# Great Rivers of the West: WASHINGTON





Report prepared by Tim Palmer and Ann Vileisis



Skagit River. Cover Photo: Hoh River and Olympic Mountains.

### Letter from the President

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



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

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

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

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

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

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

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

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

For Our Rivers,

Sue Doroff President

### Introduction

#### **Great Land, Great Rivers**

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

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

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

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



Stillaguamish River

for combined length and natural mileage, runs for more than 400 miles through a geographic maze of eight major mountain ranges and still supports one of the West's most notable runs of salmon. The Selway is even wilder, pulsing down from its headwaters in the Bitterroot Mountains. Montana has the forks of the Flathead—each remarkable for its clarity, beauty, and habitat of rare bull trout and wildlife including grizzly bears and wolves. The Yellowstone flows for more than 600 miles without large dams, its nature still largely intact from Rocky Mountain heights to the heart of the Great Plains. In Wyoming, rivers of the renowned Greater Yellowstone Ecosystem include outstanding tributaries to the upper Snake and its incomparable riparian corridor beneath the craggy peaks of the Tetons. In Colorado, the Yampa has one of the finest cottonwood forests in the West and still supports endangered warm-water fishes of the Colorado River basin.



Skagit River

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

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

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

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

estern Rivers Conservancy (WRC) is dedicated to protecting the outstanding rivers of the western United States. Based in Portland, Oregon, but working throughout an eleven-state region, this nonprofit, private organization purchases riverfront property from willing, private landowners and assures that the land will be conserved as open space. In this way, the group has successfully protected dozens of critical riverfront tracts along streams such as the Sandy, Illinois, Chetco, and Willamette Rivers in Oregon; the Hoh River and Icicle Creek in Washington; the Snake River in Hells Canyon of Idaho and Oregon; the Sun River in Montana; the Smith River and Chico Creek in California. However, both the need and the opportunity to protect rivers far exceed the ability of this—or any organization—to accomplish all that should be done. Many rivers and their landscapes must be safeguarded so that natural ecosystems can continue to function and provide for people's needs in the future.

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

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

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

Rather than start from scratch, the WRC survey built on past river inventories. These include significant studies following the National Wild and Scenic Rivers Act of 1968, such as the Nationwide Rivers Inventory (NRI), and a wide variety of other more recent studies, inventory lists, articles, and research papers. Typically, for each state, 15 to 20 such sources were consulted. Each of these had its own "take" on the definition of quality (e.g. native fish abundance, water guality, recreation values), and some lists addressed only specific regions within a state. None told the whole story, but in aggregate, these earlier efforts all pointed the way or offered useful evidence. If a particular river was identified as excellent by half a dozen different sources, for example, it was considered likely to be a "better" natural river than one that was identified only once. To specifically consider rivers' biological values, several experts—usually fisheries biologists or ecologists-were interviewed for each state. Their perspective and firsthand knowledge of local rivers provided essential insights for this survey's analysis.

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

Based on this survey, the Western Rivers Conservancy will be



Bull Trout

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

The need for river protection is becoming more urgent as western streams are increasingly affected by pressures of a rapidly growing population; of the 10 fastest growing states in the nation on a percentage basis, seven are in the West. Such growth intensifies needs for water and energy and spurs suburban development of farm and ranchlands. The urgency of conserving rivers is also heightened by the aggravating effects of global warming and by neglect of problems that have been accumulating for many years across the watersheds of the West. In this challenging context, it is the aim of this survey to inform the conservation of the best remaining rivers of the West.

#### Surveying Washington's Great Rivers

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,



Columbia River, Hanford Reach

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 eight 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.

Sol Duc Falls

### Washington's Great Rivers: List



✓ Great Rivers of Washington

Western Rivers Conservancy: Washington Project Locations



## Washington's Great Rivers: River Narratives

#### 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 four 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



Hoh River and Olympic Mountains

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



#### Queets River

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 five 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



Quinault River

eight 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 five 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 six miles have road access through the national park, followed by eight 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 six 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 nine miles upstream



North Fork Sauk Falls

#### 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 eight 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 five 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 seven 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



Skykomish River

species is somewhat limited, especially compared to streams in nonglaciated 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



Confluence of the Sauk and Suiattle Rivers

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 five 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 four 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 eight-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 source of the Bogachiel River in the Olympic Mountains.

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



Cascade River

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 five 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 nine 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 seven 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 four 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 seven 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 seven-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 two more miles through the national park, for seven miles through national forest, and, finally, for five 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



Rafting the Klickitat River

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, spectacularscenery, 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 nine 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 seven-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



Lewis River

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'



North Fork Nooksack River

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 circue 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 four miles flow through North Cascades National Park and the Mount Baker Wilderness; the next two 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, eight 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 51mile-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



Skagit River

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 two 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



**Skagit River** 

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 old-growth forests. The lower 19 miles have road access, and 15 miles of frontage within this reach include private land. The lower White—about eight miles below its confluence with the Napeequameanders 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 River* 



Carbon River

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 four 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 four 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 Cowlitz—only 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



Columbia River, Hanford Reach

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 eight 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 eight 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 seven miles are reachable only by trail. Joining the river near the dead-end 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 seven 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.



The confluence of the Snake and Grande Ronde Rivers in Washington.

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 600mile 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 eight 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



Humptulips River

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-mile-long 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 five 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.



Little Wenatchee River

#### 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 seven miles, in Olympic National Park, are reachable only by a trail from the Sol Duc hot springs area. About five 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 six 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.



Sol Duc Falls

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 five 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 five 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 spaw n 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



Robe Canyon, South Fork Stillaguamish River

sea-level wetlands at the mouth of the Skagit, seven 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



Wind River

Adams), but roads closely follow its entire 30-mile length. The upper half of the river flows through national forest, the next eight miles run through a private inholding within the Gifford Pinchot National Forest, and then the final seven 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

Sing 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.



Skykomish River

#### **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 lcicle Creek, add to the quality of this outstanding core group. The Wenatchee has habitat as good as any other mainstem, east-side 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.

#### Sources for the Washington Survey

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

1. Existing Inventories Of High-Quality Rivers

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

2. Interviews with biologists and local experts

- 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

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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."

#### Appendix 1: Assessing the Quality of Rivers

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

MINIMUM CRITERIA

Five minimum criteria were considered:

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

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

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

4. Non-urbanized shorelines. Most urban riverfronts no longer have intact corridors of riparian plant life; rather they are encased by impervious surfaces that contribute to extreme flow fluctuations and tend to aggravate problems of sedimentation and pollution. Conversely, undeveloped and undisturbed shorelines with their green band of riparian vegetation

provide shade, temper flow and temperature, filter sediments, and offer habitat for wildlife. For this reason, urban rivers—though extremely important to society—were not included in this survey of the best natural streams. But occasional small towns and rural development did not bar a river from inclusion.

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

#### QUALITY CRITERIA

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

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

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

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

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

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

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

#### backpacking.

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

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

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

#### RATING THE RIVERS

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

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

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

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

### Washington's Great Rivers Survey



✓ Great Rivers of Washington

Western Rivers Conservancy: Washington Project Locations

