near or distant sources.

To protect and restore the finest rivers that remain are goals of top importance for the future of the West, yet no recent comprehensive survey has been completed to identify the best natural rivers that remain. That is the intent of this report prepared by the Western Rivers Conservancy.

Great Rivers of the West: The Western Rivers Conservancy Survey of Eleven States

Western Rivers Conservancy (WRC) is dedicated to protecting the outstanding rivers of the western United States. Based in Portland, Oregon, but working throughout an eleven-state region, this nonprofit, private organization purchases riverfront property from willing, private landowners and assures that the land will be conserved as open space. In this way, the group has successfully protected dozens of critical riverfront tracts along streams such as the Sandy, Illinois, Chetco, and Willamette Rivers in Oregon; the Hoh River and Icicle Creek in Washington; the Snake River in Hells Canyon of Idaho and Oregon; the Sun River in Montana; the Smith River and Chico Creek in California. However,

both the need and the opportunity to protect rivers far exceed the ability of this—or any organization—to accomplish all that should be done. Many rivers and their landscapes must be safeguarded so that natural ecosystems can continue to function and provide for people's needs in the future.

To clarify its mission and focus its efforts, the WRC in 2005 adopted a strategic plan to “protect outstanding river ecosystems in the western United States” and to “conserve the great rivers of the West.” These are described as “healthy, natural rivers where ecological functions are still intact.” The plan emphasized “whole ecosystem protection” and recognized the importance of headwaters, riparian lands, estuaries, and regions that have “a high density of high-quality rivers.” To plot this ambitious course, the WRC recognized the need to complete a survey to identify the highest quality rivers. Simply stated, if the organization is to save the “great rivers of the West,” it needs to know which rivers these are.

To develop the survey, the WRC hired Tim Palmer—a noted author of ten books about rivers and river conservation, a planner trained in landscape architecture, a photographer, and an inveterate rivers enthusiast with thirty-five years of experience exploring hundreds of rivers throughout the West. A committee of noted river scientists and other western river experts reviewed the survey design as it was being developed, and state-specific experts reviewed the results for each state.

The survey examined rivers of Washington, Oregon, California, Idaho, Montana, Wyoming, Utah, Colorado, Nevada, Arizona, and New Mexico. For pragmatic reasons, Hawaii and Alaska were excluded.

Rather than start from scratch, the WRC survey built on past river inventories. These include significant studies following the National Wild and Scenic Rivers Act of 1968, such as the Nationwide Rivers Inventory (NRI), and a wide variety of other more recent studies, inventory lists, articles, and research papers. Typically, for each state, 15 to 20 such sources were consulted. Each of these had its own “take” on the definition of quality (e.g. native fish abundance, water quality, recreation values), and some lists addressed only specific regions within a state. None told the whole story, but in aggregate,



Elk at Firehole River

these earlier efforts all pointed the way or offered useful evidence. If a particular river was identified as excellent by half a dozen different sources, for example, it was considered likely to be a “better” natural river than one that was identified only once. To specifically consider rivers’ biological values, several experts—usually fisheries biologists or ecologists—were interviewed for each state. Their perspective and firsthand knowledge of local rivers provided essential insights for this survey’s analysis.

The Great Rivers of the West does not include of all rivers deserving protection. That would be a far larger list. To state this important point another way, if a river does not appear in this report, it implies no agreement that dams, pollution, new roads, or development can occur without significant public losses in river qualities and ecosystem functions. This survey, however, is the WRC’s attempt to identify the very best rivers that remain with outstanding natural values. Furthermore, restoration efforts for rivers that are not even mentioned in this survey might someday reinstate their natural qualities so that they, too, will again become “great rivers of the West.”

Based on this survey, the Western Rivers Conservancy will be able to better identify prime opportunities for its involvement. However, no land will be acquired for open space simply because a river appears on our list. And in cases where open space may eventually be bought to conserve the rivers, acquisition would be only from willing sellers who voluntarily agree upon all terms. The work of the Western Rivers Conservancy and of other conservancies and land trusts simply gives property owners an opportunity to have their land protected if they want to do so.

The need for river protection is becoming more urgent as western streams are increasingly affected by pressures of a rapidly growing population; of the ten fastest growing states in the nation on a percentage basis, seven are in the West. Such growth intensifies needs for water and energy and spurs suburban development of farm and ranchlands. The urgency of conserving rivers is also heightened by the aggravating effects of global warming and by neglect of problems that have been accumulating for many years across the watersheds of the West. In this challenging context, it is the aim of this survey to inform the conservation of the best remaining rivers of the West.

Surveying Wyoming's Great Rivers

Aridity is the dominant factor governing much of Wyoming's landscape, but rivers that gather snowmelt in high western mountain ranges flow down to canyons and plains as highlights and lifelines of the otherwise dry terrain.

In Wyoming's spectacular northwest corner, we find the Greater Yellowstone Ecosystem, one of America's premier river regions. Comprised of ten contiguous mountain ranges corrugating the northwestern eighth of the state (plus small portions of Montana and Idaho), this wild and river-laced landscape is enormously important for its wildlife habitat but also for the quality of many rivers downstream. Snowmelt from the stunning Tetons—the quintessential glaciated peaks of the Rockies—and from the Wind River Range, with its 30-mile-long lineup of massive, 13,000-foot



North Platte River

granite mountains still harboring thick glaciers on their northeast sides—feeds water to a host of excellent streams radiating outward and ultimately ending in far-flung estuaries of not only the Pacific and the Gulf of Mexico, but also the Gulf of California. This nexus of rivers, including three landmark waterways of the West—the Snake, the Green, and the Yellowstone, is truly the high, headwaters crown of the American West.

While the Yellowstone complex of mountains gives rise to the most significant cluster of waterways in Wyoming's rivers estate, three smaller and disjunct Wyoming mountain ranges also yield important streams: the Bighorn Mountains in the north-central portion of the state and the lower and drier Laramie and Medicine Bow Ranges in the southeast.

Wyoming's landscape is split roughly into three ecoregions: the Southern Rockies occupy the mountainous northwest, far west, and a north-central pocket where the Bighorns rise; the Intermountain Semi-Desert dominates the central third of the state as a high, dry

steppe in the rain shadow of high mountains; and the shortgrass prairie of the Great Plains blankets the eastern third, where the topography rolls gently and aridity is somewhat moderated by rains that occasionally storm up across the plains from the south.

Wyoming's position at the headwaters of so many large and significant watersheds gives it a unique diversity of rare native fishes. The Greater Yellowstone region hosts one of the healthiest native trout populations in the United States and includes both the Yellowstone cutthroat and Snake River finespotted cutthroat. In other areas, trout species have evolved owing to the changing isolation of streams by topography, geologic, and glacial events. The rare Bonneville cutthroat trout—endemic to the land-locked Bear River basin of Colorado, Wyoming, Idaho, and Utah—has its limited stronghold in far southwest Wyoming. Colorado River cutthroat trout are extremely limited in their surviving range, which includes streams flowing from the east face of the Wyoming Range in west-central Wyoming and also in the Little Snake River basin at the state's south-central border. Other native fishes that are declining and merit special concern include the bluehead sucker, flannelmouth sucker, roundtail chub, and leatherside chub. These native fishes are abundant in only a few select streams on the west side of the continental divide.

While fine reaches of rivers remain, especially in the northwest corner, Wyoming waterways have been widely degraded. Oil and gas drilling and other fossil-fuel energy development have taken unquestionable priority through much of the state and have impaired water quality and quantity in many streams. Overgrazing on arid lands has resulted in damage to riparian corridors. Invasive species, such as tamarisk on floodplains and brown trout in coldwater streams, crowd out and compete with native flora and fauna. And even though Wyoming has the lowest population density in the West—5 people per square mile—development pressures in recreation hotspots such as Jackson Hole threaten floodplain and riparian habitat.

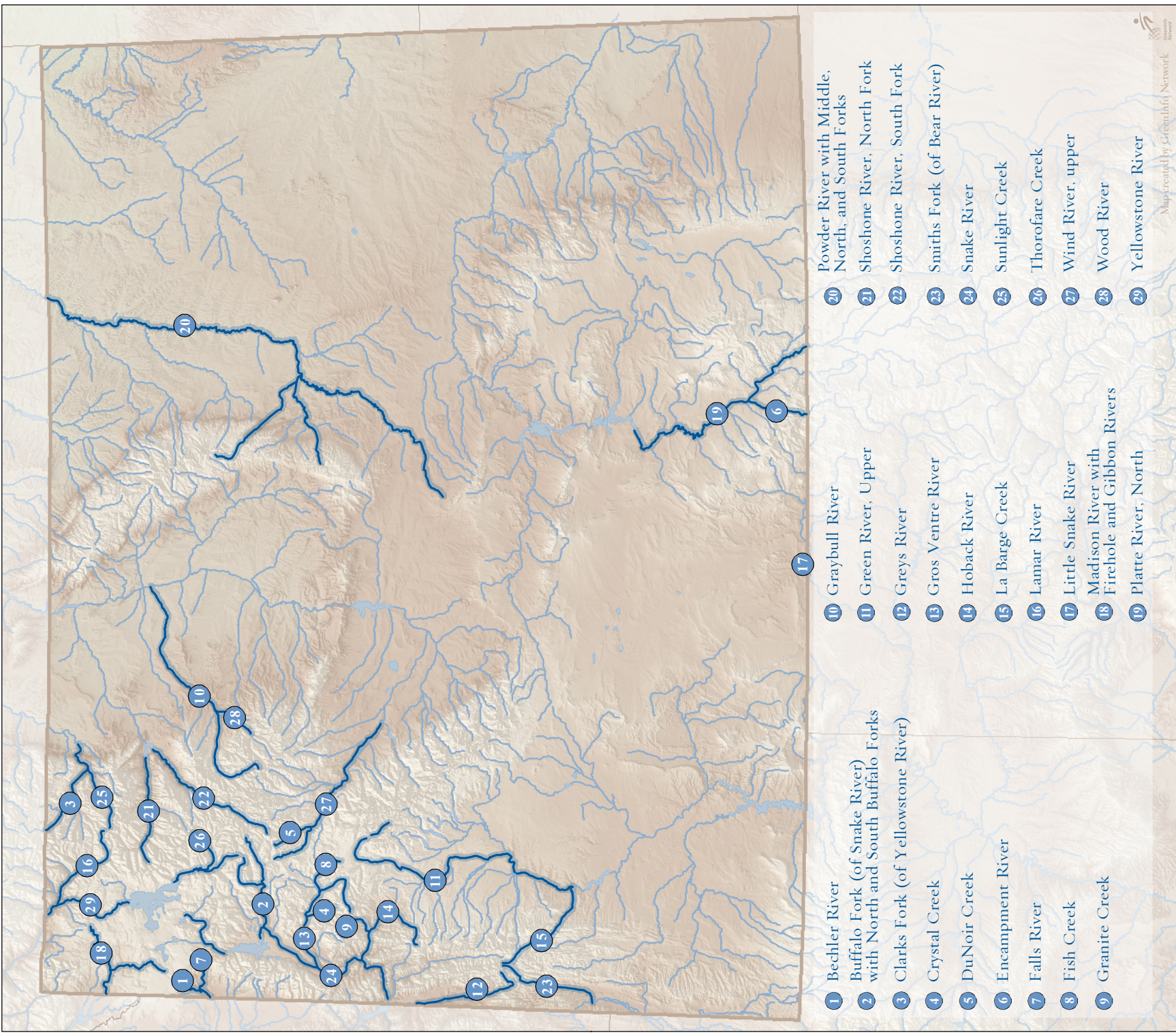
Even the finest of Wyoming's river reaches pour into reservoirs or are debilitated by diversions. As with rivers throughout the interior West, Wyoming's streams lack continuity with downstream aquatic

ecosystems. However, significant reaches remain free-flowing and wild, or at least somewhat natural, and offer good habitat.

Many streams here are clearly worthy of protection, but only one has been included in the National Wild and Scenic Rivers system: the Clarks Fork of the Yellowstone. In 2006, a bill was introduced to designate 14 additional Snake River headwaters streams in northwestern Wyoming. Owing to careful political work by the Campaign for the Snake River Headwaters, this effort has a good chance of eventual success in a state where other river conservation proposals have failed.

Although much of Wyoming's river estate has been degraded, a sizable group of streams continues to offer important habitat and natural qualities. Some of these rivers, including the upper Yellowstone, the Clarks Fork of the Yellowstone, and the Snake and its upper tributaries are truly extraordinary, even from a national perspective. ■

Great Rivers of Wyoming



Wyoming's Great Rivers:

River Narratives

WYOMING'S "A" RIVERS

Clarks Fork of the Yellowstone River with Sunlight Creek

The Clarks Fork is one of the wildest and least accessible rivers in the U.S. outside Alaska, owing to an extraordinary, deeply incised, 1,200-foot deep canyon, with vertical walls, virtually unrunnable whitewater, and no trail access.

This major Yellowstone tributary begins near Cook City, MT in a mountainous landscape checkered by mining, including old abandoned mines and currently active claims. It flows southeast, almost immediately, into Wyoming, and for 20 miles, gathers tributaries that drain the west side of the wild, expansive Absaroka Range and also the south side of the formidable Beartooth Plateau. Then, for another 20 miles, the river crashes through one of the more remarkable canyons in the West. Granite walls rise to 600 feet and then to double that height as the river churns through massive rapids and over multiple waterfalls in "The Box"—an 8-mile-long gorge unlike any other in America. This tumultuous class V-VI reach has been run only by expert kayakers, but not without 17 portages—many requiring rock-climbing skills. Below "The Box," the river enters a trail-accessible, U-shaped, glacier-carved valley that spills out into dry rolling terrain where the Rocky Mountains merge with the Great Plains. The river flows for about 25 miles to the Montana state line and then continues for 40 more miles with roads, a railroad, homes, farms, frequent diversions, and nearly continuous ranchland to the Yellowstone River upstream from Billings.

Sunlight Creek is a major tributary that flows for about 28 miles,



Clarks Fork River



Bechler River and Falls River Confluence

TIM PALMER

beginning in the North Absaroka Wilderness but quickly flowing into the mostly undeveloped Sunlight mining district and then into a valley with unimproved road access and several ranches on scattered tracts of private land in the middle of a vast region of national forest land.

The Clarks Fork watershed is prime habitat of grizzly bears, wolves, and other wildlife. In winter, large game herds, including elk, pronghorn, mule deer, and white tail deer, descend down the Sunlight valley to forage at lower elevations. It is not uncommon to see 800 to 1,000 animals grazing together here. Both streams support Yellowstone cutthroat trout, though native fish populations are augmented by a fish hatchery (Wyoming's largest) on the Clarks Fork that also stocks the river with non-native species.

In 1990, a 20.5-mile reach of the Clarks Fork, through the deepest part of the canyon, was designated as Wyoming's first and only National Wild and Scenic River. A half-mile at the lower end of the reach had to be dropped from the legislation to allow for a potential irrigation dam. The wild Beartooth Front currently faces a new surge of energy development pressures, which could affect this river.

Falls River and Bechler River

These wild, virtually untouched rivers flow across Yellowstone National Park's high, remote, and pine-studded Pitchstone Plateau, offering outstanding wildlife and cutthroat trout habitat.

The Falls River begins at Hering and Beula Lakes and then winds west through volcanic terrain just outside the Yellowstone caldera for 26 miles to the Idaho border. River frontage lacks roads and even footpaths, except for a few minor trail crossings. Moose, grizzly bears, wolves, and Yellowstone cutthroat trout thrive here. The river then runs for another 28 miles across Idaho to join the Henrys Fork of the Snake—a reach that includes a new hydroelectric project and diversions.

The 18-mile-long Bechler River follows a similarly remote headwaters path from the northeast, passing hot springs, waterfalls, wild forests, and meadowlands reachable only by trail. It joins the

Falls River 4 miles upstream from the national park boundary.

These two rivers were at the center of a path-breaking political controversy in 1920, when a proposal by Idaho irrigators to dam the Falls River was narrowly defeated. This reversed the precedent of allowing dams in national parks that had been set seven years earlier, when Congress approved the damming of Hetch Hetchy Valley in Yosemite National Park.

Both the Falls and Bechler Rivers are fully protected in Yellowstone National Park, though the lower Falls River, in Idaho, is not.

Green River, upper

One of the great arteries of the West, the Green River gets its start high in the Wind River Range, flows through a remarkably scenic valley, and spills onto undeveloped drylands where the sizable stream meanders among willow and cottonwood thickets. The Green's upper reach flows in Wyoming, but the entire river flows for 730 miles from its mountain source to its canyon-land confluence with the Colorado River in Utah (see also the Utah chapter of this report). The Green is actually longer than the Colorado where the two meet but carries less water--an average of 5,972 cubic feet per second compared to the Colorado's 7,600.

The Green's upper 10 miles drain the incredible wild interior of the Wind River Range, collecting short tributaries that drop from high, rugged terrain of the Bridger Wilderness, including 13,000-foot peaks to the east. A riverfront trail reaches to the Green's uppermost headwaters and connects to a network of foot-paths throughout the range. The river then enters the spectacular Green River Lakes, offering a classic view of western mountain scenery with the distinctive tower of Squaretop Mountain rising in the background. The river next sweeps north, west, and south in a riffing arc between the Wind River and Gros Ventre Ranges for about 25 miles to the boundary of the Bridger-Teton National Forest, where the river spills onto a broad, sagebrush-covered basin between the ranges. Gathering many tributaries from the west side of the Winds and the east side of the Gros Ventre and Wyoming Ranges, the Green



Green River

continues for about 30 free-flowing miles from the forest boundary to the Highway 191 bridge west of Pinedale. Winding through progressively drier country, the next 100-mile reach includes four low diversion dams and then the backwaters of the river's first large reservoir behind Fontenelle Dam. In its final Wyoming reach, the Green meanders from Fontenelle Dam for 70 miles to the backwater of Flaming Gorge Dam near the town of Green River. In this section, the river is blocked by one diversion dam, the floodplain becomes infested with tamarisk, cottonwoods fail to regenerate owing to the effects of the Fontenelle Dam, and the stream enters the desert country that typifies its long course through the redrock canyons of Utah.

With 160 nearly dam-free miles, the upper Green is one of the longer essentially free-flowing reaches in the Rockies and the longest for a sizable river in Wyoming. The river offers excellent fishing for rainbow and brown trout, though most native trout have been lost. The upper basin is also known as a bastion for globally

imperiled endemic plants.

Through its 25-mile north-west-south arc downstream from Green River Lakes, the upper Green River valley forms the principal terrestrial connection between the Gros Ventre wildlands and those of the massive, 80-mile-long Wind River Range. This reach also features an 8-mile section with lush riparian wetlands.

Downstream from the forest boundary, the river flows through another 12-mile section of prime wetland habitat. Through this reach and for most of the river's route to Fontenelle Reservoir, private ranchland borders the river, with BLM ownership at many of the uplands and at some scattered riverfront tracts.

The Kendall Warm Springs Dace lives only in the Kendall Warm Springs, adjacent to the river near the Bridger-Teton Forest boundary. A large Bureau of Reclamation dam was once proposed at this site. The stunning upper Green was considered by the original planners of the National Wild and Scenic Rivers system, but it was never designated--or even studied--owing to opposition from the Wyoming congressional delegation. Gas extraction poses a serious threat to much of the upper Green River basin; some 10,000 new gas wells have been proposed with a specter of water consumption, water pollution, new roads, and associated development.

Greys River

The Greys River is one of Wyoming's least developed sizeable streams, the longest river with absolutely no dams, and a stronghold of the Snake River finespotted cutthroat trout.

The river flows due north for about 56 miles in a narrow, geologically unique valley--with the Wyoming Range rising on the east side and the parallel Salt River Range rising similarly on the west side--the whole way from the stream's source to its mouth at Palisades Reservoir on the Snake River. An unimproved gravel road runs the length of the river but gets little use. Most of the riverfront falls within the Bridger Teton National Forest, and there is almost no development in the corridor. Along with nearly 50 small tributaries, the Greys is a prime refuge for the native Snake River cutthroat trout.



Greys River

TIM PALMER

The stream is popular among anglers and offers an outstanding Class II, III, and IV whitewater paddling run.

The Greys' headwaters adjoin those of La Barge Creek—one of few streams with a good population of Colorado River cutthroat trout—and of Smiths Fork of the Bear River—a similar refuge for the Bonneville cutthroat. The upper watershed marks the southernmost extension of the Greater Yellowstone Ecosystem, with its large network of contiguous wild land and rivers. The Greys basin presents the best opportunity for a wildlands connection linking the Yellowstone complex with the Uinta-Wasatch expanse of mountain land in Utah. In this sense, the Greys River valley fills a similar role to that of Montana's Rock Creek, which nominally links the northern end of the Greater Yellowstone complex and the central Idaho wildlands with the Glacier-Northern Rockies wilderness areas to the north.

Gros Ventre River with Crystal and Fish Creeks

Flowing through a mostly wild basin and drawing its waters from the Gros Ventre Range to the south and the Leidy Highlands to the north, the Gros Ventre is one of the more significant, undammed, and sparsely developed rivers in the Greater Yellowstone Ecosystem.

Beginning deep within the folds of the Gros Ventre Mountains, the river flows east, then north, and finally west for about 70 undammed miles to the Snake River just downstream from Grand Teton National Park. The upper 18 miles are accessible only by trail and flow through wild valleys, meadows, and rugged mountain terrain of the Gros Ventre Wilderness. The next reach continues in a more open valley with a gravel road, and then a paved road. Most of the corridor is in Forest Service ownership except for several guest ranches and inholdings with 6-miles of frontage along the upper river. The Gros Ventre flows through two natural lakes formed by massive landslides that once blocked the river more extensively. Ten miles of the lower river form the border between Grand Teton National Park to the north and the Jackson Hole National Elk Refuge to the south. The river's lowermost three miles flow through private ranchland subject to intense development pressures.



Gros Ventre River

Among many fine tributaries, Fish Creek, a major stream from the north, begins in a large wetlands complex that merges with the wetland-fed streams of the upper Green River basin. Crystal Creek is a major wild tributary flowing from the south that drains the high peaks of the Gros Ventre Range.

Nearly the entire Gros Ventre and most of its tributaries are good Snake River cutthroat trout habitat. Moose, elk, and wolves thrive here, and the nation's largest concentration of elk passes through the basin on its way to the National Elk Refuge each autumn. The river is popular for trout fishing and offers boaters a mix of Class II-IV whitewater. The upper Gros Ventre is the number-two priority area statewide for the Wyoming Nature Conservancy (the upper Wind River is first).

The Gros Ventre basin forms the key terrestrial connection between the Greater Yellowstone Ecosystem in Yellowstone and Grand Teton National Parks and the massive, wild, but slightly isolated Wind River Range with its upper Green River basin to the south.

Most, but not all, of the river is protected as wilderness, national forest, or national park land. However, a 4-mile section of gentle terrain and wetlands along the upper river—national forest land omitted from the Gros Ventre Wilderness—remains vulnerable because it forms the only barrier between a 4-wheel-drive route reached from the upper Green River (to the south) and the dirt road that follows along much of the length of the Gros Ventre (to the north). “Bridging” this roadless gap would create a through-road linking access from the Snake River in Grand Teton National Park to the upper Green and would eliminate the Gros Ventre’s unusual quality of being a major, lengthy river with no through-road.

On the lower river—just 3 miles up from its Snake River confluence and within Grand Teton National Park—ranchland owners completely dry up the river with a major diversion just below Highway 191. Thus, the river has no hydrologic continuity with the Snake River during the summer months. Trout Unlimited and the National Park Service (in the past) have tried to ameliorate this problem.

Snake River

Like the Green River—but to an even greater degree—the upper Snake River in Wyoming is one of the classic rivers of the West. Though it has severe intrusions and interruptions, the natural reaches that remain feature many superlative qualities—from even a nationwide perspective—including wilderness headwaters, the finest large-river riparian habitat in the interior west, an exceptional native cutthroat trout fishery even through developed reaches in Jackson Hole, and a magnificent canyon with one of the most popular whitewater runs in the West.

The Snake’s upper 40 miles are entirely roadless, and much of the river lacks even trail access as it flows from its mountain source in south Yellowstone National Park, and then through the Rockefeller Memorial Parkway to the backwaters of Jackson Reservoir in Grand Teton National Park. Below the 18-mile-long reservoir (which was once a natural lake, but only one-third the current reservoir’s



Snake River in Grand Tetons

TIM PALMER



Snake River

acreage), this sizable river-- already averaging more than 2,000 cubic feet per second--winds throughout the exquisite length of Grand Teton National Park. A riparian belt of willows and cottonwoods hosts a unparalleled abundance of wildlife with moose, elk, swans, pelicans, bison, beavers, and many other species, all easily seen within the refuge of the park.

Downstream from the park boundary for about 24 miles, levees have been built to prevent flooding of ranchland and now to protect an intensifying pattern of real estate development with massive homes, golf courses, and commercial development near the river, which flows to the west of the booming town of Jackson. Below South Park, at the southern end of Jackson Hole, the river drops 12 miles through a narrowing valley that separates the Snake River Range to the west and the Wyoming Range to the east. Finally, the river rushes through the narrow, wooded, 12-mile passage of Alpine Canyon—an extremely popular whitewater rafting and kayaking run that ends above the backwaters of Palisades Dam. In 2006, 146,000 people used this canyon for recreation—many of them rafting or kayaking.

Upper reaches of the Snake are one of the great, wild, headwater streams of the West and choice habitat of grizzly bears, wolves, moose, and elk. The National Park reach below Jackson Dam is the quintessential river of the Rockies where the full-bodied river winds in front of the Grand Teton, 13,770 feet high, and other peaks of the Teton Range, all the while nourishing a riparian belt that is perhaps the richest anywhere in the interior West. For wildlife viewing along a river, this and Hayden Valley of the Yellowstone are clearly major highlights nationwide. The river and many of its tributaries remain excellent habitat of the Snake River finespotted cutthroat trout, and the streams are also heavily fished for introduced rainbow trout. The river supports 13 native and 9 non-native fish species.

Despite its wild headwaters and superlative qualities, the Snake has not escaped degradation. Jackson Lake Dam flooded exceptional miles of riverfront wetlands and drastically altered the flow below the dam by lowering levels in the critical winter months and by eliminating most floods. Periodic floods are necessary for maintaining natural floodplain and river ecosystems; without them, Engelmann spruce are now taking over floodplains previously occupied by cottonwoods, which are essential for many wildlife species. Downstream, levees confine the flow, prevent the river from maintaining its floodplains, channelize the current, and cause aggradation or accumulation of gravel in the riverbed, which ultimately renders the levees ineffective by raising the level of the river within them. Development pressures and encroachments throughout the region are intense with the tourism and second-home draw of Jackson Hole, which is regarded by many as one of the most beautiful places in America. Local groups including a Jackson Hole Conservation Alliance and the Jackson Hole Land Trust are attempting to address some of these problems.

Yellowstone River with Thorofare Creek and the Lamar River

Like the Snake and the Green, the Yellowstone is one of the great rivers of the West. While its long flowing sweep through the Great Plains in Montana is important and exceptional, its wilderness and



TIM PALMER

Yellowstone River

national park headwaters in Wyoming are the most outstanding reach of this 678-mile-long river.

Backing-up against the source of the Snake, the Yellowstone begins in the Teton Wilderness in the Bridger-Teton National Forest and then flows north through Yellowstone National Park for about 60 miles of extremely meandering channels to Yellowstone Lake. About half this distance is through an uncommon expanse of high-elevation wetlands. Downstream from the 20-mile-long lake—one of the largest natural lakes in the West—the river flows into Hayden Valley. This expansive grassland is one of the premier places in the West to see large wildlife, including bison, moose, and elk. The river next drops over Upper Yellowstone Falls, and then the 308-foot Lower Falls—the tallest high-volume waterfall in the West. The impassable Yellowstone Gorge follows, and then the river drops into a more-open, forested valley with steep rapids that continue to the park boundary and the Montana state border (see the Montana chapter for the rest of the river).

The river's entire upper 100-mile-route is fully protected in the Teton Wilderness and in Yellowstone National Park. The river

supports the native Yellowstone cutthroat trout, though lake trout misguidedly introduced into Yellowstone Lake take a heavy toll on the native fish.

Among many fine tributaries, Thorofare Creek is a headwaters stream much like the upper Yellowstone itself, and joins in a wide wetlands complex near the southern park boundary. The Lamar River is the largest tributary in the park and drains the northeast section of the park—a key area for elk, wolves, grizzly bears, and other wildlife. The entire upper basin forms the core area of the 150- by 100-mile Greater Yellowstone Ecosystem—one of the most important areas in the West for wildlife—especially large predators such as grizzly bears and wolves. While the upper Yellowstone is well protected, much could be done to safeguard equally important rivers and lands around the fringes of the greater ecosystem.

WYOMING'S "B" RIVERS

Buffalo Fork (of the Snake River) with North Buffalo Fork and South Buffalo Fork

This large tributary to the upper Snake has two major branches that flow entirely in the Teton Wilderness. It supports native Snake River cutthroat trout, bald eagles, and a wide variety of wildlife.

The North Branch and South Branch each flow for about 25 miles through deep woodlands and riverfront wetlands of the Teton Wilderness. The main stem then runs for another 25 miles to the Snake River. Roads lie on either side of the lower river, though they do not encroach on the banks. Several miles of frontage are in private ownership, with guest ranches and second home sites. The rest of the riverfront is in the Bridger-Teton National Forest and Grand Teton National Park.

Largely protected, the Buffalo Fork includes important wildlands at the core of the Greater Yellowstone Ecosystem. The lower river flows through riparian wetlands that are important to wildlife, and nearly all the fish are native.



TIM PALMER

Powder River

Powder River with Middle, North, and South Forks

This long stream with its headwaters is clearly the finest river of the drylands and plains in Wyoming, and among the best plains rivers in the West. The Powder is undammed, only lightly developed, and retains its native assemblage of fishes with minimal interference of introduced species. This is one of few remnants of a prairie river in essentially natural and native condition.

More than half of this nearly 500-mile-long river system (South Fork and main stem) is in Wyoming; the lower portion runs north through eastern Montana to the Yellowstone River upstream from Glendive (see Montana chapter of this report). With its headwaters as the South Fork, the Powder begins in the drylands of central Wyoming and flows north through rugged, unsettled country, checkerboarded with BLM, state, and private land, and crisscrossed with 4-wheel-drive and dirt roads. After about 120 miles of often-intermittent flow, the Middle Fork meets the 70-mile long North Fork, which has one small dam at its upper reaches. The 68-mile long Middle Fork joins the North Fork just above the South Fork

confluence. The bolstered main stem then flows north-northeast for roughly 200 constantly meandering miles to the Montana line; then it flows about 230 more miles in Montana.

Most of the Powder's riverfront is private ranchland, though much of the basin is a checkerboard of BLM, state, and private land. The main stem corridor typically has cottonwood and willow trees in clusters on the inside of bends, but the river generally runs through harsh drylands of sage and mixed grasses. Little-traveled roads are present throughout the corridor, but these are usually on low bluffs above the river level.

Flows of the Powder range radically—from surging floods during short periods of peak runoff to very low flows that are normal through much of the year. During the summer, flows in many reaches drop to nominal levels and can completely disappear in places—even in the lower river—and leave the Powder as a series of elongated pools separated by sandbars and dry gravel shoals. The river is also naturally saline owing to its geology, to low inputs of fresh water, and to extreme rates of erosion. The main reason that the river is completely undammed—lacking even diversion dams—is that the water is too saline and silty for irrigation use.

Amazingly, a whole suite of native fishes have adapted to these harsh conditions. Many have become rare because there are so few undisturbed rivers left on the plains, but they survive in the Powder. Prominent among resident fishes are the western silvery minnow and silvery chub. The imperiled sturgeon chub is also found here. Rare shovelnose sturgeon, which reach lengths of 3 feet, migrate up from the Yellowstone River for great distances and sometimes reach into Wyoming. Unimpeded by dams, they go back down to the fresh waters of the Yellowstone in the summer. Channel catfish and goldeye likewise migrate up and down depending on flows. The river provides habitat for these native fishes and is largely undisturbed by the introduction of exotic species. Little sport fishing is done. Canoeing is possible in May or June of many years, with the possibility of a very long wildland trip across the plains.

While the South Fork headwaters flow from a dry, sedimentary basin, the North and Middle Forks flow from the Bighorn Mountains and their foothills. Though shorter, these streams carry more

persistent flows and account for much of the water in the river.

The remote, mostly wild Middle Fork of the Powder may be the finest natural river of the dry, semi-desert steppe of central Wyoming. Upper reaches flow in a dramatic canyon and are reachable only in a few spots by four-wheel-drive roads. The lower river meanders through an open valley loosely paralleled by Highway 190 before joining the South Fork downstream from Kaycee. The Middle Fork basin ranges in elevation from 8,000 to 5,000 feet with steep incised canyons, a dramatic sandstone escarpment known as the Red Wall, and open grassland parks interspersed with ponderosa pines, Douglas-firs, and limber pines. The Nationwide Rivers Inventory referred to the Middle Fork's "spectacular, primitive canyon with outstanding rock formations." The stream is recognized as a good fishery for non-native trout, and the basin is habitat for wintering bald eagles, elk, and bighorn sheep. Within the Middle Fork basin, 11,000 acres of BLM land have been withdrawn from mineral exploration to protect the visual qualities, wildlife habitat, fisheries, and recreational values of the canyon. The North Fork likewise runs through deep, scenic canyons with excellent dryland wildlife habitat.

The Powder also has problems and is subject to increasing threats. Tamarisk has invaded the floodplains and is displacing native cottonwoods and willows. Ominously threatening all streams of the region, coalbed methane extraction across much of northeastern Wyoming could wreak havoc with natural waterways (some 20,000 wells may be drilled). The methane lies trapped as gas adjacent to deep underground coal seams and associated groundwater deposits. To tap the methane, saline groundwater water is first pumped out. In Wyoming, this is then simply dumped into local surface waterways, and the effluent finds its route to the Powder and its tributaries (in Montana, the water must be reinjected into the ground). Acute effects are not yet occurring, though the specter of serious pollution is a concern to many, and the state of Montana has sued Wyoming over its lack of regulations regarding the disposal of the saline groundwater.

The scattered mix of BLM, state, and private land throughout the basin could possibly present an opportunity to assemble a corridor



Wind River

of protected, public land along the stream—a rare situation for the desert-steppe and Great Plains regions of Wyoming and the other plains states. Though far-reaching conservation approaches with the Powder and other plains rivers are almost non-existent, this may be an important frontier for creative protection efforts in a region where real estate values and competitive demands are less than along other, more popular waterways.

Wind River (upper) with DuNoir Creek

The upper Wind River, from headwaters to Diversion Dam, 40 miles downstream from Dubois, is free flowing with a good sport fishery of introduced trout, wildlife habitat, and an excellent riparian corridor of cottonwoods.

The river begins on the east side of Togwotee Pass and flows about 32 miles to the town of Dubois. From there, the river runs 8 miles to the Wind River Indian Reservation boundary, and then continues for 32 more miles to the Wind River Diversion Dam, where most of the flow is diverted for irrigation.

The entire route of the main stem is followed by Highway 26, and the valley is shared with other roads and power lines. Below the upper 12 miles, most of the riverfront corridor is private land. Yet an excellent riparian corridor remains along this high-gradient river, with wildlife habitat and an especially robust cottonwood forest near Crowheart on the Reservation reach. The river is a fine trout fishery, though not many native fish remain.

A superb tributary, DuNoir Creek, flows from high peaks of the southern Absaroka Range, through meadowlands and riverfront forests, to its confluence with the Wind River 8 miles upstream of Dubois. Another major tributary, the East Fork, begins in the Washakie Wilderness and flows for nearly 40 miles mostly through the Wind River Indian Reservation before reaching the main stem Wind. A lightly used, dead-end road follows up the East Fork valley, and only a trail reaches the wilderness headwaters.

Though the main stem of the Wind flows through a valley with heavily traveled roads, private land, and some development, this corridor is the top conservation priority of the Wyoming Nature Conservancy owing to its relatively intact riparian forests and its wide range of biodiversity values, spanning from high to relatively-low elevations.

WYOMING'S "C" RIVERS

Greybull and Wood Rivers

The Graybull River has one of the larger populations of native Yellowstone cutthroat trout, and with the Wood River and other tributaries, is the largest native cutthroat fishery in the sprawling Bighorn River basin.

The Greybull begins with Eleanor and Anderson Creeks in the Washakie Wilderness of Shoshone National Forest. Within 6 miles these join to form the Greybull, which then runs 7 miles through national forest and state land. The following 12 miles flow through private land with state and BLM land scattered in the corridor. The remainder of this 104-mile-long river flows through private land, though beyond the riverfront much of the land is BLM owned. The 30-mile-long Wood River similarly rises in the wilderness but quickly

flows out to a road-accessible reach that runs through private land.

The upper half of the Graybull, plus its northern tributary Meeteetse Creek, the Wood River, and other small tributaries support Yellowstone cutthroat trout in the easternmost sizable population of this native fish, and the Graybull's population is one of the largest in Wyoming. The upper basin adjoins the premier wild country of the South Fork Shoshone.

Hoback River with Granite Creek

The Hoback is a major Snake River tributary with no dams and a good cutthroat trout fishery. The river and its tributaries provide important linkage between expansive reaches of mountain land in the Wyoming Range to the south and the Gros Ventre range to the northeast.

The upper 12 miles of the Hoback drop from headwaters in the Wyoming Range. A dead-end, gravel road parallels this reach. After passing the village of Bondurant, the river rushes for about 25 miles, paralleled by highway 191, to the Snake River in a deep canyon south of Jackson Hole.

The river and its tributaries offer good habitat for Snake River cutthroat trout, and are a popular sport fishing destination. From the village of Bondurant downstream, the Hoback offers an excellent Class II and III canoeing and kayaking run.

While most of the Hoback's basin lies in the Bridger-Teton National Forest, much of the stream frontage is private land in a thin strip along the river. The upper 20 miles are lightly developed, with large meadows and open space remaining. The lower 6 miles of the river are also mostly in private ownership, but this canyon area closer to Jackson is more developed with houses and resorts.

Granite Creek is an excellent large tributary entering from the north. Flowing from headwaters in the Gros Ventre Wilderness, its first 12 miles are accessible only by trail; the lower 12 miles are paralleled by a gravel road that leads to a popular hot spring at the edge of the creek. Almost entirely in public ownership, Granite Creek is one of the outstanding small streams in the Greater Yellowstone



Hoback River

Ecosystem.

As in the upper Green River basin, gas well development is a serious threat to the water quality, quantity of flows, and watershed health of the Hoback. Energy extraction companies have proposed intensive development of 64,000 acres in the upper Hoback basin.

La Barge Creek

This tributary to the Green River may be the best remaining refuge for the rare Colorado River cutthroat trout, which has been eliminated from much of the rest of its range.

Flowing southeast for 45 miles from the southern limits of the Wyoming Range to the Green River, just upstream from Fontenelle Reservoir, La Barge Creek is one of the Green's largest tributaries and offers the best remaining habitat for rare Colorado cutthroat. (In Wyoming, this rare fish survives only here and in a few smaller tributaries to the upper Green and to the Little Snake River.) The Wyoming Game and Fish Department has launched a significant restoration project here, which seeks to remove non-native trout and to restore habitat for the Colorado River cutthroat. The La Barge project is one of the largest fishery restoration efforts of its kind anywhere.

The stream has a lightly traveled road along its entire length, and it has at least one major diversion—the Anderson-Howard Canal—in its lower reaches. The frontage is mostly in Bureau of Land Management and Forest Service ownership, but some significant tracts of private land front the creek, as well, especially in its lower valley, where the stream meanders through a massive wetland complex.

The watershed of La Barge Creek extends southward from a divide that backs up to the headwaters of the Greys River. Along with the basin of Fontenelle Creek, which lies immediately to the south, the LaBarge basin offers a continuation of the undeveloped mountain terrain at the southern limits of the Greater Yellowstone Ecosystem, and also the finest “bridge” of semi-wild country extending toward the Bear River Divide and the massive Uinta Mountain Range lying

beyond. This area may offer a critical ecosystem linkage between the Greater Yellowstone and the expansive Uinta/Wasatch wild areas to the south. Like La Barge, but for a much shorter length, Fontenelle Creek also has several miles of surviving Colorado River cutthroat habitat.

Little Snake River

Virtually unknown to most people beyond the local ranching area, the Little Snake is a small but long river that connects the highcountry of Mount Zirkel at the Continental Divide with the arid lowlands and canyons of the Yampa River near Dinosaur National Monument. Though it lacks wilderness or even long roadless mileage, almost all the river flows through extremely remote terrain with no dams, little access, and almost no development. Some rare native fish survive here and in select tributaries.

The river's route begins with its Middle Fork, which reaches nearly to the continental divide of the Sierra Madre Range, just six miles south of the Wyoming border. It flows for 14 miles through Routt National Forest with only two unimproved roads crossing the stream. The Middle, North, and South Forks join to form the main stem near the state boundary, and then the Little Snake flows west, bending into Wyoming twice for a total of 40 miles in that state and then flowing southwest through Colorado toward the Yampa. The total main stem length is about 188 tightly meandering miles.

Counting the dam-free mileage continuously occurring downstream in the Yampa, Green, and Colorado Rivers, the Little Snake marks the beginning of 554 miles of essentially free-flowing river (there may be some low diversion structures on the Little Snake)—the second-longest such combination in the West (the longest is the Elk/Yampa/Green/Colorado system).

Much of the river's course, and especially its upper reaches, are extraordinarily beautiful with green riverfront cottonwood forests, open range lacking development, and smooth sweeps of rolling hills with mountains in the background. The basin provides habitat for wildlife including elk, mule deer, pronghorn, and sage grouse.

Much of the land fronting and surrounding the Little Snake is in public ownership under the jurisdiction of the Forest Service at the headwaters and then the BLM downstream. However, many substantial private tracts also lie along the river, especially in its lower reaches. The potential might exist here to link public lands together by trading other tracts to private owners, thus creating continuous lengths of protected riverfront. However, new energy development proposals on BLM lands could affect the river and its management; if permitted, the BLM ownership may be more a liability than an asset.

No storage dams have been built anywhere on the Little Snake, though a long and bitterly contested dam on its tributary Savery Creek, in Wyoming, was recently constructed. Diversions are withdrawn for irrigated pasture, including the sizeable West Side Canal that starts near Dixon, Wyoming. Other small diversion dams may have been built along the route but do not appear on maps. Secondary roads generally follow the river's course, but they rarely run alongside and are usually set back far from the water. Only occasional bridges cross.

While much of the river's corridor and watershed have been heavily grazed, the Little Snake still nourishes substantial groves of cottonwoods, willows, and riparian vegetation. Headwaters in Wyoming shelter the rare Colorado River cutthroat trout in the main stem as it first loops into the state; they are also present in the Roaring Fork, Battle Creek, and the North Fork and its tributaries. Downstream, the rare Colorado pikeminnow has been found, and the river has populations of the roundtail chub and flannelmouth sucker—both native species of special concern owing to declining populations.

The river is exceptional in Colorado and throughout the West in flowing for a total system length of 202 miles without any substantial dams, towns, rural development, or continuous road encroachment. Considering all these assets, the Little Snake could be one of the most eminently restorable, long, natural rivers in the drylands and mountains of the West.



Madison River

Madison River with Firehole and Gibbon Rivers

The upper Madison River and its two headwaters branches flow entirely through Yellowstone National Park and have exceptional geologic, wildlife, and fishery values.

Beginning at Madison Lake on the Continental Divide, the Firehole River flows for 8 miles through wildlands and for 20 miles paralleled by Highway 191 in Yellowstone National Park. The Gibbon River flows south and west for 20 miles from wild wetland headwaters but with Highway 191 following most of its length. From the confluence of these tributaries, the Madison River flows for about 15 miles paralleled by highway to the inlet of Hebgen Reservoir just across the Montana state border.

Flowing through the Yellowstone caldera, the Firehole and Gibbon are two of the most unusual rivers anywhere for geysers, fumeroles, hot springs and other geothermal features, which add hot water to the streams. The heated water spurs faster growth of algae, bacteria, and invertebrates and keeps the rivers somewhat ice-free through winter, making the streams very productive year-

round and creating unique habitat conditions. With plentiful cold springs as well, the rivers are excellent trout waters. However, the invasion of New Zealand mudsnails into these unusual rivers may be radically altering the ecology as the invasive snails outcompete native invertebrate life. First discovered in the park's rivers in 1994, the mudsnails have reached extremely high densities in these and other thermally influenced rivers in the Greater Yellowstone area.

Platte River, North (Wyoming and Colorado) and Encampment River

The upper North Platte is the least developed of all tributaries to the massive Platte River system. It flows through a long dam-free reach, which includes one of the West's finest cottonwood forests.

With headwaters at Rabbit Ears Pass on the continental divide southeast of Steamboat Springs, Colorado, Grizzly Creek is the upriver extension of the North Platte; it meanders for about 140 continuously, curving miles to its confluence with the Roaring Fork, which marks the beginning of the North Platte. For roughly 70 miles the river flows in a braided pattern of meanders across the 30-mile-wide and relatively flat basin called North Park, lying between the Mount Zirkel highlands to the west and the southern end of the Medicine Bow Mountains to the east. The sluggish North Platte gathers the twin tributaries of Illinois and Michigan Creeks, which likewise meander through rich high-elevation wetlands and good waterfowl habitat in the Arapaho National Wildlife Refuge.

Near Colorado Highway 125, just south of the Wyoming border, the river collects in a defined channel and drops more steeply through a rugged canyon that for 20 miles bisects the two mountain ranges. This fine reach runs mostly through the Platte River wilderness and offers good habitat for wildlife including elk and black bears, Class II-III boating, fishing, and a river-front trail.

Below the canyon, the river continues for 45-miles through foothills and private ranchland with a few Class II rapids and several low diversion dams to the town of Saratoga. It is joined by the Encampment River just above town. Beyond Saratoga, the river



Encampment River

flows gently for 75 braiding miles through a lush riparian corridor of willows and narrowleaf cottonwoods before ending in Seminole Reservoir—the first of many impoundments to block the North Platte.

The entire Grizzly Creek-North Platte reach from headwaters to Seminole—including the winding mileage of the upper basin—totals about 350 miles of essentially dam-free stream—one of the longer relatively-free-flowing reaches in the Rockies. From Highway 125 to Seminole, the river has a well-defined course with 140 miles of boatable water—one of the longer such reaches in the Rockies. Through this entire section no roads parallel the waterfront and the shores are mostly undeveloped. Native fish are largely absent; the river is a popular sport fishery for introduced brown and rainbow trout.

While roughly a third of North Park is BLM land, nearly all the river frontage on Grizzly Creek and other similar braided tributaries, as well as the North Platte, is privately owned ranchland. The canyon reach is publicly owned, mostly in Routt and Medicine Bow National Forests, and the rest of the river flows mostly through private ranch

land, though some BLM tracts provide recreational access.

The upper North Platte's extensive reach of dam-free, cottonwood shaded, unroaded, and sparsely developed river is one of the most underrated semi-natural waterways in the Rocky Mountain region, appearing only on a 1982 list compiled by the Bureau of Outdoor Recreation. Few rivers flowing predominantly through private land remain with such excellent natural values. The Wyoming Nature Conservancy has several active projects in the upper North Platte basin.

The Encampment is a North Platte tributary joining from the west upstream from Saratoga. It begins with 12 miles of roadless headwaters reached by trail at the edge, but not within, the Mount Zirkel Wilderness. Another 28 miles flow through national forest and then private land with some BLM frontage to the North Platte. Like the larger stream, a fine cottonwood corridor lines much of this route, and sport fishing is popular. An irrigation diversion structure near the mouth is the only dam on the Encampment. A portion of the upper river was recommended by the Forest Service for National Wild and Scenic River designation.

Shoshone River, South and North Forks

As the major river system draining the east side of the Greater Yellowstone Ecosystem, the Shoshone's North and South Forks offer excellent wild river qualities. Flowing from Yellowstone National Park, the North Fork is paralleled by a highway but hosts a popular sport fishery. The wilder South Fork flows from wilderness south of the park and is largely undeveloped. The two forks empty into Buffalo Bill Reservoir west of Cody.

The North Fork begins in the Sunlight Mining Region at the divide between the Shoshone and Sunlight Creek/Clarks Fork basin. Several private mining claims in the national forest here are reached by 4-wheel-drive from Sunlight Creek, to the northeast. However, after its first mile, the river flows for 16 miles through the North Absaroka Wilderness before reaching Highway 20—the main road leading to the eastern entrance to Yellowstone National Park. Its next 22 miles flow through the Shoshone National Forest paralleling



Shoshone River

the highway, with many campgrounds and recreation sites along the shores. For its final 10 miles, the river flows through private land to the inlet of Buffalo Bill Reservoir. Overall, about 95 percent of the basin is in public ownership.

The North Fork Shoshone has excellent wilderness qualities in its upper reaches. Its middle reach along Highway 22, offers exceptional recreational values, including superb whitewater boating, fishing, and viewing of wildlife, including bison and bighorn sheep. The river has some native Yellowstone cutthroat trout, but is mostly an introduced rainbow and hybridized fishery.

The South Fork begins in the remote Washakie Wilderness. Only a trail follows its first 30 miles in a narrow valley. Then the river emerges into an open valley where it meanders through wetland meadows and ranchland, paralleled loosely by a dirt road. In its final reach, the South Fork enters sageland steppe, and is paralleled by a paved road, with more development near its mouth in Buffalo Bill Reservoir. The upper South Fork is one of the longer wild and roadless rivers in Wyoming. Though introduced rainbow trout have taken over much of the stream, some Yellowstone cutthroat trout remain and thrive in a few of the headwater tributaries. A 10-mile reach with unimproved road access below the wilderness area meanders through a thin strip of private land in the valley bottom, bordered by Shoshone National Forest land, and is choice wildlife habitat with lower-elevation, riparian, and wetland sloughs through willows and cottonwoods, with surrounding public land. This valley provides wintering habitat for bighorn sheep.

The exquisite wild upper reaches of this river are important as the eastern flank of the Greater Yellowstone Ecosystem, and lower reaches include excellent low elevation habitat, though the land is privately owned.

Smiths Fork (of Bear River)

This major tributary to the Bear River hosts the West's finest remaining habitat of the rare Bonneville cutthroat trout. With headwaters in the Wyoming Range that back up to the upper watersheds of both La Barge Creek to the east and the Greys River

to the northeast, the Smiths Fork flows due south for about 36 miles to join the Bear River northwest of Kemmerer. The lightly-used Highway 232 runs along the river as it flows through a ranchland valley.

The Bonneville cutthroat trout has been eliminated from 65 percent of its native habitat, and the Smiths Fork main stem and tributaries remain the largest river system where the fish survive. The stream is considered by Trout Unlimited to be the trout's "linchpin," a "reference stream" for measuring success in Bonneville cutthroat reintroductions, and the "healthiest of all the Bonneville cutthroat's spawning tributaries." The fish spawn in the Smiths Fork but use the main stem of the Bear for as far upstream and downstream as they can go until halted by dams or trapped in diversion canals.

A 25-mile canoeable reach includes Class II rapids, tight winding bends, occasional fallen trees, beaver dams, and shoreline willow thickets that give way to sagebrush along the lower reaches. While the basin is mostly in Forest Service and BLM ownership, much of the riverfront is private ranch land.

Paralleling the Smiths Fork to the west in Idaho, the Thomas Fork of the Bear River is one of few other streams that support the Bonneville cutthroat. Cottonwood Creek in Idaho and Cub Creek in Utah are also important Bear River tributaries for the Bonneville cutthroat trout. ■

Conclusion

Using eighteen lists of rivers compiled by other organizations or by agencies, plus several interviews with experts familiar with the biology of Wyoming's rivers, we have listed 116 rivers with notable natural qualities and then selected 28 of these as exceptional. We sorted these into an "A" category of 9 rivers with 4 tributaries, a "B" list of 2 rivers and 3 tributaries, and a "C" list of 10.

Unlike other states, in Wyoming, the best natural rivers are concentrated in a single large wildland area, roughly coincident with the Greater Yellowstone Ecosystem.

Greater Yellowstone Region Rivers

This expansive river region extends from the Montana border in the northwest corner of the state south through La Barge Creek (two-thirds of the way down the state) and from the Idaho border in the northwest to the Great Plains, just west of Cody and the Wind River Indian Reservation—a 100-by-200-mile area comparable in scale with the West's other great wildlands (central Idaho, the North Cascades, northwestern California, and the Sierra Nevada). From north to south, its stellar line-up of high-quality rivers includes: the Yellowstone, Lamar, Clarks Fork, North and South Forks Shoshone, upper Madison, Bechler, Falls, Thorofare Creek, Snake, Buffalo Fork, upper Wind, Gros Ventre, Granite Creek, Hoback, upper Green, Greys, La Barge Creek, Fontenelle Creek, and Smiths Fork Bear.

Most of the rivers here are well protected in a core of public land jurisdiction oriented toward conservation, including Yellowstone and Grand Teton National Parks and several surrounding wilderness areas. In many cases, protected watersheds lie back-to-back or relate as tributaries, creating protected corridors for wildlife and connectivity of aquatic habitat. But at the outer limits of this river region—beyond the park and wilderness boundaries, pro-



Firehole River

tection for some of the rivers is lacking. Included in this category, from north to south, are the Sunlight Creek basin in the Clarks Fork watershed, the lower reaches of the North and South Forks of the Shoshone River west of Cody, the upper Gros Ventre-Green River interface lying between the Gros Ventre and Wind River Ranges, and the far southern end of this mega-region of rivers where La Barge Creek, Fontanelle Creek, and Smiths Fork of the Bear River flow southward. In these cases, rivers could benefit from additional protection for important riparian areas and from restoration projects in areas that have been degraded.

Taken together, the Greater Yellowstone region's headwaters of the Yellowstone, Snake, and Green Rivers offer one of the more exemplary clusters of natural streams in the West, and the protection of this group of about 20 rivers offers a unique opportunity on the



DOANA

Snake River

wide canvas of river conservation in the West. Even more extraordinary, this region loosely links with the central Idaho wildlands to the northwest via the less-protected upper Missouri headwaters, to the Glacier/Northern Rockies Wilderness of the north through the Rock Creek/North Fork Blackfoot basins of Montana, and with the Great Plains through a magnificent but vulnerable length of the Yellowstone.

Although Wyoming has other rivers of natural value, as indicated in this survey's table, no other region within the state presented a cluster of back-to-back, or adjacent basins that compare with the key clusters of streams identified in other western states. ■

Sources for the Wyoming Survey

Wyoming Rivers were evaluated using the following sources. Please see Appendix 1 for criteria.

1. Existing Inventories Of High-Quality Rivers

- National Wild and Scenic Rivers
- National Wild and Scenic Study Rivers
- National Wild and Scenic Study Rivers
- State-designated wild and scenic rivers
- Nationwide Rivers Inventory (National Wild and Scenic Rivers Act)
- U.S. Forest Service rivers recommended for protection
- Bureau of Land Management rivers recommended for protection
- Bureau of Outdoor Recreation, Western U.S. Water Plan
- Columbia Interior Basin Ecosystem Management Plan

2. Interviews with biologists and local experts

- Holly Copeland, Wyoming Nature Conservancy, conservation planner
- Scott Bosse, Greater Yellowstone Coalition, fisheries biologist
- Wayne Hubert, University of Wyoming and U.S. Fish and Wildlife Service, Fish and Wildlife Cooperative Unit Leader
- Gary Beavais, University of Wyoming, Wyoming Natural Diversity Database, Director

3. American Wildlands, Aquatic Integrity Areas. These rivers ranked highest in “aquatic integrity” on GIS-based maps prepared by the Division of Biological Sciences, University of Montana. The map was based on a 2002 study conducted principally by Nathaniel P. Hitt and Leonard E. Broberg of the Division of Biological Sciences for American Wildlands.

4. Campaign for the Snake Headwaters. These are streams selected for a legislative bill to designate National Wild and Scenic Rivers in the Jackson Hole area.

5. Greater Yellowstone Coalition. These streams ranked “best” in terms of Relative Aquatic Habitat Quality Status, from the report Status of Fisheries and Aquatic Habitats In the Greater Yellowstone Ecosystem, by Robert Van Kirk, Ph. D., 1999.

6. The Nature Conservancy. These are major streams and rivers flowing within the Nature Conservancy’s priority areas. From “Assessing tradeoffs in biodiversity, vulnerability and cost when prioritizing conservation sites,” Journal of Conservation Planning, Vol 3 (2007), figure 3: Conservation prioritization of portfolio sites in Wyoming.

7. Trout Unlimited. These are rivers determined to be especially valuable for the surviving native Snake River and Yellowstone cutthroat trout, the Bonneville cutthroat trout, and the Colorado River cutthroat, by the group Trout Unlimited in their report, Where The Wildlands Are: Wyoming (2007).

8. Wildlands Project, lowland wildlands core and linkage areas. These streams have been identified by—or lie in areas that have been identified by—the Wildlands Project’s Heart of the West Conservation Plan as key lowland core or linkage areas that are crucial for conserving

landscape-scale habitat connectivity.

9. Wyoming Department of Natural Resources. These are streams designated or recognized as priority-outstanding trout waters by Wyoming DNR (1987), as listed in the Outstanding Rivers List (1991).

10. Wyoming Department of Natural Resources. These are streams designated as high water quality, class I, by Wyoming DNR (1988), as listed in the Outstanding Rivers List (1991).

11. Wyoming Heritage Program. These are streams recognized as high priority rivers for natural diversity conservation by the Wyoming Natural Heritage Program (1988), as listed in the Outstanding Rivers List (1991).

12. Wyoming Game and Fish Department, best streams for rare fish (WF). These are rivers west of the continental divide with “abundant” rare fishes based on the agency’s administrative report, “Conservation and Status for the Bluehead Sucker (*Catostomus discobolus*), Flannelmouth Sucker (*Catostomus latipinnis*), Roundtail Chub (*Gila robusta*), and Leatherside Chub (*Gila copei*): Rare Fishes West of the Continental Divide, Wyoming,” 2002.

Appendix 1: Assessing the Quality of Rivers

To assess the qualities of rivers, the WRC survey used two sets of criteria. The first set were minimum requirements to be considered for a base-list of the best natural rivers. The second set addressed quality indicators—the specific values that indicated which rivers were the very best.

MINIMUM CRITERIA

Five minimum criteria were considered:

1. Free-flowing current. Free-flowing reaches of rivers are those that remain with their currents, riverbeds, shorelines, valleys, and canyons unblocked by dams. These reaches continue to benefit from floods’ scouring and replenishment, they lack dams as barriers to fish migration, and they are more likely to retain ecological functions. Dams are so ubiquitous throughout the West that in many states only limited free-flowing reaches of rivers remain.

2. Reasonably natural flow regime. Natural flow regimes permit the full complement of native flora and fauna to thrive. Reaches that are de-watered or heavily diverted usually lack much of their native fish and wildlife and were not included in this survey, though rivers with minor diversions were considered. The more-natural the flow regime, the better.

3. Good water quality. High water quality is a foundation for much of the life in rivers. Heavily polluted reaches were not considered.

4. Non-urbanized shorelines. Most urban riverfronts no longer have intact corridors of riparian plant life; rather they are encased by impervious surfaces that contribute to extreme flow fluctuations and tend to aggravate problems of sedimentation and pollution. Conversely, undeveloped and undisturbed shorelines with their green band of riparian vegetation provide shade, temper flow and temperature, filter sediments, and offer habitat for wildlife. For this reason, urban rivers—though extremely important to society—were not included in this survey of the best natural streams. But occasional small towns and rural development did not bar a river from inclusion.

5. Outstanding natural features. One or more of these should be present. These include superlative scenic, geologic, hydrologic, fish, and wildlife qualities. (Historic and cultural values were excluded because they are an indicator of human activity and do not necessarily represent natural values.)

QUALITY CRITERIA

Beyond the minimum requirements (which yielded a very long list of rivers), the following four quality criteria were used to determine which rivers best retain their natural values:

1. Biological health. In keeping with the strategic plan of the WRC, this was the most important criterion. The best rivers should have intact and functioning ecosystems, with most of the native fish and wildlife species present. This survey identified rivers with exceptional biological diversity, healthy fisheries, and natural riparian corridors.

To date, no uniform or comprehensive evaluation of the biologically healthiest rivers has ever been compiled for the West, though the Environmental Protection Agency is currently working on this goal, and some states have inventoried at least small (wadeable) streams for biological integrity. Even at state or regional levels, there is little information that indicates cumulative biological values of all rivers. To make determinations in this regard, the survey consulted with biologists working for state fish and wildlife departments, state natural heritage programs, and federal agencies including the U.S. Geological Survey, Fish and Wildlife Service, and Forest Service. We also consulted some of the Nature Conservancy's ongoing ecoregion planning programs. These local experts often provided the best judgments available regarding biological values.

In evaluating rivers' biological health, the survey considered high value fisheries as ranked by state agencies and the American Fisheries Society, valuable fisheries listed by the organization Trout Unlimited, inventories of riparian conditions, and other biological data. Rivers with intact native assemblages of fish were favored over rivers where introduced species, such as pike, brown trout, and rainbow trout have become dominant (even though these fish may be popular with many anglers).

Wildlife and plantlife are also important indicators for biological health. The survey considered keystone species such as cottonwoods, healthy populations of rare species otherwise in danger throughout much of their ranges, and other fauna and flora of special interest. Federal and state endangered and threatened species and species of special concern were also considered.

2. Wildness and roadless areas. Rivers with the least development generally rank highest in natural quality. For this reason, the survey noted rivers flowing through designated wilderness, through roadless areas, and through publicly owned land. For some states, the survey consulted comprehensive proposals for wildland protection that identified large blocks of undeveloped and roadless terrain. For some states (generally those lacking other lists indicative of wildness), we conducted our own survey of roadless conditions by consulting with DeLorme atlases.

3. Recreation suitability. Though not necessarily an indicator of natural quality, river-based recreation often depends on high natural values. Thus the survey includes recreation as an additional and related category of interest and consideration. Three river-based recreation activities that depend on natural qualities were noted: fishing, river running, and backpacking.

4. Length. Though short rivers or river segments may have great natural values, rivers and tributaries with long free-flowing reaches provide the greatest range of interconnected

aquatic habitat. Connectivity is especially important for migratory fishes that depend on a range of habitat conditions for different phases of their life history. In some cases, connectivity is also important for the transfer of nutrients within river systems and from oceans to rivers. For these reasons, the survey considered longer free-flowing reaches better and focused on rivers 25-miles or more in length but did not necessarily exclude short streams.

Threats to the qualities of a river were not considered criteria for selection. This is not a list of the "most endangered" rivers. The survey, however, does note some threats to specific rivers. Consideration of these problems may be important in conservation strategies that will follow.

In addition to these specific criteria, the survey set out to include rivers that represented the full diversity of the West's biology and terrain. Recognizing the importance of biological and natural diversity, we included at least one river from each ecoregion, based on vegetation and shown on the U.S. Forest Service's map, Ecoregions of North America.

RATING THE RIVERS

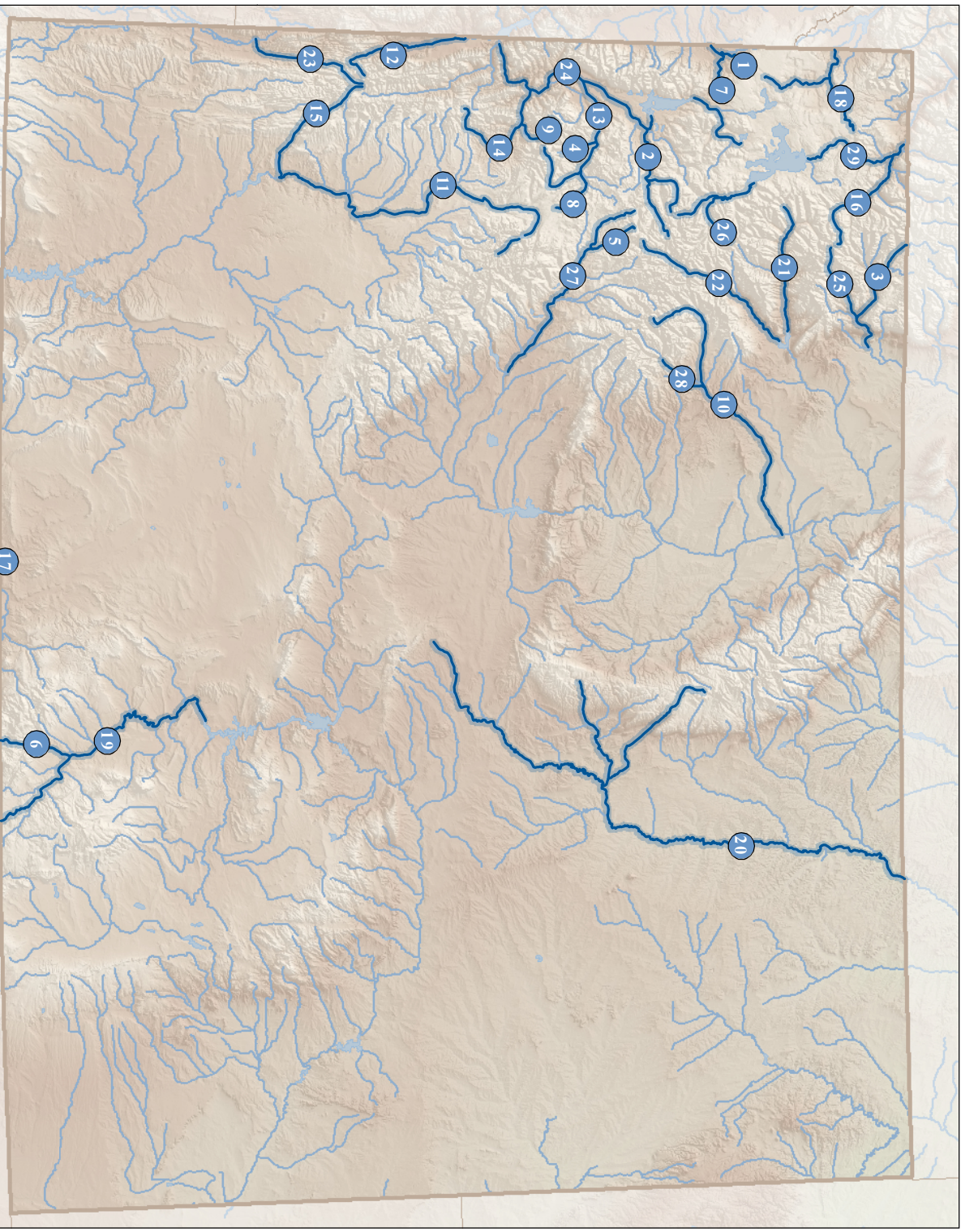
To analyze these criteria for rivers West-wide, data were obtained and tabulated for hundreds of rivers on a state-by-state basis. The resulting state-by-state tables became the integral foundation for evaluating and ranking waterways for the WRC survey. Each table lists a large number of high-quality rivers considered for the survey (100-300 for each state), the sources that have identified the river for its exemplary natural qualities, the types of qualities that are recognized, and the ecoregion that the river flows through.

Sources consulted include the National Wild and Scenic Rivers system, National Wild and Scenic study rivers, state-designated wild and scenic rivers, the Nationwide Rivers Inventory conducted by the National Park Service, rivers recommended for protection by the U.S. Forest Service and Bureau of Land Management, and streams identified in other regional planning efforts, such as the Columbia Interior Basin Ecosystem Management Plan. Additional sources were used for specific states, ranging from articles in the American Fisheries Society journal to state lists of the best water quality, top fisheries, and other natural features. Of comparable importance, the survey consulted on-the-ground experts from natural resource agencies and western universities to supplement and corroborate information about the biological values of the rivers.

The tables also list the final rankings given to streams on the basis of comparative analysis. In these rankings, A represents the most valuable natural rivers. B applies to rivers of very high value but that might occur in the same region as an A river and that have somewhat less quality or significance. C rivers lack the superlative qualities of A and B rivers or represent the second- or third-highest ranking stream in their particular region, or they have valuable qualities but also one or more significant problems.

In the main body of this report, state-by-state chapters include narrative sections that begin with an overview of the state's river system, one-page profiles of each A-, B, and C-listed river, and a description of notable river "regions" where clusters of high-quality streams are found. In this regard, advantages can be gained by protecting identifiable clusters of streams in order to safeguard continuous aquatic habitat, to conserve landscape-scale wildlife habitat in adjoining basins, and to minimize "edge" effects that can damage rivers even when the source of degradation might be distant.

Great Rivers of Wyoming



- 1 Bechler River
- 2 Buffalo Fork (of Snake River) with North and South Buffalo Forks
- 3 Clarks Fork (of Yellowstone River)
- 4 Crystal Creek
- 5 DuNoir Creek
- 6 Encampment River
- 7 Falls River
- 8 Fish Creek
- 9 Granite Creek

- 10 Graybull River
- 11 Green River, Upper
- 12 Greys River
- 13 Gros Ventre River
- 14 Hoback River
- 15 La Barge Creek
- 16 Lamar River
- 17 Little Snake River
- 18 Madison River with Firehole and Gibbon Rivers
- 19 Platte River, North
- 20 Powder River with Middle, North, and South Forks
- 21 Shoshone River, North Fork
- 22 Shoshone River, South Fork
- 23 Smiths Fork (of Bear River)
- 24 Snake River
- 25 Sunlight Creek
- 26 Thorofare Creek
- 27 Wind River, upper
- 28 Wood River
- 29 Yellowstone River