

Rocky Mountain Research Station Science You Can Use **Bulletin**



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Research Runs Through It: A Fresh Look at Wild and Scenic Rivers

ON THIS DAY IN HISTORY...

Several notable birthdays will be observed on October 2 this year. In political and human rights circles, Mahatma Gandhi will be remembered. In the music industry, Sting will turn 67. TV host Kelly Ripa will be 48. Portrait photographer Annie Leibovitz will celebrate her 69th birthday.

And across the country, river enthusiasts will celebrate the Wild and Scenic Rivers Act, which was signed into law on this day 50 years ago. Back in 1968, Congress passed this legislation to preserve river sections that have outstanding natural, cultural and recreational values, making sure that they would continue in a free-flowing



Sections of Oregon's Crooked River were designated as part of the National Wild and Scenic Rivers System in 1988 (photo by Bob Wick, Bureau of Land Management).

SUMMARY

This year marks the 50th anniversary of the signing of the Wild and Scenic Rivers Act, which preserves selected rivers that have outstanding natural, cultural, and recreational values. As the Forest Service and other agencies prepare for the next half-century of managing these national treasures, scientists at the Rocky Mountain Research Station and the Aldo Leopold Wilderness Research Institute are partnering with National Forests and university collaborators to use new research protocols to help revise river management plans. These social science approaches are helping managers quantify what river users value. Other scientists are utilizing designated rivers to study their relatively untouched environmental conditions. These efforts are especially important in light of modern river management issues that include rising public use, a warming climate, uncharacteristic fire, invasive species, and drastic population losses for keystone species such as chinook salmon.



A fire scar along the South Fork of the Flathead River shows one of the many challenges faced by Wild and Scenic River managers (photo by U.S. Forest Service).

condition for the enjoyment of present and future generations.

These rivers are a select bunch: Out of about 3.6 million miles of U.S. streams and rivers in the United States, less than 13,000 miles of waterways, including sections of 495 named rivers and tributaries, are protected by the Wild and Scenic Rivers Act.

FIFTY YEARS LATER

Fifty years ago, the U.S. population was just over 200 million. Today, it's more than 326 million. As more and more people use designated rivers and push human development closer to public lands, river management gets increasingly complicated. River managers often must balance values related to irrigation, recreation, hydropower, livestock grazing, and cultural or spiritual uses while coping with invasive species, uncharacteristic fire, declining land-management budgets, increased recreational use, and a changing climate. As these cultural and environmental "stressors" become more widespread, there is momentum to designate and protect rivers today, a process that requires extensive evaluation.

This is why scientists at the Rocky Mountain Research Station are collaborating with managers of several protected rivers. One of these scientists, Alan Watson, is helping river managers develop new, comprehensive river management plans for two designated rivers: the Eleven

Point River in Missouri and the Flathead River in Montana. These research projects may serve as blueprints for conducting river research around the United States and other countries. For example, Alan is collaborating with the Wildland Research Institute of the University of Leeds in the United Kingdom, as well as with the National Natural Science Foundation of China.

Q METHODOLOGY AND RIVER RESEARCH

Watson, a social scientist for the U.S Forest Service Rocky Mountain Research Station and

THE WILD AND SCENIC RIVERS SYSTEM: A BRIEF EXPLANATION

Rivers in the National Wild and Scenic Rivers System include one or more “reaches” (specific, uninterrupted sections) that have been designated for up to three classifications: wild, scenic, and recreational. A single section might have more than one designation, while a river might have multiple sections with one or more of the three classifications. Rivers may also be preserved under the Act for values related to geology, history, culture, fish, or wildlife.

The Act provides various protections for designated river sections. For example, the Act prohibits Federal support for the construction of dams or other in-stream activities that would harm a designated river’s free-flowing condition, water quality, or what the Act describes as “outstandingly remarkable” resource values. The Act also requires that whatever Federal agency manages the designated river section must develop a comprehensive river management plan to help protect and enhance those outstandingly remarkable values. River corridors averaging a quarter-mile from the rivers’ high-water mark on both sides of the river are also affected by the designation.



Of the nearly 3.6 million miles of streams in the United States, only 12,754 miles are protected under the Wild and Scenic Rivers Act. Research by scientists on these waterways helps managers meet the needs of stakeholders and monitor ecosystem health. The map shows wild and scenic designated river segments in the conterminous United States.



the Aldo Leopold Wilderness Research Institute in Missoula, Montana, is using a technique called Q Methodology to study river users' relationships with the Flathead River and threats to those relationships. This information is important in future adaptation planning to protect these relationships as other factors change. Invented in 1935, Q methodology focuses on personal feelings, perspectives, and opinions. (In comparison, R methodology focuses on objective data, or hard facts.) Q methodology questions use something called a Q sort technique, in which research participants rank-order statements based on how much they "agree" or "disagree" about important benefits from the river.

According to Nancy Grulke, director of the Western Wildland Environmental Threats Assessment Center, "Q-methodology is more than a user satisfaction study. It gets to the issue of how people value specific natural resources and why. It also validates users and their concerns in an egalitarian way: It's not just listening to the loudest voice in the room."

ADDRESSING CHALLENGES AT THE ELEVEN POINT RIVER

The Eleven Point River—more specifically, 44.4 miles of the river's 138-mile length—was one of the first eight rivers to be designated under the Wild and Scenic Rivers Act. The river, which originates

MANAGEMENT IMPLICATIONS

- Only a small percentage of U.S. rivers have any kind of federal protection.
- Designating a river as wild, scenic or recreational has specific management implications, but there is no single place managers can go to find science needed to support decision-making and planning.
- International interest is at a high point coinciding with the 50th anniversary of the U.S. Wild and Scenic Rivers Act.
- Scientists with the Rocky Mountain Research Station and the Leopold Institute are supporting river managers' management plan revision efforts based on stakeholder opinions regarding issues such as user capacity, desired conditions and development of land and facilities.
- Scientists are using Wild and Scenic Rivers and other protected areas to gather information on species such as chinook salmon because these sites provide the opportunity to study these species in habitats that have undergone relatively few human interventions.
- The Rocky Mountain Research Station conducts research on a variety of topics related to rivers and recreation, including benefits of water-based ecosystem services, recreation equity, climate and land use change vulnerability, and watershed erosion.



The Eleven Point River in Missouri is known for its rich history and outstanding scenic beauty (photo by Ed Sherman, U.S. Forest Service).

in Missouri's Ozark Mountains and runs through the Mark Twain National Forest, is known for fishing, canoeing, and dispersed camping, and it borders a mix of public and private land. From the late 1930s through the mid-1960s, dams and recreation area designations alike were considered and opposed. In 1968, the Act finally defined conservation goals for part of the river. In recent years, Eleven Point River managers have faced challenges related to increasing visitation, increasingly variable water levels, and public access.

According to Watson, the Leopold Institute's planned work on this river reflects a commitment to comprehensive river management planning. "This scenic river segment of this river is a heavily used recreation

resource," he explains, adding, "We're researching outstandingly remarkable values and threats to these values, with user capacities and monitoring data to be folded into the river plan."

It's a welcome effort, according to Ed Sherman, recreation manager for the Mark Twain National Forest. He explains, "Our management plan's last signature was in 1974, so we're talking dusty archives. It's such a large time gap that we're looking for updated information on things like visitor satisfaction, perceived solitude, and adequacy of Forest Services facilities and management. I get wonderful feedback but I have no hard data to back it up. We're working with Alan and the University of Missouri to develop questionnaires to quantify some of our unanswered questions."

THE FLATHEAD: WHERE IT ALL BEGAN

The Middle Fork of the Flathead River is a relative newcomer to the Wild and Scenic Rivers program, having been designated in 1976. However, in many ways, this river's connection to the Wild and Scenic Rivers Act runs much deeper.

Back in the 1950s, part of the river's South Fork was dammed, helping to drive industrial capacity and economic growth across the northwestern United States. Over the next few years, developers began to consider dams for the Flathead's Middle and North Forks. John Craighead, a local conservationist and University of Montana professor, took several Flathead float trips and, after considering what might be lost, championed the idea of protecting rivers with outstandingly remarkable values. With support from other locals, including John's twin brother, Frank, this concept helped lead to the Act's creation in 1968.

Eight years later, more than 200 miles of the river were designated. According to Watson, "The Craighead brothers had a great argument: They pointed out that we were building all these dams and there are places where we probably shouldn't. They said that keeping the landscape intact may be more valuable to future generations than water storage or hydroelectric generation."



Conservationists John and Frank Craighead helped pave the way for the National Wild and Scenic Rivers Act (photo by S. Gebhards, from Craighead family archives).



WILDERNESS OR PLAYGROUND?

Today, the Flathead faces looming challenges related to a warming climate and changing land uses, complicated by a mix of private, state-managed and federally managed lands along its banks. According to Chris Prew, the Flathead National Forest's recreation manager, "We're located just south of Glacier National Park, which breaks attendance records every year. There's also a lot of local population growth. We're not hitting major issues yet, but the Park managers are talking about hitting capacity and turning people away. When that happens, those people are likely to spill into the Flathead National Forest."

By working with Alan Watson, Flathead National Forest managers hope to improve user-monitoring efforts, with a broader goal of conserving the river and nearby

wilderness areas. Prew explains, "The Upper Middle Fork and the South Fork both start in the middle of the Bob Marshall Wilderness, which is one of the biggest

KEY FINDINGS

- Fifty years ago, the Wild and Scenic Rivers Act was signed into law, creating a system that today includes almost 13,000 miles of protected river sections. While many management plans for these rivers have remained unchanged for decades, these rivers face increasingly complex management issues such as rising public use, extreme weather, uncharacteristic fire, and invasive species.
- Scientists at the Rocky Mountain Research Station and the Aldo Leopold Wilderness Research Institute are using new social research protocols to help revise river management plans, with the goals of integrating river user values into new planning efforts.
- In some cases, Wild and Scenic Rivers and adjacent lands serve as refugia for populations of a once more widespread species such as chinook salmon. These locations can provide data for species conservation efforts.



Whitewater rafting is one of several recreational uses of the Cache la Poudre River, a designated Wild and Scenic river in northern Colorado (photo courtesy of Brian Cooke).



The Middle Fork of the Salmon River was one of the original eight rivers to be designated under the Wild and Scenic Rivers Act (Forest Service photo by Jane Cropp).

wilderness areas in the lower 48 States. There's more dispersed recreation happening here than our original management plan projected. There's also rising demand for whitewater rafting, kayaking, and fishing."

Using Q methodology and related analysis from 2018 through 2021, Watson and Flathead River managers are collaborating to revise Flathead River management plans, for use by National Forest Planners, river managers and rangers, local communities, and Native American tribes. According to Prew, "By collaborating with stakeholders, we need to find

out what people are looking for in terms of things like user capacity, desired conditions and development of land and facilities."

PRESERVING AND RESTORING NATIVE AQUATIC SPECIES

Other Rocky Mountain Research Station scientists are watching Wild and Scenic Rivers closely, but from a different perspective. Idaho-based fisheries research scientist Russ Thurow and his collaborators are taking advantage of past Wild and Scenic Rivers conservation efforts to study aquatic species in protected wilderness areas,

including the Frank Church–River of No Return Wilderness in central Idaho. The largest contiguous federally managed wilderness in the United States outside of Alaska, "the Frank" is the home of the Salmon River, two segments of which are designated as Wild and Scenic. The river's Middle Fork was one of the original eight rivers to be designated under the Act. It's been called the "crown jewel" of the Wild and Scenic Rivers System and is considered by many to be the finest whitewater trip in North America.

"The Frank is a unique area," Thurow says, explaining, "Because of its size, remote location





Western Wild and Scenic Rivers provide relatively safe but dwindling habitat for chinook salmon (photo: Bureau of Land Management).

and protected status, natural process that create habitat for a variety of native aquatic and terrestrial species function relatively unimpeded by human interventions.” Thurow goes on to say, “Many of the fish populations that can be found here, especially wild Chinook salmon, are very rare. For example, just 4 percent of the historical spring and summer Chinook salmon habitat in the Columbia River Basin supports wild, indigenous fish. Elsewhere, wild fish have been extirpated or genetically altered. Today, wild Chinook salmon populations in the Frank are at about 2 percent of their historical levels, primarily as a result of factors outside of the Salmon River Basin.”

Thurow reports that, in collaboration with a variety of

State, Tribal, and Federal biologists, “Collectively, we’ve assembled more than 60 years of population data for wild Chinook salmon, and we’re also investigating genetic and demographic population structure, movements, and potential effects of a changing climate.”

Thurow explains some interesting research results that may help in developing more effective Chinook salmon restoration efforts: “The rule for salmon is ‘high fidelity’—returning to the very riffle where they emerged from the gravel years earlier. However, natural processes in the Frank create a dynamic environment, with fires, intense storms, and debris flows or snow avalanches depositing wood and sediment into streams and rearranging habitats. But we’ve found that at least a portion of the

salmon population seems to be opportunistic and taking advantage of new spawning areas. Even at current, very low population levels, wild Chinook salmon are displaying a high level of adaptability and resiliency.”

THE NEXT 50 YEARS

Looking forward to the next 50 years, there’s hope that research will have an active role in river management. According to Steve Chesterton, the wild and scenic rivers program manager for the Forest Service’s Washington Office, “We’ve learned a lot about these rivers over the years, but we’ve also come to realize how much we don’t know. Not only do we want to raise awareness of these resources, but there’s much that needs to be pursued about how effective we’ve been in accomplishing management goals across each designated river and more broadly the health of all our rivers and watersheds.” Considering the 50th anniversary of the Wild and Scenic Rivers Act, Watson says, “It’s a great time for reflection but it’s also a time for action. We’ve assembled a broad interest community to support protection of river systems; I hope we see a lot more river research in the next few years.”

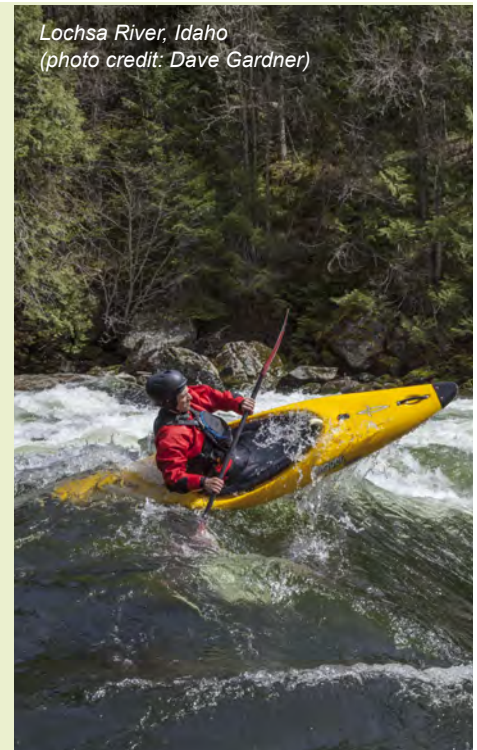
“It’s a great time for reflection but it’s also a time for action. I hope we see a lot more river research in the next few years.”



Upper Missouri River , Montana
(photo credit: Bob Wick)



Snake River, Idaho
(photo credit: Bob Wick)



Lochsa River, Idaho
(photo credit: Dave Gardner)

Under the Wild and Scenic Rivers Act, rivers can be classified as wild, scenic, recreational, or a combination. Regardless of their classification, they are managed to enhance the values that led to their designation.

RECREATION AND RIVER RESEARCH AT THE ROCKY MOUNTAIN RESEARCH STATION

Social scientists and other researchers at the Rocky Mountain Research Station and its partner organizations are helping land and river managers to understand how recreation and rivers can be managed to serve the public while maintaining the integrity of river resources. Here are a few examples:

- Recreation equity: Is the Forest Service serving its diverse publics? (www.fs.usda.gov/treesearch/pubs/56144)
- Concepts and measures of place meanings and attachment (www.fs.fed.us/rmrs/projects/concepts-and-measures-place-meanings-and-attachment)
- Outdoor Recreation as a Sustainable Export Industry (<https://leopold.wilderness.net/stories/1-Outdoor-Recreation-as-a-Sustainable-Export-Industry-0021.pdf>)
- Campsite condition data (www.fs.fed.us/rmrs/datasets/campsite-condition-data-salmon-river-frank-church-river-no-return-wilderness)
- Global warming of salmon and trout rivers in the northwestern U.S. (www.fs.fed.us/rmrs/news-releases/global-warming-salmon-and-trout-northwestern-us-road-ruin-or-path-through-purgatory)
- The Rangewide Bull Trout eDNA Project (www.fs.fed.us/rm/boise/AWAE/projects/BullTrout_eDNA.html)
- Climate change vulnerability and adaptation in the Intermountain Region (www.fs.usda.gov/treesearch/pubs/56101)
- Water quality effects following a severe fire (www.fs.fed.us/rmrs/documents-and-media/water-quality-effects-following-severe-fire)
- Watershed Erosion Prediction Project (www.fs.usda.gov/ccrc/tools/watershed-erosion-prediction-project)
- Erosion modeling tools: Geomorphic Road Analysis and Inventory Package (www.fs.fed.us/GRAIP/)

FURTHER READING

Chesterton, S.; Watson, A. 2017. A watershed moment for river conservation and science. [Introduction to the Special Issue on the 50th Anniversary of the U.S. Wild and Scenic Rivers Act]. *International Journal of Wilderness*. 23(2): 3,9. https://issuu.com/ijwilderness/docs/dec2017a_ijw_web

Rothlisberger, John D.; Heartsill Scalley, Tamara; Thurow, Russell F. 2017. The role of wild and scenic rivers in the conservation of aquatic biodiversity. *International Journal of Wilderness*. 23(2): 49–63, 72. www.fs.usda.gov/treesearch/pubs/56037

Armatas, C.; Venn, T.; Watson, A. (2016). Understanding social–ecological vulnerability with Q-methodology: A case study of water-based ecosystem services in Wyoming, USA. *Sustainability Science*. 12: 105–121. <https://link.springer.com/article/10.1007/s11625-016-0369-1>

Williams, Jack E.; Williams, Richard N.; Thurow, Russell F.; Elwell, Leah; Philipp, David P.; Harris, Fred A.; Kershner, Jeffrey L.; Martinez, Patrick J.; Miller, Dirk; Reeves, Gordon H.; Frissell, Christopher A.; Sedell, James R. 2011. Native fish conservation areas: A vision for large-scale conservation of native fish communities. *Fisheries*. 36(6): 267–277. www.fs.usda.gov/treesearch/pubs/38415

Thurow, Russell F.; Rieman, Bruce E.; Lee, Danny C.; Howell, Philip J.; Perkinson, Raymond D. 2007. Distribution And Status Of Redband Trout In The Interior Columbia River Basin And Portions Of The Klamath River And Great Basins. www.fs.usda.gov/treesearch/pubs/29180

Thurow, Russell F. 2000. Dynamics of chinook salmon populations within Idaho's Frank Church Wilderness: Implications for persistence. In: McCool, Stephen F.; Cole, David N.; Borrie, William T.; O'Loughlin, Jennifer, comps. *Wilderness science in a time of change conference—Volume 3: Wilderness as a place for scientific inquiry*; 1999 May 23–27; Missoula, MT. *Proceedings RMRS-P-15-VOL-3*. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 143–151. www.fs.usda.gov/treesearch/pubs/21980

Watson, Alan E.; Hunger, Don; Christensen, Neal; Spildie, Dave; Becker, Kurt; Comstock, Jeff. 1998. Wilderness boaters: Protecting unique opportunities in the Frank Church-River of No Return Wilderness, Idaho, USA. In: *Personal, societal, and ecological values of wilderness: Sixth World Wilderness Congress proceedings on research, management, and allocation, volume I*; 1997 October; Bangalore, India. *Proc. RMRS-P-4*. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 151–158. www.fs.usda.gov/treesearch/pubs/30707

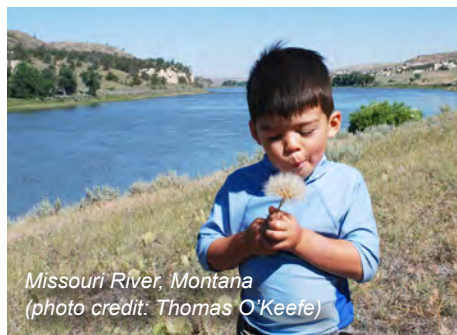
Rio Grande River, Texas
(photo credit: Thomas O'Keefe)



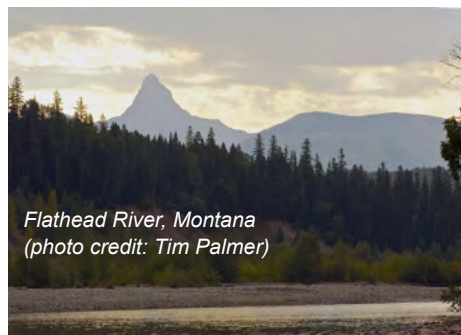
Salmon River, Idaho
(photo credit: Tim Palmer)



Missouri River, Montana
(photo credit: Thomas O'Keefe)



Flathead River, Montana
(photo credit: Tim Palmer)



SCIENTIST PROFILES

The following scientists were instrumental in the creation of this Bulletin:



ALAN WATSON is a research social scientist for the Aldo Leopold Wilderness Research Institute in Missoula, Montana. His research interests include modeling the effects of personal and social meanings on landscape-level forest policy decisions, examining the role of wilderness in larger social and ecological systems, and exploring the conflicting personal and social meanings and values associated with wilderness. He currently serves as executive editor for science for the International Journal of Wilderness. Alan received a Ph.D., a master's degree, and a bachelor's degree, all in forestry, from Virginia Polytechnic Institute and State University. Connect with Alan at www.fs.fed.us/rmrs/people/awatson.



RUSS THUROW is a fisheries research scientist with the Rocky Mountain Research Station in Boise, Idaho. His research within the Interior West region has focused on patterns of species and life stages, linkages between landscape processes and fish populations, sampling protocols, and climate effects. Russ received a master's degree in fisheries resources from the University of Idaho and a bachelor's degree in fisheries from the University of Wisconsin-Stevens Point. Connect with Russ at www.fs.fed.us/rmrs/people/rthurow.

WRITER'S PROFILE



BRIAN COOKE is a science writer based out of Fort Collins, Colorado. He received a degree in journalism-science writing from Lehigh University. Brian's writing and editing work has included assignments for several U.S. Forest Service divisions, the National Park Service and various environmental services companies. His writing is frequently colored by his National Park Service interpretive training and experience as a volunteer docent for Alcatraz Island, San Francisco Maritime National Historical Park and the Arapaho-Roosevelt National Forest.

Snake River, Wyoming
(photo credit: Thomas O'Keefe)





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Nehalem Clark

Bulletin Editor / Science Delivery Specialist
ncclark@fs.fed.us

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