Great Rivers of the West





Report prepared by Tim Palmer and Ann Vileisis



Little Cimarron River Cover: John Day 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 130 years of land acquisition experience and with offices in Oregon, California, Colorado 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. *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 the Executive Summary of the report. Also available are the 11 state chapters, published individually or together as the full report.

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. I invite you to 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,

Sue Doroff

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Introduction

The Western Rivers Survey

The Western Rivers Conservancy 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 provide for people's needs.

To clarify its mission and focus its efforts, the Western Rivers Conservancy (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 WRC 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 future 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.

This document has been prepared to address this need.

To develop the survey, the WRC hired Tim Palmer—a noted author of many books about rivers and river conservation, a planner

trained in landscape architecture, a photographer, and an inveterate rivers enthusiast with 35 years of experience exploring hundreds of the rivers throughout the West. A committee of noted 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 principal goal of the survey was to develop a list of the most outstanding natural rivers—the great rivers of the West.

The survey includes rivers of Washington, Oregon, California, Idaho, Montana, Wyoming, Utah, Colorado, Nevada, Arizona, and New Mexico. For pragmatic reasons, Hawaii and Alaska were excluded; the rivers of Hawaii are quite short and comparatively few, while Alaska encompasses 20 percent of the nation's land area and 30 percent of its rivers. Remote from the rest of the country, each of these states is in a class by itself when it comes to conservation.

Rather than start from scratch, the WRC survey built on the work of past river inventories. These include studies that both preceded and followed 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 (eg. native fish abundance, water quality, recreation values, biological integrity), 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 to be a "better" natural river than one that was identified only once.

While these sources offered a good starting point, the accumulated collection of studies did not adequately address biological values that have become recognized as crucial in recent

years. Some earlier studies, such as the NRI--completed in 1982 and then updated in 1993-- included values that remain important (such as protecting scenery and historic sites) but not directly germane to the WRC's goals.

The WRC survey has come at an opportune time in the history of river conservation. Over the past decades, a rich accumulation of information has become available through ecological assessments of many rivers and evaluation of their natural qualities by state and federal agencies and by other researchers. However, little effort has been made to assimilate this information with a broad, West-wide perspective that puts the life or biology of the rivers first yet does not ignore other values of rivers such as geographic or recreational importance.

The WRC's Great Rivers of the West survey has aimed to create a new type of inventory to serve the modern needs of river conservation—a list that the WRC, and perhaps others, can use to prioritize their work strategically.

Emphatically, the Great Rivers of the West survey is not a list 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 on this survey, it implies no agreement that dams, pollution, new roads, or development can occur without significant public losses in river qualities and ecosystem functions. Our view, in fact, is that so much of natural value has already been lost in and along our rivers that virtually every natural river and section of river should now be protected. 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 information included here, the Western Rivers Conservancy will be able to better identify prime opportunities for its involvement. However, every reader should understand that this survey is not a plan or proposal for land acquisition. 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 desire 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. The urgency of conserving rivers is also heightened by the aggravating effects of global warming, by neglect of problems that have been accumulating for many years across the watersheds of the West, and by an erosion of government influence at the local, state, and federal levels. In this challenging context, it is the aim of this survey to inform the conservation of the best remaining rivers of the West.

Assessing the Qualities of Rivers

To compile a list of the great, natural rivers of the West, we first had to consider what characteristics make a river "natural." Criteria were developed based on analysis of existing data and consultation with WRC staff and an advisory board formed for this survey.

The survey used two sets of criteria. The first are minimum requirements for a river to be considered for a base-list of the best natural rivers. The second set of criteria provides for quality indicators—the specific values that indicate which rivers are the very best.

MINIMUM STANDARDS

Free-flowing current. Free-flowing reaches of rivers are those that remain with their currents, riverbeds, shorelines, valleys, and canyons unimpounded 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. Exceptions to this dam-free standard were made in rare cases where dam removal is planned or feasible, or where dams are small run-of-river weirs or low diversion structures.

Minimum length. While a minimum length of free-flowing reach was not required for inclusion in this survey, the longer the freeflowing reach the better. Even very short rivers or river segments might have great natural value. However, literally thousands of short river segments or streams throughout the West meet this and other criteria as fine natural rivers, and so this survey tends to focus on streams of 25-mile-length or more.

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. Altered flow regimes that sometimes appear to "improve" a river—for example, by increasing its normal low level in summer or by making the water below a dam colder and more suitable to introduced gamefish—often create problems for the native life of the river, which has adapted to natural conditions through the millennia. In general, the survey followed this principle: the more natural the flow regime, the better.

Good water quality. High water quality is a foundation for much of the life in rivers. Heavily polluted reaches (listed as "degraded" in state and Environmental Protection Agency water quality reports) were generally not considered. However, some streams considered degraded because of temperature or flow problems are included if other important values of the stream remain intact. For example, some of the finest coastal streams fall into this "degraded" category for summer temperatures but still harbor excellent salmon and steelhead fisheries.

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 sediment 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 societywere not included in this survey of the best natural streams. Even where "greenway" plans with urban trails and parkways, public access areas, and recreational open space have been put into effect, natural values are seldom protected or restored to a completely. But occasional small towns and rural development did not bar a river from inclusion.

Outstanding natural features. One or more of these should be present. These include 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.) The survey considered registered National Natural Landmarks, national parks, state parks, and specially designated natural areas under Forest Service and BLM management because designations of this type often indicated high quality rivers.

QUALITY INDICATORS

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

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. Surprisingly few existing lists incorporate biological information for rivers. Even at the 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 The Nature Conservancy's ongoing ecoregion planning programs. The survey relied heavily on interviews with biologists who are active in each of the western states, and also with specialists in specific watersheds. These local experts often provided the best judgments available regarding biological values.

In evaluating rivers' biological health, the survey considered high value fisheries 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 native assemblages of fish that are still intact 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 considered, especially in cases where they serve as indicators of a river's quality.

Wildness and roadless areas. Rivers with the least development generally rank highest in natural quality. The less-developed the shoreline and the watershed, the better. For this reason, the survey noted rivers flowing through designated wilderness, through roadless areas, and through publicly owned land, all indicating a lack of development. For some states, the survey consulted comprehensive proposals for wildland protection that identified large blocks of undeveloped and roadless terrain. Apart from the wildest lands, rivers were favored where land development—as shown on DeLorme atlases—is less extensive. For some states (generally those lacking other lists indicative of wildness), we conducted our own survey of roadless conditions by consulting with DeLorme atlases and measuring the length of rivers having no roads paralleling, near, or crossing the rivers (tier 1) and also rivers with a nominal presence of roads (tier 2).

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. Recreational opportunities are, in fact, another reason that high-quality rivers are valuable to society, and even though a river might lack extraordinary biological qualities, it is difficult not to include the most important recreational rivers, such as the Arkansas River in Colorado, the Madison in Montana, and the Colorado through the Grand Canyon, among the West's best. However, recreational value alone did not generally merit inclusion or exclusion from this survey.

Three river-based recreation activities that depend on natural qualities were noted: fishing, river running, and backpacking. Conversely, activities such as motorboating, driving, and jet skiing were not included, as these activities often do not depend on having high quality natural rivers and, in some cases, may be detrimental to them. If recreation was a documented reason for a stream's inclusion in another list (for example, in the Nationwide Rivers Inventory), but the type of recreation was not specified or evident, then this survey simply noted general recreation.

Length. Though short rivers or river segments may have great natural values, rivers and tributaries with long dam-free reaches provide the greatest range of interconnected aguatic habitat. In other words, the longer the free-flowing reach, the better. 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 in ways that are only beginning to be understood. Conversely, interruptions of flow—by dams or by severe dewatering—can alter a river's underlying bed structure, change temperature gradients and flow regimes, and physically block the river, thereby tending to fragment and stress remaining aquatic habitat. For these reasons, the survey focused on rivers 25-miles or more in length but did not necessarily exclude short streams. However, the survey recognized undammed, freeflowing river reaches longer than 100 miles as especially significant. Rivers without any dams or other major habitat interruptions from headwaters to the sea were regarded as having the highest quality.

ECOREGIONS

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 physiographic province—based on landforms (John Shimer, Field Guide to Landforms in the United States)--and at least one river from each ecoregion--based on vegetation (see Fig. 1, page 10, based on Bailey's map, Ecoregions of North America). The Nationwide Rivers Inventory (NRI, see next section) considered Shimer's categories, but the WRC survey gave more recognition to ecoregions because they are more detailed. These, in fact, include all the physiographic regions, and also better reflect biological criteria. Both Shimer and Bailey are standard references among geographers, biologists, and ecologists.

CRITERIA SUMMARY

It should be noted that threats to the qualities of a river were not considered a criterion 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.

As a final note in this discussion of criteria, the issue of quality is closely related to—but not necessarily concurrent with--the issue of importance. For example, the last remaining habitat of the rare white sturgeon is extremely important, though the quality of its river might not otherwise be regarded as high. This survey tended to regard "importance" as commensurate with "quality," and the rivers' importance is often explained in the narratives regarding each specific stream.

All these criteria served as useful guidelines, but they were not absolute rules for selection. In the end, informed judgment calls at every level were necessary.

The Survey Format

This survey was conducted by analyzing already-existing lists that identified high-quality rivers and, when available, current reports regarding rivers' biological values. Then, river biologists and other experts throughout the West were consulted by telephone.

The qualitative information from all these sources was tabulated, which permitted further analysis of the rivers' qualities based on our survey criteria. Ultimately, we ranked the "best" among the many rivers that had been surveyed, and placed these top-ranking streams into three classes: A, B, and C. In some cases—simply to avoid repetition in this report--tributary or adjacent streams were grouped together when the descriptions of them were very similar.

STATE-BY-STATE TABLES

State-by-state tables assembling information about dozens of rivers became the integral foundation for evaluating and ranking rivers for the WRC survey. (These tables appear in the next section of this report.) Each table includes a large number of high-quality rivers considered for the survey. The base list of rivers for each state was derived from already existing lists, and then augmented and refined with interviews and other sources. Each table contains the following information:

Identification and Location

The name of each stream appears in the far-left column, followed in the next column by the name of the river or waterbody that the stream flows into. The larger watershed effectively locates the stream and resolves confusion when more than one stream has the same name.

Sources

The survey began with analysis of already-existing inventories and lists of high-quality rivers. Some of these had already been standardized and assembled for all of the states. Other lists were unique to one state, or existed for a partial group of states. None



M242





ECOREGION PROVINCES

M313-Arrizona-New Mexico Mountains Semi-Desert-Open Woods- Coniferous Forest-Alp. Meadow (AN) M262-California Coastal Range Open Woodland-Shrub-Coniferous Forest-Alp. Meadow (CF) M261-Sierran Steppe-Mixed Forest-Coniferous Forest-Alpine Meadow (SS) 263-California Coastal Steppe, Mixed Forest, and Redwood (CS) 315- Southwest Plateau and Plains-Dry Steppe and Shrub (SP) 261-California Coastal Chaparral Forest and Shrub (CC) 322-American Semi-Desert and Desert (AD) 313-Colorado Plateau Semi-Desert (CP) 242-Pacific Lowland Mixed Forest (PL) 321-Chihuahuan Semi-Desert (CD) M242-Cascade Mixed Forest (CF) 262-California Dry Steppe (DS) 331-Great Plains/Palouse (GP)

M333-Northern Rocky Mountains Steppe-Open Woods-Coniferous Forest-Alp. Meadow (NR) M331-Southern Rocky Mountains Steppe-Open Woods-Coniferous Forest-Alp. Meadow (SR) M332-Middle Rocky Mountains Steppe-Coniferous Forest-Alpine Meadow (MR) M341-Nevada-Utah Semi-Desert-Coniferous Forest-Alpine Meadow (NU) of these lists fully served the purposes of this WRC survey because each was created with its own purposes. However, by analyzing these lists, important information came to light. As certain rivers reappeared repeatedly on different lists, evidence of outstanding qualities accumulated. This evidence was either corroborated or challenged by local biological experts.

In the state-by-state tables, sources of recommendations appear in the third column as a series of letter codes. A key to these codes is provided for each state table. The sources fall into three categories: existing inventories of high quality rivers, state specific sources, and interviews with biologists and local experts.

1. Existing Inventories of High-Quality Rivers

The following source lists were used for all or many of the western states. All are keyed with letter codes in state-by-state tables in the next section of this report. The letter in parenthesis following the source title is the code letter used in our tables.

National Wild and Scenic Rivers (W). As America's premier designation for river protection, the National Wild and Scenic River System is the country's "flagship" for river conservation. To be designated for this system, rivers must have one or more "outstandingly remarkable" qualities of fish, wildlife, geology, scenery, recreation, or history. In most cases, congress must pass legislation to designate a river. Alternatively, a river already included in a state wild and scenic program can be added to the national system by the Secretary of the Interior or Agriculture after the governor of the state requests federal action. The national system has grown from 12 rivers (counting major tributaries) originally named in 1968 to nearly 250 (counting forks of rivers separately but not counting additional smaller tributaries such as creeks) in 2007. Given the criteria listed in the Act, plus the difficulty of passing legislation, the National Wild and Scenic Rivers system represents many of America's best rivers; with a few exceptions, this Wild and Scenic list includes some or many of the best rivers in each state. However, beyond questions of eligibility, the selection process is intensely political, and some of the finest rivers remain

undesignated--streams such as the Green in Utah, the Snake in Wyoming, and the Hoh in Washington. And, just because a river is in the national system does not mean it is adequately protected. National wild and scenic status bans dams and other developments requiring a federal permit, but it does not necessarily address other problems of land use and river degradation. Indeed, the backlog of important land protection initiatives that should be undertaken along our national rivers is large and growing.

National Wild and Scenic Study Rivers (Ws). This group of rivers has been named by Congress for careful study and consideration for the National Wild and Scenic Rivers system. The purposes of the studies are to determine if the river is eligible and if its designation is politically feasible (typically referred to as "suitability"). Historically, nearly all the study rivers have been eligible as high-quality natural rivers, but many have lacked the political support needed to receive congressional protection.

U.S. Department of Interior survey (1965) that preceded the National Wild and Scenic Rivers Act of 1968 (I). Federal resource planners and professionals assembled this list while the concept of the National Wild and Scenic Rivers system was being developed. Though the studies for this list did not include information now considered essential, they were undertaken by a highly qualified group of the finest resource professionals of that time. Looking for a relatively small set of rivers that could be considered the "crown jewels" of America's rivers estate, these experts identified what they thought to be the very best, sizable natural rivers in our nation. Ironically, the complete list of 650 rivers that were considered, and the background files for this remarkable effort, were lost to water damage at a federal storage facility. All that remains is the final list published by the Secretaries of Agriculture and Interior in an obscure 1964 report that was available only through personal contacts with people who worked on that effort. That list was incorporated in this WRC survey.

State-designated wild and scenic rivers (S). Following enactment of the National Wild and Scenic Rivers Act in 1968, 32 states passed legislation adopting river protection systems of their own. Some of these state laws have specific legal requirements for

river and riparian land management while others are simply lists of rivers where protection is encouraged (see River Conservation Fund, America's Rivers: An Assessment of State River Conservation Programs, Washington, D. C.: American Rivers, 1984). The state systems were generally regarded as back-up programs to the national system, intended for high-value rivers that may not have "national stature." Nonetheless, the state-designated rivers generally meet strict eligibility requirements and represent an excellent list of rivers. State wild and scenic systems are common in the Northeast and upper Midwest, but in the West, only Washington, Oregon, California, and, to a lesser degree, Idaho have adopted state wild and scenic river systems.

Nationwide Rivers Inventory (N). In the National Wild and Scenic River Act, Congress called for the preparation and maintenance of a continuing inventory and evaluation of potential wild, scenic, and recreational rivers nationwide. Following this directive, the National Park Service, from the mid-1970s to 1982, prepared an inventory of rivers thought to be eligible for the national system based on "outstandingly remarkable values," including recreation, scenery, history, culture, fish, and wildlife. This was significantly updated in 1993. As a nationwide effort to identify streams meeting eligibility requirements for the National Wild and Scenic Rivers system, the National Rivers Inventory (NRI) is the most comprehensive river list ever assembled. However, its selections vary considerably depending on the field staff that provided information and judgments, and it provides only very brief descriptions of rivers.

U.S. Forest Service rivers recommended for protection (F). As part of the planning process for national forests, the U.S. Forest Service has identified rivers eligible for National Wild and Scenic designation. Many of these rivers were already included in the NRI—at least the most significant ones. For this survey, the Forest Service-recommended rivers for most states were taken from the Outstanding Rivers List, compiled by American Rivers in 1991 (American Rivers, Matthew H. Huntington and John D. Echeverria, Outstanding Rivers List, Washington, D.C., American Rivers, 1991). Since that report was completed, most national forests have updated and expanded their eligibility lists. Some of these are reflected in this WRC survey. However, some forests included many rivers of very short length—in California, for example, the Forest Service has identified 324 rivers, many of them quite small. Though these eligibility lists are important for forest planning, for river protection, and for the future of the National Wild and Scenic Rivers system, many of these smaller streams were not included in this WRC survey.

Bureau of Land Management rivers recommended for protection (BL). Like the Forest Service, the Bureau of Land Management (BLM) has identified some of its rivers worthy of protection as a part of its on-going land planning process. For the WRC survey, the BLM-recommended rivers for most states was taken from the Outstanding Rivers List (1991). Since that report, further recommendations have been made but were not readily available.

Bureau of Outdoor Recreation, Western U.S. Water Plan (BO). In 1982 the Bureau of Outdoor Recreation (BOR) prepared the Western U.S. Water Plan, including a list of rivers that had outstanding freeflowing values for recreation purposes. The Bureau's efforts in river conservation were cut short when the agency was disbanded during the Reagan administration, though some of its functions were subsumed by the National Park Service. In our survey, the information for the BOR-recommended-rivers was taken from the Outstanding Rivers List.

Columbia Interior Basin Ecosystem Management Plan (C). This 1997 plan was prepared by federal agencies for the Columbia Basin east of the Cascade Mountain crest, including parts of Montana, Idaho, Oregon, Washington, Wyoming, and Nevada. The Plan identified the finest streams for "high aquatic integrity" in these states. (U. S. Department of the Interior and U. S. Department of Agriculture, Highlighted Scientific Findings of the Interior Columbia Basin Ecosystem Management Project, U.S. Dept. of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR, 1997).

Western Rivers Conservancy (WRC). In some cases, this survey identified additional high-ranking rivers that have not appeared on already-existing lists. In the report tables, WRC appears as a source only in cases where no other sources exist for a particular river.

2. State Specific Sources

In addition to these major west-wide or national-scope sources, many state-specific sources were used. These are described at the outset of each state section of this report. Though effort was made to locate comparable sources in every state, more sources were found for some states than for others. Across the West, there are wide differences (including funding) in state agency programs as well as in those of non-profit conservation groups and academic researchers. These differences affect the availability of articles, reports and books, and other information.

3. Consultation with On-the-Ground Experts

In addition to evaluating already-existing lists, this survey tapped the expertise of many river biologists and other experts throughout the West to make determinations about which rivers had the highest gualities. Information from interviews was used to identify rivers having outstanding values for biological diversity, high levels of endemism, rare and endangered species, healthy fisheries, intact riparian habitat, and other biological values. Those interviewed included biologists working for the U.S. Forest Service, Bureau of Land Management, state fish and wildlife agencies, The Nature Conservancy, U. S. Fish and Wildlife Service, National Marine Fisheries Service, conservation organizations, and several western universities. Combined, these interviews with biologists are considered another source for rivers listed in the survey. Biologists who provided significant consultation are described at the outset of each individual state section of this report. In the state-by-state tables, these major interviews are indicated by a (B) plus a number cued to the individual.

4. Assessing Sources and Special Reviews

In evaluating source lists for this survey, we recognized that some sources might be regarded as more important than others. For example, the list of National Wild and Scenic Rivers represents an especially important source because it includes the very best rivers as selected through an extremely rigorous professional and political process. The Nationwide Rivers Inventory list (N) is likewise an important set of streams, derived from professional evaluation, though its thoroughness varied from state to state. The American Fisheries Lists, which were used for Northwest states, are based on careful scientific study but apply to only a regional group of streams. All in all, a river's inclusion on any one of the source lists indicated in column 3 indicates a special value, but generally speaking, the more lists that a river has been included on, the higher the rank the stream is likely to have. This tendency was widely corroborated by interviews with local river and fishery experts.

In addition, some sources gave extraordinary reviews of some rivers. The survey captured this by indicating a "special review" in the state-by-state table's fourth column.

QUALITIES OF THE RIVERS

Using information from existing sources and interviews with biologists, the WRC survey evaluated qualities of all candidate rivers, discussed earlier as criteria. Rivers were selected because they had one or more natural qualities. When more than one quality is listed, the river might have higher natural values, though in some cases, one specified quality alone may be enough to warrant a top ranking. For this reason, in analyzing the information in our state-by-state tables, the number of "sources" (column 3) is more important than the number of "qualities" (column 5) in determining the ranking of a river. In the state-by-state river tables, we tabulated the following different qualities:

Biological importance and/or diversity (B). The survey accounted for species diversity, endemism, health of keystone species, and other biological values. With little summary information available on a statewide or regional basis, much of this information was derived from interviews with biologists. Reports such as Oregon's Living Landscape, produced by the Oregon Biodiversity Project, where also used where available.

Endangered or imperiled species (E). Though the survey did not include this information comprehensively, it took note of rivers known to be especially important to animals or plants listed on federal or state endangered and threatened species lists or species otherwise known to be imperiled and at risk of extinction. Though the presence of endangered species (in contrast to health populations) quite likely indicates degraded river conditions, this information is important because rivers where imperiled species survive are likely to be in better ecological condition than rivers where the species have already gone extinct everywhere else. Moreover, protecting river habitat may be crucial for protecting the at-risk species.

Fishery (F). The survey noted rivers that are critical to especially important native fish populations, such as keystone or indicator species, and streams that are generally considered valuable fisheries when it was unknown by us if the fish were introduced or native. If we knew that fish were stocked or introduced, we identified the streams as important for recreational angling with Rf (see below). This category overlaps somewhat with those listed above but also picks up additional rivers with important fisheries.

Geological/geographical importance (G). The survey included rivers with unique, unusual, or exemplary samples of geologic process, and also rivers of special geographical stature. In many cases, geologic distinctiveness is related to biologic distinctiveness; for example, rivers flowing through limestone strata tend to be particularly productive.

Long free-flowing reaches (L) (L+). The survey included damfree reaches of 100 miles or longer. Information was derived from Appendix 2, "Long, Undammed Sections of Rivers" in America by Rivers (Palmer, Tim. America by Rivers. Washington, D. C.: Island Press, 1996). That appendix was derived from U.S. Geological Survey maps and DeLorme Atlases. However, some low, run-of-river dams may not have appeared on the maps and could therefore be inadvertently included in this "dam-free" listing. Free-flowing reaches of main stems are coded in the state-by-state tables as (L). Reaches where combined tributaries and main stems yield a continuous free-flowing mileage of 100 or more miles are coded with (L+)

Plantlife/riparian values (P). The survey noted rivers that host special plant communities, including exceptional intact riparian

reaches, old-growth forests, and exemplary cottonwood forests. Riparian zones provide crucial habitat for a range of resident and migratory species, including non-aquatic fauna such as songbirds. In some cases, the P indicates particular rare plant species of concern, such as Port Orford cedars along the Elk River in Oregon.

Recreation (R). We noted rivers with exceptional recreation values that are dependent on high quality natural rivers. In the tables that follow, this category is refined further into recreational fishing (Rf), river running (Rr), and hiking (Rh).

Rf indicates rivers that are popular or ideal for recreational fishing (not necessarily the same as fishery (F) values, which typically refers to important native but not necessarily game fish populations). Thus, these Rf rivers might often be ones with introduced fish such as brown or rainbow trout—a complicating and potentially degrading factor that is sometimes addressed in the narrative of rivers that appear on the A, B, or C lists.

Rh indicates riverfront hiking. This includes most rivers on public lands where maintained or major trails follow near the waterway.

Rr indicates rivers that are especially valuable for river running –canoeing, rafting, or kayaking. The organization American Whitewater has developed an inventory of rivers that are prized for their whitewater rapids. Important as this quality is, it does not necessarily relate to the biological values of rivers, and so the WRC survey did not draw from that extensive list. Anyone interested in this excellent and important whitewater inventory should contact American Whitewater.

We also included a general recreation notation (R) when we cited other studies that did not specify particular recreational activities. This might include activities such as camping and hunting.

Wildlife (WL). The survey took note of rivers that support communities of exceptional wildlife, including riparian-related species such as bald eagles, moose, otters--when these were listed in other reports--and also other species of special concern.

Wildness or roadless shorelines (WN). The survey included rivers running through or past significant wilderness or roadless areas because of the high natural values associated with wildlands. In many cases, wildness is present only at a river's headwaters on in upper reaches. For some states, we did our own analysis of roadless mileage by using DeLorme atlases. WR-1 (first tier) indicates reaches of 10 miles or greater with no roads paralleling, crossing, or within ¹/₄ mile of the river (note: atlases may not include all minor roads). WR-2 (second tier) indicates river reaches of 20 miles or more with only nominal road presence, such as bridges, dead-end access areas, or 4-wheel drive roads following the river for less than 3 miles. Even with some roads, these reaches generally have a profoundly wild feel, and the biological intrusions are far less than where roads are more present.

After much deliberation, scenic values were not included as qualities in this survey. Though the NRI and the National Wild and Scenic Rivers system do recognize the importance of scenery, we concluded that all natural rivers have scenic value. Exceptional scenery is doubtless found on certain rivers, but that sometimessubjective quality also tends to be expressed in categories such as geology, plantlife, and wildness.

ECOREGIONS

One goal of the WRC survey was to identify at least one high-value river in each ecoregion (see earlier discussion of ecoregions and the Bailey map, Fig. 1, page 10). To evaluate geographic diversity, the survey tabulated which ecoregion each river flows through. Though sub-regions are not included on the Bailey map, this survey also sought to include rivers from obvious sub-regions. For example, we explicitly included rivers from the Pacific coastal forest belt as well as the Cascade Mountain region, though both are considered "Cascade Forest" on the Bailey map. We generally included at least one river from each of the major subranges of mountains, such as the North Cascades, Wind River, Gros Ventre, and San Juan. The ecoregion codes are explained in keys that accompany each state table.

RATINGS

Ultimately, all the information collected in the survey's stateby-state tables was used to develop ratings of the highest-ranking natural rivers—the "Great Rivers of the West." These ratings are listed in the seventh column of each state table as follows:

A- the most valuable natural rivers.

B- rivers of very high value but that occur in the same region as an A river or have somewhat less quality or importance.

C- rivers lacking the superlative qualities of the A and B rivers, or representing the second- or third-highest ranking stream in their particular region, or having very valuable qualities but also having one or more significant problems.

The remaining unlettered rivers have high qualities in some respect or they would not have appeared for consideration in this survey at all, but they ranked below the C list. When several rivers flow within the same ecoregion, an effort was made to determine which river was best—even when all might be of very high quality.

LISTS OF THE HIGHEST RATED RIVERS

Based on the information in the tables for each state, the survey has included a list of the highest rated rivers for each state. These lists are for quick reference and allow for consideration between states (further synthesis and ratings from the accumulated state lists is yet to be done). The lists appear at the end the introduction in each state chapter.

RIVER NARRATIVES

Following the river table, each state chapter includes a narrative section that begins with an overview of the state's river system—a short discussion of the geographic, climatic, hydrologic, biologic, and environmental factors that are important to all rivers.

More specific narrative descriptions for each of the state's A, B,

and C rivers then follow. These one- or two-page profiles address the river's top qualities, locate the stream and identify its key reaches (generally from headwaters to mouth), describe its overarching geographic, climatic, and hydrologic characteristics, elaborate on the qualities, and then sometimes offer notes about typical problems, the status of protection efforts and land ownership, and comparable rivers and their comparative value.

Finally, a summary for each state includes an overview of our findings and delineates specific "regions" of rivers where clusters of high-quality streams are found. In this regard, advantages can be gained by protecting identifiable clusters or regions of rivers where streams of high quality are found as tributaries to one another or adjacent to each other in separate watersheds. These advantages include the protection of continuous aquatic habitat, the conservation of landscape-scale wildlife habitat in adjoining basins, additional protection afforded by buffer-zones, and the elimination of "edge" effects that can damage rivers even when the source of degradation might be distant. Our conclusions for each state sometimes address general observations about river conservation strategies that might be relevant statewide.

Regional Perspectives

While each state is discussed more fully in the narratives that follow, we'd like to finish this introduction by noting a few general observations about rivers of the three meta-regions of the West: the Pacific Coast, the Rocky Mountains, and the deserts and grasslands. As with any generalizations about regions as large as these, exceptions can be found and any number of other important points can be made, but a few comments here might help to frame the larger view of river health and conservation in the West.

The Pacific Coast states of California, Oregon, and Washington have by far the greatest numbers of rivers and the greatest volume of flows in the West. The diversity of streams—and the life in them is extraordinary, coming from mountains that cover the entire coastline, from the great interior ranges of the Cascades and Sierra Nevada, and from low mountains and interior basins. Here we have the wettest places in America (outside Alaska), the highest elevation rivers, and innumerable low-elevation streams through productive habitat supporting plentiful flora and fauna down to sea level. The forests are larger and deeper. The species both on land and in water are more numerous and diverse. The Klamath basin, for example, has about the same number of native fish species as the Colorado basin but is one-twelfth the size. On the Pacific Coast, conditions for life are more humid, temperate, and productive.

While many aspects of the biology in this rich rivers estate are important, the presence of anadromous fishes, including four species of salmon with many discrete runs, steelhead, cutthroat trout, and others, have enormous importance—or once did along most of the rivers. Not only are these fish magnificent in their own right and keystone species on which dozens of other animal species depend, but they have been fundamental to the health of entire ecosystems because they redistribute nutrients from the ocean back to the rivers and the land. Protecting what remains and restoring what has been lost in these fish runs defines much of river conservation in the coastal region (and likewise in the river basins farther inland where anadromous fish still spawn).

Unlike the rest of the West, many coastal rivers maintain their continuity from headwaters to sea, and many of the streams that have lost that continuity have not lost it by much. The Chinook salmon of the John Day River, for example, confront only two dams on their lengthy migration runs, while the salmon and steelhead of central Idaho must deal with eight. Owing primarily to dams, but also to diversions, development, and natural barriers, most interior rivers have no intact biological connections to the ocean at all.

While the fundamental resource of rivers is richer here on the Pacific Coast, with more water, more streams, and more life, and while a culture of conservation is far stronger in coastal states than in the interior West, the pressures of population growth and related development are also much more extreme. California alone has more people than the rest of the West combined, and its water needs will continue to grow as its population continues to skyrocket. In this context, protecting what remains of riverfront open space is essential, but there will be tough competition with all the competing demands from growth. As with the other regions, in the future, these growth-related pressures will be even greater with global warming, making the cold and plentiful flows from high, snow-covered peaks of the Sierra Nevada and the Cascades all the more important, and making the protection and care of river systems all the more critical as the challenges of sustainability increase.

The Rocky Mountain region has some fabulously long reaches of free-flowing water—stretches longer than anything on the coast and some enormous wilderness areas that encompass more wildland than anywhere outside Alaska. But most rivers of the Rockies are seriously handicapped --isolated and truncated, not only from the sea, but also within their own lengths. Large dams or debilitating diversions are common. Introduced species prevail in most of the waters—even the ones that are famous as recreational magnets, such as the celebrated trout streams of Montana. Diversions occur on virtually all the private-land reaches of large and small streams under a use-it-or-lose-it system of water rights. In the interior West, "beneficial use," for the purpose of water allocation, has been defined principally as diversion, mostly for irrigation.

Owing to the expansiveness of this region, the isolation of some valleys, the extremes of climate and gradient, and the ageold upheavals of earth and passage of glaciers, a number of rare, unique, and endemic species of fish populate some of the rivers here, and also in the deserts and drylands. The stresses on these lifeforms are extreme, making their protection from further dams, diversions, and development crucial. Further, the restoration of natural conditions is an important goal if the irreplaceable mix of fishes and other creatures is to survive.

Key opportunities remain in some sections of the interior West to protect the truly epic river courses that are still wild or free-flowing for great lengths. While much attention has been directed at patching together the best remaining connections between several of the greatest terrestrial wildland complexes in our country outside Alaska, there is an aquatic aspect as well to this habitat conservation vision that offers an important challenge and opportunity. In many instances, protection of key river corridors can serve the twin goals of conserving links between terrestrial wildlands and aquatic habitats, and this survey has identified some of those corridors.

Rivers of the drylands—from the Sonoran Desert of southern California and Arizona to the high steppe where the Great Plains stretch eastward from Montana—are few and far between. The water in these streams almost all comes from elsewhere—from mountains that are scattered throughout and that border the arid West. With the exception of a few mega-rivers that flow from the largest mountain masses, natural river reaches in the drylands are short and extremely stressed by urban withdrawals, irrigation, energy development, grazing, mining, and exotic species. River conservation efforts can still secure some of the most valuable sections that contain for isolated pockets of endemic plants and animals that will become more threatened with population growth and global warming.

Longer reaches of rivers are likewise valuable for their continuity and for their riparian habitat—all the more precious here owing to its scarcity. Fortunately, most long reaches of free-flowing and natural rivers in the deserts have been protected to some extent, though this is not true of the northern steppes and the Great Plains. This region—at the edge of our purview in this survey—is a virtual frontier in the field of river conservation but may present opportunities for important and fruitful work.

Great Rivers of the West

The Western Rivers Conservancy survey identified nearly 1,600 rivers that had been listed by other organizations or by agencies as especially valuable for one or more natural qualities. From this group, we selected about 380 rivers and tributaries (not counting a number of minor and well-protected tributaries) and listed them in an A, B, or C group as the "great rivers of the West." This number includes 230 main-stem rivers or streams; the others are tributaries, though some are quite large.

The full list of the A, B, and C rivers in the West are listed in Appendix A. See state-specific sections of this report for state-by state tables of all listed rivers and narratives describing the A, B, and C rivers.

The Western Rivers Estate

The Western Rivers Conservancy survey organized and analyzed the vast western rivers estate through a series of state-by-state tables and narratives. In this section, for each state you'll find an introduction that sets the geographic, hydrologic, biologic, and sometimes political context for local rivers and their conservation; a great rivers list of the top-rated streams for quick reference; a description of the state-specific sources the survey drew upon; a table that assembles information about dozens if not hundreds of rivers; and, finally a narrative section that describes and discusses each of the top rivers.



Rivers of California

Streams and thousands of small ones carry runoff in rainforests receiving 100 and more inches of precipitation per year and in intermittent washes through our driest deserts. Streams flow from the ultimate height of Mount Whitney, and hundreds flow through sea level estuaries as they disgorge into the ocean. Plentiful runoff along with a variety of mountain landscapes guarantee that rivers take interesting and distinctive routes from highcountry to the sea.

The rivers system here can be pictured in four parts. First, thousands of tributaries drain magnificent mountain slopes of the Sierra Nevada's western flanks, and these meet fewer and markedly smaller streams winding off the east side of the Coast Range, altogether forming the Sacramento and San Joaquin Rivers, running south and north respectively through much of the length of the state to their junction in nation's largest inland delta before easing out to San Francisco Bay. Eleven major rivers flow from the west slopes of the Sierra Nevada—the 400-milelong unbroken mountain range that includes the highest peak outside Alaska and a fabulous array of whitewater crashing down gleaming granite slopes.

Second, waters of the north, with its wetter winters and deeply forested masses of mountains, flow west via the massive Klamath and Eel, but also in dozens of other Pacific-bound streams. The Klamath and other adjacent mountain ranges of the northern state spawn a spectacular suite of rivers through woodlands ranging from sunny oak savannas to the perpetually mossy depths of redwoods, dripping much of the time with fog if not rain.

Next, rivers of the south coast and south are small and subject to very low summer flows, and take relatively short routes to the ocean from the Coast Range and also from the Transverse and Peninsular Ranges of southern California. This complex maze of seismic topography gives rise to seasonal flows in dozens of streams within forest, chaparral, and desert, much of it lying at the doorstep of the largest megalopolis in America.

Finally, rivers of the far east tumble down off the Sierra and flow to landlocked basins and to heavily diverted fates in the drylands of the Nevada and California deserts.

The great majority of natural rivers in California occur in just one among the state's seven ecoregions. This is the single province called the Sierran Steppe-Mixed Forest—Coniferous Forest-Alpine Meadow. It includes all of the Sierra Nevada and its foothills, plus the mountainous and forested country throughout the northern third of the state. Nearly all of California's water originates in these two areas, and most of the wildest country—except for the desert—is there. Varied rivers of this ecoregion dominate the lotic list of the Golden State, with very few semi-natural rivers remaining in the other regions, which are the coastal edge, the Central Valley, the southern mountains, and the desert. These other regions house most of the state's population and also account for most of the agriculture. Even so, we have found at least one river in each ecoregion that still retains significant natural value and is worth protecting.

California has the second-and third-largest rivers on the West Coast: the Sacramento and Klamath (ranking in volume only behind the Columbia among the streams entering the Pacific). The freeflowing mileages of these and also the Middle Fork Eel/Eel are among the longest in the coastal states, however, the Klamath and Sacramento are both heavily dammed in their upper reaches, and the Sacramento is constrained by levees for much of its length.

Superlatives claimed by California rivers seem to be endless. Here is one of the best protected rivers from source to mouth the Smith. Though it has serious problems, the Klamath is the most

intact large watershed on the West Coast, with less population density than Idaho or Montana and large areas that have not been logged (though much has been, as well). The Klamath is the only large river on the West Coast with a completely natural mouth-no jetties, dredged harbors, or channelization. Though much smaller, the Mattole is spectacular in this regard as well. The Middle Fork Eel combined with the main stem Eel is the longest river protected in the National Wild and Scenic Rivers system from source to mouth and source to ocean. The American has one of the finest urban river greenways in the country, and its South Fork is one of the most used whitewater rivers in the nation. The Merced has an incomparable collection of waterfalls on its main stem and tributaries. The Tuolumne is a premier whitewater run in the West and the site of John Muir's pioneering battle to stop the building of a dam (he lost, and Hetch Hetchy Valley-the twin to Yosemite-was flooded). The Kings has the greatest undammed vertical drop in America and the deepest canyon.

Recent and on-going tectonic and volcanic activity has created a young and changing landscape with varieties of rivers unheard of elsewhere. The McCloud is born in copious springflows. The Amargosa disappears after flowing for 20 miles in the desert. The Eel, Mad, Klamath, and others were blocked by tectonic plates that repeatedly docked against the evolving California shoreline and forced the rivers to bend northward; they now flow behind the new plate aggregations before arriving at the ocean. The Kings begins higher than any other river in America amid glacier outflow, as do a number of streams in this era of receding and disappearing glaciers. The Cosumnes and other Central Valley streams pond into wetlands that are still biological bonanzas of wildlife, though 90 percent of those lush marshes have been lost to drainage, diversions, and filling. The Tuolumne flows through its own "Grand Canyon" with a blizzard of waterfalls that is awesome to behold at the height of early-summer runoff, or, for that matter, anytime.

Owing largely to the work of Friends of the River throughout a 30-year period and to the foresight of Governor Jerry Brown in 1980, California has the largest number of rivers and tributaries designated in the National Wild and Scenic Rivers system and the second-largest mileage (only Alaska has more). Furthermore—and unlike many of the other national river designations in other states--many of these rivers were protected amid intense controversy and in the face of proposals that would have eliminated long reaches as natural waterways. The Tuolumne, Merced, Kings, Kern, Middle Fork Eel, North Fork American, and others fall into this category. Simple designation, however, does not mean that the problems facing these streams are over. Even on some of these "protected" rivers, additional challenges remain regarding development of private land and degradation from influences far away, such as air pollution and global warming. In the "A" list of our WRC survey, all rivers except the Clavey, East Fork Carson, and Deer Creek have been included in the national rivers system.

The California rivers deliver the water used in two among the four largest urban areas in America. These rivers provide for a large share of the nation's food. They nourish one of the most important but stressed fisheries offshore. They transport and deposit sand needed to prevent immensely destructive erosion of ocean beaches. They make possible one of the most diverse assemblages of birds and wildlife found anywhere. They offer recreation to unprecedented numbers of people. Finally, they serve as ecological conduits used by salmon and many other forms of life. Of course, amazing as they are, the rivers can't do all of this in adequate shares, and so the specter of collapse in virtually every one of these support systems is on the horizon if not imminent

Degradation of waterways is extreme in a state where industrial agriculture, hydroelectric power, urban growth, and the invasion of exotic species have all taken an enormous toll. The state already has 1,400 sizable dams. More people live here than in the rest of the West combined, and the population is growing more rapidly than ever in history and is slated to double in only 37 years. Nearly 100 percent of that growth owes to immigration, which Congress, thus far, shows little inclination to reduce. Additional people mean greater demand for water, food, electricity, and housing. As more people move into the large cities, people there move out to the suburbs and the smaller towns throughout the Sierra foothills and elsewhere. In Bulletin 160, the state Department of Water Resources

reported that improved efficiency and lower consumption by agriculture can accommodate new water needs for 30 years. But that is not long in the life of a river, and the current and projected population growth assures that existing supplies will ultimately run short unless population growth is addressed. New forces to dam and divert rivers will gain strength. On top of these problems, global warming is expected to reduce the Sierra snowpack by up to 80 percent in the coming century. This will severely aggravate problems of water supply for cities, farms, and ecosystems. Conservation of every form, in every basin, is essential if the magnificent rivers of California are to survive the demands of the future and be available for the next generation to appreciate, admire, and use.



Deer Creek

Cindy

Great Rivers of California



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WESTERN RIVERS

Sources for California Survey

In addition to the major sources described at the outset of this report, the California survey incorporated these sources:

Interviews with biologists and local experts (B#).

Ron Remple, consultant, formerly with CA Dept. of Fish & Game (DFG)

Phil Pister, fish biologist, Desert Fishes Council, formerly with CA Dept. of Fish & Game

Malin Pinsky, Wild Salmon Center, Science and Conservation Program

Peter Moyle, fish biologist, University of CA- Davis, Dept. of Fish, Wildlife and Conservation Biology

Jerry Meral, former director of the Planning and Conservation League (PCL)

Grant Werschkull, conservation consultant

California Department of Fish and Game (CF). Designated wild trout and trophy trout waters, taken from American Rivers' 1991 Outstanding Rivers List.

Friends of the River (FR). This statewide river conservation group has been working since 1973 to protect the finest California streams. Rivers noted here are mainly taken from FOR's publication, River Gems: A Guide to Free-Flowing Rivers in California (Steve Evans, Friends of the River, Sacramento, 2002), which describes a select list of the most valuable but largely unprotected rivers. A few other streams were taken from FOR's Rivers of Life: Saving The Last Free Flowing Rivers In Southern California (Sacramento, FOR, about 2004), and from Potential Wild & Scenic Rivers in California: A Statewide Inventory (Sacramento, FOR, 2001). In addition, FOR published National Wild & Scenic Rivers in California: A Status Report, in 1998. This includes a list of rivers declared "eligible" for National Wild and Scenic River designation by the Forest Service or the Bureau of Land Management as of 1998 (others have been added to the list since then). The list of eligible rivers is far more extensive than the initial Forest Service and BLM eligible lists that appear in American Rivers Outstanding Rivers List of 1991. However, the 1998

list includes many short reaches (frequently less than 5 miles long) and small as well as larger streams and is not copied in our WRC survey.

California Natural Areas Program (CN). Taken from the Outstanding Rivers List, these are rivers itemized by the state as high priority for natural diversity conservation.

Sierra Nevada Ecosystems Project Report (SN1). These are the highest-ranking Sierra Nevada rivers (scores of 70 and above, which apply to 13 streams) as determined by an Index of Biological Integrity (IBI) that identified healthy aquatic conditions (Status of the Sierra Nevada: Volume II, "Biotic Integrity of Watersheds," Peter B. Moyle and Paul J. Randall, Center for Water and Wildland Resources, University of California at Davis, 1996, p. 978 and supplemental table). The code SNI is followed by the IBI rating (scale of 1-100).

Sierra Nevada Ecosystems Project Report (SN2). This is a list of streams of 20-mile length or greater that are still used by chinook salmon (Status of the Sierra Nevada: Volume II, "Status of Fish and Fisheries," Peter B. Moyle, et al. Center for Water and Wildland Resources, University of California at Davis, 1996, p. 962).

Sierra Nevada Ecosystems Project (SN3). This list is recommended for special management because of outstanding aquatic diversity (Status of the Sierra Nevada, Vol. III, "Potential Aquatic Diversity Management Areas in the Sierra Nevada," Peter B. Moyle et al, Center for Wildland Resources, University of California at Davis, 1996, p. 411-412).

Key to California Rivers Table

SOURCE OF RECOMMENDATION

- B#- interviews with biologists and local experts:
 - B1- Ron Remple, fishery consultant
 - **B2- Phil Pister, Desert Fishes Council**
 - B3- Malin Pinsky, Wild Salmon Center
 - B4- Peter Moyle, University of CA-Davis, fish biologist
 - B5- Jerry Meral, former dir. Planning & Cons. League

B6- Grant Werschkull, conservation consultant

BL-Bureau of Land Management (partial list)

BO- Bureau of Outdoor Recreation

CF- CA Fish and Game, Wild Trout Waters

F-U.S. Forest Service (partial list)

FR- Friends of the River, high recommendation

CN- CA Natural Areas Program

NL- National Natural Landmarks, National Park Service

NP- National Park Service, rivers eligible for Wild and Scenic

I – USDI/USDA potential Wild and Scenic Rivers list, 1965

N- Nationwide Rivers Inventory, Nat. Park Service

S- State-designated Wild and Scenic Rivers

Sp- Proposed for California Wild and Scenic status

SN1- Sierra Nevada Ecosystems Project, excellent aquatic community (numbers indicate biologic integrity scale of 1-100)

SN2- Sierra Nevada Ecosystems Project, anadromous fishery

SN3- Sierra Nevada Ecosystems Project, potential aquatic diversity management areas

W- National Wild and Scenic Rivers

Ws- National Wild and Scenic study rivers

WRC-Western Rivers Conservancy (not identified elsewhere)

BEST SOURCES: B#, FR, I, N, SNI, W

QUALITIES

B-Biological Diversity

E- Endangered or imperiled species

F- Fish

G-Geological/geographical

- L- Long free-flowing reach >100 miles L+- Long free-flowing reach, combined with streams it flows into P- Plant life/ riparian values Rf- Recreational fishing Rh- Recreational hiking Rr- Recreational river running
- WL-Wildlife

WN-Wildness

ECOREGIONS

IS-Intermountain Semi-Desert (342)

SS- Sierran Steppe-Mixed Forest-Coniferous Forest-Alpine Meadow Province (M261)

ID-Intermountain Semi Desert and Desert Province (341)

CS-CA Coastal Steppe, Mixed Forest, and Redwood Province (263)

DS-CA Dry Steppe Province (262)

CC-CA Coastal Chaparral Forest and Shrub Province (261)

CW- CA Coastal Range Open Woodland-Shrub- Coniferous Forest, Meadow Province (M262)

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Amargosa	Badwater Basin (landlocked)	B2, B4, B5, BL, FR	B2, FR	B, E, F, G, WL	AD	С	
American	Sacramento	B5, BO, NL, S, SN2, W	W	E, F, Rf, Rh, Rr	DS, SS		
American, Middle Fk	American, N Fk	F, FR	FR	Rf, Rr, WN	SS		
American, North Fk	American	B1, B5, CF, F, FR, S, SN1 (73), SN3, W	B1	B, E, F, Rf, Rh, Rr, WL, WN	SS	В	
American, South Fk	American	BL, F, FR, N		Rf, Rr	SS	С	BLM recommneded below Chili Bar
Antelope Cr	Sacramento	SN1(80), SN3		B, F	SS, DS		
Antelope Cr,	Antelope Cr,	F, CN, SN1(80),		E E	22		
Middle Fk	North Fk	SN2	ļ	с, г	33	[
Antelope Cr,	Antelope Cr/	F, N, SN1(80),			22		
North Fk	Sacramento	SN2				ļ	
Antelope Cr,	Antelope Cr/	F, N, CN, SN1(80),			22		
South Fk	Sacramento	SN2	ļ			<u></u>	
Arroyo Seco	Salinas	F, FR		E, F, Rh, WN	CW	ļ	
Atastra Cr	Rough Cr	BL, N		B, E, F, Rf	ID	ļ	
Battle Cr	Sacramento	B1, B5, BL, FR, N		F, P, Rf	DS, SS	ļ	
Bear Cr	Sacramento	CF, F, N, S		Rh, WN	DS, SS	ļ	
Bear Cr	Santa Ana	F, N		F, WN	CF	<u></u>	
Beegum Cr	Cottonwood, Middle Fk	BL, N		Rh, WN	SS		
Big	Pacific	N		F, P, Rf, Rr, WL	CS	[
Big Chico Cr	Sacramento	F, N, CN, SN2, SN3		B, E, F, G, Rf, Rh, P, WN	DS, SS		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Big Sur	Pacific	B5, BO, F, W		F, G, P, Rh, WN	CC	В	
Big Sur, North Fk	Big Sur	W		P, WN	CC	В	
Big Sur, South Fk	Big Sur	W		P, WN	CC	В	
Big Sycamore	Pacific	Ν		F, WL	CC		
Blue Cr	Klamath	B3		F, WN	SS		
Buckeye Cr	Walker, East	SN3		B, Rh, WN	SS		
Butte Cr	Sacramento	B1, B5, BL, F, N, SN2		B, E, F, G, Rh, Rr	DS, SS		
Cache Ck	Sacramento	B1, B4, BL, BO, FR, N		E, F, G, Rr, WL, WN	SS	С	
Calaveras, North Fk	Calveras/San Joaquin	SN1(80), SN2, SN3		B, E, F	DS, SS		
Carson, East Fk	Carson/ Carson Lk	B4, BO, CF, F, FR, N, S, SN3		B, E, F, Rf, Rh, Rr, WL, WN	IS, SS	A	8 native fish, including Lahontan and Paiute cutthroat trt
Carson, West Fk	Carson/ Carson Lk	B4, BO		G, Rf	SS		
Cedar Cr	San Diego	FR		WN	CW		
Cherry Cr	Tuolumne	F, N	N	G, Rr, WN	SS		
Chowchilla, East Fk	Chowchilla/San Joaquin	SN3		В	SS		
Clavey	Tuolomne	B4, B5, CF, F, FR, N, SN1(92), SN3	B4	B, E, F, P, Rf, WN	SS	А	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Clear Cr	Sacramento	B5, BL, FR, CN, N		E, F, Rf, Rh, Rr, WN	DS, SS		
Colorado	Gulf of California/ Pacific	BO, N		E, Rr, WL	AD		
Convict Cr	Owens	SN3		B, G	SS		
Cosumnes	Mokelumne	B1, BL, BO, NL, N, SN2, SN3		B, E, F, P, Rf, Rr, WL	DS, SS	С	
Cosumnes, Middle Fk	Cosumnes	F, N		R	SS		
Cosumnes, North Fk	Cosumnes	F, N		R	SS		
Cottonwood Cr	Oasis sink (in NV)	WRC		G, WN	ID		
Cottonwood Cr	Sacramento	CF, SN2		E, F, WN	DS, SS		
Cottonwood Cr, Middle Fk	Cottonwood Cr, North Fk	BL, N		Rh, WN	DS, SS		
Cottonwood Cr, North Fk	Cottonwood Cr	BL, N		Rh, Rr	DS, SS		
Cottonwood Cr, South Fk	Cottonwood Cr	BL, N		G, Rh, WN	DS, SS		
Deep Cr	Mohave	CF, F, FR, N		E, F, Rf, Rh, WL	AD		
Deer Cr	Sacramento	B4, B5, BL, F, FR, N, SN1(93), SN2, SN3	B4, FR, SN1	B, E, F, G, P, Rf, Rh, WL, WN	DS, SS	A	
Deer Cr	Kern	SN3		В	SS		
Dinky Cr	Kings, North Fk	WRC		G, Rh	SS		
Disaster Cr	Stanislaus, Clark Fk	F, N		WN	SS		
Dog Cr	Virginia Cr	BL, N		B, F, Rf	ID		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Downie	Yuba, North	F, FR, SN3		B, E, F, Rf, Rh, P, WL	SS		
Dye Cr	Sacramento	SN1(80), SN3		B, F	DS, SS		
Eagle Cr	Stanislaus, Middle Fk	F, N		WN	SS		
Eel	Pacific	B1, B3, S, W		E, F, L, P, Rr, WL, WN	CS, SS	В	
Eel, Middle Fk	Eel	B1, B3, B4, S, W	B1, B4	E, F, L+,Rf, Rh, Rr, WL, WN	SS	В	
Eel, North Fk	Eel	S, W		F, WN	SS		
Eel, South Fk	Eel	B1, S, W		F, P, Rh, Rr, WL, WN	SS		
Elder Cr	Eel, South Fk	NL		Р	SS		
Empire Cr	Lavezzola Cr	F, FR		E, P, Rh, WL	SS		
Fall	Feather, Middle Fk	CF, F, FR, N	N	G, F, Rh	SS		
Feather	Sacramento	BO, N, SN2		E, F, Rf, WL	SS		
Feather, Middle Fk	Feather	B1, CF, I, SN3, W	B1, W	B, G, F, Rr, WN	SS	А	
Firegold Cr	San Joaquin	SN3		В	SS		
Fish Slough	Owens	BL		E, F	ID		Owens Tui Chub/Owens pupfish
Garcia	Pacific	B4		E, F	CS, SS		
George Cr	Owens	BL, N	[Rf	ID		
Green Cr	Walker, East	BL, N		B, Rf	SS		
Gualala and South Fk	Pacific	Ν		F, Rf	CS, SS		
Gualala, Wheatfield Fk	Gualala, South Fk	Ν		F, Rf, Rr	SS		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Hat Cr	Pit	B1, B4, B5, CF		B, F, Rf, G	SS	В	
Hayfork Cr	Trinity, South Fk	F		E, F	SS		
Hot Cr	Owens	BL, N		G, Rf	ID		
Independence Cr	Owens	BL, N, CN		P, Rf	ID, SS		
Kaweah, East Fk	Kaweah	WRC		G, Rh, WN	SS		
Kaweah, Marble Fk	Kaweah	N	N	G, Rh, WN	SS	В	
Kaweah, North Fk	Kaweah	WRC		WN	SS		
Kaweah, Middle Fk	Kaweah	F, N	N	G, Rh, WN	SS	В	
Kaweah, South Fk	Kaweah	B4, SN1(72), SN3		B, F	SS	В	
Kern	Buena Vista Lakebed (landlocked)	BL, BO, F, FR, W		E, P, Rr, WL	SS		
Kern, Little	Kern, North Fk	F, CN		WN	SS		
Kern, North Fk	Kern	B4, I, SN1(76), SN3, W	В4, SN1	B, E, F, Rr, WN	SS	А	
Kern, South Fk	Kern	B2, F, CN, SN1(72), SN3, W	B2	B, E, F, P, WN	SS	В	
Kings	Tulare Lakebed (landlocked)	B1, B4, B5, BO, CF, F, FR, N, W	B1, B4	B, E, F, G, P, Rf, Rh, Rr, WL, WN	SS	A	
Kings, Middle Fk	Kings	B4, B5, SN3, W	B4, B5	B, F, Rh, WN	SS	А	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Kings, South Fk	Kings	B4, B5, CF, SN1(76), SN3, W	B4, B5	B, F, Rh, WN	SS	А	
Klamath	Pacific	B3, CF, F, I, N, S, W	N, W	B, F, L, Rf, Rr, WL	SS	В	
Lavezzola Cr	Downie/North Yuba	F, CF, SN3		B, F	SS		
Little Sur	Pacific	F, FR, Ws		B, F	CC		
Little Truckee	Truckee	SN3		В	SS		
Lopez Cr	Arroyo Grande Cr	Ws		Rh, WN	СС		
Lytle Cr, Middle Fk	Lytle Cr	F, FR		Rh, WN	CW		
Lytle Cr, South Fk	Lytle Cr	F, FR, N		F, WL, WN	CW		
Mad	Pacific	F, BO		F, Rr	SS		
Mariposa Cr	San Joaquin	SN3		В	SS		
Matilija Cr	Ventura	B1, F, Ws		В	CF		
Mattole	Pacific	B3, B4, BL, N		E, F, G, P	CS, SS	В	
McCloud	Sacramento	B1, B4, B5, CF, F, N, Sp	B1, B4	E, G, F, P, Rh, Rf, WL	SS	В	
Merced	San Joaquin	BL, BO, SN2, SN3, W	W	B, E, F, G, Rf, Rh, Rr, WN	DS, SS	В	
Merced, Lyell Fk	Merced	W		WN	SS		
Merced, Merced Peak Fk	Merced	W		WN	SS		
Merced, North Fk	Merced	BL, B4, F, N		F, G, WN	SS		
Merced, Red Peak Fk	Merced	W		WN	SS		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Merced, South Fk	Merced	B4, CF,W		F, P, Rf, Rh,WL,	SS	В	
Merced, Triple Peak Fk	Merced	W		WN	SS	В	
Mill Cr	Sacramento	B4, B5, BL, BO, F, FR, N, CN, SN1 (93), SN2, SN3	B4, SN1	E, F, G, P, Rh, WL, WN	DS, SS	В	
Mojave	Mohave River Wash	B1		В	AD		
Mokelumne	Sacramento	BO, BL, SN2		E, F	DS, SS		
Mokelumne, North Fk	Mokelumne	BL, B5, F, FR, N, SN3		B, G, F, P, Rf, Rh,WN	SS	С	BLM recommended reach: above Hwy 49
Navarro, with Rancheria Cr	Pacific	N		F, P	CS, SS		
Nelson	Feather	CF, F		E, F	SS		sturgeon
New	Trinity	S, W		WN	SS	С	
Niagara Cr	Stanislaus, Middle Fk	F, N		G	SS		
Olema Cr	Tomales Bay/Pacific	N		F	SS		
Owens	Owens Lk (landlocked)	B1, B5, BO, CF		E, WL	ID		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Pacific Cr	Mokelumne, NF	Ν		WN	SS		
Palm Cyn Cr	Coachella Valley	FR		WN	CW		
Pauley Cr	Downie/North Yuba	F, FR		E, P, Rh, WL	SS		
Paynes Cr	Sacramento	BL, FR, N		F, P, WL	DS, SS		
Pine Cr	Eagle Lk (landlocked)	B4, SN1(80), SN3		B, E, F	SS		
Pine Valley Cr	Tijuana R	F, FR		B, E, Rh, WN	CW		
Piru Cr	Santa Clara	F, N, Ws		F, Rh, WL, WN	CW		
Pit	Sacramento	BL, B1, N		B, G, WL	SS		
Pyramid Cr	American, South Fk	F, FR		G, Rh, WN	SS		
Rancheria Cr	Kings	SN3		В			
Redwood Cr	Pacific	B4, N, NP	}	F, P, WN	CS, SS	С	
Relief Cr	Stanislaus, Middle Fk	F, N		WN	SS		
Rock Cr	Owens	BL, N	}	G, P, Rh	SS	С	
Rock Cr	American, South Fk	SN3		B, F	SS		
Rose Cr	Stanislaus	SN3		В	SS		
Rough Cr	Walker, East	BL, N		B, E, F, WN	ID		
Rubicon	American, Middle Fk	CF, F, FR, N, SN3		B, E, F, P, Rf, Rh, WL, WN	SS		
Russian	Pacific	Ν		Rf, Rr	CS, SS		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Sacramento	Delta/ Pacific	B5, BL, BO, F, FR, I, N	B5, N	E, F, P, Rf, Rh, Rr, WL, WN	DS, SS	С	
Sagehen Cr	Truckee	SN3		В	SS		
Salmon	Klamath	B1, B4, B5, S, W	B1	F, L+, Rf, Rr, WN	SS	А	
Salmon, North Fk	Salmon	F, CN, S, W		F, L+, Rf, WN	SS		
Salmon, South Fk	Salmon	CN, S, W		F, G, Rf, Rr, WN	SS		
San Diego River	Pacific	F, FR		B, E, Rh, WL	CW		
San Filipe Cr	Salton Sea (landlocked)	NL		B, Rh	AD		
San Gabriel	Pacific	BO		R	CF		
San Gabriel, North Fk	San Gabriel	F		R	CF		
San Gabriel, West Fk	San Gabriel	F		Rh, WN	CF		
San Jacinto, North Fk	San Jacinto/ Lake Elsinore	FR		WN	CW		
San Joaquin	Delta/ Pacific	BO, F, N		F, G, WN	SS		
San Joaquin, Middle Fk	San Joaquin	F, N	N	E, F, G, Rf, Rh, WN	SS	В	
San Joaquin, North Fk	San Joaquin, Middle Fk	F, N	N	F, G, Rf, Rh, WL, WN	SS	В	
San Joaquin, South Fk	San Joaquin	F, N	Ν	E, F, G, Rf, Rh, WN	SS	В	
San Lorenzo	Pacific	BO		R	CC, CW		
San Luis Rey, West Fk	San Luis Rey/ Pacific	F, FR, CN		E, WL	CW		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
San Mateo	Pacific	F, FR		E, F	CW		
Santa Ana	Pacific	F, N		F, Rc	CW		
Santa Ana, South Fk	Santa Ana	F, N		R, WN	CW		
Santa Ynez	Pacific	B1, F, FR		E, G, Rh, WL	CW		
Santa Margarita	Pacific	B5, BL, FR, CN	FR	B, E, P, WL	СС	С	
Scott	Klamath	B4, S, W		E, F	SS		
Sespe Cr	Santa Clara	B3, B4, B5, BO, CF, F, W		E, F, G, Rf, Rh, WL, WN	CW	А	
Shasta	Klamath	B4, BL, N		B, E, F	SS	С	
Silver Cr, Jones Fk	American, South Fk	SN3		B, F	SS		
Sisquoc	Santa Maria/ Pacific	BO, F, W	W	G, Rf, Rh, P, WL, WN	CW	С	
Smith	Pacific	B1, B3, B4, S, W	B1	E, F, P, Rf, Rh, Rr, WN	SS	А	
Smith, Middle Fk (and designated tributaries)	Smith, South Fk	B1, B3, B4, S, W	B1	Rr, WN	SS	A	
Smith, North Fk (and designated tributaries)	Smith, Middle Fk	B1, B4, S, W	B1	F, P, Rr, WN	SS	A	
Smith, Siskiyou Fk	Smith, Middle Fk	B4, S, W		F, WN	SS	А	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Smith, South Siskiyou Fk	Smith, Siskiyou Fk	B4, S, W		F, WN	SS	А	
Smith, South Fk (and designated tributaries)	Smith, Middle Fk	B3, B4, S, W	w	F, Rh, Rr, WN	SS	A	
Soquel Cr	Pacific	BO		P, Rh	СС		
Squaw Valley Cr	McCloud	F, N		F, WN	SS		
Stanislaus	San Joaquin	F, N, SN2		E, F, Rf, Rh, WN	DS, SS		
Stanislaus, Clark Fk	Stanislaus, Middle Fk	F, N		WN	SS		
Stanislaus, Middle Fk	Stanislaus, South Fk	F, CF, N		F, G, R, WN	SS		
Stanislaus, North Fk	Stanislaus	B5, F, FR, N	B5, N	B, E, F, P, Rf, Rh, Rr, WL, WN	SS	С	
Stanislaus, South Fk	Stanislaus	F, N, SN3		B, G, Rh, WN	SS		
Sulphur Cr	Mill Cr	Ν		G, F, WN	SS		
Susan	Honey Lk (landlocked)	FR, SN3		B, Rf, Rh	SS		
Trinity	Klamath	B1, B5, S, W		F, L, Rr	SS	С	
Trinity, North Fk	Trinity	B5, F, S, W		F, WN	SS	С	
Trinity, South Fk	Trinity	B4, F, FR, S, W		E, F, P, Rh, Rr, WL	SS	С	
Truckee	Pyramid Lk (landlocked)	B5, BO, CF, SN3		B, G, Rf, Rr	SS		
Tule, Middle Fk	Tule	F, FR, SN3		В	SS]	
Tule, North Fk	Tule	F, FR, SN3		В	SS		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Tuolumne	San Joaquin	B5, W, SN2	B5, W	E, F, G, Rf, Rh, Rr, WN	DS, SS	В	
Tuolomne, North Fk	Tuolumne	BL		F	SS		
Tuolumne, Middle Fk	Tuolumne, South Fk	Ν		F, Rc	SS		
Tuolumne, South Fk	Tuolumne	B4, F, N, SN1(72), SN3		B, Rc, Rh, WN	SS		
Van Duzen	Eel	S, W		E, F, WL	SS		
Virgin Cr	New	F		F, WN	SS		
Virginia Cr	Walker, East	BL, N		Rc, Rf			
Walker, East	Walker/ Walker Lk (landlocked)	BL, N		F, Rh, WN	SS		in top 10% of free flowing GB rivers
Walker, West	Walker/ Walker Lk (landlocked)	BO, F, FR, N, S, SN3		B, E, F, Rh, WL, WN	SS		
Whitewater, Middle Fk	Whitewater/ Salton Sea (landlocked)	F, N		WN	CW		
Whitewater, North Fk	Whitewater/ Salton Sea (landlocked)	F, N		WN	CW		
Whitewater, South Fk	Whitewater/ Salton Sea (landlocked)	F, N		WN	CW		
Wooley Cr	Salmon	B4, F, S, W	B4	E, F, Rh, WL, WN	SS	A	
Yellow Cr	Feather, North Fk	CF, F			SS		
Yuba	Feather	SN2		E, F	SS		
Yuba, Middle	Yuba	F, N	}	G, Rf	SS		
CALIFORNIA RIVERS TABLE

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Yuba, North	Yuba, Middle	B5, BO, F, FR		E, P, Rh, Rf, WL	SS	С	
Yuba, South	Yuba	BL, BO, F, N		Rh	SS	С	

CALIFORNIA'S "A" RIVERS

Carson River, East Fork

The East Fork Carson has the longest, wildest, undammed section of river on the east side of the Sierra Nevada, harbors the imperiled Lahonton cutthroat trout and the Paiute cutthroat trout, and passes through wilderness and lightly roaded sections popular among anglers and canoeists.

Beginning on the northeast slope of Sonora Pass, the East Fork Carson flows dam-free for nearly 60 miles north to Highway 395 in Nevada, where diversions dams begin to shunt water into irrigation canals, greatly depleting the river by the time it enters Carson Sink.

In an unusual alignment, the river flows north from the Sonora Pass area, paralleling the Sierra Crest for about 35 miles through roadless terrain. The upper river cuts into both volcanic rock and granite canyons, and flows past high-country meadows where the Pacific Crest Trail follows closely for 5 miles. It then begins to drop into forests of Jeffrey and lodgepole pine and a robust riparian belt of willows and cottonwoods. The river picks up Wolf and Noble Creeks, major tributaries that contribute prodigious spring snowmelt. Upper reaches are designated as a Wild Trout stream, and the headwaters is habitat of the threatened Lahontan cutthrout trout. Lower reaches are considered a trophy fishery for non-native rainbow trout and brown trout. Downstream of Silver Creek, Highway 4 parallels the river through a deep canyon for 8 miles, popular among whitewater boaters and anglers. Then the East Fork flows for another 20 miles through roadless mountains that slope down into the dry lands of Nevada's Great Basin. In this reach, the river quickly drops from the eastern Sierra Jeffrey-pine plant community to semi-arid sagebrush slopes with pinyon pine. The section offers a popular two-day whitewater canoe trip--one of few routes in the Sierra where an overnight river trip is possible without big whitewater. A popular hot springs lies near the river in this reach.

Much of the upper East Fork Carson basin qualifies as a wilderness area, and the Forest Service has found the entire reach to be eligible for National Wild and Scenic River designation.

While most of the watershed is publicly owned, significant tracts along the middle river and scattered parcels on the lower river are private.

Clavey River

The Clavey is recognized as one of the top three rivers in the Sierra with a healthy suite of aquatic life (the others, Deer and Mill Creeks, are in the far northern Sierra). This wild, undammed, and undeveloped stream is one of few Sierra rivers that supports a full complement of native fish species and has no non-native fish.

A major tributary to the Tuolumne River, the Clavey runs for 47

miles southwest from headwaters in the Emigrant Wilderness. The river passes undammed through most of the Sierra's ecological zones, from upper reaches with meadows and aspen groves, through old-growth forests, and into dry chaparral canyons. The California spotted owl, fisher, and other wildlife thrive in the wildness of this river and its steep canyons. It also offers habitat for imperiled native frogs.

With unimproved road access at only a few remote sites, the river is used only by trout anglers, hardy hikers, and a select group of Class-V kayakers each year.

The Clavey is managed as a Wild Trout Stream along with its tributaries, Bell and Lily Creeks . Nearly all the river frontage is public land in the Stanislaus National Forest, and according to Forest Service studies, is eligible for National Wild and Scenic status.

Deer Creek

With no dams, nominal development, and little watershed disturbance, Deer Creek is one of the Sierra's top three streams in conditions for aquatic life and a rare California waterway with healthy runs of spring chinook and steelhead.

In the transition zone between the Cascade Mountains and the Sierra Nevada, Deer Creek flows for more than 50 dam-free miles from its source west of Almanor Reservoir to the Sacramento River north of Chico. The upper creek begins with hot springs and drops through a deepening volcanic canyon shared with Highway 32. In its mid-section, the creek flows through a wilderness course, winding among chaparral, some of the finest blue oak groves in California, and then grass-blanketed foothills at the northern end of the Sierra. Its final 8 miles cross the northeastern edge of the Central Valley.

The remote river supports salmon and other rare fish, and the upper reaches include old-growth forests and habitat for the California spotted owl, black bears, and other wildlife. This stream and Mill Creek, just to the north, are excellent examples of high quality waters draining the Sierra-Cascade interface. The Forest Service has recommended that 30 miles of Deer Creek be designated as a National Wild and Scenic River. Most of the stream's mileage below Lassen National Forest flows through private land.

Just to the north, Mill Creek, along with the adjacent basins of Antelope, Paynes, and Battle Creeks farther north, make an excellent complex of Sacramento River tributaries, each having accessible salmon and steelhead spawning grounds. This cluster of streams offers some of the finest potential for habitat protection and stream restoration in California. Large portions of each of these basins are privately owned.

Feather River, Middle Fork

With 108 undammed miles designated in the original National Wild and Scenic Rivers Act of 1968, the Middle Fork Feather is the longest free-flowing reaches of stream in the Sierra Nevada and one of the range's quintessential natural rivers.

The Middle Fork Feather begins at Beckwourth Pass in the northern Sierra Nevada near Quincy and flows west to the massive Oroville Reservoir. The first 14 miles of the river upstream from the town of Beckwourth meander in braided channels through a high headwaters basin that once flowed east from the Sierra crest. With mostly private land fronting the upper river, the Middle Fork gains volume and begins to cut increasingly steep rapids. West of Sloat, the road leaves the river, which then cuts a wild and rugged canyon having tumultuous Class V rapids and virtually no road access. In this 34-mile section, fine white gravel bars and deep green forests border the lucid water. At Bald Rock Gorge, granite walls rise up 2,000 feet. One of the least accessible river reaches in the state, the lower Middle Fork Feather features some of the clearest water, largest rapids, and wildest riverfronts found in the West.

Recognized as one of California's finest wild trout fisheries and premier expert whitewater runs, the river is accessible by only a few trails and unimproved access roads. However, several isolated mining claims and tracts of private land border the lower river, especially in the 6 miles below the primitive Milsap Bar Road and bridge.

Kern River, North Fork

Extraordinary for its wilderness, range of habitat, free-flowing length, and whitewater, the North Fork Kern makes its epic descent from the western flanks of Mount Whitney to low elevations in the Sierra foothills.

Located in the far southern Sierra Nevada, and confined within the depths of the mountains by massive subranges of the greater mountain chain, the North Fork of the Kern flows directly southward for 82 miles from Mount Whitney to Isabella Reservoir. More than any other Sierra stream—and unusual for mountain rivers anywhere the North Fork flows not directly away from the mountains where it begins, but entirely within a mountain fastness of high peaks that parallel the crest of the range.

The river begins as an exquisite stream of the high Sierra, flowing over immense slabs of granite. It picks up Whitney Creek, which drains the west side of the highest peak in 49 states, and then churns through a 4,000-foot-deep canyon that follows a one-of-akind, relentlessly straight fault line for 30 miles.

The upper 48 miles flow within Sequoia National Park and the Golden Trout Wilderness. Then the river flows onward past granite domes, cliffs, and ponderosa pine and fir groves of Sequoia National Forest. From the west, the North Fork is joined by the Little Kern River, which likewise tumbles for 23 spectacular miles from the lofty peaks of the Great Western Divide. Below the Johnsondale bridge, the North Fork Kern becomes road accessible and is used intensively for fishing, Class IV whitewater boating, and camping. Finally, near Kernville, the river's gradient eases to Class II and III rapids. Just below town the river enters the backwater of Isabella Reservoir, where—now impounded--it joins the South Fork to form the main stem Kern.

The North Fork of the Kern's extraordinary descent through a variety of elevations has resulted in 15 different plant communities along the river and habitat for at least 6 endangered or rare species. The river hosts an excellent trout fishery, and a trail offers superb backpacking from Johnsondale up to the river's headwaters, especially in the spring when Sierra high country is still snowed-

in, and also in the fall when the summer heat at low elevations subsides. The "Forks of the Kern" is a 17-mile raft and kayak run from the mouth of the Little Kern through pristine wilderness that California White Water calls "one of the finest stretches of expert whitewater on earth."

The entire reach from source to the Kern County boundary, 3 miles above Kernville, is in the National Wild and Scenic Rivers system. The river flows dam-free for about 80 miles—the secondlongest free-flowing length in the Sierra. However, Wild and Scenic designation in 1987 allowed for the continued use of a small hydroelectric dam and diversion on the lower North Fork. Nearly all the river frontage is publicly owned.

Kern River, South Fork

Occupying an unusual place in the geography of the Sierra Nevada, the South Fork Kern flows through inaccessible wild canyons with native fisheries and nourishes California's largest cottonwood forest where yellow-billed cuckoos and other unusual birds thrive.

Rising in the southern Sierra south of Mount Whitney and east of the North Fork Canyon, this river flows due south for 73 miles and then southwest for another 15 miles into the backwaters of Isabella Reservoir east of Kernville.

Collecting its waters from the Boreal Plateau and 11,000-footpeaks on the North Kern-South Kern divide, the upper river flows almost entirely through national forest land, including the Golden Trout Wilderness, home of California's official but rare state fish. Though they have been introduced elsewhere in the southern Sierra, the South Fork Kern is the "type locality"—the stream where this imperiled fish originated. Kennedy Meadows is a popular recreation area on the upper river, and the Pacific Crest Trail parallels the stream for 9 miles.

In mid-sections, the river cuts through deep gorges, granite outcroppings, and scattered meadows reached only by remote, unimproved roads and trails. Then it flows for 13 miles through the Domeland Wilderness, virtually inaccessible with gorges, rock walls, and bouldered terrain.

Even though the river ultimately flows off the west side of the Sierra, it runs for most of its length on the eastern side of the highest peaks and therefore lies in a rain shadow that receives less runoff than other rivers on the west slope. It also flows through a pivotal transition zone between high and low elevations and the high Sierra and Mojave Desert ecosystems. As a result, the South Fork Kern features exceptionally diverse plant life.

The lower river corridor is mostly in private ownership, and Highway 178 parallels much of the river's course. Meandering through nearly flat country before the main stem of the Kern drops precipitously through its great foothills canyon, the South Fork nourishes the largest and most intact cottonwood forest in California. The National Audubon Society has a major preserve along the lower river, where the yellow-billed cuckoo—rare in California—can be found.

Nearly 72 miles—all but the lower reach—are included in the National Wild and Scenic Rivers system.

Kings River, and Middle and South Forks

Truly a river of superlatives, the Kings has the greatest undammed vertical drop in America and flows through the deepest canyon.

The river begins at the base of Muir Pass in Kings Canyon National Park, flows westward down the steep incline of the Sierra Nevada, and enters Pine Flat Reservoir at elevation 950 feet west of Fresno.

Most of the Middle and South Fork basins lie in Kings Canyon National Park. With tributaries including Palisade Creek, Cartridge Creek, Bubbs Creek, and Roaring River, the Middle and South Forks flow from some of the most spectacular high-mountain country in America and then tumble through hundreds of rapids and over dozens of waterfalls beneath granite walls rising thousands of feet. Groves of cottonwoods, willows, and lodgepole pines shade the shorelines that are not paved with gleaming granite. The Middle Fork flows through Tehipite Valley with its spectacular, narrow, granite dome, 3,600 feet high. Footpaths in this basin, including the Pacific Crest and John Muir Trails, offer some of the finest wilderness backpacking in America.

Below the national park boundary, the Middle and South Forks join to become an extraordinary whitewater river suited only to expert paddlers. Tributary streams pour in over waterfalls, and the river carves its tumultuous path beneath Spanish Peak--8,300 feet directly above. At Garnet Dike, the river opens into a gentler foothills valley with lyrically beautiful oak savannas, grassy slopes that rise thousands of feet, a fine trout fishery and one of the most popular whitewater rafting runs in the state. Nine miles later the river enters the backwater of Pine Flat Reservoir.

From its source, the Kings drops 10,650 vertical feet without a dam—the largest free-flowing drop in the country (the high peaks of Alaska are engulfed in ice down to low elevations, and other rivers of the southern Sierra have reservoirs at higher elevations). Sierra peaks rise 8,000 feet above both sides of the river—more than Hells Canyon of the Snake River or the Grand Canyon of the Colorado. With a basin almost wholly composed of granite, and with almost all the upper watershed protected as wilderness, the water of the Kings is among the clearest anywhere—perhaps the clearest in America. The foothills canyon is often regarded as the finest large-river trout fishery in the state. The South Fork and main stem flow for a combined dam-free length of 59 miles.

Congress designated the entire Middle and South Forks as National Wild and Scenic Rivers, along with the upper 6 miles of the main stem. The remaining 11 miles of the main stem to Pine Flat Reservoir are designated as a Special Management Area, where new dams are prohibited unless Congress acts specifically to approve them—a unique classification that arose from opposition in 1987 to a proposed dam at Roger's Crossing, 2 miles above Pine Flat Reservoir.

The North Fork of the Kings, which enters a mile above Pine Flat Reservoir, is heavily dammed and diverted for hydropower, however, the 30-mile-long Dinkey Creek is nearly as large as the North Fork where the two join above the main stem Kings. The creek is freeflowing, with popular recreation sites, and in its upper reaches includes an astonishing complex of granite pools and waterfalls. The Dinkey Creek basin is mostly national forest, except for several private tracts that border the middle section.

The lower Kings River below Pine Flat Dam flows through intensively farmed and developing land, where it is diverted for irrigation. Ultimately, the river is completely dried up before it reaches its historic terminus in the now-dry Tulare Lake, which was once among the greatest of western wetlands and a robust commercial fishery.

Salmon River with Wooley Creek

With wilderness, crystal-clear water, and steep rapids, the Salmon is one of the finest remaining salmon streams in the state and an exceptional river with big whitewater.

A major tributary to the Klamath River, the "Cal" Salmon flows from the Marble Mountain and Trinity Alps Wilderness areas west to its confluence with the Klamath at Somes Bar.

The upper North Fork flows for about 15 miles through the Marble Mountain Wilderness. A narrow road then parallels the river down to the South Fork, which flows from the Trinity Alps and also has minor road access. The main stem then flows for 21 miles to the Klamath. The remarkably wild Wooley Creek—with a trail along much of its length—flows for about 20 miles through wilderness and joins the Salmon 4 miles upstream from the Klamath.

The Salmon's headwaters collect meltwater from the only glacier in the Coast Range south of the Olympic Mountains. Vividly greenand-white waters plunge through gorge-bound rapids interspersed at low flows with dark green pools. Lush riparian vegetation thrives on 80 inches of rain per year. Salmon, steelhead, and trout are important species; Wooley Creek is especially critical to springrun salmon and steelhead. White sturgeon have also been found in the lower main stem. Nearly all the watershed is national forest, though scattered private land lies along parts of the river as a result of mining claims. The North Fork, South Fork, and main stem are among California's prized trout, steelhead, and salmon rivers, and the main stem is also considered one of the premier Class V whitewater runs in the nation with three Class V and eight Class IV rapids.

The main stem is entirely included in the National Wild and Scenic Rivers system, as are the lower 8 miles of Wooley Creek, the North Fork from the Marble Mountain Wilderness boundary to its mouth, and the South Fork from Cecilville to its mouth. A contiguous 100mile reach counting the wilderness section of the North Fork and the North Fork-Salmon-Klamath combination is the second-longest reach of river in the National Wild and Scenic Rivers system that is protected from source to mouth (the Middle Fork Eel-Eel is the longest).

This extraordinary river is one of the highlights of the California rivers estate. Along with the Smith, it is the outstanding river of the northern area and the Coast Ranges. The Salmon is also centerpiece to one of the greatest regions of wild or natural rivers in the West, spanning from the Siskiyou Mountain rivers of Oregon southward through the Eel River basin.

Sespe Creek

The last remaining completely undammed river in southern California, Sespe Creek is a trout stream flowing through a wilderness of rugged, chaparral-covered mountains.

The Creek follows a convoluted route through the Santa Ynez Range east of Santa Barbara, flowing east and south to meet the Santa Clara River east of Ventura.

Upper reaches of this small stream are paralleled by Highway 33, and then the creek cuts a deep, forbidding canyon through the highly erodible amalgam of rocks that comprise the Santa Ynez—the westernmost of the five transverse ranges that angle east-west across southern California. The Sespe finally cuts southward and flows out through a mountain gap just north of Fillmore.

The Sespe runs through one of the nation's largest roadless and wilderness areas that lie near a large metropolitan area. It flows mostly through the Los Padres National Forest, including 8 miles through the Sespe Condor Sanctuary, a vital habitat area for reintroduction of the nearly extinct California condor. Sandstone cliffs rise 500 feet above the river, and prehistoric settlements and rock art sites abound. Flows vary radically with winter storms and summer drought; the Sespe can fluctuate from 70,000 cfs to a trickle of 1.5 cfs. Sediment carried by the river is essential to prevent coastal beach erosion south of Point Mugu.

The California Department of Fish and Game has designated 25 miles of the Sespe as a Wild Trout Stream, and it is considered the finest trout water south of Monterey. The Sespe also hosts some steelhead and is one of few streams in southern California with the potential to restore these fish, whose migration is currently affected by diversions downstream from the national forest.

The river and its wild canyons are used extensively by backpackers, campers, horseback riders, mountain bikers, anglers, and occasional expert whitewater boaters.

National Wild and Scenic River designation protects 32 miles of the river, but excludes the headwaters, a mid-river section where a dam has been proposed between Chorro Grade Canyon and Bear Canyon, and the lower 8 miles, which run through farmland and urbanizing property where levees have been built.

Smith River, and Middle, North, South, and Siskiyou Forks and tributaries

The largest undammed river in the state, the Smith is one of the bestprotected and most exceptional river systems on the Pacific Coast.

Collecting its North, Middle, and South Forks, the Smith drains the far northwestern corner of California and flows into the ocean just 3 miles south of the Oregon border. The main stem is 16 miles long while the North Fork is 27 miles long, the Middle Fork is 32 miles long, and the South Fork is 38 miles long.

Extraordinary in its own right, the North Fork begins in Oregon (see Oregon narrative) and flows with superb whitewater south through unroaded, rugged terrain. After the Middle Fork joins the river in the community of Gasquet, Highway 199 parallels the North Fork to its confluence with the South Fork. The main stem then runs through Jedediah Smith Redwoods State Park and turns northward, its final 12 miles flowing through rolling terrain and a broad coastal plain to a spectacular, natural river mouth at the Pacific. Highway 199 follows the Middle Fork from its headwaters on the Illinois-Smith River divide. The upper half of the South Fork flows through unroaded wild areas while the lightly traveled South Fork Road parallels the lower half.

Deeply forested, the many tributaries of the Smith drop through shaded canyons and beneath verdant mountainsides where 100 inches of rain a year create one of California's wettest watersheds. With a variety of soils including the sparsely nourished peridotite, the basin supports at least 27 species of rare or endangered plants, some in specially designated tracts such as the Myrtle Creek Botanical Area adjoining the North Fork. The basin is entirely within the Siskiyou Mountain Range, which includes the most diverse collection of conifers on the planet. Jedediah Smith Redwoods State Park, which flanks both sides of the main stem, includes some of the finest redwood groves anywhere.

One of the cleanest streams on the West Coast, the Smith's waters run crystal-clear except during floods. An excellent trout river, the Smith also hosts the finest remaining steelhead and salmon runs in the state. Roadless areas cover one-third of the basin, which is largely in public ownership except for some river frontage on lower reaches of tributaries. Most of these are scattered mining claims. In its final 12 miles, the river flows through privately owned agricultural land where further land development is likely to occur unless open space is acquired for protection.

While the main stem flows with gentle rapids, the three forks of the Smith all feature extreme whitewater. Oregon Hole Gorge, on the lower North Fork and visible from Highway 199, is a non-stop series of sharp drops and pools with steep walls and enormous boulders blocking the flow. The upper North Fork is considered one of the most beautiful whitewater runs in the West. The South Fork is the longest branch and likewise has challenging whitewater and also trail access along remote sections of the stream.

The entire length of the three forks and main stem of the Smith are designated in the National Wild and Scenic Rivers system. In addition, many tributaries to the main forks are designated, making the Smith the most completely designated watershed in the national system. (Designated Middle Fork tributaries include Griffin Creek, Kelly Creek, Knopki Creek, Hardscrabble Creek, Little Jones Creek, Monkey Creek, Myrtle Creek, Packsaddle Creek, Patrick Creek including East and West Forks, and Shelly Creek. Designated North Fork tributaries include Bear Creek, Diamond Creek and North Fork, High Plateau Creek, Peridotite Creek, Still Creek, and Stony Creek. Designated South Fork tributaries include Blackhawk Creek, Buck Creek, Canthook Creek, Coon Creek, Craigs Creek, Eightmile Creek, Goose Creek and East Fork, Gordon Creek, Harrington Creek, Hurdy Gurdy Creek, Jones Creek, Muzzleloader Creek, Prescott Fork of the Smith, Quartz Creek, Rock Creek, and Williams Creek.) To deter logging and mining proposals in the highly erodible basin, much of the watershed was also designated as the Smith River National Recreation Area.

For all its protected status, critical parcels of private land remain, and mining proposals continue to resurface. The lower river is also vulnerable to development pressures.

The Smith is centerpiece to a much larger region of contiguous wild-and-scenic river basins including the Illinois and Rogue to the north and the Klamath and other California rivers to the south. For its combined qualities of water quality, fisheries, undammed length, wildness, unusual plantlife, old-growth trees, and recreation use, the Smith is a superlative river of California and the West

CALIFORNIA'S "B" RIVERS

American River, North Fork

Dropping steeply through narrow wilderness canyons, the North Fork American has excellent trout waters, a wide range of habitat from high elevation to low, and spectacular whitewater.

From its Sierra Nevada headwaters just south of Donner Pass, the river flows west to its confluence with the South Fork in the backwaters of Folsom Dam, east of Sacramento. Beginning with the deep snow pack on the western flanks of Silver Peak, the upper North Fork drops precipitously through Sierra granite and forests and cuts 3,500-foot deep canyons at Royal Gorge and Giant Gap. Here the gradient reaches 180 feet per mile. Downstream from the Iowa Hill Bridge, the gradient lessens, but rugged and remote canyon country continues until the river reaches the backwaters of Clementine Reservoir. Downstream from that silted-in, 5-mile-long pool, the lower North Fork flows past the Auburn Dam site, where one of America's largest dams was begun but then stopped after the Oroville earthquake raised serious safety concerns. Cutting through chaparral-covered foothills, the river is joined by the Middle Fork of the American, and then finally enters the slackwater behind Folsom Dam.

With wilderness through much of its watershed, the North Fork American's remote canyons provide excellent habitat for 238 birds, 47 mammals, and a wide variety of amphibians and reptiles, including several imperiled species, such as the foothill yellowlegged frog. The river also provides high quality habitat for native fish, with 36 miles designated as a wild trout fishery.

The North Fork's remote river canyons attract many hikers, anglers, mountain bikers, and river runners, who enjoy a range of whitewater from the upper river's challenging Giant Gap run to the lower river's easier reaches. From Folsom Dam to the Sacramento River in the city of Sacramento, the main stem of the American flows through one of the finest urban river greenways in the nation and is heavily used by walkers, bicyclists, anglers, and boaters.

In 1972, 48 miles of the North Fork were designated in the California Scenic Rivers system, stopping a dam that had been planned at Giant Gap. In 1978, 38 miles from The Cedars to the Iowa Hill Bridge were protected in the National Wild and Scenic Rivers system. This reach notably excluded the section from the Iowa Hill Bridge downstream to Auburn, where the massive Auburn Dam had been proposed. Though perennially rejected as uneconomic and unfeasible, the dam continues to be championed by the local congressman. Although most of the North Fork's riverfront is publicly owned as Tahoe National Forest or as the Auburn State Recreation Area, blocks of private land dating back to railroad land grants lay scattered in a checkerboard pattern in the upper river basin.

Big Sur River with North and South Forks

Flowing from the central or southern Coast Range, the Big Sur River drops through some of the southernmost redwood groves, thick chaparral, and riparian forests to a wild beach at the Pacific, and is perhaps the finest natural river on the West Coast south of San Francisco.

Rising in the Santa Lucia Mountains of the Big Sur Coast, south of Carmel, the river runs to the ocean at Andrew Molera State Park. The Big Sur is the largest river flowing from the west side of the Santa Lucia Mountains and through the coast redwood's southern range. The river's North and South Forks gather on the Santa Lucia's rugged slopes, where a mix of chaparral, tanoak, and bay intermingle with redwoods that grow in clustered groves on the cooler northfacing slopes of the deep canyon. The river then riffles out through redwood forests in Pfeiffer Big Sur State Park, flows alongside Highway 101, enters Andrew Molera State Park, and finally curves through riparian sycamore forests and coastal scrub habitat to a spectacular wild beach at the Pacific surf.

From its North Fork source, the river runs 21 miles to the sea. Steep trails reach the main stem and its tributaries in several places. Three sulfur hot springs bubble up in the canyon, and a rainbow trout fishery benefits from the cool, foggy microclimate of the canyon and from the rugged terrain that limits access to anglers. The Big Sur River also hosts one of the southernmost steelhead runs on the West Coast, and the lower river is one of few in its region that can be canoed in the high runoff season of winter.

Both North and South Forks and 7 miles of the main stem flow through the Ventana Wilderness and are also designated in the National Wild and Scenic Rivers system. A lower 7-mile reach of the river flows through private land, with numerous recreational resorts and campgrounds, before entering the state park near its mouth. Though Sespe Creek and the Sisquoc River are longer, they each encounter major diversions before reaching the ocean, and so the Big Sur River is perhaps the finest natural river remaining on the central and southern California coast.

Eel, Middle Fork and main stem

The Eel and its Middle Fork form a long, continuous, free-flowing river running through terrain that is wild or only lightly developed from mountain headwaters to a natural estuary at the Pacific. The river still serves surviving salmon and steelhead runs.

The vast river system drains the coastal mountains of northern California, flowing west and north to the river's mouth near Eureka. The Middle Fork collects its headwaters north of Mendocino Pass, where the first 6 miles flow through wilderness. Then the river drops through a beautiful 54-mile-long canyon with ponderosa pine, scattered oaks, and vast sweeps of grassland in steep, erodible terrain. Unstable soils here can result in huge landslides, and siltloads at peak flows have reached 15 times those of the Mississippi per unit of water. The river still offers excellent habitat for summer steelhead and supports winter steelhead, winter and spring chinook, and rainbow trout, though all the anadromous runs are greatly reduced from historic levels and there is some hatchery influence on wild fish. Bald eagles winter and peregrine falcons nest in the canyon.

Several trails reach to the river, and a 30-mile whitewater run from Black Butte River to Dos Rios is popular in the spring with plentiful Class II-III rapids, sandbars, and deep pools. Coal Mine Falls is a boulder-choked, nearly unrunnable rapid for rafts. Though the river flows through Mendocino National Forest, much of the riverfront in the canyon is privately owned.

From the wilderness boundary at the upper river to its confluence at the main Eel at Dos Rios, the Middle Fork is included in the National Wild and Scenic Rivers system. Designation precluded a major dam that had been planned at Dos Rios. The main stem of the Eel below the Middle Fork confluence flows in a broadening valley with oak savanna and grasslands on steep mountainsides. A superb 46-mile reach of Class II-III whitewater runs from Dos Rios to Alderpoint. Below there, the Eel becomes wide and shallow, with immense gravel and sand bars in the summer. The lower river winds through redwood groves in Humboldt State Park and then issues past farms, small communities, pastures, and marshes before entering the Pacific at a wide, natural, sandy mouth where acres of driftwood collect.

The Eel system has a distinctive, human-altered hydrologic regime. Enormous winter and springtime flows recede after the rainy season ends, leaving the summertime river to carry only 1 percent of the river's annual volume. Low natural flows are exacerbated by large diversions of water southward from dams near the main stem Eel's headwaters. These affect water quality and temperature downstream.

In spite of this, the Eel still supports coho and chinook salmon, American shad, Pacific lamprey, and California's largest run of spring steelhead. Bald eagles, peregrine falcons, and brown pelicans find habitat along this river.

The main stem Eel is included in the National Wild and Scenic Rivers system for 157 miles from Van Arsdale Dam, at its headwaters, to the Pacific. It is unusual in the national rivers system because it is a large river, averaging 7,600 cfs (though summer flows are low), and because 80 percent of its riverfront is privately owned. The Forest Service has found 26 tributaries of the Eel to be eligible for the National Wild and Scenic Rivers system (the same number as in the Klamath basin). Though most main stem frontage is sparsely settled ranchland today, the river corridor is likely to see great development pressures in the future.

Counting the upper wilderness reach, the Middle Fork Eel-Eel combination is the longest free flowing stream protected in the national wild and scenic system from source to mouth and from source to ocean. With its upper tributary, Rattlesnake Creek, the Middle Fork-main stem Eel combination flows for 167 dam-free miles to the Pacific, making it the second-longest free flowing reach in California.

Hat Creek

Starting on the east flanks of Lassen Peak in Lassen Volcanic National Park, Hat Creek flows 53 miles north to meet the Pit River.

From headwaters just below timberline, the West Fork of Hat Creek tumbles down Lassen Peak, joins the East Fork below a highway crossing, and then continues north past a series of low volcanic cones remaining from past eruptions. Flowing through forests of lodgepole pine and past the edge of broad meadowlands, the remarkably clear Hat Creek is continuously augmented by cold spring flows prevalent in this porous landscape of lava.

With unusually regular flows that are relatively unaffected by floods, droughts, and diversions, Hat Creek hosts a renowned trout fishery and is popular among anglers despite its remoteness. Endemic species include the rough sculpin and the Shasta crawfish. Highway 89 passes through much of the length of the valley, but it is not a major traffic route. The river flows through forest and some ranchland but has very little development in its remote setting, far from California cities and towns.

Kaweah River, Marble, Middle, and South Forks

Making spectacular drops from Sierra high country to low elevation in the foothills, the Kaweah River system remains mostly wild and natural, and continues to provide habitat to native fishes.

The Marble, Middle, North, East, and South Forks of the Kaweah lie almost entirely within Sequoia National Park. Collecting headwaters from the Great Western Divide of the southern Sierra, these forks drop generally westward through an wide range of habitats from 10,800 feet in elevation to 694 feet at Kaweah Reservoir below Three Rivers—nearly as great a dam-free drop as the Kings River.

Except for the lowest 8 miles of the North Fork, 6 miles of the Middle Fork, and 10 miles of the South Fork, the basins are almost completely in public ownership, and much of the watershed is wilderness.

The Marble Fork drains the extraordinary granite high country of Sequoia National Park and flows near the largest groves of giant sequoias. The Middle Fork begins at the Great Western Divide and flows west through deep, wild canyons. The East Fork flows from the popular recreational high-country trailhead of Mineral King. The North and South Forks include wild canyons but drain lowerelevation basins. The South Fork has the best native fish habitat, hosting more robust populations and a greater diversity of species, though its lower reaches flow through private land with some development.

Below Kaweah Reservoir, the river is heavily diverted for agriculture and is ultimately dried up.

Klamath River

An epic river in the geography of the West, the Klamath is the third-largest stream flowing into the Pacific south of Canada, it has one of the longest free-flowing lengths, and it has more intact forests, fisheries, and wild tributaries than any other major West Coast stream.

Beginning in south-central Oregon, the Klamath River flows into California, is impounded by Iron Gate Dam, then flows dam-free for 188 miles to the Pacific. This is the second-largest California river, and on the entire West Coast south of Canada, the Klamath ranks third in free-flowing length behind only the Umpqua of Oregon, which is much more developed, and the Sacramento, which is severely constrained by levees and industrial farmland.

After an initial 15 miles below Iron Gate Dam where the Klamath flows through a valley linking the Cascade Mountain range with the Klamath and Coast Ranges, the remainder of the river's eventful course to the Pacific flows through deep valleys and steep sided canyons of the coastal mountain complex—subranges of the Klamaths called the Scott Bar, Marble, Siskiyou, Salmon, and Coast Ranges. The Klamath is one of only three rivers that begins east of the Cascade crest and flows through both that range and the Coast Range to reach the ocean (the others are the Columbia and the Pit-Sacramento). Once among the greatest steelhead and salmon rivers on the continent, the Klamath is plagued by irrigation diversions and polluted return flows at its headwaters and by diversions to southern California from the Trinity—its largest tributary, which joins the lower river. Nonetheless, the river remains an important steelhead, coho, and chinook fishery for three major Indian tribes along the shores, for commercial fleets extending hundreds of miles along the California and Oregon coasts, and for sport anglers.

The enormous basin still has large uncut tracts of old-growth forest and an exceptional diversity of plantlife at the intersection of several distinct ecosystems. A major upper river tributary, the Scott, is heavily diverted for irrigation but still has the best coho run in the basin. Fine Klamath tributaries include Seiad Creek, Grider Creek, Thompson Creek, Indian Creek, Elk Creek, Ukonom Creek, the Salmon River, Swillip Creek, Rock Creek, Camp Creek, Boise Creek, Red Cap Creek, Bluff Creek, and Blue Creek. In all, 26 tributaries have been found eligible for designation in the National Wild and Scenic River System by the Forest Service. The Eel is the only other river nationwide with so many eligible but not designated tributaries.

The Klamath's entire 188-mile free-flowing stretch from Iron Gate Dam to the ocean is designated in the National Wild and Scenic Rivers system, as are its tributaries the Salmon, Scott, and Trinity.

With several major rapids and hundreds of minor ones, the Klamath offers the longest whitewater rafting trip on the West Coast—188 miles with one mandatory portage at Ishi Pishi Falls above the mouth of the Salmon River. The Klamath has one of the highest densities of osprey nests in the West; black bears are seen here more frequently than on perhaps any other river; and other types of wildlife are common.

The lower river flows through the Yurok Indian Reservation and Redwood National Park, where redwood forests are recovering from past clearcutting. The Klamath has the largest natural river mouth on the West Coast south of Canada; no jetty or harbor has been built.

With its size, scale, geographic span, and diversity of plantlife, the Klamath is one-of-a-kind on the West Coast and in the West. Though it has been damaged by water diversions and logging, it is perhaps the most significant restorable river in California and the West. If the water quality problems related to upriver diversions and dams were solved, the Klamath would clearly be at the top of the list of high-quality rivers in California and the West.

Proposals to eliminate Iron Gate Dam could further enhance restoration possibilities, as would correction of the agricultural and impoundment-related water quality problems at the headwaters and diversion problems on the Trinity. Long stretches of river frontage are privately owned but lightly developed. Some of this is threatened by further development, and throughout the river's length selected tracts may be available for open space protection.

Mattole River

Isolated like no other major river on the California coast, the Mattole flows dam-free through a rain-soaked fastness of recovering redwoods and other conifers to a rare, natural outlet at the Pacific, and it still has surviving runs of chinook salmon, coho salmon, and steelhead.

On the north coast California, northwest of Garberville, the Mattole River begins less than a mile from the Pacific Ocean but then runs parallel to the coastline for 85 miles, separated by a high barrier of forested mountains—likely the result of a separate terrain "docking" against the proto-coastline. With up to 200 inches of rain a year, this watershed includes the wettest terrain in the state.

Much of the river's course is inaccessible by road. The lower river loops through an open valley with idyllic scattered ranches and secluded homesteads before braiding out to a remote, completely natural beach south of Cape Mendocino—famous for the "triple junction" where three continental plates come together in a chaos of seismic activity.

The coastal mountains in the Mattole basin once supported an extensive old-growth forest of redwoods and Douglas-firs, but only scattered uncut groves remain. The river continues to support chinook, coho, and steelhead runs with high species diversity, good habitat, and no hatcheries, though the anadromous fish are not abundant. Strong local efforts have been made to restore coho salmon.

The Mattole is California's finest example of a river flowing from source to ocean through a remote valley, isolated by mountains and tortuously curving roads in steep terrain. With little development, no dams or diversions, and enormous amounts of rainfall, the basin presents an exceptional opportunity for restoration of a onceremarkable river system.

McCloud River

With clear water, healthy spring flows, good trout habitat, and two fine wild reaches, the McCloud is the finest example of a Cascade Mountains river in California.

Starting with headwaters in the lava fields of the Modoc Plateau in northeastern California, the river flows west and south through the southern Cascade Mountains and meets the Sacramento in the reservoir behind Shasta Dam.

The upper McCloud meanders through a broad valley shared by Highway 89 and a railroad line. At Falls of the McCloud, the river drops over a spectacular three-part waterfall in a sheerwalled gorge and enters a 10-mile reach of turbulent whitewater before hitting the slackwater of a 4-mile-long reservoir called Lake McCloud. Below the dam, the river begins another remarkable descent through deep woodlands, basalt-sided gorges, swift Class-IV and V rapids, and resounding wildness. The final 14 miles of the McCloud are flooded by backwaters of the massive Shasta Dam on the Sacramento River, and would be further flooded if the dam were to be raised, as has been proposed.

The McCloud has a unique hydrologic regime. Prodigious runoff from storms dropping rain and snow in the Mount Shasta region sink quickly into the cracked and porous lava. The water then reemerges as spring flows, giving the McCloud a far steadier flow than most other rivers. It rarely floods and rarely drops to low levels. As a result, ferns, Indian rhubarb, bigleaf maples, and coniferous forests grow in lush thickness right to the water's edge. The water is some of the clearest in California. An aqueduct diverts a portion of the upper river above Falls of the McCloud, but the small flow is augmented below the Falls by springs continually discharging 500 to 1,000 cfs. Hydroelectric projects then diminish flows of the lower river by diverting water to the Pit River. Nevertheless, the McCloud remains a superb trout stream and is designated in the state scenic rivers system.

Merced River with South Fork Merced

A classic gem of the Sierra Nevada, the Merced boasts the most spectacular collection of waterfalls in America, is the lifeline and scenic masterpiece of Yosemite Valley, and sustains a good fishery from high elevations to foothills.

From the high country of Yosemite National Park, the Merced River drops with extreme gradient, pauses briefly as it winds quietly through the exquisite Yosemite Valley, and then plunges again through lower elevation canyons until it hits the backwater of McClure Reservoir, east of Turlock.

Like the Tuolumne, Kings, and Kern, the Merced collects its headwaters from an extravaganza of snowcapped peaks that reach up to 13,114 feet, vast expanses of granite, and magnificent groves of pines, firs, and cedars. Absolutely clear water drops over dozens of falls and cascades, including the 594-foot Nevada Fall and Vernal Fall. The river then flows as centerpiece to the famed Yosemite Valley—one of America's most stunning scenic attractions—where it picks up tributaries such as Yosemite Creek. This stream free-falls 1,430 feet--one of the tallest waterfalls in the world. Below the Valley, the river plunges in a narrow canyon, dropping through turbulent rapids having massive boulder gardens and bus-sized rocks.

At the town of El Portal, the Merced's gradient eases somewhat and becomes a prime Class-V paddling run and then a popular Class III-IV rafting reach. In this section, the river flows through a foothill canyon of oaks, chaparral, and grassland until it reaches the flatwater of McClure Reservoir below Halls Gulch. Downstream from the reservoir, the river drifts through the lower foothills and into the intensively farmed flats of the Central Valley, where it eventually meets the San Joaquin. The Merced attracts legions of paddlers both to the gentle current of Yosemite Valley and to the exciting whitewater below El Portal. Trails along an abandoned railroad grade below El Portal, through Yosemite Valley, and throughout the high country along the river's upper tributaries offer some of the most popular hiking in America. From Yosemite National Park downstream, the river's fishery is heavily affected by the introduction of exotic bass.

The waterfalls and scenery of Yosemite Valley put the Merced in a class by itself. Its middle reaches, however, have far more road access than the Tuolumne River to the north or the Kings and Kern to the south. Most of the corridor upstream from McClure Reservoir is publicly owned, however pockets of private land are found from El Portal down.

The South Fork of the Merced flows from the forested midelevations at the southern end of Yosemite National Park and joins the Merced in the canyon below El Portal. Roadless except for its source near the Wawona resort and campground, the river drops for 43 miles through forests, meadows, and inaccessible canyons. A trail leads upriver from the mouth for 4 miles to Hites Cove, where exceptional springtime wildflower blooms can be seen. An excellent fishery, the South Fork is one of few Sierra streams with self-sustaining rainbow, brook, and introduced brown trout.

The Merced in included in the National Wild and Scenic Rivers system for 52 miles from its source to Halls Gulch below Briceburg. Four upper basin tributaries are also designated, as is the entire South Fork, which is one of the more significant rivers that's protected in the national system from source to mouth.

Mill Creek

Mill Creek is an important salmon, steelhead, and trout stream. It is rated among the top three Sierra Nevada waterways for aquatic life and flows nearly dam-free through wild country at the interface of the Sierra and Cascade Ranges.

The creek flows for 55 spectacular miles from the southwest flanks of Mount Lassen to the Sacramento River south of Red Bluff.

The only dam is a diversion structure 5 miles above the Sacramento River.

Headwaters begin with snowfields and hot springs of Lassen the southernmost of the Cascade volcanic peaks. South of Highway 36, the creek enters a wild, steep, narrow canyon that runs for 16 miles with basalt cliffs. About 10 miles of this section flow through the Ishi Wilderness, and a trail parallels the creek through the entire reach. After a minor bridge crossing, the canyon extends for another 19 roadless miles in gentler, rolling terrain as the creek enters foothills and then the Central Valley. Upper reaches have one of the largest stands of old-growth forest remaining in the northern Sierra, and support California spotted owls, Pacific fishers, and wolverines. Lower reaches host some of the finest blue oak savanna, chaparral, and grassland.

This is one of the last streams in the northern Sierra that continue to support threatened spring run chinook salmon and winter steelhead, and it's the longest Sacramento basin tributary that the chinook ascend on their spawning run. The creek also hosts an excellent rainbow trout fishery.

An outstanding trail system makes the creek accessible to hikers. The Forest Service has recommended designation of 32 miles in the National Wild and Scenic Rivers system, but for now, Mill Creek remains one of the most extraordinary unprotected rivers in California.

San Joaquin River with North, Middle, and South Forks

The second largest river in California, the San Joaquin boasts an exquisite complex of high-country tributaries draining wilderness and national park areas in the central Sierra Nevada.

Nearly the whole lengths of the North Fork, Middle Fork, South Fork, Evolution Creek, and other tributaries flow through the Minarets, John Muir, and Ansel Adams Wilderness areas. These streams include some of the most extraordinary high mountain scenery in America. One dam is located on the South Fork. The North Fork begins at the border of Yosemite National Park and flows south to meet the Middle Fork at the edge of the Ansel Adams Wilderness. A trail follows the river's route for 10 miles in upper reaches; the lower 10 miles flows through inaccessible wilderness.

The Middle Fork begins in the scenic extravaganza of Thousand Island Lake, beneath the central Sierra landmarks of Banner Peak and Mount Ritter. The Pacific Crest and John Muir Trails roughly parallel the river's southeastward course to Devil's Postpile National Monument—perhaps the finest example of columnar basalt anywhere. Below the Monument, the river drops over the cataract of Rainbow Falls and continues through inaccessible granite canyons for 11 miles to the North Fork confluence, where the main stem begins, and then for another 12 miles of free-flow until the river hits the backwater of Mammoth Pool Reservoir.

The longer South Fork begins in the sublime Goddard Canyon, beneath the LeConte Divide in Kings Canyon National Park, and flows north, picking up Evolution Creek, which flows from 13,000foot peaks that ring Muir Pass. Seven miles northwest of the Kings Canyon National Park boundary, the South Fork is dammed in Florence Lake, where water is diverted west for hydroelectric power. The river continues on northwest for about 25 miles to its confluence with the main stem at Balloon Dome—a granite monolith surrounded by forest. The only roads that reach the South Fork are at Florence Lake (reservoir) and Mono Hot Springs, 6 miles below the reservoir.

At Mammoth Pool Reservoir the main stem San Joaquin is stopped by the first in a series of dams culminating with Friant Dam, northeast of Fresno. The lower river through the Central Valley is diverted for irrigation, leaving little or no flow in the channel, and is severely polluted by return agricultural wastewater. Nonetheless, some salmon migrate up the lower river, and long-sought restoration plans to reinstate flows for anadromous fish gained traction with a court decision in 2006 that requires that more water be returned to the lower river.

Tuolumne River

The Tuolumne flows through high meadows and an exquisite canyon that is a highlight to mountain-river scenery in America, followed by one the West's premier whitewater rafting and kayaking runs.

With its source on Mount Lyell of Yosemite National Park, the Tuolumne River drops westward for 83 miles from the Sierra Nevada crest to the foothills of the range in New Don Pedro Reservoir. Beginning among the stunning high granite and snowcapped peaks, the upper river winds through Tuolumne Meadows--the largest meadow in the entire range. Then the river drops over waterfalls and through deep granite chasms, brilliant whitewater rapids, and groves of ponderosa pine, incense cedar, and Douglasfir in the Grand Canyon of the Tuolumne--one of the superlative scenic canyons of the West.

Below the canyon, the river hits the slackwater of Hetch Hetchy Reservoir. Here, John Muir waged the seminal battle over the protection of wilderness, national parks, and wild rivers when he tried unsuccessfully to save the valley from damming.

While upper reaches of the river offer premier hiking and backpacking opportunities along the river, the lower reach offers one of the most famous whitewater runs in America. At Lumsden Campground, about 15 miles below O'Shaughnessey (Hetch Hetchy) dam, rafters and kayakers embark on one of the West's most outstanding Class-IV whitewater runs, which continues for 18 miles to the backwater of New Don Pedro Dam. This reach features a 2,000-foot-deep canyon of cliffs, ponderosa pines, oak savanna, chaparral, and grassland.

A sizable tributary, Cherry Creek, enters the river above Lumsden and offers one of the most challenging Class-V whitewater runs in the nation. Another notable tributary, the Clavey River, enters the Tuloumne in the lower canyon and is one of few free-flowing rivers left in California with no dams on its entire length (see California A list, above). The entire main stem Tuolumne corridor, from source to New Don Pedro Reservoir, is publicly owned as Yosemite National Park, Stanislaus National Forest, or Bureau of Land Management property. The biology of the Tuolumne is heavily affected by introduced trout and by severe manipulations of flow for hydropower and water supply. The native fishes of the undammed South Fork of the Tuolumne are in much better condition than those of the main stem.

Below the sprawling New Don Pedro reservoir, the river winds through the lower foothills, past intensively farmed agricultural land, and through the city of Modesto before meandering across flats of the Central Valley and joining the lower San Joaquin River.

CALIFORNIA'S "C" RIVERS

Amargosa River

The Amargosa lies within the most arid desert in America and still flows perennially in one section. It supports rare native fish and is regarded as one of the best of the small desert rivers in the West.

With its source in Nevada, the river runs for about 150 miles through the Mojave Desert, first flowing south, then west, then north to its terminus in Badwater Basin--a sandy, landlocked sink in Death Valley National Park at 282 feet below sea level and the lowest elevation in the United States. As with nearly all other rivers whose watershed is limited to deserts, much of the Amargosa is dried up most of the time. However, a 26 mile segment near Tecopa flows year round through Bureau of Land Management property. That agency has found this section to be eligible for National Wild and Scenic River designation.

In a rugged canyon with cliffs and colorful, fossil-studded rock formations, the spring-fed BLM reach includes wetlands and a riparian corridor of willows and other plant life.

The river also has most of its suite of native animal species intact. A veritable oasis, this reach supports 260 kinds of birds including the imperiled willow fly catcher, yellow-billed cuckoo, and Bell's vireo. Pools here also support the rare Amargosa pupfish and speckled dace. Though some non-native fish have been introduced, biologist Phil Pister calls the Amargosa "as pristine a river as you can get in the desert regions of the American Southwest in the year 2006."

American River, South Fork

Though the biology of this scenic river has largely been sacrificed to hydroelectric power, the South Fork American has become a tremendous recreation area with one of the nation's most popular whitewater runs. Hiking and general recreation are likewise important along the river and throughout its headwaters.

Beginning in Johnson Pass, where Highway 50 crosses the Sierra Nevada, the South Fork American flows west to Folsom Reservoir, just east of Sacramento.

Headwaters drop from granite bedrock and coniferous forests, and are joined by the spectacular tributary, Pyramid Creek, which drains the Desolation Wilderness and drops over Horsetail Falls one of the more spectacular waterfalls in the northern Sierra.

Highway 50 parallels the upper river, which tumbles through a continuous chain of rapids and clear pools. The scenic Silver Fork joins from the south after flowing through remote and sparsely roaded country from a headwaters reservoir.

In its mid-sections, the South Fork is heavily diverted for hydroelectric power. Then at Chili Bar Dam, north of Placerville, water is returned to the river during hydropower production, yielding afternoon flows of high water throughout the summer in the 20-mile-long reach to the backwaters of Folsom Dam. This may be the most popular and accessible whitewater in the West, with crowds of rafters and kayakers from northern California's metropolitan areas paddling throughout the spring, summer, and autumn months. Because of fluctuations in flow for hydropower, the river has few fish of any species; however, a new dam-operations agreement in 2007 will result in more consistent releases and better water for both fish and rafting.

Though its flows are heavily diverted and manipulated for power production, and though roads parallel the river for significant lengths, the South Fork American remains an important river because of the recreational qualities it offers and its outstanding Pyramid Creek and Silver Fork tributaries.

Cache Creek

The highest-volume river flowing from the east side of the Coast Range in California, Cache Creek hosts the largest wintering population of bald eagles in the state, a good fishery, and excellent recreational values near both Sacramento and the San Francisco Bay area.

Flowing from the outlet of Clear Lake, Cache Creek runs southeast to lowlands of the Central Valley near Woodland. The upper river drops through an 18-mile-long roadless reach with Class II-III whitewater. Below there, Highway 16 parallels the river through a rugged canyon, which ends when the river enters the Capay Valley near Rumsey. The lower river is heavily diverted into irrigation canals and ditches before reaching the Sacramento River.

Cache Creek is the largest stream draining the east side of the California Coast Range. Grassy hills, chaparral, and oak trees predominate in this low elevation area of temperate winters and hot, dry summers. A few of Cache Creek's wintering bald eagles are beginning to nest in riverfront trees. One of the state's largest herds of tule elk also inhabits the basin, and black bears are common. The river and its tributary Bear Creek also host strong populations of native fish.

Much of the canyon is in public ownership and administered by the Bureau of Land Management, which has found 32 miles of the creek eligible for the National Wild and Scenic Rivers system.

Cosumnes River

One of the least-dammed of all Sierra Nevada rivers, the Cosumnes flows through a mostly wild basin and retains its natural flow regime, which supports a valuable network of wetlands near the rivers mouth in the Central Valley. From a broad ridge lying west of Carson Pass in the central Sierra Nevada, the river drops west to its confluence with the lower Mokelumne River in the midst of the Sacramento-San Joaquin Delta.

Unlike the major Sierra rivers, the Cosumnes' watershed does not reach to the high crest of the mountains, which are drained by the American to the north and the Mokelumne to the south. Collecting its headwaters instead from the 6,500-foot Iron Mountain Ridge, the North and South Forks of the Cosumnes flow down through mid-elevation forests to a largely undeveloped foothills landscape. At lower elevations the river winds through one of the largest remaining savannas of immense valley oaks before entering the Central Valley, where the lower river supports an extensive system of marsh lands and flooded riparian habitat at its confluence with the Mokelumne River near sea level.

The Cosumnes has only an 8-foot-high dam at Michigan Bar and one dam on tributary Sly Creek. Unaffected by flood control, the river's natural flow regime remains intact, which enables it to nourish wetlands of the Central Valley much like the other Sierra rivers did before widespread damming.

Wetlands and floodplains of the lower river offer excellent habitat and are critical for large populations of migrating waterfowl and sandhill cranes. A small run of chinook salmon survives here another rarity among Sierra rivers. However, much of the lower river is dominated by exotic redeye bass, and the flow nearly dries up in late summer.

A Nature Conservancy preserve protects wetlands near the river's mouth, but most of the river's low lying floodplains and wetlands are privately owned.

Mokelumne River, upper North Fork

This small river flows through a nearly untouched wilderness canyon with granite boulders and tall cliffs rising up to high peaks of the northern Sierra.

The upper North Fork of the Molelumne flows 25 miles from Highland Lakes, south of Ebbetts Pass on Highway 4, west to the

slackwater of Salt Springs Reservoir. Rugged, forested country beneath volcanic peaks of the central Sierra yield heavy snowmelt to the upper river, which winds through the meadows and forests of Hermit Valley before dropping into a deep canyon of waterfalls and cascades. This spectacular wild reach has limited trail access for 7 miles. At lower elevations, a trail follows the canyon for 9 miles to the inlet of the reservoir.

The corridor above Salt Springs is all in the Eldorado National Forest, and much of the upper basin lies in the Mokelumne Wilderness Area.

The North Mokelumne is a rare example of a central or northern Sierra stream that does not have dams and hydroelectric diversions at high elevations, and it is one of the most significant wild Sierra streams that is not protected in the National Wild and Scenic Rivers system.

Downstream from Salt Springs Reservoir, another 18-mile canyon reach continues past Devils Nose to Tiger Creek Reservoir. This is a fine reach for whitewater boating and trout fishing, and releases from Salt Springs Reservoir have recently been improved for fish and recreation. Below Tiger Creek Dam, the river enters foothills terrain and its gradient lessens. This reach also offers a popular whitewater boating run before entering Pardee Reservoir in the lower foothills.

Redwood Creek

Undammed and undeveloped except for its lowest reaches, Redwood Creek passes some of the tallest redwood trees and offers a rare opportunity to restore a sizable coastal stream to its native, natural abundance.

This 60-mile-long stream flows from the crest of the Coast Range westward through Redwood National Park to Orick and the Pacific Ocean. Though many reaches have been heavily logged and the upper basin has many unimproved roads, the lower 18 miles flow through Redwood National Park. Much of this mileage has been logged as well, but uncut sections include some of the tallest trees on earth in the Grove of the Giants, and remote side-canyons hide other very large trees. Much of the national park frontage is accessible only by trail.

The river's estuary has been heavily riprapped and leveed for 3.5 miles near the town of Orick, but efforts are underway to consider restoration of the once-rich wetlands here. Despite these limitations, this completely undammed stream still provides for chinook and steelhead, and has one of the better coho runs in the state. Entering the lower reach, Prairie Creek is a fine tributary draining Prairie Creek State Park and some of the most magnificent of all redwood groves. These are easily reached by a trail system along the creek and through the park.

Redwood Creek offers one of the more challenging but significant opportunities to restore a key river of the redwood belt and an undeveloped and undammed waterway on the West Coast.

Rock Creek (Owens River tributary)

The premier stream of the southeastern Sierra Nevada, Rock Creek flows from high peaks and through a stunningly beautiful valley surrounded by high-country, meadows, and Sierra forests.

The creek runs for 15 miles from the heights of the range northward to the Owens River. Beginning in glacial cirques on the north side of Bear Creek Spire—a central Sierra landmark that rises to 13,713 feet--Rock Creek's headwaters gather in a cluster of pristine tarns and lakes. The stream cascades over waterfalls notched into solid granite and then courses onward. Unlike most other east-side streams that plunge directly off the escarpment, Rock Creek flows north between the towering Sierra crest to the west and the massive north-south barrier of Wheeler Ridge to the east. After the upper 6 miles, the stream is road-accessible to the mouth of the canyon at Tom's Place, east of Lake Crowley, with many campgrounds and picnic areas.

Popular for its introduced trout fishery, Rock Creek canyon also offers remarkable backpacking opportunities with a network of trails that run the length of the stream and also climb to high country on the west and east sides. The entire corridor lies in the Inyo National Forest. The only other sizable stream flowing from the southern Sierra's escarpment is Bishop Creek, which has been intensively developed for hydroelectric power.

Sacramento River, upper and middle as two separate sections

This largest river in California has a semi-wild section of outstanding whitewater and trout habitat above Shasta Dam and an exceptional low-elevation, big-channel, healthy riparian reach between Redding and Red Bluff.

As the second-largest river on the West Coast, the Sacramento carries one-third of all the runoff in California and flows south from Mount Shasta to tidewater at the city of Sacramento, then finally wends westward through the Delta to San Francisco Bay. The river is 377 miles long in all.

The upper Sacramento begins with runoff from the Trinity Alps to the west and Mount Shasta to the east and is soon impounded at Box Canyon Dam. Below this it flows through 36 miles of splendid Class III and IV rapids. This reach is a biologically productive and popular trout fishery, but its otherwise wild character is compromised by Interstate 5, cutting through the mountains nearby, and by a busy railroad that was built within the canyon. The upper river plunges through this deep, forested pathway to the backwaters of the largest reservoir in the state, impounded by the 600-foot-high Shasta Dam. Below it, a fine 56-mile-long reach flows from Redding to Red Bluff the second outstanding section of this major California artery.

The first 31 miles downstream from Redding have a healthy riparian corridor of cottonwoods and willows. In this reach, 15,000 acres of the entire Sacramento's 800,000 acres of original riparian forest remains (nearly all the rest has been lost). Much of the land is privately owned. Then a 25-mile long reach ending at Red Bluff flows past volcanic cliffs and natural shorelines unaffected by levees. Vernal pools in this corridor support rare plant species, and the riverfront is heavily used by waterfowl and sandhill cranes. Much of this section is owned by the Bureau of Land Management, which

plans to acquire more acreage from willing sellers as it becomes available.

A series of fine tributaries enters the middle Sacramento, including Battle Creek, where a 15-mile stretch north of Red Bluff features calm water flowing through healthy riparian habitat. South of Battle Creek, Paynes Creek flows through an undeveloped 7-mile gorge before joining the Sacramento. Antelope, Mill, and Deer Creeks follow consecutively to the south (see A and B sections), entering the Sacramento below the Red Bluff diversion dam. From the west, Clear and Cottonwood Creeks enter the Sacramento north of Red Bluff and have surviving salmon runs that are benefiting from ongoing restoration efforts. Farther south, Big Chico Creek enters the Sacramento from the east, followed by Butte Creek. Both have chinook salmon runs that are benefiting from restoration efforts.

The entire Redding to Red Bluff reach of 56 miles constitutes the only section of the Sacramento below Shasta Dam remaining in a relatively natural condition. With its ample flows, low elevation, and mild climate, this middle Sacramento gem offers an important riparian refuge for wildlife. Threatened or endangered runs of salmon and steelhead migrate up the river, which continues to support all four runs of chinook salmon and most of the other native fish species. Bald eagles, ospreys, and river otters are also present. The middle Sacramento also offers an outstanding canoeing route with fine campsites, year-long flows, and no major rapids—a rare combination in the West.

Below the Red Bluff Diversion Dam, levees line the river but a riparian corridor can still be found along some of the mileage, with occasional oak savanna grasslands above the floodplain where farmlands don't directly encroach. On this lower river, levees constrain the river for 69 miles as it flows toward the city of Sacramento. Below there, the tidal river winds through its delta for 83 miles to California's largest estuary--San Francisco Bay.

Santa Margarita River

With no dams on its main stem, the Santa Margarita is one of the last free-flowing rivers in southern California and has great biological diversity in its channel, floodplain, and watershed.

Just north of Fallbrook, the 27-mile-long river is formed by the confluence of Temecula and Murrieta Creeks. Cutting through the foothills of the Santa Margarita Mountains, the stream enters a rugged gorge and then crosses the coastal plain at the Pendleton Marine Corps base before entering the Pacific.

Widely recognized for its biological diversity in a region where little undisturbed native habitat can be found, the river corridor supports a multitude of species: 500 plants, 236 birds, 52 mammals, 43 reptiles, 26 fishes, and 24 aquatic invertebrates. This is considered the highest density and diversity of bird species along the south coast of California. The riparian edge also supports a large share of the nation's entire population of endangered Least Bell's vireos. Coastal wetlands along the lower river support imperiled bird species including the light-footed clapper rail, Belding's savannah sparrow, and California least tern. The estuary still has the largest native population of arroyo chubs—a fish once abundant throughout southern California but now rare. Much of the stream, however, is dominated by exotic redeye bass.

The Bureau of Land Management has found a small segment of the river eligible for National Wild and Scenic River designation, and the 4,000-acre Santa Margarita Ecological Reserve connects two parcels of BLM land lying upstream from the Pendleton base. Much of the river is closed to public access because of military use.

The Santa Margarita's relatively healthy flows may be threatened by massive suburban development occurring in the headwaters.

Shasta River

Owing to its critical location draining the north face of Mount Shasta, this small river may be important as a cold-water refuge for fish and other aquatic life in the coming age of warming climate.

Collecting snowmelt, rainfall, and ample spring flows from the northwestern slopes of Mount Shasta, this little-known river flows north to the Klamath. The 14,162-foot Mount Shasta—once thought to be the highest mountain in the United States—is the secondloftiest peak in the entire Cascade Range and the highest peak in California north of the Palisades in the southern Sierra Nevada. Because of its great height and its alignment with the path of wet storms that arrive from the north Pacific throughout the winter months, Shasta is the only mountain in the state where snowfall is increasing and glaciers are advancing. While global warming poses dire conditions for streams throughout the California and the West, the Shasta River may stay relatively cold because of the snowmelt and glacial runoff that are predicted to continue. This small and little-known river may become a critical refuge for fish and aquatic life needing cold water in the future.

Beginning a few miles south of the town of Weed, the river collects streams flowing westward from Shasta and also eastward from the Scott Mountains. Augmented with major spring flows, the river drops north to Lake Shastina—a 3-mile-long reservoir for irrigation supplies. Then the stream meanders in tight bends through pastures, hayfields, dry lands covered with sage, riparian thickets of willows, and lava beds until it pitches more steeply down to the Klamath River just west of Interstate 5.

Unlike most other rivers with great natural values, the Shasta is almost wholly owned by private landowners. Most of the stream corridor is open ranchland rather than the forests that characterize much of the Klamath watershed. Yet very little of the land is developed, and development pressure is not likely to be great in the future. Salmon still migrate here from the ocean; the Nationwide Rivers Inventory states that the Shasta River is the most important spawning tributary in the entire Klamath drainage.

If this stream could be restored to more natural conditions, its rare and irreplaceable cold-water refuge would be secured in the coming age of global warming. In recent years the Nature Conservancy has acquired nearly 5 miles of river frontage—a significant tract but a small portion of the whole river.

Sisquoc River

A rare wild river in the coast ranges of southern California, the Sisquoc flows in a remote, rugged canyon and valley of dense forest and chaparral hidden by high ridgelines on both sides.

The Sisquoc gathers it headwaters on the flanks of the 6,828-foot Big Pine Mountain, which marks the junction of three major coastal mountain ranges, and runs northwest 33 miles between the high paralleling ridges of the Sierra Madre Mountains to the northeast and the San Rafael Mountains to the southwest, eventually reaching the boundary of Los Padres National Forest. This entire upper reach lies within the massive San Rafael Wilderness--second-largest on the southern California coast.

Trout are found in the river and its tributaries though the main stem is largely overrun by exotic redeye bass. The entire upper basin offers prime habitat for the endangered California condor. Mountain lions, bears, ring-tailed cats, and other wildlife are also found in this mountainous terrain. A complex mix of plant life includes Coulter pine, big-cone Douglas-fir, Jeffrey pine, ponderosa pine, California white oak, Freemont cottonwood, California sycamore, and the southernmost stand of rare Sargent cypress.

Downstream from the national forest boundary, on private land, the river is heavily diverted for agriculture and flows intermittently. For much of its lower 20 miles, however, the Sisquoc's riverbed winds through a striking landscape of cottonwood and sycamore trees, oak savanna, and rolling pasture to the confluence with the Cuyama River. This also dries up in the summer before reaching the Pacific west of Santa Maria.

Stanislaus River, North Fork

As it flows through a spectacular, middle-elevation reach with green forests and granite bedrock into an impassable lower canyon, the North Fork Stanislaus offers the best remaining, dam-free section of the extensive Stanislaus River basin.

Beginning at the Sierra crest near Ebbetts Pass, the North Fork of the Stanislaus flows west to its confluence with the Middle Fork, which it reaches 2 miles above the backwater of New Melones Reservoir. Headwaters tumble out of the Carson-Iceberg Wilderness but are then impounded behind Spicer and Utica Dams. Though downstream flows are manipulated by these reservoirs, the next 30 miles flow dam-free through wild reaches of the middle-elevation Sierra, including low domes of granite, great cliffs, and deep forests of fir and pine. Several bridges cross the river, but no roads parallel the shores. Steep and complex rapids make this reach a favorite among expert kayakers.

The North Fork flows through Calaveras Big Trees State Park the finest northern grove of giant sequoias—and then drops into deeper canyons of mixed forest and chaparral with house-sized boulders and long chains of waterfalls before meeting the Middle Fork Stanislaus.

The Forest Service has recommended designation of the remaining free-flowing section of the North Fork Stanislaus in the National Wild and Scenic River system.

Trinity River, with North and South Forks and New River

As the Klamath's largest tributary, the Trinity flows for many miles downstream from its large, upper basin reservoirs, supports residual runs of salmon and steelhead, and has several exceptional wild tributaries.

The river begins in the Trinity Alps west of Mount Shasta and flows west and north to the lower Klamath at Weitchpec. The upper river is blocked by Trinity Dam, which forms the third largest reservoir in California. Lewiston Dam, built just downstream, diverts more than half of the river's flow southward. Below these dams, however, the Trinity flows free for 111 miles to the Klamath, which then continues unimpeded to the ocean.

Above the North Fork, intensive gold mining created enormous piles of waste debris, but with the North Fork's significant flow, the Trinity becomes much wilder. Entering not far downstream, the New River is a mostly wild tributary that flows from the Trinity Alps Wilderness. Both the North Fork and New River have runs of summer steelhead, an indication of good water guality. The Trinity next drops through the 8-mile long Class V Burnt Ranch Gorge before easing into 39 miles of gentler water.

Joining the main stem in this reach, about 5 miles upstream from the town of Willow Creek, is the South Fork, the Trinity's largest tributary. Gathering its headwaters in the Yolla Bolly Wilderness, the South Fork flows 26 miles west and then north, mostly through national forest land to Highway 36. Below there, 55 miles are designated in the National Wild and Scenic Rivers system. Though much of the riverfront land is publicly owned, there are occasional tracts of private land, especially along the lower river.

The South Fork Trinity hosts steelhead, chinook, and coho. Though the basin has seen heavy logging, burning, and debris flows, it is recovering and has great potential as a refuge for native fish.

The South Fork National Recreation Trail, several other trails, and occasional unimproved roads provide access for anglers, hikers, and residents. Completely undammed, the South Fork flows through deep coniferous and mixed forests in steep canyons with boulders and exposed bedrock.

The main stem Trinity below Lewiston Dam, the North Fork, and lower South Fork are all designated in the National Wild and Scenic Rivers system. Most of the basin lies in the Trinity National Forest, but many private tracts and mining claims border the river.

Yuba River, North and South

Though impounded twice and depleted by diversions, the South Yuba remains a magnificent small river of the northern Sierra with wild reaches, excellent whitewater, and superb pools for swimming in the hot foothills zone near Nevada City. Restoration efforts could someday make this an important river for salmon and steelhead.

Beginning in Yuba Pass, the North Yuba River flows west for 45 undammed miles to Bullard's Bar Reservoir. With wooded shorelines, class III –V whitewater, and a good trout fishery, the river retains a surprisingly wild character even though Highway 49 follows the route closely. The South Yuba River rises in Donner Pass and flows 64 miles down the western slope of the Sierra Nevada to its confluence with the Middle Yuba at the head of Englebright Reservoir. In upper reaches, Interstate 80 follows the river, but then the highway bends south and the South Yuba is left to tumble in a more remote course. The river is dammed high in its basin; Spaulding Reservoir catches massive snowmelt runoff for hydroelectric generation and for diversion south through tunnels to the Bear and North Fork American basins.

Despite the diversion, the river downstream from Spaulding drops through spectacular, rugged, roadless canyons 1,200 feet deep. Several bridges cross the river, and trails parallel much of its length. In middle reaches near Nevada City, the river is heavily used by swimmers, anglers, and whitewater boaters in the springtime.

The 39-mile-long reach from Spaulding to Englebright Reservoir was protected in the California State Scenic Rivers system after a concerted campaign by the South Yuba River Citizens League, which opposed plans to dam parts of this reach for hydropower and water supply. Half the river frontage in this section is publicly owned and managed as Tahoe National Forest, Bureau of Land Management property, or state parks. Since 1984, the California Department of Parks and Recreation has been actively acquiring important riverfront tracts in the 21-mile stretch upstream from the river's mouth, aiming to link existing park units and create a larger river-centered state park. Private land and industrial forest property remain through this reach.

The main stem of the Yuba still has residual but surviving runs of fall and spring chinook—one of few Sierra rivers that retains this vital foundation of its ecosystem. If efforts of the South Yuba River Citizens League and other groups are someday successful and the low-head Daguerra Dam on the main stem and the 261-foot-high Englebright Dam (built only for the collection of silt resulting from gold mining) are removed, the Yuba could offer prime opportunities for restoration of salmon and steelhead habitat.

CONCLUSION

With its unparalleled diversity of geography and biology, its vast regions of lightly populated landscape, and its high degree of protection owing to one hundred years of path-breaking conservation work, California still has an extraordinary estate of natural rivers.

Using eighteen lists of rivers compiled by other organizations or by agencies, plus several interviews with experts familiar with the biology of California's rivers, we have listed 198 rivers with notable natural qualities and then selected 56 of these as exceptional. We sorted these into an "A" category of 17 rivers plus several small Smith River tributaries, a "B" list of 21 rivers, and a "C" list of 18.

The best rivers are concentrated in two large regions: the North Coast in the northwestern quarter of the state, and the Sierra Nevada. To a lesser degree, the middle Sacramento, from Redding to Red Bluff, along with a suite of tributaries still hold important natural values in spite of many problems, and restoration efforts raise the possibility that this cluster of waterways could be the basis of a recovering salmon and steelhead fishery. A discussion of these three "regions" of high quality rivers follows.

North Coast Rivers

With rugged mountains, heavy precipitation, dense forests, lowpopulation, and surviving salmon runs, the North Coast's rivers are a particularly remarkable set.

California's northernmost river—the Smith—is the most intact and the most protected sizeable stream in the state, with no dams and little development. It forms an ideal basis for a vast region of natural rivers. Just to its south, the enormous basin of the Klamath has many qualities remaining, and the possibilities for restoration to outstanding natural conditions are feasible and promising, though significant challenges exist. Along with the Salmon and Trinity Rivers, a number of smaller Klamath tributaries remain in pristine condition and can be protected at relative little political and economic cost. South of the Klamath, Redwood Creek offers additional restoration potential, flowing through some of the tallest groves of trees on earth. Farther south, the Eel basin, and especially its Middle Fork, retain vital natural functions and could be further protected before development pressures grow larger. Immediately south and west of the Eel, the Mattole River offers a unique opportunity to protect a river flowing in an isolated valley to the edge of the Pacific.

Together, these rivers of the North Coast constitute one of the single greatest concentrations of natural or semi-natural rivers in the West and in America. The region also joins seamlessly with the exquisite Siskiyou complex of rivers in southwestern Oregon, including the Chetco, Illinois, Rogue, South Fork Coquille, and Elk. With few dams, much land already in public ownership, good water quality, surviving runs of anadromous fish, and less development pressure than almost any other area similarly endowed with rainfall and runoff, this region clearly offers one of the most important opportunities for the conservation of natural rivers nationwide. Thanks to National Wild and Scenic River designations, most of the rivers here are already protected from future damming. Much, however, remains to be done: restoration of degraded riparian areas, reinstatement of flows, timber harvest reforms, and acquisition of private land or easements to protect sensitive watersheds and prevent damaging development.

Sierra Nevada Rivers

The second stellar region of natural rivers in California is the Sierra Nevada—especially the southern Sierra.

Though dams block the flow of virtually all Sierra rivers in foothill elevations and thereby truncate the historic runs of salmon and steelhead, the upper reaches of many streams remain breathtaking in their beauty and valuable for their natural qualities of clean, abundant water, and wild, forested shorelines. Most of the upper basins of the Sierra streams are publicly owned as national forests or national parks, and many of the finest reaches are protected within wilderness areas.

Rivers of the northern Sierra from the Feather through the Stanislaus are exquisitely beautiful, but many have dams at middle

and even at high elevations. Roads are also more prevalent here, with 7 of 9 major roaded passes over the 400-mile-long mountain chain crossing in the north. For this reason, private lands are also mixed with public property, frequently dating to railroad land grants across a few broad swaths in these watersheds and also to mining claims staked decades ago on public land. The opportunity and the need to protect these lands through acquisition of private property—usually owned by forest industries—are great in the northern Sierra.

While the Middle Fork of the Feather is the flagship river of quality in the northern half of the range, outstanding streams in consecutive order to the south are the North Yuba, South Yuba, North Fork American, South Fork American, lower Cosumnes, upper North Fork Mokelumne, and the North Fork Stanislaus along with its Middle and South Forks to a lesser degree. Back-to-back, the upper basins of these rivers constitute one of the most contiguous masses of semi-wild land, pristine headwaters, and beautiful mountain terrain in America.

For its intrinsic mountain qualities, the northern Sierra is outdone only by the southern Sierra. From the Tuolumne River southward, no highways cross the formidable fault-block of mountains for 140 miles. Most of the high terrain through this reach is designated wilderness. The Tuolumne, Merced, San Joaquin, Kings, Kaweah, and Kern constitute a unique and unrepeatable collection of wild, high-mountain rivers. Nearly all this river mileage is now protected against further damming, and most of the land is publicly owned. However, as these rivers flow through the biologically rich, lowerelevation foothills zone, they are heavily degraded and vulnerable to further development threats.

Middle Sacramento Streams

The 56-mile-long reach of the Sacramento between Redding and Red Bluff is the only remaining reach of this great Central Valley waterway lacking levees. A fine riparian corridor of cottonwoods and willows remain—rare for low-elevation rivers in the West. Below the low diversion dam at Red Bluff, additional mileage offers good riparian habitat, though the influence of levees and nearby farming is greater. Throughout the lower and middle Sacramento, four runs of chinook salmon still migrate upstream to spawning grounds. These constitute a fraction of the historical numbers but represent viable populations that are critical to the survival of these species.

Several tributaries within the Redding-Red Bluff reach and also joining the Sacramento not far downstream from this section still retain natural qualities, provide salmon spawning habitat, and are largely undammed. Lower elevations of these basins are mostly privately owned, and all these streams have restoration needs. Nonetheless, as a group, these waterways present an intriguing opportunity to save the last semi-natural habitat of the Sacramento River system lying within and near the Central Valley. It may be possible to restore this group of streams so that they can function again as robust contributors to a once-great riparian ecosystem.

Rating highest in fishery and natural values, Deer Creek, entering the Sacramento from the east between Red Bluff and Chico, might be regarded as the core of this tributary cluster. The next major stream to its north, Mill Creek, is likewise rated as an excellent stream. Consecutive major basins to the north are Antelope, Paynes, and Battle Creeks—all with high ratings from sources used in this survey. Flowing from the Yolla Bolly Mountains on the west side of the Central Valley and joining the Sacramento north of Red Bluff, Cottonwood Creek is a major tributary with high values identified by the Nationwide Rivers Inventory, Bureau of Land Management, and State Department of Fish and Game. Farther to the south, Big Chico Creek is a fine west-side tributary of the Sacramento and has been the subject of a Western Rivers Conservancy protection and restoration project, and Butte Creek lies just to its south.

Unlike the other clusters of natural rivers in California on the North Coast and in the Sierra Nevada, this nexus of streams includes large expanses of privately owned land.

Taken singly or together, these Sacramento tributaries present a challenging but promising opportunity to restore salmon and waterfront habitat in a once-rich region that has been heavily affected by intensive farming and ranching. However, any restoration efforts for anadromous fish are also dependent on water diversion, pollution, and other problems based downstream in the Sacramento-San Joaquin Delta, which the fish must pass through to reach the middle river and its tributaries. How these problems will be resolved is difficult to predict given the massive growth in population projected for California over the next 40 years.

Beyond the North Coast, Sierra, and middle Sacramento clusters of outstanding streams, the rivers of greatest natural value in California are relatively isolated from each other. Some streams do have adjacent rivers of quality, such as the Big Sur River with the Little Sur River, and Sespe Creek with Piru Creek, but overall, the regional connections have been lost. Hat Creek, McCloud River, Cache Creek, Big Sur River, Sisquoc River, Sespe Creek, Santa Margarita Creek, and Amargosa River are all of exceptional value—especially biologically—though they are not part of large, contiguous regions of rivers. This isolation makes their protection even more critical, as the other rivers in their regions have been degraded to a degree that they do not appear on this list.

Rivers of Oregon

When the vester third of the state and also on the high mountains of the interior, with salmon still returning to natal streams, and with a great variety of landscape, Oregon is a state of magnificent and vital rivers.

The Coast Range of low, green, rain-soaked mountains runs the length of the state and gives rise to dozens of waterways; perennial streams enter the ocean nearly every one-to-five miles, including 26 major rivers. While 95 percent of the coast range has been logged, and only a few small streams remain pristine, important and exceptional coastal rivers remain. Only 3 rivers cross the whole way through the coastal mountains—the Columbia, Umpqua, and Rogue (the Siuslaw nearly does this, flowing from a low gap that almost reaches the Willamette Valley of the interior.

Forming the northern border of western Oregon, the Columbia fourth-largest river on the continent--flows from 7 states and British Columbia. The Willamette flows north to the Columbia, picking up small streams draining the east side of the Coast Range and—with far more water--the plentiful streams of the Cascade Mountains' west side. These include 9 major rivers and many forks and smaller streams. Water draining from the drier, east side of the Cascades flows into the Deschutes River in the north or the Klamath in the south. The eastern half of the state gets relatively little rain and snow but includes the north-flowing John Day, Umatilla, and Grande Ronde systems, the east-flowing Malheur and Owhyee Rivers in the southeast, and several landlocked basins in the south-central desert.

Most rivers in Oregon are, or were, salmon and steelhead streams, and the survival of these important fish—as well as many others--depends on having healthy rivers.

Extraordinary rivers in this state include the Rogue—one of the classic western rivers, popular for river running and fishing. The

Illinois is a tributary to the Rogue and one of the wildest streams of the West Coast. The Elk is one of the finest salmon and steelhead streams of its size on the entire West Coast south of Canada. Cascade rivers including the Umpqua, Sandy, and Metolius are permier streams of the Pacific Northwest. The Deschutes, John Day, and Owyhee are excellent rivers of the drylands. At the eastern border of the state, the Snake River flows through Hells Canyon—one of the deepest in America.

Much of the state is only lightly developed, and so many rivers survive in relatively good natural condition. Yet because of logging, grazing, farming, fish hatcheries, poorly executed development, and the spread of exotic species, few rivers remain in pristine condition.

Completely intact ecosystems, without a history of logging, damming, road building, or development, are extremely rare. The small basins of Cummins Creek, Rock Creek, and French Pete Creek are among the few that meet this stringent criteria. Additional streams that are virtually unaffected by people lie completely within wilderness or roadless areas, but these tend to be small and therefore are not generally highlighted in this survey.

Oregon's rivers are well-represented in the National Wild and Scenic Rivers system, owing largely to an omnibus wild and scenic act in 1988 that designated 53 rivers and tributaries. This added to several earlier designations, including the Rogue—one of the initial national rivers--and the Illinois, an exceptional wild river designated in 1984. Portions of all "A" rivers identified in this survey have been designated in the National Wild and Scenic Rivers system. However, most of these rivers, except for the Metolius, Salmon, North Fork Smith, and Wenaha, also have long reaches undesignated in the Wild and Scenic system. Stewardship of privately owned riverfronts whether in the national rivers system or not--is vital to the overall health of all these streams.

Great Rivers of Oregon



WRC Oregon Project Locations
 Oregon Great Rivers

- 1 Chetco River
- 2 Clackamas and Roaring Rivers
- 3 Coquille River, South Fork
- 4 Cummins, Rock, and Tenmile Creeks
- 5 Deschutes River
- 6 Donner und Blitzen River
- 7 Drift Creek
- 8 Eagle Creek
- 9 Elk River with North and South Forks
- 10 French Pete and Separation Creeks
- 11 Grande Ronde River, lower
- 12 Hood River
- 13 Illinois River
- 14 Imnaha River and South Fork
- 15 John Day River and North Fork
- 16 John Day River, Middle Fork
- 17 Joseph Creek
- 18 Kilchis River
- 19 McKenzie River, upper
- 20 Metolius River
- 21 Minam and Lostine Rivers
- 22 Nehalem and Salmonberry Rivers
- 23 Nestucca River
- 24 Owyhee River and Middle and North Forks and West Little Owyhee
- 25 Rogue River
- 26 Sandy and Salmon Rivers
- 27 Siletz River
- 28 Smith River, North Fork (in California's Smith River basin)
- 29 Smith River, North Fork (in Umpqua River basin)
- 30 Snake River in Hells Canyon
- 31 Sycan River
- 32 Umpqua River with South Fork
- 33 Umpqua River, North, and
- Steamboat Creek
- 34 Wassen Creek 35 Wenaha River
- 36 White River
- 37 Whitehorse and Little
- Whitehorse Creeks
- 38 Willamette River, North Fork of Middle Fork

Sources for the Oregon Survey

In addition to the major sources described at the outset of this report, the Oregon survey relied on the following state-specific sources:

Interviews with biologists and local experts (B#).

Leslie Bach, Oregon Nature Conservancy, Director of Freshwater Programs

Brett Roper, U.S. Forest Service, Fish and Aquatic Ecology Unit, Aquatic Monitoring Center Program Leader

Jack Williams, senior scientist, Trout Unlimited

Jeff Dose, U.S. Forest Service, fisheries biologist, Umpqua National Forest

Stan Gregory, Oregon State University, Professor of Fisheries, Dept. of Fish and Wildlife

Dave Moskowitz, fish conservation policy consultant

Jeff Rodgers, Oregon Department of Fish and Wildlife, Oregon Plan Monitoring Coordinator

Malin Pinsky, Wild Salmon Center, Science and Conservation Program

Dave Heller, U.S. Forest Service, Regional Fisheries Program Leader

American Fisheries Society (A1, A2). This group featured an article titled, "A Survey of Healthy Native Stocks of Anadromous Salmonids in the Pacific Northwest and California," by Charles Huntington, Willa Nehlsen, and Jon Bowers in the March 1996 issue of its journal Fisheries. The article identified the healthiest stocks of salmon and steelhead for California and the Northwest. These are listed in our survey as A1, indicating streams where existing runs are considered to be "at least two-thirds as abundant as would be expected in the absence of human impacts," and A2, indicating streams where the runs are no less than one-third the size of their pre-settlement estimates.

Oregon Rivers Council (O). In 1988, the Oregon Rivers Council, a conservation organization that later became the Pacific Rivers

Council, prepared a 137-page report with 2-to 3-page descriptions of 45 different rivers recommended for National Wild and Scenic designation. This report offers in-depth information about many of the finest rivers in Oregon (Oregon Rivers Council, Omnibus National Wild & Scenic River Bills, 1988).

Oregon Biodiversity Project (OB). This collaborative effort to identify opportunities and strategies for biodiversity conservation in Oregon produced an extensive report that includes streams of special value (Oregon's Living Landscape. Washington, D. C.: Defenders of Wildlife Publications, 1998).

Oregon Natural Resources Council (ON). This statewide conservation group has identified important areas and streams having exceptional values related to wildlands in its publication Oregon Wild: Endangered Forest Wilderness. Portland: ONRC, 2004. This organization is now called Oregon Wild.

SiskiyouProject(SP). The SiskiyouProject, a regional conservation organization based in southwest Oregon, has proposed a "Siskiyou Wild Rivers National Momument," which includes parts of 5 major Oregon rivers.

Trout Unlimited (TU). This national conservation organization has highlighted streams that support important Oregon native fisheries in its publication, Where the Wild Lands Are: Oregon (Pollock, ID: Trout Unlimited Public Lands Initiative, 2006).

Key to Oregon Rivers Table

SOURCE OF RECOMMENDATION

A1- American Fisheries Society (3/96) best salmon/steelhead streams (2/3 original abundance)

A2- American Fisheries Society (3/96) good salmon/steelhead

streams (1/3 original abundance)

B#- interview with biologists and local experts

B1- Leslie Bach, Oregon Nature Conservancy

B2- Brett Roper, U.S. Forest Service B3- Jack Williams, senior scientist, Trout Unlimited B4- Jeff Dose, U.S. Forest Service B5- Stan Gregory, Oregon State Univ., fish biologist B6- Dave Moskowitz, conservation consultant B7- Jeff Rodgers, OR Dept. of Fish & Wildlife **B8-** Malin Pinsky, Wild Salmon Center **B9-** Dave Heller, U.S. Forest Service BL- Bureau of Land Management **BO-**Bureau of Outdoor Recreation C- Columbia Interior Basin Ecosystem Management Plan F-U.S. Forest Service I – USDI/USDA Wild and Scenic Rivers list, 1965 N-Nationwide Rivers Inventory O- Oregon Rivers Council **OB-** Oregon Biodiversity Project ON- ONRC, Oregon Wild P-Portland Audubon, Important Bird Areas S- State-designated Wild and Scenic SP- Siskiyou Project **TU-Trout Unlimited** W-National Wild and Scenic Rivers Ws-National Wild and Scenic study rivers WRC-Western Rivers Conservancy

BEST SOURCES: A1, B#, I, N, O, W

QUALITIES

B- Biological Diversity
E- Endangered or imperiled species
F- Fish
G- Geological/geographical
L- Long free-flowing reach >100 miles
L+- Long free-flowing reach, combined with streams it flows into
P- Plant life/ riparian values
Rf- Recreational fishing
Rh- Recreational hiking
Rr- Recreational river running
WL-Wildlife
WN- Wildness

ECOREGIONS

CF- Cascade Forest (M242) IS- Intermountain Semi-Desert (342) MR- Middle Rockies (M332) PL- Pacific Lowland (242) SS- Sierran Steppe (M261)

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Abiqua Cr	Pudding	BO		R	CF		
Alsea	Pacific	A2, BO, F, N, O, S		F, Rf	CF		
Alsea, North Fk	Alsea	N		F, WL	CF		
Alsea, South Fk	Alsea	N		G	SS		
Applegate	Rogue	A2, OB		B, F	SS		
Baldface Cr	Smith, North Fk (in CA)	F		F, WN	SS		
Barnes Valley Cr	Lost R/Tule Lk	Ν		G	SS		
Bear Cr	Willamette, Coast Fk	Ν		F, Rf	CF		
Big Cr	Pacific	Р		E, WL	CF		
Big Marsh Cr	Crescent Cr	N, W, ON		Rr, P, WL, WN	CF		
Bitter Lick Cr	Elk Cr/Rogue	ON		Rh, WN	CF		
Blue	McKenzie	Ws		Rf	CF		
Boulder Cr	N. Umpqua	F, N, OB	{	F, WN	CF		
Breitenbush	Little North Santiam	F, N	N	E, F, G, P, Rf, Rh, Rr, WL	CF		
Breitenbush, North Fk of North Fk	Breitenbush, North Fk	F, N		G, P, Rh,	CF		
Breitenbush, South Fk	Breitenbush	F, N		G, P, WN	CF		
Browns Cr	Deschutes	F, N		F	CF		
Bull Run (upper)	Sandy	B5		F	CF		
Burnt	Snake	BL, O		F, WL	MR		
Butte Cr	Pudding	BO		R	CF		
Calapooia	Willamette	BO	}	R	CF		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Canton Cr	N. Umpqua	N		F	CF		
Canyon Cr	Josephine Cr/Illinois	F		F, Rh, WN	SS		
Castle Cr	Rogue	F		F	CF		
Chetco	Pacific	B3, B6, BO, N, O, S, SP, TU, W	N, O, Si	B, E, F, G, P, Rf, Rh, Rr, WL, WN	SS, CCS	В	
Chetco, North Fk	Chetco	N, OB		E, F	SS		
Clackamas	Willamette	B1, BO, F, N, O, ON, S, TU, W	Ν, Ο	E, F, G, N, P, Rf, Rh, Rr, WL, WN	CF, PL	С	
Clackamas, North Fk	Clackamas	B9, F, N, S		E, F	CF		
Clackamas, Oak Grove Fk	Clackamas	N, F		Е, Р	CF		
Clackamas, South Fk	Clackamas	F, N, S, ON		E, F, WN	CF		
Collawash	Clackamas	B9, BO, F, N, O		E, F, G	CF		
Coos	Coos Bay/Pacific	OB		F	CF		
Coquille	Pacific	OB		F	CF		
Coquille, East Fk	Coquille, N. Fk	A2, N		F, G, Rf, WL	SS		
Coquille, Middle Fk	Coquille, S. Fk	A2, OB		B, F	SS		
Coquille, North Fk	Coquille	A2, N, OB		B, F, P, WL	CF		
Coquille, South Fk	Coquille	A2, B3, B4, B6, F, SP, WRC	WRC	F, G, P	SS	В	
Cow Cr	S. Umpqua	N		F, Rf	CF		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Crabtree Cr	S. Santiam	Ν		F, G, P, Rf, Rh, WL	CF		
Crescent Cr	Deschutes	N, O, W		F, G, P	CF		
Crooked	Deschutes	BL, BO, N, O, S, W		G, F	IS		
Crooked, North Fk	Crooked	BL, N, O, ON, S, W		F, G, Rf, WL, WN	IS		
Crooked, South Fk	Crooked	N		WN	IS		
Cummins Cr	Pacific	Р		E, F, WL, WN	CF	В	
Deep Cr	Williamson	F		F	IS		
Deschutes	Columbia	B6, BL, BO, F, I, N, S, TU, W	I, W	B, E, F, G, Rf, Rr, WL, WN	CF, IS	В	
Deschutes, Little	Deschutes	BO, N, ON, S, W		G, L+, WL, WN	CF		
Donner und Blitzen	Malheur Lk (landlocked)	B3, BL, O, S, TU, W	B3, O, W	B, E, G, Rh, WN	IS	В	
Drift Cr	Alsea	A2, F, N	Ν	E, F, G, P, Rh, WL	CF	С	
Eagle Cr	Clackamas	BO, N		F, Rf, WL, WN	CF		
Eagle Cr	Columbia	F, ON		G, Rh, WN	CF	С	
Eagle Cr	Powder	BO, F, W		F, G, P, Rf, Rh, WN	MR		
Eagle Cr, East Fk	Eagle Cr/Powder	F		Rh	MR		
Ecola Cr	Pacific	OB		В	CF		
Elk	Pacific	B3, B4, B6, BO, O, OB, ON, S, SP, TU, W	all	B, E, F, G, P, Rf, WL, WN	SS	A	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Elk, North Fk	Elk	S, SP, W	W	B, E, F, G, P, WL, WN	SS	А	
Elk, South Fk	Elk	0, S, SP	0	B, E, F, G, P	SS	А	
Elkhorn Cr	Little North Santiam	N, ON, W		F, P, WL, WN	CF		
Fall Cr	Alsea	Ν		F	CF		
Fall	Deschutes	F, N, S		F, G	CF		
Fifteenmile	Columbia	B1, ON, Ws	}	F, WN	IS		
Fish Cr	ClaCramas	F, N		F	CF		
Fish Cr	Lake Cr/ Suislaw	Ν		F	CF		
French Pete Cr	McKenzie, S. Fk	B5, BO, OB		B, P, WN	CF	С	
Grande Ronde	Snake	BL, BO, C, N, O, S, TU, W	N, O, W	F, G, L, Rf, Rr, WL, WN	MR	С	
Greenleaf Cr	Lake Cr/ Suislaw	N		F	CF		
Hershberger Cr	Rogue	F			CF		
Hood	Columbia	WRC		E, F, G	CF	С	
Hood, East Fk	Hood	F, N, TU		E, F, G, P, WL	CF	С	
Hood, Middle Fk	Hood	F, N, TU	}	E, F, G, P	CF	С	
Hood, West Fk	Hood	WRC	*	E, F, G,	CF	С	
Hood, West Fk, Lake Branch	Hood, West Fk	WRC		G, Rh	CF	С	
Horse Cr	McKenzie	BO			CF		
Illinois	Rogue	B1, B3, B4, B5, B6, B8, ON, S, SP, TU, W	all	B, E, F, G, L+, P, Rf, Rh, Rr, WL, WN	SS	A	
Imnaha	Snake	B3, B5, B6, BO, C, O, OB, ON, S, TU, W	0, w	B, E, F, G, P, Rf, Rh, WL, WN	MR	A	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Imnaha, South Fk	Imnaha	O, S, TU, W	0, W	B, E, F, G, P, Rf, Rh, WL, WN	MR	А	
Indigo Cr	Illinois	B3, F		F	SS		
Indigo Cr, East Fk	Indigo Cr	F		F	SS		
Indigo Cr, West Fk	Indigo Cr	F		F	SS		
Jack Cr	Metolius	F, N		E, F, P	CF		bull trout
Jenny Cr	Klamath	ON		B, P, F, WN	IS		
John Day	Columbia	A2, B1, B3, B6, B8, BL, BO, N, S, TU, W	N, W	B, E, F, G, L, P, Rf, Rr, WL, WN	MR, IS	А	
John Day, Middle Fk	John Day, N. Fk	A2, B1, B2, B8, S, TU		F, L+	MR	В	
John Day, North Fk	John Day	A2, B2, B3, B5, B6, B8, BL, BO, N, ON, S, TU, W	B2, B3, B5	F, G, L+,Rf, Rh, WN	MR	A	
John Day, South Fk	John Day	A2, BL, S, W		F, G, L+, Rf	MR, IS		
Johnson Cr	Coquille, South Fk	F		Р	SS		Port Orford Cedar
Joseph Cr	Grande Ronde	BL, BO, N, O, OB, ON, W	Ν, Ο	B, F, G, P, WL, WN	MR	В	
Kiger Cr	Donner und Blitzen	B3, Ws		F, Rf, Rh, WL, WN	IS		
Kilchis	Tillamook Bay, Pacific	A1, B4, B6, B9, BO, N, OB		B, F, Rf, Rr	CF	В	
Klamath	Pacific	B1, BL, N, O, S		F, Rf, Rr	SS		
Lake Cr	Siuslaw	BO			CF		
Lewis and Clark	Columbia	OB	{	В	CF		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Little Wildhorse Cr	Alvord Lk	Ws		F, G, WL, WN	IS	С	
Little Silver Cr	Silver Cr	F			SS		
Little North Santiam	N. Santiam	BO, F, N, OB, S		F, P, Rh	CF		
Lobster Cr	Five Rivers	Ν	}	F	CF		
Lobster Cr	Rogue	ON		F, Rr, WN	SS		
Lostine	Wallowa	B3, B5, BO, N, OB, S, TU, W	B5, N	B, F, G, Rf, Rh, WL, WN	MR	В	
Malheur	Snake	B3, N, ON, W		F, G, Rf, Rh, WL, WN	IS		
Malheur, North Fk	Malheur	B6, ON, W		F, G, Rf, Rh, WL, WN	IS		
Malheur, South Fk	Malheur	BL		WN	IS		abandoned RR
Marten Cr	McKenzie	Ν		F	CF		
Mary's	Willamette	BO	}	L+	CF		
McDowell Cr	S. Santiam	BO		R	CF		
McKenzie	Willamette	B5, B6, BO, N, OB, ON, S, Ws		B, E, F, L+, P, Rf, Rh, Rr, WL, WN	CF	С	
McKenzie, South Fk	McKenzie	B5, BO, F, OB, S		B, F, WN	CF		
Metolius	Deschutes	B3, B5, B6, ON, S, TU, W	W	F, P, Rf, WL, WN	CF	A	
Miami	Tillamook Bay, Pacific	A2, BO		F	CF		
Miller Cr	Lost R/Tule Lk	Ν		G	SS		
Millicoma	Coos	A2, OB		F	CF		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Minam	Wallowa	N, O, OB, S, TU, W	N, W	B, F, L+, Rf, Rh, WL, WN	MR	В	
Mollala	Willamette	BO, N, S		G, Rf, Rh	PL		
Mosby Cr	Row	BO			CF		
Murderer's Cr	John Day, S. Fk	ON, TU		F, WN	IS		
Myrtle Cr	Silvies	ON		WN	IS		
Nehalem	Pacific	B5, B6, BO, N, OB, S		F, L, R	CF	В	
Nestucca	Pacific	A1, BL, BO, F, N, O, Ob, ON, S		F, Rf, WN	CF	С	
Nestucca, Little	Nestucca Bay, Pacific	A1, BO, F, N		F	CF		
New/ Floras Cr	Pacific	A2, N		E, F, G, WL	CF		
Opal Cr	Little North Santiam	B5, F, N, S		G, P, WN	CF		
Owyhee	Snake	B6, BO, S, W	W	G, L, Rr, WL, WN	IS	В	
Owyhee, Middle Fk	Owyhee	B6, BO		L+, WN	IS	В	
Owyhee, North Fk	Owyhee	B6, BL, O, W		G, L+, WL, WN	IS	В	
Owyhee, West Little	Owyhee	B6, O, W		G, L+, WL, WN	IS	В	
Paulina Cr	Deschutes	F, N		G	IS		
Pine Cr	Snake	ON		F, WN	MR		
Pistol, South Fk	Pistol	Ν		E, F, WL	SS		
Powder	Snake	BL, W		F, WL	CF		
Powder, North	Powder	ON, W		F, P, Rf, Rh, WL, WN	MR		
Pudding	Willamette	BO			MR		
Quartzville Cr	Middle Santiam	BL, F, N, W	}	F, Rf, Rr, WL	PL		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Minam	Wallowa	N, O, OB, S, TU, W	N, W	B, F, L+, Rf, Rh, WL, WN	MR	В	
Mollala	Willamette	BO, N, S		G, Rf, Rh	PL]	
Mosby Cr	Row	BO			CF	[
Murderer's Cr	John Day, S. Fk	ON, TU		F, WN	IS		
Myrtle Cr	Silvies	ON		WN	IS		
Nehalem	Pacific	B5, B6, BO, N, OB, S		F, L, R	CF	В	
Nestucca	Pacific	A1, BL, BO, F, N, O, Ob, ON, S		F, Rf, WN	CF	С	
Nestucca, Little	Nestucca Bay, Pacific	A1, BO, F, N		F	CF		
New/ Floras Cr	Pacific	A2, N		E, F, G, WL	CF		
Opal Cr	Little North Santiam	B5, F, N, S		G, P, WN	CF		
Owyhee	Snake	B6, BO, S, W	W	G, L, Rr, WL, WN	IS	В	
Owyhee, Middle Fk	Owyhee	B6, BO		L+, WN	IS	В	
Owyhee, North Fk	Owyhee	B6, BL, O, W		G, L+, WL, WN	IS	В	
Owyhee, West Little	Owyhee	B6, O, W		G, L+, WL, WN	IS	В	
Paulina Cr	Deschutes	F, N		G	IS		
Pine Cr	Snake	ON		F, WN	MR]	
Pistol, South Fk	Pistol	N		E, F, WL	SS		
Powder	Snake	BL, W		F, WL	CF]	
Powder, North	Powder	ON, W		F, P, Rf, Rh, WL, WN	MR		
Pudding	Willamette	BO		}	MR]	
Quartzville Cr	Middle Santiam	BL, F, N, W		F, Rf, Rr, WL	PL		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Quosatana Cr	Rogue	ON		WN	SS		
Rickreall	Willamette	BO			PL		
Roaring	Clackamas	O, ON, TU, W	0, W	E, F, P, Rh, WL, WN	CF	С	
Roaring, South Fk	Roaring	BO, F, N, O, S, TU	N	E, WL, WN	CF		
Rock Cr	Catlow Valley (sink)	В3		F, P	IS		
Rock Cr	Pacific	Р		F, WN	CF	В	
Rough and Ready Cr	Illinois	F, ON	ON	B, F, P, WN	SS		
Rough and Ready Cr, North Fk	Rough and Ready Cr	F		F, WN	SS		
Rogue	Pacific	A2, B1, B4, B5, B6, B8, BO, N, O, ON, S, SP, TU, W	O, W	F, G, L, P, Rf, Rh, Rr, WL, WN	SS	A	
Rogue, Middle Fk	Rogue (Lost Cr Resvr.)	F		Rh, WN	CF		
Salmon	Pacific	B3		F	CF		
Salmon	Sandy	BO, O, ON, S, W	0, W	E, F, P, WL, WN	CF	A	
Salmonberry	Nehalem	A2, B5, B6, B9		F	CF	В	
Sandy	Columbia	B1, B3, B6, BO, O, S, TU, W	0, W	F, Rf, Rr, WL, WN	CF, PL	А	
Santiam	Willamette	BO		F, R	CF, PL		
Santiam, Middle	S. Santiam	B5, BO, F, N	B5, N	F, G, P, WN	CF		
Santiam, North	Santiam	BO, F, N, O, S		F, P, Rf, Rr	CF		
Santiam, South	Santiam	BO, N, F, S		F, P, WL, WN	CF		
RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
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Sebastepol Cr	Josephine Cr/Illinois	F		Rh	SS		short
Separation Cr	McKenzie, S. Fk	B5	B5	F, WN	CF	С	
Sharps Cr	Row	Ν	}	Rf	CF		
Shasta Costa Cr	Rogue	ON		WN	SS		
Siletz	Pacific	A2, B4, BO, N, OB, S		B, F, G, R	CF	С	
Siletz, North Fk	Siletz	Ν	Į	F, WL	CF		
Siltcoose	Pacific	N, OB		B, E, G, WL	CF		
Silver Cr	Illinois	B3, F	}	F, WN	SS		
Silver Cr, North Fk	Silver Cr	F		WN	SS		
Silvies	Malheur Lk	ON		WN	IS		
Siuslaw	Pacific	A2, B4, BO, F, N, OB		E, F, G, L, Rf, Rr, WL	CF		
Siuslaw, North Fk	Siuslaw	A2		F	CF		
Sixes	Pacific	B3, BO		Rf, Rr	SS		
Sixes, South Fk	Sixes	B6	}	F, WN	CF]	
Smith	Umpqua	A2, BO, OB		E, F, WL	CF		
Smith, North Fk	Smith/Umpqua	B5, B9, F, N	B5, B9, N	E,F, P, WL	CF	В	
Smith, North Fk	Smith (in CA)	B3, B5, B8, F, OB, SP, TU, W	B3	B, F, Rr, WN	CF	A	
Snake	Columbia	BO, S, Ws	S	F, G, P, Rr, WL	MR	A	
Sprague	Williamson	N, OB, S	}	B, F	IS]	
Sprague, North Fk	Sprague	N, O, W		G, WN	IS		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Sprague, South Fk	Sprague	F			IS		
Squaw Cr	Deschutes	F, N, W		F, G, R, WL, WN	CF		restoration/ conservation project
Steamboat Cr	N. Umpqua	F, N, O, OB, S, Ws	0	F, G, Rf	CF	А	
Sucker Cr	Illinois	B3, F		F, WN	SS		
Sun Cr	Wood/Klamath	B3		F	CF		
Sycan	Sprague	B3, O, ON, W		B, F, P, Rf, Rf, WL, WN	IS	С	
Takenitch Cr	Pacific	F, N	N	E, G, R, WL, WN	CF		
Tenmile Cr	Pacific (Oregon Dunes)	Ν		E, G, WL	CF		
Tenmile Cr	Pacific (S of Cummins Cr)	B6, F, P		E, F, WL	CF	В	
Three Rivers	Nestucca	F		F, R	IS		
Tillamook	Tillamook Bay, Pacific	A1		F	CF		
Todd Cr	Silver Cr/ Illinois	F		WN	SS		
Trask	Tillamook Bay, Pacific	A1, BO, N, S		F, Rf	CF		
Trask, South Fk	Trask	Ν		F	CF		
Trask, North Fk	Trask	BO, N		F	CF		
Tualatin	Willamette	BO		R	PL		
Union Cr	Rogue	F		Rh	CF		
Umatilla, North Fk	Umatilla	OB		B, WN	MR		
Umpqua	Pacific	B1, B6, F, N, OB	Ν	F, R, L, WL	CF	С	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Umpqua, North	Umpqua	A2, B1, B3, B4, B5, B6, BO, F, O, OB, S, W	B3, B4, O, W	B, F, L+, Rf, Rr, WL, WN	CF	A	
Umpqua, South	Umpqua	B2, N, OB		B, F, L+	CF	С	
Umpqua, South, Castle Rock Fk	S. Umpqua	WRC		L+	CF		
Van Horn Cr	Great Basin	TU		F	IS		
Walker Cr	Nestucca	N, S		Е	CF		
Wallowa	Grande Ronde	BO, C, N, S, W		L+, Rr	MR		
Wassen Cr	Smith, Umpqua	B9, N, F	B9	E, F, P, Rf, WL	CF	С	
Wenaha	Grande Ronde	N, O, TU, W	N, O, W	F, Rh, WL, WN	MR	А	
White	Deschutes	B9, BL, O, W	B9, O, W	F, P, Rf, Rr, WL	CF	В	
White Branch Cr	McKenzie	ВО		G, WN	CF		
Whitehorse Cr	Great Basin	B3, TU		P, F	IS	С	
Whitewater	Metolius	B3		F, WN	CF		
Whittaker Cr	Siuslaw	Ν		F	CF		
Wildhorse Cr	Alvord Lk	Ws		F, P, Rf, Rr, WL	CF		
Wiley Cr	S. Santiam	BO			CF		
Willamette	Columbia	BO, N		F, G, L, P, R, WL	PL		
Willamette, Coast Fk	Willamette	BO		L+	PL		
Willamette, Middle Fk	Willamette	BO, F, N		B, G, R, WL	CF		
Willamette, North Fk of Middle Fk	Willamette, Middle Fk	BO, B4, B6, O, S, W	B4, B6	E, F, Rf, Rh, Rr, WL, WN	CF	A	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Willamson	Klamath Lk	B3, N, O, OB		B, F, G	IS		
Wilson	Tillamook Bay, Pacific	A1, B9, BO, N		F, R, WL	CF		
Winchuck	Pacific	A2, B6		F	SS		
Yachats	Pacific	Р		E, WL	CF		
Yamhill	Willamette	BO		R	PL		
Yaquina	Yaquina Bay, Pacific	A2, N		F	CF		
Zigzag	Sandy	F, TU	[F, WN	CF		

OREGON'S "A" RIVERS

Elk River and North and South Forks

The Elk is the best-protected large watershed on the coast of Oregon, with the most remaining old-growth timber, and has been regarded by some fisheries biologists as the finest salmon and steelhead stream of its size on the West Coast south of Canada.

This 32-mile-long stream, including its main stem and North Fork, flows west and northwest to the Pacific Ocean near Port Orford. The basin lies at the northwestern end of the Siskiyou Mountains where they merge with the Oregon Coast Range.

The Elk River's upper forks are either roadless or only slightly affected by gravel logging roads. The upper main stem flows for 14 miles through a rugged, deeply forested canyon with intense whitewater. Then the lower river meanders for another 11 miles through a mix of forest and ranchland to a wild beach without road access at the Pacific Ocean. Here the Elk forms one of few natural estuaries and river mouths on the coast. Wild fall chinook, coho, winter steelhead, fall coho, and sea-run cutthroat trout all thrive here, and coho densities are among the highest remaining in Oregon. A hatchery on the lower river uses only brood stock from the Elk. Bordering the river for 10 miles, the 17,300-acre Grassy Knob Wilderness is the largest designated wilderness in the Oregon Coast Range (the larger Kalmiopsis Wilderness lies in the Siskiyou Mountains). Adjoining Grassy Knob, the Copper-Salmon roadless area totals another 11,000 acres where wilderness designation is proposed and widely supported. The Elk's upper watershed is mostly public land, but a few important tracts are held by private timber companies.

A highlight of this largest block of intact forest in the Oregon Coast Range, Port Orford cedar trees reach diameters of 5 feet and thrive on floodplain soils. Old-growth Douglas-firs grow even larger, and western hemlocks also reach enormous size. At the basin's headwaters, the Iron Mountain Botanical Area includes the rare Brewer Spruce and unusual plantlife that grows in distinctive nutrient-poor soils that weather from ultra-mafic rocks. With stunning natural beauty, old-growth trees, and deep green pools of transparent water, the middle reach of the Elk offers excellent swimming and riverfront camping, and includes a challenging Class III-IV whitewater run. On the lower river, fishing for salmon and steelhead is popular, and drift boats are used.

The lower 11 miles of riverfront are mostly privately owned, though only lightly developed. Gorse—a thorny, exotic, invasive shrub—has infested much of the once-farmed or logged land along the lower 6 miles of the valley. Opportunities may be available here to protect frontage of the lower river through easements.

The Oregon Rivers Council reported that the Elk has "some of the most unique fisheries, wildlife, and botanical values in the nation." The river is part of a complex of nearby Siskiyou Mountain rivers including the Rogue, Illinois, Chetco, and South Fork Coquille, all of which inspired a Wild Rivers National Monument proposal by the Siskiyou Project in the 1990s.

With its fishery, wildness, water quality, old-growth forests, and scenery, the Elk is clearly one of the premier rivers on the West Coast south of Canada.

Illinois River

On the West Coast of America, no other river compares to the Illinois as a sizable stream flowing through wilderness with superb water quality, fisheries, challenging whitewater, and geologic complexity.

A major tributary to the Rogue River, the Illinois gathers small streams from the Siskiyou Mountains of far southwest Oregon, winds through a rolling plateau within the coastal range, and then plunges northwest through a 50 mile-long canyon—unique and extraordinary in the estate of American Rivers.

The wildest river on the West Coast south of Canada, the Illinois is roadless for 30 miles and nearly without road access for the entire 50 miles that it is designated in the National Wild and Scenic Rivers system. For 16 miles it penetrates the Kalmiopsis Wilderness. The upper extension of the river is Rough and Ready Creek—a fine, wild stream in its own right with unusual plantlife. It flows for 15-roadless miles from the Siskiyou Mountain crest to its confluence with the Illinois. Only the upper basin of the Illinois is developed. A 6-mile reach passing near the town of Cave Junction is bordered by private land, used for ranching, rural home sites, and logging, as are 10-mile reaches of the East and West Forks upstream from their junction where the main stem begins.

The water of the Illinois is famous for its clarity—crystal clear in deep pools that alternate with steep, boulder-choked rapids. The river is also notorious for flash floods during winter rains; the level can go from less than 1,000 cfs to 20,000 cfs in a day or two, creating extreme hazards for unwary boaters.

An excellent refuge for Rogue basin salmon and summer steelhead, the Illinois and its tributaries are also fine trout fisheries. Twenty species of fish live here. Bald eagles, osprey, cougars, otters, and bears thrive as well. A remarkable diversity of plant species more than 1,400—are found across climatic and geographic mixing zones and across a wide spectrum of soil types found in the distinctive geological formations of the Siskiyou Mountains.

Trails reach the river only at several points. One of the paramount whitewater paddling runs of America, the Illinois challenges boaters with a constant menu of Class IV water and a renowned Class V drop called the Green Wall. The Illinois has a number of fine tributaries, including Silver, Heather, Indigo, Lawson, Collier, Granite, and Klondike Creeks.

Centerpiece to a larger system of wild rivers, the Illinois joins the Rogue and is bordered on its west by the Chetco basin and on the south by the extraordinary Smith River of California. Silver and Indigo Creeks are exceptional tributaries with fine fisheries and wildlands.

Water diversions and land development in the upper basin pose serious threats to the health of the Illinois in its wild canyons below. Though lightly populated now, pressures for development have grown in the upper basin and will continue to increase in the future.

Imnaha River and South Fork

With excellent water quality, no dams, and wildness even in its middle reach where there is private land and nominal road access, the Imnaha is an important salmon and steelhead stream of the Snake River basin and a secluded whitewater route through mountains, forests, and dry canyons.

In the northeastern corner of Oregon, the Imnaha flows east and north for 78 miles to its confluence with the Snake River in Hells Canyon, just 4 miles upstream from the mouth of the Salmon River.

The Imnaha begins as the South Fork on the flanks of Eagle Cap Peak—the summit of the Wallowa Mountains in the Eagle Cap Wilderness. Amid crags of granite, limestone, and basalt, it drops through meadows and groves of old-growth conifers. Then the extended, middle reach of the Imnaha flows directly north through a spectacular landscape of semi-arid ranchlands incised in places with steep canyon walls. The final 5 miles drop in rocky rapids through a scenic landscape of cliffs and striking rock towers ending in the depths of Hells Canyon.

The Imnaha is an outstanding steelhead and trout stream, with native rainbow trout, bull trout, and one of the better surviving runs of chinook salmon in the Snake River watershed. Threatened throughout the Columbia basin, spring chinook still spawn here. This is the uppermost major Snake tributary still accessible to anadromous fish. The watershed is also a haven for bighorn sheep, elk, deer, bald eagles, golden eagles, peregrine falcons, martens, fishers, Canadian lynx, and wolverines.

Outstanding trails follow along the river's headwaters and also along a lower reach to its confluence with the Snake River.

About 40 percent of the river frontage is privately owned, including the entire middle reach, which is road accessible, though roads to not follow the riverfront. Landowners here have enforced private property restrictions and aggressively denied access to boaters.

The basin is one of only five on the east side of the Cascade Mountains in Oregon listed as having a high degree of aquatic integrity in the Interior Columbia Basin Ecosystem Management Project (the others are the adjacent Minam, Wallowa, Wenaha, and Joseph Creek basins). The Imnaha is also one of few rivers nationwide included in the National Wild and Scenic Rivers system from source to mouth, and it is perhaps the most splendid river in the system with so much private land.

The Imnaha basin borders the spectacular Hells Canyon to the east and the choice complex of the Joseph Creek and the Lostine, Minam, Wallowa, Wenaha, and lower Grande Ronde Rivers to the west and north. Except for the Grande Ronde, the Imnaha is the largest among this nexus of superb streams in the northeastern corner of Oregon.

John Day River and North Fork

As a large, relatively intact natural river system, lacking dams, remote from urbanizing pressures, and with high potential for restoration, the John Day is extraordinary in Oregon and the West. Here are the best remaining salmon runs of the Columbia above its first dam and the longest dam-free reach of river in the entire Northwest.

This large river system drains much of north-central Oregon. Snowmelt collected from the Blue and Strawberry Mountains flows into three major branches. The North Fork flows for 95 miles, beginning in the Blue Mountains' North Fork Wilderness and then passing through rugged basalt canyons and fine stands of ponderosa pine and Douglas-fir before entering juniper and sage drylands. It picks up the Middle Fork, which flows 54 miles from its own Blue Mountain headwaters. Downstream another 30 miles, the North Fork carries twice the volume of the main stem where the two join at Kimberly.

The North Fork supports the largest population of spring chinook salmon and summer steelhead in the Columbia River system above Bonneville Dam. A trail follows much of the river, and difficult rapids are run by kayakers in the spring. The upper main stem begins in Dixie Pass in the Blue Mountains, collects tributaries from the Strawberry Mountain Wilderness, and then is joined by the 48-mile-long South Fork.

The main stem is a National Wild and Scenic River for 148 miles from Service Creek to the backwaters of the Columbia, as is the North Fork for 54 miles and the South Fork for 47 miles. State scenic waterway designation also protects most of the main stem and its three forks. The main stem is about 44 percent public land while the North Fork is 28 percent public and the South Fork is 41 percent public.

The entire system is virtually dam-free, flooded only in its lowest 12 miles by backwaters of The Dalles Dam on the Columbia. With a free-flowing length of 252 miles from the North Fork headwaters to the Columbia backwater, this is the longest free-flowing reach of river in the Northwest and among the dozen longest dam-free reaches west of the Great Plains. This river offers one of the longest canoeing trips in the West and an easy rafting expedition until the water level drops in May or June.

The main stem curves through desert canyons, 1,000 feet deep, interspersed with semi-arid ranchlands, and it flows through the John Day Fossil Beds National Monument—a site of unique geologic and paleontologic value. The river is one of the longest wild anadromous streams in the Columbia system and hosts the largest remaining wild chinook runs in northeast Oregon. Introduced bass have exploded in population and are popular among anglers. Here and along the major forks, bald eagles, peregrine falcons, bighorn sheep, cougars, bobcats, and other wildlife thrive. The main stem flows through three wilderness-study areas administered by the Bureau of Land Management.

The river has been heavily affected by diversions for ranchland along most of its length, by grazing almost throughout the basin, by timber harvest through most of the headwaters, by gold dredging, and by Columbia River dams. However, with only two dams downstream—compared to eight affecting the Grande Ronde of northeast Oregon and Salmon River of Idaho—the salmon and steelhead of the John Day have relatively few obstacles to overcome, and are surviving. Likewise, though grazing is present throughout the basin, the steep topography and remoteness of the canyons have protected much larger areas of native grasslands than are found throughout most of the Columbia basin. Unlike along the Deschutes River, urban development pressures have been minimal, and will not likely grow very much.

Within this extensive river system, the North Fork includes the best remaining anadromous fish habitat. The South Fork has been more degraded. The main stem is unique in the West and critical to fish migration routes to the upper forks.

Metolius River

With its extraordinary water clarity and steady, spring-fed flow, the Metolius has an excellent resident trout fishery, a roadless reach of whitewater, and is unique in Oregon and the West.

In the central Cascades of Oregon, the Metolius flows north and east from springs at the bases of Mount Jefferson and Three Fingered Jack to the backwaters of Round Butte Dam on the Deschutes River.

The Metolius literally springs out of the ground at enormous groundwater discharges that collect snowmelt of the Cascade peaks through underground conduits in the basaltic rock. Upper reaches flow gently and are heavily used for recreation while lower reaches tumble through a wild, swift-water canyon with no road access.

Because it is almost entirely springfed, the river does not deviate from a 45-54 degree temperature—very cold—and it flows at a nearly constant rate year-round, producing one of the steadiest hydrographs known on a sizable river. Water quality is outstanding, with aquamarine pools and white rapids.

A legendary trout-fishing river, the Metolius supports native rainbow and bull trout as well as introduced brown and brook trout. The state set aside one section for fly-fishing only in 1939—one of the earliest protections of its type. The river is unusual in having kokanee salmon that swim up from Billy Chinook Reservoir formed by Round Butte Dam. Beavers, otters, goshawks, and bald eagles are also residents. Anadromous fish runs were blocked when Round Butte Dam was built—over state objections—downstream on the Deschutes River. Current plans to build effective fish passage around the dam may bring anadromous fish back to the Metolius basin. Waters here may be too cold to offer prime chinook salmon habitat, but it is possible that the kokanee population will evolve into a sockeye salmon fishery.

Trails follow both the upper and lower river reaches. Below the road-accessible upper reach, the lower river is a premier and difficult whitewater paddling run.

Most of the upper river is public land, with six resorts and twelve campgrounds along the shores. On the roadless, lower river, the south shore is Deschutes National Forest and the north shore is the Warm Springs Indian Reservation. A large Metolius tributary—the Whitewater River--flows entirely within the Reservation and joins the Metolius 5 miles above the reservoir.

Most of the river is in the National Wild and Scenic Rivers system, and the upper 14 miles are in the State Scenic Waterways program.

Rogue River

The Rogue is extraordinary owing to its surviving salmon and steelhead runs, its wild and roadless reaches, its diversity of plantlife and wildlife, its popularity as an extended river trip of four days or more, its long free-flowing mileage, and its complete crossing of the coastal mountains. No other river on the West Coast combines these qualities so well.

This 210-mile-long river begins in the southern Oregon Cascades north of Crater Lake and flows by a circuitous route westward to the Pacific Ocean at Gold Beach. It is one of only 3 rivers in Oregon and 6 on the entire U. S. West Coast that begins in the interior mountains and transects the entire Coast Range (others are the Chehalis, Columbia, Umpqua, Klamath, and Pit-Sacramento). The only rivers that dramatically cut the whole way through rugged sections of the Coast Range are the Umpqua, Rogue, and Klamath, and among these, the Rogue has by far the longest roadless reach. The river begins at Boundary Springs—thought to be the outflow of Crater Lake—and drops 43 miles through steep rapids, enchanting pools, and thin strips of old-growth forest backed by heavily logged tracts to the flatwater of Lost Creek Dam. At one point the entire river drops into underground lava tubes, then boils up to the surface 200 feet away. Trails follow much of this river course, and 99 percent of the upper corridor is publicly owned.

Below Lost Creek Dam, the middle river runs for 55 miles through the Rogue River Valley, passing near Medford and through Grants Pass. Most of this reach is private land, and many roads lie near the river, including a 12-mile section of Interstate 5. Gold Ray Dam—a small, antiquated, unused hydropower site—blocks the river northwest of Medford, followed by Powerhoue Dam—an old, low structure just upstream from Gold Hill. The last dam on the river is 3 miles above Grants Pass at Savage Rapids. No longer needed for irrigation, and blocking the migration of salmon, the dam is slated for removal.

From Savage Rapids Dam to the Pacific, the Rogue runs damfree for 113 miles—the fifth longest free-flowing reach of river in Oregon and the Northwest. Without Savage Rapids and the other antiquated dams, the free-flowing Rogue would total 153 miles from Lost Creek Dam to the Pacific.

Downstream from Grants Pass the river begins to cut through the Oregon Coast Range, and below Grave Creek, a 35-mile roadless section is widely regarded as one of America's premier wild river reaches and most popular whitewater journeys.

At Foster Bar the canyon opens up, and in the final 10 miles below Lobster Creek the river riffles through a broad coastal valley and enters tidal water about 5 miles upstream from the Pacific.

Historically the Rogue has been a world-renowned salmon and steelhead fishery, though the runs are now depressed because of the dams, spawning habitat loss owing to logging, and other problems. Lost Creek Dam has harmed the river by eliminating flood flows and altering the temperature regime in the water below the dam. Commercial jet boat use is heavy from Grants Pass to Gallice above the wild reach—and for 45 miles from Blossom Bar Rapid (the terminus of the "wild" designation) to the Pacific. Anglers still flock to the Rogue by the thousands in salmon and steelhead seasons, and Rainie Falls, below Grave Creek, is one of few places in the West where salmon can still be seen jumping over waterfalls on their spawning journeys. Fall chinook remain healthy, but the Rogue's spring chinook and summer steelhead are in jeopardy and the coho are listed as threatened. The river is also one of only three on the West Coast with green sturgeon (others are the Columbia and Sacramento).

The Rogue's route through the Coast Range offers one of the greatest cross-sections of plantlife on the Pacific coast. Douglasfir intermingle with ponderosa pine, sugar pine, white fir, incense cedar, red cedar, Port Orford cedar, Pacific yew, Oregon white oak, California black oak, Pacific madrone, Oregon myrtle, big leaf maple, and the rare Brewer spruce on high ridges.

The Rogue's upper 40 miles have been designated as a National Wild and Scenic River, and the 85-mile reach from the mouth of the Applegate River (below Grants Pass) to Lobster Creek was among the original 12 rivers protected in the national system. Both sections are likewise protected in the Oregon State Scenic Waterways system.

To discourage logging proposals on BLM land, American Rivers and other groups in 2007 proposed adding portions of 16 tributary streams to the Rogue in the National Wild and Scenic Rivers system. These include Anna, Big Windy, Dulog, Grave, Hewitt, Howard, Kelsey, Jenny, Little Windy, Mule, Missouri, Montgomery, Quartz, Rum, Whiskey, and Wildcat Creeks.

Between the protected upper and lower Rogue reaches lies the heavily populated and rapidly urbanizing Rogue Valley, including the cities of Ashland, Medford, and Grants Pass. Private development of land—especially river frontage—throughout the middle section of the river will pose threats to the Rogue's water quality and flow regime. Unlike many other rivers, the wildest sections of this river lie not upstream, but downstream from urbanizing areas.

Sandy and Salmon Rivers

The Sandy River and its wild tributary, the Salmon River are premier streams of the Oregon Cascades owing to their dam-free length and gradient, fine fisheries including salmon and steelhead, wildness with old-growth forests, and its suitability for recreational use. The Sandy is the largest dam-free river entering the Columbia below its first impoundment; anadromous fish here have no dams to face as obstacles in their spawning journeys.

The 75-mile-long Sandy and its tributary, the 34-mile-long Salmon River, both begin at the edges of glaciers on Mount Hood and flow northwest, entering the Columbia just east of the Portland urban area.

Starting at the Sandy Glacier, the Sandy River flows 5 miles through meadows, woodlands, and a rocky volcanic landscape of the Mount Hood Wilderness. In its mid-section, the river drops through wooded gorges with both intense whitewater and gentle rapids. The lower river is a miniature of the Columbia Gorge with deep forests, rocky outcrops, and nearby development.

Following a similar but wilder course, the Salmon River runs from the Palmer Glacier on the south flank of Mount Hood and flows 8 miles through the Salmon-Huckleberry Wilderness, then onward through old-growth and second-growth forests to its confluence with the Sandy at Brightwood. With most of its frontage and watershed roadless, the Salmon was called an "Oregon work of art" by the Oregon Rivers Council. Flowing dam-free from source to sea level, the stream is an exquisite example of a free-flowing and mostly-wild river extending from a high elevation at 6,200 feet in the Cascades to low elevation (300 feet) at its confluence with the Sandy and then continuing onward, undammed to the tidal Columbia.

Both rivers flow through forests of old-growth Douglas-fir, noble fir, and western hemlock. Wooded habitat shelters spotted owls, otters, minks, martens, cougar, Roosevelt elk, and bald eagles. The Sandy is home to three species of endangered amphibians and three rare plants: the nodding onion, Columbia River willow, and giant trillium. Flowing into the Columbia downstream of the lowest mainstem dam (Bonneville), these rivers offer relatively unimpeded spawning routes for salmon and steelhead. The Sandy is one of the state's top producers of winter and summer steelhead and also supports spring chinook, coho, and smelt, and also native rainbow and cutthroat trout in the upper river. The excellent habitat and wildness of the Salmon River supports the best anadromous fishery in the Sandy basin, hosting steelhead, coho, and chinook in lower reaches. In addition, a fine headwaters population of cutthroat trout thrive in a reach lying above six waterfalls—one of them 75 feet high—which stop migrating fish.

Lying only an hour's drive from more than 1 million people in the Portland metropolitan area, the Salmon and Sandy are among the most important recreational rivers in Oregon. Trails along both rivers see heavy use. Anglers flock to both rivers, and especially the lower Sandy—popular among fishermen in drift boats and onshore alike. River runners enjoy Class I to III segments on the lower river and an extraordinary Class IV whitewater run on the middle Sandy.

Public land comprises 82 percent of the Salmon's shorelines, with the private land occurring in a 7-mile reach as it nears Highway 26. The lower Sandy flows mainly through private land interspersed with several state and county parks.

In a model river restoration project, the Western Rivers Conservancy has acquired several important tracts in the middle gorges of the Sandy and helped to arrange for the 2007 dismantling of Marmot Dam—the only dam that previously blocked the main stem's flow (2 large dams impound Bull Run—a major Sandy tributary to the north). A diversion related to Marmot Dam, which had de-watered part of the river for decades, has been discontinued.

Twenty-five miles of the Sandy are designated in the National Wild and Scenic River system in two sections, and 12 miles are protected in the State Scenic Waterways system. The entire Salmon, from headwaters to source, is protected as a National Wild and Scenic River. Homesites have proliferated along the lower Sandy, and intense urbanizing pressures along lower reaches pose continuing threats to this outstanding river system.

Smith River, North Fork (southern Oregon reach in basin of California's Smith River)

One of the more extraordinary rivers protected from source to mouth, the North Fork Smith features emerald water that drops through intricate rapids and the wildness of unroaded forest.

The river flows 13 miles southward from its source to the California border (the entire North Fork runs 27 miles to its confluence with the South Fork Smith). Beginning beneath Chetco Peak, half the Oregon reach lies in the Kalmiopsis Wilderness. Douglas-firs and mixed conifers crowd the steep canyon. Water quality is renowned, and the river supports strong runs of chinook, coho, steelhead, and sea-run cutthroat trout. A critical spawning area for the famous main stem Smith River, the North Fork is closed to fishing.

The isolated basin includes peridotite soils and supports a unique mix of rare and endemic plant species. At least 7 sensitive species and 10 species on a review or "watch" list for threatened status occur along one tributary alone—Lemmingsworth Gulch. Two sensitive plants, the California ladyslipper and harvest brodiaea, are found near the river.

Nearly all of the riverfront is roadless, with gravel roads reaching the North Fork at only three places. No trails parallel the river. From Rowdy Creek Road downstream for 13 miles, the North Fork offers one of the most extraordinary Class IV whitewater rivers in the West, comparable to the Illinois River, and runnable only on high water in winter and spring.

This highly protected corridor flows entirely through Siskiyou National Forest in Oregon. The entire stream is designated in the National Wild and Scenic Rivers system, and the California portion is protected as part of the Smith River National Recreation Area. A tract of private land straddles the river just south of the Oregon border, and the left shore at the confluence with the Middle Fork in California is privately owned.

The entire Smith system is featured as one of the outstanding rivers of the West in the California section of this report.

Snake River in Hells Canyon

With its deep, wild, arid canyon, its variety of plant, animal, and fish life including imperiled salmon and sturgeon, and its superlative qualities for extended whitewater trips, this section of the Snake River is one of the outstanding reaches of large river in the West.

For more than 250 miles the Snake River forms the border between Oregon and Idaho (the entire river is 1,040 miles long and by volume ranks as the twelfth-largest river in America). Most of the Oregon length is impounded by the Hells Canyon complex of 3 dams, or it is heavily polluted by agricultural wastewater in the reach upstream from the dams. However, 70 miles remain free-flowing through the lower half of Hells Canyon, and have exceptional qualities. Counting downstream mileage along the border of Washington, the Snake flows free for 100 miles in this reach.

Here the river has carved the second-deepest canyon in America (only the Kings of the Sierra Nevada is deeper), and the deepest canyon carved by a large river. Massive in scale, the Snake in Hells Canyon averages 13,000 cfs even during the low-water month of August. Steep volcanic slopes rise from 5,000 to 8,000 feet above the water. Upper reaches of the canyon, immediately downstream from Hells Canyon Dam, include a blend of ponderosa pine, fir, and grasslands; lower sections are rocky and arid.

An intricately varied fishery includes bass, trout, surviving runs of fall chinook salmon and steelhead that still migrate to the mouths of the Grande Ronde, Salmon, and Imnaha Rives. Forming the migration path for salmon and steelhead coming up the Columbia-Snake-Salmon Rivers system, the lower end of Hells Canyon is critical to these endangered and imperiled anadromous runs that were once among the finest in the world. Salmon in this system must now overcome 4 dams on the Columbia and 4 dams on the lower Snake before reaching the hospitable Snake River tributaries in Hells Canyon. A critically threatened species, the Snake River fall chinook spawn directly in the river in the free-flowing reach below Hells Canyon Dam. This is also one of the best remaining reaches of river supporting rare white sturgeon—the largest freshwater fish in North America. With its classic high-volume whitewater, the Snake attracts rafters, drift boaters, and kayakers from all over the nation for extended river trips of 3-7 days. It is also popular among jet boaters, unrestricted for many years even after non-motorized use had been limited by quotas. This has resulted in severe conflicts between the two groups. Trails follow portions of the canyon.

Umpqua River, North, and Steamboat Creek

With an excellent and popular steelhead fishery, clear water, and outstanding paddling and hiking opportunities, the North Umpqua may be the finest river of Oregon's southern Cascades.

From the Cascade crest north of Mount Thielsen, the 106-milelong North Umpqua flows west to its confluence with the South Umpqua near Roseburg. It offers fishery, scenic, geologic, and recreational values.

The upper river system is dammed 8 times, sections are diverted for hydroelectric power, and a hatchery at Rock Creek affects native fish. But then, below Eagle Rock, west of Toketee Falls, the river flows through magnificent whitewater rapids and deep green pools to Idleyld Park. Highway 138 parallels the river for this entire middle section. With only intermittent road access, the lower river enters rolling foothills of the Cascades and flows through pools and occasional rapids. A low dam for recreational flatwater blocks the North Umpqua at Winchester, and the final 6 mile reach flows through a widening floodplain of cottonwood-lined bottomlands until it meets the main stem Umpqua, which runs for another 113 dam-free miles to the Pacific.

Internationally known for its fishery, the summer steelhead run on the North Umpqua has been one of the best on the West Coast. Chinook, coho, rainbow trout, and exotic brown trout also do well, and the river retains its full compliment of native fish. The combination of large steelhead and steep banks make angling a challenge. The North Umpqua is also a favorite of whitewater boaters because it is one of few Cascade streams floatable throughout the summer. Though its corridor is also shared with a major highway, a hiking trail parallels the river for 79 miles through National Forest land, making it one of the longest riverfront trails in Oregon and the West. The deep green water, rock-filled rapids, and heavily forested shorelines are uncommon along a river with such ready road access. Aside from the riverfront and the Boulder Creek Wilderness Area (northwest of Toketee Falls), much of the basin has been heavily logged.

From the powerhouse below Toketee Falls to Rock Creek (upstream from Idleyld Park), 34 miles of the North Umpqua is designated in the National Wild and Scenic Rivers System. About 94 percent of the basin in this reach is National Forest land. Most of the riverfront downstream from Idleyld is privately owned.

Steamboat Creek is a major tributary flowing for 27 miles and entering the North Umpqua from the north at Steamboat. With the upper North Umpqua being dammed and diverted for hydroelectric power, the North Umpqua-Steamboat combination effectively becomes the longest free-flowing reach of this river. An extremely important steelhead nursery, accounting for half the spawning in the entire North Umpqua, this watershed is all in National Forest ownership. It is heavily logged but is now recovering with oldgrowth reserves. Another significant tributary downstream from the North Umpqua's hydropower dams is the 8-mile-long Boulder Creek, which flows from source to nearly its mouth through the Boulder Creek Wilderness.

Though the upper Rogue is more spectacular in its scenery, its geology, and its dam-free nature, the North Umpqua excels as an outstanding fishery and recreational river within the southern Cascades region.

Wenaha River

The Wenaha is perhaps the finest stream in eastern Oregon combining wildness, productive fisheries, and remote rugged character.

In far northeastern Oregon, the 33-mile-long Wenaha River plus its South Fork flow eastward through the Blue Mountains to the Grande Ronde River at Troy. One of the wildest and least accessible rivers in the Northwest, the Wenaha runs for all but its last 6 miles through the Wenaha-Tucannon Wilderness. The stream can be reached only by foot or horse at several trail crossings.

Prime habitat for bighorn sheep, bald eagles in winter, whitetail deer, Rocky Mountain elk, black bears, bobcats, cougars, and beavers, the river also offers some of Oregon's finest native rainbow and bull trout habitat. It provides much of the remaining salmon and steelhead spawning areas in the Grande Ronde basin. Along with the Minam River, the Weneha is considered the only part of the expansive Grande Ronde basin that remains pristine in character. Its cool water helps to moderate high temperatures in the Grande Ronde Ronde River that result from upstream grazing and logging along the heavily altered main-stem. Both the Interior Columbia Basin Ecosystem Management Project and Trout Unlimited list this river as one of few premier fisheries in eastern Oregon.

The entire main stem of 22 miles is designated in the National Wild and Scenic Rivers system, and 95 percent of the river frontage all but the lowest portion—is in public ownership.

Willamette River, North Fork of Middle Fork

A gem of Oregon's central Cascades, this reach is among the finest in the entire Cascade Range in Oregon though it is surrounded by heavily logged mountains and isolated by downstream dams.

Flowing for 44 miles from its source in the central Cascade Mountains of Oregon to its confluence with the Middle Fork, this stream is the last bastion of wildness in the heavily dammed and logged Willamette River basin.

The river's source, Waldo Lake, is considered one of the purest lakes in the world. The upper 12 miles of the river remain roadless, and the river cascades over 34 waterfalls in 6 miles. A mid-section flows past the Constitution Grove—one of the Cascades' finest old-growth Douglas-fir and western hemlock forests. The lower river cuts through a 1,000-foot-deep canyon.

The basin supports a fine rainbow and cutthroat trout fishery designated for fly-fishing only. With waterfalls in lower reaches,

anadromous fish have never migrated to upper reaches of this stream, and its native fish are unaffected by exotic or hatchery fish. The basin also offers winter habitat for elk, bears, cougars, other wildlife, and rare and endangered plants such as bog orchids and mountain ladyslippers. The Shale Ridge Trail follows the river's upper 9 miles.

OREGON'S "B" RIVERS

Chetco River

This important salmon and steelhead stream flows through wilderness and then a long, gentle, forested corridor to the ocean just north of California.

The 56-mile-long stream runs through the Siskiyou Mountains west to the Pacific Ocean at Brookings. The upper 26 miles bisect the Kalmiopsis Wilderness—an area of rugged mountains, varied geology, and rare plant communities. The river is one of the finer coastal salmon and steelhead rivers, with some of the highest smolt returns among all coastal rivers in Oregon. The basin also supports varied wildlife.

In its upper reaches, the Chetco passes through steep terrain clad with old-growth forests and also slopes of sparse and unusual plantlife. The river erodes striking formations of water-worn bedrock before broadening into a valley with wide gravel bars. The northernmost grove of coast redwoods grows just north of the river at Loeb State Park.

From its source to the Siskiyou National Forest boundary, the Chetco is designated as National Wild and Scenic River, and its headwaters is the longest reach to flow through a designated wilderness on the West Coast. The Chetco and Illinois have the greatest undammed vertical drops among Oregon's coastal streams.

The lower 10 miles of the river flow through private land, which faces development pressures as the Brookings area grows rapidly. The city takes its drinking water from the lower Chetco, and new developments including a 1,000-home community north of Brookings threaten to overtax the river's meager summertime flows. Gravel mining on the lower river could also pose a threat to the health of the river and estuary.

Coquille River, South Fork

The South Fork Coquille flows over waterfalls, past old-growth forests, and then supports both winter and summer steelhead in its scenic, rapid route to the largest estuary in southern Oregon.

This largest fork of the Coquille lies just north of the Rogue River and flows west and then north to join the North Fork at Myrtle Point. As the second-largest river on the south coast of Oregon (next to the Rogue), the main stem Coquille then flows for about 38 estuarine miles to the Pacific at Bandon— the longest estuarine reach of river in the state next to the Columbia.

The South Fork drops gently through beautiful wooded terrain and deeply forested gorges and plunges over Coquille River Fallsone of the larger waterfalls in the Oregon Coast Range. With outstanding Class V whitewater in the high runoff of winter and spring, it flows beautifully through rocky rapids, borders the Port Orford Cedar Research Natural Area, and flows near the largest Port Orford Cedar in the world. The river is rated among only 7 other Oregon coastal streams as a high-quality winter steelhead fishery. With the Siletz and Rogue, it has one of few summer steelhead runs remaining in Oregon—a sign of good water quality.

Though most of the basin has been heavily logged, the corridor of this river remains among the most beautiful in the Oregon Coast Range, and a designated National Forest Scenic Byway follows much of the river's path. The North and Middle Forks of the Coquille have seen extensive logging and are dominated by hatchery fish.

Cummins, Rock, and Tenmile Creeks

Though it's not large, Rock Creek is the largest stream directly emptying into the Pacific and having no development or roads in its basin. Cummins Creek, just 6 miles to the north, is nearly as pristine, and Tenmile is a small steream lying between the two.

Cummins and Rock Creeks, 7- and 6-miles long respectively, flow directly into the Pacific in the Cape Perpetua area of Oregon's central coast. They may support larger native runs of salmon, steelhead, and cutthroat trout than any similar-sized watersheds in Oregon (these streams are much smaller than the Elk River). One fish count in 1979 found 50 coho salmon per 100 feet on the lower 2 miles of Cummins Creek. The basins include old-growth Sitka spruces up to 9 feet in diameter and giant Douglas-firs farther inland.

Between the two basins and lying both north and south of them, this section of the Oregon coast between Waldport and Florence has the largest block of public land extending from the Coast Range summit to the ocean. Other basins, including Bob Creek and Tenmile Creek (between Cummins and Rock Creeks) and Big Creek, Cape Creek, and Wapiti Creek (to the south) include some private land and heavily logged national forest but also have great restoration potential. The National Audubon Society and other collaborating organizations have restoration efforts underway at Tenmile Creek. With most if its basin in the Siuslaw National Forest but much of its river frontage in private ownership, Tenmile presents important restoration possibilities as the only sizeable stream between Cummins and Rock Creeks.

Deschutes River

The Deschutes has some of the most popular whitewater in the West and hosts one of the better known sport fisheries in the country. The river with its exceptionally varied route, offers outstanding values for fish, wildlife, geology, recreation, and scenery.

Flowing north for 252 miles on the east side of the Cascade Mountains, this is the eighth-largest river in Oregon. Discounting rivers that originate in other states—the Snake and Columbia--it is by far the largest Oregon stream east of the Cascades.

Beginning on forested slopes south of the Three Sisters, the Deschutes flows south for 25 miles, enters drier country at the

eastern base of the mountains, and then turns decisively to the north. It flows through the communities of Sun River and Bend and then descends into arid canyons that extend the whole way to the Columbia. Drawing most of its water from spring flows of the Cascades, the Deschutes is one of few major U. S. rivers outside Alaska with a natural peak discharge in midsummer.

The upper river is dammed twice, with diversions below Wickiup Dam that deplete its flow for 22 miles. But below Benbow Falls, the river flows for 54 miles through one of the most remarkable lava landscapes in America and is replenished by spring flows. Through these upper reaches, the river meanders past ponderosa pine groves and wet meadows and also plunges over low cataracts and major rapids. Some sections are developed with homes and recreational facilities, including the resort community of Sun River. A low dam blocks the river at the city of Bend.

For the next 40 miles, the river flows through drylands and canyons with several major rapids and falls. Round Butte Dam, which blocks the migration of salmon and steelhead, forms a major reservoir followed by the Pelton reregulating dam. Then the lower river runs for 100 miles through basalt canyons as much as half a mile deep. For about 45 miles the river borders the Warm Springs Indian Reservation. The Deschutes finally enters backwaters of The Dalles Dam on the Columbia.

Some of the upper reaches comprise outstanding fisheries for rainbow trout, Dolly Varden and kokanee, and also have introduced brown trout. Salmon and steelhead still migrate upriver from the Columbia to Pelton Dam. Spring chinook—threatened throughout the lower Columbia basin—continue to spawn in the lower Deschutes. An unusual plant, the Estes wormwood, occurs nowhere else in the world. About 89 percent of the upper river above Bend and 51 percent of the lower river flows through public land in Deschutes National Forest and Bureau of Land Management jurisdictions.

In three separate sections, National Wild and Scenic River designation protects 173 miles. State Scenic Waterway status applies to 199 miles.

Outstanding Deschutes tributaries include Browns Creek, Crescent Creek, Crooked Creek, Little Deschutes, Paulina Creek, Squaw Creek, White River, and the Metolius River.

The value of the river may be greatly increased with ongoing efforts to build effective fish passage around Round Butte Dam. Passage currently exists for upstream migrants, but downstream smolts do not survive. If the current plans are successful, salmon and steelhead will once again be able to reach the upper Deschutes and its stellar cast of tributaries.

The Deschutes shares the distinctive geography of central Oregon with the John Day River, and while both rivers are extremely valuable, they are quite different. The Deschutes carries more water, has ample flows throughout the summer, plunges through more whitewater, and is subject to immensely greater urbanizing pressures, especially in its middle reaches.

Few other rivers in the West combine the Deschutes' lava landscape, year-round flows, fishing popularity, and whitewater boating.

Donner und Blitzen River

Heavily glaciated though they are surrounded by desert, these streams drop through U-shaped canyons with distinct rims, riffle past meadows and aspen groves, and plunge over waterfalls before reaching drier country below.

In south-central Oregon this unusual river system begins in the high, glaciated valleys of Steens Mountain and flows northwest to the Malheur National Wildlife Refuge and Malheur Lake, which has no outlet.

The rare mottled sculpin survives in upper reaches. Native rainbow trout thrive, and the uncommon redband trout is found here.

The main stems and tributaries of Big Indian Creek, Little Indian Creek, and Fish Creek are all designated in the National Wild and Scenic Rivers system, as is the nearby and similar Kiger Creek. Most have fine riparian corridors.

Ironically, the Donner und Blitzen is dried up by irrigation diversions when it reaches the National Wildlife Refuge. About 64 percent of the river system is in BLM ownership, and the rest is private.

This group of streams makes up Oregon's finest set of endorheic rivers—streams that flow into isolated or land-locked basins where the water evaporates.

John Day River, Middle Fork

Though it is not as intact as the North fork, the Middle Fork John Day still offers fine anadromous fish habitat as it flows through its sparsely settled basin.

This major tributary to the North Fork of the John Day begins in the Blue Mountains east of Austin and flows northwest. Unlike the main stem, North Fork, and South Fork, this branch of the river was not included in the National Wild and Scenic Rivers system. The combined free-flowing mileage of the Middle Fork, North Fork, and main stem is 211 miles. The entire Middle Fork remains undammed.

Joseph Creek

In a dramatic, 2,000-foot-deep canyon, the creek rushes past primeval ponderosa pine forests and shelters populations of native rainbow trout, steelhead, and wildlife.

Flowing north for 49 miles through northeastern Oregon and southeastern Washington, Joseph Creek joins the Grande Ronde River just upstream of its confluence with the Snake.

The stream has eroded through massive layers of Columbia Plain basalt. Bald eagles, peregrine falcons, and Lewis's woodpeckers are found here, along with elk, deer, bighorn sheep and bears. Rugged and inaccessible, the stream is used only lightly by hikers, hunters, and anglers. A 8.6-mile reach in the Wallowa-Whitman National Forest is designated as a National Wild and Scenic River.

Kilchis River

In a narrow, heavily wooded canyon, this small river has excellent water quality and scenery, and along with the Miami River, just to the north, has one of few chum salmon runs remaining on the Oregon coast.

The Kilchis flows southwest from its Oregon Coast Range headwaters to its mouth at Tillamook Bay. One of the least developed watersheds on the north coast—with some of the least intrusive road access—the river runs for 25 miles and is a favorite run of experienced kayakers in the winter rainy season. This is the most pristine of 6 nearby streams that remain as the only highquality fall chinook rivers left in Oregon.

The stream's upper half lies in Tillamook State Forest. Land along the lower river is privately owned.

Minam and Lostine Rivers

Flowing from high peaks and wilderness, these adjacent rivers in northeastern Oregon are important to native bull trout and surviving runs of chinook salmon and steelhead.

The 50-mile-long Minam flows northeast from the peaks of the Wallowa Mountains to the Wallowa River, which then flows into the Grande Ronde. The upper 39 miles lie entirely in the Eagle Cap Wilderness and are designated in the National Wild and Scenic Rivers system—the only designated river reach outside Alaska that flows entirely through wilderness. The lower river is included in the Oregon Scenic Waterways system.

Crystal-clear water drops from 7,000-foot peaks, passes rugged outcrops of limestone and granite, winds around green meadows in a glacial valley, then courses through deep forests and old-growth ponderosa pine. Native rainbow trout, cutthroat trout, and bull trout do well here, and chinook salmon and steelhead still spawn in this upper tributary to the Snake River. A variety of wildlife thrive.

Along the entire river, only 8 miles have road access, all on Boise-Cascade Corporation land bordering the lower river. The Minam flows into the Wallowa River only 8 miles above its confluence with the Grande Ronde, making the Minam-Wallowa-Grande Ronde system a vital habitat nexus for surviving runs of anadromous fish.

Likewise flowing north from the height of the Wallowa Mountains, the Lostine River is just east of the Minam and runs for 31 miles to the Wallowa.

Amid stunning mountain scenery, the small stream cuts through alpine meadows, U-shaped glacial valleys, steep canyons with crags of granite, and then dense forests at lower elevations. Wild salmon and steelhead spawn here, and elk, deer, and bears thrive in the upper basin. Downstream from a 16-mile section that is designated in the National Wild and Scenic Rivers system and 97 percent publicly owned, the river flows northwest through a mix of forest and privately owned ranchland to its mouth.

With upper reaches much like the Minam River, but not as long, the Lostine is centrally located in the cluster of outstanding northeastern Oregon rivers including the Snake, Imnaha, Minam, Joseph Creek, Wenaha, and lower Grande Ronde.

Nehalem and Salmonberry Rivers

Less disturbed than many other watersheds on the heavily logged north coast, the Nehalem and its tributary the Salmonberry have long undammed mileage and support three species of salmon and steelhead.

Following a circuitous route west, the Nehalem begins in the Coast Range northwest of Portland and ends in the large estuary of Nehalem Bay. Most of the basin has been logged, and roads parallel the river's route, though much of the river retains a wild character with recovering coniferous forests and scattered ranches and farmlands.

One of the larger rivers in the Oregon Coast Range, the Nehalem nearly transects the mountains, and it flows its entire length of about 114 miles with no dams. In some places hills rise 1,200 feet above the river. Steelhead, coho, and chinook salmon runs still do well in this river, which has significant restoration potential. The river has greater fish species diversity than most streams, and has chum salmon, which are only found from Tillamook Bay north. Much of the basin is publicly owned as the Tillamook State Forest.

The highlight of the Nehalem basin is the Salmonberry River, a large tributary that begins near the Nehalem's source but flows more directly west, running 24 miles before joining the main stem about 22 miles above its mouth. The Salmonberry flows almost entirely through the Tillamook State Forest, though several parcels of private timberland also lie along the river. The Salmonberry's winter steelhead run is still considered healthy, surviving at one-third or more of its historic abundance. The North Fork of the Nehalem is also a good fishery, though a hatchery is located along it.

Though a few other coastal rivers offer better anadromous fish habitat, the main stem Nehalem is unusually valuable in having no hatcheries to interfere with wild stocks. Only two other coastal streams in Oregon—the sizable Umpqua and Rogue--have longer dam-free mileage.

Owyhee River system

The upper Owyhee basin is the wildest, most rugged region in Oregon and one of the least accessible desert-canyon complexes in the West.

This extensive river system drains the canyonlands in southeastern Oregon and southwestern Idaho. The West Little Owyhee flows north and joins the main stem, which at that point is sometimes called the South Fork. The main stem, Middle Fork, and North Fork flow northwest from Idaho to join at Three Forks, Oregon. From there to Owyhee Reservoir, the main stem flows 96 miles through inaccessible canyons except for one highway crossing near the community of Rome. Below a 35-mile-long reservoir on the lower river, the Owyhee is heavily depleted for its final 30 miles to the Snake River.

The entire 58-mile length of the West Little Owhyee is designated as a National Wild River. The Oregon portions of the main stem

(24 miles) and North Fork (10 miles) are also National Wild Rivers. Substantial additional mileage lies as headwaters in Idaho, where wild and scenic river status is proposed.

All these branches and the main stem cut through vertically incised basalt canyons as deep as 1,300 feet. Remarkable cliff faces, hot springs, and geologic curiosities abound, along with bighorn sheep, rattlesnakes, and many kinds of raptors. The main stem offers popular Class IV boating from April to June, and the North Fork and South Fork also offer wilderness kayaking runs.

Most of the main stem canyon is publicly owned except for 10 miles in the Rome area. The North Fork canyon in Oregon is 75 percent public land.

In a region overrun with exotic cheatgrass and other invasive plants, the Owyhee Canyons remain almost unaffected.

Smith River, North Fork (Umpqua River basin)

A small, isolated gem, this river flows through a deeply forested corridor and supports native fish, imperiled spotted owls and marbled murrelets, and other wildlife.

A tributary to the lower Umpqua River (not to be confused with the more southerly North Fork Smith that flows into California), this stream begins in the Coast Range, flows about 32 miles southwest, and joins the main stem Smith River roughly 17 miles above its confluence with the lower Umpqua in its broad estuary.

Lightly traveled roads follow some portions of this small river as it winds and curves through the mountains, and other sections are road-free. The basin has little development except for its lowest reaches. Two waterfalls lie in upper reaches, and some sections flow through old-growth conifers and overhanging maples. Four runs of anadromous fish and wild resident cutthroat trout thrive here in a region otherwise heavily logged. Several nesting sites of northern spotted owls and marbled murrelets have been found on this river.

White River

From the slopes of Mount Hood, this spectacular river flows into forests and then drylands, dropping over waterfalls in a remote canyon with resident trout and abundant wildlife.

The 47-mile-long river forms at the base of glaciers on the south face of Mount Hood and flows southeast to the Deschutes River 5 miles below Maupin. Headwaters tumble over boulders, cobbles, and rocky glacial outwash, and the milky-gray glacial meltwater courses through braided channels offering spectacular views of Mount Hood—the highest peak in the state. The river enters the forest belt of the east Cascades and then drops through a spectacular canyon with multiple waterfalls. The upper 22 miles flow entirely through the Mount Hood National Forest, while the lower 25 miles cross BLM and private land used for grazing and agriculture.

The Forest Service found remarkable botanic and geologic values, and the stream also has a fine resident trout fishery and wildlife habitat along its entire length, which has no paralleling road and only a few road access points. Below White River Falls State Park, near the mouth, the river provides spawning habitat for salmon and steelhead that have come up the lower Deschutes.

The White is one of few rivers in Oregon that is nearly entirely pristine and free of roads and development, and the boating guide Soggy Sneakers calls the 11-mile section above Tygh Valley one of the most delightful canyons in Oregon.

OREGON'S "C" RIVERS

Clackamas and Roaring Rivers

An important anadromous and trout fishery, the Clackamas hosts one of only two remaining runs of spring chinook in the Willamette basin and significant runs of coho and winter steelhead. This river and its tributary, the Roaring River, flow from wilderness down to lowlands facing development pressures at the edge of the Portland urban area. Originating at the Cascade crest near Olallie Butte, north of Mount Jefferson, the Clackamas flows for 75 miles northwest and joins the Willamette River at Oregon City, just downstream from the lowest Willamette dam. Two dams and one major reservoir, 3.5 miles long, lie on the river's main stem.

The upper two-thirds of the river, above North Fork Reservoir, is 95 percent public land within the Mount Hood National Forest. Dense forests and canyon walls alternate with open meadows at the headwaters, followed by a deep, forested canyon. The lower third of the river's frontage is mostly private land with at least 8 public-recreation sites and access areas at the very edge of Portland.

Studies suggest that the late-winter Clackamas coho is the last viable native coho population remaining in the Columbia River Basin. This run benefits from roadless areas at the river's headwaters—one of the finest wildland complexes in the Oregon Cascades. Yet the wild stocks of fish are in serious decline, affected by hatcheries, hydropower generation, logging, and development and farming along the lower river.

The upper Clackamas also features excellent scenery, water quality, whitewater, old growth forests, and wildlife. Bald eagles, ospreys, spotted owls, elk, deer, black bears, bobcats, cougars, river otter, and other wildlife thrive. Seven threatened or endangered plant species have been found. Geothermal vents heat the Austin Hot Springs along the river. The Riverside National Recreational Trail and other trails follow the water in several sections and lead to old growth forests at Alder Flat. Other parts of the upper basin have been intensively logged.

The uppermost 47 miles of the river, from the source to Big Cliff, are designated in the National Wild and Scenic Rivers system. The Oregon State Scenic Waterways system also protects 54 miles of the upper river, from the Olallie Lake Scenic Area to North Fork Reservoir, and 12 miles of the lower river, from River Mill Dam to Carver, which is 8 miles upstream from the mouth.

Private property along the lower river will become increasingly prone to land development here near Portland.

The Clackamas is among the best rivers on the west side of the Cascades in Oregon. Outstanding tributaries include the North Fork, Oak Grove Fork, South Fork, Roaring River, and Collawash River. The Clackamas basin adjoins several other fine river basins: the Breitenbush and Little North Fork Santiam to the south and the Salmon and Sandy to the north.

The 14-mile-long Roaring River, which enters the Clackamas 5 miles above North Fork Reservoir, is a particularly notable tributary. With no development and no roads, this is an archetypal wild river, plunging at the steep rate of 200 feet per mile from an elevation of 4,000 feet. Beginning as a U-shaped glacial valley it turns to a V-shaped canyon full of old-growth conifers and habitat for peregrine falcons, bald eagles, and spotted owls. Wild coho, chinook, steelhead, rainbow trout, and cutthroat trout spawn here. Remote trails reach the river in only a few places. The entire stream is in the National Wild and Scenic Rivers system. The South Fork Roaring River is similarly wild but undesignated for its 4-mile length.

The Clackamas, Sandy, and Willamette are the only major Oregon streams in the Columbia River system that are uncompromised by downstream dams on the Columbia.

Drift Creek

This small stream flows through one of the finest remaining wilderness areas on the Oregon coast, and adjoining private lands are largely roadless as well.

The 25-mile-long river flows through the Oregon Coast Range and into the Pacific Ocean at Alsea Bay near Waldport. While the watershed is surrounded by Siuslaw National Forest, most of the stream winds through private forest land, with only about 5 miles in the national forest. This middle reach, however, is in the Drift Creek Wilderness, a 5,800-acre tract of pristine old-growth. Additional, adjoining wild lands bring the total roadless area to 11,500 acres—the second-largest wild acreage in the Coast Range north of the Siskiyou Mountains. Only the Elk River has more wilderness and roadless area.

In this wilderness tract, large western hemlocks and Douglasfirs thrive. The greater basin supports spotted owls, bald eagles, Roosevelt elk, deer, and black bears. Native chinook, coho, steelhead, and cutthroat trout migrate from the ocean each year. Hatchery fish have never been stocked.

Excellent trails traverse the wilderness and provide access to the creek, and Drift Creek offers the finest wilderness and old-growth hiking opportunity along any stream in the Oregon Coast Range (the Elk River has few trails).

While Cummins and Rock Creeks, to the north, flow through similar coastal wilderness areas, these are smaller than the wild area surrounding Drift Creek. Even though Drift Creek is recommended for protection only on the Nationwide Rivers Inventory and the Forest Service's list of outstanding waterways, this stream is superlative as a sample of a small Coast Range stream winding through old-growth and recovering forest.

The stream presents an outstanding opportunity to protect adjoining roadless National Forest land as wilderness, but even more important, virtually all the private land in the entire watershed remains undeveloped, and basin-wide protection here may be feasible and would result in an outstanding coastal river.

Eagle Creek

With nearly its whole basin in the Columbia Wilderness, and its lower reach in the Columbia River Gorge National Scenic Area, this 13-mile-long stream represents the most significant Oregon waterway incised into the Northwest's grandest gorge.

Oregon has several Eagle Creeks that are fine wild streams; this one flows north to its confluence with the Columbia River just upstream of Bonneville Dam. A highlight in a region of spectacular scenery, Eagle Creek is one of the most popular hiking destinations in the greater Portland area. A trail passes 5 spectacular waterfalls and other cascades.

Basalt cliffs characteristic of the Gorge are fully exposed in some places, but most of the streamfront and watershed are blanketed in deep forests and luxuriant old-growth Douglas-firs, western hemlocks, and bigleaf maples. Entirely in public ownership, this stream is the principal Columbia tributary on the south side of the Gorge, which is bounded on the west by the Sandy River and on the east by the Hood River. The Eagle Creek Trail offers one of the premier waterfall-hiking opportunities in the Northwest.

French Pete and Separation Creeks

These two creeks are two of the finest representatives of small wilderness streams in the heart of Oregon's Cascade Mountains.

The 15-mile-long French Pete Creek begins high in the central Cascades and flows northwest to its confluence with the South Fork McKenzie just upstream of Cougar Reservoir. One of the most pristine streams in the Northwest, the entire length of French Pete Creek flows through the Three Sisters Wilderness. A primitive trail follows along much of the route, and old-growth forest is found through much of the basin. Efforts to designate this watershed as a wilderness in the early 1970s marked one of the first efforts to protect significant old-growth forests in the National Wilderness Preservation system.

Following a similar route, Separation Creek begins on the western flanks of the 10,348-foot South Sister and runs about 13 miles west to Horse Creek and the McKenzie River. Flowing through the Three Sisters Wilderness in its upper miles, its small headwaters are spectacular at the base of the snowcapped volcanos. Then the creek churns through a deep forest of old-growth conifers. A trail parallels the creek through its middle section.

Grande Ronde River, lower

A long river of northeastern Oregon, the Grande Ronde winds through a spectacular landscape of forests, grasslands, and canyons and provides for native bull trout as well as depleted but surviving runs of Snake River salmon and steelhead.

The 150-mile-long river flows northeast from the Blue Mountains, through the town of LaGrande, and then on to the Snake River at the lower end of Hells Canyon.

Upper reaches gather water from the Wallowa-Whitman National Forest. For more than 50 miles the river eases through ranchlands northeast of LaGrande. Much of this route has been relocated from its original path by a channelization project called the State Ditch. Below its confluence with the Wallowa River, the Grande Ronde cuts canyons as deep as 3,000 feet with grassy slopes and a savanna of ponderosa pines and Douglas-firs.

For 44 miles, from the Wallowa confluence to the Washingtonstate line, the river is designated in the National Wild and Scenic Rivers system. The lower canyon continues for another 38 miles in Washington before entering the Snake. A beautiful landscape of rolling hills and steep slopes blanketed with grass, the lower canyon is home to 1,000 elk, and also to deer and bighorn sheep. Otters, great gray owls, goshawks, and dozens of bald eagles can sometimes be seen along this reach, which makes a popular multiday float trip for drift boaters, rafters, kayakers, and canoeists. Trout and steelhead fishing are popular, and native rainbow and bull trout thrive.

Although the upper river is heavily affected by diversions, logging, grazing, channelization, and development, the lower canyons are popular for recreation. About 66 percent of the lower canyon river frontage is publicly owned. The Grand Ronde once boasted fine salmon and steelhead runs, but these fish have been decimated by downstream dams—4 on the lower Snake River below Lewiston and then 4 on the lower Columbia.

Flows on the lower Grand Ronde benefit greatly from the additions of outstanding cold-water tributaries—the Wallowa (including its tributaries the Minam and Lostine), the Wenaha, and Joseph Creek.

Hood River, with West Fork, Lake Branch, Middle Fork, and East Fork

Draining the north and east slopes of its namesake, Oregon's preeminent Mount Hood, the Hood River is also one of the largest salmon streams having only one Columbia River dam located downstream.

All three of the river's tributary forks flow from the northern and eastern flanks of the 11,235-foot Mount Hood—a glacial monolith and the highest mountain in Oregon. They collect cold glacial flows from 6 of the mountain's 11 glaciers. Lake Branch of the West Fork begins at the western limit of the basin, flowing from the iconic beauty of Lost Lake—a scenic highlight of Oregon with Mount Hood rising majestically in the background. The West Fork collects the north-face runoff of the mountain and flows about 18 miles to its confluence with the main stem. Roads follow along most of this route. Several private inholdings lie along the stream's upper half, which is otherwise in the Mount Hood National Forest. The lower half flows mainly through private land.

The smaller Middle Fork likewise collects north-face runoff of Mount Hood and flows for about 14 miles to its confluence with the East Fork; roughly half this length is in the national forest.

The larger East Fork collects the remainder of the Mount Hood's north-and east-side runoff and flows for about 27 miles to its confluence with the Middle Fork. Its upper 15 miles flow through national forest; the remainder runs through private land in one of Oregon's outstanding fruit-farming valleys. Highway 35 runs along the East Fork for most of its length. The main stem then extends for about 14 miles to the impounded Columbia River at the town of Hood River.

The Hood River system has only one dam, at Powerdale on the lower river, and its owner, PacifiCorp, plans to remove it in 2010. While the river currently has runs of coho, spring chinook, winter steelhead, and summer steelhead, its fisheries should improve with the removal of this significant barrier. The river also has bull trout one of the easternmost populations in Oregon.

As the destination of all Mount Hood's cool, north-side runoff, this river could have tremendous significance in the future as the climate warms, glaciers recede, and cold waters such as these become less common (all the Mount Hood glaciers have retreated 61 percent through the past century). This cold-water runoff, combined with the scheduled dam removal and the fact that only one Columbia River dam lies downstream, may make the Hood River system one of truly outstanding importance to the survival and recovery of Columbia River salmon and steelhead. The Hood River will be among the largest dam-free tributaries to the lower Columbia below The Dalles Dam (others are the East Fork Lewis River in Washington and the Sandy in Oregon, which have no dams downstream, and the Klickitat and White Salmon in Washington, which have only Bonneville Dam downstream).

The East Fork Hood River has important wet meadow habitat as well as volcanic canyons, and the Middle Fork flows past jagged lava flows. The West Fork, East Fork, and main stem have difficult but popular whitewater sections. Proposed additions to the Mount Hood Wilderness area would further protect parts of all these main stem tributaries. Planned acquisitions by the Western Rivers Conservancy will safeguard up to 3,000 acres on all three major forks.

McKenzie River, upper

This popular recreational river flows from the central Cascades and offers good habitat for native fish, geologic attractions, and oldgrowth forests.

An important river of Oregon's central Cascades, the McKenzie runs west to the Willamette at Eugene. While the shorelines of the lower river have roads and residential development, the upper reaches above the Blue River are more natural. Roads still parallel much of the route, but the upper basin is largely national forest.

Clear Lake, at the river's source, resulted from a 3,000-year-old lava flow that impounded the McKenzie; the remains of the forest that was rapidly drowned by the lake can still be seen underwater. From the lake outlet, the river rushes through old-growth Douglasfirs and western hemlocks. It drops over several waterfalls and then pools up for 1 mile behind Trail Bridge Dam. The upper river is considered to have some of the cleanest water in the state.

Though affected by hydropower development, the upper river remains a fine fishery supporting bull trout, cutthroat, rainbow trout, and wild spring chinook. The McKenzie River National Recreation Trail closely follows the river with many scenic views, and below Olallie Campground the river becomes one of Oregon's most popular rivers for whitewater rafting, kayaking, and canoeing.

Nestucca River

Though degraded in some ways, the Nestucca River remains one of the finest anadromous fisheries on the northern Oregon coast and a popular river for recreation.

Rising at the height of the Coast Range, the Nestucca flows west to the Pacific Ocean at Pacific City, south of Tillamook. One of the longer rivers of the Oregon coastal mountains, the Nestucca is blocked by McGuire Dam near its source, where water is diverted east to the city of McMinnville. The rest of the river flows for 48 miles to the ocean. The beautiful, forested stream is important for fall chinook, coho, chum, steelhead, and cutthroat trout. The river produces some of the highest numbers of steelhead and salmon in Oregon. With many different runs, anadromous fish use the river nearly all year long. Elk, bears, and bald eagles are also found here. Much of the river is popular among anglers, and canoeists and drift boaters float in many sections.

The entire valley is road accessible. The upper 12 miles are 92 percent owned by the Bureau of Land Management, which has designated this reach as an Area of Critical Environmental Concern. The lower river is mainly in private ownership. Much of the basin and riverfront has been heavily logged. Ranches, roads, and private development are found throughout the lower 35 miles.

Along with the similar but smaller Little Nestucca, this river is part of a cluster of Oregon north coast rivers that still retain high values for salmon and steelhead; others nearby are the Tillamook, Trask, Wilson, and Kilchis. The Wilson and Nestucca are the longest of these, and the Nestucca has less-intrusive highway development. Though the Siuslaw and Nehalem are north coast rivers with significant undammed mileage—117 and 114 miles respectively—the Nestucca and its nearby rivers appear to have better wild anadromous fish habitat.

Siletz River

With long, undeveloped reaches through forest, whitewater, gentle current, and estuary, the Siletz River hosts the finest summer steelhead run on the central and northern Oregon coast and several other populations of anadromous fish, as well.

Located in the north-central portion of the Oregon Coast Range, the Siletz begins with its North and South Forks and then continues for 68 miles to Siletz Bay. A paved road follows most of the river's course, with gravel roads reaching to the headwaters, though in many place the roads are set back far from the river. Nearly the entire basin is privately owned; much of it by the timber industry.

The relatively healthy summer steelhead run in this river is extremely rare in the Oregon Coast Range; the Nestucca and Tillamook River systems (and the Rogue River, in the southern Coast Range) are the only other streams with viable summer runs, but the Siletz's is the finest on the central-northern coast. The health of this fishery is indicative of clean, cool waters throughout the summer, which persist even with heavy logging activity in the past and continuing timber harvest. The clarity may be related to plentiful bedrock in the river's course. The Siletz also has runs of coho salmon, spring chinook, and winter steelhead, with a steelhead sportfishing season in winter, summer, and fall, and a chinook season in the fall.

About 4 miles below the North and South Fork confluence, above Elk Creek, the river plunges down a 70-foot drop. Below here, the river offers Class I-IV whitewater boating, with a long section of gentle water below Moonshine County Park and then 25 miles of tidal flow leading to Siletz Bay.

Sycan River

The Sycan watershed is heavily used for logging and grazing but remains a beautiful example of a relatively undeveloped Great Basin river and is the finest of the major tributaries flowing into Klamath Lake and thus nourishing the upper Klamath River. Located in south central Oregon, this 73-mile-long river begins in the mountains southwest of Summer Lake, and then runs west and south to its confluence with the Sprague River, which flows into the Williamson River and Upper Klamath Lake.

With its upper and middle reaches in Fremont National Forest, the river runs through forests and stringer meadows, and then into the biologically rich Sycan Marsh. Owned by the Nature Conservancy, the 23,600-acre wetland is leased for ranching and supports 130 bird species including one of the largest nesting colonies of sandhill cranes and bald eagles. Downstream from the marsh, the river drops through lava-walled canyons, meadows, old stands of ponderosa and lodgepole pines, and ranchlands. The river is home to a variety of wildlife and a fine native trout fishery.

Umpqua River with South Fork

Though affected by logging, ranching, development, and the Interstate 5 freeway corridor, the South Fork of the Umpqua still supports three endemic species of fish, and the South Umpqua-Umpqua combination has the longest dam-free mileage on the entire West Coast south of Canada.

Beginning at its North and South Forks confluence west of Roseburg, the main stem Umpqua flows west for 113 miles to the Pacific at Reedsport.

Next to the Columbia, this is the largest Oregon river emptying into the Pacific, flowing with an average of 7,786 cfs. The North Fork has outstanding natural values, and the South Fork has an unusual degree of endemism for warm-water aquatic species. The Umpqua chub, Umpqua dace, and Umpqua pikeminnow are found only in this river system. The main stem, however, is overrun with introduced smallmouth bass.

Unique on the West Coast south of Canada, the Umpqua is the largest river with no main-stem dams. Even more impressive, the combined Castle Rock Fork/South Fork/main stem Umpqua flows for 223 miles with no major dams—the longest free-flowing length on the West Coast and the second longest in Oregon (only the John Day has longer dam-free mileage).

The river flows through hundreds of riffles, long placid pools, and several steep and rocky rapids as it transects the entire width of the Coast Range. Unlike the Rogue and Klamath, the Umpgua follows a gentler course and its valley is accessible and settled with rural A mix of forest and ranchland lines the riverfront. homesites. Ospreys, bald eagles, and other wildlife thrive along the extensive riparian zone of cottonwoods and willows, and the river continues to support runs of salmon, steelhead, and warm water fish. Unlike most streams, it has both summer and winter steelhead. Introduced smallmouth bass, however, have proliferated throughout the main stem, overtaking native species and putting the river in biological jeopardy. Nonetheless a popular fishery, the Umpgua is often floated in drift boats. The river also presents the best opportunity on the entire West Coast for an extended canoe trip, offering a fine voyage of a week or more.

Even though the Umpqua has significant problems as a natural river, its size, extensive free-flowing length, and diversity of habitat still make it an exceptional waterway in Oregon and the West.

Wassen Creek

A small but remarkable and vulnerable stream, Wassen Creek is virtually inaccessible by road or trail and flows as a nearly pristine waterway within a thoroughly logged region.

This 18-mile-long tributary to the lower Smith (Umpqua basin) lies on the opposite side of the Smith River from the Lower Smith River Road, and upper portions of the basin are only touched by logging roads. Upper reaches of the river have many ledges and waterfalls, and the stream flows through great forests of large, mature conifers. The basin supports spotted owls and other old-growth dependent species.

About one-third of the river flows through private land, one-third Siuslaw National Forest, and one-third Bureau of Land Management land.

Whitehorse and Little Whitehorse Creeks

These small streams flow through excellent riparian habitat within arid mountain country and support a rare native fish species of the Great Basin.

In southeast Oregon, Whitehorse and Little Whitehorse run north from the Oregon Canyon and Trout Creek Mountains to the landlocked Coyote Lake, east of Steens Mountain. Cows were removed by the Bureau of Land Management in the late-1980s, and beavers have returned and established wetlands and choice riparian areas for waterfowl and wildlife within this harsh desert region.

Whitehorse Creek is the primary habitat for an endemic form of the threatened Lahontan cutthroat, sometimes called the Whitehorse cutthroat trout.

CONCLUSION

From the hundreds of Oregon rivers and streams that are worthy of protection, 215 rivers were considered in this survey's base list, which was taken from 18 already-existing lists of rivers deemed by others as having exceptional values and from 8 interviews with Oregon river experts in biological fields. The survey identified 18 Oregon rivers and tributaries in the "A" list of highest value, 20 in the "B" list, and 21 in the "C" list.

This survey identified 4 distinct clusters or regions of highestvalue natural rivers in Oregon. All of the state's 5 ecoregions are represented in these 4 clusters:

Siskiyou Mountain rivers: the Rogue, Illinois, Chetco, Elk, and South Fork Coquille, along with additional tributaries. This cluster of streams drains the Siskiyou Mountains, world renowned for their biological diversity. With dams affecting few of these streams, with one of the largest roadless and wilderness area complexes on the West Coast, and with some of the finest remaining anadromous fish habitat, this is one of the most extraordinary regions of rivers in the West. Northern Oregon Cascade rivers: the Sandy, Salmon, Clackamas, Roaring, Collawash, Breitenbush and its forks, and Little North Santiam. This is the largest cluster of relatively intact streams remaining in the Oregon Cascades, and with their mouths being low in the Columbia and Willamette systems, they are the leastaffected by downstream dams blocking anadromous fish migration. Large blocks of public land and wilderness typify the headwaters as well as many of the middle and some of the lower reaches of these streams. The 2007 removal of Marmot Dam on the Sandy ant the ongoing restoration of that stream makes this sizable river at the edge of the Portland urban area a strong anchor for a significant region of natural rivers.

John Day River system: including the main stem and its North, Middle, and South Forks. This large river system is one of the rare strongholds of anadromous fish in the interior basins of the Westonly two dams lie downstream. For long, continuous free-flowing mileage, the John Day is one of the best rivers in the West; its damfree mileage exceeds all other rivers in Oregon and Washington.

Lower Grande Ronde River system: including the Wenaha, Joseph Creek, Imnaha and its South Fork, Minam, Lostine, Wallowa, and the lower Grande Ronde from the Wallowa to the Snake. Though these streams suffer from 8 downstream dams on the Columbia and Snake Rivers, they remain one of the final, threatened strongholds of anadromous fish in the immense Snake River system. Several of these streams are exceptionally wild, with minimal effects from road building and other intrusions. Logging, farming, ranching, and land development affect the Grande Ronde in its upper reaches, though restoration possibilities are being pursued there.

In addition to these 4 highest-ranking river clusters, 5 other clusters also have great value, listed here as a secondary set of river regions:

Northern Oregon coastal rivers: including the Nehalem, Miami, Kilchis, Wilson, Trask, Tillamook, Nestucca, and Little Nestucca. These account for most of the rivers along a 45-mile length of coastline. This region is distinctive in Oregon because most of the streams are on the American Fisheries Society list of highest-value anadromous fisheries—the only such cluster on the Oregon coast. **Central Oregon coastal rivers:** Drift Creek, Cummins Creek, Ten Mile Creek, Rock Creek, Big Creek, Cape Creek, and North Fork Siuslaw. These small rivers, flowing mostly from the Siuslaw National Forest, meet the Pacific in a 30-mile length of coastline. Restoration of wild characteristics like those now found at Cummins and Rock Creeks may be more feasible with this cluster of streams than anywhere else on the coast.

Umpqua River system: including North, South, and tributaries. Despite a large upstream dam, the North Fork and its tributaries--Steamboat and Boulder Creeks--are outstanding. The South Umpqua is a center of endemism, and the large main-stem Umpqua offers a great variety and extent of habitats. The Castle Rock Fork/ South Umpqua/Umpqua combination is the longest undammed reach of river on the West Coast. For a large river system with ample flows and restoration possibilities, the Umpqua is clearly a highlight.

Malheur Lake tributaries: Donner und Blitzen and its tributaries of Little Blitzen, Kiger, Cucamonga, McCoy, Bridge, Mud, and Fish Creeks comprise an unusual set of streams draining the remarkable Steens Mountain. From the north, the Silvies River and its tributaries are also notable. Though diversions affect all of these streams as they near the landlocked Malheur Lake, this complex represents an excellent and unusual network of waterways in the arid Columbia Plateau ecosystem that still sustains high wildlife values.

Owyhee River system: including the main stem, North Fork, Middle Fork, South Fork, and West Little Owyhee. This large river system includes an extraordinary complex of wild desert canyons, all connected with one another, remote, and free-flowing until the lower reaches of the main stem Owyhee.



West Fork Hood River

Rivers of Washington

I lowing with plentiful rain and snowmelt from the Olympic, Cascade, and North Cascade Mountains, and also from drier ranges to the east, Washington has a rich estate of rivers. Though dams, development, and logging have affected nearly all the streams to some degree, many shorter reaches of excellent natural waterways remain, and a number of medium-sized rivers are superb. These include most of the finest salmon and steelhead fisheries south of Canada.

The river system here is most simply divided into two parts: rivers flowing west of the north-south Cascade Mountain crest, and rivers to the east of it.

Hundreds of west-bound streams benefit from the ample winter rains and deep snows of storm-ridden western Washington, and they take relatively short paths to the Pacific. Within this meta-region, the rivers of the Olympic Peninsula in far northwest Washington are a one-of-a-kind radial collection, flowing out from the heights of massive Mount Olympus like spokes on a wheel. These include some of the finest and least disturbed natural rivers in America. The North Cascades are a conglomeration of high peaks that give rise to spectacular rivers and streams flowing from both the west and east sides of the mountain crest. The Central Cascades are scarcely less impressive, including landmarks no-less than Mount Rainier, and they spawn their own family of churning whitewater through forested canyons and valleys. In the far south, the west-bound Columbia River receives a suite of tributaries dropping from the Cascades through a lava-rock landscape blanketed with trees.

In the east, the entire length of the Cascades sends dozens of fine streams pitching down into drylands that lie in the rain shadow of the high mountains. These waterways eventually feed the Columbia, America's fourth-largest river (largest in the West), though it is thoroughly dammed in the United States except for one 52-mile reach. East of the Cascades, scant precipitation yields few rivers, though interior mountains--including the Blues, which extend from Oregon into far southeastern Washington, and the first ramping-up of the northern Rocky Mountains in the far northeast-produce some streams.

An extraordinary collection of natural rivers can still be found in Washington for several reasons. The state has the highest amounts of rainfall covering a large area in the lower forty-eight states, the highest peaks of both the Coast Range and the Cascade Mountains, the largest concentration of glaciers with their cold summertime runoff, large acreages in public ownership, several magnificent national parks, more wilderness than anywhere else in the Northwest, more wilderness protecting old-growth forests than anywhere in the U.S. outside Alaska, and remoteness from cities. Washington streams are also the finest in the U.S. outside Alaska for spring or summer chinook, coho, sockeye, chum, and pink salmon as well as winter steelhead.

Washington has 8 rivers totaling 177 miles in the National Wild and Scenic Rivers system. This excellent group includes some of the finest streams, but considering the quality of rivers here, the state is severely underrepresented in America's premier program of river conservation. This points to the need to designate more rivers for national protection, and also the need to safeguard streams through other means.

Along many of Washington's best rivers, especially in upper reaches, land is owned by the federal government as either national forests or national parks. However, in their lower reaches, many of these streams are bordered by private and state-owned property. The private tracts are typically owned by the forest industry, and the state land is also subject to intensive logging under a legislated formula that funnels timber-sale proceeds to public education. A number of the finest rivers have only a small amount of these vulnerable lands in their lower reaches—places where a limited but strategic program of land acquisition could reap enormous dividends in river conservation. For example, the Suiattle, Cascade, North Fork Skykomish, Hoh, Dosewallips, White Chuck, White (Wenatchee basin), and Duckabush Rivers all fall into this category of being largely protected but having industrial timber or state land in their lower reaches.

Unfortunately, rivers that lie east of the Cascade Mountain Range have been almost uniformly degraded through damming, overgrazing, industrial farming, and unsustainable logging practices. The remnant, free-flowing reach of the Columbia stands out as an exception, and the lower Grand Ronde River remains in the far southeastern corner of the state as an atypically natural river flowing through drylands.



Nason Creek

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Great Rivers of Washington



Great Rivers of Washington
Western Rivers Conservancy: Washington Project Locations



Sources for the Washington Survey

In addition to the major sources described at the outset of this report, the Washington survey relied on the following:

Interviews with biologists and local experts (B#).

Robert Naiman, University of Washington, Center for Streamside Studies, Director,

Peter Bisson, U.S. Forest Service, Pacific Northwest Research Station, fish biologist

Bob Bilby, Weyerhaeuser Co., fisheries biologist

American Rivers (AR). After 16 years, American Rivers has reactivated the Washington state Wild and Scenic campaign and hopes to have Congress designate more rivers. In 2007, the Seattle staff of that organization developed a preliminary list of rivers for consideration, focusing on the most politically receptive regions from the Cascade Mountains westward.

American Fisheries Society (A1, A2). This organization published "A Survey of Healthy Native Stocks of Anadromous Salmonids in the Pacific Northwest and California," by Charles Huntington, Willa Nehlsen, and Jon Bowers, in the March 1996 issue of the journal Fisheries. The article identified the healthiest stocks of salmon and steelhead in the Northwest and California. These are listed in our survey as A1, indicating streams where existing runs are considered to be "at least two-thirds as abundant as would be expected in the absence of human impacts," and A2, indicating streams where the runs are no less than one-third the size of their pre-settlement estimates. This is one of the most important sources used in this survey. A number of subsequent efforts have been made to rank anadromous fish runs, but we regard this article as the fundamental reference.

Washington Department of Fish and Wildlife. This state agency maintains a Salmonid Stock Inventory with timely estimates of the health of various fish populations listed by river basin. This list includes many small streams and generally corroborates the Fisheries article mentioned above, and so we did not key this as a separate list on our table of Washington rivers. It does, however, offer detailed and up-to-date information, and includes stocks of another indicator species--bull trout--though the health of most of those populations is still unknown.

The Nature Conservancy (NC-1, NC-2). In 2006 the Washington Nature Conservancy released The State of our Waters: An Assessment of Freshwater Systems in Washington State. The product of rigorous study and thoughtful analysis, this fine report focused on the quality of streams and lakes, biological diversity, imperiled species, and optimum conservation opportunities. The Conservancy identified 10 river basins, with some 35 rivers counting forks and main stems, as either "Tier 1" or "Tier 2" freshwater conservation opportunities.

Northwest Rivers Council's Washington Wild and Scenic Rivers Campaign (NR-1, NR-2). As the leader of a coalition of conservation groups, the Northwest Rivers Council (formerly the Washington Rivers Council and now inactive) prepared a 190-page report in 1991 featuring 88 rivers plus many tributaries "deserving of designation" in the National Wild and Scenic Rivers system (Washington State Wild & Scenic River Proposal, 1991). Owing to political difficulties at the height of the old-growth timber debate of the early 1990s, this exemplary effort failed to result in a wild and scenic bill. However, the well-researched report remains the most comprehensive catalog of outstanding rivers in the state, and was summarized as an appendix to Washington's Wild Rivers: The Unfinished Work, published by The Mountaineers in 1990.

State Scenic Rivers Assessment (WP). In 1988, the Washington State Parks and Recreation Commission developed a statewide Outstanding Rivers Inventory for purposes of identifying the best rivers for protection and for potential designation as state wild and scenic waterways.

Washington Interagency Science Advisory Team (WIS). In 1999, a team of state biologists proposed a report for the Governor identifying priority streams for the protection and restoration of wild salmonids. The highest scoring streams (50 points or greater) from that study are listed in our analysis, and those streams scoring 100 points or greater are noted as receiving a "special review."

Washington Rivers List Key

SOURCE OF RECOMMENDATION

A1- American Fisheries Society (3/96) best salmon/steelhead

Streams (this may appear more than once if there is more than one notable run of fish)

A2- American Fisheries Society (3/96) very good salmon/ steelhead streams

AR- American Rivers, considered for Wild & Scenic status

B#- interview with biologists and local experts:

B1-Robert Naiman, University of WA, stream ecologist

- B2- Peter Bisson, U.S. Forest Service, fish biologist
- B3- Bob Bilby, Weyerhaeuser, fisheries biologist
- BL- Bureau of Land Management (BLM)

BO-Bureau of Outdoor Recreation

C- Columbia Interior Basin Ecosystem Management Plan--high aquatic integrity

F-1- Forest Service, eligible for Wild & Scenic River system

F-2- Forest Service, recommended for Wild & Scenic River system

I- USDI/USDA Wild and Scenic Rivers list, 1965

N- Nationwide Rivers Inventory

NC-1- Nature Conservancy, tier 1

NC-2- Nature Conservancy, tier 2

NP- National Park Service-proposed for state W&S status

NR-1- Northwest Rivers Council, recommended for W&S

NR-2- Northwest Rivers Council, recommended for state wild and scenic rivers

S- State designated Wild and Scenic

W-National Wild and Scenic Rivers

Ws-National Wild and Scenic Study Rivers

WP-Washington Parks and Recreation, Dept. (1988)

WIS- WA Interagency Science Advisory Team WRC- Western Rivers Conservancy

BEST SOURCES: A1, B#, I, N, NC-1, NR-1, W

QUALITIES

B-Biological Diversity

- E-Endangered or imperiled species
- F- Fish
- G-Geological/geographical
- L-Long free-flowing reach >100 miles
- L+- Long free-flowing reach when combined with streams it flows
- N-North side of Cascade, Olympic peaks
- P-Plant life/riparian values
- Rf-Recreational fishing
- **Rh-Recreational hiking**
- Rr-Recreational river running

S- scenic as determined by FS eligibility studies, listed if no other Outstandingly Remarkable Values (ORVs)

WL-Wildlife

WN-Wildness

ECOREGIONS

CF- Cascade Forest (M242) GP- Palouse (331) IS- Intermountain Semi-Desert (342) MR- Middle Rockies (M332) NR- Northern Rockies (M333) PL- Pacific Lowland (242)

Great Rivers of the West: Summary Report

RIVER	tributary to:	source of list	special	qualities	ecoregion	rating	additional
Acotio Cr	Spaka	NC 2	review	Г			comments
ASOLITI CI	эпаке	NC-Z	}	Г	IVIR	}	
Asotin Cr, North Fk	Asotin Cr	F-1		F	MR		
Agnes Cr	Stehekin	Ν		F, G, Rh, WL	CF		
American	Naches	BO, F-1, F-2, N, NR- 1		F, P, WL, WN	CF		
Baker	Skagit	B2, BO, F-1, F-2, N, NR-1		F, G, WL, WN	CF		
Bear Cr	Tucannon	F-1		F	CF		
Bear Cr	Bogachiel	A2		F	CF		
Beckler	Skykomish	BO, B2, F-1, S	B2	F, P, Rf, WL	CF	{	
Bell Cr	Nooksack, South Fk	F-1, F-2		F, WL	CF		
Big Cr	Yakima	NR-1		G, P, WL	CF		
Big Beaver Cr	Ross Lk/ Skagit	F-1, N		G, Rh, WL, WN	CF		old growth
Big Quilcene	Puget Sound	BO, NR-1		P, Rh, WL, WN	PL		
Bogachiel	Quillayute	A1, A1, A2, F-1, B2, B3, BO, N, NR-1, WIS	NR-1	F, P, Rh, Rr, P, WL, WN	CF	В	
Bogachiel, North Fk	Bogachiel	A1, B2, N		F, WL, WN	CF	В	
Boulder	Stillaguamish, North Fk	BO, F-1, F-2, N, NR- 1, NP		F, WL, WN	CF		
Bridge Cr	Stehekin	Ν		F, G, Rh, WL	CF	A	
Buck Cr	Suiattle	F-1, N		F	CF		
Bumping	American/ Naches	BO, NR-1		F, P, WL, WN	CF		
Butte Cr	Wenaha (Oregon)	F-1		S	MR		
Calawah	Bogachiel	A2, A2		F	CF		
Calawah, North Fk	Calawah	A2, A2, NR-1	NR-1	F	CF		
Calawah, South Fk	Calawah	A2, A2, N, NR-1	NR-1	F, WN	CF		
Canyon	Satsop, West Fk	NP	[F	CF	[
Canyon Cr	Ruby Cr/Skagit	F-1, N, NR- <u>1</u>		F, Rh, WN	CF	[

RIVER	tributary to:	source of list	special review	qualities	ecoregion	rating	additional comments
Canyon Cr	Lewis	NR-1		G, P	CF		
Canyon Cr	Stillaguamish, South Fk	BO, F-1, N, NR-1		F, P, WL, WN	CF		
Canyon Cr, South Fk	Canyon Cr/ Stillaguamish, So. Fk	F-1, N		F, P, WL, WN	CF		
Carbon	Puyallup	B3, BO, F-1, N, NR- 1, WP	NR-1	G, F, N, Rh, WN	CF	С	
Cascade	Skagit	NP, W		F, L+, N, P, WL	CF	В	
Cascade, Middle Fk	Cascade	WRC		F, P, Rh, WN	CF	В	
Cascade, North Fk	Cascade	WRC		F, L+, N, P, WL	CF	В	
Cascade, South Fk	Cascade	W		F, L+, N, P, WL, WN	CF	В	
Cascade Cr	White Salmon	N		G, P, Rr	CF		
Cedar	Puget Sound	BO		Rf	CF		
Cedar Cr	Bogachiel	A1, A2, NP		F	CF		
Chehalis	Grays Harbor/ Pacific	A2, NC-1, NP, WIS	WIS	F	CF, PL		lower only
Chewack (Chewuch)	Methow	B2, F-1, F-2, N, NC- 2, NR-1	B2	F, G, P, Rf, WL, WN	CF	С	
Chilliwack	Fraser in British Columbia	Ν		G, F-1, Rh, WN	CF		
Chiwawa	Wenatchee	B2, F-1, N, NC-1, NR 1, NP, WNP	B2, NR- 1	F, P, Rf, Rr, WN	CF	С	
Cispus	Cowlitz	AR, BO, F-1, F-2, N, NR-1, NP, WA	NR-1	F, N, P, Rf, Rr, WN	CF	С	
Cle Elum	Yakima	BO, F-1, N, NR-1		P, Rr, WL, WN	CF		
Clear Cr	Muddy/ Lewis	F-1, N, NR-1		G, Rf	CF		
Clearwater	White/ Puyallup	F-1, N		F, WL, WN	CF		
Clearwater	Pacific	A2, A2, NC-1		F	CF		
Columbia (Hanford reach)	Pacific	A1, BO, F-2, N, NR- 1, 5(d), P, WP, Ws	NR-1	F, G, WL	IS	С	
Copalis	Pacific	NC-2		F	CF		

RIVER	tributary to:	source of list	special	qualities	ecoregion	rating	additional
Cowiche Cr	Nachos	NP_1	TEVIEW	\\/I\//NI	15	}	comments
Cowlitz	Columbia	BO F-1 N		G	CE PI		
Cowlitz, Clear Fk	Cowlitz	AR, F-1, F-2, N		G, WN	CF		
Cowlitz, Muddy Fk	Cowlitz	AR, F-1, N		G, WN	CF		
Deception Cr	Туе	F-1, F-2, N, NR-1		WL, WN	CF		
Deer Cr	Stillaguamish, North Fk	BO, F-1, N, NR-1		F, WL	CF		
Dewatto	Puget Sound	BO		F	PL		
Dickey	Quillayute	A2, A2, A2		F	CF		
Diobsud	Skagit	F-1, N, NR-1		P, Rf, Rh, WL, WN	CF	{	
Dosewallips	Puget Sound	AR, B1, B2, B3, BO, F-1, N, NC-1, NR-1, NP	NR-1	F, G, P, Rf, Rh, WL, WN	CF, PL	В	
Downey Cr	Suiattle	F-1, N		F, L+, WL	CF		
Duckabush	Puget Sound	A2, AR, B1, BO, F-1, F-2, N, NR-1, NP, WP		F, G, P, WN	CF, PL	A	
Dungeness	Pacific	BO, F-1, F-2, NP, NR- 1, WIS		F	CF, PL		
Elochoman	Columbia	BO, NC-2, WIS		F	PL	}	
Elwha	Pacific	BO, F-1, NP, WIS		F, G, Rf, Rh, WN	CF		restoration required
Entiat	Columbia	B3, BO, F-1, NP, NR- 1		G, WN	CF		
Entiat, North Fk	Entiat	BO, NR-1		G, WN	CF		
Foss	Туе	BO, F-1, F-2, N, NR- 1		F, Rf, WL	CF		
Foss, East Fk	Foss, West Fk	F-1, F-2		Rh, WN	CF	[
Foss, West Fk	Foss	F-1, F-2		Rh, WN	CF	{	
Grande Ronde	Snake	N, WP		F, Rf, Rr	MR	С	
Granite Cr	Ruby Cr/Skagit	F-1, N, NR-1		F, N	CF	}	

RIVER	tributary to:	source of list	special review	qualities	ecoregion	rating	additional comments
Gray Wolf	Dungeness	AR, F-1, F-2, N, NR- 1, NP		F, G, Rf, Rh, WN	CF		
Grays	Grays Harbor/ Pacific	BO, NC-2, WIS		F	PL		
Green	Puget Sound	BO, N, NR-1, NP, S, WP		F, G, Rf, WN	CF		
Green	Toutle, North Fk	F-1		Rh, WN	CF		upper
Greenwater	White/Puyallup	F-1, N, NR-1		F, WL, WN	CF		
Hamma Hamma	Puget Sound	A2, AR, B2, B3, BO, F-1, N, NC-2, NR-1, NP	B2, B3	F, P, Rh, WN	CF, PL	С	
Harvey Cr	Sullivan Cr/ Pend Oreille	NR-1		F, WL, WN	NR		
Hoh	Pacific	A2, A2, A2, B1, B2, B3, B0, F-1, I, N, NC· 1, WIS	B1, B2, WIS	F, G, N, P, Rh, Rr, WN	CF, PL	A	
Hoko	Strait of Juan De Fuca	A2		F	CF		
Hoquiam	Grays Harbor/ Pacific	A2, A2		F	CF		
Humptulips	Grays Harbor/ Pacific	A2, B2, B3, BO, F-1, N, NR-2, WA	B2, B3	F, P, Rr	CF	С	
Humptulips, West Fk	Humptulips	A2, B2, BO, F-1, N, NR-1, WP	B2	F, P, Rf, Rr	CF	С	
Humptulips, East Fk	Humptulips	A2, B2, BO, F-1, N, NR-1, WP	B2	F, G, P, Rf, Rr	CF	С	
Icicle Cr	Wenatchee	F-1, NC-1, NR-1, NP		P, Rh, WN	CF		
Illabot Cr	Skagit	AR, F-1, N, NR-1		F, WL, WN	CF	В	
Iron Cr	Cispus	NR-1		F	CF		
Joseph Cr	Grande Ronde	BO, N, NR-1		G, WN	MR		
Kalama	Columbia	B2, B3, BO, WIS		F	PL		no dams
Kettle	Columbia	B2, F-1, N, NR-2, NP		F, P, Rf, Rr	NR		

RIVER	tributary to:	source of list	special review	qualities	ecoregion	rating	additional comments
Kitsap Cr	Dyes Inlet/Puget Sound	WIS		F	CF		
Klickitat	Columbia	B2, BO, C, N, NR-1, NP, W, Ws	NR-1	F, G, Rr, WL, WN	CF	В	
Lennox Cr	Snoqualmie, North Fk	F-1, N, NR-1		F, WL, WN	CF		
Lewis	Columbia	AR, A1, BO, F-1, N, WIS		Rf, Rh, WN	CF	В	
Lewis, East Fk	Columbia	AR, A1, B2, B3, BO, F-1, N, NR-1, NP, WIS	B2, WRC	F, P, Rf, Rr, WN	CF	В	
Lewis, North Fk	Lewis	AR, F-2, NR-1	NR-1	F, G, P, Rf, Rh, Rr, WN	CF		major dam
Little Naches	Naches/ Yakima	NR-1		WN	CF		
Little Pend Oreille	Colville	NC-1, NR-1		Rr, WL	NR		
Little Spokane	Spokane	NR-2, WP		Rr, WL	IS		
Little Wenatchee	Wenatchee	B2, BO, N, NC-1, NR- 1		F, WN	CF	С	1 of few sockeye streams in eastern WA
Little White Salmon	Columbia	N, NR-1, NP		G, Rf, WN	CF		
Lost	Methow	F-1, F-2, N, NR-1, NP		F, G, WL, WN	CF		
Lyre	Pacific	NR-1		F	CF		
Mad	Entiat	NR-1, NP		F, G, WL, WN	CF		bull trout
Methow	Columbia	B2, B3, BO, F-1, F-2, I, N, NR-1, NR-2, NP, WP		F, G, Rf, Rr, WL, WN	CF, IS		agriculture on middle and lower river
Miller	Skykomish, South Fk	B2, BO, F-1, F-2, N, NR-1		F, Rf, WL	CF		

RIVER	tributary to:	source of list	special review	qualities	ecoregion	rating	additional comments
Miller, East Fk	Miller, West Fk	B2, F-1, F-2		F, Rf, WL	CF		
Miller, West Fk	Miller	B2, F-1, F-2		F, Rf, WL	CF	••••••••••••••••••••••••••••••••••••••	
Morovitz Cr	Baker Lk/ Skagit	NP			CF		
Muddy	Lewis	Ν		G	CF		
Naches	Yakima	B3, C		F, P	CF	}	
Napeequa	White	N, F-1, NR-1		G, WN	CF	В	
Nasalle	Willapa Bay/ Pacific	A2, B2, B3, BO, NC-1	В3	F, P	CF		restoration potential
Negro Cr	Peshastin Cr/ Wenatchee	NR-1		Р	CF		rare plant: <i>Silene Seelyi</i>
Nemah	Willapa Bay/ Pacific	A2, B3		F	CF		
Nisqually	Puget Sound	A2, B3, BO, N, NC-2, NR-1, WIS		G, WN	CF/PL		Ft. Lewis protection possibilities
Noisy	Baker Lk/ Skagit	AR, F-1, F-2, N, NP		F	CF		
Nooksack	Puget Sound	AR, BO, N, NC-1, WIS		F, Rf, Rr	CF, PL		farming
Nooksack, Middle Fk	Nooksack	AR, BO, F-1, N, NC- 1, NR-1, WIS		F, WL, WN	CF		
Nooksack, North Fk	Nooksack	AR, A2, B2, F-1, F-2, NC-1, NR-1, NP, WP, WIS	NR-1	F, G, N, P, Rf, Rr, WL, WN	CF	В	
Nooksack, South Fk	Nooksack	AR, B2, F-1, F-2, N, NC-1, NR-1, NR-2, WP, WIS	B2, NR- 1	F, P, WL	CF		
North	Willapa Bay/ Pacific	A2, B3		F	CF		
Ohanapecosh	Cowlitz	AR, F-1, F-2, N		F, G, P, WL, WN	CF		
Ozette	Pacific	N		F, P, Rf, Rh, WN	CF		
RIVER	tributary to:	source of list	special review	qualities	ecoregion	rating	additional comments
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Palix	Willapa Bay/ Pacific	A2, B2		F, P	CF		
Palouse	Snake	BO, N, NR-1, NP		G	GP	{	
Panther Cr	Wind	NR-1		F	CF		
Park Cr	Baker Lk/ Skagit	NP		WN	CF		upper
Pasayten	Fraser in British Columbia	F-1, N		WN	CF		
Pend Oreille	Columbia	BO		F	NR		
Pilchuck Cr	Stillaguamish	BO		F	CF		
Pratt	Snoqualmie, Middle Fk	F-1, F-2, N, NR-1		G, P, Rf, Rh, WL, WN	CF		
Puyallup	Puget Sound	BO		F	CF, PL		
Quartz Cr	Lewis	F-1, N, NR-1		G, WN	CF		
Queets	Pacific	A1, A2, B1, B2, B3, I, N, NC-1, WIS	B1, B2	F, G, P, WL, WN	CF	A	
Quilcene	Dabob Bay/Puget Sound	WIS		F	PL		
Quinault	Pacific	A2, B1, B2, B3, F-1, N, WIS	WIS	F, G, P, Rh, Rf, WL, WN	CF	А	
Quillayute	Pacific	BO, WIS	WIS	F, Rf, WL	CF	С	
Rapid	Beckler	F-1		F, R, WL, WN	CF	{	
Rattlesnake Cr	Naches/ Yakima	NR-1		F, P, WL, WN	CF	}	
Rock Cr	Palouse	N		G	GP		
Royal Cr	Dungeness	N		G, Rf, Rh	CF		Olympic N.P.
Ruby Cr	Skagit	F-1, N, NR-1		F, G, N, Rh, WL	CF		
Salmo, South Fk	Salmo/Pend Oreille	F-1		F, R, WL, WN	NR		
Sammamish	Lk Washington/ Puget	A2, NP		F	PL		urban
Sanpoil	Columbia	B2, B3, BO		F, P	NR		one of best in northeast WA
Sanpoil, West Fk	Sanpoil	BO		F	NR		

RIVER	tributary to:	source of list	special review	qualities	ecoregion	rating	additional comments
Satsop	Chehalis	NC-1, NP	NC-1	F, B	CF		highest fish diversity
Satsop, East Fk	Satsop	NC-1	NC-1	F, B	CF		
Satsop, Middle Fk	Satsop	NC-1	NC-1	F, B	CF		
Satsop, West Fk	Satsop	NC-1, NR-1	NC-1	B, F, WL, WN	CF		
Sauk	Skagit	A1, A1, B3, BO, NC- 1, NP, W		F, G, L+, N, Rf, Rr	CF	А	
Sauk, North Fk	Sauk	A1, B3, F-1, NC-1, W		F, G, L+, N, P, Rh	CF	А	
Sauk, South Fk	Sauk	A1, B3, F-1, N, NC-1, NR-1		F, L+, WL, WN	CF	А	
Sheep Cr	Tucannon	F-1		S, Rf	MR		short
Silesia Cr	Fraser in British Columbia	F-1, N		WL, WN	CF		
Silver Cr	Yakima	NR-1		G, P, WL, WN	CF		
Similkameen	Okanogan	BO		Rh	NR		
Siouxon Cr	Lewis	F-1, N, NR-1		F, Rf, Rh, WN	CF		
Sitkum	Calawah, South Fk	NR-1, NP		F, Rr	CF		
Skagit	Skagit Bay/Pacific	AR, A1, A1, A2, F-1, I, N, NR-1, NP, W, WIS		F, L, Rf, Rr, WL	CF, PL	В	
Skamokawa Cr	Columbia	BO	 	F	PL		
Skokomish	Puget Sound	BO		F	PL	<u></u>	
Skokomish, North Fk	Skokomish	во		Rh	CF		large dam at hdwtrs
Skokomish, South Fk	Skokomish	BO, F-1		F, Rf, Rh, WN	CF, PL		
Skykomish	Snohomish	A1, A2, BO, F, N, S, WIS		F, R, Rf, Rr, WL	CF, PL		
Skykomish, North Fk	Skykomish	AR, A1, A2, B2, B3, F 1, F-2, N, NR-1, NP, S, WP, WIS	NR-1, B2, B3	F, P, Rf, Rr, WL, WN	CF	A	

RIVER	tributary to:	source of list	special review	qualities	ecoregion	rating	additional comments
Skykomish, South Fk	Skykomish	AR, A1, A2, BO, F-1, F-2, N, NR-1, NP, S, WP, WIS		F, Rr, WL, WN	CF		
Smith Cr	Muddy/ Lewis	F-1, N		G	CF		
Snake	Columbia	NR-1, W, Ws		F, Rf, Rr, WL	MR		
Snohomish	Puget Sound	A1, A2, BO, P, WIS		F	PL		
Snoqualmie	Snohomish	BO, N, WIS		F, WL	PL		
Snoqualmie, Middle Fk	Snoqualmie	AR, B2, B3, BO, F-1, F-2, N, NR-1, NP	B2, B3	F, G, P, Rf, Rr, WL, WN	CF		good trout fisheryfew exotics
Snoqualmie, North Fk	Snoqualmie	AR, BO, F-1, F-2, N, NR-1, NP		F, Rf, WL, WN	CF		
Snoqualmie, South Fk	Snoqualmie	BO, F-1, N		WL	CF		
Soleduck	Quillayute	A2, B2, B0, F-1, N, NR-1, WP, WIS	NR-1, WIS	F, G, P, Rf, Rh	CF	С	
Soleduck, North Fk	Soleduck	B2, WRC		F, G, P, Rf, Rh, WN	CF	С	
Spokane	Columbia	BO, NP		R	IS		
Stehekin	Lk Chelan/ Columbia	F-1, N, NR-1		F, G, Rf, Rh, Rr, WL, WN	CF	A	
Stillaguamish	Puget Sound	A2, B2, B0, N, NC-2, WP, WIS		F, Rf, WL	CF, PL		
Stillaguamish, North Fk	Stillaguamish	A2, A2, B2, B0, F-1, N, NC-2, NR-1, NR- 2, WP, WIS	NR-1	F, WL, WN	CF	С	
Stillaguamish, North Fk, North Branch of	Stillaguamish, North Fk	B2, F-1, N		F	CF		

RIVER	tributary to:	source of list	special review	qualities	ecoregion	rating	additional comments
Stillaguamish, South Fk	Stillaguamish	A2, A2, B2, B0, F-1, F-2, NR-1, N, NR-2, F, NP, WP, WIS		F, Rr, WL	CF	С	
Suiattle	Sauk	B3, BO, NP, W, WIS, WRC		F, G, L+, N, P, Rr	CF	A	
Sullivan Cr	Pend Oreille/ Columbia	NR-1		F, Rf, WL, WN	NR		
Sullivan Cr, North Fk	Sullivan Cr/ Pend Oreille	NR-1		F	NR		
Sultan	Skykomish	BO		F	CF		
Taylor	Snoqualmie, Middle Fk	F-1, F-2, N, NR-1		F, G, Rf, Rr, WL, WN	CF		
Teanaway	Yakima	во		P, Rf, Rh, WL, WN	CF		pronounced Tee- ANN-away
Teanaway, Middle Fk	Teanaway	NR-1		P, Rf, Rh, WL, WN	CF		
Teanaway, North Fk	Teanaway	NR-1		P, Rf, Rh, WL, WN	CF		
Teanaway, West Fk	Teanaway	NR-1		P, Rf, Rh, WL, WN	CF		
Thirteenmile Cr	Sanpoil/ Columbia	NR-1		P, WL, WN	NR		
Thunder Cr	Ross Lk/ Skagit	F-1, N		G, N, P, Rh, WN	CF		
Tieton	Naches/ Yakima	NR-1		G, Rr, WL	CF		
Tieton, North Fk	Tieton	BO, NR-1		G, Rr, WL, WN	CF		
Tieton, South Fk	Tieton	BO		G, Rr, WL, WN	CF		
Tolt	Snoqualmie	BO		F	PL		
Tolt, North Fk	Tolt	BO		F	CF		
Tolt, South Fk	Tolt	BO, F-1, N, NP		F	CF		
Toutle	Cowlitz	BO, F-1, N, NP		G, WL, WN	CF		
Toutle, North Fk	Toutle	BO		G	CF		
Toutle, South Fk	Toutle	BO		G	CF		
Troublesome Cr	Skykomish, North Fk	F-1, N, NP		WL, WN	CF		

RIVER	tributary to:	source of list	special review	qualities	ecoregion	rating	additional comments
Tucannon	Snake	BO, F-1, N, NC-1, NR 1		F, Rh, Rr, WL, WN	IS, MR		
Twisp	Methow	BO, F-1, F-2, N, NR- 1, NP		F, Rh, Rr, WL, WN	MR		
Туе	Skykomish, South Fk	BO, F-1, NR-1, NP, S, WP		F, Rf, WL, WN	CF		
Wallace	Skykomish	BO		R	CF		
Wanlick Cr	Nooksack, South Fk	F-2			CF		short
Waptus	Cle Elum	F-1, N, NR-1	{	G, WN	CF		
War Cr	Twisp	NP		Rh, WN	CF		
Washougal	Columbia	BO, NR-2, NP, WP, WIS		F, Rf, Rr	CF		
Wells Cr	Nooksack, North Fk	BO, F-1, F-2, N, NR- 1		F, G, Rr, WL	CF		
Wenaha, North Fk	Wenaha	C, F-1, NR-1		F, S, WL, WN	MR		See Oregon
Wenas Cr, North Fk	Yakima	NP			CF		
Wenas Cr, South Fk	Yakima	NP			CF		
Wenatchee	Columbia	A1, C, F-1, N, NC-1, NR-1, NR-2, NP, WP, 5(d)		F, G, P, Rf, Rh, Rr	CF, IS		
West Cady Cr	Skykomish, North Fk	F-1, N		WL, WN	CF		
White	Wenatchee	B2, BO, F-1, N, NR- 1, 5(d)	NRI	F, G, P, WN	CF	В	1 of few sockeye streams in eastern WA
White	Puyallup	F-1, F-2, N, NR-1		F, N, P, Rh, Rr, WL	CF		
White, West Fk	White/ Puyallup	N	{	N, Rh, WL, WN	CF	<u>}</u>	
White Chuck	Sauk	AR, BO, F-1, N, NR-1	NR-1	F, L+, P, Rf, Rh, Rr, WL, WN	CF	A	
White Salmon	Columbia	BO, F-1, N, NR-1, W, Ws, WP, WIS		F, G, P, Rh, Rr, WL	CF		

RIVER	tributary to:	source of list	special review	qualities	ecoregion	rating	additional comments
White Salmon Cr	Nooksack, North Fk	NP		G	CF		short
Willapa	Willapa Bay/ Pacific	A2, A2, WIS		F	CF		
Wind	Columbia	B2, BO, F-1, N, NR- 1, WIS	B2, NR- 1	F, G, P	CF	С	
Wishkah	Chehelis	A2, A2		F	CF		
Wolf Cr	Lk Chelan/ Columbia	F-1, F-2, N		F, WL, WN	CF		
Wynoochee	Grays Harbor/ Pacific	A2, BO, F-1, N, NR- 2, NP, WP		F, G, Rf, WL	CF		dam at hdwtrs
Yakima	Columbia	BO, N, NR-1, NP		G, F, P, Rf, Rr, WL	IS		
Yellowjacket Cr	Cispus	F-1, N, NR-1		F, P	CF	}	

WASHINGTON'S "A" RIVERS

Duckabush River

Among the six stellar, major streams flowing off the east side of the Olympic Mountains, the Duckabush is one of the largest. It boasts some of the wildest headwaters and hosts some of the best remaining salmon and steelhead runs.

The river begins at O'Neal Pass in the southeastern part of Olympic National Park and flows east for 23 miles to the Hood Canal, on the west side of Puget Sound. The upper 14 miles lie within Olympic National Park, where the spectacular mountain river collects water from 6,000-foot-high peaks. Then the river flows for 3 miles through the Brothers Wilderness of Olympic National Forest, followed by another 3 miles of road-accessible terrain in the Olympic National Forest. Finally it flows through 4 miles of private land before reaching its mouth.

A trail runs the length of the river beyond the last road access,

near the wilderness boundary, and offers spectacular hiking through a pristine riparian corridor with deep canyons, old-growth forests, and alpine meadows. A few whitewater boaters paddle from the end of the road to the mouth. The river still hosts a good run of pink salmon and also has chum, coho, steelhead, sea-run cutthroat trout, and resident fish.

Some development has occurred along the private acreage of the lower river, and the Forest Service reach has an inholding of private land. The stream was studied and recommended for state wild and scenic river designation, and the Forest Service has found the portion in the national park eligible for federal designation. The finest salmon spawning areas are located in the lower river—the least-protected reach.

This is the second-longest river on the east side of the Olympic Mountains. Only the Dosewallips is larger, but the Duckabush has a stronger run of pink salmon. While most of the river is in the Cascade Forest ecoregion, the lower miles flow through the Pacific Lowland of Puget Sound.

Hoh River

The Hoh is one of three extraordinary streams that flow down the west face of the Olympic Mountains. Running through wild terrain for nearly half its length, the river drains the entire northern half of the Mount Olympus massif and then winds through the Hoh Rainforest, which has been internationally recognized as both a Biosphere Reserve and a World Heritage Site.

Running 56 miles westward from headwaters on Mount Olympus to the Pacific Ocean, the Hoh River begins above timberline in the outwash of the mountain's far eastern glaciers. The river flows north between Olympus and the craggy Bailey Range, and then curves westward around the mountain's north slopes. Mount Olympus is the only intensively glaciated mountain on the West Coast south of Canada and is the highest peak so close to the ocean, rising to 7,969 feet within 35 miles of the Pacific. Owing to these unique geographic attributes, amounts of rain and snowfall here are among the greatest in the U.S. south of Alaska.

The Hoh's upper 28 miles flow entirely within Olympic National Park, and 20 miles of this reach lie beyond road access. The Hoh River Trail follows the river for 18 miles, passing through a forest of immense Sitka spruce, western hemlock, and western redcedar—the world's premier temperate rainforest. The 18-mile-long South Fork joins at the national park boundary after draining an equally impressive west face of the mountain. A road follows up the lower 5 miles of the South Fork. Beyond that, a trail climbs up through the South Fork valley and dead-ends in a rainforest basin below the steeply rising Olympus.

The lower 28 miles of the Hoh's main stem flow through private land, largely held by timber industry owners, though much of the river's frontage is being acquired by the Western Rivers Conservancy for management by a newly established Hoh River Trust. The Hoh empties into the Pacific at one of the most natural mouths of a sizable river on the West Coast, bordered on the south by the Hoh Indian Reservation and on the north by the thin coastal swath of Olympic National Park. This swath is the second-longest roadless section of coastline in the U.S. outside Alaska (only the Lost Coast-Sinkyone wilderness in northern California is longer). The Hoh is one of the four finest remaining winter steelhead streams in the Northwest, and it also has a good run of fall chinook salmon, which migrate 45 miles upstream to spawn. In addition, it hosts runs of summer steelhead, fall coho, fall chinook, and bull trout, all listed as threatened or endangered species. Lacking dams or encroachments, the river has an entirely natural flow regime. Its riparian zone remains intact, and the watershed supports bald eagles, black bears, spotted owls, and many other types of wildlife associated with old-growth forests.

Queets River

Perhaps the most-protected river in America from source to ocean, the Queets flows as a mirror image of the Hoh on the south side of the great mountain, and carries significantly more water then the Hoh or the nearby Quinault. Among these three most outstanding Olympic Peninsula rivers, the Queets may be the most pristine of all.

Beginning on the eastern and southern flanks of Mount Olympus, the river flows south and then westward for about 50 miles to the Pacific Ocean. The upper 10 miles have no road or trail access; the next 17 miles are accessible only by a dead-end trail. Then comes a 15-mile reach roughly paralleled by a gravel road. The river's final 8 miles border or flow within the Quinault Indian Reservation.

The Queets hosts the greatest diversity of salmon runs on the Olympic Peninsula, including one of the best winter steelhead runs in the Northwest, plus good runs of fall chinook. It flows through an outstanding temperate rainforest, which includes the world's largest or near-largest specimens of western hemlock, Douglasfir, and black cottonwood. The Queets basin is often selected for research as the only truly pristine mainstem river on the West Coast south of Canada.

The Queets is largely protected, however, the 15-mile corridor through the park and the the Indian Reservation are less secure than the upper reaches. While the river's upper 42 miles flow entirely within Olympic National Park, public ownership of the national park's lower, 15-mile-reach extends to only a thin corridor, one or two miles wide. And within that road-accessible zone, logging has been permitted in an embattled history of compromised management of national park land.

The Clearwater River—a major tributary entering from the north just 5 miles above the mouth of the Queets—still has a good run of fall chinook and winter steelhead but has been heavily logged and flows entirely through Forest Service and private timber industry land. Restoration of this tributary--now a "weak link" in the basin--would do much to establish the Queets as one of America's truly exemplary rivers.

Quinault River

The southernmost of three consecutive, outstanding rivers on the west side of the Olympics, the Quinault has all the values if the Hoh and the Queets and also flows through a sockeye salmon bearing lake--extremely rare in the coastal mountains south of Canada.

Beginning with the glaciers of Mount Anderson, in the eastcentral recesses of Olympic National Park, the river flows southwest for 56 miles to the Pacific Ocean. The upper 13 miles, in the park, have only trail access through a wild valley with gorges, waterfalls, old-growth forests, and rugged mountain peaks. The next 6 miles have road access through the national park, followed by 8 miles where the park has jurisdiction on the north side and Olympic National Forest has jurisdiction on the south side of the river. Within the national forest, the Colonel Bob Wilderness parallels the river, its boundary perched about 250 feet above the banks, for 6 miles. However, there are many private inholdings directly fronting the river on the south side within this reach. The river next enters the 3 mile-long Quinault Lake, which was formed by a terminal moraine of the Quinault Valley Glacier. The river's final 26 miles flow through the Quinault Indian Reservation to the ocean.

The river has a good run of winter steelhead and also supports spring chinook, fall chinook, and coho. Quinault Lake—unusual in being so close to the ocean—supports a run of sockeye salmon, which are uncommon anywhere in the U.S. south of Alaska. This fishery has been diminished in recent decades by erosion from upstream riverbanks in areas that were logged and perhaps also from natural landslides. Upper reaches of the watershed provide prime opportunities for wilderness backpacking.

The North Fork Quinault is likewise an excellent wild river, flowing from high country at the divide between the Queets and Elwha River watersheds. It joins the main-stem 9 miles upstream from the lake.

The Quinault flows almost entirely in national park, national forest, or the Quinault Indian Reservation ownership except for private parcels on the south side of the river upstream from the lake. Depending on Indian management of the substantial lower reach, this could be one of America's most completely protected rivers from headwaters to sea.

Sauk River with North and South Forks, and White Chuck River

The Sauk system is the most extraordinary natural river complex draining the entire Cascade Range, and it ranks as one of the finest wild river systems in America. Exquisite wild headwaters including the North Fork, White Chuck, and Suiattle (covered separately in this report) drain the highcountry of the Glacier Peak Wilderness. Though the main stems flow silty with glacial runoff, many clear tributaries join the river and the basin hosts a fine anadramous fishery. When combined with the Skagit, the Sauk and its North Fork offer a freeflowing length of more than 116 miles, the longest in Washington, and one of the longest undammed reaches on the West Coast.

The three branches and main stem are grouped together here because of their many similarities. Flowing from the monolith of Glacier Peak and the snowy summits of the North Cascades, the Sauk drops west, then flows mostly north, and joins the Skagit River at Rockport.

The two premier wild reaches here are the North Fork Sauk and the upper White Chuck, which parallels the North Fork and lies to the north of it. Both begin on the glacier-clad west slopes of the North Cascades and plunge down over waterfalls, churn through remote gorges, and wind through valleys filled with ancient coniferous forests. The North Fork flows for 10 miles through the Glacier Peak Wilderness and then for another 8 miles with road access through the Mt. Baker National Forest before joining the South Fork to form the main stem. The White Chuck flows for 10 miles through the Glacier Peak Wilderness and then for another 12 miles with road access through the national forest to its Sauk River confluence. The basins of both streams are almost entirely under national forest ownership. Trails along these rivers—as with the Suiattle River directly to the north—offer some of the finest riverfront wilderness hiking in the Northwest.

The South Fork Sauk basin is also mostly public land. The stream flows 12 miles northward from the Henry Jackson Wilderness at the North Cascades crest to its confluence with the North Fork. Its upper 5 miles can be reached by way of an unimproved road that provides access to a campground, trailhead, and several mining claims near the headwaters of the river; its lower 7 miles are paralleled by a paved road.

From the North and South Fork confluence, the main stem Sauk runs northward for 40 miles to the Skagit River. This steep route includes many rapids, a broad floodplain forest, intricate meanders in glacial outwash, large bars of glacial cobbles and gravel, spectacular views of the North Cascades, a few remaining stands of old-growth trees, and entire mountainsides that have been clearcut. Several sections of the river are popular as whitewater rafting and kayaking runs.

While national forest land predominates along the upper 13 miles of the main stem, nearly all of the riverfront and corridor from the town of Darrington downstream--27 miles to the Skagit confluence--are owned by the timber industry and the state, and much of this section has been heavily logged. Some of this route winds through braided glacial outwash with extensive riparian forests. Cold, clear water becomes clouded with glacial silt in summer as the White Chuck and Suiattle Rivers add their runoff to create a substantial continuous flow. Upper basins of all the streams support spotted owls, mountain goats, deer, bears, and other wildlife.

Below barriers imposed by waterfalls on the forks and tributaries, the Sauk basin provides important habitat for anadromous fish,

including excellent runs of chum and winter steelhead. The Sauk is one of only three rivers south of Canada listed in the journal, Fisheries, as having two runs of anadromous fish still running at twothirds or better than their pre-settlement levels (the other two rivers are the Skagit and Bogachiel). The White Chuck River hosts chinook, coho, Dolly Varden, and resident rainbow trout. Like the Sauk, these waters are often silty owing to glacial runoff, and diversity of aquatic species is somewhat limited, especially compared to streams in non-glaciated areas.

The entire main stem Sauk and the North Fork from the wilderness boundary downstream were designated in the National Wild and Scenic Rivers system in 1978, along with much of the Skagit River. Though it is entirely in public ownership, the White Chuck is not yet designated as a wild and scenic river. The management of the extensive private and state-owned land along the Sauk below Darrington will determine much about the health of this extraordinary river system. If this corridor were protected, the Sauk could be one of the finest and best-protected river systems in the West.

The North Fork and main stem Sauk together flow 58 miles, and combined with 58 free-flowing miles of the Skagit, which lie immediately downstream, the flowage offers 116 miles of dam-free river. The combined free-flowing mileage of the Suiattle-Sauk-Skagit is comparable, making the greater Sauk-Skagit system unique on the West Coast.

Skykomish River, North Fork

Exquisite clear, water tinted green, boulder-riddled rapids, deeply forested shorelines, and a fine fishery make the North Fork of the Skykomish the exceptional river of Washington's central Cascades.

The North Fork flows southwestward for 28 miles through the heart of the Cascade Mountains to the South Fork confluence, where the main stem Skykomish begins. Headwaters rise in the Henry Jackson Wilderness and include Quartz, Troublesome, and Cady Creeks as wild tributaries. Four miles of the North Fork headwaters lie in the wilderness area, reachable only by trail. A dead-end forest road parallels and provides access to the rest of the river. The North Fork Skykomish hosts an excellent run of winter steelhead and a good run of chum salmon. Other fish include coho, chinook, and resident trout. The wild basin provides habitat for bald eagles, mountain goats, and spotted owls. Old-growth conifers are still found in the upper basin, and the riparian forest remains largely intact. The lower North Fork provides some of the finest whitewater paddling in the Cascades, and offers spectacular scenery, with Mount Index and other peaks rising up from its valley.

Downstream from Bear Creek Falls, 13 miles of the North Fork are designated as a state scenic river. Most of this river frontage and corridor lie within national forest; however, the lowermost 5 miles include a number of private inholdings and state-owned land that has been logged.

Below the mouth of the North Fork, the main stem Skykomish flows for 25 miles to the Snohomish River, which then runs for about 16 miles to Possession Sound of Puget Sound, just north of Everett. From North Fork headwaters to the sea, the river flows undammed for about 70 miles, and it is considered one of the finest winter steelhead streams in the Northwest. Downstream from the North Fork, the main stem Skykomish and then the Snohomish River flow almost entirely through private land.

The South Fork Skykomish and its principal tributaries--the Miller, Bechler, Tye, and Foss Rivers--are fine streams and have excellent runs of winter steelhead. But unlike the North Skykomish, the South Fork's valley is crowded with a major highway, a railroad, power lines, private inholdings within the Snoqualmie National Forest, and secondary roads that extend up several tributary streams.

Stehekin River with Bridge Creek

Though short, the Stehekin River and its tributaries are unique, flowing from high glacial peaks of the North Cascades eastward to the inlet of Lake Chelan. These streams offer an unusual recreational experience with Alaska-like remoteness, reachable only by trail or by ferryboat on the 60-mile long lake. This is one of the most remote basins east of the Cascade crest. The river begins at Cascade Pass, in the heart of the North Cascade Mountains. Collecting glacial runoff, the upper river flows southeastward through spectacular high country for 4 miles to Cottonwood campground. Below this, the river is paralleled for 18 miles by a minor road coming from Lake Chelan, but this little-used access is reachable only by ferryboats motoring across the entire length of the lake. The 8-mile reach just upstream from Lake Chelan is paddled by whitewater kayakers.

The Washington Wild and Scenic Rivers Campaign called the Stehekin the "most undisturbed major river valley on the east side of the Cascades." The basin contains a wide range of habitat ranging from high peaks to low elevation Ponderosa pine forests typical of the dry, east-Cascade front. It supports grizzly bears, gray wolves, black bears, and martens, and has a resident trout fishery, including bull trout. Spectacular glacial scenery, old-growth forests, and outstanding wildlife make the Stehekin one of the finest rivers of the east slope of the North Cascades.

The basin is entirely protected within North Cascades National Park, the Stephen Mather Wilderness, and the Lake Chelan National Recreation Area.

Suiattle River

With all the extraordinary qualities of the upper Sauk basin, the Suiattle—a major tributary—wraps north around the North Cascade's iconic Glacier Peak, and then flows westward to join the lower Sauk, 12 miles above its confluence with the Skagit.

The river's 44-mile northwestward route begins on the wild and snowy slopes of Glacier Peak. The most isolated among the massive summits of the Cascades, the 10,538-foot summit pours the lion's share of its rainfall, snowmelt, and prodigious glacial runoff into the upper Suiattle. The river cups the mountain's entire south side, then its east face, and finally its northern exposure, all the while plunging tumultuously downward in a route comparable to that of the Hoh, which similarly arcs around the north side of Mount Olympus. The Suiattle's upper 20 miles lie entirely within the Glacier Peak Wilderness and constitute one of the wildest and most-remote river reaches in the Northwest. The first 10 of these miles are inaccessible by either road or trail, and the second ten-mile section is reached only by trail. Then, from the wilderness boundary to its confluence with the Sauk, the Suiattle is paralleled by an unimproved road. Here, adjacent mountainsides have been cut. The lower 11 miles flow through a mosaic of private timber industry and state land, which have also been heavily logged. Although the entire Suiattle is designated in either the Glacier Peak Wilderness or the National Wild and Scenic River system, these measures have failed to protect the significant lower reaches from the impacts of logging.

Highcountry and old-growth forests predominate along the upper reaches of the Suiattle. The excellent runs of chum salmon and winter steelhead that migrate up the Sauk River may use the Suiattle as well. The lower river from Rat Trap Bridge to the Sauk is a premier Class III whitewater run with good summer flow owing to the large amount of glacial runoff.

The Suiattle is the finest example of a river draining the north side of a major Cascade peak, with the resulting glacial-fed flow that will likely be sustained even when other rivers become depleted owing to global warming and to the predicted likelihood of more runoff coming as rain than snow at lower elevations.

The river also has great significance in its free-flowing length—114 miles when combined with downstream mileage of the Sauk and Skagit. This, along with the North Fork/Sauk/Skagit, White Chuck/ Sauk/Skagit, and Chehalis are the only streams in Washington with undammed flows greater than 100 miles.

WASHINGTON'S "B" RIVERS

Bogachiel River, North Fork with main stem Bogachiel

Prized for its fine remaining salmon and steelhead runs, the Bogachiel affords many of the assets of the Hoh-Queets-Quinault complex to its south, but it flows through more private land, has more roads, and has endured more logging in its watershed. This 43-mile-long river flows westward from 5,000-foot peaks to its confluence with the Quillayute River, which then runs 5 miles to the Pacific.

The upper 25 miles of the Bogachiel lie within Olympic National Park and include ancient rainforests, waterfalls, gorges, and wild valleys with a rich riparian corridor. For its first 12 miles the upper Bogachiel has no road or trail access. A comparable length of the North Fork is paralleled by a trail. Below the main stem-North Fork confluence, a trail follows the Bogachiel for another 9 miles to a road near the national park boundary. From there downstream for 18 miles to the Pacific, the riverfront is owned almost entirely by timber industry and other private owners. Though heavily logged, the lower river still has a broad floodplain with riparian forests and frontage that is mostly undeveloped.

The Bogachiel hosts excellent runs of fall chinook, plus runs of coho, chum, pink salmon, steelhead, and sea-run cutthroat trout. Overall, it ranks as one of the best anadromous fisheries on the Olympic Peninsula. Bald eagles, elk, and black bear also thrive here.

Cascade River with North, Middle, and South Forks

A major tributary to the upper Skagit, the Cascade River system features many of the wilderness and fishery qualities of the Sauk basin to its south, but it is smaller and enters higher on the Skagit's main stem.

The Cascade flows northwest for 29 miles from its South Fork headwaters to the Skagit River at Marblemount. The upper 7 miles of the South Fork and upper 3 miles of the Middle Fork lie in the Glacier Peak Wilderness and drop from massive North Cascade peaks and glaciers and join the North Fork at Mineral Park. The North Fork is about 4 miles in length, and is paralleled by a road almost to its headwaters near Cascade Pass. Downstream from the confluence of its North and South Forks, the main stem Cascade flows with clear, blue-green glacial water for 13 miles through the Mt. Baker National Forest. For its final 7 miles, the river runs through a mixture of state and private timberlands that have been heavily logged. When combined with the free-flowing Skagit, downstream, Cascade waters flow dam-free for 93 miles. The Cascade is an important anadromous fishery and also choice habitat for eagles, bears, and other wildlife. Upper reaches still have old-growth timber.

The entire length of the South Fork is protected as either a national river or in the Glacier Peak Wilderness. Much of the North Fork is protected within North Cascades National Park, and the entire main stem is designated as a National Wild and Scenic River. However, the lower river remains threatened with degradation from logging or land development that can occur on private and state-owned land.

Dosewallips River

The Dosewallips is the largest river on the east side of the Olympic Mountains and is widely recommended for protection by fisheries biologists. (It is curiously not on the American Fisheries Society list).

The river flows for 28 miles from eastern peaks of Olympic National Park to the Hood Canal south of Quilcene Bay. The river begins in a cirque of snowy peaks that lie east of Mount Olympus, and then drops into lush rainforest. The river's upper 14 miles are accessible only by trail. The Dosewallip's major tributary, the West Fork, likewise has a trail along its entire 7-mile length. A few miles downstream from where the West Fork enters, the main stem tumbles over cascades at Dosewallips Falls, and reaches the end of an access road. From there, the river flows for 2 more miles through the national park, for 7 miles through national forest, and, finally, for 5 miles through private land to sea level.

The Dosewallips is similar in many ways to the Duckabush--the next river to the south—but it is larger. While its pink salmon run is not considered as good as that of the Duckabush, the Dosewallips hosts all Washington runs of salmon except sockeye, sea-run and cutthroat trout. It also has the only steelhead run that enters Olympic National Park from the east side. Bald eagles and black bears thrive here, and winter range in the basin is critical to deer and elk herds. Upper reaches of the river are popular among hikers in the national park, and whitewater kayakers and rafters paddle on the lower river, which has a commercial raft run. Common among other Olympic Peninsula rivers but exceedingly rare elsewhere, the Dosewallips watershed contains a reasonably intact ecosystem, from high-mountain passes to sea level. However, logging, home building, and a once-proposed dam and hydroelectric project have threatened--and continue to threaten-the lower river.

Klickitat River

With some of the longest undammed mileage in the state, spectacular scenery, wildlife, recreational values, and a fine remaining salmon fishery that encounters only one dam downstream on the Columbia, the Klickitat may be the finest among a suite of rivers draining into the Columbia from southern Washington. Flowing from the east side of the Cascades, the Klickitat is one of the best examples of a natural river coursing through ponderosa pine groves and drier terrain in the rain shadow of the Cascade mountains.

The river flows for 95 miles southward from Cispus Pass to the Columbia River at Lyle, forming one the longest free-flowing reaches in the state, behind only the Sauk-Skagit system (116 miles) with several of its tributaries, and the Chehalis (106 miles).

Headwaters drain the Goat Rocks Wilderness area and have no trail or road access for 9 miles. The next 36 miles of the river flow through the Yakima Indian Reservation—one of the longest reaches of river on Indian land in Washington. Through this section, the river picks up substantial runoff from the east face of Mount Adams—a Cascade strato-volcano lying just to the west. Downstream from the reservation, unimproved or paved roads run through the river valley but rarely encroach on the river. One 7-mile section upstream from the mouth of the Little Klickitat River has only trail access. A paved highway then parallels the river's lower route, though in one reach the Klickitat drops deep into narrow basalt gorges with churning whitewater.

The Klickitat hosts chinook, coho, and two runs of steelhead, but it also has a hatchery in its middle reaches below the Indian reservation. In its Middle Klickitat Wild and Scenic River Study, the U.S. Forest Service called this river "the most significant anadromous fishery on the Washington side of the Columbia between Portland and the Snake River." Sport fishing is popular and Indians dip net for salmon in the lower reach. The basin also provides one of the state's most important deer wintering areas, plus important bald eagle wintering habitat.

Popular for recreation, the middle reaches--with their mix of basalt canyons, forested slopes, and broad riparian floodplains-provide for excellent whitewater rafting, kayaking, and drift boating. The river is often considered the most scenic in central or eastern Washington. The lower 11 miles were added to the National Wild and Scenic Rivers system in 1986, and middle reaches have also been studied for inclusion.

The state manages the Klickitat River Breaks Wildlife Management Area along the middle river, but private land through the middle and lower corridors presents an opportunity for open space protection and restoration along this important stream.

Lewis River, East Fork with main stem

The East Fork Lewis, combined with the short main-stem Lewis downstream, forms the largest, dam-free, north-side tributary to the Columbia below Bonneville Dam, offering anadromous fish an unobstructed migratory route to excellent spawning habitat.

This 32-mile-long river flows westward from the Gifford Pinchot National Forest to the main stem Lewis River, which then runs for 3 miles and empties into the Columbia across the river from the town of St. Helens, Oregon. The main stem Lewis is the eighth-largest river in Washington.

The upper 11 miles of the East Fork flow through national forest land and feature numerous waterfalls and heavily forested frontage. Downstream from the forest boundary, nearly all the land bordering the river is privately owned and is used for farming, homesites, and cabins, with progressively more development in lower reaches.

The East Fork Lewis hosts an excellent run of fall chinook and also has sea-run cutthroat trout, resident trout, and some of the largest steelhead caught in Washington. Upper reaches offer popular whitewater runs, and drift boats, tubers, and campers use middle and lower sections extensively.

However, gravel mining has threatened the lower river, and land development pressures are greater here than on almost any other valuable natural river in the state because the frontage is all in private ownership, in non-mountainous terrain, and near a rapidly urbanizing area.

Unlike the Lewis River's North Fork, the East Fork is undammed, leaving a free-flowing channel from headwaters to ocean. And unlike other fine lower Columbia tributaries such as the Klickitat, Wind, and White Salmon, the Lewis River joins the Columbia below the first main-stem dam at Bonneville. Thus, fish going up the East Fork Lewis have no dams in their path. This distinguishes the East Fork as the largest undammed tributary to the Columbia below Bonneville and the most significant completely dam-free route ocean to headwaters—in the Columbia basin (the Sandy River in Oregon is similarly free-flowing now that Marmot Dam has been removed). The Toutle River, a tributary to the Cowlitz, is similar in length to the East Fork Lewis, but it has been heavily affected by Mount St. Helens' mudflows. With this unique status, the East Fork Lewis may be the most important relatively natural river in Washington that remains mostly in private ownership.

Nooksack River, North Fork

A paragon of mountain scenery, the North Fork Nooksack flows from a glacial cirque high in the North Cascades, drops over waterfalls and through dense forests, and supports valuable fisheries.

As the far northern river of Washington, the North Fork flows 45 miles westward from the Nooksack Cirque, on the northeast slope of Mount Shuksan, to the South Fork confluence, where the main stem begins. The upper 4 miles flow through North Cascades National Park and the Mount Baker Wilderness; the next 2 miles are paralleled by a trail from an unimproved road at White Salmon Creek. Downstream from there, the river flows for 16 miles through

national forest land, with highway access, a commercial ski area, and a few other private inholdings. The final 19 miles flow mostly through private land to the South Fork confluence, where the main stem Nooksack begins.

Upper reaches drain the spectacular peaks of Mount Shuksan one of the most-photographed mountains in America—and also the snow and glacier-clad pyramid of 10,775-foot Mount Baker, one of the classic strato-volcanoes of the Cascade Range. At Nooksack Falls, the river drops 100 feet, a scenic attraction marred by a diversion dam.

A good run of chum salmon remains in the North Fork below the falls. The river supports all species of Washington salmon plus Dolly Varden, sea-run cutthroat, rainbow trout, and a full suite of native fishes. The Nooksack Research Natural Area and Wells Creek basin have magnificent stands of old-growth forests. Bald eagles, elk, spotted owls, and other wildlife can be found here. Owing to summer snowmelt from glaciers on Mount Baker and Shuksan, the river maintains important fishery flows and adequate whitewater rafting flows all summer—one of only three rivers in the state with consistently ample runoff even in late summer (the Suiattle and Skagit are the other two).

Mining claims and hydroelectric proposals have threatened the North Fork, logging has occurred throughout the extensive private and state-owned lands along lower reaches, and more real estate development is now occurring. A salmon hatchery is located at Kendall Creek, 8 miles up from the South Fork confluence, in what could otherwise be a pristine wild fishery.

Although the main stem of the Nooksack flows almost entirely through farmland, with increasing rural development along its 51-mile-long reach to Bellingham Bay, the entire Nooksack system remains virtually undammed. The Middle and South Forks have similar qualities as the North Fork, but the North Fork's chum salmon run is in better condition, and the river benefits from the ample north-face summer flows of Mount Baker.

Skagit River with Illabot Creek

Classic among rivers of the West, the highly accessible Skagit provides important habitat for salmon runs and bald eagles, and it offers free-flowing mileage of more than 100 miles when combined with some of its tributaries, though the upper reaches are heavily affected by a complex of hydroelectric dams that supply Seattle with power.

With headwaters in British Columbia, the Skagit flows southward into Washington in a reach now flooded by the massive Ross Dam. Immediately downstream, Diablo and Gorge Dams block and divert the river for hydropower, leaving 2 miles of river channel severely dewatered. But from Newhalem downstream the river flows westward without dams for 80 miles to its mouth in Skagit Bay. The Skagit is the fourth largest river in Washington by volume; only the Columbia, Snake, and Pend Oreille are larger.

Below Ross Dam, roads parallel the river for its entire length. For 11 miles from Newhalem to Bacon Creek the river flows within the Ross Lake National Recreation Area. Below that, most of the frontage is privately owned, with scattered rural development and clearcut logging on mountain slopes. In this reach, the valley also has a railroad and power lines. On the lower river, large tracts of farmland border the floodplain, and development pressures intensify. Nearing sea level, the Skagit splits into two main forks and many small distributaries that flow through farmland and through some of the most significant wetlands in the region.

The Skagit is the largest river emptying into Puget Sound and is the only river in Washington that still supports all five types of West Coast salmon. It provides habitat for excellent runs of chum and pink salmon, good runs of winter steelhead, and also chinook, coho, and sockeye, which are rare south of Canada. Sea-going Dolly Varden and cutthroat trout also migrate up the Skagit. Together, these runs account for 30 percent of all anadromous fish in Puget Sound.

On the lower river, flood plains still have broad riparian forests, though their health and regeneration have been limited since the construction of the dams upstream. These forests have made the Skagit one of the prime wintering areas for bald eagles, with up to 200 birds roosting in cottonwood trees along the water. A Nature Conservancy preserve has protected an important eagle habitat area.

The river from Newhalem to Marblemount offers paddlers Class II and III whitewater. Below there, the river glides with more gentle flows and offers one of the longest, dam-free, canoeable streams on the West Coast, with comparable mileage only on the Chehalis, Umpqua of Oregon, and Sacramento of California, all of which are far more developed.

The Skagit reach from Bacon Creek, below Newhalem, to Sedro Woolley, on the lower river, was designated in the National Wild and Scenic Rivers system in 1978. The fine section above Bacon Creek was omitted owing to Seattle City Light's proposal for Copper Creek Dam. Likewise, the lower river was omitted because of a nuclear power plant proposed at Sedro Woolley. Both these proposals have since been dropped and now offer no political impediments to further protection of this great river.

Illabot Creek is a 15-mile-long tributary lying between the Cascade and Sauk Rivers and flowing into the Skagit from its south side downstream from Marblemount. With headwaters in the Glacier Peak Wilderness and old-growth forests along its shores, this is a critical tributary to the river. Many of the Skagit's famed runs of summer and fall chinook, coho, and pink salmon spawn in the Illabot.

Though its flow regime has been heavily affected by upstream dams, the Skagit still offers 80 miles of free-flowing current and dam-free habitat. This free-flowing quality is amplified by the river's excellent tributaries--the Cascade and Sauk Rivers and their branches, which combine with the Skagit to create exceptionally long dam-free waterways. Clearly a unified system, the health of these wilder tributaries depends on the well being of the Skagit River and its floodplain below.

Even though the main stem flows through private land and its corridor has been logged, farmed, and developed in places, the Skagit remains a vitally important river for its fishery and for wildlife. Restoration of the significant wetlands at the river's mouth may be feasible, and further protection of river frontage along the entire route is critical.

White River (Wenatchee basin) with Napeequa River

Among the many rivers flowing down the east side of the Cascade Mountains, the White and its stunning tributary, the Napeequa, may be the finest among the Little Wenatchee-White-Chiwawa-Entiat group that drains the wild country south of Lake Chelan. The White River flows east and then south for 34 miles from the high country of the Glacier Peak Wilderness to Lake Wenatchee and the Wenatchee River. Immediately east of the White, the Napeequa follows a similar southeastern course but is nested in a spectacular narrow glaciated valley between massive paralleling ridgelines. In its final mile it curves dramatically westward, drops through a mountain gap, and joins the White.

Upper reaches of both rivers are surrounded by stark mountain peaks. Both flow from glaciers, over waterfalls, and through long rapids in their spectacular plunge from high elevations. Except for its final mile, the 16 mile-long Napeequa lies entirely within the wilderness. The White's upper 15 miles also lie within the wilderness area and are accessible by trail. Middle sections pass through oldgrowth forests. The lower 19 miles have road access, and 15 miles of frontage within this reach include private land. The lower White about 8 miles below its confluence with the Napeequa--meanders through expansive meadows above the inlet of Lake Wenatchee. Eagles, otters, and a host of other wildlife thrive here. This reach has also become a popular recreation area for campers.

A prime spawning destination for fish that migrate up the Wenatchee River, the White supports five anadromous runs, including one of few sockeye runs in eastern Washington. Because 96 percent of the sockeye habitat of the Columbia River basin has been lost, the White is crucial for these fish. The river also hosts an important population of bull trout. However, a hatchery recently proposed at the river's mouth could pose a threat to wild fish populations.

Flowing from the east side of the North Cascades, the Little Wenatchee, White, and Chiwawa take very similar routes—each important to fish, and each remarkably beautiful. However, the White spans more gradient from glacial heights to lowland, and its wild upper basin is larger.

WASHINGTON'S "C" RIVERS

Carbon River

Within the radial system of rivers that flow from the slopes of Mount Rainier, the Carbon is the only one without major dams. It supports good fisheries, flows through old-growth forests, and offers spectacular access to the Northwest's greatest mountain.

The river flows for 29 miles from the northwest slope of Mount Rainier to the Puyallup River. The Carbon begins at the mouth of the Carbon Glacier and foams with silty water down through terminal moraines and across the spectacular highlands of Mount Rainier National Park. The upper 4 miles, including headwaters of Moraine Creek, are reachable only by trail. Below there, the river is paralleled by roads for most of its length. Another 4 miles flow through the national park, followed by 21 miles through private land to its mouth. Downstream, the Puyallup River runs entirely through private land and is heavily farmed and developed; at its channelized mouth, the river is one of the most intensively industrialized in the Northwest.

The Carbon supports chinook, pink, and coho salmon along with resident and sea-going cutthroat trout and Dolly Varden. The trail to its headwaters offers one of the finest windows to the grandeur of Mount Rainier.

The Carbon lies on the northwest side of the great strato-volcano and so benefits from the longer-lasting snowpack and larger icefields there. The White (Puyallup basin) is the other north-slope river, with its own scenic upper reaches, but unlike the Carbon, the White is dammed downstream. Among all the mainstem rivers emanating from Rainier—the Puyallup, Nisqually, and Cowlitzonly the Puyallup is undammed. Its headwaters reach to the eastern flanks of the mountain, but it has less mileage within the national park and flows through less public land than does the Carbon.

Chewack River

As the largest and most undeveloped part of the Methow basin, the Chewack (also spelled Chewuch) flows through wild country and ponderosa pine forests more reminiscent of the Rocky Mountains than of the rainy Cascades. For 41 miles, the river runs southward from the Pasayten Wilderness of Okanogon National Forest to the Methow River.

Less than 1 mile from the British Columbia boundary, the headwaters of Cathedral Creek begin to flow south. With other tributaries, they form the Chewack. Its upper 12 miles drop through the Pasayten Wilderness and can be reached only by trail. Another 25 miles flow mostly through national forest, and the lower 8 miles cross private land with road access serving cabins and rural homesites. The Chewack joins the Methow at the tourist town of Winthrop.

The river supports spring chinook and summer steelhead runs that make long migrations up the Columbia and Methow. Resident fish and wildlife, including bull trout, grizzly bears, and gray wolves, find excellent habitat at upper reaches. The upper Chewack constitutes an important corridor of wildness to the undeveloped mountains of British Columbia. Unlike the glacier-clad headwaters of other nearby North Cascades rivers, the Chewack rises in more rolling mountain terrain with less rain and snowfall, and it flows down to the ponderosa pine belt of the drier east-side of the Cascades. An excellent riparian forest of black cottonwood lines much of the river's route. The valley is popular for camping, fishing, and canoeing.

Downstream from Winthrop, the Methow River flows undammed for about 45 miles through cottonwoods, farms, and small communities to its confluence with the Columbia. However, the Methow is dewatered by many diversions for irrigation, and its mouth lies upstream from 8 mainstem dams on the Columbia. The Chewack is effectively the headwaters of the Methow, running longer than other upper river stems or tributaries.

Chiwawa River

Much like the White River (Wenatchee basin) to its south and west, the Chiwawa drops from high passes on the east side of the North Cascades and has excellent water quality.

The river flows for 40 miles southward from the Glacier Peak Wilderness to the Wenatchee River below Lake Wenatchee. Its upper 7 miles are reachable only by trail. Joining the river near the deadend of the Chiwawa River Road, Buck and Phelps Creeks are similar streams, slightly longer than the Chiwawa's headwaters reach. For the next 26 miles, the river is paralleled by the road but remains isolated behind a wide buffer of forest. The river flows mostly through national forest land, though there are several large private inholdings and mining claims. In this middle reach, tall cedars and pines rise from the river's crystal clear, green-tinted water. The Chiwawa's lowermost 7 miles meander through floodplain cottonwood groves, with a scattering of roads, cabins, and homes built near the river. Frontage of the lower river is privately owned, but much of it remains a rich habitat of riparian forest. In this reach, a minor weir blocks boaters' passage at low flows, but otherwise the river is dam-free.

The river supports four anadramous runs, including spring chinook and steelhead as well as bull trout, resident rainbow trout, and Dolly Varden. Old-growth forest remains along the west bank for 20 miles upstream from Chickamin Creek.

With 15 Forest Service campgrounds and access to 22 trails, the entire river corridor has become a popular recreation area; hikers enjoy the trailed upper reach and boaters and campers use the middle river. On several sections, class II to V whitewater is popular among rafters, kayakers and canoeists; Whitewater Rivers of Washington called the middle river "class III nirvana." The Chiwawa is one of only three relatively natural rivers on the east side of the Cascades that are raftable.

Columbia River, Hanford reach

Compromised but enormously significant, this 52-mile-long reach is the only free-flowing remnant of the Columbia in its 600-mile route within the United States above the tidal zone (three isolated sections remain free-flowing in British Columbia's 640-mile reach of the river).

As America's fourth-largest river, the Columbia drains much of the Northwest and also land that reaches east to the Rockies. In spite of numerous dams, the river remains a significant thoroughfare for anadromous fish throughout its enormous basin. The reach at Hanford hosts the only remaining spawning grounds of chinook salmon in the entire main stem. As such, it may hold extraordinary importance as a population that could resettle numerous tributary spawning areas if they can be restored to their past health and if the problems of dam obstruction can be solved.

This 52-mile-long section flows generally southeastward from Priest Rapids Dam to the outskirts of Richland. Most of the south and west shore is part of the Department of Energy's Hanford Nuclear Reservation, plagued with waste disposal problems and contaminated by the manufacturing of nuclear weapons and the processing of radioactive waste. Most of the north side of the river is now designated as a national wildlife refuge and a national monument, though the lower 15 miles on the east side are privately owned and generally farmed.

Grande Ronde River

The Grande Ronde River is the only Washington river east of the Columbia having outstanding natural values without the problems of dams, diversions, or pollution from farming. This 150-mile-long waterway begins in Oregon's Wallowa Mountains. Only its lower 38 miles--from the state-line to the Snake River --flow in Washington.

Of these Washington miles, the first 8 are paralleled closely by a road. Then the river drops into an inaccessible canyon, cutting through 2,000-foot-deep layers of volcanic basalt--the finest example of an arid, rock-walled river canyon in the state. Although the Bureau of Land Management (BLM) owns some river frontage, much of it is privately held by cattle ranchers, making this reach one of the more outstanding dryland canyons of the West largely in private ownership.

Although the Grande Ronde once provided spawning grounds for large numbers of chinook salmon and steelhead, these runs are now imperiled, owing in large part to Columbia and Snake River dams downstream that obstruct migration.

See the Oregon section of this report for a more complete description of the qualities of the Grande Ronde River.

Hamma Hamma River

Though smaller than other rivers on the east side of the Olympic Mountains, the Hamma Hamma still offers fine natural qualities. A favorite of some fisheries biologists, it supports important anadramous runs.

The 18-mile-long stream flows eastward from high mountains in the southeast portion of the Olympic Peninsula to the Hood Canal. Its upper 3 miles drop through the Mount Skokomish Wilderness, followed by 15 road-accessible miles through national forest, then 3 miles through state-owned land. The final 3-mile reach to the river's mouth is fronted by private land--mostly commercial forest.

The small river supports a good run of pink salmon, plus chum, coho, chinook, steelhead, and sea-run cutthroat trout. Resident trout thrive in the headwaters, and bald eagles winter in the valley.

Though the headwaters of this fine river are well protected, the lower half is not, and further logging and land development could occur. Four hydroelectric dams have been proposed here in the past.

The Hamma Hamma has fine anadromous fish runs but the stream is much smaller than the Dosewallips and Duckabush, which adjoin this watershed to the north. Those streams also have much of their mileage protected in Olympic National Park.

Humptulips River with East and West Forks

The Grays Harbor (Chehalis River) and Willapa Bay (Willapa River) watersheds of southwestern Washington's coast include many small basins that have been laced with roads, and repeatedly logged. The largest undammed stream in this area is the Humptulips, with headwaters rising in Olympic National Forest.

The river flows for 16 miles southwestward into North Bay of Grays Harbor. The main stem is formed at the confluence of the 30-milelong East Fork and the 42-mile-long West Fork, both of which run southward from Olympic foothills just south of Olympic National Park.

About 16 miles of both forks meander through national forest land before entering industrial forest and other private property. Some relatively undisturbed wooded land is found in the upper basin, but nearly all of the watershed has been heavily cut and has many roads. The East Fork flows through several deep basalt gorges.

However, good runs of chum salmon and winter steelhead remain, along with coho, chinook, sea-run cutthroat trout, and resident rainbow trout. A fish hatchery is located near the East and West Forks confluence. The river's broad, lower corridor provides habitat for bald eagles and Roosevelt elk.

Though the Grays Harbor basin is privately owned and has been repeatedly logged for a century and a half, several tributary streams still have good runs of anadromous fish. The Humptulips is the largest of these and may present the best opportunity for restoration because of its size, health, and public-land headwaters. Other good anadromous fish runs of the Grays Harbor/Chehalis River basin include the Hoquiam, the Wishkah, and the Satsop, which has the greatest diversity of fish species among all rivers in Washington and would be another fine choice as a key stream to protect in the lower Chehalis basin. It is highly regarded by the Nature Conservancy for protection. Just to the south, Willapa Bay has a number of similarly logged and privately owned watersheds retaining at least some anadromous runs where restoration work may be feasible, including the North, Nasalle, Nemah, Palix, and Willapa Rivers.

Unlike other coastal rivers that flow directly into the pacific, these rivers flow into estuaries with important habitat for fish and birds.

Little Wenatchee River

Splashing down from the Cascade divide to Lake Wenatchee, the Little Wenatchee River has wild headwaters, surviving runs of salmon and steelhead, and clear water flowing through dense forests. Bald eagles nest along its shores. The Little Wenatchee, along with the adjacent White and Chiwawa Rivers, make for a fine cluster of three outstanding streams flowing from the eastside of the North Cascades.

The 28-mile-long Little Wenatchee flows southwestward from the Henry M. Jackson Wilderness. The upper 5 miles are accessible only by trail, and the rest of the river down to Lake Wenatchee has road access and heavy recreational use. Much of the lower basin has been logged. However, the river supports five runs of anadromous fish, including fall sockeye salmon, coho, spring and fall chinook and steelhead, plus bull trout, and other resident fish. This is one of few streams in eastern Washington with native sockeye. These fish spawn in both the Little Wenatchee and the White Rivers and depend on Lake Wenatchee for rearing.

The Little Wenatchee follows a similar path as the White and Chiwawa Rivers, but it is shorter, has less land protected as wilderness, and more land that has been heavily logged.

Soleduck River with North Fork, and Quillayute River

The Soleduck (sometimes spelled Sol Duc) is the longest river on the Olympic Peninsula. It has good runs of salmon and steelhead, along with scenic wilderness reaches, but also has major highways along much of its length and flows through private land with residential development and industrial logging.

The river flows 65 miles westward from the Seven Lakes Basin, north of Mount Olympus, to its confluence with the Bogachiel River. Its upper 7 miles, in Olympic National Park, are reachable only by a trail from the Sol Duc hot springs area. About 5 miles downstream from the trailhead, national forest land begins on the south side of the river while the north side remains as national park for another 6 miles. In this reach, the North Fork enters. Completely wild and entirely within the national park, this important tributary flows westward for about 18 miles in a parallel valley, with only partial trail access. Below its confluence with the North Fork, the Soleduck enters a mix of timber industry, state, and private land for the rest of its route to the Pacific.

The Soleduck is not only the largest river but also the top fish producer on the Olympic Peninsula. It hosts good runs of spring or summer chinook and winter steelhead, and also pink, coho, chum, and sockeye salmon, Dolly Varden, sea-run cutthroat trout, and resident trout. The upper river begins in magnificent highcountry and then drops through classic old-growth rain forests, much like in the Hoh, Queets, and other protected basins in the park. This habitat supports bald eagles, Roosevelt elk, bears, and other wildlife. Downstream from the park, the Soleduck offers 30 miles of variously challenging and easy boating for canoeists, kayakers, rafters, and drift boaters who fish while floating.

Unlike other major rivers of the Olympic Peninsula, the Soleduck is girded by highways, secondary roads, cut-over tracts, and private development for about three-quarters of its length, including the outskirts of the town of Forks. Though the Soleduck is similar in many ways to the smaller Bogachiel River, which lies just to the south, it has far more road access and development.

The Soleduck and Bogachiel Rivers join to form the Quillayute River, which then carries the combined flow another 5 miles to the Pacific at LaPush. Just one mile upstream from the mouth of the Quillayute, the 30-mile-long Dickey River joins from the northeast. Though it flows entirely through private forest industry and stateowned land, this meandering stream, with lakes, wetlands, and very little development, supports an excellent run of fall chinook and coho salmon and may have important restoration potential.

Stillaguamish River, North and South Forks

The Stillaguamish is the finest river draining the lower western Cascades, and hosts good anadramous fish runs.

The North Fork runs westward for 50 miles to Arlington, and the

South Fork follows a similar course for the same distance. Below the confluence, the main stem meanders across Puget Sound lowlands for 12 miles to Skagit Bay, where it empties into saltwater just south of the Skagit River.

Unlike other Cascade rivers that rise in high mountains, the Stillaguamish is truncated from the high peaks to the east by the north-flowing Sauk River and instead collects its waters from lower western mountains. Located closer to Interstate 5 and coastal cities, both Stillaguamish branches have major roads along most of their lengths.

The North Fork flows for 13 roadless miles, but then is paralleled for 5 miles by a gravel road and for 32 miles by Highway 530. Below the upper sections, the North Fork corridor is almost entirely in state and private ownership, with much of the frontage held by timber industry owners.

The North Fork still hosts a good run of winter steelhead along with chinook, pink, and chum salmon. Coho spawn in tributaries, such as the 11-mile-long Boulder River, an excellent stream entering from the south. All but 3 miles of this key tributary lie in the Boulder River Wilderness, which is unusual in its location far west of the Cascade crest.

The South Fork Stillaguamish flows unroaded for 3 miles, and then shares the valley with Highway 92 throughout its middle reaches. The lower river is roaded as well. While the fishery here is not considered as good as that of the North Fork, the South Fork has runs of chinook, coho, chum, and pink salmon. Unlike the North Fork, the South Fork has national forest frontage along much of its length, including many popular road-accessible recreation sites; however, there are also scattered private inholdings. Below Robe Gorge, the lower 24 miles of the South Fork are privately owned. Both the South Fork and Boulder Creek have been recommended by the Forest Service for National Wild and Scenic River designation.

A unique geographic feature of these forks is that they almost join with the Sauk River, immediately to the east. Only an extremely low gap separates the North Fork from the Sauk flowage at Darrington; a similar low gap separates the South Fork of the Stillaguamish from the South Fork of the Sauk. The mainstem Stillaguamish, which begins with the confluence of the North and South Forks, runs for 12 miles through private land to Skagit Bay. Here a broad, low floodplain has many wetlands and ends in a delta of marshland that is contiguous with the extensive sea-level wetlands at the mouth of the Skagit, 7 miles to the north. Both the lower Skagit and lower Stillaguamish are rare examples of relatively intact, estuarine wetlands in the Puget Sound region, and each may offer exceptional restoration possibilities.

While the Stillaguamish lacks the qualities of wildness and public land ownership enjoyed by other Cascade rivers on this list, it is still a relatively natural and undeveloped watershed, lacking dams and urbanization. Unlike the other rivers, it lies entirely on the lower western slope of the Cascades—a unique characteristic--but one that also makes it more vulnerable to the problems of development and global warming.

Wind River

With remaining salmon and steelhead runs and the possibility of restoration, this scenic river through basalt gorges is one of the finest streams flowing into the Columbia from southern Washington.

The Wind gathers its waters in foothills lying to the west of the Indian Heaven Wilderness (about 25 miles southwest of Mount Adams), but roads closely follow its entire 30-mile length. The upper half of the river flows through national forest, the next 8 miles run through a private inholding within the Gifford Pinchot National Forest, and then the final 7 miles wind through a wider basin of private and state owned property before meeting the Columbia River east of Stevenson

The Wind is a designated "wild steelhead" stream by the state and flows through several spectacular basalt gorges in a reach known as one of Washington's finest expert whitewater kayak runs. Trapper Creek drains a small wilderness area on the west side of the river, and Panther Creek, entering the lower Wind from the east, is a major steelhead spawning tributary. The largest old growth forest in the south Washington region lies in the Thorton Munger Research Natural Area along tributary Trout Creek. A small dam there is slated for removal. Once known for its outstanding summer steelhead run, the Wind suffered habitat losses owing to heavy logging. But with most of the frontage in public ownership and only one dam downstream on the Columbia, restoration may be possible.

The Wind River is similar to the better-known, 45-mile-long White Salmon River to the east, but is somewhat smaller, with less agriculture, with more frontage in public ownership, and with perhaps better potential for restoration as a natural river in the lower Columbia basin.

CONCLUSION

Using twenty-one different lists of outstanding streams completed by others and interviews with three distinguished fish biologists, we have identified 229 rivers and Washington streams as especially valuable natural waterways. Based on the established lists, interviews, and our analysis, we sorted this group into an A list of 12 rivers and tributaries, a B list of 15, and a C list of 16.

In the course of our survey, two truly river regions—the Olympic Peninsula and the upper Skagit basin—stood out, and four other fine collections of streams became evident.

Olympic Peninsula Rivers

The Olympic Peninsula rivers are a one-of-a-kind group. This radial collection of rivers—flowing generally out from the center of Olympic high country like spokes of a wheel—is repeated in few other places in America, and nowhere does this pattern of drainage include so many outstanding streams. Fourteen rivers listed in our A, B, and C lists are found here, and many others are also in good condition. No similar group has such consistently high values for anadromous fisheries, fully-functioning flood plains with healthy riparian vegetation, natural flow regimes, protected headwaters, wildlife habitat, old-growth forests, and wild river recreation opportunities. The origins of nearly all these rivers are safeguarded

in Olympic National Park, but none of these waterways are fully protected. Nearly complete protection is possible for some of these streams, such as the Hoh, Queets, and Quinault. Others would be fully protected if limited amounts of private land were acquired in their lower miles—the Dosewallips, Duckabush, and Hamma Hamma. Others, such as the lower Bogachiel, Humptulips, and Soleduck, include significant private forest industry or state land in their lower reaches, but still offer good possibilities for restoration.

Upper Skagit River system

The Sauk and nearby rivers flowing from Washington's mostlyhidden but nonetheless massive volcanic summit—Glacier Peak are extraordinary. The Cascade River system and the Sauk, including the incomparable Suiattle, the White Chuck, and the North Fork of the Sauk all flow into the upper Skagit and make one of the most magnificent sets of wild rivers in America. Except for the White Chuck, the North Fork of the Cascade, and the South Fork of the Sauk, these are all in the National Wild and Scenic Rivers system, but important lengths of riverfront remain unprotected. When combined with the undammed reach of the Skagit, these rivers offer Washington's most notable continuous free-flowing river corridors exceeding 100 miles in length (only the Chehalis also tops 100 miles, but it has been heavily logged and is entirely road-accessible, with rural and some urban development). The Sauk-Skagit system is one of few river groups on the entire West Coast south of Canada that runs dam-free from headwaters to the sea.

Wenatchee River system

The three principal tributaries to the Wenatchee also make a distinct group of fine streams. The Little Wenatchee, White (with its tributary Napeequa), and Chiwawa all flow from similar headwaters at the Cascade crest, support imperiled salmon runs of the middle Columbia River system, shelter the rare bull trout, and offer a host of wildlife and recreation values. Other Wenatchee tributaries, such

as Icicle Creek, add to the quality of this outstanding core group. The Wenatchee has habitat as good as any other mainstem, eastside river in the state. It lacks dams plus it has Lake Wenatchee and some of the few native runs of sockeye salmon in Washington. The Wenatechee's middle and lower watershed, however, is heavily farmed, grazed, logged, and urbanized.

North Cascade Rivers

Though they are more spread out than the Olympic and upper Skagit River groups, a larger selection of west slope rivers draining the North Cascades offer an excellent collection with few dams and relatively little development. From north-to-south, the Nooksack, Skagit, Stillaguamish, and Skykomish are all nearly undammed except for the notable exception of the Ross Dam complex on the upper Skagit. Together, this group offers premier wilderness at the headwaters, uninterrupted free-flowing mileage, spawning grounds for many anadromous fishes, and significant remnants of sea-level wetlands where the rivers disgorge into Puget Sound. Likewise, they all suffer from heavy logging in middle and lower reaches and development pressures at their lower ends in the Cascade foothills and Puget Sound Lowlands. Perhaps nowhere else in the West do we have such exceptional rivers facing such intensive development pressures, along with the tradition of comprehensive clearcut logging.

East Cascade Rivers

A fine group of rivers also flows from the east slope of the Cascades, ranging from the Methow in the north the whole way through the Yakima headwaters in the south. Also, the lower Columbia tributaries, beginning with the Klickitat in the east and including the White Salmon, Little White Salmon, Wind, Washougal, and East Fork Lewis are all important rivers near a metropolitan area. In most other regions of the United States, each of these suites of streams would be considered truly exceptional.

North-side Rivers

Finally, a non-contiguous group of exceptional rivers are the north-side streams flowing from the high glacial peaks. Getting ample snowfall, with flows sustained all summer by glaciers, these rivers may gain increasing importance as the climate warms, as the lower peaks receive more rain and less snow, and as depleted flows become more common and troublesome to aquatic life in summer and fall. The best of these north-side streams are the Hoh, North Fork Nooksack, Suiattle, and Carbon, with the White (Puyallup basin), North Fork Lewis, and Cispus also flowing from glaciated north slopes.

Rivers of Idaho

Which was mountainous terrain deeply cut by waterways, abundant snow and rainfall, and more remote country than any state outside Alaska, Idaho is widely regarded as America's premier state for free-flowing rivers that are both wild and long.

Idaho is capped by the Rockies—the northern extent of America's longest continuous mountain range, which rises for nearly the entire length of the West, from the Canadian border to southwestern sub-ranges that continue into Mexico. These mountains clearly dominate the central and northern state, and their influence—via waterways—is felt throughout. Fine streams can be found throughout the Rocky Mountains, but the Middle and Northern Rockies in Idaho and Montana get by far the most rain and snow and have nine of the region's ten largest rivers. In Idaho, these include the Pend Oreille, Clearwater, Kootenai, Salmon, and Snake.

The state's rivers system can be understood most fundamentally by knowing the route of the Snake River. The "Mississippi of Idaho," this artery receives almost all the water, except for a few rivers in the far north. The Snake enters southeastern Idaho after maturing with the generous runoff of eight contiguous mountain ranges in the Greater Yellowstone region of Wyoming. It quickly flows onto the arid Snake River Plain of Idaho, completely crosses the southern state, then bends north to eventually define the western boundary with Oregon. Along the way, the Snake receives a stellar collection of rivers draining Rocky Mountain highlands to the north and east. Centerpiece there is the vast Salmon River system—lifeline of the mountainous heart of Idaho and legendary among all rivers of the West. Other valuable river systems here include the Henrys Fork, Lost, Big Wood, Boise, Payette, and Clearwater. From the south and west, the Snake absorbs the meager flows of the Blackfoot, Bruneau, Owyhee, and smaller streams running seasonally off arid mountains. In Idaho's small area north of the Snake basin, the St. Joe River is a premier stream flowing into Coeur d'Alene Lake and hence to the Spokane River in Washington and to the Columbia. Beyond Coeur d'Alene, the Pend Oreille is all dammed but transfers the massive flow of Montana's Clark Fork on its way to the Columbia, and also picks up the partly wild Priest River of far northwest Idaho. The full-bodied Kootenai also crosses the thin, northern panhandle of Idaho in a brief, undammed interlude between Montana and British Columbia, where the "Kootenay" empties into the Columbia just north of the border.

Many of Idaho's natural rivers support one or more of the state's important native cold water fishes: chinook salmon, summer steelhead, bull trout, redband trout, and westslope cutthroat trout. Idaho's salmon and steelhead were once among the most plentiful in the world. But dozens of distinct runs have been reduced to remnants or driven to extinction owing to downstream dams, diversions, loss of spawning habitat, and hatchery populations that conflict with native fish. Yet many runs survive, and the importance of their protection is heightened by their scarcity. The other native fishes are likewise imperiled in most streams. Bull trout, which need long reaches of high quality aquatic habitat, are especially indicative of natural streams that remain.

Idaho boasts one of the two longest undammed and largely undiverted sections of river in the West—the Salmon (the Green in Utah is the other). The Salmon, along with most of its tributaries, provides key habitat for anadromous fish. These fish are currently the object of one of the most intense efforts ever undertaken for river conservation in our nation's history. Excellent salmon and steelhead habitat remains throughout the large basin or is restorable, and biologists believe that once-magnificent runs can be brought back if problems associated with downstream dams on the Snake River are solved. Beyond the stellar Salmon system, other rivers, including the Selway, Lochsa, Clearwater, St. Joe, Payette, Boise, Owyhee, Bruneau, and Snake also have exceptional natural and recreational qualities. Many of these rivers offer excellent aquatic habitat for resident trout, rich riparian zones including some of the finest cottonwood forests in the West, and extraordinary opportunities for river running and streamside hiking through wilderness.

The river rankings that follow differ slightly in format from those of some other states in this report. For several rivers, multiple tributaries are grouped together under one description rather than covered individually. This is done in cases where the receiving river is quite large and where many high-quality tributaries tend to have similar characteristics and are all protected to a comparable degree. For example, the small, wild tributaries of the Salmon are presented here as a group rather than listed separately.





Great Rivers of Idaho



- Owyhee River, South Fork Payette River, South Fork Owyhee River, Sou
 Pahsimeroi River
 Payette River, Sout
 - Rapid River
 - Saint Joe River
 - Salmon River
- Salmon River, East Fork
- Salmon River, Middle Fork
 - Salmon River, South Fork
 - Secesh River 8
 - Selway River 8
- Sheep Creek 8
- Snake River, South Fork 8
- Snake River, Hells Canyon 8
 - Weitas Creek 8
- White Sand Creek



21.

E

Sources for the Idaho Survey

In addition to the major sources described at the outset of this report, the Idaho survey incorporated these state-specific sources:

Interviews with biologists and local experts (B#).

Bert Bowler, Idaho Rivers United, fisheries biologist

Will Whelan, The Nature Conservancy, director of government relations

Roger Rosentreter, Bureau of Land Management, botanist

Scott Bosse, Greater Yellowstone Coalition, fisheries biologist

Russ Thurow, U.S. Forest Service, Rocky Mountain Research Station, fisheries biologist

Scott Grunder, Idaho Department of Fish and Game, native species coordinator

Idaho/U.S. F&WS-EPA, highest-value fishery resource (FI). These streams have been jointly designated by the Idaho Department of Fish and Game, the U.S. Fish and Wildlife Service, and the Environmental Protection Agency based on values for both biological diversity and sport fishing.

Idaho Department of Fish and Game, Outstanding Rivers Inventory (IF). These streams have been identified by Idaho's fish and game department for outstanding fishery resources.

Idaho Rivers United (IRU). These rivers are on an informal list that Idaho's statewide river conservation group regards as the finest and also the most critical for conservation efforts.

Trout Unlimited (TU). These are rivers highlighted for their native fisheries values in Where the Wild Lands Are: Idaho, 2007.

Idaho Rivers List Key

SOURCE OF RECOMMENDATION

- B#- interviews with biologists and local experts:
 - B1- Bert Bowler, Idaho Rivers United

- B2-Will Whelan, The Nature Conservancy
- B3- Roger Rosentreter, BLM, botanist
- B4- Scott Bosse, Greater Yellowstone Coalition

B5- Russ Thurow, U.S. Forest Service

B6- Scott Grunder, ID Dept. of Fish & Game

BL-Bureau of Land Management (BLM)

BO- Bureau of Outdoor Recreation

C- Columbia Interior Basin Ecosystem Management Plan- high aquatic integrity

F- U.S. Forest Service

Fr- Wild & Scenic designation recommended by Forest Service FI- U.S. F&WS, EPA, ID F&G designated highest-valued fishery resource

I- USDI/ USDA Wild and Scenic List, 1965

IF- Idaho Dept. of Fish and Game Outstanding Rivers Inventory

IRU- Idaho Rivers United, informal list

N- Nationwide Rivers Inventory

S- State designated Wild and Scenic rivers

TU-Trout Unlimited highlighted wildland rivers

W-National Wild and Scenic Rivers and Study Rivers

Ws-National Wild and Scenic Study Rivers

WRC-Western Rivers Conservancy

BEST SOURCES: B#, F, Fr, N, W

QUALITIES

- **B-Biological Diversity**
- C- Cold water/ high elevation
- E- Endangered or imperiled species

F- Fish

G- Geological/geographical L- Long free-flowing reach >100 miles L+- Long free-flowing reach, combined with streams it flows into P- Plant life/ riparian values Rf- Recreational fishing Rh- Recreational hiking Rr- Recreational river running WL-Wildlife WN- Wildness

ECOREGIONS

GP- Palouse (331) IS- Intermountain Semi-Desert (342) MR- Middle Rocky Mountains (M332) NR- Northern Rocky Mountains (M333) SR- Southern Rocky Mountains (M331)



RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Alturas Lake Cr	Salmon	WRC		C, E, F, G, L+	MR	Α	
Bargamin Cr	Salmon	B1, B5, C, F, N		L+, P, Rf, Rh, WN	MR	А	
Battle Cr	Owyhee	BO, IF		L+	IS		
Bear	Bear Lk	BO		G	SR		
Bear Cr	Selway	B1, BO, N		E, F, G, L+, P, Rh, WN	MR	A	
Bear	Boise, North Fk	F		WN	MR		
Bear Valley Cr	Salmon, Middle Fk	F		F, Rf, Rh, WL	MR	А	
Beaver Cr	Salmon	WRC		F, WN	MR	А	
Big Cr	Salmon, Middle Fk	B1, BO, C F, FI, IRU, N	B1, N	E, F, G, L+, Rf, Rh, Rr, WN	MR	А	
Big Jack's Cr	Bruneau	IRU		G, WN	IS		
Big Lost	Snake	BO		E, G	MR/IS		endemic whitefish, bull trout
Big Lost, East Fk	Big Lost	BO		E, G	MR		
Big Lost, North Fk	Big Lost	BO		E, G	MR		
Big Wood	Snake	B5, BO, BL		Р	MR		
Blackfoot, upper	Snake	B4, B5, B6, BL, BO, FI, IF, N		E, F, W	SR/IS	С	cutthroat trout, upper river
Boise	Snake	BO, IF, FI, N	N	F, WN	MR/IS		
Boise, Middle Fk	Boise	BO, F, IRU		Rh, Rr, WN	MR		bull trout
Boise, North Fk	Boise	BO, F, FI, IF, IRU, N	N	F, WN,Rr	MR	С	
Boise, South Fk	Boise	BO, F, Fr, IF, N, S		F, G, P, Rf, Rr, WL	MR		tail race fishery

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Bruneau	Snake	B3, Fr, IF, IRU, TU, Ws	IRU	F, G, L, Rr, WN	IS	В	
Bruneau, Eask Fk	Bruneau	WRC		F, G, WN	IS	В	
Buffalo	Henrys Fk	BO		F	SR/IS		
Camas Cr	Salmon, Middle Fk	C, F, N	С	G, L+, Rh, WN	MR	A	
Cayuse Cr	Kelly Cr	B4, F, Fr, IF, N, TU	N	E, F, WL	NR	В	
Chamberlain Cr	Salmon	B1, B5, C, F	С	E, F, L+, Rh, WN	MR	А	
Clearwater	Snake	BO, IF		F, L+	GP		
Clearwater, Middle Fk	Clearwater	W		F, L+	MR	В	
Clearwater, North Fk	Clearwater	B1, B2, B4, BO, Fr, IRU, N, TU		E, F, G, Rf, Rh, Rr	NR	В	upper river
Clearwater, South Fk	Clearwater	BO, F, IF, N		E, F, G	MR		
Coeur D'Alene	Spokane	B6, BO F, IF		F	NR		westslope cutthroat trout
Coeur D'Alene, North Fk	Coeur D'Alene	BO, F, N		F, WN	NR		
Crooked Cr	Valley Cr/ Salmon	С	С	F, L+	MR	A	
Crooked Fork	Lochsa	WRC		WN		В	
Crooked	Boise, North Fk	F	ļ	WN	MR	ļ	
Deadwood	Payette, South Fk	F, IF, N		G, Rr	MR		
Deep Cr	Owyhee	BO, IF, IRU		G, Rr	IS	С	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Elkhorn Cr	Salmon, Middle Fk	WRC		F, WN	MR	А	
Fall Cr	Snake	IF		F	SR		
Falls	Henrys Fk	BO, IF, N		G, Rr, WL, WN	SR/IS		
Fish Cr	Lochsa	F, IRU, N	IRU	F, L+, WL	MR		B-run steelhead
French Cr	Salmon	F, N		F, L+	MR		
Gedney Cr	Selway	Fr, N	Ν	F, L+, P	MR	А	
Germania Cr	Salmon, East Fk	TU, WRC		F, G, L+, Rh, WN	MR		
Goat Cr	Valley Cr/ Salmon	WRC		C, L+	MR	А	
Hayden Cr	Lemhi	F, N		F, L+	MR		
Hell Roaring Cr	Salmon	WRC		F, WN	MR	А	
Henrys Fk	Snake	B1, B2, B4, BO, FI, IF, N, S,	N	B, F, G, Rf, Rr, WN	IS/ MR	С	
Horse Cr	Salmon	B5, WRC		F, WN	MR	А	
Hungry Cr	Fish Cr	F, N		F, WL	MR		
Indian Cr	Salmon	WRC		F, WN	MR	А	
Indian Cr	Salmon, Middle Fk	WRC		F, WN	MR	А	
Iron Cr	Valley Cr/ Salmon	WRC		C, L+	MR	А	
Iron Cr	Salmon	WRC		F, WN	MR	A	
Jarbidge	Bruneau	B2, B3, BO, Fr, IF, IRU, TU	IRU	G, L+, Rr	IS	В	
Jarbidge, East Fk	Jarbridge	BO, TU		G, L+	IS	В	
Johns Cr	Clearwater, South Fk	N		F, G, WN	MR		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Johnson Cr	Salmon, East Fk of South Fk	B5, F		L+	MR		
Kelly Cr	Clearwater, North Fk	B1, B4, B6, BO, F, Fr, FI, IF, N, TU	B1, B4, N	E, F, G,Rh, WN	NR	В	
Kootenai	Columbia	BO	}	G	NR		sturgeon
Lake Cr	Boise, Middle Fk	F, IF, N		F, P	MR		
Lemhi	Salmon	B2, BO		E, F, L+	MR		
Little Jack's Cr	Bruneau	IRU		G, WN	IS		
Little Loon Cr	Salmon, Middle Fk	WRC		F, WN	MR	A	
Little North Fk Clearwater	Clearwater, North Fk	BO, F, FI, N	N	F, G, WL, WN	NR		
Little Salmon	Salmon	BO		F, L+	MR		
Little Wood	Big Wood	BO		F	MR		
Lochsa	Clearwater, Middle Fk	IRU, W		F, L+, Rf, Rr	MR	В	
Lochsa, Crooked Fk	Lochsa	WRC		F	MR	В	
Lolo Cr	Clearwater	IF	}	L+			
Long Cyn Cr	Kootenai	F, N	Ν	E, P, WL, WN	NR		
Loon Cr	Salmon, Middle Fk	C, F	С	F, L+, Rh, WL, WN	MR	А	
Malad	Snake	B1, BO		F, G	IS		
Marble Cr	Salmon, Middle Fk	С	С	F, L+	MR	А	
Marble Cr	St. Joe	F	[L+	NR	[
Marsh Cr	Salmon, Middle Fk	B1, C, F, IRU, N	N	E, F, L+, P, Rr	MR	А	
Marten Cr	Selway	WRC	}	WN	MR	A	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Meadow Cr	Selway	BO, F, N		E, F, L+, Rh, WL, WN	MR	А	
Monumental Cr	Big Cr/ Salmon Middle Fk	C, F, N	C, N	G, L+, Rh, WN	MR	А	
Moose Cr	Henrys Fk	BO		G	SR		
Moose Cr	Selway	B1, BO, N		F, L+, P, Rh	MR	А	
Moyie	Kootenai	IF, IRU, Ws		Rr	NR		
Napias Cr	Panther Cr	B5		F	MR		
Owl Cr	Salmon	WRC		WN	MR	Α	
Owyhee ("East Fork")	Snake	BO, Fr, IF, IRU, TU, W (in OR)	IRU	G, L, WL, WN	IS	С	
Owyhee, Middle Fk	Owyhee	BO, TU		L+, WN	IS	С	
Owyhee, North Fk	Owyhee	BO, TU		L+, WN	IS	С	
Owyhee, South Fk	Owyhee	BO, BL, IF, N, TU		G, L+, WN	IS	С	
Pack	Pend Oreille	F, N		F	NR		
Pahsimeroi	Salmon	B2, B4, B6, BO, N	B4	B, E, F, G, L+	MR	С	
Pahsimeroi, East Fk	Pahsimeroi	F		F, L+	MR		
Palisades Cr	Snake, South Fk	IF		Rh, WN	SR		
Panther Cr	Salmon	B5, BO, F, N		G, L+	MR		above Blackbird mine
Paradise Cr	Selway	BO		L+, Rh, WN	MR	Α	+
Payette	Snake	BO, IF, N, S	{}	Rr	MR		
Payette, Middle Fk	Payette	F		Rf	MR		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Payette, North Fk	Payette	BO, F, FI, IF, N, S		F, Rf, Rr	MR		
Payette, South Fk	Payette	BO, BI, F, FI, IF, IRU, N, S	N	C, F, G, Rf, Rr	MR	С	
Pend Oreille	Columbia	BO		G	NR		
Pistol Cr	Salmon, Middle Fk	WRC		F, WN	MR	А	
Portneuf	Snake	BO		G	IS		
Priest	Pend Oreille	B1, B3, Fr, IF, N, S, Ws		F, P, Rf, Rr	NR		upper river cutthroat trout/ disjunct cutthroat/ Pacific coast plants
Queens	Boise, Middle Fk	WRC	f	C, Rh, WN	MR		
Rapid	Little Salmon	B1, B5, BO, IRU, TU, W	B1	E, F, G, L+, Rh, WN	MR	А	
Rapid, Lake Fk	Rapid	B5		F	MR		
Rapid, West Fk	Rapid	B1, B5, IRU, TU, W	B1	E, F, G, L+, Rh, WN	MR	A	
Redfish Lake Cr	Salmon	WRC		C, E, F, L+, Rh, WN	MR	A	
Rhett Cr	Salmon	WRC		F, WN	MR	А	
Roaring	Boise, Middle Fk	F		Rh, WN	MR		
Running Cr	Selway	F, Fr, N		E, F, G, L+, Rh, WL	MR	A	
Rush Cr	Big Cr	F		WN	MR		
Sabe Cr	Salmon	B1, B5, BO		F, L+, WN	MR	А	
Saint Maries	St. Joe	BO, IF		Rf	NR		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Salmon	Snake	B1, B3, B4, B5, BO, BL, F, Fr, FI, I, IF, IRU, N, W	N, W, WRC	E, F, G, L, P, Rf, Rh, Rr, WL, WN	MR	A	
Salmon Falls Cr	Snake	BO		G	MR		
Salmon, East Fk	Salmon	B4, BO, FI, N, TU	B4, N	E, F, G, L+, Rf, Rh, Rr	MR	В	
Salmon, East Fk of South Fk	Salmon, South Fk	В5		F	MR		
Salmon, Middle Fk	Salmon	B1, B2, B4, C, IRU, W	B1, C, W	E, F, G, L, L+, Rf, Rh, Rr, WL, WN	MR	А	
Salmon, North Fk	Salmon	BO		L+	MR		
Salmon, South Fk	Salmon	B5, B6, BO, F, FI, IF, N	N	E, F, G, L+, Rf, Rh, Rr, WN	MR	В	
Salmon, Yankee Fk	Salmon	BO, F, IF, N		F, L+	MR		
Secesh	Salmon, South Fk	B5, F, IF, N	N	F, L+, Rh, Rr	MR	В	
Selway	Clearwater, Middle Fk	B1, B2, B4, C, IRU, W	C, W	F, L+, Rf, Rh, Rr, WL, WN	MR	А	
Sheep Cr	Bruneau	BO, Fr, TU		G, L+, WN	IS	В	
Sheep Cr	Salmon	WRC	}	F, L+, Rh	MR	A	
Sheep Cr	Salmon, Middle Fk	WRC		Rh, WN	MR	А	
Silver Cr	Big Wood	BO, IF		F, Rf	IS		
Slate Cr	Salmon	F, N		F, G, L+	IS		
Smiley Cr	Salmon	WRC		WN	MR	Α	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Snake	Columbia	B2, B3, B4, BO, BL, F, FI, IF, I, N, S, W, Ws	B4, N, W	B, E, F, G, P, Rf, Rf, WL, WN	IS/MR	A	Hells Cyn/ and "South Fork"
Soldier Cr	Salmon, Middle Fk	WRC		WN	MR	Α	
Squaw Cr	Salmon	WRC		WN	MR	А	
St. Joe	Coeur D'Alene	B1, B2, B4, B5, I, IRU, TU, W	B1, B4	F, L, Rf, Rf, WL, WN	NR	В	
Stanley Lake Cr	Valley Cr/ Salmon	WRC		C, F, G, L+	MR	А	
Teton	Henrys Fk	I		Rf, Rr	SR		
Three Links Cr	Selway	N		F, L+	MR	А	
Trestle Cr	Pend Oreille	B6		E, F	NR		excellent bull trout
Valley Cr	Salmon	BO		F, L+	MR	А	
Warm	Henrys Fk	BO, N		F, G	NR]	
Warm Springs Cr	Salmon	WRC		F, WN	MR	А	
Weitas	Clearwater, North Fk	BO		Rh, WN	NR	В	
White Bird Cr	Salmon	F, N		F, G	MR	}	
White Cap Cr	Selway	С	С	F, L+	MR	А	
White Sand Cr	Lochsa	BO, F, N		L+, Rf, Rh, WN	MR	В	

IDAHO'S "A" RIVERS

Rapid River and West Fork

Bursting with clean, cold water from the isolated highcountry immediately east of Hells Canyon, the Rapid River is an excellent, small, salmon-supporting stream reached only by trail. This is the finest river in the uniquely isolated Seven Devils Mountains—an outlier of Rocky Mountain topography separated from the rest of the range.

Both forks of the Rapid River rise in the Hells Canyon National Recreation Area and flow northeast to the Little Salmon River just a few miles upstream from its confluence with the Salmon River at Riggins. The river supports salmon, resident fish, and diverse wildlife in its short 20-mile drop from headwaters at 8,956 feet on Monument Peak to mouth at under 2,000 feet. The cold water of the Rapid River is important to the health of the lower Salmon River and to its threatened runs of salmon and steelhead.

In 1975 the main stem of the Rapid River was designated in the National Wild and Scenic Rivers system for 18 miles—its entire length except for the lowermost 2 miles below a major fish hatchery. All 8.8 miles of the West Fork were likewise protected. The basin is entirely publicly owned except for two isolated state tracts, a mining claim, and the 2 lower miles.

Salmon River

Flowing for 425 miles with only one low dam (a weir) at a fish hatchery near the headwaters, the Salmon is the landmark river of Idaho and a premier natural river of America. Surviving salmon and steelhead runs here are among the most critical in the Columbia basin and the West and can possibly be restored. Much of the basin is also a stronghold of the large, migrating bull trout, and some sections and tributaries support native westslope cutthroat trout. Numerous wild or semi-wild tributaries contribute clean, cold water from unroaded basins throughout central Idaho, including the largest wilderness in America outside Alaska. The Salmon, when combined with the Snake River downstream, is one of only two rivers in the West that offer an extended river expedition of more than 400 miles without dams (the other is the Green of Utah). The dam-free reach of the Salmon and Snake together total about 416 miles from the Sawtooth Valley hatchery weir to the Snake River backwater of Lower Granite Dam upstream from Lewiston. Because of its free-flowing length, wilderness, surviving runs of salmon and steelhead, and riparian habitat, the Salmon is arguably the most valuable and important river in the entire Rocky Mountain region. If four dams downstream were removed (the least useful among eight that lie below the mouth of the Salmon River), it is likely that the magnificent runs of salmon and steelhead would return, making this river system all the more valuable.

The river begins at the juncture of the Smoky and Sawtooth Mountains northwest of Ketchum and flows in a remarkably roundabout course, but generally tending northwest. Its epic route brushes against nine major subranges of the Middle Rocky Mountains. Each was formed through seismic activity, and each determined the river's flow as the mountains arose. The Salmon first heads north from the Smoky Mountains and scribes a line between the spectacular jagged skyline of the Sawtooth Mountains to the west and the taller, more pyramidal White Cloud peaks to the east. Then it runs east past the Salmon River Mountains to the north while the Pioneer, Lost, and Lemhi ranges rise consecutively to the south. At 175 miles into its journey, the once-again north-bound Salmon encounters the base of the Continental Divide at the toe of the Bitterroot Mountains (Beaverhead subrange) near the town of Salmon, then veers directly west through remote canyons that dramatically bisect the mountainous heart of Idaho. It swings north again along the front of the Seven Devils Mountains, and then finally turns west to its confluence with the Snake River in the remote, arid depths of Hells Canyon.

The Salmon evokes more superlatives than nearly any other river in the West. It is at once the longest, wildest, and cleanest river of its size, offering excellent habitat to both imperiled salmon and steelhead. No other river transects so much mountain country continuous for the river's entire length and its 7,000-foot descent
from the base of snow clad alpine peaks above Sawtooth Valley to the harsh desert of Hells Canyon—one of the hottest places in the Rockies.

The river's chinook salmon population may have been the most abundant in the world. Fish still migrate 900 miles upstream from the ocean—one of the longest anadromous journeys anywhere and the fishes' headwater destinations may be the highest-elevation salmon-spawning areas on the globe.

The river can be divided into four sections of roughly a hundred or more miles each. First, headwaters in the Sawtooth Mountains gather in some of the loftiest and snowiest mountain country in Idaho and yield abundant cold water. Dozens of tributaries here will be increasingly important to the river as the climate warms (these are treated as a distinct group of streams in the text that follows). Likewise, many tributaries throughout the basin flow from wild or semi-wild landscapes and add clean, cold water to the main stem's flow, and are later considered as a discrete group of streams.

The second section of the river, from Clayton to North Fork, includes one of the finest continuous cottonwood forests in the West. This reach of more than 100 miles flows largely through private ranchland, with many diversions for irrigating pasture, but much of the river's aquatic habitat and rich riparian forest remains reasonably intact or is potentially restorable.

The third section of river--from North Fork to Riggins--cuts westward for 150 miles through the mountainous backbone of Idaho. This outstanding wild reach flows through tumultuous whitewater rapids, all the while picking up stellar tributaries that drain mountains that rise 6,000 feet above the river. Here, a 79-mile roadless stretch offers one of the most sought-after river trips in the West. This reach borders the Frank Church-River of No Return Wilderness and lies close to the Selway-Bitterroot Wilderness—two of the four largest wilderness areas in the lower forty-eight states.

The final section, known as the lower Salmon, penetrates four dry, desert canyons between Riggins and the Salmon's confluence with the Snake River. Together, these constitute the third-deepest canyon in America, behind only the Kings of California and Hells Canyon of the Snake, which the Salmon joins at its mouth. Both the wild reach and the lower river offer some of the most important winter ranges for wildlife in Idaho and support bighorn sheep, elk, mule deer, mountain lions, mountain goats, black bears, and bald eagles. Jet boats also ply lower parts of the wild reach and—even more so--the lower river near the Snake River confluence.

The Salmon, with its Middle Fork tributary, hosts the best remaining steelhead and spring and summer chinook salmon habitat in the entire Columbia basin, which is also the largest single mass of salmon spawning habitat in the West. The similarly wild Selway River, in the neighboring basin to the north, also has surviving steelhead populations, but it lost its native wild salmon runs when a downstream dam obstructed fish migration; the salmon in the Selway have been introduced from elsewhere.

The Salmon River's 125-mile wild reach from the North Fork, below the town of Salmon, to Long Tom Bar, above the town of Riggins, was designated in the National Wild and Scenic Rivers system in 1980. A more limited federal law banning hydroelectric development was passed to protect the lower 112 miles of river in 1988.

The Salmon River's upper reaches include large tracts of private ranchland through the Sawtooth Valley, though easements resulting from the Sawtooth National Recreation Area designation protect most of this property from development. The mid-section from Clayton to North Fork is mostly private ranch land, with many critical tracts of riparian habitat. The middle "River of No Return" reach is mostly national forest land, though private parcels used as resorts and second-homes are scattered along the river, and mining claims have been patented along some tributaries. In the Salmon's lower reach, much of the frontage of the upper 30 miles, from Riggins to White Bird, is privately owned, and development and encroachments for gravel extraction in this section have been increasing. But downstream from White Bird, 52 miles are largely in BLM ownership owing to a successful land acquisition program that boosted public ownership from 20 percent to 80 percent over the last 20 years (unfortunately, in that same time, an exotic plant, star thistle, has overtaken the drylands of the canyon with its impenetrable thickets of sharp spines, virtually useless to wildlife or cattle).

The Salmon is the longest largely natural river in the West with much of its frontage in public ownership. Additional protection of open space and restoration of flows from current ranchland diversions could markedly improve riparian and aquatic habitat and restore some of the river's outstanding fish and wildlife values. The Idaho State Office of Species Conservation has been working to minimize diversion-dam barriers to salmon along middle reaches and to protect selected river frontage. If further riparian openspace protection were to be combined with removal of the four lower Snake River dams lying downstream, this river could become America's most remarkable exemplar of river restoration and conservation.

Salmon River's Sawtooth Mountain headwater tributaries

Forming the headwaters of the Salmon River, ten major tributaries tumble down from the jagged Sawtooth Mountains. This is one of the largest blocks of high-elevation terrain in Idaho, with more clean and cold water flowing from it than from any comparable region. Much like runoff coming from glaciers on the north sides of Cascade peaks in the Pacific Northwest, these Sawtooth creeks will become increasingly important in the age of global warming.

Most of the mileage of these streams flows through the Sawtooth National Forest and the Sawtooth Wilderness, but the lower ends of several streams are privately owned. Valley Creek, which drains the highest country at the north end of the Sawtooth Range, flows mostly through private land near the town of Stanley. However, easements purchased as a result of the Sawtooth National Recreation Area designation bar development on much of this private ranchland.

Important Salmon River tributaries include Smiley and Beaver Creeks, at the southern and upstream end of the basin. Both of these also flow through privately owned mining claims. Alturas Lake Creek, Hell Roaring Creek, and Redfish Lake Creek drain the center of the Sawtooth highcountry. At the northern end of the range, Goat Creek, Iron Creek, Crooked Creek, and Stanley Lake Creek collect waters from the spectacular Sawtooth range before emptying into Valley Creek, which winds through a broad, willowcovered valley to the town of Stanley before joining the upper Salmon River. Protection of riparian vegetation and the prevention of diversions for new development along these headwaters streams are critical to maintain cold temperatures and healthy flows for the entire Salmon River system.

Salmon River's minor tributaries

Dozens of small tributaries are important to the health of the Salmon River and to the stocks of salmon and steelhead that persevere in this basin. A few of the most important high-quality creeks, beginning at the upper river, include Warm Springs, Slate, Squaw, Iron (Challis National Forest), Indian, Owl, Horse, Chamberlain, Sabe, and Bargamin. These are all clean streams that are already well protected. Rhett and Sheep Creek basins are similar but include clusters of mining claims.

Most of these, as well as many smaller streams, have basins that are entirely in U.S. Forest Service ownership, and most are within wilderness areas. Water quality is almost uniformly excellent, and most streams offer fine spawning habitat for salmon and steelhead if natural barriers, such as waterfalls, do not exist. Minor intrusions, such as mining claims are located along some of these streams.

See the B and C rivers in this chapter for the larger Salmon River tributaries: South Fork Salmon, Lemhi, Pahsimeroi, and East Fork Salmon Rivers.

Salmon River, Middle Fork and tributaries

The Middle Fork is the "crown jewel" of the Salmon River system and—many people would say—of the entire riverscape of the West. This 104-mile-long stream is the Salmon's largest tributary, has no dams, is mostly publicly owned, and flows through a wilderness landscape where nearly the entire watershed is protected and unpolluted. With excellent salmon habitat and a resident trout fishery, with intricate whitewater rapids, and with fine trails leading up tributary streams, the Middle Fork offers what many seasoned river runners consider the premier extended river trip in America.

Starting high in the southernmost Salmon River Mountains, the Middle Fork begins where its upper tributaries, Marsh and Bear Valley Creeks, join. It then drops down steep and narrow rapids, accessible only by trail, to Dagger Falls. Just below lies Boundary Creek, the put-in for Middle Fork river trips. This 96-mile-long whitewater route includes Class IV rapids, tributary waterfalls plunging off the canyon rim, hot springs, and stellar campsites. Occasional lodges and resorts are located along the river and often include small private airstrips. A trail follows the river for its entire length, and the corridor is surrounded by the 3.2 million acre Frank Church-River of No Return Wilderness.

One of the longest rivers designated from source to mouth, the entire length of the Middle Fork was included in the original National Wild and Scenic Rivers Act of 1968. Cattle grazing continued for decades with degradation of riparian areas in headwater basins but was largely discontinued in the 1990s when 120,000 acres of grazing permits here and in neighboring basins were bought for retirement. A marked improvement in riparian vegetation resulted within just a few years.

Superb Middle Fork tributaries include the Rapid River and Camas, Elkhorn, Soldier, Pistol, Indian, Marble, Little Loon, Loon, Sheep, Big, and Waterfall Creeks. These streams are well protected in the wilderness area, though mining claims and some state-owned land lie along Big Creek and its tributary, Monumental Creek. Expert whitewater kayakers consider Loon Creek one of the most beautiful streams in Idaho.

Selway River and tributaries

With crystal clear water, a pristine mountain wilderness of rugged peaks, lush evergreen forests, challenging rapids, and a fine fishery of westslope cutthroat trout, wild steelhead, and reintroduced chinook salmon, the Selway is regarded by many as the ultimate wild river of the West. The Selway begins in the Bitterroot Mountains and flows 98 miles westward to its confluence with the Lochsa River. The two then flow as the Middle Fork of the Clearwater. Most of the basin is in a protected wilderness area.

Spoken of in near-mythic tones by veteran river-runners, the Selway's lucid water roars through difficult Class IV rapids when flows are high and then subsides to rocky, technically demanding drops at lower flows in late-June and July. The 48-mile-long river trip is more difficult than the similarly regarded Middle Fork of the Salmon, it has fewer lodges and guest ranches along its shores, and it is regulated far more stringently; only one raft trip is permitted each day. This is the only river in America that is managed to guarantee river runners such a pristine wilderness experience.

Western hemlock, grand fir, and western red cedar blanket the mountains below the rocky and snowy highcountry. For 47 miles the Selway churns through the 1. 8 million acre Selway-Bitterroot Wilderness area. Only a dirt road separates this from the 3.2 million acre Frank Church-River of No Return Wilderness. Combined, they form the largest block of wilderness in the lower 48 states. An outstanding trail follows the Selway and offers one of the West's finest river-oriented backpacking trips—an experience that's always available after the rafting season ends owing to low flows in midsummer. Below Selway Falls—a road-accessible tourist attraction in its own right—a fine Class II whitewater day-trip extends to the river's mouth.

With all 94 miles of the Selway designated in the original National Wild and Scenic Rivers system, this is one of America's longest rivers protected from source to mouth.

The Selway has always been free-flowing, but a dam built downstream on the lower Clearwater at Lewiston blocked the migration of salmon and has affected the Selway's fishery. Though the "B" run of Clearwater basin steelhead managed to make it past the dam, the river's native salmon run went extinct. In one of the first celebrated cases of dam removal, the antiquated fish-blocking structure was destroyed in 1973. Chinook salmon from other rivers were stocked here in the 1970s and are now reproducing as a partially naturalized run of fish. Thus, unlike the Middle Fork of the Salmon, which still has its native salmon run, the Selway is heavily stocked with hatchery fish by the Nez Perce Tribe, which largely controls fishery management in the basin.

Much like Salmon and Middle Fork Salmon, the Selway is fed by a stellar group of wild, clean, cold tributary streams. Foremost and largest of these, Moose Creek runs for its entire length through the Selway-Bitterroot Wilderness area, and is accessible only by trail. Upstream from Moose Creek, Bear Creek likewise drains highcountry wilderness. Other excellent wilderness area creeks are Meadow, Gedney, Three Links, Marten, Paradise, Running, and White Cap. All of these streams offer fine fish habitat and are paralleled by trails that provide for excellent backpacking.

Snake River in Hells Canyon

This legendary reach forms the boundary between Idaho and Oregon. See Snake River in the Oregon chapter of this report (page 83).

Snake River, "South Fork" reach

From Palisades Dam, near the Wyoming border, to the Henrys Fork confluence, the Snake River flows with ample runoff through one of the finest cottonwood forests in the West and offers outstanding habitat for native cutthroat trout and a host of wildlife (this section is often called the "South Fork."

For 15 miles below Palisades Dam, Highway 26 follows the river northwest through the ranchlands of Swan Valley. At Conant Valley, the river leaves the road and, for the next 30 miles, riffles through a magnificent forest of black cottonwoods with gravel bars exposed in low water and lava cliffs rising above. A rare orchid, the Ute Ladies Tress (Spiranthes diluvialis) has been found here. To the northeast, Engelmann spruce cover mountainous slopes that give way to drier terrain and to the southwest, irrigated farmland perches on the bluffs above the river. For another 25 miles the river continues to braid through bottomland cottonwood forests, though enormous diversions are withdrawn from the Snake and farmland encroaches on the river with levees. This 70-mile section of the Snake is one of few large-volume, gentle flowing rivers in the Rocky Mountains. Famous for its native cutthroat trout fishery, the river draws anglers nationwide and is one few sport-fishing rivers for this native trout. The river is managed for native fish, with efforts to reduce non-native species. The riparian forest supports bald eagles, osprey, moose, and a host of other wildlife.

The Snake is the major river of Idaho. As it leaves its Rocky Mountain reach at the mouth of the Henrys Fork, it flows with an average of 8,779 cubic feet per second—the seventh-largest river flowing within the Rocky Mountain region. By the time it reaches its confluence with the Columbia, 1,040 miles from its source in Yellowstone National Park, it carries 56,900 cfs and ranks as the second-largest river in the West and twelfth-largest in America.

Despite the Snake's size and significance, the entire river below the Henrys Fork is heavily affected by diversions, agricultural pollution, damming, and land development. Nevertheless, some sections still offer important natural values. Several free-flowing reaches west of Twin Falls support rare white sturgeon (though they reproduce only in the section below Bliss Dam owing to the sturgeon's need for long free-flowing reaches). Springs flowing into the river from the north near Hagerman are heavily manipulated for hydropower and fish farms, but they still support an imperiled sculpin and rare snails, and replenish the river's diverted flows. Cliffs rising above the river at the Birds of Prey Natural Area near Swan Falls Dam support more species of nesting raptors than any other area in the nation. Farther downstream, the extraordinary Hells Canyon lies below the Hells Canyon Dam complex and is discussed in the Oregon chapter of this report. Although significant and even unique natural values still exist in these lower-river reaches, the overwhelming presence of agriculture here precludes consideration of the middle and lower Snake as one of the great natural rivers of the West.

St. Joe River

The St. Joe River flows with outstanding clear water from forested lands of the Northern Rockies and supports one of the state's—and the West's--strongest populations of native westslope cutthroat trout and also bull trout. Completely undammed for its entire 130mile length, this is one of the ten longest free-flowing river reaches in the Rocky Mountains.

Beginning almost on the continental divide at St. Joe Lake, the river drops west for about 28 miles, with a trail following its length the entire way. For the next 40 miles, to the town of Avery, a gravel road follows the stream. Then the river continues for 62 miles through a forested and cut-over valley, paralleled by a paved road to its mouth at Couer D'Alene Lake.

The river hosts an excellent native trout fishery, and is one of few major rivers where native cutthroat are still the dominant species. The basin supports wildlife including elk, mule deer, black bears, and grizzly bears. Westslope cutthroat trout are resident here and also migrate upstream from Couer D'Alene Lake, though introduced fish species and deterioration of the lake have degraded the lower river's native fishery.

The St. Joe's mouth at the lake is a unique feature with natural levees extending into the lake like two paralleling ribbons of land that support two strips of stately cottonwood trees. These house what may be the largest nesting colony of osprey in the country.

The entire river is enjoyed by trout anglers and Class II-IV whitewater paddlers.

Sixty seven miles have been designated in the National Wild and Scenic Rivers system: the upper 27 miles are classified as wild and the next 40 miles are classified recreational. The designation stops above Avery.

Upper portions of the watershed remain clad with old-growth forests, which are uncommon in the Northern Rockies. Middle sections have been logged, and the lower watershed has been intensively cut and recut. Most of the frontage above Avery roughly the halfway point on the river—is under the jurisdiction of the St. Joe National Forest. Nearly all the land below Avery is owned by Potlatch and by other forest-industry companies. If the entire St. Joe were like its upper reaches, this would be one of the very finest rivers in the West. Intensive logging occurred through much of the middle and lower basin in the 1980s and 90s but has mostly been stopped, and there may now be opportunities for restoration of the St. Joe's exceptional qualities, even in its lower reaches.

IDAHO'S "B" RIVERS

Bruneau River with East Fork, Sheep Creek, and Jarbidge River with its East Fork

The Bruneau carves a spectacular vertical-wall canyon in the thick basalt layers of southwestern Idaho's Snake River plain. This desert river and its tributaries still support Idaho redband trout.

The river gathers its headwaters from snowmelt in the Jarbidge Mountains, which rise to 10,789 feet in northern Nevada (see Nevada chapter of this report). It then flows north into Idaho, where it incises its remarkable canyon with high cliff faces, spires, and enormous piles of rockfall. Beyond its canyon, the river flows 14 miles through irrigated pastureland to the backwaters of C. J. Strike Dam on the Snake River.

With its largest tributaries, including the 60-mile-long East Fork, 80-mile-long Jarbidge River, and 70-mile-long Sheep Creek—the roughly 150-mile-long Bruneau and neighboring Owyhee River are unusual in the West for their extremely rugged, narrow canyons cut into dark, jagged layers of volcanic basalt. (New Mexico's upper Rio Grande in the Taos Box is the only canyon that could be considered comparable.) The 700-to 1,200-foot-deep canyons are entrenched in a vast, rolling, sagebrush-covered desert plain. If the most important criteria for this survey were geology and rugged, unusual scenery rather than biological importance, the Bruneau would surely be in the A list of this report.

Upper, mountainous reaches of the river system support resident trout, including redband, plus a remnant population of bull trout in the Jarbidge, which along with its smaller East Fork is exceptional among desert rivers in having cold, clear water rather than warm, silty flows typically found across arid landscapes of the West. The reduction of grazing within the canyons and headwaters areas over the past two decades has benefited the Bruneau, and fisheries and riparian qualities are recovering, according to BLM managers. In this respect, the Bruneau-Jarbidge system is now of greater natural value than the somewhat comparable but less-improved Owyhee River system to the west.

The extremely hot and remote desert canyons of the Bruneau provide habitat for mule deer, mountain lions, rattlesnakes, and other wildlife, including the threatened peregrine and prairie falcons. Along the lower river, a rare hot spring snail is found.

Because of the steep perpendicular walls, access to the Bruneau and its tributaries is extremely limited. One rugged trail winds down from the canyon rim in the river's middle section. A few other sites are reachable only by rugged 4-wheel drive routes that are impassable when wet. Long reaches of river are accessible only by kayak or raft. Sixty miles of the middle Bruneau, 15 miles of the lower Jarbidge, and 20 miles of lower Sheep Creek are run by boaters only during a short high-flow period in the spring.

A total of 121 miles of the Bruneau, along with the Jarbidge and lower Sheep Creek, were recommended for National Wild and Scenic River designation by the Department of the Interior in 1975; this remains one of the longest-standing but un-acted-upon federal recommendations for Wild and Scenic status. A bill for designation was being considered anew in 2007.

Most of the river corridor upstream from the lower canyon's mouth is in public ownership and is managed by the Bureau of Land Management. Some tracts of arid ranchland are privately owned but have little potential for development. In the 1990s—amid great controversy and some concessions--the Air Force expanded a nearby bombing range farther into the Bruneau canyonlands.

Clearwater, Middle Fork with the Lochsa River, Crooked Fork, and White Sand Creek

A twin to the famed Selway River, the more northerly Lochsa flows with fabulous, clear whitewater and through thick evergreen forests to its confluence with the Selway. There, the combined flow forms the Middle Fork Clearwater. Unlike the wild Selway, the Lochsa and Middle Fork Clearwater have a major highway paralleling them for their entire length.

The 69-mile-long Lochsa begins in Lolo Pass, at the Idaho-Montana border, and flows west. Visible from Highway 12, the river plunges over rapids and through deep green pools. Then the Middle Fork Clearwater flows for about 25 miles farther to its confluence with the South Fork Clearwater, where the main stem begins.

As with the Selway, native runs of salmon were blocked from the Lochsa and the Middle Fork by Lewiston Dam, but steelhead survived along with a fine cutthroat trout fishery, and non-native salmon have been introduced, and reproduce in these rivers again.

Among the initial 12 National Wild and Scenic Rivers designated in 1968, the Lochsa and Middle Fork offer some of the finest river scenery that is accessible by a major highway. The Lochsa offers an exciting 35-mile reach of Class III-IV whitewater, boatable through early summer.

Nearly the entire Lochsa corridor is publicly owned in Clearwater National Forest, however, vital headwater basins are checkerboarded by private ownership and managed for timber production. White Sand Creek, flowing from the south, is only slightly affected, but the Crooked Fork of the Lochsa is thoroughly checker-boarded with forest-industry ownership. Acquisition of these lands would make the protection of the Lochsa complete.

Downstream from the Lochsa-Selway confluence, Middle Fork Clearwater frontage is split between national forest ownership through much of the upper half and private land on the lower half. The lowermost 4 miles of the river flow through the Nez Perce Indian Reservation, as does most of the main stem Clearwater River for 74 more miles downstream to the Snake River at Lewiston.

Clearwater River, North Fork with Kelly, Cayuse, and Weitas Creeks

These exceptionally beautiful Northern Rockies streams include deeply forested wild areas and superb cold-water fish habitat. Their legendary runs of steelhead and salmon were eliminated by the 717-foot-high Dworshak Dam and its 54-mile reservoir, but the river and its tributaries above the reservoir support fine resident trout fisheries, including some of the very best populations of imperiled bull trout and westslope cutthroat trout.

The North Fork Clearwater flows generally west for about 78 miles from headwaters at the Idaho-Montana border to the backwater of Dworshak Dam, near the mouth of the North Fork, east of Lewiston. Forty miles of the river are paralleled by road, and most of the rest is paralleled by a 4-wheel drive route. The river has several important wild tributaries. Kelly Creek is 31 miles long with road access along its lower 10 miles, and is considered by fisheries biologists to be among the best bull trout streams anywhere. Entering from the south, Weitas Creek flows for 20 miles, accessible only by trail. Cayuse Creek runs for 30 miles with only trail access.

People who knew the undammed North Fork Clearwater regarded it as one of the finest river systems in Idaho; it once supported one of the most legendary runs of large steelhead ever known.

Though anadromous runs are extinct, the North Fork is now popular for trout fishing and for a 60-mile, Class III-IV boating run through splendidly remote, undeveloped valleys and canyons. The area is also known for elk and deer hunting and sustains several rare plant communities. An exceptional gem, Cayuse Creek has cutthroat trout, bull trout, and kokanee salmon, and also wolf habitat in its resoundingly wild basin. Kelly Creek is known for its fine cutthroat trout and bull trout and flows through a mix of exquisite meadows with forests and then tight canyons.

Nearly all the land in these watersheds lies in the Clearwater National Forest, but none of it is protected as wilderness, and many areas have been heavily logged or could be logged in the future. The upper end of the North Fork includes several miles of frontage owned by the timber industry, and other adjacent headwater areas lie in a checkerboard of national forest and industrial forest ownership. This river, with its mixed pattern of ownership, is a priority concern for the Idaho Nature Conservancy.

Salmon River, East Fork

This key tributary to the upper Salmon River has an important salmon and steelhead spawning population and a bull trout fishery. From alpine headwaters, the river drops through forested slopes and then winds through dry, rugged terrain with a rich riparian corridor of extensive cottonwood forests. The East Branch is the finest dryland river in Idaho with its salmon runs still present.

The East Fork flows north from the Boulder Mountains where its South and West forks collect headwater flows in the Sawtooth National Recreation Area. Both tributaries and 5 miles of the upper river are accessible by trail. The East Fork next flows for 6 miles through the Sawtooth and Challis National Forests. In this middle reach, the East Fork is fed by several tributaries that flow from the rugged White Cloud Mountains, which includes some of the highest peaks in Idaho. The entire east side of that range drains to the East Fork, providing healthy flows that support important anadromous runs and vital cold-water flows to the main stem Salmon River downstream. The East Fork next runs for 23 miles through a narrow strip of private ranchland surrounded by Bureau of Land Management property until it reaches its mouth at the main stem Salmon River, east of Clayton. Ranching and diversions for pasture have heavily affected the East Fork, but excellent potential remains to restore the health of this important Salmon tributary.

The chinook salmon runs of the East Fork are especially important to the Shoshone and Bannock Tribes of southern Idaho.

To the east of the East Fork, the Lemhi and Pahsimeroi Rivers are Salmon tributaries that roughly parallel the route of the East Fork, but they flow largely through private ranchland and don't have the protected headwaters and high mountain snowmelt that benefit the East Fork.

Salmon River, South Fork and Secesh River

This major Salmon River tributary has important habitat for steelhead and salmon spawning and for bull trout, and was once regarded by many as the best of all habitat in the entire Salmon River basin. Badly damaged by logging in the past, but recovering, this basin is undeveloped and mostly in national forest ownership.

The South Fork begins in Boise National Forest but flows north mostly through the Payette National Forest, running for 67 miles to its confluence with the main stem at Mackay Bar, 20 miles upstream from the usual river-runners' take-out for the popular River of No Return reach of the Salmon. The South Fork flows through a varied landscape of meadows, pine forests, and rocky canyons incised within the granitic Idaho batholith.

While most of the basin is national forest, and lies directly adjacent to the large Frank Church River of No Return Wilderness, none of the South Fork watershed is similarly protected. Heavy logging here in the 1960s and 70s led to catastrophic landslides of the highly-erodible, granitic soils, and immediately to siltation that was disastrous to the world-class fish runs. The river has begun to recover from that damage. Forests have begun to regrow, however, the loss of soil, disturbance of the riverbed, and lack of returning salmon as a nutrient base have all had lasting effects.

The lower 25 miles are accessible only by trail, and a gravel road roughly follows the South Fork's corridor for the rest of its length. The steep-gradient, Class III-IV stream has become popular among whitewater boaters who are willing to cope with a long and arduous shuttle early in the summer. The river is a good fishery for spring and summer Chinook salmon and bull trout. Several tracts of private land are located along the middle and lower sections of the river.

The Secesh River (pronounced SEE-sesh) flows for 38 miles from the west and north and joins the South Fork Salmon in its mid-section. Gravel roads follow much of the Secesh's length, but 12 miles have only trail access. This tributary has a good salmon, steelhead, and cutthroat trout fishery. One sizable private inholding in the Payette National Forest is located along the upper river at Secesh Meadows. Other fine tributaries also enter the South Fork downstream from the Secesh.

IDAHO'S "C" RIVERS

Blackfoot River

The upper Blackfoot River has some of the most productive water for native trout in Idaho, and perhaps the very best.

Rising in the little-known Webster Range of the middle Rocky Mountains in far southeast Idaho, the Blackfoot flows north to the Snake River plain on the Fort Hall Indian Reservation north of Pocatello. The lower two-thirds of the river, from Blackfoot Reservoir down, flow through a remote Class III whitewater run--an inaccessible canyon with extreme whitewater along the border of the Shoshone and Bannock Fort Hall Reservation--and then lower reaches are severely diverted and dammed for irrigation. The upper third of the river, above Blackfoot Reservoir, is the reach that is listed here as one of Idaho's outstanding rivers.

Headwaters begin with the twin streams of Chippy Creek, which flows 15 miles south, and Diamond Creek, which flows 18 miles north, both meeting to form the Blackfoot. Chippy Creek runs through a 3-mile-wide belt of private ranchland between sections of the Caribou National Forest. Diamond Creek flows 12 miles through the national forest and then 12 miles through private land.

The Blackfoot then curves for about 26 miles through a broad floodplain and wide, open, high elevation valley replete with wetlands along much of the river's route, ending in Blackfoot Reservoir. Nearly all of the corridor lies within a few, large, private ranches.

Though this stream is heavily affected by deforestation, diversions, channelization, roads, and grazing, it was once among the very top native Yellowstone cutthroat trout (and perhaps bull trout) streams in Idaho and the West, likely much better than the current fishery in the renowned South Fork Snake. With limestone in the basin, the alkalinity of the water is high, leading to similarly high productivity for aquatic life. The conductivity of the stream—a measure of total dissolved solids indicative of nutrients—ranges between extremely high ratings of 500 to 700. The Salmon River, for comparison, rates from 40 to 70 (though a fine stream, the Salmon

has only one-tenth the productivity of this little known and highly affected waterway.) Trout here can reach an exceptional 8 pounds, and grow at roughly twice the speed of fish in many other popular angling streams. Bird life is likewise outstanding, with throngs of shore and wading birds in the wetlands and with the potential for habitat much like the bird-rich Grays Lake National Wildlife Refuge, just 10 miles north from the river's inlet to Blackfoot Reservoir.

As a stream with high restoration potential, it would be difficult to pick a more promising river than the Blackfoot.

Boise River, North Fork

Flowing through wild mountain canyons, this clear, cold stream hosts a fine fishery of both native and hatchery trout and offers good opportunities for hiking and whitewater paddling.

The 43-mile-long river gathers waters from 8,000 ft peaks and flows for 8 miles through the Sawtooth Wilderness. It then runs through Boise National Forest for 11-miles accessible in part by 4-wheel drive road, and for 16 scenic miles accessible by gravel road. The river finally then plunges into a wild canyon with no road or trail for 9 miles before reaching its confluence with the Middle Fork Boise. Nearly the entire river lies in the Boise National Forest.

Much of the watershed burned in 1994, and many landslides ensued, but the basin has been gradually recovering. The river offers a fine sport fishery with trout, including native Idaho redbands, and the lower reach is a favorite of expert whitewater boaters who value the canyon for its beauty, seclusion, and whitewater.

Although the biological values of the North Fork Boise do not compare to Idaho's most exceptional rivers, many reaches of the North Fork and of the whole Boise River system offer outstanding recreational and natural qualities close to Idaho's largest population center. The lower river, in the city of Boise, is centerpiece to one of the finest urban greenways in America, and the greenway is being expanded to include more of the low-elevation river. The Middle Fork, above Lucky Peak Reservoir, is a beautiful free-flowing stream with wonderful early-summer whitewater boating and gravelroad access to the old mining town of Atlanta. At the Middle Fork's headwaters, the Queens River is an outstanding trail-accessible wilderness stream flowing from Sawtooth peaks. The South Fork has a popular whitewater run, a dam-release trout fishery between Anderson Ranch and Arrowrock Reservoirs, and a fine cottonwood corridor along upper reaches above Anderson Ranch. However, the North Fork is the least developed of the three Boise River branches.

Henrys Fork, Snake River

Considered by some anglers to be the finest dry-fly trout fishing river in the West, the Henrys Fork of the Snake has excellent cold water, unusual spring-fed flows, waterfalls, and wildlife habitat. Although it has development and roads and is blocked by two dams, the upper basin is geologically and ecologically the closest type of landscape we have to another Yellowstone caldera.

The 110-mile river rises with robust spring flows within a few miles of the continental divide, just west of Yellowstone National Park. Several tributary creeks flow into Henrys Lake, which has been raised by a small dam. Below it, the river meanders through forests and wetlands to Island Park Reservoir, which is managed for irrigation in the lower basin. Six miles below the dam, the river winds placidly through Railroad Flat at Harriman State Park—Idaho's first state park and the most popular fishing reach. Farther downstream the river plunges over three major waterfalls.

The Henrys Fork is exceptional in its clean, cold water with abundant insect life. Native cutthroats survive only in the upper river while the quiet, mirror-like surface of the Railroad Flat reach supports mostly non-native rainbow trout and is regarded as one of the premier dry-fly fishing rivers in the nation.

The river is also unique in flowing through the Island Park Caldera—an area of past volcanic activity that has left a broad, depressed basin isolated in the highlands of the Rocky Mountains. The collapsed caldera makes the geology, plantlife, and wildlife habitat of the upper Henrys Fork very similar to that of Yellowstone National Park. Moose, elk, and eagles are found here, as well as rare trumpeter swans, which depend on the relatively warm spring flows of the Henrys Fork in the winter. The upper half of the basin is mostly in public ownership in the Targhee National Forest, but there has been heavy clearcutting throughout the area. Although no road parallels the river, there are several crossings and a fair amount of recreational development. After plunging through a nearly impassable canyon, the river enters its lower watershed, which is intensively farmed and irrigated but still has some fine cottonwood corridor. Diversion dams with large intakes shunt much of the river's flow into canals. The Henrys Fork Foundation is an active local group dedicated to the conservation of the river and to working cooperatively with the basin's farmers.

Owyhee River and Middle, North, and South Forks, and Deep Creek

The Owyhee River flows through an extremely remote and sparsely-roaded desert of southwestern Idaho with deep, narrow, vertical-wall canyons, a mix of gentle riffles and heavy whitewater, and habitat for golden eagles, bighorn sheep, and arid-land wildlife. Combined with the river's greater length in Oregon, and with the Bruneau River, the Owyhee is one of the two greatest wild rivers of the northern desert region of the West.

With seasonal flows coming from snowmelt in the Independence and Bull Run Mountains, the main stem Owyhee (sometimes called East Fork above the South Fork confluence) winds through dry mountains for about 60 miles in Nevada before reaching Idaho and then flows for about 100 miles from the Duck Valley Indian Reservation to the Oregon border. Much of this length is through steep, incised canyons with vertical walls of dark, volcanic basalt. In this reach, the South Fork, which also flows for about 100 miles in Nevada and then for 40 miles in Idaho, joins the main stem (see Nevada chapter of this report). The sixty-mile long Deep Creek is another tributary to the main stem that enters in Idaho. Two other important Owyhee tributaries, the North Fork and the Middle Fork, enter the main stem far downstream in Oregon, but flow for their first 22 miles and 8 miles, respectively, in western Idaho. (See the Oregon section of this report for a description of these tributaries.)

The Owyhee and its branches pass through some of the most

remote desert lands in the West. The only access is by difficult, 4-wheel drive roads, impassible when wet. Though most of steppelands of southern Idaho have been heavily grazed, the Owyhee canyons are so rugged in many places that cattle have been kept out, leaving native grasses and other plantlife to thrive. The remote canyons also offer excellent habitat for desert wildlife including bighorn sheep. Major sections of the river and its tributaries provide good habitat for redband trout. Unfortunately, diversions for hay pasture in the Duck Valley area persistently affect the river and impede recovery of its fishery and other biological values.

The Owyhee canyonlands are well regarded by boaters for their remoteness and stark beauty. The main stem Owyhee offers a demanding, springtime Class II-IV kayak or canoe trip (up to 78 miles with a portage). The South Fork has a 36-mile Class II-III trip, and Deep Creek has a 39-mile Class II trip that whitewater guidebook author Grant Amaral calls a miniature Grand Canyon.

A bill to designate some of the Owyhee in Idaho in the National Wild and Scenic Rivers system was considered in 2007. Most of these river canyons are public land managed by the Bureau of Land Management.

Pahsimeroi River

This tributary to the mid-section of the Salmon River has been heavily affected by ranching and related diversions but remains important because of its high fisheries productivity and restorable spawning habitat.

The Pahsimeroi flows for about 52 miles north between the Lemhi Range and the Lost River Range. Its source lies on public land on the slopes of Idaho's tallest peak, the 12,662-foot Mount Borah.

With its ample gravels and cold water, this is an ideal stream for salmon spawning, and in the past was a tremendous producer of fish. Unlike most of central Idaho's basins, which are mainly granitic, this watershed has large deposits of limestone, which is especially conducive to invertebrate and fish life. The river still supports bull trout and westslope cutthroat trout. Two Pahsimeroi tributaries—Falls Creek and Big Creek—support strong populations of westslope cutthroat. The Pahsimeroi, however, flows through a wide, open, arid valley that has been converted to ranching. Yet with cold springflows, meandering channels, and cottonwood forests either present or capable of regeneration, parts of this river could offer some of the extraordinary restoration possibilities. The Idaho Nature Conservancy has identified the Pahsimeroi and neighboring Lemhi Rivers as priority areas for attention and is working with the state's Office of Species Conservation and with ranchers on land protection and riparian restoration projects.

In a parallel course, but to the east, the Lemhi River has its headwaters of Eighteenmile Creek and flows for 64 miles, including reaches that are diverted and completely dewatered. It flows northwest between the towering Bitterroot-Beaverhead Range, which marks the border of Idaho and Montana, and the Lemhi Range, which lies to the west. It empties into the Salmon at the town of Salmon. This stream is similar to the Pahsimeroi but more degraded.

Payette River, South Fork

The South Fork Payette tumbles from high peaks of the Sawtooth Wilderness, pounds through a spectacular middle-elevation canyon with hot springs along the shores, and offers excellent trout habitat, plus opportunities for streamside hiking and whitewater boating.

Beginning in the heart of the Sawtooth Mountains, the South Fork draws its waters from a gem-like collection of high-country lakes, then it flows for nearly 20 miles through wilderness, with a trail following its entire length. For its next 24 miles, the river rushes through scenic mountain terrain with riffles, pools, large rapids, intimate canyons, hot springs, and lush riparian thickets of willows. A road parallels this reach with Forest Service campgrounds and access areas. Then for 15 miles below Lowman, the river drops into a steep, rugged canyon and plunges over waterfalls. The South Fork's final 8 miles riffle and drop through Garden Valley to its confluence with the Middle Fork, where the main stem Payette begins.

Though it is heavily affected by introduced trout and not a highly productive stream, the South Payette basin is important habitat

for Idaho's surviving redband trout, which are found only in the southwestern part of the state. Bull trout also survive in this river and its tributaries.

Most of the river frontage along the lower river, in Garden Valley, is private land and could face heavy pressure for subdivision and development.

The South Fork's dam-free drop of about 67 miles--from alpine source to low-elevation canyons and valleys--offers an exceptional tour of the middle Rocky Mountains.

CONCLUSION

Idaho has the finest long reaches of natural free-flowing rivers remaining in the West. Surviving chinook salmon, steelhead, bull trout, westslope cuthroat trout, and redband trout are all important native species that still survive in many of the streams. Further protection of Idaho's most outstanding rivers would ensure their significant values for the future. Restoration of rivers that have been degraded--but not irrevocably altered--by cattle, diversions, mining, and development would help to recreate natural river systems of great significance nationwide.

Using eleven lists developed by other organizations or agencies, plus several interviews with biologists and other experts familiar with the fisheries and ecosystems of Idaho, we have found 144 rivers that have been identified for their high natural qualities. We sorted the most exceptional of these into an "A" category of 7 rivers, which includes the 420-mile-long Salmon, plus nearly 50 small-and middle-sized tributaries of the "A" rivers (these are clustered together in several groups by basin owing to their similarities). Our "B" category of excellent natural streams includes 16 rivers and tributaries. Our "C" list includes 10 rivers and tributaries.

Idaho has 9 rivers in the National Wild and Scenic Rivers system totaling 686 miles—not much considering the number of excellent rivers in the state, but nonetheless the largest mileage by far in the interior West. Designated mileage, however excludes most of the main stem Salmon River, critical lower reaches of valuable rivers such as the St. Joe, most tributaries of designated rivers, and—as of this writing—the entire complex of incomparable desert rivers in the southwest corner of the state. A bill was introduced in 2006 to add 386 miles of Idaho's desert rivers to the National Wild and Scenic River System. Of these, 100 miles were on the Bruneau, West Fork Bruneau, Jarbidge, and Sheep Creek, plus 60 miles on the lower Bruneau tributaries of Big Jack's Creek and Little Jack's Creek. In the Owyhee basin, 226 miles were proposed.

Idaho's best natural rivers benefit from having extensive mileage that is publicly owned and managed by the U.S. Forest Service, and some of this mileage is fully protected within wilderness areas. However, many scattered parcels of land within the national forests are privately owned. Mining claims in some of the wildest regions could cause serious threats to water quality, and the checkerboard pattern of industrial forest ownership in northern rivers means that clearcut logging is a continuing threat to the integrity of whole watersheds. In low-elevation areas, which are also the most biologically productive, major reaches of the finest rivers are predominantly owned by ranchers or by industrial forest companies, whose management can conflict with conservation of river values. The Salmon River is a special case, having a long mid-section with privately owned frontage that is vulnerable to land development. Yet because much of the private land along many of Idaho's rivers is owned by either ranchers or by the forest industry, much of it remains in large blocks under single ownerships. This aspect may make protection and restoration efforts more feasible than they would otherwise be after large tracts become subdivided.

Three significant clusters of outstanding natural rivers became evident as this survey unfolded. Two of these clusters are located in the wild and lightly developed lands of central Idaho, which, all told, encompass an area nearly 300 miles long and 100 miles wide. With a population density lower than any other place in the contiguous 48 states, the wildlands of central Idaho represent the most substantial mass of relatively natural landscape in the United States outside Alaska. The river network that threads through this wild country represents the best opportunity for river and habitat protection at an ecosystem scale, nationwide. Within this large wild area, we divided the riverscape into central and north-central clusters.

Central Idaho/ Salmon River system

The central cluster is actually the entire 420-mile-long Salmon River and its tributaries. The Salmon has an extraordinary and enormous watershed spanning 150 miles east-west and 150 miles north-south. The entire length of this river is worthy of protection at some level, making the challenge of conservation equivalent to that of safeguarding many separate rivers in many of the other western states.

Two sections of the main stem Salmon have major mileage with privately owned river frontage: the extensive middle reach from Clayton to the North Fork, and the initial section of the lower river between Riggins and White Bird. Some form of protection and restoration in these two reaches may be critical to the long-term health of this incomparable waterway.

Many Salmon River tributaries are also excellent natural streams, and together they represent one of the most notable groupings of high quality waterways in America. The Sawtooth Mountain headwaters of the Salmon River contribute clean, cold water that is vital to the health of the larger river and that will become even more important in the age of global warming. Most of these streams are already well protected.

The major east- (and dry-) side tributaries--the East Fork, Pahsimeroi, and Lemhi Rivers--are adjacent basins that also have great importance in the main stem of the Salmon. They, too, drain very high terrain, though their mountains receive less snowfall than the Sawtooths and White Cloud Mountains owing to the rain shadow cast by those great windward ranges, and also to their smaller area of highcountry. Although they are productive for fisheries owing to their geologic (limestone), hydrologic (springflows and snowmelt), and ecological makeup, these three rivers have been seriously degraded. They are not, however, heavily developed. In fact, they are scarcely developed at all, and their restoration is eminently possible. The East Fork, in particular, offers great potential because it adjoins the highly protected Sawtooth-White Cloud Mountain complex, has only a thin strip of private ranchland running down the center of its narrow valley, and retains many of its natural qualities.

North-central Idaho/ Selway-North Fork Clearwater-St. Joe River systems

Immediately north of the Salmon River basin lies the extraordinary north-central cluster of Idaho rivers. Here the wild Selway-Lochsa system adjoins adjacent watersheds of the North Fork Clearwater and St. Joe.

The Selway-Lochsa is an outstanding complex of rivers and streams. A relatively small checker-boarded patch of private industrial forest land at the headwaters of the Lochsa is the only weak-spot in this otherwise highly protected river system. The North Fork Clearwater basin above Dworskak Dam (but excluding the Little North Fork, which has a lot of industrial ownership) has a stellar set of wild tributaries with only small amounts of industrial forest land in its upper basin.

The St. Joe watershed is wild at its headwaters, but in its mid-reach is checker-boarded with industrial forest tracts and national forest land that has been heavily logged. The lower St. Joe is biologically important but is owned almost entirely by the forest industry.

Idaho Desert/ Bruneau-Owyhee River Systems

The third great cluster of natural rivers in Idaho lies in the desert southwest--the Bruneau and Owyhee basins. Like the forested wildlands of central Idaho, this area is remote from cities and major highways, and is accessible only by a sparse network of unimproved roads. Though cattle ranching has degraded much of the spare, arid landscape, the canyons remain as wild enclaves. As such, they remain as refugia for redband trout, native grasses, desert plants, and wildlife. Unlike some of the more road-accessible reaches of the Salmon and other central Idaho basins, the wild rivers of



Hells Canyon, Snake River

Rivers of Montana

s the second-largest state in the West, Montana's river geography is split roughly in two. Rivers in the western part of the state are mountainous, pulsing and rushing through valleys and canyons of the northern, middle, and southern Rocky Mountain provinces. Rivers in the eastern part of the state begin in the mountains, but then wind and flow with low gradient through expansive grasslands of the semi-arid Great Plains.

The mountainous regions have wilder rivers, with public land and some well-protected national park and wilderness watersheds, though mining, logging, and now recreational and second-home development have taken a heavy toll. On the prairie, few reaches have escaped the degradation of diversions, damming, grazing, and roads, though a few relatively intact sections of waterways remain. Even in the mountainous regions, precipitation is less plentiful here than in northern Idaho and on the western slope of the Cascades in Oregon and Washington. But still, the mountains in Montana receive far more water than the rest of the 1,000-mile-long Rocky Mountain range that extends southward through New Mexico.

As such, Montana's rivers are some of the largest (by volume) in the Rocky Mountains. The second-largest river flowing within the Rockies—the Clark Fork/Pend Oreille—also has the longest river mileage entirely within the Rocky Mountain region (the largest Rocky Mountain river in volume is the Columbia, whose length through the American portion of the Rockies is nominal). The Kootenai, which begins in Canada but then flows across far northern Montana before entering Idaho and ultimately returning to Canada, is the Rockies' fourth-largest river. The Flathead—principal tributary of the Clark Fork—is the sixth largest. The Missouri and Yellowstone rank eighth and ninth for size while they are still within the Rocky Mountain region; they flow with similar volumes where they each leave the Rockies and enter the Great Plains. The Yellowstone is actually the larger of the two at the confluence, with 13,080 cfs on average versus the Missouri's 11,000 (the Missouri grows to 76,200 cfs by the time it reaches the Mississippi, far downstream).

Montana can boast part of the third-largest block of wild and semi-wild land outside Alaska: the northern portion of the Greater Yellowstone Ecosystem (only central Idaho and the Sierra Nevada are larger). This Greater Yellowstone region includes many fine tributaries of the upper Missouri and upper Yellowstone Rivers. Another large and significant block of wild terrain is the Glacier National Park/Northern Rockies ecosystem, which is threaded by the Flathead River system and upper portions of the Two Medicine, Teton, Sun, Dearborn, and North Fork Blackfoot Rivers.

Montana has four rivers with 368 miles designated in the National Wild and Scenic Rivers system—the three forks of the Flathead plus the wild section of the Missouri. While many more rivers are deserving of protection, this is the fifth-largest contingent of Wild and Scenic rivers in the nation, behind Alaska, California, Oregon, and Idaho.

With its ample waters and wild country, Montana has perhaps the finest reputation in America for trout fishing. Excellent sport fishing on the Madison, Gallatin, Big Hole, Yellowstone, Beaverhead, Smith, and other rivers draws anglers from around the country. However, most streams across the state are biologically degraded to some extent--some of them severely. Even the reputation of the state's "blue ribbon" trout waters typically owes to introduced species, such as rainbow and brown trout, rather than to native fishes that are more indicative of a stream's ecological health. For example, while non-native rainbows have become common, bull trout, which once thrived on many if not most of the cold-water streams of the mountain region, are now limited to a select few waterways that retain high-quality habitat. (The upper South Fork Flathead is perhaps the only secure stronghold for these fish.) For this reason, the bull trout can be considered a good indicator species for the ecological integrity of native aquatic life in Montana streams much as the salmon and steelhead are for rivers of the Pacific Coast.

The biological degradation of Montana's streams owes to many factors. Dams have been built on nearly all the rivers, and diversions for irrigation are almost universal in the eastern part of the state. As soon as rivers leave the mountains and enter ranchland, diversions severely deplete flows. (Even mountainous reaches of some streams, such as the Big Hole, are severely affected by diversions.) The invasion of exotic species—from stocked brown trout to knapweed—pose a suite of problems that affect most of Montana's aquatic habitats. For example, whirling disease, spread by stocked fish, has already decimated or diminished some of the state's finest sport fisheries and has posed ominous threats for native fish throughout the region. Hard-rock mining has long polluted Montana's rivers, with some of the worst degradation owing to old and now defunct mines. As testament to this legacy, the state's largest river, the Clark Fork/Pend Oreille, also happens to be the nation's longest superfund toxic waste site—a 120-mile-long reach of the upper Clark Fork beginning near Butte. Current coal and gas development on the Great Plains and urbanization in resort and mountain-town areas such as Big Sky, Missoula, and Kalispell now add formidable threats to the state's waterways.

Nevertheless, some fine river systems, or at least portions of them, remain, and several are truly exceptional from a nationwide perspective. Foremost are the Yellowstone and Flathead Rivers. Many other reaches retain important qualities, and at least some of their original wealth can be restored if adequate measures are taken to avoid further problems and to fix some of the damage of the past.



Three Dollar Bridge

Great Rivers of Montana





Sources for the Montana Survey

In addition to the major sources described at the outset of this report, the survey relied on the following state-specific sources for Montana:

American Wildlands (AW1). This list includes the highestranking rivers in A River Integrity Assessment for Western Montana. The study, conducted by biologists at the University of Montana, considered connectivity of natural river features, native/exotic fish assemblages, floodplain conditions, and headwaters conditions.

American Wildlands (AW2). This list includes high-ranking rivers in, A River Integrity Assessment for Western Montana

Interviews with biologists and local experts (B#):

David Feldman, Montana Department of Environmental Quality, biological integrity analyst

Don Skaar, Montana Fish, Wildlife, and Parks Commission, chief of the state fisheries management bureau

Dave Stagliano, Montana Natural Heritage Program and the University of Montana, formerly with The Nature Conservancy, aquatic ecologist

Scott Bosse, Greater Yellowstone Coalition, fisheries biologist

Montana Department of Environmental Quality (ME). From this agency's Reference Stream list (2005), which considered only the state's smaller streams, we included waterways identified as "pristine" as well as some of the relatively larger streams that had high quality rankings based on biological criteria.

Montana Fish, Wildlife, and Parks Commission, outstanding trout waters (MF1). This 1988 list of top fishing rivers includes streams with introduced fish, such as rainbow and brown trout, and incorporates the well-known "blue ribbon" trout waters that the state first designated in the 1970s.

Montana Fish, Wildlife, and Parks Commission, outstanding recreation rivers (MF2). Though recreation is not the most important criterion for the Western Rivers Survey, we include this 1988 list because recreation is usually dependent on high quality waters.

The Montana Nature Conservancy, informal list (NC). This list of top rivers was taken from an interview with Jamie Williams (2007), Montana state director of TNC and an avid rivers enthusiast.

Natural Heritage Program, high biodiversity streams (NH). The Montana Natural Heritage Program is based at MT State University (previously with the Nature Conservancy). This list of streams with high biodiversity is taken from the report, Freshwater Measures for the Northern Great Plains Steppe Ecoregion of Montana. By David M. Stagliano, Dec. 2006.

Key of Montana Rivers Table

SOURCE OF RECOMMENDATION

AW1- American Wildlands Assessment, highest ranking

AW2- American Wildlands Assessment, high ranking

B#- interviews with biologists and local experts:

- B1- David Feldman, MT Dept. of Env. Quality
- B2- Don Skaar, MT Fish, Wildlife, and Parks Comm.
- B3- David Stagliano, MT Nat. Heritage Prgm, U of MT
- B4- Scott Bosse, Greater Yellowstone Coalition
- BL- Bureau of Land Management
- **BO-** Bureau of Outdoor Recreation

C- Columbia Int. Basin Ecosystem Management Plan, high aquatic integrity

F-U.S. Forest Service

I- U.S. Dept. of Interior, 1964 list

ME- Montana Dept. of Environmental Quality, Reference Streams ("pristine" and large)

MF1- Montana Fish, Wildlife, and Parks, outstanding trout waters (1988)

MF2- Montana Fish, Wildlife, and Parks, top recreation rivers (1988)

N-Nationwide Rivers Inventory

NC- The Nature Conservancy, informal list NH- Natural Heritage Program, Mt. State Univ/TNC P- Pacific Rivers Council, (Northern Rockies, Forests & Endangered Native Fish, 2/95) W- National Wild and Scenic Rivers Ws-National Wild and Scenic Study Rivers WRC-Western Rivers Conservancy

BEST SOURCES: B#, ME, N, W

QUALITIES

B-Biological Diversity

E- Endangered or imperiled species

F- Fish

G-Geological/geographical

L- Long free-flowing reach >100 miles

L+- Long free-flowing reach when combined with streams it flows into

P- Plant life/ riparian values

R-Recreation, general (camping, etc.)

Rf- Recreational fishing

Rh- Recreational hiking

Rr- Recreational river running

WL-Wildlife

WN Wildness

ECOREGIONS

GP-Great Plains (331) IS- Intermountain Semi-Desert (342) MR- Middle Rocky Mountains (M332) SR- Southern Rocky Mountains (M331) NR- Northern Rocky Mountains (M333)



Middle Fork of the Flathead River

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Badger Cr, North	Badger Cr/ Two Medicine	B1, F, N	N	F, Rh, WN	GP		lrg cutthroat population
Basin Cr	Flathead NF	F, N		WN	NR	А	
Beauvais Cr	Bighorn	B1, ME	B1	В, Р	GP		Crow Reservation
Beaver Cr	Swan	F, N		F	NR		blue ribbon trout spawning
Beaver Cr	Blackfoot	F			MR		
Beaverhead	Jefferson	MF2		Rf	MR		
Belt Cr	Missouri	BO, MF2		R	GP		
Big Cr	Kootenai (resv.)	F, N		R, WN	NR		
Big Cr	Flathead, North Fk	N	N	E, F	NR	А	bull trout
Big Hole	Jefferson	BO, BL, I, P, MF1, MF2	Р	E, F, Rf	MR		arctic grayling
Big Hole, North Fk	Big Hole	AW2, B3		В	С		rds, cattle
Big Salmon Cr	Flathead, South Fk	F, N		WN	NR		
Big Sheep Cr	Redrock/ Beaverhead	AW2		В	SR		rds, cattle
Bighorn	Yellowstone	B1, MF1, MF2		F, P, Rf	GP		
Birch Cr, North Fk	Birch Cr/Two Medicine	B3, N		G, WN	GP		
Bitterroot	Clark Fork	BO		P, Rr	MR		
Bitterroot, West Fk	Bitterroot	F, N		G, R, Rf, Rr	MR		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Black Canyon Cr	Bighorn	N	N	F, G, P, Wi, WN	GP, SR (Bighorn Mts)		Bighorn NRA intermittent
Blackfoot	Clark Fork	AW2, B2, I, ME, NC, MF1, MF2		F, Rf, Rr	MR		lower river best
Blackfoot, North Fk	Blackfoot	AW1, B2, B3, B4, F, N	AW1	B, R, Rh, Rf, Rr, WN	MR	В	upper river
Blacktail Deer Cr	Beaverhead	AW2		В	SR		rds, cattle
Blodgett Cr	Bitterroot	F, N		G, Rh, WN	MR		
Boulder	Yellowstone	B4, F, MF2, N, NH		B, G, Rf	MR		diversions lower
Boulder, West	Boulder	В4		F, WN	MR		cutthroat trout
Boxelder	Little Missouri	NH		В	GP		
Bull	Clark Fork	B3, BO, F, N		R, Rf, Rr	NR		bull trout, cutthroat, roads
Bull, East Fk	Bull	ME		В	NR		
Cabin Cr	Madison	Р		E, F	MR		only cutthroat in Gallatin NF
Cache Cr	Fish Cr, South Fk/ Clark Fk	F, N		Rh, WN	NR		
Canyon Cr	Big Hole	F, N		R	MR		
Cedar Log Cr	Fish Cr/ Clark Fk	F		WN	NR		
Clack Cr	Flathead, Middle Fk	Ν		E, F	NR	A	bull trout
Clark Fork	Pend Oreille	BO, F, N, MF2		R, Rh, Rf, Rr	MR, NR		
Clearwater	Blackfoot	F, N		R, Rf, Rr, WL	MR		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Coal Cr	Flathead, North Fk	Ν		E, F	NR	A	bull trout, cutthroat trout
Coal Cr, South Fk	Coal Cr/ Flathead, North Fk	N		E, F	NR	A	bull trout
Copper Cr	Blackfoot, Landers Fk	F			MR		
Cow Cr	Missouri	NH		В	GP		
Crooked Cr	Bighorn	F, M, N		B, F, G, P	GP		easternmost Doug firs/ diversion, roads
Cyclone Cr	Coal Cr	N		F	NR		cutthroat trout
Danaher Cr	Flathead, South Fk	F, N		WN	NR	A	
Deadman Cr	Beaverhead NF	F, N		Rf, WN	MR		
Dearborn	Missouri	B3, N, NC, MF2		G, R, Rh, WN	MR	С	
Deer Cr	Yellowstone	NH		В	MR		
Elk	Madison, West Fk	F, N	N	F, WN	MR		spawning for Madison R. fishery
Falls Cr	Dearborn	F		WN	MR		
Fish Cr, North Fk	Fish Cr/ Clark Fk	F		Rh, WN	NR		
Fish Cr, West Fk	Fish Cr/ Clark Fk	F, N		G, P, Rh, Wn	NR		old growth cedar in hdwtrs
Flathead, upper	Clark Fork	MF1, MF2		F, Rf, Rr, L+	NR	А	reach to Flathead Lake
Flathead, lower	Clark Fork	WRC		Rf, WN	NR	С	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Flathead, Middle Fk	Flathead	AW1, B1, B2, B3, B4, C, I, NC, W	AW1, C	L (126), L+(167), Rf, Rr, WL, WN	NR	A	bull trout
Flathead, North Fk	Flathead	AW1, B1, B2, B4, I, MF1, NC, W	AW1	F, L(118), L+(142), Rf, Rr, WL, WN	NR	A	bull trout
Flathead, South Fk	Flathead	AW1, B1, B2, B3, B4, C, I, ME, NC, P, W	AW1, C, P	Rf, Rr, WL, WN	NR	A	bull trout
Frenchman Cr	Milk	NH		В	GP		
Gallatin	Missouri	AW2, B1, B2, BO, F, N, MF1, MF2	N	B, G, Rf, Rr, WL, WN	MR	С	upper river best
Gardiner	Yellowstone	B1, ME, N		B, G, R, WN	SR		
Glacier Cr	Swan	F, N		G, WN	NR		
Grasshopper Cr	Beaverhead	AW2		В	MR		rds, mines, cattle
Hallowat Cr	Big Cr/ Flathead, North Fk	N		E, F	NR	A	bull trout
Hyalite Cr	Gallatin	MF2			MR		reservoir, road
Jefferson	Missouri	B4		В	MR		cottonwoods
Judith	Missouri	BL, N, MF2	Ν	G, R, WL, WN	GP		dewatered
Judith, Middle Fk	Judith	F, N		cultural only	GP		
Kootenai	Columbia	B2, B4, BO, F, N, P, MF2	B4, N	E, F, G, Rf	NR	С	
Lake Cr	Blackfoot, North Fk	F, N		G	MR		
Lion Cr	Swan	B3, F		Rh, WN	NR		
Little Bitterroot	Flathead	F, N		G	NR		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Little Blackfoot	Clark Fork	F, N		F, WN	MR		cutthroat trout/ bull trout
Little Missouri	Missouri	F, ME	WRC	B, L(560 in WY, MT, ND, SD)	GP	В	diversions
Little Powder	Powder	ME, NH		В	GP		
Little Prickly Pear Cr	Missouri	AW2		В	MR		roads, RR
Little Salmon Cr	Flathead, South Fk	N		F, Rf, WN	NR	A	cutthroat-trout
Lolo Cr, South Fk	Lolo Cr/ Bitterroot	F, N		G, Rf, WN	MR		
Lost Horse Cr	Bitterroot	F, N		G, Rh, Rf	MR		
Madison	Missouri	BO, BL, F, N, MF1, MF2		F, Rf	MR	С	
Madison, West Fk	Madison	F, N		F, G, Rf, Rr	MR		
Marias	Missouri	B1, B2, B3, BL		P, Rr, WL, WN	GP	С	eastern MT, shovelnose sturgeon
Mathias Cr	Coal Cr, South Fk/ Flathead North Fk	Ν		E, F	NR		spawning bull trout
Medicine Lodge Cr	Horse Prairie Cr	AW2		В	SR		roads, cattle, diversions
Mill Cr	Ruby/ Beaverhead	N, ME		scenery and culture	MR		old mines
Milk	Missouri	WRC		L (127)	GP		diversion dams

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Missouri	Mississippi	B1(up), B3, BO, F, I, N, MF1, MF2, W		E, F, G, L (149), Rf, Rr, WL, WN	MR, GP	С	pallid sturgeon, paddlefish
Moose Cr	Flathead, North Fk	N		F	NR	A	cutthroat trout
Monture Cr	Blackfoot	B3, F		Rh, WN	MR		
Morrison Cr	Flathead, Middle Fk	N		E, F Rf, WN	NR	A	bull trout
Musselshell	Missouri	BL		L (314 w/diversions)	GP		dewatered
O'Fallon Cr	Yellowstone	NH		В	GP		
Peoples Cr	Milk	NH		В	GP		
Poplar	Missouri	NH		В	GP		
Poplar, West Fk	Poplar/ Missouri	B1, ME, NH		В, Р	GP	С	
Porcupine Cr	Missouri	NH		В	GP		
Powder	Yellowstone	B2, B3, NC, NH, WRC		B, E, F, L (385 w/ diversions)	GP	С	
Rattlesnake Cr	Clark Fork	F, N		R, Rf, Rh, WN	MR		
Red Meadow Cr	Flathead, North Fk	F		E, F	NR	A	bull trout, cutthroat trout
Roaring Lion Cr	Bitterroot	B1, ME		В	MR		
Rock Cr	Clark Fork (east of Missoula)	B2, B4, BO, C, F, ME, N, MF1, MF2	С	F, Rf, WN	N	В	bull trout
Rock Cr, Middle Fk	Clark Fork (east of Missoula)	B2, ME		F	MR		
Rock Cr	Milk	NH		В	GP		
Rock Cr	Clarks Fk Yellowstone (in WY)	F, N	N	G, R, Rf, WN	SR		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Rock Cr, Lake Fk	Rock Cr/ Clarks Fk Yellowstone (in WY)	ME, N		B, G, Rh, WN	SR		
Rock Cr, West Fk	Rock Cr/ Clarks Fk Yellowstone (in WY)	F, N		G, Rh	SR		
Rosebud Cr	Stillwater	MF2		Rf	MR		diversions
Rosebud Cr, East	Rosebud Cr	F, ME, N		B, G, Rh, WN	MR		diversions
Rosebud Cr, West	Rosebud Cr	F, N		G, R, Rf, Rh, WN	MR		hydro dam
Ruby Cr	Jefferson	AW2		В	MR		rds, cattle
Running Cr	Selway	F		Rh, WN	MR		
Schafer Cr	Flathead, Middle Fk	Ν		E, F, Rf, WN	NR	А	bull trout
Shorty Cr and its South Fk	Whale Cr	N		E, F	NR	A	bull trout
Slough Cr	Lamar/ Yellowstone	N		E, F, R, WL, WN	SR		
Smith	Missouri	AW2, BO, F, N, NC, MF2	N	G, Rf, Rr, WL	MR	С	
Soda Butte Cr	Lamar/ Yellowstone	N		G, WL	SR		
South Willow	Willow Cr/ Jefferson	F			MR		
Spotted Bear	Flathead, South Fk	N		F, Rf, Rh, WN	NR	А	cutthroat trout
St. Regis	Clark Fork	F			NR		
Stillwater	Yellowstone	BO, F, ME, N, MF1		B, F, G, Rf, Rh, WL, WN	MR	С	grizzly habitat

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Stillwater, West Fk	Stillwater/ Yellowstone	WRC		B, F, G, Rh, WL, WN	MR	С	
Straight Cr	Fish Cr/ Clark Fk	F, N		Rh, WN	NR		
Straight Cr, Green Fk	Straight Cr/ Sun, South Fk	F, N		G, Rh, WN	NR		unusual underground hydrology
Strawberry Cr	Flathead, Middle Fork	F, N		F, Rf, Rh, WN	NR	A	
Sullivan Cr	Flathead, South Fk (resvr)	Ν		E, F, Rf	NR		
Sun	Missouri	AW2, BO		G, Rh, WL, WN	NR, GP		
Sun, North Fk	Sun	F, N		WL, WN	NR		
Sun, South Fk	Sun	F, N			NR		
Sunday Cr	Stillwater	MF2		Rh	MR		logging rds
Swan	Flathead	B3, BO, N, F		E, F, Rf, WL	NR		bull trout, cutthroat trout
Teton, North Fk	Teton/ Missouri	ME		В	NP/ GP		
Tongue	Yellowstone	WRC		F, L (163 w/diversion dams), Rr	GP		paddlefish, shovel-nosed sturgeon/ methane development, pollution, reservoir in WY

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Trail Cr	Flathead, North Fk	N		G	NR	A	
Tenderfoot Cr	Smith	F, N		F	MR		
Thompson	Clark Fork	BO, F		R	NR		road
Two Medicine	Marias	B1, MF2		В	GP		
Vermilion	Clark Fork	F, N, MF2		R, Rf	NR		
Warm Springs Cr	Big Hole	F, N		F, G, Rh, WL	MR		warm water fishery and waterfowl
West Boulder	Boulder	MF2		Rf	MR		
Whale Cr	Flathead, North Fk	N		E, F	NR	A	bull trout
White	Flathead, South Fk	F, N		G, Rh, WN	NR	A	
Willow	Teton	NH		В	GP		
Willow Cr, South	Jefferson	Ν		F	MR		only Jefferson trib w/ westslope cutthroat trout

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Wise	Big Hole	B2, F, N		R	MR		cutthroat trout
Yaak	Kootenai	AW1, B2, B3, BO, F, N, MF2	AW1	Rf, Rr	NR	В	bull trout, redband trout in mid river
Yaak, North Fk	Yaak	Ρ		E, F	NR		redband trout
Yaak, East Fk	Yaak	Р		E, F	NR		redband trout
Yellowstone	Missouri	B2, B3, B4, I, F, MF1, MF2, N, NC, NH	B2, B4, N	B, E, F, G, L (360), P, Rf, Rr, WL	SR, GP	A	
Youngs Cr	Flathead, South Fk	N		G, Rh, WN	NR	А	

MONTANA'S "A" RIVERS

Flathead River, to Flathead Lake

The extraordinary Middle, North, and South Forks of the Flathead are among the finest river systems in Montana and in the Rocky Mountains. Though overshadowed by these stellar tributaries, the upper main stem Flathead is also a river of great value. It is effectively a long, undammed extension of both the North and Middle Forks into a rare, low-gradient, wetland riparian zone ending at Flathead Lake.

From the confluence of the North and South Forks to Flathead Lake—a natural lake that was raised by Kerr Dam—the upper main stem Flathead runs for about 38 meandering miles, most of it flatwater. The quiet river drifts through silt-filled flats that precede Flathead Lake and threads through a plethora of islands in a vast wetlands complex. With excellent habitat for waterfowl, the river also supports bull trout, cutthroat trout, and introduced trout species. Ecological problems in the lake have diminished the river's native fishery in recent years, according to the Pacific Rivers Council. Nearly all of the Flathead's sprawling wetland corridor is privately owned and is used as pasture and hayfields. This valley is one of the more substantial complexes of wetlands in the entire Rocky Mountain region.

See the "C" list of Montana rivers for the lower Flathead (page 178).

Flathead River, Middle Fork and tributaries

Running from the heart of one of America's great wilderness areas and then along the border of Glacier National Park, the Middle Fork Flathead is free of dams and diversions for its entire 101 miles.

Uppermost headwaters are gathered by the 12-mile-long Strawberry Creek, effectively an extension of the upper Middle Fork. Then the upper river flows for 61 miles through the Bob Marshall and Great Bear Wilderness areas, which are the core of what may be the fourth-largest wild ecosystem in the West (even larger when combined with substantial contiguous wild country in Canada). The next 40 miles flow at the border of Glacier National Park and the Great Bear Wilderness in a thin corridor—shared with Highway 2 and the Great Northern Railroad--that separates the two protected zones. The river's final eight miles mark the boundary of the park on one side, with private land and national forest on the other.

The Middle Fork Flathead offers extraordinary wilderness values from highcountry of the Northern Rockies, through rugged canyons, flowered meadows, and dark forests to low-elevation riparian habitat, thick with willows and cottonwoods. The Middle Fork supports grizzly bears, mountain goats, bald eagles, native westslope cutthroat trout, bull trout, and a host of other wildlife. The upper river is among the wildest sizable rivers in the West and is comparable in many ways to the Selway of Idaho, though it does not have the native anadromous salmon and steelhead (and never did owing to waterfalls on the Pend Oreille River, downstream). The Middle Fork Flathead is one of few rivers on the Rockies that flows for more than 100 miles with no dams

The river offers the unusual opportunity for especially remote river trips by packing or flying into Schaefer Meadows and floating for 25 miles to Highway 2, with the option of then going another 40 road-accessible miles to the confluence of the Middle and North Fork and even beyond, to Flathead Lake. A river-front trail also makes the upper Middle Fork a premier route for backpacking.

The entire length is designated in the National Wild and Scenic Rivers system—the fourth-longest river designated from source to mouth. With national park, wilderness, and wild and scenic designations, this river is protected from land development and logging more than almost any other stream in the West, though its lower 40-mile highway and railroad corridor has associated traffic, noise, riprap, and cut-and-fill.

All the Middle Fork tributaries offer excellent wild river qualities, and many support bull trout. A few of the major tributary creeks are Bowl, Clack, Morrison, Nyack, Schafer, and Strawberry.

Flathead River, North Fork and tributaries

Flowing through a semi-wild region at the border of Glacier National Park, the North Fork Flathead has exceptional natural assets, though a paved and then gravel road runs the whole way up its valley. The river supports cutthroat and bull trout in an excellent riparian corridor with cottonwoods, gravel bars, and largely undeveloped shorelines.

After rising in Canada, the North Fork flows for 58 miles to the South Fork confluence, where the main stem Flathead begins. The east side of the river, in Glacier National Park, is wild, and while a gravel road runs up the west side, it is usually set-back from the river and seldom visible from the water.

The North Fork offers fine habitat for grizzly bears, moose, mountain lions, otters, bald eagles, cutthroat trout, Dolly Varden, and bull trout. It's an excellent canoeing stream, with many Class II and one Class III rapids, and is one of the West's finest streams for semi-wild overnight float trips with easy road access. The water of the North Fork is famously clear and tinted blue-green with its colorful tinge of glacial runoff from the peaks of the Livingston Range in Glacier National Park. This clarity, however, has deteriorated in recent decades owing to road cuts as the highway up the west side of the valley has been upgraded. Coal mining upstream in Canada, along with oil and gas exploration and drilling, pose serious threats with international complications that could potentially involve the International Joint Commission.

Most tributaries are in good condition and remain undeveloped, but west-side streams in Flathead National Forest could be threatened by gas drilling and logging. State-owned lands lie along Cyclone and Coal Creeks, and some private lands can be found along Trail, Moose, and Hay Creeks.

The entire U.S. portion of the river is in the National Wild and Scenic Rivers system. About 90 percent of the frontage is public land, but important private parcels remain in the corridor. Some of these have been built-on in recent years, and some could be further developed.

Flathead River, South Fork and tributaries

Although a 30-mile-long reservoir impounds the South Fork Flathead in its lower reaches, the 60 miles of river upstream include superb wilderness and the finest remaining habitat for bull trout in Montana, according to the Pacific Rivers Council

The headwaters of the South Fork begin with Danaher and Youngs Creeks—each flows about 25 miles through the Bob Marshall Wilderness before the South Fork begins at the confluence of the two streams. The South Fork then runs for 60 miles to the backwater of the sizeable Hungry Horse Dam. All but the final 10 miles of this are wild, with only trail access, and most of this is in a designated wilderness area.

The unroaded basin is a stronghold of grizzly bears, westslope cutthroat trout, and other wildlife, and is considered the only sizable, secure habitat of bull trout in Montana. The South Fork's entire length offers excellent wilderness backpacking, and 27 miles of the river above the reservoir are sometimes floated by boaters who pack-in their gear for this exceptional wilderness trip.

Magnificent tributaries to the South Fork include the Spotted Bear River, which flows 32 miles, beginning in the Bob Marshall wilderness and joining seven miles above the reservoir. The 24-milelong White River flows right through the heart of the wilderness-–a stream that's guarded for miles by high peaks on both sides of a high-elevation valley like no other sizeable waterway in the Rockies. These and other tributaries can be reached by paralleling trails some of the premier riverfront wilderness backpacking in America.

All of the South Fork above Hungry Horse Reservoir is designated in the National Wild and Scenic Rivers system. The entire upper basin is public land, and most if it is designated as wilderness.

Yellowstone River

The 678-mile-long Yellowstone is often regarded as the longest undammed river in the U.S. outside Alaska. That's not quite true. Although there are no storage dams on its entire length, six low diversion dams are built across the river—four of them significant barriers to fish migration and canoeists. Nevertheless, the river has many exceptional qualities: pristine headwaters in Yellowstone National Park, good water quality throughout its length, a largelyintact riparian corridor with cottonwood forests that continue offand-on for literally hundreds of miles, and an excellent assemblage of native fishes unlike any other in the West. With its qualities, size, and range of habitat—from high elevation to low—the Yellowstone might well be regarded as the premier river of Montana.

The upper 100 miles of the Yellowstone lie in Wyoming, where the wilderness river flows into Yellowstone Lake. Below there it winds through Hayden Valley—one of the most outstanding areas in the country to see large wildlife including bison, moose, grizzly bears, and wolves. The river crashes over the tallest high-volume waterfall in America-308 feet compared to Niagara's 160-and through the turbulent, impassable wilds of the Grand Canyon of the Yellowstone. All this is in Yellowstone National Park. Below there, the river drops through the rapids of Yankee Jim Canyon to Montana's Paradise Valley—an idyllic ranching scene with steep slopes of the Absaroka Range rising to the east and the Gallatin Range to the west. Once threatened by the proposed Allenspur Dam and its 31-mile-long reservoir, this section was spared by an outpouring of opposition. Unfortunately it is now undergoing massive vacationhome development and troublesome related effects of extensive riprapping along the river's banks. Below Paradise Valley and the town of Livingston, the Yellowstone breaks out of the mountains and crosses a foothills transition zone before entering the Great Plains. Below Big Timber, the Yellowstone flows another 500 miles across the Plains before joining the Missouri River, just beyond the Montana state line in North Dakota.

All in all, the Yellowstone spans a substantial geography of both the Rocky Mountains and the Great Plains and is—along with the Salmon River of Idaho—one of the two longest essentially freeflowing and natural rivers in the West. In its epic trek, the river incorporates the exquisite wildness and wildlife habitat of protected headwaters in the national park, excellent trout fishing, stunning scenery, and habitat for charismatic wildlife. Many of these qualities extend downstream to Livingston. Below there, the Yellowstone features the longest nearly free-flowing reach of river in the Great Plains. Long stretches of riparian habitat remain reasonably intact and support beavers, whistling swans, bald eagles, sandhill cranes, white pelicans, and much waterfowl. For roughly 225 miles, between Billings and Glendive, the north side of the river—with no major paralleling roads (Interstate 94 parallels the south side)— includes extensive mileage of undeveloped shoreline where the river's interface with the Great Plains is relatively uncompromised. However, many miles are also heavily encroached upon, and riparian habitat has been greatly reduced by nearly continuous ranching and hay farming.

The Yellowstone hosts an exceptional assemblage of 45 species of native fishes, including rare and ancient paddlefish, a freshwater cod called burbot, and shovelnose sturgeon—a large fish weighing up to 140 pounds. The imperiled paddlefish migrate in the lower river but are stopped by Glendive Dam. While some tributaries, such as the Powder, retain some of their natural values and native fish, many have been severely degraded by withdrawals, and energy developments to the south, in Wyoming, are now causing pollution of the Powder and Tongue Rivers. This could reach the Yellowstone.

Although many prairie rivers have been severely compromised by withdrawals that have depleted flows for more than a century, the Yellowstone's riparian habitat and native fishery remain in reasonably good condition, in large part owing to a path-breaking river protection policy adopted by the Montana Board of Natural Resources and Conservation in 1978. When threats of large withdrawals and dams appeared to be imminent owing to proposed and on-going coal and energy development in the eastern part of the state, the Board reserved large portions of the natural flows of the Yellowstone for its flora, fauna, and ecological health. Nationwide, this state policy stands as perhaps the most significant for reserving flows in a large river to protect its ecosystem. However, a complimentary program for protecting the riparian habitat through easements, acquisition, or other arrangements along the river has never been launched.

From Paradise Valley down, most of the Yellowstone's frontage is privately owned. Protection of such a large river is a daunting task,

but much could be done to safeguard the finest remaining riparian tracts. Especially valuable tracts include the least-developed shorelines where roads and agriculture do not directly encroach, islands covered with cottonwoods and other native plants, the mouths of tributaries, and frontage along reaches of particular importance for endangered fish. With the Flathead River's natural reaches being largely protected (except for parts of the North Fork), the Yellowstone might be regarded as the premier opportunity for land-based river conservation in Montana.

MONTANA'S "B" RIVERS

Blackfoot River, North Fork

The North Fork of the Blackfoot flows south from its headwaters in the Scapegoat Wilderness, which adjoins the Bob Marshall Wilderness, making this the southernmost extent of the greater Glacier National Park/Northern Rockies ecosystem of protected federal land. (This complex encompasses the Flathead basin to the north and includes the upper Sun, Dearborn, and other basins to the east.)

The 35-mile-long North Fork flows south from pristine wilderness headwaters including Cabin Creek, Dry Creek, and Lake Creek. Trails follow along these streams and the North Fork for its upper 19 miles. The lower 16 miles have road access, and much of the river frontage is in private ownership, mostly by the timber industry.

The North Fork joins the main stem Blackfoot 20 miles west of Lincoln, or about halfway through the river's 100-mile course. Popular among anglers and boaters, the main stem has been degraded by past mining, but it has also been the subject of reclamation efforts and a pioneering program of easement acquisition for recreation and riverfront protection begun in the 1960s. The Blackfoot became an early model of easement success for the Nature Conservancy in the 1970s and remains the target of innovative conservation efforts through an organization called Blackfoot Challenge. The river will also benefit by plans to remove Mill Town Dam, which impounds both the Clark Fork and lower Blackfoot, and also Mike Horse Dam on the upper Blackfoot.

With additional protection of the lower North Fork's river corridor, the vast wildlands of the Flathead/upper Sun/upper Dearborn basins would be linked with the improving river corridor of the Blackfoot. Adding to this wildland complex, Monture Creek is another excellent stream, immediately west of the North Fork Blackfoot and flowing south from headwaters bordering the Bob Marshall Wilderness.

Little Missouri River

Though its significance to Montana may seem minor, the Little Missouri passes through the far southeastern corner of the state on its 560-mile, tortuously winding journey to the Missouri River. With no storage dams and only minor diversion structures, this is the eighth-longest essentially undammed river on the Great Plains, and it's longer than any reach of undammed river in the rest of the West. With hundreds of miles of cottonwood and willow-lined shores, including highlights such as a stunning passage through Theodore Roosevelt National Park, the Little Missouri may be the finest river remaining on the entire Great Plains.

The Little Missouri rises in Wyoming, where its intermittent headwaters flow northeast into Montana. For 130 sinuously looping miles the tiny river drifts through rolling dry reaches of Montana's short-grass prairie. From there it flows through the northwest corner of South Dakota and then for hundreds of miles north and east across North Dakota, finally ending at its confluence with the Missouri River in the backwaters of behemoth Garrison Dam. In addition to its short but stunning segments through two divisions of Theodore Roosevelt National Park, the river winds for roughly 200 continuous miles through the Little Missouri National Grassland. This area is almost entirely grazed by cattle, but the land is publicly owned and intended to be a model of good range management.

The nation's second-largest semi-free-ranging buffalo herd lives along the Little Missouri in the national park (the park is fenced), and the abundance of wildlife here, including deer, elk, raptors, beavers, badgers, foxes, and much more, is probably the best approximation of the richness that once existed throughout the Great Plains.

The price of land may be cheaper in this region of the Plains than anywhere else in America, which could present a unusual opportunity for large-scale protection of a riparian corridor. This could possibly be combined with model management by willing private landowners and with improved riparian protection of the river's corridor through the national grassland. The national significance of this best-remaining remnant of the Great Plains, and perhaps its finest river, warrants examination for large-scale, ecosystem protection.

Rock Creek (tributary to lower Clark Fork)

Rock Creek is the only river flowing north from a rugged complex of southern Montana mountain ranges that has no major roads, developments, or diversions. It is one of only three basins identified by the Interior Columbia Basin Ecosystem Management Project as having "high aquatic integrity." (The Middle and South Forks of the Flathead are the other two).

The sizable stream gathers its waters on East Pintlar Peak in the Anaconda-Pintlar Wilderness (due west of Butte) and flows north, paralleled by a trail for 4 miles. From there, for roughly 45 miles to the creek's mouth at the Clark Fork River (20 miles upstream from Missoula), the stream is followed by unimproved or lightly-used roads. (Montana has many "Rock" Creeks, including two smaller ones that enter the Clark Fork farther downstream.)

The stream supports bull trout and a popular sport fishery. It is considered one of the state's top streams for biological integrity by the Department of Environmental Quality, and is one of the larger streams on that premier list of mostly small waterways. Non-native sport fish, unfortunately, have largely taken over the lower river and are likely spreading upstream.

Rock Creek's watershed may be strategically important to three of the finest wild terrestrial ecosystems in the West. It lies directly between the Glacier/Northern Rockies wilderness complex to the north, the Selway/Salmon/central Idaho complex to the southwest, and the Greater Yellowstone ecosystem to the southeast. The undeveloped, semi-wild, and lightly-roaded landscape of the Rock Creek basin appears to be the finest "bridge" between these three areas of extraordinary importance to wildlife and nature in the Rockies.

Most of the Rock Creek basin lies within the Deer Lodge and Lolo National Forests, though many private parcels front the river, and mines have been active in the past. Most of these parcels are limited to thin strips of land along the stream. Some Burlington-Northern, state, and BLM lands are also found near the creek. Unlike many other unprotected rivers where large amounts of private land are found, this small, undeveloped gem of southern Montana may include opportunities for an ambitious program of land conservation to effectively protect a whole river corridor—one whose location may be important to areas of enormous consequence in the ecology of the West.

Yaak River

Draining a mostly forested and undeveloped basin in far northwestern Montana, the Yaak supports bull trout in its lower reaches and native redband cutthroat trout upstream.

With some of its headwater tributaries beginning in Canada, the main stem of the Yaak flows for 45 miles from its East and North Forks confluence southwestward to its mouth on the Kootenai River. Highway 508 follows the river for its entire length, logging roads probe most of the tributaries, and two or three paralleling roads occupy the valley in its upper reaches and along its East Fork. Yet some of the rain-rich basin remains unlogged, and a sense of wildness similar to what is found in northern Idaho and in the rainy Northwest prevails. The native fishery has survived and could possibly recover with restoration of logging and mining sites. A river integrity study sponsored by American Wildlands found this to be one of the better rivers in the state, and the Nationwide Rivers Inventory identified good recreational qualities here.

MONTANA'S "C" RIVERS

Dearborn River

The Dearborn is perhaps the finest river flowing from the spectacular Rocky Mountain Front—the escarpment on the east face of the Rockies that extends from the Canadian border southward for 130 miles. Upper reaches flow from the Scapegoat Wilderness and plunge down to the Plains. The river has no dams as it winds through the rolling hills of the far-western Great Plains to its confluence with the Missouri River.

For most of its uppermost 20 miles the river drops through a wilderness that is secluded behind the first great ridgeline of the Northern Rockies. Downstream from the Lewis and Clark National Forest boundary, the Dearborn runs for 60 miles through private land in the Rocky Mountain foothills and across high, rolling prairie terrain to the Missouri River. Limestone cliffs include the stark 500-foot-rise of cliffs on Scapegoat Mountain. The river has good sport fishing for introduced rainbow trout and some cutthroat, though it is not known for native fish. River otters, which are uncommon in much of Montana, are seen here. The lower 45 miles of the river make a fine river trip for intermediate or advanced paddlers, though the season is short and landowners have aggressively discouraged boating in the past.

Other rivers of the Rocky Mountain Front include the Saint Mary in the far north followed by the Milk, Cutbank, Two Medicine, Birch Creek, Teton, and Sun. All these streams have more intrusions in the form of diversions, dams, oil and gas wells, and roads. The Dearborn has escaped some of these problems but does have diversions in its 60-mile foothills/prairie reach. Like the Dearborn, the Sun River, immediately to the north, has exquisite wilderness headwaters that connect with the greater Glacier/Northern Rockies wildlands, but the massive Gibson Dam blocks the Sun River's flow even before it leaves the mountains.

Flathead River, lower

The lower Flathead, below Kerr Dam, is a large river flowing for about 80 miles with clean, clear water and very little development.

All but the lower five miles flow through the Flathead Indian Reservation. The water flowing from Flathead Lake is incredibly clear, and remains clean for its entire route through dry prairie, low mountains, and canyon terrain. Unlike the situation at many other dams, the temperature of the lower river is little affected by Kerr Dam. At its mouth, the Flathead's flow roughly doubles the size of the Clark Fork, making it and ultimately the Pend Oreille (the same river renamed below Pend Oreille Lake) the second-largest river of the Rockies.

For about 30 miles the Flathead has no roads or development along its shores—extremely rare for a river of this size anywhere. Buffalo Rapids—a major, high-volume, Class IV rapid—lies within this remote reach. For the river's remaining mileage, a road and railroad parallel its path, but virtually no development is found. The lower river is not noted for native fish species; 17 non-native fishes throughout the basin have been proliferating and are wellrepresented in the lower river.

In part because it flows through the Indian Reservation, this significant river is little-known by non-Indian people; it appears on none of the lists that were examined for this survey. However, owing to its size, clarity, and lack of development, there may be tremendous potential to restore the river to excellent conditions.

Gallatin River

Tumbling out of Yellowstone National Park, the Gallatin River offers excellent sport fishing, whitewater boating, and an important wildlife corridor as it flows through scenic valleys and canyons toward the three-forked confluence where it converges with the Madison and Jefferson to form the Missouri.

The main stem—sometimes called the West Gallatin River—rises at Gallatin Lake in Yellowstone National Park. The upper 10 miles flow through meadows and past mountainsides reachable only by trail. Then the river drops into the Gallatin Canyon—a 50-mile-long descent with both riffles and big rapids. Here the river separates the Madison Range, immediately west of the river, and the Gallatin Range, just to the east. Below the mouth of the canyon (about 12 miles southwest of Bozeman), the river winds quickly with a steady gradient through gravel bars, willow thickets, and fine cottonwood stands for another 60 miles to its mouth, which marks the start of the Missouri River.

Though it still has some native westslope cutthroat trout, the Gallatin is prized for its sport fishery and is regarded as a "blue ribbon" trout stream. The Gallatin Canyon is one of Montana's most popular whitewater rivers for rafting, kayaking, and expert canoeing. The canyon is a crucial wildlife corridor in the Greater Yellowstone Ecosystem, especially for the park's large elk herds that descend into the valley for shelter in winter. Grizzly bears frequent the canyon and the upper river basin. Owing to its excellent water quality, the Gallatin is currently being considered as Montana's only candidate for "Outstanding Resource Water" status, a designation that would govern effluent standards from new developments, including those at the Big Sky Resort, just west of the river.

The Gallatin is one of a group of revered rivers that form the Missouri headwaters after flowing across a 100-mile wide expanse of southwestern Montana and drawing from six subranges of the Rockies. The upper Gallatin is highlighted here for its lack of development and ranching, for the importance of its wildlife corridor to Yellowstone, and for its recreational and scenic value. The other rivers, however, also have significant qualities. Immediately to the west, the Madison is legendary among trout anglers for its trophy rainbow and brown trout fishing and it widely considered the most popular sport fishery in the state. It is dammed at its headwaters and then flows through a more open, ranchland valley before being dammed again for hydropower above the rugged whitewater of Bear Trap Canyon. Moving west from there, the Ruby is a small, unsung river with scenic mountain headwaters and a lower reach that is dammed as it flows into ranchland before converging with the Beaverhead. The Beaverhead is a popular trout stream with lower reaches that wind through ranchlands and willow thickets.

Interstate 15 and a railroad parallel its middle section and part of its tributary, the Red Rocks River. This little stream notably forms the farthest-reaching source of the Missouri; counting Red Rocks as its upstream extension, the Missouri is the longest river in America, flowing for 2,540 miles from its source to its mouth at the Mississippi. Westernmost of this Missouri headwaters group, the circuitous Big Hole flows for 150 miles through arid ranchland and supports the only population of fluvial Arctic grayling in the lower 48 statesthese grayling live entirely in rivers and not in lakes. The Big Hole, however, has egregious problems with diversions, which in some years reduce the river to a series of isolated pools. State agencies have been trying to ameliorate the flow problem through voluntary agreements with ranchers. The small but significant North Fork of the Big Hole contributes needed cold water to the main stem. The combined Big Hole and Beaverhead join to form the Jeffersonanother good trout-fishing river that winds through ranchland and riparian thickets to its confluence with the Madison and Gallatin.

Kootenai River

The Kootenai is the second-largest river in Montana (exceeded in volume only by the lower Clark Fork after it is joined by the Flathead) and is one of few big-volume, forested rivers in the interior West. The Kootenai's clear waters still harbor a small, non-reproducing population of the rare white sturgeon—the largest freshwater fish in North America, which once inhabited all the big rivers of the Northwest but now are found in only a very few.

The Kootenai can well be regarded as a branch of the Columbia itself; the river actually begins 90 miles north and 30 miles east of the Columbia's headwaters in Canada and flows south from fabulous glacial valleys while the Columbia, in somewhat of a mirror image, flows north before turning toward Washington state.

With substantial volume where it enters the U.S., the Kootenai is flooded for 90 miles by Libby Dam. But from there downstream, the river runs for about 84 miles across far northern Montana and Idaho before reentering British Columbia, where it is again dammed. The Kootenai's total length in both countries is 480 miles. The riffling and rapid river flows with clear water through a forested valley with a highway on one side and a railroad on the other, so its route is certainly not natural, yet owing to the river's size and to the screening forest, the big waterway retains a sense of wildness and power through much of its route. Above Troy, it roars over Kootenai Falls, the highest-volume waterfall in the West that's unaffected by dams or major diversions (Lower Yellowstone Falls has less volume; Shoshone and Twin Falls on the Snake are entirely diverted much of the time). Rapids below Kootenai Falls quickly ease into a gentle current that takes the river into Idaho, where the flow slows to a nearly imperceptible drift and meanders toward the backwaters of massive Kootenay Reservoir in Canada.

White sturgeon, which once grew to be sixteen feet long, still live in the Kootenai in Montana. Libby Dam, however, has drastically reduced the fish's habitat and dramatically altered the flows of the river for hydropower, in the process destroying the flow regime that is essential for sturgeon reproduction. Efforts are being made to alter the hydropower release schedule to mimic natural conditions of the river in order to help the sturgeon and other threatened native fish, including whitefish and a freshwater burbot on the verge of extinction owing to temperature alterations caused by Libby Dam. The river also has the only native rainbow trout (redband) in Montana. All the others-extremely popular among anglershave been introduced. These fish have now made the Kootenai a trophy rainbow trout fishery without the high-end recreational profile attached to other "blue ribbon" trout streams such as the Madison and Yellowstone. Many ospreys nest along the river, and the Kootenai is one of few rivers in Montana where black bears are often seen along the water, especially in spring.

The ownership of the shorelines is a mix of private land, including the towns of Libby and Troy, and national forest. Pressures for land development in this remote area are not as strong as they are along many of Montana's other desirable rivers, so further open space protection may be possible. If the efforts to reinstate semi-natural flows are pursued and timber management is reformed in this loggingindustry-driven corner of the state, the Kootenai's unusual and even extraordinary qualities might be protected and partially restored.

Madison River

One of the most famous fly-fishing rivers in America, the Madison is an extremely productive river for trout.

The Madison begins in Yellowstone National Park in Wyoming and then in Montana immediately runs into the reservoir behind Hebgen Dam. Quake Lake lies just 4 miles below, formed by an earthquake-induced landslide in 1959. After 4 miles of heavy rapids formed by the landslide, the river enters a broad sagebrush valley and runs for 57-miles with swift, riffling current, through braided, willow-lined channels in a reach renowned for trout fishing. This section ends in Ennis Lake, just downstream from the town of Ennis. Madison Dam forms this reservoir, releasing warm water from the shallow, silt-filled reservoir. A deep whitewater canyon called Bear Trap follows for 16 miles. In another 20 miles, the braided, cottonwood-lined river reaches its confluence with the Jefferson, and immediately after that with the Gallatin River at Three Forks, where the Missouri River begins.

The Madison is world-renowned as a fly-fishing river for nonnative but wild, reproducing rainbow and brown trout. Tens of thousands of anglers fish here every year; this is among the most popular fishing rivers in the West.

Marias River

Though it is greatly affected by a dam, the lower Marias River has one of the most beautiful river corridors of the Great Plains, and its lower reach supports a host of wildlife along its mostly-wild journey to the Missouri River.

Far upstream from this section, the river actually begins with its tributary, the Two Medicine River, at one of the more spectacular road-accessible locations in the Northern Rockies—Two Medicine Lake in the southern reaches of Glacier National Park. Below the lake, and below Lower Two Medicine Lake, which was raised by a dam, the Two Medicine River descends rapidly to the Great Plains where it winds across undeveloped terrain of the Blackfeet Indian Reservation. North Badger Creek, with fine cutthroat trout habitat
at its headwaters, joins from the south, and where Cut Bank Creek joins from a cluttered field of oil wells to the north, the 210-mile-long Marias River begins. Passing through rangeland and diminished by diversions, the muddy river winds across the northern plains to Tiber Dam. Below Tiber lies the excellent lower reach of the river discussed here.

The lower Marias meanders across a wide, sandstone-canyon floor with groves of large plains cottonwoods. A put-and-take trout fishery is stocked below the dam. The river is not known for native fish, though some might survive in lower reaches near the Missouri. Wildlife here, however, is outstanding, with plentiful beavers, coyotes, waterfowl, and eagles. The river runs for about 80 miles, the entire route like a small, intimate version of the famed White Cliffs section of the Missouri itself, and ideal for canoeing. Some of the shorelines are owned by BLM but much of the land is privately owned. A land protection program here along with flow releases from Tiber Dam to encourage regeneration of the cottonwood forest could ensure that the lower Marias would remain and improve as one of the great streams of the Plains.

Missouri River

A list of Montana rivers would hardly be complete without the longest remaining dam-free section of the Missouri, which is freeflowing for about 200 miles east of Great Falls. With its source in Montana, the entire Missouri is America's longest river—counting its headwater reaches in the Jefferson-Beaverhead-Red Rocks River system, it is 2,540 miles long.

Already a mature river where it forms at the convergence of three substantial tributaries in the aptly named town of Three Forks, the Missouri's first 20-mile-reach offers fine trout-fishing. After this brief free-flowing upper section, the river is obstructed by a diversion dam, by Canyon Ferry Dam and its large reservoir, and by two other dams in quick succession. Just downstream from the city of Great Falls, Great Falls of the Missouri—once a hugely spectacular cataract--is now largely obscured by a hydroelectric dam. After four more dams in the 12-mile reach below Great Falls, the Missouri's longest dam-free section begins below Morony Dam and continues for about 200 miles to the backwaters of Fort Peck Dam, east of Highway 191.

This reach hosts 49 species of fish—native and introduced including one of only six remaining populations of the rare paddlefish. These fish grow to 140 pounds and survive only in deep, turbid waters of large, undammed lengths of the Missouri, Yellowstone, and Mississippi. Even more rare, about 50 pallid sturgeon still survive in this section of the Missouri. Plains cottonwoods shade in groves along the riverfront, though their health and extent are greatly reduced owing to the effects of heavy cattle grazing and to alterations in flow and diminished floods from the dams upstream. Good riparian habitat remains at the mouths of Arrow Creek, the Judith River, and Cow Creek. The undeveloped corridor offers fine wildlife habitat for pronghorn, beavers, mule deer, elk, golden eagles, white pelicans, and waterfowl. In the "White Cliffs" section, limestone bluffs rise 200 feet above the water.

The 149-mile Class I paddle from Fort Benton to Highway 191 is a classic in the West, in part owing to its history as the route of Lewis and Clark and frontier fur trappers. With gentle current but heavy winds and muddy water, this section is boated by more than 3,000 people per year, typically running trips of three to ten days. This section was the subject of one of the prototype river studies that led to the National Wild and Scenic Rivers system, and the 149-mile reach was later designated by Congress in 1976.

The riverfront is mainly private ranchland for the upper 36 miles to Fort Benton and for the next 60 miles to Kipps Rapids, below Coal Banks Landing. Downstream from there the river frontage is mostly BLM land mixed with many parcels of private and state-owned land.

Another, disjunct, free-flowing section of the Missouri lies downstream, below Fort Peck Dam, and runs for 125 miles across far eastern Montana. This section flows through rough "breaks" in the plains incised by ravines and offers important habitat for waterfowl, raptors, and whooping cranes. While the upstream dam causes massive effects on water temperature, turbidity, and fish habitat, those effects are largely ameliorated after about 60 miles, and native prairie fish return. Though Highway 2 is nearby, this remote and runner-up reach of the Missouri offers the feeling of quiet isolation, sees little recreational use, and is one of the finer rivers on the Plains.

Poplar River, West Fork

This extremely remote, small river is among the most biologically intact streams remaining in the Great Plains in Montana. The West Fork begins in Saskatchewan and enters Montana north of the settlement of Opheim. It flows southeast for about 100 tightly meandering miles to the main stem Poplar River, which then flows another 100 miles to its confluence with the Missouri River at Poplar, in the Fort Peck Indian Reservation.

The West Fork is ranked among the top prairie rivers in the state for biological integrity in a comprehensive study by the Montana Department of Environmental Quality. Plains cottonwoods grow along the stream for much of its length. The middle-third of the river includes large amounts of state-owned land, and the bottomthird flows through the Fort Peck Indian Reservation, as does all the remaining 100 miles of the main stem. The West Fork Poplar would rank among the finest streams flowing through Indian lands in Montana and the West.

Powder River

This small river is among the ten longest essentially dam-free streams on the Great Plains (the second-longest in Montana, next to the lower Yellowstone). It has very little development, and still supports 19 species of native fish, including the rare shovelnose sturgeon. This is one of the longer Great Plains rivers that remains relatively intact as an ecosystem.

With its extensive mileage roughly split between the high, dry plains of Wyoming and Montana, the Powder runs for roughly 400 miles with no major dams. Owing to its salinity, the river is not diverted for agriculture. Little-traveled roads parallel both shores for much of the length, however, these are usually set back on bluffs above the river. The flow meanders within a narrow valley constantly alternating with banks and floodplains covered with cottonwoods or pasture. Incredibly remote, the river is seldom even visited by people other than local ranchers. Coal bed methane development in Wyoming poses a serious pollution threat to this stream, as it has to the Tongue River, just to the west.

In spite of the low, warm, turbid, and even saline flows, much of the native life of this river has survived. To some extent, these demanding conditions have always been present in the river, and the fauna is well adapted, though stresses have greatly increased with diversions, grazing, cutting of cottonwoods, and now energy development upstream.

Still surviving are 25 species of fish including 19 native ones one of the finest such assemblages on the Plains. The rare and large shovelnose sturgeon still lives in the lower river. Five species of globally rare sand-dwelling mayflies have been found here, as well as the sturgeon chub—a small fish on the state's species of special concern list. The Montana Natural Heritage Program's survey of aquatic biological integrity ranks the Powder and several of its tributaries as the largest concentration of relatively intact watersheds on the Plains.

Threats to the river are considered high because of coal bed methane development in Wyoming—the subject of an ongoing lawsuit between the two states. Much of the sprawling watershed is public land managed by BLM, however, most of this is in a checkerboard pattern, and most is in the rugged "breaks" or ravines incised within the dry terrain. Nearly all the riverfront is private property, making watershed-scale protection more difficult than along the somewhat-similar Little Missouri, which lies to the east and flows through an extensive national grassland in North Dakota. See also the Power River in the Wyoming section of this report.

Smith River

With a geography unlike any other Montana river, the Smith flows through the isolated mountains of the central state, cutting a deep limestone canyon with only minor road access. Headwaters rise in the Castle Mountains and meander through a wet valley bottom of irrigated ranchland for nearly 50 tightly curving miles to the entrance of a canyon between the Big Belt Mountains to the west and the Little Belt Mountains to the east. With riffles and small rapids, the river winds through the canyon for about 65 miles, and then flows for 20 miles through ranchland to the Missouri River not far upstream from Great Falls.

Unique in its geology and geography, the small river penetrates isolated, uplifted mountain ranges that are outliers of the main body of the Rockies, all surrounded by high prairie. With clear water cutting into a deep limestone canyon, the stream is popular for fishing and floating through its class I and II rapids. The Smith offers one of few multi-day, semi-wilderness float trips possible in Montana with road access at either end. Deer, elk, and otters live along the river, and anglers flock here for introduced rainbow and brown trout, though the Smith still supports some native cutthroat as well.

The upper and lower portions of the river are entirely privately owned. The middle, canyon section lies within Lewis and Clark National Forest but includes a substantial scattering of private parcels and large tracts, some of which are being developed.

Stillwater River and West Fork Stillwater (Yellowstone tributary)

The pristine upper reach of this river flows for many miles through wilderness and is perhaps the finest stream draining the spectacular Beartooth and Absaroka Ranges to the north of Yellowstone National Park.

The main stem begins just northwest of Cook City and flows for 28 miles through the heart of the Absaroka-Beartooth Wilderness. A trail follows the river the entire way, making this one of the finer river/wilderness/trail routes in the Rockies. Downstream from the wilderness boundary, the Stillwater soon leaves Custer National Forest and then riffles for 50 miles through private ranch land before reaching its mouth at the Yellowstone River. Low diversion dams through this section shunt water out of the river for irrigation. Beginning in the river's uppermost miles--just north of the Fisher mine complex--the river passes through spectacular mountain terrain of metamorphic and granitic bedrock. This wilderness area offers some of the finest grizzly bear habitat in the lower 48 states. A long trail along the Stillwater offers excellent riverfront backpacking through a large wilderness, and the river's sport fishery for trout is well known. From the end of the road to the mouth of the river, the Stillwater's nearly continuous gradient and lively rapids also offer a demanding whitewater run for kayakers.

The West Fork of the Stillwater follows a similar route, though there are no mines near its headwaters and it flows for only 17 miles through the wilderness area before leaving the national forest and entering ranchland. Then it flows for another 12 miles with roads and diversions to its confluence with the main fork Stillwater.

While the upper ends of these streams are entirely in wilderness, the lower portions, with significant mileage to the Yellowstone River, flow entirely through ranchland. Though private, this is only lightly developed. The rivers are known for sport fishing but not for native fish.

Several other rivers drain this spectacular region of Montana and are quite similar to the Stillwater, with comparable values. The Boulder River lies west of the Stillwater, and is an excellent stream but has less mileage in the wilderness area and more that is affected by roads, and diversions. The 30-mile-long West Boulder has 12 miles that are reached only by trail, and sustains some cutthroat trout. Rosebud Creek and its forks lie to the east of the Stillwater. Here, West Rosebud Creek is dammed for hydropower six miles upstream from the national forest boundary. East Rosebud Creek flows for 14 utterly spectacular miles from a chain of wilderness lakes to the national forest boundary. Finally, West Rock Creek and Lake Fork Rock Creek flow from even higher glacial country of the incomparable granite Beartooth Plateau, but they have far less wild mileage before encountering roads, private land, and development in the Red Lodge area. All of these streams have stunning headwater scenery and wildness, with habitat for grizzly bears and other wildlife, and with sport fishing for introduced trout. All, however, lack complete biological or hydrologic continuity downstream, where they encounter diversions and encroachments on their floodplains.

CONCLUSION

Using sixteen lists of rivers compiled by other organizations or by agencies, plus several interviews with experts familiar with the biology of Montana's rivers, we have listed 133 rivers with notable natural qualities and then selected 17 of these as exceptional. We sorted these into an "A" category of five rivers plus 19 Flathead River tributaries, a "B" list of four rivers, and a "C" list of 12.

The natural qualities of the Flathead and the Yellowstone overshadow the rest of Montana's rivers estate. In both large river systems, scale alone means that each stream and its tributaries can be regarded as a cluster in its own right. Moreover, in both cases, the opportunity for restoration to a level of unmatched quality is extraordinary among all the rivers of the West. Beyond these two stellar rivers, a number of other distinctive sets of streams might be considered for their cumulative regional value. In this survey, we have highlighted only the best river in each of these areas, but other streams, appearing on our master table and sometimes mentioned in the text, are nearly comparable in value, and together create sets of streams whose combined ecosystem values are notable.

Flathead River System

The Flathead River system is outstanding nationwide in its degree of wildness and presence of species that indicate ecological health, including bull trout and grizzly bears. The Flathead's three forks, plus virtually all their dozens of tributaries, constitute one of the most distinct groups of contiguous top-quality streams in the country. With the exception of the North Fork Flathead and the dammed portion of the South Fork, these basins are almost entirely protected.

Yellowstone River System

The 678-mile length of the Yellowstone might—all by itself be regarded as the state's second great river region. Without even thinking about its tributaries, the sheer length of this waterway makes it significant when considering protection and restoration opportunities of an enormous landscape. Though it lacks wildness except in its stunning Wyoming headwaters, the Yellowstone is truly remarkable in its length of essentially free-flowing mileage, its assemblage of native fishes including rare species such as the paddlefish, its nearly continuous riparian corridor, its protected large volume of flow, and its range of habitat from high to low elevation.

Rocky Mountain Front rivers

Streams of the Rocky Mountain Front form a third river cluster. While only the Dearborn is highlighted in this report as the best of the suite, other rivers of the Front include the Two Medicine, which rises in the spectacular wilds of Glacier National Park and flows dam-free across the Blackfeet Indian Reservation and then picks up Badger Creek, which has likewise flowed from pristine high country. South of those basins, the Teton River similarly comes from high mountains and flows across the western plains for many miles without major dams, though it is seriously depleted by diversions. The Sun River is the next stream to the south, and has exquisite, wild, high-country mileage but unfortunately encounters Gibson Dam before the waterway even leaves the mountains. The Dearborn is the southernmost of this group. The upper reaches of all these streams are part of the wild Glacier/Northern Rockies ecosystem. All could be protected for additional mileage as they start across the plains, and all could conceivably be part of a larger strategy to reconnect the wildness of the Northern Rockies with the once-abundant nature of the Great Plains-especially in the Plains' westernmost, highest-elevation, fifty-mile-wide swath from the base of the mountains to the north-south corridor of Interstate 15.

Missouri Headwaters rivers

The fourth river cluster is the Missouri headwaters, led by the Gallatin, which is highlighted in this survey, and includes the Madison, Ruby, Beaverhead, Wise, Big Hole, and Jefferson. These begin in the ranges of southwestern Montana and then flow for many sinuous, riffling miles through ranchland with riverfront willows and cottonwoods. The Jefferson has a particularly fine corridor of cottonwoods. Several of these streams are popular trout-fishing rivers. Their lower reaches—particularly those located to the east—tend to face heavy land-development pressures in the greater Bozeman area. Some, such as the Big Hole and Jefferson, have inherited difficult problems resulting from diversions. include the small Black Canyon Creek in the Bighorn National Recreation Area, the likewise diminutive Beauvais Creek, flowing through the Crow Indian Reservation, the dam-controlled tailrace fishery of the lower Bighorn River, and portions of the Judith River, which still have some fine cottonwood floodplains in central Montana.

Absaroka-Beartooth rivers

The fifth group of high-quality rivers includes the Yellowstone River tributaries that flow northward from the rugged bulwark of the wild Absaroka and Beartooth Mountains. Headwaters of the adjacent Boulder River, Stillwater River, Rosebud Creek (not to be confused with Rosebud Creek on the Plains), and Ruby Creek all flow from high wilderness mountains that stand just north of Yellowstone National Park—forming a virtual northern extension of wildlands that totals half the size of the park itself. While this survey focuses on the Stillwater, the other three rivers are quite similar in many respects. The integrity of all streams are important to the Yellowstone Ecosystem, and all could be better connected biologically through their free-flowing but diverted mileage and their riparian corridors, which extend the whole way to the Yellowstone River and its remarkable aquatic ecosystem.

Great Plains rivers

Finally, though not contiguous, a number of streams constitute a group of the best remaining examples of rivers flowing through the Great Plains. This survey has selected the Yellowstone, Little Missouri, Missouri, Marias, Powder, and West Fork Poplar Rivers as the best from this expansive, 370- by 260-mile semi-arid region. These streams are widely scattered across the state. Other Great Plains streams appearing on our listing of valuable waterways include the Missouri below Fort Peck Dam with its substantial 125-mile length of free-flowing current—the second-longest undammed reach on the entire Missouri. Smaller streams with relatively intact habitat

Rivers of Wyoming

ridity 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 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.



Snake River



Other Rivers and Streams

WESTERN RIVERS CONSERVANCY

Great Rivers of Wyoming

Sources for the Wyoming Survey

In addition to the major sources described at the outset of this report, the survey relied on the following state-specific sources for Wyoming:

American Wildlands, Aquatic Integrity Areas (AW). 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.

Interviews with biologists and local experts (B#).

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

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

Greater Yellowstone Coalition (G). 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.

The Nature Conservancy (NC). 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.

Trout Unlimited (TU). 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).

Wildlands Project, lowland wildlands core and linkage areas (WP). 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.

Wyoming Department of Natural Resources (WN1). These are streams designated or recognized as priority-outstanding trout waters by Wyoming DNR (1987), as listed in the Outstanding Rivers List (1991).

Wyoming Department of Natural Resources (WN2). These are streams designated as high water quality, class I, by Wyoming DNR (1988), as listed in the Outstanding Rivers List (1991).

Wyoming Heritage Program (WH). 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).

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.

Key to Wyoming Rivers Table

SOURCE OF RECOMMENDATION

AW1- American Wildlands Assessment, highest ranking

B#- interviews w/ biologists and local experts:

B1- Holly Copeland, Nature Conservancy

B2- Scott Bosse, Greater Yellowstone Coalition

B3- Wayne Hubert, U of WY and U.S. F&W Service

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B4- Gary Beavais, Wyoming Natural Diversity Database **BL-** Bureau of Land Management **BO-** Bureau of Outdoor Recreation C- Columbia Interior Basin Ecosystem Management Plan (1997), high aquatic integrity CS- Campaign for the Snake Headwaters, wild & scenic proposal F- U.S. Forest Service G-Greater Yellowstone Coalition, habitat and watershed integrity, 70 % + I- USDI/ USDA, Wild and Scenic Rivers list, 1965 N- Nationwide Rivers Inventory

NC- Nature Conservancy, Conservation Priorities

TU-Trout Unlimited, highlighted wildland rivers

WF-Wyoming Game and Fish Dept., best streams for rare fishes west of the continental divide

WN1- Wyoming Dept. of Natural Resources, designated or recognized priority/outstanding trout waters (1987)

WN2- Wyoming Dept. of Natural Resources, high water quality, class I (1988)

WH- Wyoming Heritage, high priority rivers for natural diversity conservation (1988)

WP-Wildlands Project, lowland core and linkage areas

W-National Wild and Scenic Rivers

Ws-National Wild and Scenic Study Rivers

WRC-Western Rivers Conservancy

BEST SOURCES: B#, CS, G, I, N, W

OUALITIES

B-Biological Diversity E- Endangered or imperiled species F- Fish G-Geological/geographical L- Long free-flowing reach >100 miles L+- Long free-flowing reach when combined with streams it flows P- Plant life/ riparian values R-Recreation, general (camping, etc.) Rf- Recreational fishing **Rh-**Recreational hiking **Rr-** Recreational river running WL-Wildlife WN Wildness

ECOREGIONS

IS- Intermountain Semi-Desert (342)

- GP-Great Plains (331)
- SR- Southern Rocky Mountains (M331)

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Atlantic Cr	Yellowstone	N	<u> </u>	G, WL, WN	SR		
Bailey Cr	Snake	CS, N		G, Rh, WL, WN	SR		westslope cutthroat trout
Battle Cr	Little Snake	TU		E, F, WN	IS		Colorado cutthroat trout
Bear	Great Salt Lake (in UT)	TU, WP		E, F	IS		Bonneville cutthroat trout
Bear Cr, North Fk	Great Divide Basin	N		G, R, WN	IS		landlocked, intermittent
Bear Trap Ck	Powder River, Red Fk, North Fk of	N		R, WN	IS		
Beaver Cr	Cheyenne	NC		В	GP		
Beaver Cr	Powder, North Fk	Ν		G, WN	IS		intermittent
Bechler	Falls (in ID)	Ν	Ν	E, F, G, R, WL, WN	SR	А	
Belle Fourche	Cheyenne/ Missouri	WH		F	GP		
Big Fall Cr	LaBarge Cr	N		G	IS		spring flows
Bighorn	Yellowstone (in MT)	NC, WN1		В	IS		
Big Sandy	Green	F, G, WF		E, F	IS		flannelmouth sucker
Blackrock Cr	Buffalo Fk	CS, N		F, WL	SR		
Box Canyon Cr	Greys	N	Į	G, WN	SR		
Buffalo Fk	Snake	B2, CS, F, NC, TU	NC	B, F, P, R, WL, WN	SR	В	Yellowstone cutthroat trout

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Buffalo Fk, North	Buffalo Fk	B2, CS	B2	F, WN	SR	В	Yellowstone cutthroat trout
Buffalo Fk, South	Buffalo Fk	CS		F, Rh, WN	SR	В	Yellowstone cutthroat trout
Buffalo Fk, Soda Fk	Buffalo Fk, North	CS		F, WN	SR		
Canyon Cr	Vermillion Ck/ Green	N		R, WN	IS		
Cheyenne	Missouri (in SD)	B1, NC		В	GP		
Clarks Fk	Yellowstone	B3, B4, BO, G, NC, TU, WH, WN1, WN2, W	NC, W	B, F, G, Rh, WN	SR	A	Yellowstone cutthroat trout
Cliff Cr	Hoback	Ν		R, WN	SR		
Conant Cr	Falls (in ID)	NC		В	MR		
Crazy Woman Cr, Middle Fk	Crazy Woman Cr/ Powder	Ν		R, WN	IS		
Crazy Woman Cr, South Fk	Crazy Woman Cr/ Powder	Ν		WN	IS		
Crystal Cr	Gros Ventre	CS, N	N	WL, WN	SR	A	key migration route for bighorn and elk
Currant Cr	Green, Flaming Gorge Resvr.	N		F, R, WN	IS		small

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Currant Cr, Dripping Springs Fk	Currant Cr	Ν		F	IS		small
Currant Cr, East Fk	Currant Cr	Ν		F	IS		small
Currant Cr, Middle Fk	Currant Cr	N		F	IS		small
Currant Cr, West Fk	Currant Cr	N		F, WN	IS		small
DuNoir Cr	Wind	WRC		F, Rh, WL	SR	В	
Encampment	Platte, North	B3, BO, TU, WN1, WN2, Ws		F, WN	IS	С	
Encampment, East Fk	Encampment	TU		WN	IS		
Falls	Henrys Fk (in ID)	BO		E, R, WL, WN	SR	A	
Firehole	Madison	Ν	N	F, G, R, WL, WN	SR	С	unique species adapted to extreme temps
Fish Cr	Gros Ventre	WRC		F, Rh, WL, WN	SR	А	
Fontenelle Cr	Green, Fontanelle Resvr.	F, N, NC		B, F, G, WN, WL	IS		
Fontenelle Cr, South Fk	Fontanelle Cr	N		G, WN	IS		
Gallatin	Missouri (in MT)	Ν		F, G, WL, WN	SR		
Gardiner	Yellowstone (in MT)	N		G, R, WN	IS		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Gardiner Cr	Powder, North Fk	N		G, P, WL, WN	IS		diversity of plants
Gibbon	Madison	N	N	G, WL, WN	SR	С	hot and acidic
Granite Cr	Hoback	CS, F, N, WN2		G, R, Rh, WN	SR	С	
Green, upper	Colorado (in UT)	BL, BO, F, I, N, NC, WN1, WN2, WP	N, NC	B, E, F, P, R, WL, WN	SR/IS	A	Kendall dace (endangered) in upper river
Greybull	Bighorn	B1, B2, B3, B4, NC, TU		B, F, WN	SR	С	Yellowstone cutthroat trout
Greys	Snake	B2, B3, B4, C, F, G, N, NC, TU, WN1	B2, N	B, F, G, Rf, Rr, WL	SR	A	Yellowstone cutthroat/ bull trout
Gros Ventre	Snake	B2, C, CS, F, G, I, N, NC, TU, WF	N, NC	B, E, F, G, R, WL	SR	A	Yellowstone cutthroat/ bull trout/ bluehead sucker
Hams Fk	Blacks Fk/ Green	F, N, NC, WN1, WF, WP		B, E, F, R, WL	IS		flannelmouth sucker/ bluehead sucker/ roundtail chub
Henrys Fk	Green	BO, NC	<u> </u>	В	SR		
Hoback	Snake	BO, C, CS, F, G, N, TU	N	F, G, R, Rr, WL, WN	SR	С	Yellowstone cutthroat trout
Horse Cr, North	Powder	N		WN	IS		intermittent

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Horse Cr, South	Powder	N		WN	IS		intermittent
La Barge Cr	Green	B2, F, NC, TU		B, E, F, WN	IS	С	Colorado cutthroat trout
Lamar	Yellowstone	N	N	F, R, WL, WN	SR	A	
Laramie	North Platte	B1		В	IS		
Lewis	Snake	Ν		F, N	SR		brown trout fishery
Little Bighorn	Bighorn (in MT)	B2, F, N, TU, WN1		B, F, P, WL, WN	IS		
Little Greys	Greys	BO, F, N		R, WN	SR		
Little Missouri	Missouri (in ND)	NC		В	GP		
Little Powder	Powder	NC	NC	В	GP		
Little Snake	Yampa (in CO)	B3		F	SR	С	
Little Snake, North Fk	Little Snake/ Yampa (in CO)	B4, TU		E, F, WN	IS		Colorado cutthroat trout
Little Snake, Roaring Fk	Little Snake/ Yampa (in CO)	TU		E, F	IS		Colorado cutthroat trout
Madison	Missouri (in MT)	N	}	E, F, G, WL	SR	С	
Marten Cr	Greys	Ν		R, WN	SR	{	
Muddy Cr	Blacks Fk/ Green	NC		В	IS		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Muddy Cr	Little Medicine Bow/ Medicine Bow	NC, WP		B, E, F, P	IS		key linkage area/ bluehead sucker, roundtail chub, flannelmouth sucker
New Fk	Green	BO, F, G		F	IS		
New Fk, East	New Fk	BO		F	IS		
Oasis Spring Cr	Bighorn	Ν	·	Rf, WN	IS		
Owl Cr, South Fk	Owl Cr/ Bighorn	AW		F, WN	SR		
Pacific Cr	Snake	CS, F, N, TU		G, R, WL, WN	SR		
Pass Cr	Powder, North Fk	Ν		WN	IS		
Pine Cr	New Fk	F, N		G, Rh, WN	IS		high elevation
Piney Cr, North	Green	N		P, WN	IS		
Platte, North	Platte (in NE)	B1, B4, BO, WN1, WN2		B, P, Rf, Rr, WL	SR/IS	С	
Poison Cr	Crazy Woman Cr, Middle Fk	Ν		G, P, R, WN	IS		small stream; diversity of plants
Pole Cr	Crazy Woman Cr, North Fk	N		WN	IS		small
Popo Agie	Wind	B3, BO, TU		F, WN	SR		Yellowstone cutthroat trout, sauger

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Porcupine Cr	Bighorn (in MT)	BL, N		G, Rf, Rh, WN	SR		
Powder	Yellowstone (in MT)	B1, B3, B4		В	GP	В	
Powder, Middle Fk	Powder	B3, B4, BL, N, WN1, WN2	N	F, G, Rf, WL	IS	В	
Powder, Main Fk of Red Fk	Powder	Ν		WN	IS		
Powder, North Fk	Powder	B3, B4, N		R, WL, WN	IS	В	
Powder, North Fk of Red Fk	Powder, Red Fk	N		R, WN	IS		
Powder, South Fk of Red Fk	Powder, Red Fk	N		R, WN	IS		
Powder, South Fk	Powder	B3, B4		F	IS	В	
Roaring Fk Cr	Green	Ν		WN	SR		
Salt	Snake	B3, B4, BO, F, G, TU, WN1		F, R, WN	SR		Yellowstone cutthroat trout/ Spring flows, development pressure
Shoal Cr	Hoback	CS		F, WN	SR		
Shoshone	Bighorn	G, N		F, WL	SR/IS		sturgeon chub
Shoshone, North Fk	Shoshone	B2, NC, G, WH	B2	B, F	SR	С	Yellowstone cutthroat trout
Shoshone, South Fk	Shoshone	AW, B2, WH		F, WN	SR	С	Yellowstone cutthroat trout

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Slough Cr	Yellowstone	N		E, F, R, WL, WN	SR		
Smiths Fk	Bear	AW, B4, NC, TU, WP		B, F, WN	IS	С	Bonneville cutthroat trout
Snake	Columbia	B2, N, TU, WN1, WN2, Ws	B2	B, F, G, P, R, WL, WN	SR	А	
Snake, Buffalo Fk (See Buffalo Fk)							
Soda Butte Cr	Lamar	N		G, WL	SR		
Sunlight Cr	Clarks Fk	B3, WRC	<u> </u>	F, WL	SR	А	
Sweetwater	North Platte	B1, B4, N, NC, WN2, WP, Ws	NC	B, R, WL	IS		NOT rec'd for W&S
Teton Cr	Teton (in ID)	NC		В	MR		
Tensleep Cr	Nowood/ Bighorn	NC, WN1		В	SR		
Thorofare Cr	Yellowstone	N, WN1	N	F, WL, WN	SR	A	riparian corridors/ yellowstone cutthroat trout
Tongue	Yellowstone (in MT)	F, N, TU, WN2	N	F	IS		Yellowstone cutthroat trout
Tongue River, North	Tongue	N, TU		F, G, WL	SR		Yellowstone cutthroat trout
Tongue River, South	Tongue	N, WN1, WN2		F, G, WL	SR		
Tosi Cr	Green	Ν		G, R, WN	IS		Karst/ limestone
Trout Cr	Bighorn	Ν	}	Rf, WN	IS		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Wiggings Fk	Wind River, East Fk	N		G, WL	SR		
Willow Cr	Hoback	CS, N		R, WL, WN	SR		
Wind, upper	Bighorn	B1, B2, B3, B4, G, I, NC, TU, WH, WN1, WN2, WP	B2, NC	B, F, P, WN	SR/IS	В	Yellowstone cutthroat trout
Wind, North Fk	Wind	AW	<u>}</u>	F, WN	SR		••••••••••••••••••••••••••••••••••••••
Wolf Cr	Snake	CS, N		R, WN	SR	[
Wood	Greybull	B2, B4, NC, TU		B, F, WN	SR	С	Yellowstone cutthroat trout
Yellowstone	Missouri (in MT)	AW, B2, F, G, I, N, TU, W	B2, N	B, E, F, R, WL, WN	SR	A	Yellowstone cutthroat trout

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, 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 riffling 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 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. 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.

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 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 gualities, 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 secondhome 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 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 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 highelevation 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 308foot 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.

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 oftenintermittent 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 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 relativelylow 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 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

(See the Colorado chapter of this report, page 231.)

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, hotsprings 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-milewide 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 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

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-toback 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, protection 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 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.



Wind River

Rivers of Colorado

The Rockies rise as a massive north-south backbone across Colorado. Mountain country makes up about half the terrain of this sixth-largest Western state, while the other half lies either in the Great Plains to the east or in desert and red-rock canyons of the Colorado Plateau (Nevada-Utah Semi-Desert ecosystem province) to the west.

Colorado, like Wyoming, is one of America's key headwaters; 18 states receive water that begins its seaward journey in Colorado's Rockies. These towering mountains boast more peaks that rise over 14,000 feet than any other state and 75 percent of the nation's land exceeding 10,000 feet in elevation. All this highcountry is key to the state's hydrology. Soaring mountains push clouds up high enough to reach cool, dew-point-temperature air, wringing snow or rain from even relatively dry air masses that have already dropped the lion's share of their moisture on the windward heights of the Sierra. Three-guarters of Colorado's precipitation comes as snow, which blankets the mountains each winter with a deep pack that melts into an extensive system of rivers in late spring and early summer, and then subsides sharply. Wet storms also come to the state from the south, and bring late summer rain to the southern mountains and plains. Still, lying in an extended rain shadow, and located south of the storm patterns that soak the upper latitudes of the West, Colorado receives far less precipitation than states in the Northwest and the Northern Rockies.

The high and snowy Colorado Rockies give rise to four major river systems. The Colorado drains the entire western half of the state and flows to the Gulf of California as the nation's seventh-longest river (1,450 miles) and the major artery of the Southwest. The Platte drains the northeastern Rockies and northern Great Plains and flows to join the Missouri River in Nebraska. The Arkansas—at 1,460 miles the sixth-longest river in the United States--collects its flows from the southeastern Rockies and runs across the southern plains to join the Mississippi in Arkansas. And the Rio Grande, America's fifthlongest river with 1,885 miles, flows from Colorado's south-central mountains to its mouth at the Gulf of Mexico, though it is heavily diverted in southern Colorado and New Mexico and scarcely flows in several reaches.

Biological highlights of the Colorado rivers estate include long riparian corridors of cottonwoods, willows, and sometimes box elder trees and red-osier dogwoods, together providing excellent habitat for a diverse array of birds, fish, and other wildlife in a semiarid landscape. The Yampa, White, and lower Animas are superb in this regard, and many other rivers, including the Elk, Rio Grande, San Miguel, Green, and Gunnison, also have rich riparian corridors.

Endemic fish are another point of biological interest. Three imperiled subspecies of cutthroat trout still survive here in select small rivers with high water quality. The greenback cutthroat were thought to be extinct but in fact had been reduced to two streams-tiny Como Creek and the South Fork Cache la Poudre. Successful reintroductions have increased their range to 42 streams, half of which have stable and reproducing populations (though genetic analysis in 2007 revealed that the number may be much lower owing to the stocking of Colorado River cutthroat trout by mistake). The populations that until recently were thought to be greenbacks total only 5 percent of the fishes' historic extent, and are scattered in short segments of streams along the Front Range from the North Fork of the Cache la Poudre near the Wyoming border, to Apache Creek, south of the Arkansas River. Another subspecies, the Colorado cutthroat trout, once had 144 distinct populations. These were sharply reduced but have now increased again to 56 groups in short stream segments throughout much of the Colorado Rockies and especially in tributaries of the Yampa, the White, and Elk, and in small streams of the West Elk Mountains in the central portion of the Rockies. The Rio Grande cutthroat survives in a small set of streams in that basin, with the most viable cluster flowing west from the Sangre de Cristo Mountains. However, one wild trout subspecies, the yellowfin cutthroat, has already gone extinct, underscoring the urgency of protecting high-quality aquatic habitat.

No less important, four species of warmwater fishes--the Colorado River pikeminnow (formerly squawfish), the humpback chub, bonytail chub, and razorback sucker—survive in parts of the Colorado River basin but their populations have been drastically reduced. These fishes had adapted to the warm, turbid, greatly fluctuating levels of rivers in the western parts of the state but are now considered endangered owing to radical changes in flow regimes resulting from dams and diversions, and from predation from introduced, exotic species such as the voracious northern pike. The strongholds of these ancient fishes include the Yampa River below Craig, the Colorado River below Rifle, the White below Rio Blanco Dam west of Meeker, the Green below the Yampa confluence, and the Gunnison below Delta. These five reaches, which have been designated as critical habitat for the pikeminnow, humpback, bonytail, and razorback, represent 29 percent, 28 percent, 14 percent, and 49 percent respectively of the historical habitat for these four fishes, according to the Upper Colorado River Endangered Fish Recovery Program.

Colorado's Rocky Mountains include many short, spectacular, high-country streams in wilderness or remote areas. As in the rest of this survey, only a few of these small streams are recognized here owing to their numbers and to the high degree of protection that many of the best already have in wilderness or national park areas. Rivers on the west side of the Continental Divide eventually gather and flow into the Colorado Plateau as a remarkable set of canyon and dryland rivers: the lower Yampa, Green, White, Gunnison, and Animas. The east slope drains to the Great Plains, where rivers flowing across Colorado's portion of this vast grassland are universally diminished by diversions and agriculture. Yet sections of three rivers, the Purgatoire River, Tempest Creek, and Arikaree River, retain more of their natural values than most of the Mississippibound waterways. Colorado has a number of exceptionally popular recreational rivers, including the Arkansas, which is one of the most-floated whitewater reaches in the nation, the Big Thompson in Rocky Mountain National Park, the Gunnison in the national monument protecting the phenomenal Black Canyon, the Yampa and Green in Dinosaur National Monument with its superb multi-day rafting run, the Animas in Durango and in the deep canyon upstream, and the South Platte, which flows through Denver. Some of these waterways are included in this report because they also retain important biological values; all are vitally important to people who live near them and to people who come from elsewhere to enjoy and experience these streams.

Out of tens of thousands of miles of rivers and streams in the state, portions of only 2 rivers have been designated in the National Wild and Scenic Rivers system—the Cache la Poudre and its South Fork. Another 10 rivers—principally on national forest land--were formally studied for designation, and 7 of those were recommended, but Congress has designated none. Clearly, though, a number of Colorado streams qualify for the national system and deserve protection.

As with the other western states, rivers in Colorado are degraded by dams, diversions, ranching, farming, logging, mining, urbanization, and global warming. However, degradation problems here tend to be more severe owing to a high population relative to other mountain states, dry climate, and a long history of intensive resource use. Early in the settlement of the state, pioneering ranchers diverted almost all major streams and many of the minor ones where runoff flowed out of mountains and entered productive lowlands, creating a pattern of irrigation that persists to this day. Hard-rock mining (silver, copper, lead, molybdenum, etc.) has scarred more mountains and polluted more waterways here than elsewhere in the West and has left a grim legacy of neglect in abandoned sites that have caused depressed invertebrate life, fish-kills, and human health threats. More recently, energy development has been intensive in oil and gas fields of the West Slope or Colorado basin, and new threats include the possibility of highly water-consumptive and polluting oil-shale extraction. Finally, increasing population with its footprint of urban sprawl is rampant at the base of the Front Range and near booming recreational towns throughout the mountains, drawing water from streams to meet residents' demands and crowding more riverfronts with development. For all these varied reasons, Colorado has fewer rivers meeting criteria for natural quality than states to the north and on the West Coast.

Nevertheless, the magnificent river systems that remain here need to be protected from future energy development, population growth, damming, and global warming. And many of the rivers that have been degraded can potentially be restored to at least some measure of their historic worth to conserve important river values for generations to come.



Gunnison River

Great Rivers of Colorado





Sources for the Colorado Survey

In addition to the major sources described at the outset of this report, the Colorado survey incorporated these state-specific sources:

Interviews with biologists and local experts (B#).

Colbert Cushing, Colorado State University, aquatic ecologist

Tom Iseman, Colorado Nature Conservancy

Dave Winters, U.S. Forest Service, regional aquatic ecologist

Renée Rondeau, Colorado Natural Heritage Program, director

Colorado Division of Wildlife, Wild Trout Rivers (CW). These are short reaches identified for their habitat value for wild trout, as listed in The Rivers of Colorado, by Jeff Rennicke (Falcon Press, 1985), p. 158.

Colorado Division of Parks and Recreation (CP). These are streams that have been prioritized for natural diversity conservation by the state parks and recreation agency, as listed in American Rivers, Outstanding Rivers List, 1991.

U.S. Fish and Wildlife Service, critical habitat (FW). These are reaches that have been designated as critical habitat for endangered fish, including the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub, as listed on the Upper Colorado River Endangered Fish Recovery Program website, August 2007.

Colorado Nature Conservancy, river project sites (NCR). These are rivers where the Colorado Nature Conservancy has active projects, as listed in Colorado: Rivers of the Rockies, by John Fielder and Mark Pearson (Westcliffe Publishers/CO TNC, 1993), p. 11.

Trout Unlimited, high-priority native trout streams (TU). These are streams that Trout Unlimited has identified as providing crucial habitat for greenback cutthroat trout, Colorado River cutthroat, and Rio Grande cutthroat, in its report, Where the Wild Lands Are: Colorado (ca. 2007). Many of the stream segments identified in this excellent report were too small to be recorded in this survey.

Western Rivers Conservancy, essentially roadless and damfree reaches (WR-R). These are nearly roadless reaches of 20 miles or more, as identified on DeLorme atlas of Colorado.

Key to the Colorado River Tables

SOURCE OF RECOMMENDATION

B#- interviews w/ biologists and local experts:

B1-Tom Iseman, Colorado Nature Conservancy

B2- Dave Winters, U.S. Forest Service

B3- Colbert Cushing, Colorado State University

B4- Renée Rondeau, CO Natural Heritage Program

BL- Bureau of Land Management

BO- Bureau of Outdoor Recreation

CP- Colorado Div. of Parks and Rec, priority streams for natural diversity conservation

CW- Colorado Division of Wildlife, wild trout rivers

F- U.S. Forest Service

FW- U.S. Fish and Wildlife Service, critical habitat for endangered warm water fish

I- USDI/ USDA, Wild and Scenic Rivers list, 1965

N- Nationwide Rivers Inventory

NP-National Park Service

NC- Nature Conservancy high priority aquatic sites for conservation of biological diversity (1990)

NCR-Nature Conservancy rivers projects

TU-Trout Unlimited, survey of native trout streams

W-National Wild and Scenic Rivers

Ws-National Wild and Scenic Study Rivers

WRC-Western Rivers Conservancy

WR-R-Western Rivers Conservancy essentially roadless and

dam-free reaches \geq 16 miles

BEST SOURCES: B#, CP, I, N, W
QUALITIES

B- Biological Diversity
E- Endangered or imperiled species
F- Fish
G- Geological/geographical
L- Long free-flowing reach >100 miles
L+- Long free-flowing reach, combined with streams it flows into
P- Plant life/ riparian values
R- Recreation, general (camping, etc.)
Rf- Recreational fishing
Rh- Recreational hiking
Rr- Recreational river running
WL- Wildlife
WN- Wildness

ECOREGIONS

- CP- Colorado Plateau (313)
- GP- Great Plains (331)
- ID- Intermountain Semi-Desert and Desert (341)
- IS- Intermountain Semi-Desert (342)
- MR- Middle Rocky Mountains (M332)
- NU- Nevada-Utah Semi-Desert (M341)
- SR- Southern Rocky Mountains (M331)



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RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Alamosa	San Luis Valley irrigation/ Rio Grande	BO		R	SR		
Alder Cr, West	Alder Cr/Rio Grande	TU		E, F	SR		Rio Grande cutthroat trout
Animas	San Juan (in NM)	BO, N, NC, NCR	N	B, F, G, L, Rf, WL	SR	С	
Apache Cr	Arkansas	TU		F, E	GP		greenback cutthroat trout
Apishipa	Arkansas	BO	{	WL, WN	GP		
Arikaree	Republican, North Fk (in KS)	B1, N, NC, NCR		B, F, P, WL	GP		good riparian wetlands
Arkansas	Mississippi (in AR)	CP, CW, N, NC	Ν	B, E, F, G, R, Rf, Rr, WL, WN	SR	С	public ownership: 46 % from FS boundary above leadville to Pine Cr; 46 % PC to Buena Vista; 40% BV to Salida; 41% Salida to Vallie Bridge; 70 % VB thru Royal Gorge
Avalanche Cr	Crystal	WRC		P, Rh, WN	SR		road-free for 10 miles
Badger Cr	Arkansas	BL, N		F, G, R, Rf, WN	SR	{	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Bear	Yampa	BO		R, Rf	SR		
Beaver Cr	Arkansas	BO, N	Ν	E, F, G, R, WL, WN	SR		reservoir at headwaters
Beaver Cr	Gunnison	WRC-R		Rh, WN	SR		road-free for 16 miles
Beaver Cr	Rio Grande, South Fk	TU		E, F	SR		Rio Grande cutthroat trout
Bellows Cr, West	Bellows Cr/ Rio Grande	TU		E, F	SR		Rio Grande cutthroat trout
Big Blue Cr	Gunnison	WR-R		G, Rh, WN	SR	С	road-free for 25 miles
Big Thompson	Platte, South	BO, N, Ws	N	E, F, G, WL, WN	SR		greenback cutthroat trout/ not rec'd for WS
Big Thompson, North Fk	Big Thompson	N		E, F, Rf, Rh, WN	SR		greenback cutthroat trout
Bijou Cr, West	Bijou Cr/ Platte, South	СР		В	GP		
Blue	Colorado	BO, CW		F, Rf	SR		below Green Mt. Dam
Blue Cr	Gunnison (resvr.)	N		G, WN	SR		
Boulder Cr	St. Vrain Cr	NC		B, R	SR, GP		
Boulder Cr, North	Boulder Cr	BO		R	SR		
Boulder Cr, South	Boulder Cr	BO		R	SR		
Boxelder Cr	Platte, South	СР		В	GP		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Brush Cr	Colorado	СР		В	SR		
Cache La Poudre	Platte, South	BO, CP, CW, I, W		B, E, F, G, R, Rf, Rh, Rr, WN	SR, GP	В	greenback cutthroat trout
Cache La Poudre, North Fk	Cache La Poudre	F, N, NC, NCR	N	B, F, P, Rh, WL	SR	В	
Cache La Poudre, South Fk	Cache La Poudre	W		WN	SR	В	
Capital Cr	Roaring Fk	BO		G, Rh, WN	SR		
Cement Cr	East	BO		G, Rh, WN	SR		
Chacuaco Cyn	Purgatoire	Ν		G, WL	SR		intermittent
Chalk Cr	Arkansas	BO		R	SR		
Clear Cr	Arkansas	BO		R	SR		
Coal Cr	Gunnison (resvr.)	N, TU		E, F, WL, WN	SR		one of longest Colorado River cutthroat trout streams
Cochetopa Cr	Tomichi Cr	BO, CP		B, Rh	SR		
Colorado	Gulf of California (in Mexico)	B4, BL, BO, CW, CP, FW, N, Ws	FW, N	B, F, G, L, Rf, Rr, WL	SR, IS	С	NOT rec'd for WS/ Gore Canyon wild troutcritical habitat: from Rifle downstream
Conejos	San Luis Valley irrigation/ Rio Grande	BO, CW, N, NC, NCR, Ws		B, F, G, Rf	SR		rec'd for WS/ roads, diversions

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Conejos, El Rito Azul Fk	Conejos	Ν		F, G, Rh, WL, WN	SR		
Conejos, North Fk	Conejos	Ν		F, G, Rh, WL, WN	SR		
Conejos, Middle Fk	Conejos	Ν		F, G, Rh, WL, WN	SR		
Conundrum Cr	Castle Cr/ Roaring Fk	WRC		WN	SR		road-free for 10 miles
Cony Cr	North St. Vrain Cr	TU		E, F	SR		greenback cutthroat trout
Cottonwood Cr	Tallahassee Cr/ Arkansas	BO		R	SR		
Cottonwood Cr	Arkansas	BO		R, WN	SR		
Cross Cr	Eagle	BO, WRC		Rh, WN	SR		road-free for 13 miles
Cross Cr	Jacks Cr/ Saguache Cr/ Rio Grande	TU		E, F	SR		Rio Grande cutthroat trout
Crystal	Roaring Fk	BO, F, N		F, WL, Rf, Rr	SR		Colorado River cutthroat trout
Crystal, North Fk	Crystal	Ν		F, WL, Rf, Rr	SR		
Crystal, South Fk	Crystal	Ν		F, WL, Rf, Rr	SR		
Curecanti Cr	Gunnison (resvr.)	Ν		F, Rh, WN	SR		
Deep Cr	Colorado	B4, TU	}	E, F, G	SR]	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Dolores	Colorado (in UT)	B1, B2, BO, CP, W, WR-R		B, G, L+, Rr, WN	SR, NU	С	Colorado River cutthroat trout
Eagle	Colorado	BO		R	SR		
East	Gunnison	CW, N	N	E, F, P, Rf, Eh, Ee, WL	SR		riparian habitat, wintering bald eagles, wild trout above East River
East Pass Cr	Saguache Cr/ Rio Grande	TU		E, F	SR		Rio Grande cutthroat trout
Elk	Yampa	CP, N, W		B, F, L+, P, Rh, Rr, WN	SR	A	
Elk	Conejos	BO		Rh, WN	SR		
Elkhead Cr	Yampa	BO		WN	SR		
Encampment	Platte, North	BO, N, W	<u> </u>	F, WL, WN	SR		
Escalante Cr	Gunnison	СР	ļ	В	NU		
Fall	Big Thompson	N	Į	WL	SR		
Fall Cr	San Miguel	BO	<u>.</u>	R	SR		
Fish Cr	Yampa	BO		Rh	SR		at Steamboat Springs
Flint Cr	Los Pinos	N, W		G, Rh, WN	SR		
Florida	Animas	BO		R	SR		reservoir, road
Ford Cr	Saguache Cr/ Rio Grande	TU		E, F	SR		Rio Grande cutthroat trout
Fraser	Colorado	BO, CW		F, Rf	SR		Hwy 40/ wild trout above Granby

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Fryingpan	Roaring Fk	BO		R	SR		
Goose Cr	Rio Grande	BO		Rh, WN	SR		
Gore Cr	Colorado	BO		R	SR]	I-70
Grape Cr	Arkansas	BO, BL		R, WN	SR		headwaters/ road free for 32
Green	Colorado (in UT)	BO, FW, WRC	FW, WRC	E, F, G, L, P, Rr	SR, IS	В	critical warm water fish habitat from Yampa confluence down
Greenhorn Cr	Arkansas	TU		E, F	GP		greenback cutthroat trout
Grizzley Cr	Colorado	BO	<u> </u>	Rh, WN	SR		
Gunnison	Colorado	B4, BL, BO, CP, CW, FW, N, NC, NCR, W	FW	B, F, G, Rf, Rr, WN	SR, IS	В	wild trout below Black Cyn/ critical warm water fish habitat from Delta down
Gunnison, Lake Fk	Gunnison (resvr.)	BL, BO, N, NCR		B, Rf, Rr, WL	SR		bighorn sheep and bald eagles/ non native fishery/ road
Gypsum Cr	Eagle	BO		R	SR]	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Hermosa Cr	Animas	B4, BO, TU, WR-R		E, F, WN	SR	A	longest network of Colorado River cutthroat trout streams/ road-free for 23 mi
Homestake Cr	Eagle	во		R	SR		road, reservoir
Huerfano	Arkansas	N		G	GP		sounds like a reach below a major diversion/ cultural values- petroglyphs
Illinois	Michigan	BO		WL	SR		Arapaho NWR/ antelope, elk, deer, migratory ducks and geese
Jacks Cr	Saguache Cr/ Rio Grande	TU		E, F	SR		Rio Grande cutthroat trout
La Garita Cr	San Luis Valley irrigation/ Rio Grande	во		WN	SR		diverted
Lake Cr	Los Pinos	N, W		G, Rh, WN	SR		
Laramie	Platte, North	CW		F	SR		Hohnholz State Wildlie Area

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Little Snake	Yampa	B1, B4, BL, BO, NC		B, L+	SR, IS	А	
Little Snake, Middle Fk	Little Snake	WRC		L+	SR		
Los Pinos	San Juan (in NM)	BO, N, W		G, Rh, WN	SR		reservoir
Lost Cr	Goose Cr/ Platte, South	NP		G, Rh, WN	SR		
Mad Cr	Elk/ Yampa	BO	{	Rh, WN	SR	{	
Michigan, North Fk	Michigan/ Platte, North	BO		R, WL	SR		reservoir
Michigan, South FK	Michigan/ Platte, North	BO		R, WL	SR		
Middle Cr	Saguache Cr/ Rio Grande	TU		E, F	SR		Rio Grande cutthroat trout
Navajo	San Juan	BO, NC		В	SR		roads
Newlin Cr	Arkansas	TU		E, F	SR		greenback cutthroat trout
Ohio Cr	Gunnison	СР		В	SR		
Parachute Cr	Parachute Cr/ Colorado	B4		E, F, G, P			Colorado River cutthroat trout
Piedra	San Juan	BO, N, NC, NCR, Ws		B, F, G, WL, WN	SR		
Piedra, Middle Fk	Piedra	NC, W		В	SR		
Piedra, East Fk	Piedra	NC, W	}	В	SR	{	
Piney	Colorado	BO, WR-R	WRC	Rh, WN	SR	A	road-free for 28 mi

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Platte, North	Platte (in NE)	BO, CW		Rf, Rr, W	SR	В	See Wyoming
Platte, South	Platte (in NE)	B2, BO, CP, CW, NC, N	N	B, F, G, R, Rf, Rh, WL, WN	SR, GP		bald eagles
Purgatoire	Arkansas	B1, B2, B4, BO, CP, N, NC, NCR	N	B, G, F, WL	SR	С	
Quartz Cr	Tomichi Cr	BO	{	R	SR		
Rincon La Osa	Los Pinos	N, W		G, WN	SR		
Rincon La Vaca	Los Pinos	N, W		G, WN	SR		
Rio Blanco	San Juan	BO		R	SR		restoration efforts
Rio Grande	Gulf of Mexico	B4, BL, BO, I, N, NC, NCR	N	B, E, G, P, Rr, WL, WN	SR, GP		wetlands in Alamosa NWR, includes habitat for whooping cranes
Rito Saco Cr	Ventero Cr/ Rio Grande	TU		E, F	SR		Rio Grande cutthroat trout
Roaring Fk	Colorado	BO, CP, CW, NC		B, F, P, Rf, Rr	SR		wild trout habitat below Hallum L.
Rock Cr	Cochetopa Cr	BO		R	SR		
Saguache Cr, South Fk	Saguache Cr/ Rio Grande	TU		E, F	SR		Rio Grande cutthroat trout
San Francisco Cr	Rio Grande	TU		E, F	SR		Rio Grande cutthroat trout
Sangre de Cristo Cr	Trinchera Cr	TU		E, F	SR		Rio Grande cutthroat trout

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
San Juan	Colorado (in AZ)	Ν		F, P, WL	SR		very important wildlife habitat for diverse species
San Juan, East Fk	San Juan	BO, N	N	F, WL	SR		very important wildlife habitat for diverse species
San Juan, West Fk	San Juan	BO, N	N	F, WL	SR		very important wildlife habitat for diverse species
San Miguel	Dolores	B1, B4, BL, BO, NC, NCR		B, P, Rr	SR	С	
Sand Cr	San Luis Valley irrigation/ Rio Grande	BO, WRC		G	SR, GP		Sangre de Cristo Mts. To Sand Dunes

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Sheep Cr	Saguache Cr/ San Luis Valley irrigation/ Rio Grande	BO		R	SR		
Sierra Vandera	Los Pinos	N, W		G, WN	SR		
Snowslide Cyn Cr	Los Pinos	N, W		G, WN	SR		
Soap Cr	Gunnison	BO		Rh, WN	SR		
Sopris Cr, East Fk	Sopris Cr/ Roaring Fk	BO		R, Rh, WN	SR		
Sopris Cr, West Fk	Sopris Cr/ Roaring Fk	BO		R	SR		
St. Vrain Cr, Middle	St. Vrain Cr/ Platte, South	BO		B, R	SR		
St. Vrain Cr, North	St. Vrain Cr/ Platte, South	B2, BO, CP, CW, N, NCR, TU	Ν	B, E, F, G, P, WL, WN	SR	A	greenback cutthroat trout, cougar, elk, bighorn, golden eagles, big elevation drop from Longs Peak at 14, 215 to 6000', last roadless area on urban front range
St. Vrain Cr, South	St. Vrain Cr/ Platte, South	NC		В	SR		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
St. Vrain, South, North Fk	St. Vrain Cr, South	B4, N		F, WL, WN	SR		
Spring Cr	Uncompahgre	BO		R	SR		
Sweetwater	Colorado	BO	}	Rh, WN	SR		
Tarryall Cr	Platte, South	BO		R	SR		
Taylor	Gunnison	BO, N		F, R, Rr	SR		scenic, dam
Tempest Cr	Arkansas	B2		B, WN	GP		national grassland
Tomichi Cr	Gunnison	BO		R	SR		Hwy 50
Torcido Cr	Trinchera Cr	TU		E, F	SR		Rio Grande cutthroat trout
Trinchera Cr	Rio Grande	BO			GP		reservoir/ subdivision
Twin Peaks Cr	Saguache Cr, South Fk	TU		E, F	SR		Rio Grande cutthroat trout
Uncompahgre	Gunnison	BO		R	SR		
Ute Cr	Trinchera Cr	TU		E, F	SR		Rio Grande cutthroat trout
Vallecito Cr	Los Pinos	BO, WR-R		G, Rh, WN	SR		road-free for 20 mi/ reservoir at bottom
Wannamaker Cr	Saguache Cr, South Fk	TU		E, F	SR		Rio Grande cutthroat trout
West Elk Cr	Gunnison (resvr.)	N		WL, WN	SR		
Whale Cr	Saguache Cr, South Fk	TU		E, F	SR		Rio Grande cutthroat trout

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
White	Green (in UT)	BL, BO, FW, WRC	FW, WRC	E, F, L, P, Rr	NU	A	critical warm water fish habitat from Rio Blanco Dam down
White, North Fk	White	I, N	N	F, G, L+, R, Rr, WL	SR		
White, South Fk	White	F, I, N, WRC, WR- R	N, WRC	F, G, L+, P, R, Rh, WL, WN	SR	A	includes Spring Cave3d largest cave in CO/ underground waterways/ road-free for 22 mi
Williams Fk	Yampa	BO		L+, P	SR		
Williams Fk, East Fk	Williams Fk	BO		L+, P	SR		
Williams Fk, South Fk	Williams Fk	BO		L+	SR		
Willow Cr	Colorado	BO		R	SR		
Yampa	Green	B1, B4, BL, BO, CP, FW, N, NC, NCR, WR-R, Ws	FW, N, WR-R	B, E, F, G, L+, WL	SR, NU	A	critical warm water fish habitat from Craig down/ road-free for 46 mi
Yellow Jacket Cr	McElmo Cr/ San Juan	во		R	IS		

COLORADO'S "A" RIVERS

Elk River

With rare wildness for the southern Rockies, the Elk River flows for about 42 miles. It has no dams or major highways along it and has robust flows from deep winter snowpacks.

One of the largest Yampa tributaries, the Elk begins on the flanks of Mount Zirkel at 12,180 feet, the highest peak in north-central Colorado. In Routt National Forest, the Elk's North and South Forks each run for 12 miles (with trail access) from opposite sides of Zirkel and then join to form the main stem. Five miles below the confluence, the Elk leaves national forest and flows mostly through privately owned ranches with some excellent cottonwood groves for 25 miles to its mouth at the Yampa downstream from Steamboat Springs.

A tributary to the upper main stem of the Elk, Willow Creek hosts imperiled Colorado River cutthroat trout. The upper main stem is a popular trout fishing stream and a whitewater boating run in early summer. The Elk is one of seven Colorado rivers studied and recommended for the National Wild and Scenic Rivers system. As discussed later in the Yampa River section, the North Fork Elk and Elk combine with the Yampa, Green, and Colorado to make up the longest dam-free river mileage in the West—587 miles.

Hermosa Creek

Hermosa Creek is one of the longer streams in Colorado that is mostly roadless, and one of the longer entire streams in the state with no dams. Out of 144 surviving and restored populations of Colorado River cutthroat trout, Hermosa offers the longest contiguous length of stream (about 28 miles) and has the most adjoining tributaries (12) that currently provide habitat for this fish.

With headwaters in the San Juan Mountains, Hermosa Creek's upper watershed backs up against the Dolores basin, and flows due south for about 28 miles to join the Animas River north of Durango. The stream begins at Bolam Pass at an abandoned mine site, and its first 7 miles are paralleled by a 4-wheel-drive mining road to the mouth of the East Fork. Then Hermosa Creek drops in a rush of whitewater for 18 completely roadless miles, with only a trail along its banks. Then an unimproved road follows the river's final 3 miles (perched about 300 feet above the stream), and leads out of the valley to Highway 550.

Hermosa Creek has about the ninth-longest reach of stream in the state with no dams or roads and is probably the third-longest full stream with no dams. According to Trout Unlimited's analysis, it appears to be the longest reach of stream anywhere supporting the Colorado River cutthroat trout. And, with essentially all its tributaries also providing habitat, it is the only complete watershed system available to this imperiled native fish. Nearly all the basin is in public ownership in the San Juan National Forest, but private lands near the mouth, along with two separate parcels along the lower creek and at the mouth of the East Fork, are private and appear to be mining claims.

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 6 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.

Piney River

This beautiful mountain stream may be the longest entire river in Colorado with no dams and only nominal roads alongside. Colorado River cutthroat trout survive in its headwaters.

The river begins in the Eagles Nest Wilderness north of Vail and flows northwest for about 28 miles to the Colorado River. For its upper 5 miles, the river flows from the crest of the Gore Range through the wilderness area with only trail access. Downstream from the wildnerness boundary, it flows another 14 miles through the White River National Forest with a trail and nominal road access at one point, though there are several isolated private parcels along this reach. The next 7 miles run through private land, and the Piney's final 2 miles flow through BLM land to its confluence with the Colorado River at State Bridge.

Upper reaches offer good habitat for Colorado River cutthroat trout. The entire river is an undeveloped and mostly wild west-slope basin of the upper Colorado. While the Piney is likely the longest entirely dam-and nearly road-free river in the state, it is the sixth longest when individual reaches of larger rivers are included, ranking only behind two sections of the much larger Dolores, Yampa, Grape Creek (which has a dam at its headwaters), and Gunnison. In the 1970s a trans-mountain diversion was proposed to take the water from the Piney and divert it under the Continental Divide to Denver. The plan was halted owing to opposition by river conservationists and others. The small amount of private land along this remote stream may present an unusual opportunity to secure an outstanding stream that remains wild but not fully protected.

St. Vrain Creek, North

With an upper watershed that is undisturbed, North St. Vrain Creek supports greenback cutthroat trout, and its basin is known for a diverse array of native plants and wildlife.

The creek begins with several highcountry tributaries flowing off 13,000-foot peaks of the Front Range northeast of Boulder. The North Fork flows for about 8 miles with some trail access for 3 miles with a road alongside. Then 12 miles are road-free again to Button Rock Reservoir. Below there, the creek joins with Middle and South St. Vrain Creeks, but the stream is heavily diverted as it enters the Great Plans and flows across the rapidly urbanizing outskirts of the Denver metropolitan area before joining with the South Platte northeast of Longmont.

A designated wild trout stream, North St. Vrain Creek is one of few waterways that support greenback cutthroat trout. Its pristine upper basin has old-growth ponderosa pine forests, bighorn sheep, winter concentration areas for elk, golden eagle nesting sites, and habitat for mountain lions and black bears. The basin is home to rare aquatic insects, imperiled plant communities of foothills grasses and shrubs that have been degraded in most places elsewhere, and a sizeable population of the rare plant Larimer aletes.

Boulder County has purchased land or easements to a number of critical ranches and tracts along North and South St. Vrain Creeks, and some of the upper basin area was designated as a Research Natural Area by the Arapaho and Roosevelt National Forest.

Though this stream is small and its intact reach is short, it appears to be the best remaining section of natural stream in the heavily developed Front Range region north of Denver.

White River and South Fork White

With wild mountain headwaters, many miles of fine cottonwood corridor through an extremely harsh desert, long stretches of roadless and rarely visited riverfront, and prime habitat for imperiled warm-water fishes of the Colorado basin, the White River is one of Colorado's most varied and valuable semi-natural rivers.

Including its South Fork headwaters, the White flows for 225 miles from the Flat Tops Wilderness to the Green River in Utah. The South Fork gathers headwaters atop the aspen-clad Flat Tops massif and flows for 8 miles with no roads or trails through wilderness. It flows another 15 miles followed by a trail through the Routt National Forest and fronted by a few small private mining claims. The spectacular mountain stream then plunges through a 2,000-foot-deep canyon incised into the massive White River Plateau. This upper reach ranks eighth in length statewide for road-and dam-free reaches of river. The South Fork's final 13 miles are paralleled by a dirt road through a narrow corridor of private land surrounded by national forest.

The North Fork is similar, but shorter and road accessible. It flows off the north side of the Flat Tops for 5 miles (with a trail) down to Trappers Lake, and then heads west and runs for 23 miles, paralleled by a road with several recreation sites, down to the South Fork confluence.

The main stem runs for about 21 miles through a roaded valley of mostly private land, with diversions for pasture, to the town of Meeker. From Meeker to Rangly the river meanders for about 85 miles through quiet water and pastureland, with several low weirs for diversions and a small reservoir located just off-stream at Rio Blanco Lake, above the mouth of Piceance Creek. Just upstream from Rangely, the White hits the backwater of Taylor Draw Dam, built only recently in the mid-1990s for hydroelectric power.

From Rangely to the Green River, the White flows another 83 miles (60 of them in Utah) through a stark sagebrush desert. A lush but thin band of cottonwoods and willows line much of the riverfront in this reach, though exotic tamarisk has taken over many floodplains, as it has on most desert rivers throughout the Southwest and in the Green River system. Occasional dirt roads meet or cross the river, but no major roads come near and none parallel the river's wild course in this section. Sagebrush hills give way to sandstone and shale cliffs and bluffs as the river carves into the spare canyon terrain of the Colorado Plateau before joining the Green River at a remote confluence.

From its mouth at the Green River to Taylor Draw Dam at Rangely, the White offers habitat for the endangered Colorado River pikeminnow, humpback chub, bonytail chub, and razorback sucker. In its upper basin, the White's North and South Forks both have multiple small tributaries that support the rare Colorado River cutthroat trout. With the exception of Taylor Draw Dam, the White River system offers the most length and the best quality of connectivity between aquatic habitats in wild Rocky Mountain headwaters and the desert canyons of the Green and Colorado Rivers systems.

The stresses on the White River are, however, severe. Riprap and diversions for pasture affect upper reaches of the main stem, and energy development including oil and gas drilling and oil shale exploration are common throughout the lower basin. In the heart of the oil-shale zone of western Colorado and eastern Utah, the riverfront has natural oil seeps that leak out of the ground along the waterfront. Massive amounts of oil and gas drilling have occurred, and extraction is likely to intensify here in the future.

The BLM owns about 40 miles of the riverfront in the eastern portion of Utah, and some of this frontage includes thin parcels of private land. The lower 20 miles of the river flow through the Uintah and Ouray Indian Reservation.

Protection and restoration possibilities might be considered here for the thin strip of private land along the lower South Fork, the BLM land in eastern Utah, and other private land throughout the main stem's length.

Yampa River

The least-dammed of the major Colorado River tributaries, the Yampaflows for 170 miles from the Flat Tops Wilderness to the Colorado

in Dinosaur National Monument, coursing through magnificent redrock canyons and some of the West's finest cottonwood-box elder forests. This is one of the most important of all streams for endangered warm-water fishes in the Colorado River basin.

From headwaters in the Flat Tops Wilderness, the river flows east and then northwest through private ranchland to the town of Steamboat Springs, where it offers a popular paddling reach. For 73 miles from there westward to the town of Maybell, the Yampa nourishes one of the finest riparian corridors in the West--a nearly continuous riverfront band of narrowleaf and Fremont cottonwoods mixed with box elder, red osier dogwood, and willows offering prime habitat for a plethora of songbird species, beavers, elk, and other wildlife. Most of this is privately owned ranchland. The Nature Conservancy has a major preserve along the river downstream from Steamboat and a field office dedicated to the Yampa River. Only about 7 percent of the river's plentiful runoff is diverted by ranchers and other users along its route—rare for a major western river flowing through drylands.

Below Maybell, the Yampa enters canyon country of the Colorado Plateau. First, at Cross Mountain Canyon, the river pounds through heavy whitewater in a narrow, vertical-walled gorge. Then below Deerlodge Park the river enters one of the West's classic river-routes, rushing through sinuous canyons with thousand-foot sandstone walls, lush cottonwood groves at the mouths of tributaries, and wildness beyond the reach of roads. For 46 miles the river flows within Dinosaur National Monument—one of the longer reaches of a river protected within the national park system. This is the state's longest reach of river lacking dams or roads.

All four species of imperiled Colorado basin warm water fish are still present here: the Colorado pike minnow, which can reach 6-foot lengths and 80 pounds, the humpback chub, bonytail chub, and razorback sucker. These fish need many miles of free-flowing river; some migrate hundreds of miles from the White River up the Green River and then into the Yampa to spawn. In the upper basin, small tributaries of Elkhead and Fortification Creeks—flowing in from the north--offer a significant assemblage of high-quality habitat for Colorado River cutthroat trout.

Waters flowing from tributaries of the Yampa--and then in the subsequent, continuous path down the Yampa, Green, and Colorado to the backwaters behind Glen Canyon Dam-- constitute the longest completely free-flowing river mileage in the West. Leading this list of tributary configurations, Trail Creek flows into the North Fork Elk, then the Elk, Yampa, Green, and Colorado for a continuous damfree length of 587 miles, exceeding even the Salmon of Idaho. The combined Silver City Creek, Middle Fork Little Snake, Little Snake, Yampa, Green, and Colorado flow for 554 miles, though low diversion dams are present on the Little Snake. A combination that begins with the mainstem Yampa (below Stagecoach Dam), through the Green and Colorado offers 547 miles of excellent boatable mileage without impoundment (though the whitewater of Cross Mountain Canyon is for experts only). This is the longest continuously boatable river mileage in America outside Alaska, with the exception of the lower Mississippi (entirely bordered by levees) and several rivers of the Great Plains (usually too low for floating, and with many small diversion dams). Almost equal to the main-stem Yampa route, the combination of Bunker Creek, East Fork Williams Fork (of the Yampa), Williams Fork, Yampa, Green, and Colorado flows for 541 miles. The Green and Colorado River portions of these dam-free corridors are covered in the Utah section of this report.

COLORADO'S "B" RIVERS

Cache la Poudre with its North and South Forks

With two reaches of restored greenback cutthroat trout habitat, wild sections beyond the reach of roads, and undammed mileage except for two small reservoirs on the North Fork, the Cache la Poudre flows from the Front Range to the plains in northern Colorado.

The main stem runs for about 21 roadless miles from wild, trail-accessible headwaters in Rocky Mountain National Park and the Comanche Peak Wilderness, and then for 62 more miles with Highway 14 paralleling the river to the eastern base of the Front Range. (Many more heavily diverted, dammed, and developed

miles continue through the Great Plains to the South Platte River, for a total river length of 126 miles).

The South Fork flows for about 32 mostly-road-free miles in the national park, the Cache la Poudre Wilderness, and Roosevelt National Forest. The North Fork flows for about 70 miles, first with no roads alongside, then with road access, two significant reservoirs and diversions, and with one reach that is important to greenback cutthroat trout.

The main stem "Poudre" (pronounced POO-der) rushes through steep-walled granite canyons 1,000 feet deep and narrow valleys, and then flows into a broader, U-shaped, glacial valley with slower water and a more rolling landscape. Wildlife in the corridor include elk, bighorn sheep, and mountain lions.

The river's flow is augmented by trans-basin diversions from the west- to east-side of the Rockies, and later by diversions from the river, and has roads throughout much of its length, and so the Poudre is far from natural. But without dams and major developments in its mountain reaches, it is less developed than other sizable streams on the eastern front of the Rockies. The South Fork is one of only two streams—and by far the largest—where the greenback cutthroat trout survived near-extinction. These fish have been reintroduced into the main stem and the North Fork. The main stem is popular among anglers, and it is also considered one of the state's whitewater highlights for advanced paddlers.

Green River

For about 42 miles the Green River arcs through the far northwestern corner of Colorado after it flows out of Flaming Gorge Dam in Utah. In Colorado, it flows through Browns Park National Wildlife Refuge and then through the stunning Lodore Canyon in Dinosaur National Monument. The Green then flows back into Utah, where it runs for most of its epic length to the confluence with the Colorado River in Canyonlands National Park. See the Utah section of this report for coverage of this entire reach.

Gunnison River

Though severely dammed in its upper reaches, the Gunnison is the largest tributary to the Colorado River above the Green and the second-largest river in Colorado. Below the dams, it carves one of the most exceptional canyons in the West at Black Canyon of the Gunnison National Monument. Immediately below there, it flows through a stellar section for whitewater paddlers and anglers of introduced trout, and then continues to run for many dam-free miles through undeveloped drylands in a reach that provides important habitat to imperiled warm-water fish of the Colorado basin.

The 159-mile-long river begins at the confluence of the East and Taylor Rivers. The 38-mile-long East drops from high mountains around Crested Butte and flows south through an excellent cottonwood corridor with high-elevation wetlands and meadows. East of the East River, the Taylor drops for about 18 miles to Taylor Park reservoir and then flows in a remarkably beautiful granite canyon with a popular and boulder-studded whitewater run. Below the confluence, the main stem Gunnison flows through a broad valley for about 15 miles to the town of Gunnison.

Downstream from town, the river meets the slackwater of the first in a chain of three enormous back-to-back reservoirs—Blue Mesa, Morrow Point, and Crystal--built as the Bureau of Reclamation's sprawling Gunnison River Project. The dams impound the main stem Gunnison for 45 miles, including the upper 40 miles of the famous Black Canyon (only 11 miles are left undammed). They also divert 300,000 acre feet of water a year westward to the Uncompander Valley for farming, leaving the Gunnison's flows depleted.

For the first 11 miles below Crystal Reservoir Dam, the river churns in a narrow gorge through Black Canyon of the Gunnison National Monument. In its combined deepness and narrowness, this canyon might be the ultimate in the West--reaching a depth of 2,800 feet with a width at the bottom of only 40 feet in some places. Gradient reaches 240 feet per mile, making this one of the most extreme whitewater runs anywhere. Below the Monument, the canyon continues in a less-dramatic but still remote and beautiful 16-mile-long reach that can be accessed only by trail. Hearty boaters (who must pack boats in) and anglers are drawn to excellent rapids, scenery, and fishing for introduced rainbow trout in this section, which is in BLM jurisdiction. From there, the Gunnison flows gently for about 50 miles through irrigated farmland and publicly owned drylands--gathering tributaries (North Fork and Uncompahgre) that replenish some of its flows. The river encounters the Redlands Diversion Dam and its fish-passage facility just a few miles upstream from the confluence with the Colorado River in Grand Junction.

In its long lower section, which includes Dominguez Canyon, the Gunnison sweeps past rocky bluffs, desert slopes, and riparian thickets of cottonwoods as it winds at the edge of the Colorado Plateau. This reach is one of few places where the four species of Colorado basin warm-water fish still survive, and the corridor has been designated as critical habitat by the U.S. Fish and Wildlife Service. This section is also one of few in the southern Rockies available for an extended trip of mostly gentle-water canoeing.

Though heavily dammed, depleted of flows, and ecologically altered, the Gunnison is still a remarkable river with a unique canyon, a long length of free-flowing water, a fine riparian zone, and habitat for endangered warm-water fish in its lower reaches.

North Platte River

See the Wyoming section of this report for this river that begins in Colorado but flows north into Wyoming (page 208).

COLORADO'S "C" RIVERS

Animas River

This largest tributary to the San Juan River flows through an extraordinary canyon that is 5,000 feet deep—nearly as deep as the Grand Canyon of the Colorado. Peaks rise up to 14,000 feet above sea level. Thus, it is one of the deepest, high-elevation canyons on the continent. Lower reaches include excellent cottonwood corridors and one the best riparian zones in New Mexico.

Among the highest-elevation major rivers in the Rockies, the Animas begins at 9,230 feet at the confluence of the West and North Forks and flows through one of the Colorado's most intensively mined regions near Silverton. Below there the river enters its truly awesome canyon with frothing Class V rapids and wild scenes of incomparably rugged terrain. No road passes through the canyon but a narrow-gauge railroad remaining from the mining boom now carries tourists from Durango to Silverton. Near the lower end of this canyon, the river roars through an impassable, unrunnable cleft riddled with boulders and logs. Emerging from the canyon, the river glides through a gentle 10-mile section above Durango and then flows through a moderate whitewater reach, followed by a 24-mile-long extended cottonwood corridor in the Southern Ute Reservation, eventually reaching the New Mexico border. After about 45 more miles, the Animas meets the San Juan in the city of Farmington, where a low diversion dam span the river. With a total length of about 110 miles, this is the longest, nearly undammed river in Colorado.

From its headwaters to the mouth of its canyon, the Animas flows through San Juan National Forest lands. The frontage upstream from Durango is mostly in private ownership. In Colorado, much of the lower river's cottonwood corridor lies in the Southern Ute Indian Reservation. The cottonwoods continue into New Mexico, where the river lies mostly in private ownership.

The wild canyon and the lower cottonwood corridor are both exceptional natural features of this river. The canyon reportedly has some wild cutthroat trout, and the lower river has native flannelmouth suckers and bluehead suckers.

In terms of recreation, the canyon offers one of the ultimate wildland whitewater experiences for expert kayakers, and the Durango reach offers some of the most accessible and heavily-used urban whitewater in the West; a popular racing course has been established in the town.

The problems of the Animas are, however, formidable. Headwaters flow from an area intensively mined before there were any regulations regarding runoff. Zinc, copper, and other pollutants degrade the water, with impacts on invertebrate life and fish in the river's upper reaches. Water quality begins to recover in the canyon. Near Durango, one of the last heavily subsidized, uneconomic, environmentally damaging, controversial water projects of the federal Bureau of Reclamation is currently being built after thirty years of debate. It will siphon water from the Animas and transfer it to the La Plata basin to the west, in the process, depleting important flows for the downstream riparian corridor. The lower Animas in New Mexico faces increasing development pressure and has a low, private hydroelectric dam and a pumping station operated by the city of Farmington that halts the upstream migration of native flannelmouth and bluehead suckers. Finally, the lower river is thoroughly infested with the exotic Russian olive tree, which has displaced native cottonwoods and willows.

In spite of all these problems, the river remains a valuable stream for its upper canyon, its recreational reach through Durango, and its lower-river cottonwood corridor—still one of the finest in the Southwest, though its fate is uncertain owing to the Animas-La Plata water project.

Arkansas River

The upper end of this major Mississippi tributary flows with only minor low dams through the southern Rockies for 150 miles and offers some of the most popular rafting and kayaking reaches in the West.

The Arkansas gathers its headwaters from a ring of high wilderness peaks in the Sawatch and Mosquito Ranges in the heavily mined Leadville area. The river flows south along the base of Colorado's largest peaks— including the state's highest summit, 14,422-foot Mount Elbert--and gathers more mountain tributaries. Near Salida, the Sangre de Cristo Mountains deflect the river to the east, where it cuts through the narrow and awesome chasm of Royal Gorge, 1,200 feet deep. After emerging from the gorge at Canon City, the river is heavily dammed, diverted, and entirely dried up in places as it flows across the Great Plains of southern Colorado. Additional tributaries enter, and the river ultimately runs a total of 1,460 miles, accumulating big flows in its eastern reaches before joining the lower Mississippi with a plentiful 40,290 cfs.

While the river has a sport fishery and long corridors of cottonwoods, its principal value is recreational. The Arkansas is one the three most popular paddling rivers in the West, attracting 200,000 boaters a year (the other two are the Snake near Jackson and the South Fork American near Sacramento). The river offers many outstanding reaches of whitewater, including the class III-IV Browns Canyon between Buena Vista and Salida, and the class V Royal Gorge.

The river's corridor is mostly in public ownership but also includes many private tracts and several towns; four small diversion dams create minor obstructions. The upper river receives augmented flows via trans-basin diversions from the Fryingpan and Eagle Rivers, for withdrawal downstream by cities and irrigators.

However, the upper reaches are polluted by abandoned hardrock mines with zinc, lead, cadmium, and other toxins emanating from Superfund waste sites. At California Gulch, near Leadville, aquatic insects cannot live and the streambed is orange with mining waste. Other tributaries, including Cripple Creek, are contaminated as well. The pollution becomes quickly diluted, but is still detected at Salida, 70 miles downstream. Trout productivity is relatively unaffected, though fish lifespans are reduced, and many live no more than three years.

While several reaches of the Arkansas-- such as Browns Canyon--are isolated from roads, much of the river's corridor is shared with highways, small roads, and railroads. A railroad even passes through the narrow depths of Royal Gorge.

Big Blue Creek

This little-known stream may be the second-longest in Colorado without dams and with only nominal road encroachment (Piney River appears to be the longest).

Big Blue flows from the north face of Uncompany Peak; at 14,309 feet, it is among the highest mountains in the United States. The creek runs 12 miles through the Big Blue Wilderness, with a trail along its highcountry route. An unimproved road reaches the stream at only one point, and then the creek flows another 10 miles through the Uncompany National Forest and BLM land, with a few private inholdings. An additional 5 miles through private land lead to Highway 50, and a final 4 miles of national forest and national recreation area to terminate in Morrow Point Reservoir. For 25 miles—most of its length—the stream has no roads along its shores.

The wild creek is a rare, essentially road-free, undammed river flowing from some of the highest country in the Rockies to a relatively low elevation of 7,200 feet.

Colorado River

Owing to a dam and to massive headwater diversions that take water out of the basin, and also to roads or railroads along nearly all its length, the Colorado is not considered one of the state's premier waterways in this study, except for the reach downstream from Grand Junction. Here the river flows through Ruby-Horsethief Canyon and provides habitat for endangered warm-water fish. Because this reach flows into Utah, where the river continues to be an exceptional stream, the Colorado River is covered in the Utah section of this report.

Dolores River

With a length of 250 miles, the Dolores is the Colorado River's longest (but not largest) tributary in the state, and it flows through two of the three longest dam-free and relatively road-free reaches of stream. About 187 miles of unimpounded (but heavily diverted) river run from McPhee Dam to the Colorado confluence. The Dolores' red-rock canyon from Slick Rock to Bedrock is among the most beautiful of America's wild desert canyons.

The river begins at Bolam Pass at the height of the San Juan Mountains south of Telluride. It flows for 6 miles with only trail access and then is paralleled by Highway 145 through the abandoned mining district of Rico and west for about 38 miles to the confluence with the West Fork—itself a fine, 32-mile-long river with an unimproved road along its entire length.

After another 15 miles, the main stem hits the backwater of McPhee Reservior. Built only in 1984, after great controversy, this is the only dam on the entire river. Water is diverted out of the Dolores basin to the south, and, downriver flows are severely diminished from their historic levels, and at times, very little water is left for instream flow.

Below McPhee Dam, the Dolores flows 12-miles with Highway 504 alongside, and then drops into its first great wilderness canyon. For 48 miles, to Slick Rock, the river winds through a narrow valley with groves of stately ponderosa pines, lush riparian willows, and whitewater rapids including the infamous Snaggle Tooth. One unimproved road meets the river within this reach.

From Slick Rock to Bedrock, the Dolores enters the Colorado Plateau and flows for another 45 miles with few roads except for a bridge crossing and a small amount of road frontage where the river cuts across of the agricultural Big Gypsum Valley. The wild and winding desert canyon that follows this valley has vertical sandstone walls, overhanging cliffs, ancient juniper trees, and moderate whitewater. This reach remains one of the classic desert canyon float trips in the West when adequate water is released from the Bureau of Reclamation dam upstream.

Below Bedrock, the Dolores picks up the San Miguel River's substantial volume and flows for 44 miles to Gateway through ranchland and canyons with Highway 141 alongside. The Dolores enters Utah 9 miles downstream from Gateway and flows another 23 miles to its mouth at the Colorado River, mostly through the wild, remote, narrow Gateway Canyon, with challenging rapids at State Line.

The Dolores does not support the humpback chub and other imperiled warm-water fish of the Colorado basin, but it is an important stream for the bluehead sucker, flannelmouth sucker, and roundtail chub, which are other species of special concern owing to their increasing scarcity and to the destruction of their habitat. The wilderness and remoteness of the Dolores' sandstone canyons are exceptional. If adequate releases were made from McPhee Dam, this would once again be one of the truly great desert rivers of Colorado and the Southwest.

Purgatoire River

All rivers of the Great Plains in Colorado are seriously degraded by diversions, grazing, riparian forest elimination, and the introduction of exotic species. The Purgatoire is the least affected of the major streams and, while far from pristine, is included here as the best representative of the Great Plains ecoregion of Colorado.

Collecting nearly all its flow from the east face of the Sangre de Cristo Mountains in southern Colorado, the South, Middle, and North Forks of the Purgatoire, plus other tributaries come together to form the main stem, which runs about 22 miles across Park Plateau to a reservoir just west of the city of Trinidad. Below Trinidad, the river flows about 25 miles across rolling terrain and then enters Purgatoire Canyon and winds northeast through this unusual cleft in the plains for about 70 miles.

Much of Pugatoire Canyon is now national forest, resulting from a land exchange with the Pinon Canyon Military Reservation. Lower reaches of the canyon are privately owned. Beyond the canyon, the lower 65 miles wind through rolling, road-accessible ranchland, with gravel pits and diversions, until the river finally reaches the Arkansas at John Martin Reservoir in the southeast corner of the state.

Exotic tamarisk has invaded much of the floodplain, and introduced brown trout ply upper reaches, but this Great Plains river also hosts a unique array of native fish including longnose dace, white suckers, and others--11 native species in all. Native mud turtles and snapping turtles are also present. Bighorn sheep and elk graze on the hillsides, and long-billed curlews and burrowing owls survive here, though they are in declining populations generally. Small side canyons form interesting and beautiful alcoves within the prairie. Colorado State University biologists say that the Purgatoire is one of few comparatively undisturbed streams in the region. The Forest Service is attempting to manage its portion of canyon to protect native species. Much of the private land is held in a few very large ranches. The Colorado Nature Conservancy regards the Purgatoire River as one of the most intact rivers on the plains, and the organization has several on-going projects in the area.

San Miguel River

One of the longest essentially undammed rivers in Colorado, the 90-mile-long San Miguel flows into the lower Dolores and then the Colorado to create a continuous free-flowing reach of about 275 miles. Fine cottonwood groves line much of the river. The San Miguel and the Yampa are the most-natural of the major streams flowing from western Colorado.

The San Miguel begins with the high mountain waters of Bridal Veil Creek as it plunges hundreds of feet down from headwalls of the San Juan Mountain crest into the narrow alpine valley of Telluride--an old mining town that's boomed into an upscale ski resort. Abandoned mines scattered around the river's headwaters remain a legacy of the town's history. Downstream from the heavily developing town, the San Miguel drops precipitously 400 feet in half a mile over a terminal glacial moraine. Below there, it picks up substantial flows from its South Fork and then rushes rapidly northwest, paralleled by Highway 145 for 25 miles to the Norwood Bridge. From there, the river runs for another 29 miles--including a 14-mile reach of roadless wild canyon--to the small town of Naturita. After passing two diversion dams and a powerplant, the San Miguel flows for its final 22 miles to the Dolores River, paralleled by Highway 141 the whole way.

The Colorado Nature Conservancy, which has three preserves along the river, regards the San Miguel's riparian habitat as some of the very best in the upper Colorado Basin. The group's South Fork preserve features a globally rare plant community of narrowleaf cottonwood, Colorado blue spruce, and black twinberry.

Both the main stem and the South Fork offer fine whitewater paddling in early summer.

Though the river has development, abandoned mines, roads paralleling much of its length, and two diversion dams, it is the only major Colorado tributary in the state with no major storage reservoir.

CONCLUSION

Owing to the lack of large wilderness networks, a plethora of roads and railroads, a surfeit of dams and diversions, mining damage from the past, and a pervasive pattern of most mountain streams quickly reaching developed or ranchland valleys, Colorado has fewer outstanding natural rivers than other states to the north and on the West Coast. Yet it does have some excellent streams, an abundance of small, wild creeks of good quality, and many rivers where recreation is important.

Using 17 lists of rivers compiled by other organizations and agencies, plus several interviews with biologists and experts familiar with Colorado's rivers, we have assembled a table of 155 rivers and streams identified as having notable natural values. From that group we selected an "A" list of 8 rivers, a "B" list of 6 rivers, and a "C" list of 7 rivers.

Through this survey, several groupings of fine natural rivers became evident.

Yampa, Elk, and Little Snake

The Yampa with its Elk and Little Snake tributaries boast the least developed and least degraded long reaches of river in Colorado. Nearly dam-free, these streams have escaped many of the problems of past mining that are so prevalent elsewhere in the state. Geographically, the Elk and Yampa also lie mostly beyond the threats of new energy development.

At least some native fish survive here: Colorado cutthroat trout populate the upper Elk and upper Little Snake basins, and the endangered warm-water fishes of the Colorado basin do their best in the lower Yampa and appear at least occasionally in the Little Snake. The cottonwood riparian corridors along these rivers are among the best in the state, and in the West.

Large expanses of public open space along the rivers and throughout their watersheds have protected some natural values. Large amounts of private land are found here as well.

White River system

The main stem White, with its North and South Forks, is one of the least developed basins in the state and in the southern Rocky Mountain/drylands region. Headwaters flow from superb wild country, and only one small dam blocks the flow of the main stem. Excellent riparian corridors are found along most of the length of the river. Much of the river frontage is publicly owned by the Forest Service and BLM, though much of it is also in private ownership, as well.

Oil and gas drilling is prevalent in the middle and lower river basin and may expand, but it need not preclude the protection of an extended and semi-continuous riverfront corridor. Indeed, river corridor protection might well be regarded as reasonable mitigation for unavoidable damage resulting from energy development on public land in the basin.

This is one of few large river systems in the southern Rockies and drylands that is still relatively intact, and where critical areas could still be protected and other important natural features restored.

Cache la Poudre and its forks

Flowing on the east side of the Rockies at the northern end of the Front Range, the Cache la Poudre and its South Fork are currently the only rivers in the state protected in the National Wild and Scenic Rivers system. They and the North Fork have important surviving populations of the rare greenback cutthroat trout. All three streams flow steeply off the face of the Rockies and are hotspots of recreation activity, within easy reach of Denver and its nearby Front Range cities.

Most of the basins are publicly owned, but substantial tracts of private land are also located along the streams, especially along the North Fork. As sizeable streams largely without dams, past mining waste, and major diversions, this set appears to be the best cluster of rivers flowing from the Front Range.



Gunnison of the Black Canyon

Rivers of Utah

entered 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 highcountry 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 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 seldomvisited 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 Mountans 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 spare 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 downstream. 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.



Green River





Great Rivers of Utah

Sources for the Utah Survey

In addition to the major sources described at the outset of this report, the Utah survey incorporated these state-specific sources:

Interviews with biologists and local experts (B#).

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

Utah Nature Conservancy, high priority for conserving natural diversity (NC). 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).

Utah Division of Wildlife Resources, outstanding trout fishery waters (UW). 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).

Utah Rivers Council, Wild and Scenic recommendation, tier 1 (UR-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.

Utah Rivers Council, Wild and Scenic recommendation, tier 2 (UR-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.

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

Utah Sierra Club, significant rivers inventory (SC). 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).

Western Rivers Conservancy, essentially roadless and damfree reaches (WR-R). These are nearly roadless reaches of 15 miles or more, as identified on DeLorme atlas of Utah.

Key to the Utah River Tables

SOURCE OF RECOMMENDATION

B#- interviews with biologists and local experts

B1- Joel Tuhy, Utah Nature Conservancy

- B2- Merritt Frey, Director, Utah Rivers Council (URC)
- B3- Krissy Wilson, fisheries biologist, Utah Division of Wildlife
- B4- Zack Frankel, former director, URC

BL-Bureau of Land Management (BLM), recommended prior to 1991

BO- Bureau of Outdoor Recreation

F-U.S. Forest Service

I- USDI/ USDA Wild and Scenic List, 1965

N-Nationwide Rivers Inventory

NC- Utah Nature Conservancy (1988) high priority for natural diversity streams

UR-1- Utah Rivers Council, Wild and Scenic recommendation, tier 1

UR-2- Utah Rivers Council, Wild and Scenic recommendation, tier 2

UR- Utah Rivers Council, other recommended rivers

UW- Utah Division of Wildlife Resources, outstanding trout fishery waters

SC- Utah Sierra Club, significant rivers inventory

W- National Wild and Scenic Rivers

Ws-National Wild and Scenic Study Rivers

WRC-Western Rivers Conservancy

WR-R- essentially roadless and dam free reaches ≥15 miles

QUALITIES

B-Biological Diversity

C- Cold water/ high elevation

E- Endangered or imperiled species

F- Fish

G-Geological/geographical

L- Long free-flowing reach >100 miles

L+- Long free-flowing reach, combined with streams it flows into

P-Plant life/ riparian values

Rf-Recreational fishing

Rh-Recreational hiking

Rr- Recreational river running

WL-Wildlife

WN-Wildness

ECOREGIONS

CP- Colorado Plateau (313)

ID- Intermountain Semi-Desert and Desert (341)

NU- Nevada-Utah Semi-Desert (342)

SR- Southern Rocky Mountains (M331)



RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
American Fork Cr	Utah Lake/ Jordan	N		R, WN	SR		
American Fork Cr, South Fk	American Fork Cr	UR-1	UR-1	E, F	SR		Bonneville cutthroat trout
Argyle Cr	Nine Mile Cr	N		R	SR		
Ash Cr	Virgin	В3		E, F	ID		Virgin spinedace, other native fishes
Ash Cr, South	Ash Cr	UR-1	UR-1		ID		
Ashley Cr	Green	B4, BO, WR-R		R	NU	В	26 mi WR-R with Ashley, South Fk
Ashley Cr, South Fk	Ashley Cr	B4, BO, WR-R, UR- 2			SR		
Ashley Gorge Cr	Ashley Cr	UR-2			SR		
Bear	Great Salt Lake	BO, UW		F	SR, ID		
Bear, East Fk	Bear	B2		WN, WL	SR		
Bear, Hayden Fk	Bear	UR		R	SR		
Bear, Stillwater Fk	Bear	B2, UR-2		WN, WL	SR		
Beaver	Beaver sink (Sevier)	BO		R	ID		
Beaver Dam Wash	Virgin (in AZ)	В3		E, F	ID		Virgin spinedace, other native fishes
Beaver Cr	Ogden, South Fk	BO		R	SR		road

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Big Cottonwood Cr	Jordan	UR		R	SR		
Birch Cr	Snake Valley sink	B3, N		E, F, G, R	NU		Bonneville cutthroat trout re-introduced
Blacks Fork	Green (in WY)	BO, UR		R	SR		
Blacks Fork, East Fk	Blacks Fk	UR		R	SR		Colorado River cutthroat trout
Blacks Fork, Little West Fk	Blacks Fk	UR		E, F	SR		Colorado River cutthroat trout
Blacks Fork, Middle Fk	Blacks Fk	UR		R	SR		
Blacks Fork, West Fk	Blacks Fk	UR, UW		E, F	SR		Colorado River cutthroat trout
Blacksmith Fork	Little Bear	B1, BO, F, NC, SC, UW		F	SR	С	
Blacksmith Fork, Left Hand Fk	Blacksmith Fk	F, UR, UW		F	SR	С	
Boulder Cr	Escalante	B4		E, F, WL	NU	В	
Bowns Cyn Cr	Glen Canyon NRA	N		B, G	СР		intermittent, northern leopard frog

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Camp Cr	Kanarra Cr/ Ash Cr/ Virgin	N		Rh, WN	СР		Zion N.P.
Castle Cr	Glen Canyon NRA	Ν		E, G, P, WL	СР		small/ habitat for rare astagalus
Chalk Cr	Weber	B3, B4		E, F	SR	С	Bonneville cutthroat trt, other native fishes
Chalk Cr, South Fk	Chalk Cr	В3		E, F	SR		Bonneville cutthroat trout
Chalk Cr, Mill Fk	Chalk Cr	B3		E, F	SR		Bonneville cutthroat trout
Clearwater Cyn Cr	Glen Canyon NRA	Ν		G, R, WL			small
Coalpits Wash	Virgin	Ν		G, Rh, WN	NU		intermittent/ petrified forest/ Zion N.P.
Colorado	Gulf of CA (in Mexico)	B1, BL, I, N, NC, SC, WR-R, Ws	N	E, F, G, P, Rh, Rr, WL, WN	CP, ID	A	67 mi WR-R below Moab
Cottonwood Cr	San Rafael	SC, UW	{		ID		
Cottonwood Cr	Weber	WRC		WN	SR		
Courthouse Wash	Colorado	Ν		G, F, P, Rh, WL, WN	СР		small, intermittent/ in Arches N.P.
Cow Cyn	Glen Canyon NRA	N		G, Rh, WL	СР		small/ potential spotted owl habitat

			special			and lan a	additional
RIVER	tributary to	source	review	qualities	ecoregion	rating	comments
Coyote Cr	Escalante	N		G, Rh, WL	СР		probable spotted owl habitat
Crystal Cr	Virgin, North Fk	WRC, WR-R		WN	NU	А	18 mi WR-R w/ Virgin, North Fk
Cub Cr	Bear	BO		R	SR		
Currant Cr	Red Cr/ Strawberry	B3, UW		E, F	SR		bluehead, flannelmouth, speckled dace
Dark Cyn Cr	Glen Canyon NRA	N		E, G, Rh, WL, WN	СР		small/ peregrine habitat
Davis Cr	Glen Canyon NRA	N		G, Rh, WL	СР		small
Deep Cr	Virgin, North Fk	N, UR-1, WR-R	N	F, G, Rh, WL, WN	NU	A	potential habitat for woundfin/ Virgin R. spinedace, VR chub/ 18 mi WR- R w/ Virgin, North Fk
Diamond Fk	Spanish Fk/ Utah Lk	В3		E, F	SR		Bonneville cutthroat trout, leatherside chub
Dirty Devil	Colorado	B1, B2, BO, N, SC, WR-R		E, F, G, WL, WN	СР	С	razorback sucker/peregrin e/ 14 mi WR-R
Dolores	Colorado	BO, N, SC, UW, Ws		WN	NU	С	

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Duchesne	Green	BO, UW	}	F	ID		
Duchesne, North Fk	Duchesne	UR		R	SR		
East Canyon Cr	Weber	UW	}	F	SR		
Escalante	Colorado	B2, B4, BL, N, NC, SC, WR-R	N	E, F, G, Rh, Rr, WL, WN	СР	В	potential spotted owl and known cougar habitat, Colorado River cutthroat trt/ 70 mi WR-R below Escalante
Explorer Cyn Cr	Glen Canyon NRA	N		E, G, R, WL	СР		peregrine habitat
Fence Cyn Cr	Glen Canyon NRA	N		E, G, R, WL	СР		probable spotted owl habitat
Fence Cr	Glen Canyon NRA	N		G, R, WL	СР		probable habitat of spotted owl
Fiftymile Cr	Glen Canyon NRA	N		G, R, WL	СР		probable spotted owl habitat
Fish Cr	Scofield resvr/ Price	B2, UR-2, UW		F, WL	NU		
Fortymile Cr	Glen Canyon NRA	N		G, R, WL	СР		probable spotted owl habitat

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Fremont	Dirty Devil	B1, B4, BO, N, NC, SC		E, G, P, Rh, WN	NU		4 endangered plants/ Capitol Reef N.P beautiful stream east from Hwy 12
Gooseberry Cr	Fish Cr	B2, UR-2		WL	NU		willow flycatcher, 54 bird species
Granite Cr	Snake Valley sink	В3		E, F	NU		Bonneville cutthroat trout
Green	Colorado	B1, B3, B4, BL, BO, I, N, NC, SC, UR-1, UW, WR-R	N, UR- 1	E, F, G, P, Rh Rr, WL, WN	NU	A	humpback chub, pikeminnow, native suckers/ 4 roadless reaches (156 mi, 107 mi, 45 mi, 20 mi)
Halls Cr	Glen Cyn NRA	N		G, Rh, WL, WN	СР		flows from sping in Capitol Reef N.P.
Harris Wash	Escalante	N		E, G, Rh, WL	СР		
Henrys Fork	Green (Flaming Gorge Resvr)	BO, UR-1, UW	UR-1	R	SR		
Horseshoe Cyn- Barrier Cr	Green	N		Rh, WL, WN	ID		intermittent
Horsethief Cyn Cr	Green	N		G, Rh, WL	СР		free-flowing trib of Green
Huntington Cr	San Rafael	UR-1		F	NU		
RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
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Huntington Cr, Left Fk	Huntington Cr	B2, UW		F, Rh, W	NU		
Jones Hole Cr	Green	UW		F	ID		
Jordan	Great Salt Lake	BO, SC		R	ID		
Kolob Cr	Virgin, North Fk	N		Rh, WN	NU		Zion N.P.
Lake Fork	Duchesne	Ν		R	SR	В	15 mi WR-R
La Verkin Cr	Virgin	B3, N, WRC		E, F, R, Rh, WN	NU	А	Zion N.P., native fishes
Little Bear	Bear	UW		F	SR		
Little Bear, East Fk	Little Bear	UW		F	SR		
Little Cottonwood Cr	Jordan	UR		R	SR		
Little Deer Cr	Provo	UW		F	SR		
Little Provo Deer Cr	Provo	UR-2			SR		
Llewellyn Cr	Glen Canyon NRA	N		E, G, R, WL	СР		
Logan	Bear	B1, BO, NC, SC, UR-1, UW	UR-1	В	SR	В	
Lost Cr	Weber	UW		F	SR		
Mammoth Cr	Sevier	UW		F	NU		
Manning Cr	Sevier	UW		E, F	NU		Bonneville cutthroat trout
Mikes Cyn Cr	Glen Canyon NRA	N		G, P, R, WL	СР		habitat for rare astagalus
Milk Cr	Yellowstone Cr	UW		F	SR		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Mill Cr	Blacksmith Fk	В3		E, F, P	SR		Bonneville cutthroat trout , other native fishes
Moqui Cyn Cr	Glen Canyon NRA	Ν		E, G, R, WL, WN	СР		
Muddy Cr	Dirty Devil	B1, BL, N, SC, WR- R		G, Rh, Rr, WN	ID	С	71 mi WR-R below Emery/ heavy ATV use in one reach
Negro Bill Cyn	Colorado	WRC		G, Rh, WN?	ID		
Nine Mile Cr	Green	N		Rh	С		
North Cr	Virgin	WRC		G, WN	NU	А	Zion N.P.
North Cr, Right and Left Fks	North Cr/ Virgin	Ν		G, Rh, WN	А	А	Zion N.P.
Ogden	Weber	UR, UW		F	SR		
Ogden, South Fk	Ogden	UW		F	SR		
Orderville Cyn	Virgin, North Fk	N		Rh, WN	NU		Zion N.P.
Paria	Colorado	BL, BO, N, SC, WR- R		F, G, P, Rh, WL, WN	СР		18 mi WR-R above Hwy 89
Pleasant Cr	Fremont	B4, N		G, Rh, WN	NU		Capitol Reef N.P./ beautiful stream
Price	Green	BL, B4, N, SC, UW, WR-R		G, Rr, WL	ID	В	48 mi WR-R below Wellington
Provo	Utah Lake	B3, BO, UW		E, F	SR		June sucker, other native fishes

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Range Cr	Green	B4, BL, N		P, R, WL	ID	В	one of few perennial streams in Bookcliff region
Red Butte Cr	Great Salt Lake	В4		E, F	SR		Bonneville cutthroat trout
Red Cedar Cr	Snake Valley sink	В3		E, F	NU		Bonneville cutthroat trout, re-introduced
Reflection Cyn Cr	Glen Canyon NRA	N		E, F, R, WL	СР		
Rock Cr	Duchesne	BO, N, UW, WR-R		F, G, Rf, Rh, WL	SR		16 mi WR-R
Rock Cr	Green	B4, WRC		G, Rh, P, WN	ID	В	riparian
Salt Cr	Colorado	N		E, G, P, Rh, WL, WN	ID		Canyonlands NP
Salt Wash	Green	Ν		E, F, G, P, WL	ID		pikeminnow south of town of Green River
San Juan	Colorado	B2, B4, BL, BO, I, N, NC, SC, WR-R	N	E, G, Rr, WL, WN	СР	В	2 roadless reaches (56 mi, 28 mi)
San Rafael	Green	B1, BL, BO, N, SC, WR-R	N	G, Rh, Rr, WL, WN	ID	С	65 mi WR-R below Castle Dale, 20 mi WR- R above Green
Scoggins Wash	Coalpite Wash/ Virgin	N		G, Rh, WN	NU		Zion N.P./ petrified forest
Seven Mile Cr	Fremont	UW		F	NU		
Sevier	Sevier Lk (sink)	BO		F	ID		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Sevier, East Fk	Sevier	B3, UW		E, F	ID		Bonneville cutthroat trout , other native fishes
Sheep Cr	Green (Flaming Gorge Resvr)	UR		F	SR		Bonneville cutthroat trt and Colorado River cutthroat trt
Smiths Fk, East Fk	Smiths Fk/ Blacks Fork (in WY)	UR		R	SR		
Smiths Fk, West Fk	Smiths Fk/ Blacks Fork (in WY)	UR		E, F, R	SR		Colorado River cutthroat trout
Soft Step Cr	Glen Canyon NRA	N		E, G, R, WL	СР		
Strawberry	Duchesne	NC, UW		B, F	SR		
Stevens Cr	Glen Canyon NRA	Ν		E, G, R, WL	СР		
Stillwater Fork	Bear	UW		F	SR		
Taylor Cr, South, Middle and North Fks	Ash Cr/ Virgin	Ν		G, Rh, WN	NU		Zion N.P.
Toms Cr	Snake Valley sink	B3		E, F	NU		Bonneville cutthroat trout, re-introduced
Trachyte Cr	Glen Canyon NRA	N		E, G, R, WL	СР		
Trail Cr	Green	WRC		G, WN	ID		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Trout Cr	Snake Valley sink	N		F, G, WN	ID		Bonneville cutthroat trout, re- introduced/brist lecone in basin
Twenty-five Mile Cr	Glen Canyon NRA	N		G, R, WL	СР		
Uinta	Duchesne	B2, B4, BO, F, N, UR-1, UW, WR-R	UR-1	WN	SR	В	20 mi WR-R
Virgin	Colorado	N, NC, SC	Ν	E, F, G, R, WL, WN	NU	A	woundfin minnon and VR chub/ one of the least disturbed, most unique aquatic riparian systems in CO R basin/ Zion N.P.
Virgin, East Fk	Virgin	B1, N, WR-R	N	Rh, WN	NU	А	16 mi WR-R
Virgin, North Fk	Virgin	B1, B4, N, NC, UR- 1	N	F, G, Rh, WL	NU	A	includes Virgin River narrows/potenti al habitat for woundfin/ Virgin R. spinedace, Virgin R. chub

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Weber	Great Salt Lake	UR, UW		F	SR, ID		2d best Bonneville cutthroat trt stream
White	Green	B3, N, NC, SC, WR- R	N	E, F, Rr, WL, WN	ID	A	pikeminnow, humpback chub, razorback chub, bluehead, flannelmouth sucker/ 64 mi WR-R
White Cyn	Colorado (Powell Resvr)	BL, N		G, Rh, WL, WN	СР		
Whiterocks	Uinta	Ν		WN	SR	В	13 mi roadless
Whiterocks, East Fk	Whiterocks	UR-2			SR		
Whiterocks, Middle Fk	Whiterocks	UR-2			SR		
Whiterocks, West Fk	Whiterocks	UR-2			SR		
Willow Cr	Glen Canyon NRA	N		G, R, WL	СР		
Wilson Cr	Glen Canyon NRA	Ν		G, P, R	СР		hanging gardens
Yellowstone	Lake Fk/ Duchesne	BO, N, UW, WR-R		WN	SR	В	15 mi roadless

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 12mile 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 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-milelong 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 96mile 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 freeflowing, 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.

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 warmwater 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 a 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 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.

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.

The Escalante River begins about 8 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 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 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 sagebrushstudded 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. Springfed, 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 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 4 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, oftensnowcapped 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 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-foothigh 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 5 roadless miles to Ant Valley. After flowing 4 miles through gentler, ranch land terrain, it meets state Highway 101 and drops steeply again for 8 miles through the Bear River Range to the confluence with the Left Hand Fork. After another 4 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 pineclad canyons for 16 miles to Highway 10, and then 12 miles across an agricultural valley to Interstate 70, where it enters a 48-mile, 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 6 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 74mile 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 8 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 thickets of tamarisk.

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 9. 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 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.



Rivers of Nevada

Nearly all desert, its 110,567 square miles lie squarely in the rain shadow of the towering Sierra Nevada, immediately upwind, and also at drier latitudes than the more northern portions of the West. Eighty percent of the land here is owned by the federal government—a far greater proportion than in any other state. Most of this falls under the jurisdiction of the Bureau of Land Management, but extensive acreage also lies in Toiyabe and Humboldt National Forests and in military reservations and weapons test sites.

The entire state of Nevada lies in the Basin and Range geographic province, and its landscape is characterized by a distinctive pattern of long, thin, paralleling mountain ranges, aligned north-south, and interspersed with wide valleys. These lowlands are almost all landlocked—surrounded by higher country uplifted by seismic action. Rather than making their way to the ocean, most Nevada streams flow into these low basins and evaporate.

Four ecoregions are present here. In the north, the Intermountain Semi-Desert is typical of the drylands found in Idaho and Oregon. The Intermountain Semi-Desert and Desert is drier and covers much of the state, especially the lower terrain. The Nevada-Utah Mountains Semi-Desert, with spare forests of juniper, pinyon, and a few other conifers at high and snow-prone sites, covers higher terrain, shaded canyons, and the north faces of some mountains. The American Semi-Desert and Desert, coincident here with the Mojave Desert, lies in the south.

Most of Nevada's precipitation comes as snow on the mid-and upper slopes of the mountains, especially in the higher ranges, including the Independence, Ruby, and East Humboldt Mountains in the northeast, the Snake Range of east-central Nevada, and the White Mountains at the California border in the southwest. Hundreds of small streams—and no large ones—carry the ephemeral runoff quickly off the steep mountains and into parched, arid valleys where landlocked lakes historically formed in the spring. Nearly all the streamflows and accessible groundwater, however, has long been tapped by ranchers who graze cattle and grow hay wherever possible. Most of Nevada's streams are completely diverted before they reach their traditional ending points in the lakes, playas, and associated wetlands that once supported a host of wildlife. Mining occurring in mineral-rich belts throughout much of the state—has also taken a toll on streams by diverting their flows, excavating their watersheds, and using them to process waste.

However, at upper elevations, many of the small streams still have good water quality and flow through wild country, if only for a few miles. The Nevada Department of Wildlife has listed 87 streams as outstanding trout waters—an indicator of cold, clean water. These are mostly in the northern part of the state, though few of them have native fish.

There are several notable exceptions to Nevada's typical highcountry-to-playa stream pattern. The Jarbidge, Bruneau, and Owyhee Rivers rise in the northeastern mountains and escape the Basin and Range's landlocked pattern by flowing out to Idaho and eventually to the Snake River and Pacific Ocean. Headwaters here in the high peaks of the Independence, Bull Run, and Jarbidge Mountains form the sources of streams that later become great wild rivers of southeastern Idaho and southwestern Oregon.

In Nevada, simply finding a perennial stream of more than 10 miles in length is rare. The only long river in the state is the Humboldt, which flows 300 miles from east-to-west across the northern tier; Interstate 80 parallels much of its route. Other roads, railroads, power lines, towns, and farmland line this corridor as well and preclude its inclusion here as a natural river. Never growing large--385 cubic feet per second is average where its flows are strongest--the Humboldt

is repeatedly diverted throughout its course, and is mostly depleted before reaching its terminus at the Humboldt Sink. Some Humboldt tributaries, especially from the north, are not as altered, and some still support remnant populations of the native Lahontan cutthroat trout.

Five significant river systems flow into Nevada from large mountains elsewhere. The Truckee, Carson, and Walker come from ample snowfalls in California's Sierra Nevada. The Truckee is the second-largest river in Nevada and, after providing water for sprawling Reno and for extensive irrigated agriculture, it goes on to supply the biologically important and landlocked Pyramid Lake. The East Fork of the Walker flows with longer, largely undeveloped mileage than any other river in Nevada before reaching its end in the surrounding desert's low spot of Walker Lake. The Colorado is nominally a Nevada river as it forms the state boundary with Arizona; however, all but about 44 of its Nevada miles are impounded by Hoover and Davis Dams, and what is left is radically altered by the dams, by land development, levees, and exotic species. Finally, the Virgin River flows into Lake Mead of the Colorado after originating with flows from the Zion National Park area of southwestern Utah. These highly affected remnants of the Virgin and Colorado are the only sizeable rivers in the Mojave Desert.

Biological highlights of Nevada streams are surviving bull trout in the headwaters of the Jarbidge, and the Lahontan cutthroat trout--a magnificent fish that still lives in a few isolated Nevada streams and now in some others where the fish are stocked. These fish populated the ice-age Lake Lahontan, which covered much of the central and northern state. As the lake receded—and then as the remaining streams were diverted and dried up--the fish that could once move throughout a vast waterway system were forced into smaller and smaller isolated enclaves. The Quinn River basin in the northwest corner of the state and the Marys in the northeast are two of these basins that still harbor the Lahontan cutthroat in upper-watershed streams, largely in public ownership but often grazed with damaging effects on the streams. Past approaches to protect remnant populations of the fish had addressed specific isolated streams, but biologists are not considering the stewardship of "meta-populations" of the trout, with hopes of increasing their ability to migrate, mix, and thrive with more available habitat. This approach would involve protection and enhancement of larger streams.

In the far north, bull trout survive in the headwaters of the Jarbidge. Though they do not live in rivers, several remnant endemic fishes survive in pools associated with springs and intermittent flows of short streams across the arid expanse of southern and central Nevada. The closest relatives to these rare and endangered "pool fishes" are found in Mexico.

Nevada has no streams included in the National Wild and Scenic Rivers system, and none that have been congressionally mandated for study.

With extremely little water to begin with, the problems of Nevada's streams are severe. Diversions occur commonly even on the public lands, and grazing is also widespread or dominant throughout the BLM and Forest Service estate here; having a large percentage of the land in public ownership has by no means guaranteed sustainable management of habitat for wildlife.

With the sprawling cities of Las Vegas and Reno, where 90 percent of residents live, Nevada has had the highest growth rate in America on a percentage basis. As the demands for water have rapidly increased, the Truckee, Colorado, and Humboldt Rivers have all been intensively tapped, and the pumping of groundwater sharply depletes instream flows. Mining is also a powerful political force in the state, and the industry has used water and altered streams as needed.

While much of the interior West is politically conservative and reluctant to protect rivers through regulation or government initiative, Nevada may be the most resistant, with organized groups openly defying federal natural resource laws and even threatening federal officials.

Though much land in Nevada is publicly owned, it has often not been effectively managed for public values, such as wildlife and fisheries. Furthermore, much of the critical fish and wildlife habitat lies in valleys where water is accessible—typically the lands that were selected by homesteaders for private ownership. A new landtrust approach to conservation may be effective here.

In Nevada, the challenges for conservation are certainly greater than in most places, yet a number of the state's rivers offer important values and are worthy of protection for fish, wildlife, increasing numbers of recreational visitors, and the up-and-coming generation of a rapidly growing local population.



Walker River

Great Rivers of Nevada





Great Rivers of Nevada

- Other Rivers and Streams

Sources of the Nevada Survey

In addition to the major sources described at the outset of this report, the survey relied on the following state-specific sources for Nevada:

Interviews with biologists and other local experts (B#).

Glenn Clemmer, director, Nevada Natural Heritage Program.

Jim Heinrich, fisheries biologist, Nevada Department of Wildlife.

Kim Tisdale, fisheries biologist, Nevada Department of Wildlife.

The Nature Conservancy, priority sites for aquatic conservation (NC). These are streams identified by the Nature Conservancy in 1985 as high priority for conservation of aquatic diversity, as listed in American Rivers, Outstanding Rivers List (1991).

Nevada Department of Wildlife, outstanding trout waters (NW). These are streams designated by the Nevada Department of Wildlife (formerly the Nevada Department of Fish and Wildlife) as outstanding trout waters for angling, as listed in American Rivers, Outstanding Rivers List (1991). This designation does not indicate anything about the viability of native fish.

Trout Unlimited (TU). These are streams identified by Trout Unlimited as important for conserving native fish in Nevada.

Western Rivers Conservancy, roadless reaches (WR-1). Roadless reaches of 10 miles or longer, identified on DeLorme atlas of Nevada.

Western Rivers Conservancy, nearly roadless reaches (WR-2). Nearly roadless reaches of 20 miles or more, identified on DeLorme atlas of Nevada.

Key to Nevada River Tables

SOURCE OF RECOMMENDATION

- B#- interviews with biologists and local experts:
 - B1- Glenn Clemmer, NV Nat. Heritage Program
 - B2- Jim Heinrich, Nevada Dept. of Wildlife
 - B3- Kim Tisdale, Nevada Dept. of Wildlife
- BL-Bureau of Land Management (BLM)
- BO- Bureau of Outdoor Recreation
- F-U.S. Forest Service
- N- Nationwide Rivers Inventory
- NC-Nature Conservancy 1985
- NW- Nevada Department of Wildlife, outstanding trout waters
- TU-Trout Unlimited
- WRC-Western Rivers Conservancy
- WR-1-WRC roadless \geq 10 mi
- WR-2- WRC nearly roadless ≥ 20 mi

BEST SOURCES: B#, N, WR-1, WR-2

Note: The Nevada Department of Wildlife list of trout waters is large, but it includes many streams with introduced, non-native fish.

QUALITIES

- **B-Biological Diversity**
- C- Cold water/ high elevation
- E- Endangered or imperiled species
- F- Fish (in NV, this does not necessarily indicate native species)
- G-Geological/geographical

L- Long free-flowing reach >100 miles L+- Long free-flowing reach, combined with streams it flows into P- Plant life/ riparian values Rf- Recreational fishing Rh- Recreational hiking Rr- Recreational niver running WL-Wildlife WN- Wildness

ECOREGIONS

- AD- American Semi-Desert and Desert Province (322)
- ID-Intermountain Semi-Desert and Desert (341)
- IS- Intermountain Semi-Desert (342)
- NU- Nevada Utah Semi-Desert (M341)



South Fork Owyhee River

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Ackler Cr	Starr Cr/ Humboldt	NW		F	NU		
Alder Cr	Continental Lk	NW		F	IS		NW Nevada
Amargosa	Death Valley sink (in CA)	NC		В	AD		intermittent
Baker Cr	Snake Valley sink (in UT)	NW, WRC		F, G	NU	A	Mt. Wheeler/ Great Basin National Park
Bassett Cr	Spring Valley sink	NW		F	NU		
Beaver Cr	Owyhee	NW		F	NU		
Berry Cr	white pine ?	NW		F	NU		
Big Cr	Quinn River sink	NW		F	ID		
Big Goose Cr	elko?	NW					
Big Wash	Preuss Lk (in UT, near Garrison)	NW		F	NU	A	Mt. Wheeler/ Great Basin National Park
Big Wash, South Fork	Big Wash	N, NW		F, WN	NU		exceptional water quality
Boulder Cr	Owyhee, South Fk	NW		F	IS		
Bruneau	Snake (in ID)	B1, NW, WRC		E, F	IS	А	redband trout
Bull Cr	Owyhee, South Fk	NC		F	IS		
Bull Run Cr	Owyhee, South Fk	NW		F	IS		
Canyon Cr	Salmon Falls Cr, North Fk/ Snake (in ID)	NW		F	IS		
Carson	Lahontan Resvr. (sink)	B1, B2, BO, NW		F, R	IS		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Carson, East Fk	Carson	BL, F, N, NW		F	IS		See CA
Clear Cr	Humboldt	NW		F	NU		
Cleve Cr	Spring Valley sink	NW		F	NU		
Cleve Cr, North Fk	Cleve Cr	NW		F	NU		
Cold Cr	John Day Cr/ Lamoille Cr	NW		F	NU		
Columbia Cr	Bull Run Cr	NW		F	IS		
Copper Cr	Bruneau	NW		F	IS		
Coyote Cr	Maggie Cr/ Humboldt	NW		F	ID		
Deadman Cr	Smith Cr/ Snake Valley sink (in UT)	NW		F	NU		
Duckwater Cr	Duckwater sink	NC		F	ID		
Walker, East	Walker	BL, BO, N, NW		F	ID		
Ellison Cr	White	NC		В	NU		
Foreman Cr	Humboldt, North Fk	NW		F	NU		
Furlong Cr, North	Humboldt, South Fk	NW		F	ID		
Galena Cr	Steamboat Cr/ Truckee	NW		F	IS		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Gilbert Cr	Smith Cr/ Huntington Cr/ Humboldt, South Fk	NW		F	IS		
Goshute Cr	Goshute Lk	WRC		E, F	ID		Bonneville cutthroat trout
Hendrys Cr	Snake Valley sink (in UT)	NW		F	ID		
Humboldt	Humboldt sink	BO, NW		F	ID		
Humboldt, North Fk	Humboldt	NW		F	ID		
Humboldt, South Fk	Humboldt	NW		F	ID		
Humboldt, South Fk, North Fk of	Humboldt, South Fk	NW		F	ID		
Humboldt, South Fk, South Fk of	Humboldt, South Fk	NW		F	ID		
Hunter Cr	Truckee	NW		F	IS		
Jack Cr	Harrington Cr/ Owyhee, South Fk	NW		F	IS		
Jarbidge	Bruneau (in ID)	B1, BO		E, F, R	IS	А	bull trout/ redband trout
Jarbidge, East Fk	Jarbidge	B1, N	N	E, F, R, Rh, Rr, WN	IS	A	Dolly Varden, bull trout, redband trout
Kings	Quinn River sink	NW		F	ID/ IS		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Kingston Cr	Big Smoky Valley sink	NW		F	NU		
Kleckner Cr	Humboldt, South Fk	NW		F	ID		
Lake Cr	Preuss Lk (in UT, near Garrison)	NW		F	NU		
Lamoille Cr	Humboldt	NW, WRC		F, G, P	NU	В	
Leach Cr	Clover Valley sink	NW		F	NU		
Lehman Cr	Baker Cr	NW, WRC		F	NU	A	Mt. Wheeler/ Great Basin National Park
Lime Cr	Salmon Falls Cr, North Fk	NW		F	IS		
Little Humboldt, North Fk	Little Humboldt/ Humboldt	Ν	Ν	E, G, P, WN	ID/ IS		rare plants
Little Humboldt, South Fk	Little Humboldt/ Humboldt	NW		F	ID		
Long Cyn Cr	Humboldt, South Fk	NW		F	IS		
Maggie Cr	Humboldt	NW		F	IS		
Mahogany Cr	Summit Lk sink	WRC		F, WN, WL			Lahontan cutthroat trout
Marsh Cr	Bull Run Cr/ Owyhee, South Fk	NW		F	IS		
Marys	Humboldt	B1, BL, N, NW	N	E, F, P, WN	IS	В	Lahontan cutthroat trout/ good riparian

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
McCutcheon Cr	Smith Cr/ Huntington Cr/ Humboldt, South Fk	NW		F	NU		
McDermitt Cr	Quinn	WRC		E, F	IS		Lahontan cutthroat trout
McDonald Cr	Bruneau	NW		F	IS		
Meadow Cr	Bruneau	NW		F	IS		
Muddy	Virgin/ Lake Mead	B2		E, F	ID		Moapa dace/ 25 springs
Owyhee	Snake (in ID)	BO, NW		F	IS		
Owyhee, South Fk	Owyhee	BL, N, NW	N	F, G, R, WN	IS	С	
Pearl Cr	Huntington Cr/ Humboldt, South Fk	NW		F	NU		
Penrod Cr	Owyhee	NW		F	IS		
Pine Cr	Pine Cr sink	NW		F	NU		
Pole Cr	Bruneau (in ID)	NW		F	IS		
Pratt Cr	Humboldt, North Fk	NW		F	NU		
Quinn	Black Rock Desert sink	B3		E, F	IS		Lahontan cutthroat trout in tributaries
Rattlesnake Cr	Huntington Cr/ Humboldt, South Fk	NW		F	NU		
Rebel Cr	Quinn River sink	NW	}	F	IS		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Red Mountain Cr	Fly Resvr (sink)	NW		F	IS		
Reese	Humboldt	BO, B2		R	ID		Lahontan cutthroat trout/ Columbia spotted frog
Rock Cr	Fish Lake Valley sink	WRC		G, F	ID		old mines scattered in this otherwise outstanding basin
Salmon Falls	Snake (in ID)	NW		F	IS		
Schoer Cr	Clover Valley sink	NW		F	ID		
Seitz Cr	Rabbit Cr/ Humboldt	NW		F	NU		
Sheep Cr	Bruneau	TU		E, F	IS		redband trout
Short Cr	Deep Cr sink	NW		F	IS		
Shoshone Cr	Salmon Falls Cr (in ID)	NW		F	IS		
Smith Cr	Pine Cr/ Humboldt	NW		F	ID		
Snake Cr	Preuss Lk (in UT, near Garrison)	NW		F	NU	A	Mt. Wheeler/ Great Basin National Park
Snake Cr, South Fk	Snake Cr	NW		F	NU		
Snow Cr	Butte Valley sink	NW		F	NU		
Soldier Cr	Willow Cr Resvr. (sink)	NW		F	ID		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Steptoe Cr	Bassett Lk resvr/ Steptoe Valley sink	NW		F	NU		
Sweetwater Cr	East Walker	NW	}	F	ID		
Tabor Cr	Humboldt	NW	}	F	ID		
Talbot Cr	Lamoille Cr	NW		F	NU		
Thomas Cr	Humboldt (near Winnemucca)	NW		F	NU		
Thomas Cr	Steamboat Cr/ Truckee	NW		F	ID		
Thorpe Cr	Lamoille Cr	NW		F	NU		
Thousand Springs Cr	Great Salt Lake desert (sink, in UT)	во		R	IS		
Trail Cr	Owyhee	NW		F	IS		
Truckee	Pyramid Lk (sink)	B1, B3, BO, NW		B, F, R	IS	С	Lahontan cutthroat trout
Twin, North	Twin/ Big Bmoky Valley	NW		F	NU		
Twin, South	Twin/ Big Bmoky Valley	NW		F	NU		
Virgin	Colorado (Lake Mead resvr.)	Ν	N	E, F, G, WL	ID		woundfin minnow, Virgin River chub

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Wall Canyon Cr	Wall Canyon sink	B1		E, F	IS		small intermittent stream, endemic Wall Canyon sucker
Walker	Walker Lake (sink)	NW		F	ID		
Walker, East	Walker	B1, B3, F, N	N	R	ID	В	
White	White River sink (near Sunnyside)	B2, NC		B, E	NU		roundtail chub (endangered)
Wilder Cr	Wilder sink (near Denio)	NW		F	IS		
Wilson Cr	Soldier Cr/ Secret Cr/ Humboldt Cr	NW		F	ID		

NEVADA'S "A" RIVERS

Baker, Lehman, and Snake Creeks, and Big Wash (Wheeler Peak streams)

These four streams flow from the Wheeler Peak area, located in Great Basin National Park. At 13,063-foot, Wheeler is the secondhighest mountain in Nevada and the highest whose summit is not shared with another state. Cold, undammed, and mostly wild, these streams drop with spectacular scenery from their highcountry sources through aspen groves and coniferous forests eastward to the Snake Valley sink at the Utah state line. Bonneville cutthroat trout are being reintroduced.

Baker Creek drains the south side of Wheeler Peak. Its upper 4 miles are paralleled by trail, then a campground access road follows the creek down to the mouth of its canyon, where the stream subsequently spills across the valley and is tapped for irrigation. Lehman Creek flows from the north side of the peak in a similar fashion, its lower reach paralleled by the main access road to Great Basin National Park. With an unimproved road along much of its length, Snake Creek flows for 12 miles from Pyramid Peak--a sub-peak just south of Wheeler--to its canyon mouth just west of Garrison, Utah. Southernmost of the group, Big Wash and its North Fork drop from the faces of Washington and Lincoln Peaks with trails along upper reaches and a 4-wheel-drive route at the lower end.

All four streams are listed as outstanding trout streams by the state Department of Wildlife. The National Park Service plans to reintroduce Bonneville cutthroat trout into 18 miles of streams in the park, including these. Ancient bristlecone pines grow on higher slopes, and all streams have good riparian corridors. Excellent hiking trails lead to the upper basins and high peaks.

Bruneau River

One of the longest and healthiest perennial streams in Nevada, the Bruneau drops from the Jarbidge and Independence Mountains through remote canyons with nominal roads, almost no development, and few diversions as it flows north toward the extraordinary wild desert and canyon country of southern Idaho.

The river begins on the south side of the Jarbidge Mountains highlands and in 8 miles encounters the small Charleston Reservoir and the community of Charleston. Below there, the river winds for 40 miles through rugged mountain country, mostly within the Humboldt Toiyabe National Forest but with some private land also along the river. A small, unimproved road follows much of this course.

The Bruneau's trubutaries carry snowmelt and groundwater from mountains that reach to nearly 10,000 feet; these headwaters are the source for most of the river's volume, even as it flows into Idaho, where the Bruneau is known as a premier wild river and a rare desert stream with cold, clear water supporting native redband trout (see the Idaho section of this report). Here at the Nevada headwaters, a cluster of 7 tributaries are listed as outstanding trout waters by the Nevada Wildlife Department. Native bull trout populate some of these streams. One trout stream, Sheep Creek, becomes a principal tributary to the Bruneau and is an exceptional canyon waterway in its own right.

Jarbidge and East Fork Jarbidge Rivers

The finest wild stream in Nevada, the East Fork Jarbidge is roadless and dam-free for about 20 miles, much of it in the Jarbidge Wilderness. The main stem flows slightly longer, but much of its length has a minor road alongside and abandoned mines in its basin. As with the upper Bruneau (the adjacent basin to the west), the Jarbidge's Nevada headwaters are the principal water source for an exquisite canyon river that lies downstream in Idaho and offer a long, continuous reach of aquatic habitat—rare in Nevada.

The main stem Jarbidge begins on the flank of Cougar Peak, which rises 10,559 feet above sea level, and tumbles down for 4-miles with only trail access. After passing Jarbidge Peak (10,789 feet) and a number of abandoned mines, the river meets up with a minor county road, which parallels the rest of its length in Nevada and 5 miles in Idaho. Beyond there, the river is roadless for almost

its entire length (see the Idaho section of this report). In Nevada, all but the lower 6 miles are in the Humboldt Toiyabe National Forest.

The East Fork Jarbidge begins on the north flank of Mary's River Peak (10,5995 ft.), flows north through the Jarbidge Wilderness for 13 miles (followed by a trail), and then for another 10 miles in a steep, roadless canyon to the Idaho state line and 2 more miles beyond. Its final 4 miles are paralleled by a road to the confluence with the main stem in Idaho. No other river in Nevada flows damfree and roadless for this length.

These rivers both support bull trout—extremely rare in this area—and also redband trout and the only population of Dolly Varden trout in Nevada.

NEVADA'S "B" RIVERS

Lamoille Creek

One of the most beautiful headwater streams of the landlocked basins that typify most of Nevada, Lamoille Creek is also one of the longest free-flowing and undeveloped rivers in the state.

It plunges down from highcountry of central Nevada's Ruby Mountains for 12 miles. Below the mouth of its canyon it continues to flow for 24 miles to the Humboldt River.

A highlight of mountain scenery in Nevada, the Lamoille headwaters can be reached by a paved road southeast of Elko. From the end of the road, the Ruby Crest National Recreation Trail climbs the final mile to the creek's source above Lamoille Lake. Much like a high canyon in the southern Rocky Mountains, the area is blanketed in aspen groves and evergreens, with cottonwoods thriving along the stream. The state Department of Wildlife lists the creek as an outstanding trout fishery; it is populated with introduced rainbow and brook trout.

Though there are diversions downstream through the Lamoille Valley, this stream's continuous and perennial flow of 36 undammed

and undeveloped miles make it among the longest relatively intact rivers in Nevada.

Marys River

This is one of the best tributaries to the extensive Humboldt River system and has a riparian corridor and a remnant population of native Lahontan cutthroat trout.

The river begins high in the Jarbidge Mountains where its upper reaches within a wilderness area back-up against the headwaters of the Jarbidge and East Fork Jarbidge Rivers.

After flowing 15 miles through the Humboldt Toiyabe National Forest, the stream enters BLM and private land for the rest of its length to the Humboldt River. In about 12 miles the narrow mountain valley reaches a broader corridor with a riparian belt that is wide relative to most other Nevada lowland streams. Tightly meandering southbound past several private ranches for about 45 more river miles with a nearly continuous corridor of riparian vegetation, it reaches the Humboldt River at Deeth, just west of Wells.

Upper reaches still support native and reproducing populations of the rare Lahontan cutthroat trout.

Walker River, East

The East Walker has one of the longer reaches of perennial freeflowing water in Nevada, including a wild section of canyon and other undeveloped reaches.

Fed by snowmelt of the Sierra Nevada, the East Walker's headwaters rise in the Hoover Wilderness along the eastern border of Yosemite National Park. The stream is impounded in Bridgeport Reservoir in California, then flows without large dams for about 100 miles to Weber Reservoir, east of Yerington. More than half of this route is largely wild or undeveloped.

Below Bridgeport Reservoir, the East Walker flows northeast for 16 miles through a canyon with Highway 182/338 alongside. After the river enters Nevada, it flows through private ranchland in the Sonoma valley and then leaves a Forest Service road and drops for 16 miles through a wilderness canyon in the Humboldt-Toiyabe National Forest, with one large private tract. Beyond the forest boundary, the river runs for 48 miles—flowing through another short canyon and then meandering through an opening valley with wetlands south of Yerington to its confluence with the West Walker.

With more generous flows than most Great Basin streams, the East Walker also has one of the wildest river canyons and one of the longest undammed and relatively natural river corridors in Nevada. It supports some native fish, including redsides, suckers, and dace, but the Lahontan cutthroat trout have been replaced by introduced and reproducing brown and rainbow trout. The river remains excellent habitat and has become a popular trophy fishery.

The West Walker River is more developed and farmed than this branch. The two join and flow to Walker Lake—once a stellar Lahontan trout area. With over-appropriation of its waters and diversions upstream, the lake is receding.

NEVADA'S "C" RIVERS

Owyhee River, South Fork

This major Owyhee tributary (about the same length as the main stem above the South Fork confluence) flows for roughly 100 miles across northern Nevada with no dams and with only limited road access serving isolated ranches. This is the principal headwaters for the extraordinary canyon-bound river that lies downstream in Idaho and Oregon.

Originating at the far southern end of the high, snow-raking Independence Mountains, the South Fork flows northwest, winding through the rugged, dry foothills and then across the vast expanse of the Owyhee Desert. Low diversion structures may divert a portion of the stream's flow at widely scattered ranches. Unimproved roads also follow the river's remote route, but none closely parallel it. Eight separate small tributaries flowing from the Independence Mountains are listed by the state Department of Wildlife as outstanding trout fisheries. The cold flows of these and other streams are crucial to the Owyhee in its long path across northern Nevada, southwestern Idaho, and southeastern Oregon (see the Idaho and Oregon sections of this report).

Truckee River

For about 25 miles the lower Truckee flows from Wadsworth to Pyramid Lake through the Pyramid Lake Indian Reservation. Though it has two small dams, this final section of the river is an undeveloped, open corridor through the desert, heavily diverted upstream but still supporting stocked, reintroduced Lahonton cutthroat trout and supplying Pyramid Lake with nearly all its water.

From peaks in the Sierra Nevada, the Truckee flows down into Lake Tahoe (the second deepest lake in the United States and larger in volume than all other lakes and reservoirs in California combined) as its the principal source, runs through a forested valley, through the town of Truckee, and out of the Sierra (and California) via a canyon route shared with Interstate 80, a railroad, and other highways. After flowing into Nevada, the river becomes the attractive and refreshing centerpiece of downtown Reno and an expanding urban greenway. Then it continues eastward with I-80 alongside until Wadsworth. Here the river turns decidedly north on its final leg to Pyramid Lake. This is the only reach in Nevada where the river is not crowded by highways and development.

Through the open valley separating the Pah Rah Range and the Truckee Range, the river winds with groves of cottonwoods, though the heavy diversions and dams upstream have depleted the flows and consequently limited the regermination of the forest. The exotic tamarisk has also invaded heavily, but restoration projects on the Reservation are reinstating some of the original types of plantilfe. The river supports a stocked population of Lahonton cutthroat trout, which historically grew three feet long. The Truckee also supplies Pyramid Lake, which holds the record for the largest Lahonton cutthroat. Long-standing efforts to reestablish the native trout have met with limited success, but tribe and state officials continue with restoration activities and stocking. Among the 3 major rivers that once had plentiful Lahontan cutthroats—the Truckee, Walker, and Carson—the Truckee has received the most restoration attention and likely has the best chance of success, in part owing to new initiatives to reestablish the native fish in upstream Lake Tahoe.

Pyramid Lake is also the only remaining habitat of the cui-ui, an endemic, endangered sucker that once migrated far up the Truckee River but now is limited to the lake and its fringes and to a transport program that lifts the fish over Marble Bluff Dam at the mouth of the river. These fish are especially important to Indians of the Pyramid Lake Reservation.

Owing to withdrawals upstream, the lake has been shrinking, and has dropped a total of 90 feet. For years local Indians negotiated for improved flows of the Truckee in order to restore adequate levels to the lake, to reinstate its unique fishery, and to save the imperiled cui-ui. A 1995 Truckee operating agreement appears to be having some effect, with gradually increasing levels in the lake.

CONCLUSION

Extreme aridity notwithstanding, Nevada still has many streams, along with surprising variety given such spare water supplies. But very little attention has been given to river conservation here. We found few lists of quality streams compiled by others; the largest, by far, is a list of outstanding trout waters, which primarily reflects introduced fish that, in many cases, could be detrimental to native fish. There is no state-wide river conservation group, and few organizations have organized for local or regional protection. We did, however, find 6 lists of rivers totaling 104 streams. Included are and A list of 7 rivers, a B list of 3, and a C list of 2. Two clusters of high-quality streams became evident as a result of the survey.

Wheeler Peak streams of Great Basin National Park

The four streams discussed here as Wheeler Peak watersheds--Baker Creek, Lehman Creek, Snake Creek, and Big Wash—form an excellent suite flowing from the high mountains of Great Basin National Park. Fisheries biologists are reintroducing Bonneville cutthrout trout here at the westernmost part of their historic range.

Jarbidge, Bruneau, and South Fork Owyhee Rivers

The second suite of rivers drain from the Independence, Jarbidge, and Bull Run Mountains of north-central Nevada and supply most of the runoff to the Jarbidge, Bruneau, Owyhee, and South Fork Owyhee Rivers. These streams all continue flowing downstream to become exquisite wild canyon rivers in Idaho or Oregon. The Nevada Department of Wildlife has listed some 20 tributaries of these rivers as outstanding trout streams—the greatest such concentration in that state. Watershed protection here is essential for conserving both the viability of these relatively natural streams in Nevada and also the vital, cold-water sources for important wild rivers downstream.

Rivers of New Mexico

w Mexico is the third-largest state in the West and among the driest. Like the other desert states, New Mexico has few perennial streams produced by precipitation that falls within its bounds; however, unlike Utah and Arizona, New Mexico receives only nominal flows from major water-producing mountain ranges elsewhere.

In the south-easternmost limits of what we consider the "West," New Mexico is divided into four geographic areas. The southern limits of the Rocky Mountains dip into the north central part of the state and provide the snow and runoff, accounting for much of the streamflow. The Colorado Plateau occupies the northwestern portion, with sandstone mesas and also a mix of dry mountain country. The southern limits of the Basin and Range account for the largest part of the state, rippling across its southwest and southcentral mass. Finally, the Great Plains lie across the entire eastern quarter of the state with dry prairies and rugged narrow valleys formed by streams draining toward the Mississippi and lower Rio Grande. The ecoregions of the state mirror these landforms with deserts, scrub-covered mountains, a few outliers of Rocky Mountain forests, and prairies that are like much of the rest of the Great Plains, only drier at this southern latitude.

The undisputed centerpiece of the rivers estate here is the Rio Grande. Beginning in the mountains of southern Colorado, it flows into New Mexico and then runs the whole way through the state to Texas. It carves a spectacular canyon, but its life-force is utterly crippled by diversions and dams. Endangered fish as well as the longest cottonwood forest in the West are now dying-out as a result.

The unrivaled river gem in this state is the Gila and its tributaries, which flow wild and undammed from west-central mountains into Arizona. In contrast, the heavily dammed and developed San Juan arcs through the northwestern corner of the state, degraded by overgrazing and girded by the rigs and roads of the oil and gas industry. The Pecos flows with clean snowmelt from the southern Sangre de Cristo Mountains in northern New Mexico but then staggers southward through the state with dams, heavy diversions, and oil wells all the way to Texas. In the far east, the Canadian is the key river of New Mexico's Great Plains, flowing through one splendidly remote region in the north before being dammed and reduced to a weed-infested trickle.

Reaches of 5 New Mexico streams have been designated in the National Wild and Scenic Rivers system. One of the very first, the Rio Grande, is designated for 50 miles through its incomparable basalt canyon near Taos; a 4-mile section of its tributary, the Red River, was also included. A beautiful section of the Rio Grande's largest tributary, the Rio Chama, is protected for 25 miles between El Vado Dam and Abiquiu Reservoir. An 11 miles reach of the more remote and forested East Fork Jemez is included, and 21 miles of the 900-mile-long Pecos are protected, just downstream from its mountain source.

As in the other desert states, the collection of perennially flowing rivers here was limited to begin with, and then it has been severely diminished by a history of abuse, neglect, and--most important today--by the growing needs of a booming population. The natural rivers that remain are a small fragment of what once was, and all require increased attention and care if they, too, are not to be lost.

Great Rivers of New Mexico



WESTERN RIVERS CONSERVANCY

Sources for the New Mexico Survey

In addition to the major sources described at the outset of this report, the survey relied on the following state-specific sources for New Mexico:

Interviews with biologists and local expert (B#).

Esteban Muldavin, New Mexico Natural Heritage Program

Tom Turner, biologist, University of New Mexico

Brian Shields, Director, Amigos Bravos

Amy Unthank, U.S. Forest Service, regional fisheries program manager

New Mexico Division of Parks and Recreation, priority for natural diversity (B#). These are streams identified by the New Mexico Division of Parks and Recreation (1990) as highest priority for conserving natural diversity.

Western Rivers Conservancy, roadless reaches (WR-1). Roadless reaches of 10 miles or longer, identified on DeLorme atlas of New Mexico.

Western Rivers Conservancy, nearly roadless reaches (WR-2). Nearly roadless reaches of 20 miles or more, identified on DeLorme atlas of New Mexico.

Key to New Mexico River Tables

SOURCE OF RECOMMENDATION

B#- interviews with biologist and local experts:

- B1- Esteban Muldavin, NM Natural Heritage Program
- B2-Tom Turner, biologist, U of New Mexico
- B3- Brian Shields, Amigos Bravos
- B4- Amy Unthank, U.S. Forest Service
- BL-Bureau of Land Management (BLM)
- **BO- Bureau of Outdoor Recreation**

F- U.S. Forest Service

I- USDI/ USDA Wild and Scenic List, 1965

NMP- priority sites for natural diversity, as compiled by the New Mexico Parks and Rec. Division (1990)

N- Nationwide Rivers Inventory

W- National Wild and Scenic Rivers

Ws-National Wild and Scenic Study Rivers

WRC-Western Rivers Conservancy

WR-1-WRC roadless ≥ 10 mi

WR-2- WRC nearly roadless ≥ 20 mi

BEST SOURCES: B#, N, I, WR-1, WR-2

QUALITIES

- **B-Biological Diversity**
- C- Cold water/ high elevation
- E- Endangered or imperiled species
- F- Fish
- G-Geological/geographical
- L- Long free-flowing reach >100 miles
- L+- Long free-flowing reach, combined with streams it flows into

P-Plant life/riparian values

Rf-Recreational fishing

- Rh-Recreational hiking
- **Rr-** Recreational river running

WL-Wildlife

WN-Wildness
ECOREGIONS

- AN- Arizona New Mexico Mountains Semi-Desert (M313)
- CD- Chihuahuan Semi-Desert (321)
- CP- Colorado Plateau Semi-Desert (313)
- GP- Great Plains (331)
- SP- Southwest Plateau and Plains-Dry Steppe and Shrub (315)
- SR- Southern Rocky Mountains (M331)



Rio Grande River

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Animas	San Juan	NMP		Р	СР		
Black	Pecos	NMP			CD		roads
Black Canyon Cr	Gila	B4, WR-2		WN		А	WR-2 (18 mi)
Canadian	Arkansas	B1, B3, BO, F, N, WR-2		G, R, WL, WN	AN, SP	В	flows through Kiowa Natl grasslands/ rec'd for state W&S/ WR-2 (94 mi)
Canjilon Cr	Rio Chama (Abiqui Resv)	F		F	AN		
Comanche Cr	Costilla Cr	B3		R	SR	Α	
Cañones Cr	Rio Grande (Abiqui Resvr)	F, N	N	F, G, R	AN, CP	В	hdwtrs in Valles Caldera/ Rio Grande cutthroat trout/
Cimarron	Canadian	во		R	AN		
Costilla Cr	Costillo Resvr/ Rio Grande	B3, N		E, F, R, WL	SR	А	one of best native trout streams in NM/flows thru

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
El Rito Cr	Rio Chama	F		F	AN		
Gallinas	Pecos	F, N		F, R, WL, WN	SP		roadless frontage
Gila	Salt (in AZ)	B1, B2, B3, B4, BL, BO, F, I, N, NMP, WR-1	N	E, F, G, WL, WN	AN	A	Gila trout is ES/ recmn'd for state W&S/ richest avifauna
Gila, East Fk	Gila	B1, B2, B3, WR-1		WN	AN	A	WR-1 (14 mi)
Gila, Middle Fk	Gila	B1, B2, B3, WR-1		WN	AN	А	WR-1 (36 mi)
Gila, West Fk	Gila	B1, B2, B3, B4, WR-1		WN	AN	А	WR-1 (25 mi)
Jemez	Rio Grande	B1, B3	{	Р	SR	С	
Jemez, East Fk	Jemez	B1, W		E, G, P, R, Rf	AN	С	W&S (11 mi)/ Jemez salamander

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Latir Cr	Costilla Cr	WRC		G	SR	А	
Mimbres	San Lorenzo sink	B1		В, Р	AN		
Mora	Canadian	N		G, P, WL, WN	AN, SP		free- flowing/good riparian
Mule Cr	San Francisco	WR-1		WN	AN	В	WR-1 (16 mi)
Negrito Cr	Tularosa	F, WRC		WN	AN	В	
Pecos	Rio Grande (in TX)	B2, B3, B4, BO, N, W, WR-1		R, Rf, Rh, WL	SR, AN, CD		W&S (21 mi)/ WR-1 (14 mi)
Red	Rio Grande	F, W		Rh, WN	SR, AN		W&S (4 mi)
Red, East Fk	Red/ Rio Grande	BO		G, WN	SR		¢
Rio Brazos	Rio Chama	B1, B2, B3, BO, WR-1		G, Rr, WN	AN, SR	С	WR-1 (10 mi)/ beautiful
Rio Cebolla	Jemez					С	
Rio Chama	Rio Grande	B3, F, W, WR-2		G, P, Rf, Rr, WL, WN	AN	С	W&S (25 mi)/ WR-2 (25 mi)/ beautiful
Rio Grande	Gulf of Mexico (in TX)	B1, B2, B3, BO, I, W, WR-1		G, P, Rh, Rr, WL	AN, GP, CD	С	W&S (49 mi)/ WR-1 (10 mi /14 mi)

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Rio Guadalupe	Jemez	BO, N (F, NMP)	N	E, G, R, Rf, Rh, WL	AN	С	state natural area study
Rio Lucero	Rio Pueblo de Taos	BO		G, WN	AN		
Rio Medio	Rio Grande	WR-1		WN	SR		
Rio Ojo Caliente	Rio Grande	WRC		Rr			
Rio Peñasco	Pecos	BO, F			CD		intermittent
Rio Pueblo	Embudo Cr/Rio Grande	BO, F		R	SR		
Rio Pueblo de Taos	Rio Grande	WR-1		G, WN	AN		WR-1 (14 mi)
Rio Puerco	Rio Grande	WR-2		WN	AN		WR-2 (45 mi)
Rio de los Pinos	Rio San Antonio/ Conejos (in CO)	во		Rf	SR		
Rio Santa Barbara	Embudo Cr/Rio Grande	В3		R, WN			
Rio Tusas	Rio Ojo Caliente						
Rio Vallecitos	Rio Ojo Caliente	B3		Rf, WN	SR		
San Antonio	Jemez					С	
Sacramento	Rio Peñasco	F		WL			intermittent
San Francisco	Gila (in AZ)	B1, BO, N, WR-1, WR-2	N	E, F, G, Rf, Rh, WL	AN	В	Arizona trout in upper river/ rec'd state W&S/ WR-1 (29 mi) / WR-2 (24 mi/ 40 mi)

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
San Juan	Colorado (in UT)	BO, I		R	AN, CP		
Sapillo Cr	Gila	WR-1		WN	AN	Α	
Turkey Cr	Gila	WR-1		WN	AN	А	WR-1 (12 mi)
Tularosa	San Francisco	BO		Rf, WN	AN	В	
Vermejo	Canadian	WRC		G, WN	GP	С	
Whitewater Cr	San Francisco	BO, WR-1		Rf	AN	В	WR-1 (12 mi)

New Mexico's "A" RIVERS

Costilla Creek with Comanche and Latir Creeks

Flowing from the crest of the Sangre de Cristo Mountains, Costilla Creek and its southern tributaries, Comanche and Latir Creeks, wind through undeveloped mountains and foothills, and Costilla is among the best Rio Grande cutthroat streams in the state.

Costilla Creek begins at the Colorado border on the flanks of the Sangre de Cristo and runs south, flowing beneath the towering ridge of New Mexico's tallest mountain range for 14 miles with one small dam and only unimproved roads through private land, the Turner Ranch. The 8-mile long Comanche Creek joins from the south, flowing entirely within Carson National Forest, including heavily logged and roaded areas in its upper basin. With Comanche's added flow, Costilla runs northwestward for 5 miles directly through a dramatic gap in the towering Sangre de Cristo Mountains to the confluence of Latir Creek. This small, 7-mile stream makes its own dramatic descent from the 12,708-foot Latir Peak. With the added flow, the Costilla continues westward through conifer-clad, rounded hills to the base of the mountains and then a final 14 miles across a volcanic plain to the Rio Grande. In its spectacular mountain setting, Costilla Creek offers one of the best remaining habitats for the imperiled Rio Grande cutthroat trout. One of the most ambitious cutthroat reintroduction programs is underway here on private ranchland. The native Rio Grande sucker and Rio Grande chub also live here. Under provisions of the federal Clean Water Act, Costilla Creek is the only designated "outstanding resource waters" in the state.

Gila River with Middle, West, and East Forks, with Black Canyon, Sapillo, and Turkey Creeks

The Gila is clearly the finest natural river in New Mexico, and with its network of three forks and other wild tributaries, its upper basin in New Mexico is the largest relatively intact river system south of the Greater Yellowstone Ecosystem in Wyoming. The main stem and tributaries flow for many miles with nominal or no road intrusion much of it protected as wilderness--and no large dams have been built.

As the upriver extension of the main stem of the Gila, the Middle Fork begins with its highest tributary, Iron Creek, on the flanks of Whitewater Baldy, 10,895 feet, in the heart of the Mogollon Mountains in Gila National Forest. With Iron Creek, the Middle Fork flows for 44 miles to the confluence of the East Fork. All but the last 6 of those miles are roadless and in the Gila Wilderness.

Directly south of the Middle Fork, the West Fork similarly flows for 28 miles to its confluence with the Middle Fork, all of it in wilderness down to a recreation site at the mouth. In the same region of wild country, the East Fork rises on Kemp Mesa and drops 28 miles that are mostly roadless to its junction with the Middle Fork. This marks the beginning of the main stem. An East Fork tributary, Black Canyon Creek, flows for 18 wild miles with only one minor road crossing.

The dead-end, paved Highway 15 (to Gila Cliff Dwellings National Monument) crosses the Gila at the Middle Fork-East Fork confluence, but then the main stem flows 28 miles southwestward through the Gila Wilderness. Within this reach, Sapillo Creek joins from an equally wild 8-mile lower canyon on the south side and Turkey Creek joins from an entirely wild watershed on the north side. In the vicinity of the town of Cliff, a 24-mile reach of the main stem has road access through a broad valley, including 13 miles through private land. Beyond there, the river enters the Gila National Forest again and flows for another 9 miles with no roads as the stream cuts through the northern end of the Big Burro Mountains. From there, the river flows for its final 28 miles to the Arizona state line through a mix of BLM and private property that includes the small communities of Red Rock and Virden and a notable canyon called the Gila Lower Box. Unexpectedly, at Virden, the river goes underground for 6 miles. It reemerges near the town of Duncan, 5 miles past the Arizona line (see the Arizona section of this report).

With its upriver extension of the Middle Fork and Iron Creek, the Gila flows for about 130 miles in New Mexico and another 58 miles in Arizona as a natural stream before encountering the more intensive development, damming, and diversions that characterize much of the river's once-great route across Arizona.

Apart from its obvious qualities as the largest network of natural streams in the Southwest, the Gila system is considered "continentally outstanding in terms of its biological distinctiveness" in Freshwater Ecoregions of North America: A Conservation Assessment. Fourteen native fishes live in the basin. Of these, the desert sucker, spike dace,

Gila trout, and Apache trout occur only in the headwaters. The Gila trout is a federal listed endangered species. Unlike the lower basin, where non-native fish have proliferated, native fish are found more plentifully above the confluence with the San Francisco. Gila trout used to be widespread but are now restricted to upper streams, especially the West Fork and Black Canyon Creek. The Gila riparian corridor is considered the richest in New Mexico for birds, and southern bald eagles are residents here.

The upper Gila system has been recommended for National Wild and Scenic River designation by the New Mexico Wilderness Alliance.

In its upper 190 miles, the Gila in New Mexico and eastern Arizona is one of the longest valuable reaches of undeveloped river in the Southwest, and with its tributaries it forms a network of wild and semi-wild basins that can no longer be found elsewhere.

NEW MEXICO's "B" RIVERS

Canadian River

The best river of the southern Great Plains, the Canadian flows for about 125 nearly roadless miles across the grasslands of northeastern New Mexico before encountering its first large dam.

This 906-mile-long river rises in the plains, and the upper main stem is separated by more westerly basins from the Rocky Mountains' runoff. But these tributaries, including Ponil Creek and the Vermijo River, later feed the Canadian with their runoff from the east face of the Sangre de Cristo Mountains. At the Vermejo confluence, the finest reach of the Canadian begins.

This "wild" section of the Canadian first flows through 20 miles of private land with some unimproved road access between the Vermejo confluence (downstream from Maxwell) and the community of Taylor Springs. Below there, the river becomes wilder, with a mix of private and state-owned land for 19 miles. Then the river enters the Kiowa National Grassland, a federally owned tract managed by the Forest Service for grazing and recreation. The river flows for 23 miles through the grassland in a deepening narrow valley with only occasional dirt road access. Below there, the Canadian winds for another 26 miles in a deeply inset, remote, mostly roadless setting consisting of private ranches and state-owned land.

Then, the Mora River enters from the west—another largely undeveloped river of the New Mexico plains. This major tributary rises in the southern Sangre de Cristo and then flows through a heavily roaded upper reach, but below Valmora it begins a 50-mile undeveloped stretch with only remote and unimproved ranch roads for access.

Below the Mora River confluence, the Canadian continues for about 37 more miles with only one crossing of Highway 419 and several remote ranch roads, ending in the backwater of Conchas Dam. Below the dam, the flows are often reduced to a trickle.

No other plains river in New Mexico is as undeveloped and wild as the Canadian, and considering the entire southern Great Plains, only the Purgatoire in southern Colorado has similar values. Furthermore, this 125-mile reach of the Canadian—from the Vermejo River near Maxwell to Conchas Dam--is the longest, single, relatively unroaded section of perennial river in the state.

The Canadian flows over very unstable sand and mud substrates, and its channels frequently shift and change. Subject to high turbidity and extreme temperature and flow fluctuations, the river offers a harsh environment for aquatic life. Invasive tamarisk has invaded many of its floodplains; some restoration efforts are underway to remove it.

Cañones Creek

The remarkable canyon of Cañones Creek is incised within a dramatic volcanic landscape. The canyon is completely wild until its lower end and supports a viable population of rare, native Rio Grande cutthroat trout.

The small river begins with headwaters on the north side of the Valles Caldera, a topographic depression ringed by a collection

of volcanic cones that is now managed as a National Preserve. Immediately entrenching itself in the igneous terrain, the river runs rapidly north for 14 roadless miles to Canoñes and then to its mouth in Abiquiu Reservoir.

Almost entirely in Sante Fe National Forest, the river is part of a unique geologic area and a rare refuge for native trout. A trail follows along the creek for 8 miles.

San Francisco River, with Tularosa River and Negrito, Whitewater, and Mule Creeks

Much like the upper Gila, but without the long wilderness reaches, fewer native fish, and more private inholdings along its shores, the San Francisco River flows through the high, undeveloped mountains of west-central New Mexico, picking up wild tributaries as it goes, finally joining the Gila in eastern Arizona.

The San Francisco begins in Arizona and flows east 8 miles to New Mexico. Then, for 80 miles, it winds east and then mainly south with some highway and 4-wheel-drive access but also with two nearly roadless reaches of 24 miles each. The river dramatically skirts the northern escarpment of the San Francisco Mountains and heads south along the eastern base of the Saliz Mountains and then brushes against the western slopes of the larger Mogollon Mountains. South of Pleasanton, the river leaves Highway 180 and plunges through a 28-mile-long roadless wilderness of steepsloped canyonlands, much like the wild sections of the Gila, which lies to the east. The canyon turns sharply west, and the last 8 miles of this reach run into Arizona, where the San Francisco then flows for another 28 miles with the unpaved San Francisco River Road alongside. A final 10-mile reach takes the river to its confluence with the Gila.

All in all, this river of about 160 miles has some road access, but is only lightly developed. Nearly the entire length of the San Francisco lies in the Gila National Forest of New Mexico and the Apache National Forest of Arizona, though there are inholdings and sections of private land along the river. Native Gila trout are rare, if present in the river, but a few other native fishes, including the spike dace, loach minnow, and native suckers, survive here.

The San Francisco has several outstanding tributaries. The Tularosa River flows for 28 miles from the Continental Divide to join the San Francisco at Reserve. Highway 12 follows along most, but not all of this undeveloped stream. Negrito Creek flows 18 miles from its South Fork headwaters to the lower Tularosa, all of it nearly roadless. Whitewater Creek begins on the west side of Whitewater Bald (just west of the Gila River's Iron Creek source) and flows for 15 miles-- its upper two-thirds completely roadless--to the San Francisco. After the San Francisco bends westward toward Arizona in its long roadless reach, Mule Creek--another nearly roadless tributary--enters from the south. The lower half of this creek lies in national forest but the upper half runs through private land. In Arizona, the San Francisco picks up the Blue River, described separately in the Arizona section of this report.

The upper San Francisco basin has deep canyons with ponderosa pines, junipers, cottonwoods, and Arizona sycamores, and upper reaches support the Arizona trout, an endangered species. Wildlife includes bighorn sheep, whitetail deer, and mule deer. Along the lower river, many hot springs are found. The San Francisco River Box, Canyon Hot Springs, and Natural Bridges have been identified by the state as significant natural areas.

NEW MEXICO'S "C" RIVERS

Jemez River and East Fork, with Jemez tributaries of San Antonio Creek, Rio Guadalupe, and Rio Cebolla

With its source within the geologically unique Valles Caldera just west of Los Alamos, the East Fork Jemez flows west and joins the Jemez, a popular recreation river.

The 14-mile long East Fork gathers it flows from the slopes of 9,000, 10,000, and 11,000-foot volcanic cones, and then passes through high wetland meadows and rhyolite cliffs—an area inhabited by the

rare Jemez salamander and the endangered peregrine falcon.

The East Fork and the similar San Antonio Creek, which drains the northern part of the caldera, join to form the main stem Jemez, which flows south through a deep, forested canyon for 13 miles, where the Rio Guadalupe enters from the northwest. This stream, along with its upriver extension Rio Cebolla, offers a 28-mile-long reach popular for recreation and best known for its spectacular box canyon.

The upper East Fork and San Antonio lie within the Valles Caldera National Preserve; much of the rest of the upper Jemez basin lies within Santa Fe National Forest.

Downstream from the mouth of the Rio Guadalupe, the main stem Jemez enters Jemez Pueblo land and flows through this and several other Indian reservations in a dry, braided channel to the Rio Grande at Algodones, north of Albuquerque.

Rio Brazos

With a long roadless and nearly roadless reach draining the highlands west of the Sangre de Cristo Mountains, the Rio Brazos flows through a remarkable box canyon that is wild, remote, and beautiful.

The small river begins south of the Colorado state line in the rugged San Juan Mountains just outside Carson National Forest east of Chama, and then flows south and westward. A 9-mile reach has dirt roads nearby, followed by a spectacular 13-mile roadless section through a narrow box canyon where walls rise 1,800 feet above the river and large trees remain unlogged on the canyon slopes. The lower 9 miles have road access and some development near Ensenada before the river meets the Rio Chama. The entire river appears to be in private ownership.

Rio Chama

One of the more popular and perhaps most scenic paddling trips in New Mexico, the Rio Chama flows with clear water for 25 roadless miles. The Chama starts in southern Colorado, with its East and West Forks flowing from the South San Juan Wilderness. The river enters New Mexico, paralleled by Highways 17 and then 64, until it runs into El Vado Reservoir.

Below the reservoir, the excellent recreational section of the Rio Chama begins, and it runs for 25 miles through a mountain canyon with ponderosa pines, junipers, and grasslands along the shores until it meets the backwater of Abiquiu Reservoir. This is the only canyon in northern New Mexico with brightly colored sedimentary rocks rather than blackened basalt that typifies the Rio Grande and other canyons of igneous origin. The float trip between the two reservoirs is considered one of the most scenic river trips in the Southwest.

Unlike most western rivers, flows in this reach are not depleted, but rather augmented by water projects. Runoff from the San Juan River is diverted south to the Rio Grande via the Rio Chama; the flows in this river are artificially increased by up to 100,000 acre-feet per year. With a lush riparian zone, this canyon offers outstanding wildlife habitat, though the river's aquatic life has been completely altered by the cold water and unnatural flow regime below El Vado Dam.

Below Abiquiu Dam, the river is still scenic but has Highway 84 alongside and faces increasing development pressure.

The principal hydrologic artery of New Mexico, the Rio Grande flows through spectacular canyons in the northern reaches of the state and has nourished the West's longest continuous cottonwood bosque in its mid-reaches, extending both north and south of Albuquerque.

Other than the San Juan River, which nominally cuts across the northwestern corner of New Mexico, the Rio Grande is the only major river that brings water to New Mexico from the distant highcountry of the southern Rockies. But it doesn't bring much, and its flow is chronically diverted in southern Colorado. Thus, the upper river is sometimes nearly dry where it enters the state.

Springs and tributaries restore some of the flows, and the river cuts an amazing route through the volcanic landscape of north-

central New Mexico, running for 56 miles with some of the leastaccessible canyon country in the southern Rocky Mountain region. The river passes the perfectly symmetrical Ute Mountain, an ancient volcanic cone 10,093 feet above sea level, and then cuts a dramatically deepening canyon into multiple layers of nearly black basalt.

At the Upper Box the river plunges in extreme rapids and waterfalls. The Red River then enters from the east, delivering a pulse of snowmelt from the Sangre de Cristo crest. After 10 miles of gentler rapids, the Rio Grand drops into the Lower Box, with nearly vertical canyon walls 800 feet high and big whitewater that is a challenging but popular rafting run. Wildlife abounds through many of these remote reaches, and the canyon walls offer ideal nesting sites for raptors.

Below the Lower Box, the river flows gently through private farmland and several Indian reservations for about 25 miles. It then enters another roadless canyon that runs for about 10 miles from Highway 502 to Cochiti Reservoir (with Bandelier Wilderness to the east). Below Cochiti, the river runs for 40 miles through several more Indian reservations and then enters the sprawling city of Albuquerque. Downstream from the city, the river flows about 160 miles to the next large reservoir, Elephant Butte. In this reach, the river shares its valley with many nearby roads (including I-25) and burgeoning suburbs, but it also features several national wildlife refuges, including Bosque del Apache, which offers habitat crucial for endangered whooping cranes and southwestern willow flycatchers. Most important, nearly the entire 200-mile reach from Cochiti Dam to Elephant Butte Reservoir has nourished a massive and aged cottonwood forest-called a "bosque" in New Mexico--that is acclaimed as the longest continuous riparian forest in the West.

Unfortunately, the trees are not regerminating owing to diversions and the regulation of floods and silt flows upstream at Cochiti. The river is almost entirely diverted in some places, and invasive tamarisk has taken over floodplain habitat. The altered flows have also driven the Rio Grande silvery minnow to near extinction; this is the only endemic fish of the entire basin that still survives in New Mexico. Efforts are now being made to reinstate crucial flood flows and to restore riparian areas that are essential to wildlife. But increasing development of homesites on the floodplains, especially near Albuquerque, makes the goal or restoring this one-of-a-kind riparian forest more and more difficult.

Below Elephant Butte, the river hits another reservoir almost immediately and then runs with severely depleted flows, and with Interstate 25 and several towns and developing cities alongside all the way to El Paso, where the depleted and silty river turns eastward on its long trek to the Gulf of Mexico.

Vermejo River

A major tributary to the Cimarron and then Canadian River, the Vermejo flows from high peaks in southern Colorado and across the western limits of the Great Plains with almost no development along its shores.

This primary water-supplier to the Canadian backs up against the Purgatoire River watershed in southern Colorado and collects the high snowmelt of the Sangre de Cristo Mountains through several wild tributaries, flows into New Mexico via the North Fork Vermejo, Little Vermijo Creek, and Ricardo Creek, and then meanders through foothills and rolling grasslands to the southeast. For about 80 miles the main stem winds through the hills of the Park Plateau, which stands beautifully as the precursor to the steep rise of the Sangre de Cristo. An old railroad parallels the river for much of this distance. At the town of Maxwell the Vermejo joins the Canadian at the beginning of its semi-wild descent across the high plains.

The old railroad and very minor unimproved roads are the only access along most of the river's length. With its dependable springtime runoff from the high mountains, its long distance through undeveloped and seldom-visited country, and its linkage of the Rocky Mountains to the Canadian River and the Great Plains, the Vermejo is an fine example of the ecosystem and geographic connectivity that undammed and undeveloped rivers can provide.

CONCLUSION

Working from 13 lists compiled by other organizations and agencies, plus several interviews and additional research, we found 51 rivers and streams that have been noted for their natural values. From this we developed an A list of 10 rivers and tributaries, a B list of 7, and a C list of 9.

Two clusters of excellent rivers became evident:

Gila River system

The Gila with its three forks and with a number of outstanding wild tributaries, as well as the adjacent San Francisco River system, may be the greatest cluster of fine natural rivers in the Southwest. These are all discussed under the Gila River heading, above.

Jemez River system

The East Fork Jemez and the main stem with its headwater reaches of San Antonio Creek, Rio Guadalupe, and Rio Cebolla make a distinctive set of fine streams flowing from the volcanic uplands west of Los Alamos. Not wild, but clearly undeveloped and almost entirely within the Valles Caldera National Preserve and the Sante Fe National Forest, this suite of rivers offers outstanding values and is covered above under the Jemez river heading.

Rivers of Arizona

ying squarely in the dry latitudes of the Southwest, Arizona is unequivocally a desert state. Although it lacks high mountain peaks that can rake a lot of moisture from passing clouds (the way the Sangre de Cristo do in New Mexico, or the way the Independence, Ruby, and Snake Ranges do even in Nevada), Arizona has much terrain that can be considered mountainous. Its northern half lies within the redrock-sandstone empire of the Colorado Plateau, and its southern half and western edge are an extension of the Basin and Range province, with small mountains separated by dry valleys. Arizona's ecoregions reflect the underlying pattern of these landforms. A wide range of desert plant communities thrive, including those of the Colorado Plateau in the north and central areas, those of the Sonoran Desert--a drier habitat of the American Semi-Desert in the southwest--and those of the Chihuahuan Desert in the southeast. In addition, a belt of rugged mountains through much of the center and east-central parts of the state manage to coax some measure of rain and snow out of passing clouds and support a diverse woodland community of pines and oaks.

Most of the "waterways" here are intermittent-- dry most of the time, but raging when intense monsoon rains move up from the Gulf of California and flash floods hit. Arizona's rivers were not always this way. Historic accounts describe life-filled streams where we now typically have dry and sharply eroded washes. Profound environmental changes have occurred since settlers first brought cattle and sheep that overgrazed the native plantlife, exposing and compacting fragile desert soils. But, some rivers still run, and a handful of these are exceptional.

Like other desert states, Arizona's greatest river arteries (the Colorado and the Gila) flow from high mountains lying upstream beyond the state boundary. The Colorado, which flows here in the Grand Canyon, is in a class by itself—nothing compares nationwide,

or for that matter, on the globe. Even the exceptional, long, wild, canyon reaches of the Colorado and Green Rivers in Utah seem small next to the Colorado in the Grand Canyon, with its 5,000-foot-deep chasm, its thunderous flows, and its epic 250-mile length without dams, roads, or bridges.

With myriad intermittent tributaries fingering across Arizona, the Colorado collects any and all the runoff that might flow from the state's drylands and mountains. However, runoff is sparse, and almost all the Colorado's smaller tributaries are dry arroyos, sunbaked riverbeds, and calcified rocky washes for much of the year. The big river also gets water from parts of western New Mexico (via the Gila) and a minor node of northern Mexico that tilts north into Arizona via the San Juan River.

Arizona's other major artery, the Gila, flows from mountains in New Mexico, traverses the entire state east-to-west, and joins the Colorado at its very lower limits in the U.S., at the town of Yuma. With a watershed covering about half of the state's area, the Gila enjoys more runoff than the northerly and westerly watersheds that drain into the Colorado. Arizona's central and eastern mountains give rise to the Black, White, Salt, Verde, and other streams that all join the Gila during the spring or summer seasons of snowmelt or rain. However, nearly all but the largest streams—and often they as well--dry up after the runoff stops or when the meager flows are dammed and diverted for agriculture and booming Sunbelt growth. As a consequence, despite its length and tributaries, the Gila is dry most of the time in its lower half. Even though flows drop low in the headwaters as well, the Gila in its upper reaches remains one of the Southwest's most remarkable streams.

Diversions for agriculture and booming suburban growth are typical not only in the Gila basin, but they strain and stress rivers throughout the state. In addition, extensive logging of most of the dryland forest—sparse and stunted as it often is—has significantly degraded rivers by diminishing the capacity of their watersheds to absorb water during rainstorms. In the past, forests held water and then slowly released it later in a way that benefited both the life of the streams and the people living along them. Now, water runs off rapidly and erratically, causing damaging erosion and sedimentation. Mining has also affected Arizona's rivers with massive watershed disturbances and leachate from tailings.

Though native fish in all the west's desert states face serious challenges to survival, Arizona has the dubious distinction of having the highest percentage of its native freshwater fishes at risk of extinction-63 percent. For comparison, in Utah, 58 percent of native fish are at risk; in Nevada, 52 percent; and in New Mexico, 30 percent. (TNC, Rivers of Life, 1998). In Arizona, twenty-four native fishes are at risk. Throughout the Southwest, 11 fish species have already gone extinct, mostly victims of dewatering and exotic species. The Southwest Center for Biodiversity has estimated that, unless major changes are made regarding land and water management, most of the region's native ichthyofauna will face extinction in the coming decades. None of Arizona's rivers have truly viable populations of native fish. Almost all have been extirpated by diversions, dams, over-grazing, and especially the introduction of exotic fish, including popular game fish. The native fish have been eliminated from virtually all the sizable rivers, and survive only in smaller tributaries that are remote, undiverted, and seldom visited. Efforts to reinstate natives into larger streams are without exception met with resistance from sport anglers because the introduced gamefish or catfish need to be eliminated for the natives to survive.

Remnant native populations make streams such as Arqavaipa Creek, the Little Colorado, Rucker Canyon, and tributaries to the upper Gila, Verde, and a few others all the more valuable for conserving biodiversity. The native Apache trout, which was extirpated from all its original range, has been reintroduced into a few streams in the upper Salt and upper Little Colorado basins, but hope for restoring this species and other native species will depend on restoring and conserving their habitat. In the course of the Arizona survey, we counted about 20 perennial streams having roadless reaches of 10 miles or more. With few listings of high-quality rivers available here, this accounting of wildness became an especially important part of our Arizona analysis. Unlike many roadless reaches of rivers in the wetter regions of the Rocky Mountains and the West Coast, most of the roadless canyons here do not have trail access either. The state's longest roadless reach, by far, is the 250 miles of Colorado in the Grand Canyon. The Little Colorado appears to run for 56 miles without roads, the Black River for 48 miles, Clear Creek for 40 miles, and the Verde River and Navajo Creek each for 38 wild miles.

Only one river—the Verde for 41 miles—is designated in the National Wild and Scenic Rivers system. Some others have comparable values; 13 rivers, for example, have reaches of 20 miles or more that are dam-free, nearly roadless, and in a relatively natural condition. These and other streams are worthy of protection through federal, state, or local programs, or through the work of land trusts and local watershed associations.



Colorado River, Grand Canyon National Park

Great Rivers of Arizona



WESTERN RIVERS CONSERVANCY

Sources for the Arizona Survey

In addition to the major sources described at the outset of this report, the Arizona survey incorporated the following state-specific sources:

Interviews with biologists and local experts (B#).

Heidi Blasius, Bureau of Land Management, fisheries biologist Amy Unthank, U.S. Forest Service, regional fisheries program manager

Arizona Nature Conservancy, high priority for conserving natural diversity (NC). These are streams that were identified by the Nature Conservancy in 1985 as high priority for conserving natural diversity, as listed in American Rivers' Outstanding Rivers List, 1991.

Arizona Nature Conservancy, Freshwater Assessment summary (NC-1). These streams were identified in 2006 as some of the most important streams for native fish.

Western Rivers Conservancy, roadless reaches (WR-1). Roadless reaches of 10 miles or longer, identified on DeLorme atlas of Arizona.

Western Rivers Conservancy, nearly roadless reaches (WR-2). Nearly roadless reaches of 20 miles or more.

Key to Arizona Rivers Table

SOURCE OF RECOMMENDATION

B#- interview with biologists and local experts

B1- Heidi Blasius, BLM

B2- Amy Unthank, U.S. Forest Service

BL- Bureau of Land Management (BLM)

BO- Bureau of Outdoor Recreation

F- U.S. Forest Service

I- USDI/USDA, Wild and Scenic List, 1965

N-Nationwide Rivers Inventory

NC-Nature Conservancy 1985 priority sites for aquatic conservation

NC-1- Arizona Nature Conservancy Freshwater Assessment W- National Wild and Scenic Rivers Ws- National Wild and Scenic Study Rivers WRC- Western Rivers Conservancy

WR-1- WRC roadless \geq 10 mi

WR-2- WRC nearly roadless ≥ 20 mi

BEST SOURCES: B#, I, N, NC-1, W, WR-1, WR-2

QUALITIES

- **B-Biological Diversity**
- C- Cold water/ high elevation
- E- Endangered or imperiled species

F- Fish

G-Geological/geographical

- L- Long free-flowing reach >100 miles
- L+- Long free-flowing reach, combined with streams it flows into
- P-Plant life/ riparian values
- Rf-Recreational fishing
- **Rh-**Recreational hiking
- **Rr-** Recreational river running
- WL-Wildlife
- WN-Wildness

ECOREGIONS

- AD-American Semi-Desert and Desert (322)
- AN- Arizona New Mexico Mountains Semi-Desert (M313)
- CP- Colorado Plateau Semi-Desert (313)
- CD- Chihuahuan Semi-Desert (321)

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Agua Fria	Gila	N		P, WN	AN, CP		riparian area
Aravaipa Cr	San Pedro	B1, N, NC-1		B, F, P, WL, WN	СР	A	riparian/mixed broadleaf and mesquite bosque/ loach minnow
Arnett	Whitlow Ranch Flood Control Basin	N		Ρ	AN		intermittent
Ash Cr	Gila	N		P, R	AN		intermittent
Barbershop Cyn	East Clear Cr/ Little Colorado	Ν		F, P, WN	СР		
Bear Wallow Cr	Black	B2, N		F, P, WN	AN		
Bill Williams	Colorado	N, WR-2	N	P, WL, WN	AD, CP		one of most impt desert riparian ecosystems in AZ / WR-2 (14 mi)
Black	Salt	BO, F, N, WR-1, WR-2	N	F, Rh	AN	В	WR-1 (48 mi)/ WR2 (64 mi)
Black, East Fk	Black	N	N	F, P, R, Rf, WL	AN	В	
Black, North Fk of East Fk	Black, East Fk	Ν	N	R, Rf, WL	AN		
Black, West Fk	Black	N	N	F, P, R, WN	AN	В	
Blue	San Francisco	B2, N, WR-1, WR- 2		E, F, R, WL	AN	В	WR-1 (15 mi), WR-2 (25 mi)/ loach minnow
Big Sandy	Bill Williams	N		F, P, WL, WN	СР		

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Bonita Cr	Gila	B1, N		E, F, P, R, WL	СР		endangered fish
Boucher Cr	Colorado	N		F, G, Rh, WN	СР		Grand Canyon N.P.
Burro Cr	Big Sandy/ Bill Williams	N		F, G, R, WL, WN	AD		intermittent
Cañada del Oro	sink	Ν		P, R, WN	СР		Pima County
Canyon Cr	Salt	N, WR-1, WR-2		R, WL	AN	В	Reservation/ WR-1 (14 mi),
Carrizo Cr	Salt	WR-2		WN	AN		WR-2 (22 mi)
Cave Cr	San Simon Valley sink	Ν		E, F, G, P, R, WL, WN	CD	С	internationally recognized for birding/ Rio Yaqui fishes
Cave Creek, South Fk	Cave Cr	N	N	F, G, P, R, WL, WN	CD	С	
Cherry Ck	Salt	N		F, WL	AN	В	
Cherry Springs Cyn Cr	San Pedro	B1		E, F	CD		endangered fish
Chevelon Cr	Little Colorado	BO, B2, N, WR-2	N	F, G, P, Rf, WL	СР	В	Little Colorado River spinedace/ WR- 2 (52 mi)
Cibecue Cr	Salt	WR-1		WN	AN		
Clear Cr	Little Colorado	N		F, G, Rh, WN	СР	В	Grand Canyon N.P.

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Clear Cr, East	Clear Cr/ Little Colorado	N		F, P	AN, CP		
Clear Cr, West	Clear Cr/ Little Colorado	BO, N		G, P, R, Rf, WN	AN, CP		
Chuar Cr	Colorado	Ν		G, WN	СР		Grand Canyon N.P.
Cibecue Cr	Salt	WR-2		WN	AN		WR-2 (20 mi)
Cima Cr	Cave Cr	Ν		F, G, P, R, WL, WN	CD		
Cinega Cr	Mescal Arroyo/ Santa Cruz	N, NC		F	AS		intermittent
Colorado	Gulf of CA (in Mexico)	BO, I, N, WR-1	Ν	E, F, G, P, Rf, Rh, Rr, WL, WN	CP/ AD	С	in Grand Canyon and Iower reach below Cibola Dam/ WR-1 (280 mi)/ Colorado pikeminnow, bonytail sucker, razorback sucker
Crystal Cr	Colorado	N		F, G, Rh, WN	СР		Grand Canyon N.P.

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Diamond Cr	White, North Fk	во		R	AN		
Deer Cr	Colorado	Ν		E, F, G, Rh	СР		Grand Canyon N.P./ loach minnow
Eagle Cr	Gila	N, NC, NC-1, WR- 1, WR-2	N	P, WL	AN		raptors/ WR-1 (10 mi), WR-2 (19 mi)/ Phelps Dodge land
Fish Cr	Black	N		F, P, R	AN		intermittent
Fossil Cr	Verde	N		F, G, WL, WN	AN		restored flows in 2005
Francis Cr	Burro Cr	N		F, P, R, WL	AD		
Gila	Colorado	BL, BO, N, NC, WR· 1	N	E, F, G, P, Rr, WL, WN	AD, AN, CP	A	WR-1 (10 mi, 10 mi) / see also NM
Hassayampa	Gila	N		P, R, WL	AD		intermittent flow, TNC preserve
Havasu Cr	Colorado	N		G, P, Rh, WN			
Hermit Cr	Colorado	N		G, F, Rh, WL, WN			
Home Cr	Black, West Fk	N		F, P	AN		
Hot Springs Cyn	San Pedro	N		F, P, WL, WN			
Kanab Cr	Colorado	N	N	F, G, P, R, WN	СР	А	native fish spawning

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Kwagunt Cr	Colorado	N		G, WN	СР		Grand Canyon N.P.
Leonard Cyn	East Clear Cr/ Little Colorado	N		F, P, R	СР		
Little Colorado	Colorado	BO, N, NC, WR-1, WR-2		E, F, G, WN	СР	В	humpback chub/ WR-1 (56 mi, 28 mi), WR-2 (152 mi)
Little Colorado, East Fk	Little Colorado	B2, N		F, P, R, WL	СР	В	
Little Colorado, South Fk	Little Colorado	B2, N		Р	СР	В	
Little Colorado, West Fk	Little Colorado	B2, N		P, R, WL, WN	СР	В	
Marijilda Cr	Graveyard Wash/ Gila	N		P, R	AN		intermittent/ small
Nankoweap Cr	Colorado	Ν		G, WN	СР		
Navajo Cr	Colorado (Lake Powell Resvr)	WR-1		WN	СР		WR-1 (38 mi)
Oak Cr	Verde	BO, N		F, G, R, Rh	AN		near hwy/ developed
Oak Cr, West Fk	Oak Cr	Ν		G, R, WL, WN	AN		
O'Donnell Cr	San Pedro	B1, N		E, F, P	AN		Gila chub, Gila topminnow
Paria	Colorado	BL, N, WR-1		F, G, P, Rh, WL, WN	СР		WR-1 (28 mi w/ UT reach)
Parker Cr	Cottonwood Cr	N		Р	AN		
Pigeon Cr	Blue	N		WN	CD		intermittent

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Pinto Cr	Salt	N		Р	AN		
Post Cr	Grant Cr	Ν		Р	AN		intermittent, small
Redfield Cyn	San Pedro	B1, N		E, F, P	AN		intermittent/ endangered fish
Rucker Cyn	Sulphur Springs Valley sink	B1, N		E, F, G, P, R, WN	CD	С	intermittent/ Rio Yaqui fishes
Sabino Cr	Tinque/ Verde/ Santa Cruz	B1, N		W, F, P, R, WL, WN	AD, CP		Pima County
Salome Cr	Salt (Roosevelt Resvr)	N		WL, WN	AN		
Salt	Gila	BO, I, N, NC, W, WR-1, WR-2		E, F, G, P, Rr, WL, WN	AN, CP	В	Fort Apache Resvr to Black River/ WR-1 (28 mi), WR-2 (38 mi, 28 mi)/ bald eagle, Mexican duck, Colorado pikeminnow
Salt Cr	Cibecue Cr	NC, WR-1		WN			WR-1 (10 mi)
San Francisco	Gila	BL, N, NC, W, WR- 1	N	F, G, Rf, Rh, WL, WN	AN	В	WR-1 (28 mi w/ NM reach)/ Arizona trout/limestone /hot springs

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
San Pedro	Gila	NC, N, NPS		B, F, P, R, WL	CD	С	
Santa Cruz	Gila	NC		В	AD		
Santa Maria	Bill Williams	N	Ν	F, G, P, WL, WN	AD		
Sardine Cr	San Francisco	Ν		Rh	AN		scenery, intemittent pools
Shinumo	Colorado	Ν		F, WN	СР		native fish because of waterfall at mouth
Sonoita Cr	Patagonia Reservoir/ Santa Cruz	B1, NC		E, F, P, WL,	AD		endangered fish, birds, good riparian habitat
Spring Cr	Tonto Cr	N		F, P, WN	AN		
Stone Cr	Colorado	N		G, WN	СР		Grand Canyon N.P.
Swamp Springs Cyn	Redfield Cyn/ San Pedro	N		F, P, WL, WN	CD		small
Sycamore Cyn	flows into MEXICO	Ν		F, WL	AD		intermittent
Sycamore Cr	Verde	N		F, R, Rh, WN	AN	А	intermittent
Tapeats Cr and Thunder R	Colorado	Ν		G, WN	СР		Grand Canyon N.P.
Tonto Cr	Salt (Roosevelt Resvr)	BO, N, WR-1, WR- 2		F, G, P, R, WL, WN	AN		WR-1(20 mi), WR-2(40 mi)
Turkey Cr	sink	N		E, F, P, R	AN		loach minnow/ N. Graham Co.

RIVER	tributary to	source	special review	qualities	ecoregion	rating	additional comments
Turkey Cr, West	Whitetail Cr/ San Simon Valley sink	B1		E, F	CD	С	Rio Yaqui fishes
Verde	Salt	B1, BO, N, NC, NC- 1, W, WR-1	N	F, P, Rr, WL, WN	AN	А	WR-1 (38 mi)
Verde, East	Verde	B2, BO, N, NC, WR 1		F, P, WL, WN	AN	А	WR-1 (15 mi, 12 mi)
Virgin	Colorado	N, NC-1		G, P, R, WL, WN	СР		
Wet Beaver Cr	Verde	Ν		G, R, WN	AN		
White	Salt	BO		WN	AN		intermittent
Willow Cr	Clear Cr/ Little Colorado	N		P, WL, WN	СР		ephemeral
Willow Springs Cyn	Chevelon Cr	N		WN	СР		
Woods Cyn Cr	Chevelon Cr	Ν	}	P, WL, WN	CP	}	
Workman Cr	Salome Cr	Ν		P, R,WL, WN	AN		small

ARIZONA'S "A" RIVERS

Aravaipa Creek

This small waterway is considered by The Nature Conservancy and others to be the most important stream in Arizona for native fish.

From a high valley between the Pinaleno Mountains and the Galiuro Mountains, Aravaipa Creek flows northwest for nearly 50 miles to its confluence with the San Pedro River northeast of Tucson.

The creek dries-up in many sections, yet it has remained an isolated stronghold of native fishes that have been extirpated elsewhere. Much of the river's upper 25 miles run through a thin belt of private land with state-owned land on the slopes above, rising to higher mountains in the Coronado National Forest. In its lower reaches, the river turns west and drops steeply through the Aravaipa Canyon Wilderness for several miles while the road veers away to the east. The creek then joins the San Pedro River, which continues north to the Gila River, though major sections are often dried-up.

The creek supports 7 native species: the desert sucker, Sonora sucker, longfin dace, speckled dace roundtail chub, loach minnow, and spikedace. The spikedace occurs in no other stream. Lacking dams or large diversions, the Aravaipa's hydrologic complexity of pools and riffles is largely intact, as is its natural hydrograph, and native fishes tend to compete better than introduced fishes when confronted with the hazards of peak floods alternating with extremely low flows.

Increasing development and resulting water consumption in the upper basin may pose problems to the native fish.

Gila River

As it flows through wild canyons of eastern Arizona, the Gila continues downstream from its wild headwaters east of the state line (see the New Mexico section of this report).

After the Gila enters Arizona, its winds for 8 miles through a broad valley with roads, railroad tracks and several small towns, including Duncan. The valley narrows as the river continues to run for about 24 miles through private land along the waterfront with state and BLM land on the hillsides. Then the roads and track leave the river again, and the Gila enters its first wild section in Arizona. This 26-mile reach—beginning upstream from the mouth of the San Francisco River (see New Mexico section of this report) and extending beyond Bonita Creek-- is largely wild and unroaded, and 23 miles of it is designated as the Gila Box Riparian National Conservation Area, managed by the BLM. A 10-mile section here through the Conservation Area is completely roadless. This "Gila Box," section is known for its steep cliffs, colorful bluffs, deep canyons, and healthy riparian vegetation. According to the Nationwide Rivers Inventory, the canyon provides habitat for birds of prey that is "unexcelled" in Arizona. The reach is also considered excellent for paddling. The river is dominated by non-native fishes; natives are typically found only in tributary refugia.

Beyond this canyon, the Gila enters the Safford urban area and soon becomes heavily encroached upon by roads and highways, agriculture, and land development. Farther downstream, the river is impounded by Coolidge Dam.

Immediately below Coolidge, the Gila enters its second wild canyon in Arizona. For 10 miles the river runs through a gorge without roads or trails, but flows are heavily affected by the dam upstream.

When combined with the outstanding 130 miles of the Gila in New Mexico, the 58 miles of the upper Gila in Arizona make a 182-mile-long corridor of dam-free river. With the exception of the lightly developed 8 miles in far eastern Arizona, most of the river's route to San Carlos Reservoir behind Coolidge Dam is wild, semiwild, or lightly developed.

In its entirety, the Gila basin covers half the state. The river and its tributaries historically supported 18 native fish species. One of these is extinct, 10 are listed as endangered or threatened, and most others are imperiled but not officially listed.

Kanab Creek

With excellent water quality, Kanab Creek flows through remote and roadless country, starting in aspen-forest uplands and dropping to the redrock depths of the Grand Canyon. This is the second-largest tributary entering the Colorado River within the Grand Canyon. (The Little Colorado is the largest.)

The stream begins in Utah, on the Paunsaugunt Plateau in Dixie National Forest, and flows south for 40 miles --with a 10-mile roadless reach--to the town of Kanab. Crossing into Arizona, it runs for 5 miles through the Kaibab-Paiute Indian Reservation and then enters a magnificent 56-mile roadless reach plunging downward through canyon country, ultimately dropping 5,000 feet to its confluence with the Colorado River in the bottom of the Grand Canyon. The creek passes through BLM land and then through the Kanab Creek Wilderness of Grand Canyon National Park. The Nationwide Rivers Inventory states that native fish spawn in the creek.

Verde River and East Verde River, Fossil Creek, and Sycamore Canyon

The Verde River flows through headwater reaches that still harbor native fish, a wild canyon with spectacular scenery, a forest of saguaro cactus, and a riparian belt with excellent habitat for birds and other wildlife.

Roughly 160 miles long, the river begins at a minor impoundment, Sullivan Lake, near Paulden (southwest of Flagstaff), and flows east and south as a small stream for about 20 miles through private, state, and national forest land with only occasional unimproved roads near the stream. A 64-mile stretch follows through rugged canyons and then a broad valley, with a railroad track alongside and with roads and communities peppered enroute, as well. Then, below the town of Camp Verde, the river enters an exquisite 38-mile roadless reach. Below there, the lower Verde has 2 major reservoirs in a span of 26 miles, followed by a final 8 miles of flowing river through the Fort McDowell Indian Reservation before meeting with the Salt River east of Phoenix. Small tributaries upstream from Camp Verde are known for their surviving native fish species. Twelve fishes historically occurred here; owing in part to reintroduction efforts, 9 native species can be found today. The Nature Conservancy considers this to be the second-most important native fishery in the state (after Aravaipa Creek). The Verde is a rare sizable stream that still harbors some native fish, and a reintroduction program aims to reestablish 12 native species in the basin.

For recreation, wildlife, and desert plantlife, the Verde's middle, roadless reach is premier. Nearly 41 miles here were designated in the National Wild and Scenic Rivers system in 1984—Arizona's only stream in the national system. This reach is known for its beautiful landscape and habitat, and flows through what may be the finest saguaro cactus forest anywhere that is accessible by river travel. Bald eagles nest in cottonwoods, though the trees ceased regerminating about 100 years ago, presumably owing to effects of heavy grazing. The Forest Service is now attempting to protect critical areas for regrowth. Almost all of the designated corridor is public land, but only about half of the Verde's mileage eligible for the National Wild and Scenic Rivers system was designated.

The East Verde River is the least disturbed part of the Verde River watershed. This stream flows into the main stem from the east. Its upper 10 miles include road access to popular recreation sites and a beautiful canyon and valley with sycamores and other riparian plantlife. The middle river is a 12-mile roadless canyon to the Highway 87 crossing, followed by a 15-mile roadless reach through the Mazatzal Wilderness to the main stem Verde River. The East Verde still has some of its native fish.

Fossil Creek enters the main stem Verde 3 miles upstream from the East Verde after flowing southward for about 16 miles. Its steep upper pitch, called Sandrock Canyon, flows through the Fossil Springs Wilderness. Throughout its length this small stream drops through a deep canyon with nominal road access. Diverted for decades by a hydropower project, water has recently been returned to Fossil Creek. The native leopard frog has survived, and is thriving again. In 2004 the U.S. Forest Service stocked the newly restored stream with native fishes, including the desert sucker, Sonora sucker, headwater chub, roundtail chub, longfin dace, and speckled dace. These are all propagating well, with the potential of making Fossil Creek an outstanding reclaimed river and a criterion stream with native fishes. Ironically, the fact that all streamlife had been obliterated by the hydroelectric project made it possible to reintroduce the native species without competition from introduced game fishes

Sycamore Canyon is a major upper Verde tributary of about 30 miles, entering from the northeast. Its spectacular, steep canyon sides with colorful rock strata and tributary gorges are reached by a popular hiking trail through the 21-mile-long Sycamore Canyon Wilderness.

The Verde watershed is seeing rapid growth; its population is predicted to increase by 143 percent between 1994 and 2040. Increasing demands for water—even when obtained from underground aquifers—will likely continue to deplete instream river flows to critically low levels.

ARIZONA'S "B" RIVERS

Black River

Deep in the mountains of the Fort Apache and San Carlos Indian Reservations, the Black River has the third-longest roadless mileage among all rivers in Arizona and is centerpiece to some of the best river-wildness in the state. The Black and White Rivers join to form the Salt. At the confluence, the Black is the largest of the two, and thus, it is the upriver extension of the Salt River—the major riparian artery of central Arizona north of the Gila and ultimately the major tributary to that river.

Beginning in east-central Arizona with the North Fork of its East Fork, the Black River flows from a popular forest and lake recreation area of Apache National Forest in east-central Arizona and soon plunges down the face of the Mogollon Rim—a dramatic escarpment separating the Colorado Plateau from the Arizona mountains to its south. After this upper reach of about 36 miles, the main stem cuts into a lower plateau and runs for about 64 more miles through a maze of rugged and nearly roadless country. This entire lower reach is within the Fort Apache and San Carlos Indian Reservations.

Riparian forests can be found along much of the river's length, and pinyon and juniper forests cover the slopes rising beyond. The Nationwide Rivers Inventory calls this a "high quality trout fishery." Native fish, however, have largely been extirpated. Native Apache trout have been reintroduced into a number of the tributaries by the White Mountain Apache Tribe, which has a growing interest in managing the watershed for native fish. Bear Wallow is one of the more intact and beautiful small tributaries with reintroduced native trout.

Blue River

The major Arizona tributary to the San Francisco River, the Blue flows dam-free and undeveloped with major springflows, wild canyon country, and habitat for raptors and other wildlife.

Counting its headwaters of Campbell Blue Creek, the Blue River flows for about 62 miles through the rugged mountains of eastcentral Arizona. Upper reaches are accessible by recreation roads in Apache National Forest. Then the river drops into wilder canyons, running 24 miles with almost no road access. With its flow and habitat, the river is a critical part of the San Francisco and upper Gila River complex of outstanding wild rivers of western New Mexico and eastern Arizona.

Non-native trout have been stocked in this river, but a barrier to their migration may be put into the river and the native Gila trout reintroduced.

As the largest tributary to the Colorado River within the Grand Canyon, the Little Colorado runs for 290 free-flowing miles. Much of its length has no roads, and its lower reaches are important habitat for the endangered humpback chub. Two tributaries, Chevelon and Clear Creeks, also flow for long, wild distances. The Little Colorado begins in the same highlands of Apache National Forest that feed the Black and San Francisco Rivers but flows in the opposite direction. From a dozen tributaries, including its West Fork, the Little Colorado starts its long, desert-bound journey north and westward, sharing its valley with Highway 180. Native Apache trout are being returned to portions of the West Fork and other tributaries. After about 20 miles, the main stem pools into Lyman Lake behind a small storage dam. Below there, the river flows dam-free for the rest of its length.

The wildest section of the river lies downstream from the town of Winslow, where the essentially roadless river flows through the Navajo Indian Reservation and past the multicolored rocks and hills of the Painted Desert. Highway 89 crosses the river just above the beginning of the Little Colorado Gorge, which continues for 56 miles in a deepening canyon through the Little Colorado River Gorge Navajo Tribal Park. Very much like a "little Grand Canyon," the stream meets the Colorado River in the depths of the stunning Marble Canyon section of the Grand Canyon.

The endangered humpback chub, which cannot survive in the Colorado's cold, dam-released water, persists in lower reaches of the Little Colorado much like it did throughout the Grand Canyon before Glen Canyon Dam was built upstream. Near the Little Colorado's mouth, water that is milky-blue from calcium creates spectacular travertine terraces, pools, and riffles before the river's modest average flow of 244 cubic feet per second joins the mighty main stem.

Headwaters of the Little Colorado are the East, West, and South Forks, which rise high on the northwest side of Baldy Peak, 11,403 feet, in the Sitgreaves National Forest--a popular recreation area with scattered lakes. Native Apache trout have been reintroduced to these streams.

Outstanding tributaries are Chevelon Creek, joining the Little Colorado just above Winslow, and Clear Creek, which flows in at Winslow. Without the highway and road intrusions, these nearly roadless streams might be considered wilder "sources" of the Little Colorado than its own upper main stem. Chevelon begins on the Mogollon Rim and flows for 12 miles through an upper canyon thick with conifers and other trees in Sitgreaves National Forest. The unusual plains-grassland here has been identified by the Department of the Interior as a potential national natural landmark. A recreational fishery has been stocked with non-native fish, but the creek still supports the Little Colorado spinedace—a native whose range is now very limited. The creek is then impounded in Chevelon Canyon Lake. Five miles downstream at Mormon Crossing Road, the creek begins its nearly roadless course north for 52 more miles toward the Little Colorado, passing through private land that is mixed with state parcels and some BLM acreage.

A twin to Chevelon, Clear Creek takes a parallel course just to the northwest and flows for 40 roadless miles before Highway 99 crosses just above the confluence with the Little Colorado in Winslow.

Salt River with Canyon and Cherry Creeks

This spectacular section of the Salt is sometimes called a "mini-Grand Canyon." It is habitat to three federally listed endangered species and is a one of the Southwest's best whitewater paddling runs.

The Salt River begins at the confluence of the White and Black Rivers. It immediately drops into a deep canyon of layered, sedimentary rocks, with large rapids and no road or trail access for about 28 miles to the Highway 60 bridge. Then an unroaded canyon continues for another 45 miles to the backwater of Roosevelt Dam. This entire reach of about 73 miles is nearly roadless and flows swiftly through a spectacular canyon. Three endangered species are found here: the bald eagle, Mexican spotted owl, and Colorado River pikeminnow.

Four fine tributaries also enter from the north within this reach. First, Carrizo Creek flows south from the base of the Mogollan Rim, and its lower 25 miles are essentially roadless. Downstream from Highway 60, Cibeque Creek similarly flows southward from its source near Carrizo Creek, and its lower 20 miles are nearly roadless. In another 10 miles downstream, Canyon Creek also flows from the north with 34 miles that are nearly roadless. All three creeks run for most of their lengths through the Fort Apache Indian Reservation. Farther west, Cherry Creek flows from the north with unimproved roads nearby but not along the stream. Both Cherry and Clear Creeks are listed in the Nationwide Rivers Inventory as valuable natural streams.

Below the massive reservoir formed by Roosevelt Dam—the first dam built by the Bureau of Reclamation and recently reconstructed the Salt River is repeatedly dammed and depleted. It picks up the nourishing flow of the Verde River, and then is completely diverted as it approaches the Phoenix urban area. The normally-dry channels of the Salt and Gila meet in Phoenix, and run only when storms and high runoff flood these two streams that were once the freshwater arteries of central Arizona.

San Francisco River

See the New Mexico section of this report for coverage of this important Gila River tributary (page 294).

ARIZONA'S "C" RIVERS

Cave Creek and its South Fork, Rucker Canyon, and West Turkey Creek

These 4 streams of the Chiricahua Mountains in far southeastern Arizona are beautiful desert waterways, and some are habitat to rare endemic fishes. Cave Creek flows through a fabulous cottonwood forest and is an internationally recognized birding location.

Flowing from the northeast side of the high Chiricahua Mountains, the South Fork of Cave Creek meets the main stem and both flow for a few miles to the community of Portal before they sieve out across alluvium of the San Simon Valley and disappear. These streams are considered showcases of the Chiricahua Mountains. Flowing from conifer-clad peaks with clear water into a valley with lush cottonwoods, Cave Creek is a premier site for birds in the spring. Because of its strong flows, lush riparian belt, and far southern location, large numbers of bird species can be seen here. Sonoita Creek, farther west and near the Mexico border, is likewise an excellent location for migrating birds of many species, but that short stream lacks the diversity of habitat found along Cave Creek as it flows from its high mountain headwaters.

Flowing off the west side of the Chiracahuas, Rucker Canyon and West Turkey Creek are very small streams but support rare native fishes including the Mexican stoneroller, found more commonly in the Rio Yaqui system of northern Mexico.

Colorado River

The Grand Canyon of the Colorado is in a class all by itself probably the most photographed place in the American desert and a symbol of the national park system. It is the premier extended bigwhitewater journey of the continent and perhaps the world, running through massive rapids with vigorous flows, typically 30,000 cubic feet per second but peaking much higher. The combined depth, length, width, and roadless wilderness of the Colorado River through its greatest canyon is unrivaled anywhere, and hundreds of side streams—usually with intermittent flows—offer amazing enclaves and enchanting additions to the massive canyon itself.

Entirely within Grand Canyon National Park, the 275-mile river corridor from Glen Canyon Dam to the backwater of Hoover Dam is all public land and protected from development, however, the upriver dam has had highly disruptive and degrading effects on the biology and habitat of the river and its floodplain. Silt that once flowed continuously downriver is now trapped in Lake Powell, and the water that is released from the dam is cold, creating an aquatic environment inhospitable and fatal to native life that evolved with silty, warmer flows. Furthermore, the erratic rhythm of releases for hydroelectric power (even though they are now moderated compared to what they were in the 1980s) combined with water that is "hungry" for lack of silt, causes erosion of beaches and floodplains without the matching deposition of silt that had been present with the natural river. Thus, the habitat of the canyon floor has been greatly reduced or eliminated. Experimental flood flows have done little to change the long-term prospects for the riparian health of this great river.

The Grand Canyon remains one of the more spectacular river sights in America, and the journey down its length is a highlight of almost any river runner's lifetime experience, but the nature and native biology of the canyon is being severely degraded, with little chance to curtail losses, given the presence of Glen Canyon Dam.

San Pedro River

With its headwaters in Mexico, this is the southernmost stream highlighted in this survey of western rivers. For about 42 miles it flows through the San Pedro Riparian National Conservation Area and is known for its excellent cottonwood and willow corridor, its native fish in small tributaries, and its diversity of birds.

Just east of the Huachuca Mountains, the small stream enters the United States. With intermittent flows, it winds north in a wide valley with the Fort Huachuca Military Reservation and the booming town of Sierra Vista to the west and the Tombstone Hills to the east. In spite of a railroad that runs parallel to the river, and some road access, the river still has an excellent riparian corridor. The BLM manages a narrow strip, half a mile or so wide and 35 miles long, as a Riparian National Conservation Area, with an emphasis on restoring riparian vegetation. The Nature Conservancy also has a preserve in this corridor.

Tributary streams including Hotsprings Canyon, Cherry Springs Canyon Creek, and Redfield Creek are refugia for endangered native fishes. Hotsprings alone has 5 native species and another 4 are planned for reintroduction.

Unfortunately, increasing water demand from the rapidly growing Fort Huachuca area has been drawing down the local aquifer, which, in turn, has led to depleted streamflows and desiccated sections of riverbed.

CONCLUSION

Using 12 lists compiled by other groups or by agencies and the WRC, and several interviews with biologists and local experts, we found 99 rivers with high natural qualities. We sorted these streams into an A list of 7 rivers, streams, including tributaries, a B list of 14, and a C list of 6. The following clusters of high-ranking natural rivers became evident in the survey.

Little Colorado River system

The Little Colorado with its headwaters of the East, South, and West Forks, and its major tributaries of Clear Creek and Chevelon Creek together make an important system of relatively natural waterways. These offer habitat for surviving and reintroduced native fishes, long reaches of stream that are dam-free and roadless or nearly so, and remote river frontage that is undeveloped.

Upper Salt River system

The Salt River above Theodore Roosevelt Reservoir has wild, unroaded mileage in rugged whitewater canyons and undeveloped and nearly roadless tributaries including Cherry, Canyon, and Cibecue Creeks. The extensive and wild Black River is the upriver extension of the Salt, with headwaters where native trout are reintroduced.

Verde River system

The Verde system is one of the finest remaining basins for native fish, and the river passes through a spectacular landscape of mountain and desert scenery and diverse plantlife, including the finest saguaro cactus forest reachable by river. The headwaters are one of the state's best areas for native fishes, the East Fork is a wild and remote tributary, Fossil Creek is a premier example of river restoration with native fishes thriving, and Sycamore Canyon is a magnificent recreation area and premier hiking destination.

Conclusion

From the Great Plains to the Pacific, the American West is interlaced with an extraordinary and irreplaceable collection of rivers that provide for wildlife and sustain whole ecosystems and economies across the length and breadth of eleven large states. While none of these waterways remain in completely pristine condition, many streams and portions of rivers have outstanding natural qualities that are important if not essential to the fabric of life.

By considering a great body of work done by others, by interviewing experts who know the biology of western waters the best, and by calling on years of our own experience, the Western Rivers Conservancy has developed this document that considers, analyzes, and rates the rivers of the West based on their natural qualities. This does not mean or imply that other rivers are not worth people's attention. However, the 1,600 waterways that have been listed by other organizations and by public agencies and the 380 rivers and streams that the WRC has rated in the top "A," "B," and "C" categories of this report rank among the most valuable natural resources in the West.

Further work regarding current and future threats to these rivers, plus some thoughtful reflection about opportunities to engage in fruitful conservation activity along all these rivers could provide useful supplements to this survey.

This report was initiated in the awareness that no other comprehensive evaluation of the natural qualities of western rivers has ever, to our knowledge, been completed. The immediate purpose of the Western Rivers Survey is to aid the Western Rivers Conservancy as it seeks to protect the "great rivers of the West" through land trust activities. We are gratified, however, to share this information with anyone who can make good use of it, and we hope that our work might benefit others who seek to protect and restore the rivers of the West.

Appendix A. Rivers List

CALIFORNIA

A RIVERS

Carson River, East Fork Clavey River Deer Creek (Sacramento River basin) Feather River, Middle Fork Kern River, North Fork Kern River, South Fork Kings River and Middle and South Forks Salmon River with Wooley Creek Sespe Creek Smith River and Middle, North, South, and Siskiyou Forks and tributaries

B RIVERS

American River, North Fork Big Sur River with North and South Forks Eel, Middle Fork and main stem Hat Creek Kaweah River, Marble, Middle, and South Forks Klamath River Mattole River Mattole River McCloud River Merced River with South Fork Merced Mill Creek (Sacramento River basin) San Joaquin River with North, Middle, and South Forks Tuolumne River

C RIVERS

Amargosa River American River, South Fork Cache Creek Cosumnes River Mokelumne River, upper North Fork Redwood Creek Rock Creek (Owens River basin) Sacramento River, upper and middle as two separate reaches Santa Margarita River Shasta River Shasta River Sisquoc River Stanislaus River, North Fork Trinity River with North and South Forks and New River Yuba River, North and South

OREGON

A RIVERS

Elk River and North and South Forks Illinois River Imnaha River and South Fork John Day River and North Fork Metolius River Rogue River Sandy and Salmon Rivers Smith River, North Fork (in California's Smith River basin) Snake River in Hells Canyon Umpqua River, North, and Steamboat Creek Wenaha River Willamette River, North Fork of Middle Fork

B RIVERS

Chetco River Coquille River, South Fork Cummins, Rock, and Tenmile Creeks Deschutes River Donner und Blitzen River John Day River, Middle Fork Joseph Creek Kilchis River Minam and Lostine Rivers Nehalem and Salmonberry Rivers Owyhee River and Middle and North Forks and West Little Owyhee Smith River, North Fork (in Umpqua River basin) White River

C RIVERS

Clackamas and Roaring Rivers Drift Creek Eagle Creek (Columbia) French Pete and Separation Creeks Grande Ronde River, lower Hood River, East, Middle, and West Forks with Lake Branch McKenzie River, upper Nestucca River Siletz River Siletz River Sycan River Umpqua River with South Fork Wassen Creek Whitehorse and Little Whitehorse Creeks

WASHINGTON

A RIVERS

Duckabush River Hoh River Queets River Quinault River Sauk River with North and South Forks and White Chuck River Skykomish River, North Fork Stehekin River with Bridge Creek Suiattle River

B RIVERS

Bogachiel, North Fork with main stem Bogachiel Cascade with North, Middle, and South Forks Dosewallips River Klickitat River Lewis River, East Fork with main stem Lewis Nooksack River, North Fork Skagit River with Illabot Creek White River with Napeegua Creek (Wenatchee tributaries)

CRIVERS

Carbon River Chewack River Chiwawa River Columbia River (Hanford reach) Grande Ronde River Hamma Hamma River Humptulips River with West Fork, East Fork Little Wenatchee River Soleduck River with North Fork, and Quillayute River Stillaguamish River, North and South Forks Wind River

IDAHO

A RIVERS

Rapid River and West Fork Salmon River Salmon River's Sawtooth Mountain headwater tributaries Salmon River's minor tributaries Salmon, Middle Fork and tributaries Selway River and tributaries Snake River in Hells Canyon Snake River, "South Fork" reach

St. Joe River, above Avery

B RIVERS

Bruneau River with East Fork, Sheep Creek, and Jarbidge River with its East Fork

Clearwater River, Middle Fork with the Lochsa River, Crooked Fork, and White Sand Creek

Clearwater River, North Fork with Kelly, Cayuse, and Weitas Creeks

Salmon River, East Fork

Salmon River, South Fork, and the Secesh River

C RIVERS

Blackfoot River Boise River, North Fork Henrys Fork, Snake River Owyhee River with its Middle, North, and South Forks, and Deep Creek Pahsimeroi River Payette River, South Fork

MONTANA

A RIVERS

Flathead River, main stem to Flathead Lake Flathead River, Middle Fork and tributaries Flathead River, North Fork and tributaries Flathead River, South Fork and tributaries Yellowstone River

B RIVERS

Blackfoot River, North Fork Little Missouri River Rock Creek (tributary to lower Clark Fork) Yaak River

C RIVERS

Dearborn River Flathead River, lower Gallatin River Kootenai River Madison River Marias River Missouri River Poplar River, West Fork Powder River Smith River Stillwater River (tributary to Yellowstone) and West Fork

WYOMING

A RIVERS

Clarks Fork (of Yellowstone River) with Sunlight Creek Falls River and Bechler River Green River, upper Greys River Gros Ventre River with Crystal and Fish Creeks Snake River Yellowstone River with Thorofare Creek and Lamar River

B RIVERS

Buffalo Fork (of Snake River) with North Buffalo Fork and South Buffalo Fork Powder River with Middle, North, and South Forks Wind River, upper with DuNoir Creek

CRIVERS

Graybull and Wood Rivers Hoback River with Granite Creek La Barge Creek Little Snake River Madison River with Firehole and Gibbon Rivers Platte River, North, and Encampment River Shoshone River, South and North Forks Smiths Fork (of Bear River)

COLORADO

A RIVERS

Elk River Hermosa Creek Little Snake River Piney River St. Vrain Creek, North White River and South Fork White Yampa River

B RIVERS

Cache La Poudre with its North and South Forks Green River (See Utah) Gunnison River Platte, North (See Wyoming)

C RIVERS

Animas River Arkansas River Big Blue Creek Colorado River (See Utah) Dolores River Purgatoire River San Miguel River

UTAH

A RIVERS

Colorado River Green River Virgin River, with North Fork and East Fork, Deep Creek, Crystal Creek, North Creek and its Right and Left Forks, and La Verkin Creek White River

B RIVERS

Escalante River and Boulder Creek

Logan River

Price River, lower

Rock Creek and Range Creek (Desolation Canyon tributaries of the Green River)

San Juan River

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

C RIVERS

Blacksmith Fork River and Left Hand Fork Blacksmith Fork Chalk Cr with South Fork and Mill Fork Dirty Devil River and Muddy Creek

Dolores River

San Rafael River

NEVADA

A RIVERS

Baker, Lehman, and Snake Creeks, and Big Wash (Wheeler Peak streams) Bruneau River Jarbidge and East Fork Jarbidge Rivers

B RIVERS

Lamoille Creek				
Marys River				
Walker River, East				

C RIVERS

Truckee River Owyhee River, South Fork

NEW MEXICO

A RIVERS

Costilla Creek with Comanche and Latir Creeks Gila River with East, Middle, and West Forks, and Black Canyon, Sapillo, and Turkey Creeks

B RIVERS

Canadian River

Cañones Creek

San Francisco River with Tularosa River and Negrito, Whitewater, and Mule Creeks

C RIVERS

Jemez River and East Fork with Jemez tributaries of San Antonio Creek, Rio Guadalupe, and Rio Cebolla Rio Brazos Rio Grande

Rio Chama

Vermejo River

ARIZONA

A RIVERS

Aravaipa Creek Gila River Kanab Creek Verde and East Verde Rivers, Fossil Creek, and Sycamore Canyon

B RIVERS

Black River with East and West Forks Blue River Little Colorado with East, South, and West Forks, and Chevelon and Clear Creeks Salt River with Canyon and Cherry Creeks San Francisco River

C RIVERS

Cave Creek & its South Fork with Rucker Canyon & West Turkey Creek Colorado River San Pedro River


Hoh River