

Great Rivers of the West: **UTAH**



WESTERN RIVERS
CONSERVANCY

Report prepared by Tim Palmer and Ann Vileisis



TIM PALMER

Virgin River in Zion National Park. Cover: Green River in Dinosaur National Monument.

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 loops and a long horizontal stroke at the end.

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



White River

for combined length and natural mileage, runs for more than 400 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 Tetons. In Colorado, the Yampa has one of the finest cottonwood forests in the West and still supports endangered warm-water fishes of the Colorado River basin.



Confluence of the Colorado and Green Rivers

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 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, 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, 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 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, Western Rivers Conservancy will be able to better identify prime opportunities for its involvement. However,



Escalante Canyon

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 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 10 fastest growing states in the nation on a percentage basis, 7 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 Utah's Great Rivers

Centered in the great American desert that extends southward from the Columbia basin to the Mexico border, Utah is the second-driest state. Yet it still has 14,000 miles of perennial streams, including some fine semi-natural waterways.

With the fewest streams, the western portion of the state lies in the Basin and Range geographic province and sits in the rain shadow of both the Sierra Nevada and the high mountains of eastern Nevada. This landscape is typified by long, thin, arid mountain ranges interspersed with landlocked valleys that are isolated by seismic activity that has given rise to the mountains surrounding them. In these basins, ephemeral streams pool up and evaporate; many of Utah's waterways never reach the ocean at all.

A large block of the southern and southeastern state is part of the Colorado Plateau. This is the archetypal desert landscape of red-rock bluffs and table-top mesas along with sizeable intruded mountain ranges, all incised by valleys and canyons of incomparable drylands grandeur.

The northeastern portion of the state is part of the southern Rockies. Here the Wasatch and related mountains rise high for a north-south length 260 miles. Even higher, the Uinta Mountains lie on an unusual east-west alignment for 100 miles between the Wasatch and the state of Colorado. All this high country catches abundant snowfall feeding many small streams that flow down to the Great Salt Lake, the Green River, or the Colorado.

Utah's large rivers all flow long distances from extensive mountain masses elsewhere. The Colorado, Green, White, Dolores, and San Juan gather their flows from the high peaks of the Rockies in Wyoming or Colorado before winding their way across Utah in an extravaganza of deep red-rock canyons that are the signature of Utah's outstanding rivers estate.

The largest river in Utah is the Colorado. Carrying more water than any other stream in the southern Rockies and Southwest, this



Green River

is the seventh-longest river in the U.S.—1,450 miles from Colorado to the Gulf of California in Mexico. It enters Utah at its east-central border and flows southwestward into redrock canyons; however, half its length in Utah is impounded by Glen Canyon Dam.

The Colorado's largest tributary, the Green River, is truly the artery of Utah, flowing for much of its epic 730-mile length within the state. The Green features one of the longest free-flowing sections of river in the West—and the longest that can reasonably be boated with rafts or other whitewater craft.

Other sizable tributaries to the Colorado include the lower Dolores as it flows from Colorado, and the San Juan as it enters Lake Powell from Colorado and New Mexico. Smaller and intermittent tributaries to Utah's lower Colorado have carved wild and seldom-visited but spectacular canyons: the Dirty Devil River with its Muddy River headwaters, the Escalante of legendary red-rock beauty, and other smaller streams incised into multiple layers of sandstone.

The Uinta Mountains in the northeast corner of the state spawn a set of snowmelt-nourished streams that plunge through Rocky Mountain forests until they are dammed and diverted as they

approach the Duchesne Valley. Streams of the Wasatch Front make even shorter, rapid plunges down the mountains but are quickly piped away to farms, and to Salt Lake City and its 100-mile-long chain of suburbs.

The Bear River takes one of the most roundabout river routes in America, rising on the north slope of the Uinta Mountains and running north into Wyoming and Idaho, then looping back west and south and finally emptying into the Great Salt Lake (60 percent of the lake's water comes from the Bear). Similarly blocked and redirected by the seismic uplifts in the central part of the state, the Sevier River nearly encircles the Tushar Mountains to the south and the larger Pahvant Range to the north and terminates in the landlocked, saline, Sevier Lake, which is nearly dry much of the time.

Finally, the 134-mile-long Virgin River is nourished by mountains of southwestern Utah and cuts one of the most majestic canyons in the West through Zion National Park before being diverted in the St. George area and then flowing into Arizona and Nevada, ultimately ending in Lake Mead—the reservoir formed by Boulder Dam on the Colorado.

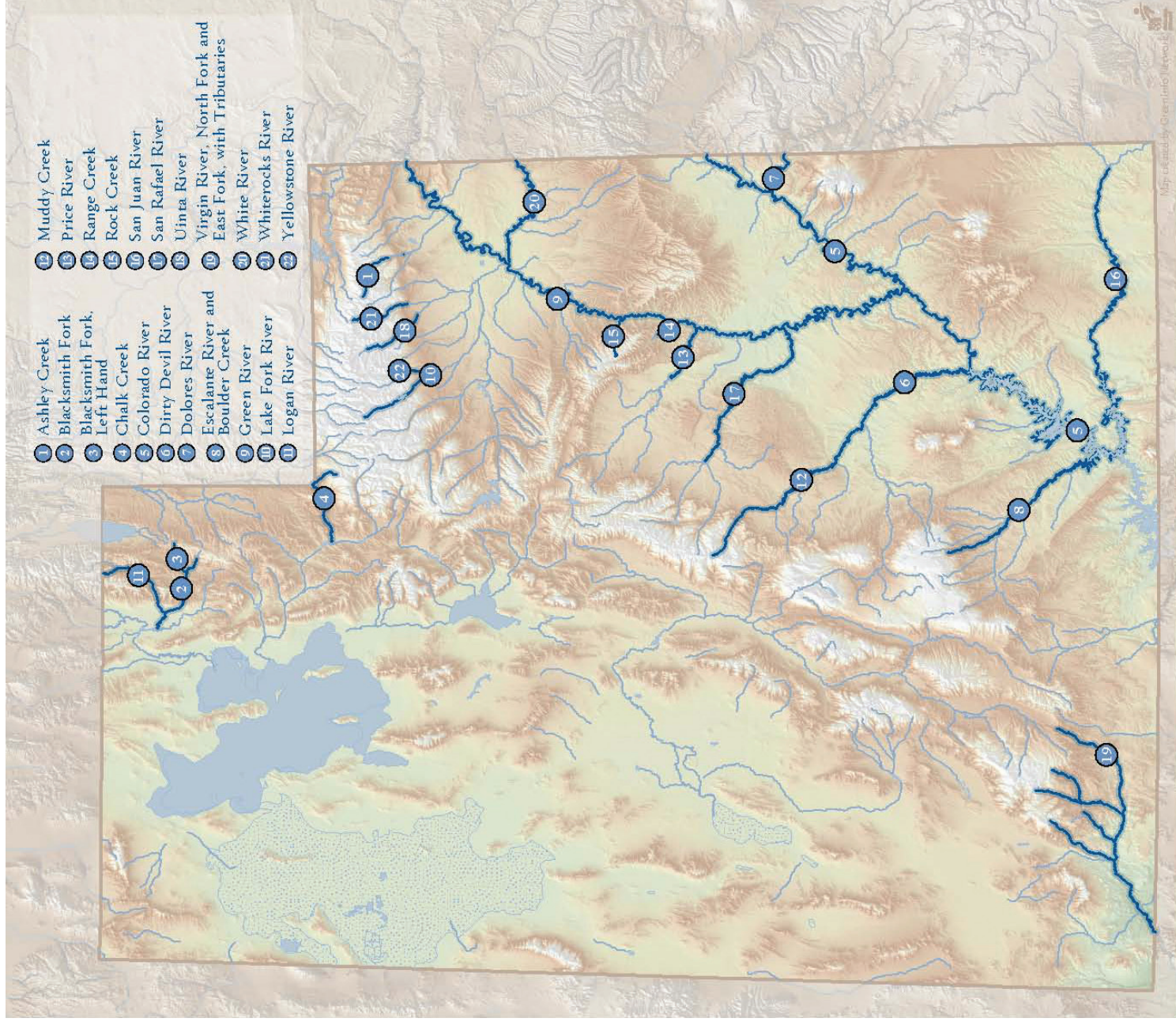
Biologically impoverished compared to many other regions of the West, the Utah rivers are limited owing to their naturally low, erratic, intermittent, and extremely turbid and warm flows, and even more to the severe demands that have been placed on them through damming and diversions. Four endangered fishes—the Colorado pikeminnow, humpback chub, razorback sucker, and bonytail chub—migrate up and down large silty rivers and survive in the Green, Colorado, and lower White, as well as in some shorter, isolated reaches of river such as the lower San Juan. Not yet endangered, but becoming rare, the flannelmouth sucker, bluehead sucker, and roundtail chub likewise long ago adapted to the extreme conditions of the desert waterways and survive in isolated pockets where the rivers have not been dammed or completely desiccated. A few mountain streams still hold the rare Bonneville, Lahontan, or Yellowstone cutthroat trout. The riparian corridors along large and small rivers here are critical to some 70 percent of the birds and other wildlife and represent rare greenery with trees and shrubs in an otherwise extremely harsh landscape with sparse vegetation.

Like elsewhere, only perhaps more so, the health of nature in Utah depends on the health of its rivers.

Though this state has some rivers unlike any others, including a few unquestionably extraordinary waterway routes, such as the Green, and major recreational assets in waterways such as the Colorado and Virgin, not a single stream here has been protected in the National Wild and Scenic Rivers system. Nor is there any state system of protected rivers. The Utah congressional delegation has not supported the national program, though the Utah Rivers Council works toward proposals that the organization hopes will gain the backing of broad interests.

Like the rivers of the West overall, and especially similar to streams in the other arid states of Nevada, Arizona, and New Mexico, the Utah rivers have almost universally been diminished by dams, diversions, and grazing in a region where watersheds are easily damaged. This survey has identified only 12 river reaches exceeding 40 miles that remain without dams and virtually without roads, though all these are affected by dams or diversions just up- or down-stream. The pressure for more water development will continue, and increase: Utah has the fourth-highest growth rate in the nation on a percentage basis, and demographers predict another million people by the year 2020. With dams already restraining natural flood flows, floodplains and riverbanks downstream have been overrun by tamarisk. Occupying roughly 90 percent of the floodplains here and in the rest of the Southwest, this exotic shrub has displaced native cottonwoods, willows, and other plants needed by wildlife (efforts at biological control of tamarisk through an introduced insect hold some promise). Even with these problems and others, a group of remarkable rivers remains with substantial natural assets, and fine reaches of several large canyon rivers here are exceptional. ■

Utah's Great Rivers: List



Great Rivers of Utah

Other Rivers and Streams

Utah's Great Rivers: River Narratives

UTAH'S "A" RIVERS

Colorado River

The Colorado River—myth-making, life-giving, rock-carving centerpiece to the entire southwestern region of the nation—flows through Utah in a series of deep and spectacular sandstone canyons with riparian corridors and habitat for endangered fish of the desert.

The river enters Utah in the east-central part of the state through the closely linked Horsethief and Ruby Canyons, which extend 27 miles with sandstone cliffs, distant mesas, and gentle riffles below Loma, Colorado. A railroad, but no road follows the river's course here. The 17-mile Westwater Canyon follows, with narrow walls, intense whitewater, and no road or trail access. Below Westwater, the river flows gently through more open tablelands for another 12 miles of mostly roadless riverfront and then for 35 riffling miles with Highway 128 running alongside, all through spectacular redrock canyonlands to the town of Moab. Then, the Colorado continues for another 15 miles of still water with Highway 279 alongside, until that road dead-ends at a phosphate plant. From that point downstream, the river flows for 67 wilderness miles through some of the grandest canyon country of the West, including Cataract Canyon with its 12-mile reach of big whitewater, before hitting the backwater of Lake Powell. The rest of the Colorado's path through Utah is flooded by the reservoir, whose tentacles also reach up many tributaries.

Though the Grand Canyon is yet to come in Arizona, the Colorado's route of 176 miles from the beginning of Horsethief Canyon to the Powell reservoir backwater is one of the great



Colorado River in Cataract Canyon

canyon complexes of the West—dam-free, with long reaches lacking roads or development of any kind. The endangered warm-water fish of the Colorado basin survive here, with Ruby and Horsethief Canyons having one of the healthiest populations of the Colorado pikeminnow. Riparian forests of cottonwoods, tributary streams with narrow and enchanting passages, and long reaches of both superb whitewater and also gentle-gradient boating are all found here. Along with sections of the Green River in its twin path southward through the Colorado Plateau of eastern Utah, the Colorado River offers the nation's most awesome flatwater paddling in deep desert canyonlands with monumental geologic features

exposed throughout. These include sandstone walls at Colorado National Monument on the south shore below Loma, Fisher Towers and striking canyon walls along Arches National Park above Moab, and the massive cliffs of Canyonlands National Park in the lower end of the free-flowing reach of the river. Sandstone rims of the canyons reach up to 2,000 vertical feet in places such as Dead Horse Point State Park, downstream from Moab. Westwater Canyon includes big-water boating challenges, and Cataract Canyon includes rapids that in high water rival those of the Grand Canyon.

Most floodplains of the Colorado River and its tributaries are now covered by the invasive exotic shrub, tamarisk, which diminishes or totally eliminates the rich riparian habitat provided by the native cottonwood and willow community. There is hope that an introduced beetle will reduce this invasive shrub and allow native plantlife and its related species of birds and other fauna to thrive once again.

Most of the Colorado River corridor is public land under the management of BLM or the National Park Service (Arches and Canyonlands National Parks), though large tracts of private land are also located here, especially in Ruby and Horsethief Canyons and in the reach between Westwater Canyon and Moab, which is now experiencing intense development pressures associated with growth in the Moab vicinity.

Green River

Exceeding even the Colorado in grandeur, length, and wildness, the Green is the major artery of Utah, and most of its phenomenal 425-mile free-flowing reach slices through the high plateaus and canyonlands of the eastern part of the state (a 40-mile section arcs through northwestern Colorado).

After beginning in wild mountains of Wyoming (see the Wyoming section of this report), the Green reaches Utah within a 65-mile-long reservoir; Flaming Gorge Dam in far northeastern corner of the state is the lower of two major dams on the Green. Below it, the river flows clear and cold for 47-miles through the Flaming Gorge and Brown's Park National Wildlife Refuges. Then it enters a spectacular

56-mile-long wilderness reach through the narrow and tightly linked Lodore, Whirlpool, and Split Mountain Canyons, all within Dinosaur National Monument. Below there, the Green flows for a 96-mile respite of gentle water past desert wetlands of Ouray National Wildlife Refuge and through the Uintah Ouray Indian Reservation to enter the starkly beautiful Desolation and Grays Canyons, which continue for 87 miles before breaking out of the Bookcliff Plateau near the town of Green River. The river's final 139 miles flow gently through Labyrinth and Stillwater Canyons, to the confluence with the Colorado in the heart of Canyonlands National Park. From here, the combined Green and Colorado cavort in 18 miles of big whitewater before ending in the backwater of Lake Powell, giving the Green-Colorado Rivers a continuous free-flowing length of 443 miles—slightly longer than the Salmon-Snake combination of free-flowing, boatable whitewater in Idaho.

Because there is a dearth of runoff across the river's desert route, and because almost all the region's water comes via larger rivers from far away, the mighty Green River has only a few major tributaries. The Yampa and White Rivers are listed and described in the Colorado chapter.



Green River below Flaming Gorge Dam

TIM PALMER

A few other notable, but small, tributaries enter in Desolation Canyon; these include Rock Creek, Range Creek, and the Price River (see C Rivers), all of which drop from high elevation tablelands, through remote canyons with perennial flows and lush riparian corridors.

Downstream from the Yampa confluence in Dinosaur National Monument, the Green supports the endangered Colorado warm-water fishes. Above that point the flow manipulations of Flaming Gorge Dam have made the river inhospitable to native fish and have instead favored introduced trout in a cold-water, tailrace fishery below the dam, which has attained a national reputation as an excellent “blue ribbon” sport fishery with up to 20,000 trout per mile.

Throughout its free-flowing length, the cliffs, wilderness tributary canyons, whitewater, lush riparian forests at the mouths of side streams, Indian pictograph sites, and wildlife habitat all combine to make the Green River exceptional in the West. Highlights include the deep, narrow canyon of Lodore, the enchanting confluence where the Yampa joins in Echo Park, the one-of-a-kind bisection of Split Mountain in Dinosaur National Monument, the 100-mile flatwater reach with riparian wetlands downstream, the 85-mile wilderness canyon of Desolation, and the sheer-walled canyons of Labyrinth and Stillwater before the Green joins the Colorado within the rock-walled fastness of Canyonlands National Park.

When paired with the Yampa and its tributaries, the Green River system offers the longest continuous free-flowing mileage in the West. The Green likewise has some of the longest essentially roadless riverfront in the West, with a reach of 107 miles below Ouray, 156 miles from Green River to the backwater of Lake Powell, and 45 miles through Dinosaur National Monument. The river sections downstream from the towns of Ouray and Green River are two of the longest in the West uncrossed by a bridge.

Most of the Green River corridor is public land managed by BLM, the National Park Service, the Fish and Wildlife Service within national wildlife refuges, and the Uinta and Ouray Indian Reservation. Scattered private tracts, however, do appear in several sections, and significant reaches of private land are found between Dinosaur National Park and the Uinta and Ouray Indian Reservation



Virgin River, Zion Narrows

in the Jensen area, and upstream for 10 miles from the town of Green River. However, perhaps the greatest threat to the Green River looms with potential for development and expansion of oil and gas drilling and also oil extraction from shale that is abundant in areas managed by the BLM.

Virgin River, North Fork and East Fork, with Deep Creek, Crystal Creek, North Creek and its Right and Left Forks, La Verkin Creek, and the upper main stem Virgin

The outstanding streams of the upper Virgin River basin cut through stunning canyons in Zion National Park—sometimes called a “red-rock Yosemite”—and comprise the major river system draining southwestern Utah.

Gathering waters on the 8,800-foot high Pink Cliffs Plateau, the North Fork Virgin begins by tumbling 1,000 feet in a 12-mile reach through private and BLM land to the boundary of Zion National Park. The stream then flows for 20 miles through the park, with road

access along the lower two-thirds of this reach, to the confluence with the East Fork, where the main stem begins.

The East Fork likewise begins on a high plateau, drops into Long Valley where it flows for about 25 miles with Highway 89 running alongside, and then enters a deepening, roadless canyon where it flows 10 miles to the national park boundary. It continues for 5 roadless miles through the park, followed by 2 miles through private land, to join the North Fork.

The North Fork Virgin in Zion National Park is one of the more remarkable small rivers of the region. After picking up the 16-mile roadless and dam-free Deep Creek, along with its tributary, the similarly wild 10-mile-long Crystal Creek, the North Fork flows through “The Narrows”—an extended, slot-canyon as little as 18 feet wide at its bottom but with red-rock sandstone walls soaring 2,000 feet upward. The Narrows can be waded and walked in low water—a one-of-a-kind river hike in the West, though flash-floods can be a consequential hazard. With their continuous mileage, the Deep Creek-North Fork and Crystal Creek-Deep Creek-North Fork combinations each offer an 18-mile roadless reach of wild streamfront that is spectacular and remote. From the mouth of the Virgin River Narrows, the Zion National Park road follows the North Fork downstream as it winds through spectacular canyon scenery with cottonwood trees on flood plains and cliffs rising to towering heights of 1,000 and 2,000 feet. Two low diversion dams are located on the lower river before its confluence with the East Fork.

The East Fork of the Virgin begins with a long road-accessible reach through private land, followed by a striking, inaccessible canyon. The short reach that flows within Zion National Park is a designated research natural area with access restricted for scientific purposes.

The main stem Virgin was once one of the truly great rivers of the desert southwest. From the confluence of the North and East Forks, it flows for 8 miles with Highway 9 alongside, and then picks up the flows of North Creek. This 18-mile tributary runs from the western side of Zion National Park with roadless upper reaches in its Right and Left Forks. The Right Fork is regarded as one of the most adventurous and rugged backcountry hikes in the park; the Left

Fork is a wilderness canyon noted for unique geological formations. The lower 7 miles of North Creek flow largely through private land mixed with BLM acreage.

Eight miles downstream from the North Creek confluence, the main stem Virgin picks up La Verkin Creek, which flows in from the north after dropping for 12 miles from wild recesses above and within Zion National Park and then for another 15 miles through lower wilderness canyons managed mostly by BLM, but with several state and privately owned tracts as well. This “branch” of the Virgin is even wilder than the others because it is roadless except for a few miles of unimproved access in its lower reach. Virgin spinedace, speckled dace, and desert suckers—imperiled native fish—survive here.

The upper main stem Virgin supports the imperiled Virgin River spinedace, which is also present in some of the tributaries.

Seven miles downstream from La Verkin Creek, the main stem Virgin encounters Quail Creek Reservoir, an off-stream impoundment supplied by water diverted from the river. Below this point, the river is severely depleted of its flow and enters the heavily urbanizing



Virgin River

St. George area. Native warm-water fishes once thrived in the main stem but are now depleted or extinct from major sections of the river. Though Interstate 15, other highways, urban development, and diversions affect the river, the Nationwide Rivers Inventory still lists the lower main stem as supporting the endangered woundfin minnow, Virgin River chub, and a variety of bird and mammal species.

The Zion complex of Virgin River tributaries remains the only vestige of natural streams left in southwestern Utah and stands as one of the most spectacular sets of red-rock canyon streams in the Southwest. The entire watershed is threatened by recurrent proposals for dams and diversions above the national park and on tributaries including North Creek to serve the booming St. George urban area.

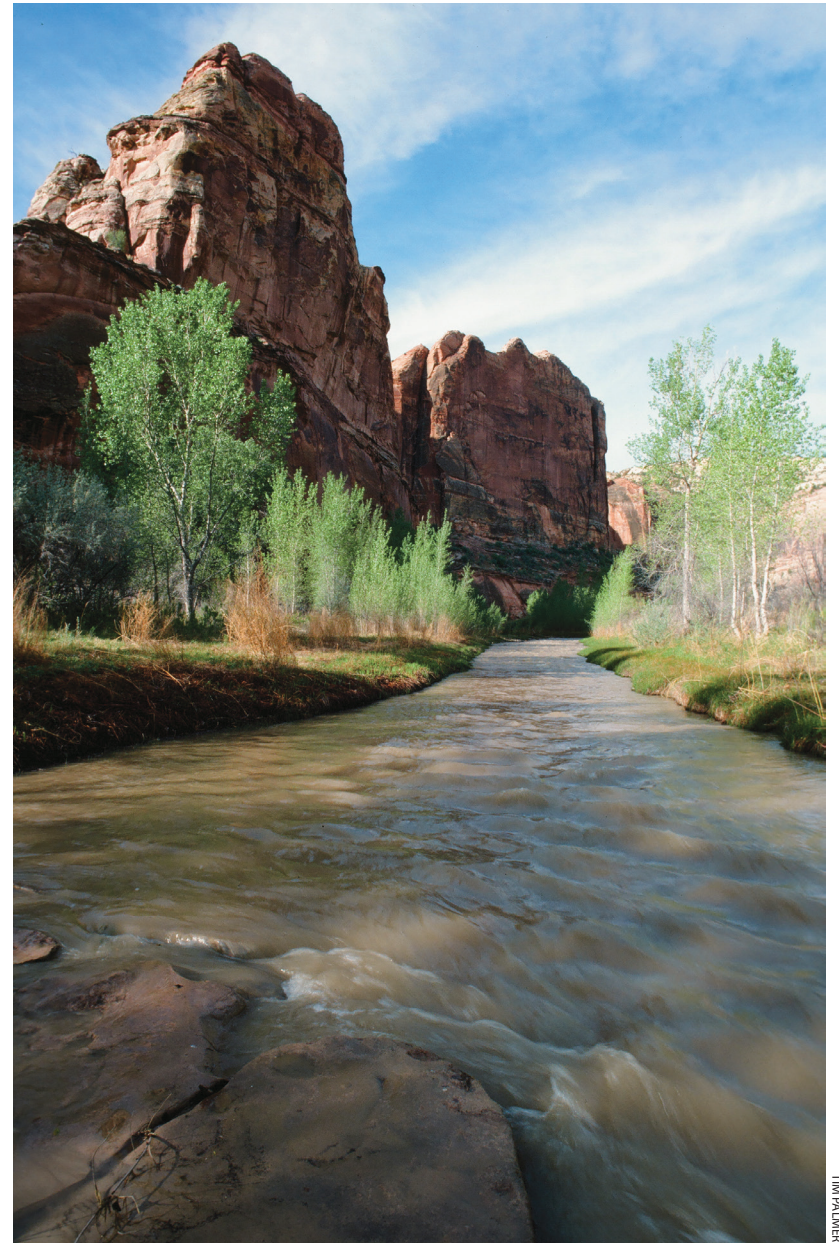
White River

This major tributary to the Green River supports endangered warm-water fishes and flows undammed and nearly roadless for all of its distance in Utah and has a cottonwood corridor along the shores. Though oil and gas development has affected the watershed, and the river's riparian corridor is often lean, the river is still exceptional in its long free-flowing reach and undeveloped and roadless character. See the Colorado section of this report for a more complete discussion of this important river.

UTAH'S "B" RIVERS

Escalante River and Boulder Creek

This amazing tributary of the Colorado flows from high mountain plateaus down to deep desert canyons, with cottonwood groves, mazes of entrenched meanders, and towering vertical walls. The river corridor offers habitat to bald eagles and potentially to peregrine falcons and Mexican spotted owls.



Escalante River

TIM PALMER

The Escalante River begins about eight miles northwest of the town of Escalante, collecting waters from roaded tributaries that start high on the 10,000-foot, conifer-clad Aquarius Plateau. Much of this flow is diverted for irrigation, but east of town, the river drops for 12 roadless miles through a spectacular canyon, where its flows are restored by significant tributaries, including Pine, Death Hollow, and Calf Creeks. This wild stretch is reachable by a trail from Calf Creek Recreation Area where Highway 12 crosses the river. From there to the backwater of Lake Powell near Coyote Gulch, the Escalante flows dam-free through a twisting wilderness of red-rock canyons in Grand Staircase Escalante National Monument and then Glen Canyon National Recreation Area. The principal, and best source of the river is Boulder Creek and its West Fork, a 25-mile-long stream that remains less affected by diversions and development than other Escalante sources. Most of its length has no roads nearby.

Unlike many other tributaries to the Colorado in southern Utah, the Escalante is almost always wet at least in pools. Dozens of tributaries join the river; many of them with magnificent narrow slot canyons.

Hikers explore the wild canyon when flows are low, typically from late March through June and mid-September through October. Even at these low-water times, much wading is required. In years with ample precipitation, whitewater boaters may find a narrow window of opportunity in spring to negotiate the route with some rapids and minor portaging.

The Escalante's upper tributaries (North, Pine and Boulder Creeks) are home to Colorado River cutthroat trout, and the Boulder River system is especially productive. According to the Nationwide Rivers Inventory, bald eagles use the lower canyon, and the river corridor offers potential habitat for peregrine falcons, mountain lions, and Mexican spotted owls. With 70 free-flowing miles, the Calf Creek-Coyote Gulch reach appears to be the fourth-longest roadless and dam-free section of river in Utah, behind two sections of the Green, and the Dirty Devil River. Along with the North Fork of the Virgin, the Escalante is one of the premier narrow, scenic, wilderness canyons for paddling and hiking.

Cattle have roamed freely through much of the canyon for



Logan River

decades, but designation of Grand Staircase Escalante National Monument in 1996 led to retirement of grazing permits in the river corridor in 1999, and the effects of cattle are largely limited to herds crossing the river en route to other grazing areas. Owing to rock barriers, cattle have never been able to reach and degrade the lower 20 miles.

Before the filling of Lake Powell, the lower Escalante was considered one of the most sublime of all desert canyons with its massive walls, narrow depths, and abundance of intricate side canyons.

Logan River

This scenic, popular recreation river east of Logan is the best stream for Bonneville cutthroat trout in Utah and probably the second best in the three-state area where these native fish occur.

Beginning in southern Idaho, the Logan drops quickly into

Utah and flows 7 miles with the lightly traveled Forest Service Route 006 in its valley before encountering Highway 89. With this busy highway alongside, the river drops steeply for 22 more miles through beautiful Rocky Mountain country with a lush willowed riparian zone to the mouth of its canyon, and then winds through the city of Logan and the agricultural Cache Valley to the Little Bear River. The river is unregulated by storage reservoirs, though there is a small hydro project just upstream from the canyon mouth.

Flowing through karst, limestone terrain, the Logan has a particularly productive fishery and is a favorite of many trout anglers. But more important to this survey, it is the finest remaining Utah stream for native Bonneville cutthroat trout, which have been extirpated from all but 30 percent of their native range. This may be the largest population in the state, and the river system is one of the two longest that is still suitable to this widely migrating fish (the best among all Bonneville cutthroat streams is the Smiths Fork of the Bear River; see the Wyoming section of this report). Headwater basins of the main stem Logan—Spawn Creek, Beaver Creek, and other tributaries—are vital spawning grounds for this fish that lives in the main stem for much of its life but migrates upstream to spawn in small tributaries. While many of the current Bonneville cutthroat populations elsewhere survive only in isolated fragments of stream where habitat has not been degraded and where non-native fish have not been introduced—such as a short section of Red Butte Creek above the University of Utah in Salt Lake City—two larger stream systems remain where these native fish are doing well: the Logan and Weber Rivers. With more suitable habitat remaining, the Logan is the best of these. This river also has a popular whitewater boating run.

Price River, lower

The Price River is the largest tributary to the Green within its Desolation-Grays Canyon reach. Though heavily affected in upper reaches by the city of Price, by mining, by industry, and by roads, the lower river has a fine riparian corridor in a long roadless reach, including 35 miles that support the endangered Colorado



JESSE VARNER

San Juan River

pikeminnow.

From Woodside (south of Price) on Highway 6 to the Green River, the Price flows 23 miles through the uplifted sandstone formations of the Beckwith Plateau. A 4-wheel-drive road follows near the river for the first 6 miles of this reach; after that, the route is completely roadless as the river twists through its canyon in Class II and III rapids. A BLM wilderness study area, the canyon supports mountain lions and other wildlife in a corridor linking the wildlands east of the Wasatch Plateau with the extensive wilderness of the Green River's Desolation-Grays Canyon complex.

Rock Creek and Range Creek (Green River tributaries in Desolation Canyon)

These two perennial streams are excellent tributaries to the Green River within Desolation Canyon, the second-longest essentially roadless reach of river in Utah. Flowing from the 10,000 foot West

Tavaputs Plateau and Roan Cliffs, these creeks drop 4,000 feet through remote aspen-clad mountain terrain and then sagebrush-studded desert canyons to join the Green.

Rock Creek has a healthy year-round flow of crystal-clear water in a region where almost all streams are intermittent and silty. Spring-fed, it flows with far more water than any other Desolation tributary except the Price River, even though Rock Creek is only 8 miles long. The roadless watershed features a lush riparian corridor of willows.

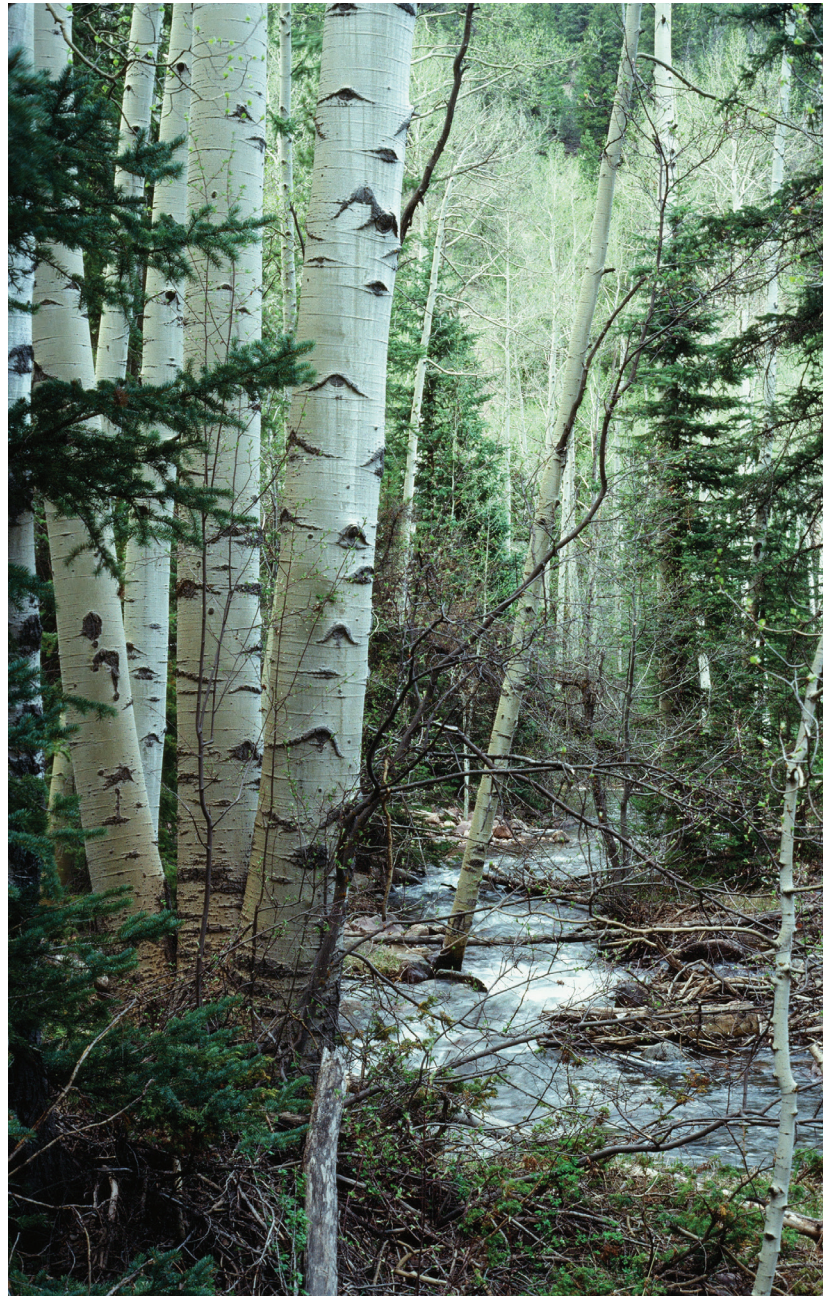
Range Creek is a 36-mile-long tributary to the Green. An unimproved road follows much of its length, and a private ranch is located along its mid-section. Its elevation spans from a spruce and fir belt at its upper end to lush cottonwoods in its lower reaches. The Nationwide Rivers Inventory lists golden eagles and peregrine falcons as residents here.

San Juan River, lower

The lower 84 miles of this 400-mile-long river offer an exceptional desert and canyon waterway with small rapids, entrenched meanders 1,000 feet deep, and wilderness country with rugged side canyons.

The San Juan begins in highcountry of the Weminuche Wilderness in the southern Rockies of Colorado, flows through the town of Pagosa Springs, and backs-up in the massive impoundment of Navajo Reservoir at the New Mexico state line. Heavily developed, diverted, farmed, and urbanized, it passes through the city of Farmington and then through Shiprock on the Navajo Indian Reservation. The heavily depleted river enters Utah and is riddled with roads and oil wells to the small community of Bluff, where its face is suddenly changed as it drops into an exquisite canyon complex that continues for 84 miles to the backwater of Lake Powell. The San Juan is the third-largest tributary to the Colorado River, after the Green and Gunnison.

Below Bluff, the river flows for a 28-mile-long roadless reach to Mexican Hat, where Highway 261 crosses the river on a high bridge, though there is an access ramp. The river then proceeds through



Ashley Creek

TIM PALMER

stark, wild canyons for 56-miles to the backwater of Lake Powell, where an unimproved road at Clay Hills offers access.

These two reaches of the San Juan include moderate rapids, exceptional rock art and Indian ruins, and excellent desert hiking. In the lower reach, spectacular tributary canyons, including Slickhorn and Grand Gulch, enter from the north side. Canyon walls rise in multiple layers of sandstone and shale, and the Honaker Trail climbs 1,500 feet up to the rim to overlook the “Goosenecks” section, a tightly looping series of meanders where the river is deeply entrenched in the Monument Upwarp of the Colorado Plateau. The two adjacent roadless reaches of the San Juan have a combined length of 84 miles.

The lower San Juan is habitat to all four endangered warm-water fishes of the Colorado basin, though the razorback sucker is especially rare. Peregrine falcons and bald and golden eagles live here. Like other Colorado tributaries, the banks of the San Juan are crowded with exotic tamarisk.

In Utah, nearly the entire river flows through BLM, Navajo Reservation, or Glen Canyon National Recreation Area lands.

Uinta Mountain Rivers: Uinta River, Ashley Creek, Whiterocks River, Yellowstone River, and Lake Fork River

Five outstanding small rivers flow from the south side of the 130-mile-long Uinta Mountains, a high, rounded, often-snowcapped range that lies in an unusual east-west alignment across northeastern Utah. Together, these streams are the finest of Utah’s mountain waterways, each flowing from highcountry and dropping into deeply forested valleys and canyons carved by glaciers. Typically roadless in their upper reaches, they are reached by lightly traveled, dead-end roads and then trails approaching from the south. All these streams are diverted for irrigation or water supply as soon as they leave the mountains (or before). In contrast, the north-side streams of the Uintas have shorter roadless reaches and drop more quickly off the mountain slopes to a high and dry



Whiterocks River

TIM PALMER

plateau terrain. The following descriptions of the south-side streams are ordered from west-to-east.

On the western reaches of the Uinta Mountains, the North Fork Duchesne has been depleted by a major diversion tunnel even at a high elevation, and the adjacent stream, Rock Creek, has likewise been diverted. But the next stream to the east, Lake Fork River, begins near the 13,219 feet high Mount Lovenia in the High Uintas Wilderness and flows for about 15 miles with trail access down to the backwater of Moon Lake Reservoir. Below the dam, another 8 miles of road-accessible river are boated by whitewater paddlers in June or late spring. Then a diversion dam shunts most of the river's flow into the Farnsworth Canal for irrigation below.

The Yellowstone River, with its upper extension of Yellowstone Creek, flows from the Uinta crest at Kings Peak, Utah's highest summit at 13,512, also in the High Uintas Wilderness. It drops through a deep glaciated valley with trail access for 15 miles to the end of Forest Service Route 124, and then continues another 4 miles to a dam. Below the dam, the river flows 8 more miles through an opening valley and then is heavily diverted. With spectacular scenery, waterfalls, and cascades, the river is an important wildlife corridor and is one of few streams in the state with a genetically pure strain of Colorado River cutthroat trout. A proposed 200-foot-high Bureau of Reclamation dam is slated to impound a currently free-flowing reach of this river, but has been thus-far been stopped owing to opposition by Indians and others.

The Uinta River runs for about 20 miles from its high, rocky, meadowland source of Gilbert Creek near Gilbert Peak, which rises to 13,442 feet (Kings Peak also drains into this river) in the High Uintas Wilderness. The stream passes through a deep, glaciated valley with trail access to the end of Forest Service Route 118. The river flows another 5 miles with road access to a diversion dam that blocks the flow several miles above a power plant. Below there, other diversion dams take most of the river's water. The river supports native whitefish, mountain suckers, speckled dace, long nosed dace, and Colorado River cutthroat trout, along with a superb wildlife corridor.

Like the Yellowstone, the Uinta River is threatened by a proposed

200-foot-high dam as part of the Bureau of Reclamation's Central Utah Project. The Ute Tribe has thus far not allowed this project to proceed.

The Whiterocks River has road access via Forest Service Route 110 to its source in Chepeta Lake, which lies beneath high rolling peaks on the Uinta crest, but then it flows for 13 miles through a deep mountain canyon without road or trail access. Then the river flows for 8 miles alongside Forest Service Route 492 to the mouth of the canyon where the river is diverted. The river canyon provides excellent habitat for wildlife including bighorn sheep, moose, elk, and others, and its tributary, Reader Creek, is habitat for the Colorado River cutthroat trout and has been an important stream for the reintroduction of this native species.

Finally, the easternmost of the relatively natural Uinta streams is Ashley Creek. Its South Fork begins on the south slope of Leidy Peak and flows about 14 miles with trails alongside and only one remote road-crossing down to the North Fork confluence. The main stem then flows for another 12 miles through a deep mountain canyon before roads appear and diversions begin.

Among these 6 streams, the Uinta River appears to have the longest roadless mileage (20) and the longest dam-and diversion-free length (25 miles).

UTAH'S "C" RIVERS

Blacksmith Fork and Left Hand Fork Blacksmith Fork

Dropping in rugged mountain canyons through paralleling subranges that lie to the northeast of the Great Salt Lake, these two relatively undeveloped tributaries to the Little Bear River are among the best streams flowing from the west slope of the southern Rockies—from the Wasatch and related subranges that extend through the northern two-thirds of Utah.

The Blacksmith Fork begins near Red Spur Mountain in the Monte Cristo Range and drops precipitously for about five roadless



Dirty Devil River

miles to Ant Valley. After flowing four miles through gentler, ranch land terrain, it meets state Highway 101 and drops steeply again for eight miles through the Bear River Range to the confluence with the Left Hand Fork. After another four miles, the small stream reaches the mouth of its canyon at the base of the mountains and then winds through the suburbanizing Cache Valley, south of Logan, to the Little Bear River.

Wilder than the main fork, the Left Hand Fork of Blacksmith starts in the high basin of Strawberry Valley and plunges for 14 miles through the Wasatch-Cache National Forest to its confluence with the Blacksmith Fork. A lightly traveled road and several campgrounds are located along the wooded stream. Both forks are noted trout fisheries and support native whitefish as well as Bonneville cutthroat trout. Remnant populations of native mountain suckers, and longnose dace can also be found here.

Even though the Bear River-Wasatch-Fish Lake Mountains comprise the north-south backbone of the southern Rockies for 260 miles in Utah, and collect the greatest amount of snow, and

give rise to most of Utah's rivers not coming from outside the state, few streams of high quality remain along this impressive mountain front. Nearly all are encroached on by roads, blocked by dams for water supply and hydroelectric power, and heavily developed by ski resorts at their upper ends along with intensely urbanizing corridors in low elevations. Though far from wild, the Blacksmith Fork and its Left Fork tributary are among the least affected streams on this mountain front.

Chalk Creek, with South Fork and Mill Fork

Chalk Creek and its major tributaries are one of the most important stream systems for the rare Bonneville Cutthroat trout, with more than 100 interconnected miles of habitat.

Starting near the Utah-Wyoming border, this stream flows about 32 miles west to the Weber River. Highway 133 follows along most of the stream's length. Bonneville cutthroat trout range throughout the river system, but tributaries Mill Fork and South Fork, which drain the northern end of the Wasatch Range, offer particularly good cutthroat habitat. Much of the main stem winds through a valley with ranchland and with forests on the mountain slopes. Canoeists use the lower river from the South Fork down, which has mostly a gentle flow except for one mile of Class II whitewater. Most of the stream valley and frontage is privately owned.

Dirty Devil River and Muddy Creek

Among the most remote, long reaches of river in Utah, the Dirty Devil and its upriver extension of Muddy Creek are extensive and essentially roadless, dam-free rivers with spectacular canyons and some of the least-visited riverfront in the greater Southwestern desert region.

Beginning on the Wasatch Plateau in the Manti-La Sal National Forest west of Ferron, Muddy Creek flows southeast through pine-clad canyons for 16 miles to Highway 10, and then 12 miles across an agricultural valley to Interstate 70, where it enters a 48-mile,



Dolores River

wild canyon that cuts through the uplift of the San Rafael Reef. The river carves into various layers of sandstone and flows through a box canyon known as the Chute; in one place, walls narrow to a 7-foot-wide slot within a 300-foot-deep chasm with overhangs that block the sky from view. One unimproved dirt road reaches the river about 28 miles downstream from I-70, and another comes in 20 miles farther downstream and then parallels the creek for about six miles. Muddy Creek then runs roadless for its final 22 miles to the town of Hanksville, where it joins with the greater flow of the Fremont River to form the Dirty Devil River. Whitewater guidebook author Gary Nichols calls Muddy Creek a “truly outstanding desert river,” referring to its “incredible scenery, isolation, and numerous rapids.” In May or June of a wet year, the creek runs high enough to float whitewater boats, however, much of the time the canyon remains mostly dry.

After flowing for about 15 miles through open desert terrain below the Muddy Creek-Fremont River confluence, the Dirty Devil

enters the spectacular Robber’s Roost Canyon and flows through a maze of rocky country to the backwaters of Lake Powell. Only one unimproved road comes down to the river in this remote 74-mile reach. In early June of a wet year, the river offers Class I and II paddling. Side canyons formed by flash floods offer beautiful hiking opportunities. Peak flows on this stream, which often dries up in the summer and leaves just lingering flatwater pools—was 35,000 cfs in 1957; flash floods can transform the Dirty Devil into an equivalent of the Grand Canyon of the Colorado.

Combined, the 98-mile-long Muddy Creek and 74-mile-long Dirty Devil form a continuous undammed route of 172 miles. An 84-mile reach of Muddy Creek and 74-mile section of the Dirty Devil are also essentially roadless, with just a few unimproved dirt roads coming close to the river. With canyons 300-900 feet deep, the Dirty Devil corridor supports golden eagles and peregrine falcons. The uppermost reaches of tributaries support a population of Colorado cutthroat trout, while the lower river offers habitat for endangered razorback suckers as well as other imperiled fish including flannelmouth suckers, bluehead suckers, speckled dace, and roundtail chubs.

Muddy Creek and the Dirty Devil are similar in some ways to the better-known Escalante River—another north-side tributary to the Colorado in its flooded reach behind Glen Canyon Dam. The Muddy Creek-Dirty Devil reach, however, is longer, and more remote.

Dolores River

The lower end of this important Colorado River tributary flows through Utah. If McPhee Dam did not divert such large amounts of water, the Dolores would be one of the finest rivers of the Colorado Plateau. See the Colorado section for a description of this river.

San Rafael River

This remote, undammed, often dry, and largely roadless river flows through spectacular canyon country as it cuts through the

San Rafael Swell of dramatically uplifted sandstone and as it drifts across desert valleys on its way to the Green River.

The San Rafael begins at the confluence of Ferron, Cottonwood, and Huntington Creeks, which drain runoff from 11,000-foot peaks into the well-settled Castle Valley, southwest of Price. The river soon enters a spectacular canyon that twists through the massive sandstone uplift of the San Rafael Swell. In places, sheer walls overhang the swift river, and at the “Black Box,” the stream drops through steep rapids and small waterfalls. The river almost completely encircles the cone of Mexican Mountain, before it drops steeply again through the San Rafael Reef, another uplift of rock. Then it meanders through lowlands to the Interstate 70 crossing. In another eight miles, Highway 24 crosses the San Rafael. From there, the river runs for about 36 miles, first through private ranchland with only unimproved road access and then through BLM canyon county to the Green River.

The Nationwide Rivers Inventory makes note of the San Rafael’s deeply entrenched canyons, scenic sandstone formations, excellent hiking opportunities, unique geology, archaeological sites, and golden eagle habitat, and guidebook author Gary Nichols refers to the canyons’ “indescribable beauty.” The entire river length of about 110 miles has no dams and little road access. Yet the river is heavily diverted at its headwaters, and usually has little or no water in its channel. Even then, it remains an important wildlife migration corridor. Lower reaches with perennial flows support the native Colorado pikeminnow, round-tail chub, speckled dace, flathead minnow, red shiner, flannel mouth sucker, and bullhead sucker.

The biology of the river has been much degraded even within the past few decades. Native warm-water fishes, including roundtail chub, bluehead sucker, flannelmouth sucker, and Colorado pikeminnow were present in the San Rafael River system in the late 1970s but since then have been extirpated owing to depleted flows. Vegetation along much of the stream includes large thicket of tamarisk. ■



TIM PALMER

San Juan River

Conclusion

Using 15 lists of high quality rivers compiled by other groups or by agencies, we found 132 Utah rivers that were noted for natural values. With further analysis and drawing upon interviews with local experts, we sorted these streams into an A list of 12 rivers and tributaries, a B list of 12, and a C list of nine. The following clusters of high-ranking natural rivers became evident.

Colorado-Green-White system, for endangered fish

A significant complex of contiguous, undammed river reaches in the Colorado River Basin offers the best remaining habitat for endangered and imperiled warm water fishes—the Colorado pikeminnow, humpback chub, razorback sucker, and bonytail chub. These reaches include the Colorado River from the mouth of the Gunnison River (in Colorado) down to the backwater of Lake Powell, the Green River from the mouth of the Yampa (in Colorado) to its confluence with the Colorado, and the White River from Taylor Draw Dam to its Green River confluence. The lower Price River could also be included in this group. This suite of rivers is also exceptional for its spectacular redrock canyons through the Colorado Plateau geologic province, its length of long undammed and mostly roadless riverfront, and its incomparable scenery and recreational opportunities, including long river trips uninterrupted by dams or significant development. Much of the land in these river corridors are publicly owned, but large areas and many scattered parcels are also privately held.

Upper Virgin River system

The upper Virgin River with its Zion National Park tributaries stands as the exemplary river system of southwestern Utah. From



Green River

forest mountain plateaus to redrock canyonlands, the stellar East Fork, the North Fork with its tributaries of Deep and Crystal Creeks, North Creek with its Left and Right Forks, and La Verkin Creek all flow as excellent streams in adjacent, parallel valleys before joining to form the Virgin. Few desert river systems combine such spectacular scenery with perennial flows and dam-free, roadless mileage. Some of the upper Virgin's mileage is protected in Zion National Park, but much of it is threatened by water supply proposals from the urbanizing St. George area, just downstream.

Dirty Devil system

In the incredibly inhospitable desert lands at the southcentral part of the state, the Dirty Devil River with its upriver extension of

Muddy Creek is exceptional for its remote wildness and scenery, which is seldom visited by anyone. The Dirty Devil's major tributary from the west—the Fremont River, along with its tributary, Pleasant Creek—are also fine complements to this unusual river system. Those two streams were not included in our top rankings mainly because of highway encroachment, but they are nonetheless listed and recommended for protection by other groups and flow beautifully through Capitol Reef National Park.

Uinta Mountain rivers

The rivers of Utah's mountain ranges tend to be short, to flow quickly into arid valleys from their mountain terrain, and to be heavily tapped for water supplies. Roads and dams often encroach, even in upper basins of many streams. The finest suite of mountain rivers remaining are the 5 streams that flow from the south side of the Uinta Range, all documented in our "B" list. All begin near the crest of this towering mountain range, all flow with snowmelt that will be increasingly important in the age of global warming, and all have valuable remaining mileage that is dam-free, virtually roadless, and without upper-river diversions. The Uinta River is the best of these, followed by Ashley Creek, the Whiterocks River, Yellowstone River, and Lake Fork River. The north Uinta waterways including the Bear River headwaters and Blacks Fork system are also fine streams but are shorter than the south-side streams and probably in less pristine condition. ■



Virgin River

Sources for the Utah Survey

Utah 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

- Joel Tuhy, Utah Nature Conservancy
- Merritt Frey, Director, Utah Rivers Council
- Krissy Wilson, fisheries biologist, Utah Division of Wildlife (with input from other regional biologists within the state)
- Zack Frankel, former director of the Utah Rivers Council

3. Utah Nature Conservancy, high priority for conserving natural diversity. These streams were identified as high priority for conserving natural diversity by the Utah Nature Conservancy in 1988, as listed in American Rivers, Outstanding Rivers List (1991).

4. Utah Division of Wildlife Resources, outstanding trout fishery waters. These streams were identified by the Utah Division of Wildlife as outstanding trout fishery waters (class 1 and 2) in 1988, as listed in American Rivers, Outstanding Rivers List (1991).

5. Utah Rivers Council, Wild and Scenic recommendation, tier 1. These are the top ten river reaches (#1-10), under Forest Service or BLM jurisdiction, identified by the Utah Rivers Council as candidates for the National Wild and Scenic Rivers system.

6. Utah Rivers Council, Wild and Scenic recommendation, tier 2. These are the second set of river reaches (#11-20), under Forest Service or BLM jurisdiction, identified by the Utah Rivers Council as candidates for the National Wild and Scenic Rivers system.

7. Utah Rivers Council, Wild and Scenic recommendation. These are additional rivers that have been identified by the Utah Rivers Council as candidates for the National Wild and Scenic Rivers system.

8. Utah Sierra Club, significant rivers inventory. These streams were identified as the most significant rivers in the state by the Utah Sierra Club in 1988, as listed in American Rivers, Outstanding Rivers List (1991).

9. Western Rivers Conservancy, essentially roadless and dam-free reaches. These are nearly roadless reaches of 15 miles or more, as identified on DeLorme atlas of Utah.

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.

Utah's Great Rivers: List

