



River cleanup volunteers.

River Inspires Regional Renewal & Revitalization

by Heather Barrar

The tide was out and the sun was setting as my husband and I packed our equipment after a day of filming on the Appomattox River – we are 11 months into the pandemic and making a video was our latest project to keep online meetings interesting. Despite the late hour, I noticed the parking lot was full at the Hopewell Riverwalk, the newest addition to the Appomattox River Trail. Folks were taking one last walk before the impending ice storm. As I walked along the boardwalk and through City Park where children were enjoying the nature inspired playground, I reflected on the fact that just a few years ago, no one could even see the river, let alone walk alongside it. The area was forgotten, neglected, and unsafe, walled-in by kudzu vines and blanketed

in trash. But thanks to a study in the late 1990s and a handful of dedicated volunteers, our region is transforming the riverfront and rejuvenating our community health and economy. The Friends of the Lower Appomattox River, or FOLAR, is leading the collective effort to develop a new regional park system along the river.

The River as a Place of Commerce (history)

The Appomattox River is located in Central Virginia, approximately 25 miles south of the state's capital city of Richmond. It is a tidal river that flows into the James River

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Executive Director's Eddy

After practicing COVID-19 pandemic response precautions for a year, a light at the end of the tunnel beckons, cautiously. As we have learned and been reminded repeatedly how resilient, resourceful, brilliantly bold and fabulously frail we each are, we've witnessed creativity and patience in ourselves and others to learn enthusiasm for flexibility and developing alternative plans.

We have become proficient at attending, setting up, and recording virtual meetings with friends, family and colleagues. It is no longer outlandish to participate in conferences, conduct multi-day training workshops and interview for jobs via desktops and phones, just as we've watched our children attend classes and take music lessons via the family laptop. As a species, we are pretty darn resilient.

Whether we work on the river each day or study the critters that live there, we have become familiar with pandemic-inspired levels of outdoor recreation. And, having survived unprecedented levels of visitorship on and around our rivers, we have developed protocols to welcome visitors safely. More evidence of resilience!

As a result of the response to the sobering and undismissable voice for social justice, we have seen steps taken to address inhospitable and inequitable workplace environments and are thrilled to see bold, thoughtful change charted. Training workshops initiated through the A-DASH Collaborative, dedicated to positive and supportive means to rid workplaces of sexual harassment, have begun. At the April 2021 Symposium, we will reboot conversations initiated in 2020 by the River Management Roundtable (formerly the State River Programs Working Group) to understand diversity, equity, and inclusion tenets — and answer the question “What can I do to increase awareness, understanding, and change in myself, my organization,



and my community?” We will learn about one of the first-in-the-nation statewide workplace systems whose processes have been evaluated with a diversity lens and reframed to create meaningful change.

Speaking of the *From Mountain Creeks to Metro Canals* Online River Management Symposium: this RMS hallmark event offers as much programmatic depth as ever. We will meet Virginia Governor Northam, Richmond Mayor Stoney, and US Senator Mark Warner; hear from over 50 presenters; meet sponsors and attend field trips about, along, and at the James River. Since many Symposium organizers have been at it for over two and a half years, we salute you!

Thank you Co-Chairs Dr. James Vonesh and Lynn Crump, Program Chair Helen Clough, Marketing Chair Emma Lord and team members Joni Gore, Kelleen Lanigan, Allyson Conner, Lucy Portman, Katie Willi, Angie Fuhrmann, Bekah Price, James Major, and Dan Carr for your enthusiasm, patience and capacity to pivot, big time!◆

Risa Shimoda
Executive Director

RMS President's Corner

Crazy is how most of us would describe 2020 in both our personal lives and in our professional lives. We have sailed through the challenging times and are looking forward to the moment we put our oars and paddles in the water and remember why each one of us seeks out the rivers, lakes, and oceans.

I thank you all for trusting that I can carry forward with RMS's mission in the shadow of Linda Jalbert, whom we all know to have been a great RMS President. RMS was successful under Linda's leadership and the Board of Directors made great leaps and bounds to move RMS into the new century with huge accomplishments, including: the conversion of the 2020 symposium and the River Ranger Rendezvous into virtual programs for 2021, launching the River Training Center, and continuing to improve and add three new schools to the River Studies and Leadership Certificate program.

The Spring RMS Journal is coming out as river managers rub their crystal balls, magic mirrors, or just toss a coin in the water in an attempt to determine what the river season will look like and in hopes that the roll-over river permits from 2020 are launched successfully.

Ironically, the last six months have proven that the River Management Society

community has expanded beyond river management — we came together with outfitters to discuss how to operate safely in the COVID world, and how others are dealing with user conflicts due to increased use of public lands. The RMS listserv has been utilized even more frequently to locate information regarding issues such as multi-language signage, recreation site development, scenic easements, interpreting the new executive order for masks, and addressing memorials that are popping up around the country.

Although our relationships in the past year have been experienced mostly through wavering screens — “can you hear me?” moments and frustrations with technology — the fact that we are missing personal interactions, away from computers or telephones, only increases the value of the relationships we have built or are building through RMS. We continue to recruit the next generation into river management — to help fill the gaps of those who have retired or are retiring in the near future — and it is important for RMS to continue this work in the coming years.

May the new generation, as well as those of us who have been part of this community for many years, continue to strive to explore new avenues and ideas to improve river management for everyone who wishes to experience the wonders of the water.◆



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Judy Culver
RMS President

(FOLAR, from page 1)

and ultimately the Chesapeake Bay. The section of river in the FOLAR service area is referred to as the “lower” Appomattox River, a 20-mile stretch from the Brasfield Dam at Lake Chesdin to the confluence with the James River. It flows through three cities of Colonial Heights, Hopewell and Petersburg and three counties of Chesterfield, Dinwiddie and Prince George and the area is referred to as the Tri-Cities Region. The landscape is as varied as the river, passing through both rural forested landscapes and urban city centers.

Historically settled by Native Americans at the falls of the Appomattox River, this region continued to thrive in the Colonial period through the Industrial era as the river was the hub of all economic activity including manufacturing and transportation. In fact, this region boasted one of the largest ports in the state in the 1700s and one of the largest cities in the 1800s. Factories and mills lined the riverbanks, powered by the mighty flow of the river, and a canal system extended the navigation inland to western cities. Following the mills and factories, many towns and villages were also located along the banks of the river. Recreation and amusement parks were located on the river at sites like Flea Island and Ferndale Park. Like many communities, the addition of the railroad changed the look and feel of the community, but the region maintained its economic standing into the late 1800’s and mid 1900’s. Slowly, as the economy shifted away from the river, we were left with a community physically disconnected from the riverfront. Canals and railroads made the riverfront inaccessible and forgotten. As small-town economies were impacted by big malls and suburban sprawl of the 1980s, the community continued to decline. Today we are seeing a reinvestment back into our small towns as historic factory buildings become apartments, coffee shops and breweries. Our region, with its historic architecture, is a popular backdrop for movie and television production including a wide variety of genres ranging from *Lincoln* to *The Walking Dead*. The first fully state supported African American college, Virginia State University, is located on the banks of the Appomattox River, along with the first freed black community located on Pocahontas Island. Our rich history, coupled with a dedicated community and a scenic river, make this region’s future bright.

The River as a Recreational Asset (recent history)

By the 1970s, the community saw the potential of the Appomattox River as a recreational asset. The community knew that the lower Appomattox River offered an experience like no other through unparalleled natural beauty and the relaxed convenience of nearby small-town hospitality. The river offers all sorts of experiences, including both whitewater and tidal flatwater for paddlers, unspoiled riverbanks for fishing and birding, and the experience of an explorer while walking and discovering the historic remains of the early industrial era. The original scenic river designation, a legislative action in Virginia, was approved in the 1970s and was extended twice in the 2000s to reach the

mouth of the James River. While the scenic river designation in the 1970s set the stage for riverfront renewal, it wasn’t until the late 1990s that efforts really got underway.

Collective Impact and Collaboration

Our work at FOLAR stems from a regional river study of the 1990s. Instead of sitting on a shelf, the community formed a nonprofit to take on the work of the study. Our mission is to conserve and protect the Appomattox River in partnership with the community for all to enjoy. And we are accomplishing that mission by building the Appomattox

River Trail, a 25-mile greenway and blueway through the region, something we heard was important to the community through a strategic visioning process. We completed the regional trail master plan in 2017 and are consistently working towards implementing that plan mile by mile.

The nonprofit was volunteer based for many years, but in the last five years we have added two professional full-time staff and are looking to add one more staff member this year. We can’t say enough about the groundwork that was laid by our founding board members. They had the vision, and just as importantly they had the passion and grit, to put in the on-the-ground work necessary to build support and partnerships in city council chambers, business meeting rooms, and with many diverse stakeholders — to make the vision of revitalized riverfront a reality. Most importantly, they were local and had a wide network of friends and family that they brought to the vision and the organization.

At FOLAR, we believe the Appomattox River Trail has the capacity to positively impact many aspects of our community. This project is about land conservation, protecting scenic views, and the water quality of a regional drinking water supply. This project is about community wellness by increasing public access to greenspace along the riverfront for paddling, walking, fishing, and picnicking. This project is about transportation, providing an alternative form of transportation in a region that has low rates of car ownership. This project is about stewardship, education, and community pride as the river becomes an outdoor classroom. This project is about economic development, providing opportunities for entrepreneurs and community amenities that corporations seek in a region.

That is why FOLAR works so hard to build cross-sector relationships and has organized around the concept of *collective impact* to the region. Collective impact is an intentional way of working together and sharing information to solve complex issues, with a backbone organization coordinating the effort. FOLAR serves as the regional backbone organization for the development of the Appomattox River Trail. And because of that role, we have a large and diverse network that has us serving on health-focused work groups, partnering with Chambers of Commerce and collaborating with the local university. The Appomattox River Trail has statewide significance as well as local appeal. It is featured in the Governor’s Conserve Virginia

FOLAR’s mission is to conserve and protect the Appomattox River in partnership with the community for all to enjoy.

‘Collective impact’ brings people together in a structured way, to achieve social change. (collectiveimpactforum.org)

map and is listed as a featured project in the region by the Virginia Outdoors Plan while also appearing in all the local comprehensive plans. Funding to support FOLAR and its mission comes from a wide variety of partners including conservation organizations, local business and industry, and health legacy foundations.

Making Progress

Every community along the Appomattox River is increasing trail and river access and working together to create a regional system. While our goal is to have 25 miles of continuous trail, including several dedicated bicycle and pedestrian bridges, we have about 10 miles of trail on the ground today. The master plan vision is for the trail route to be safe and accessible for all ages and abilities and will be an accessible and paved shared-use path where possible, though a portion of our trail route will be on road with bike lanes and sidewalks. We are excited to be part of constructing 3.5 miles of bike lanes along our route this year. We also just completed a Blueway Plan, thanks to a local graduate student. This plan will help guide the future infrastructure needed to improve the paddling experience alongside the trail development.

Back at the Hopewell Riverwalk, we truly have experienced the “if you build it, they will come” phenomenon. The Riverwalk has won two awards in its first year — including the Governor’s Environmental Excellence Award as a Gold Medal winner — and sees thousands of visitors each month. Not bad for a park that saw a few visitors a day prior to the Riverwalk. And downtown Hopewell is feeling the benefits of a new nearby recreational amenity. The Hopewell Downtown Partnership, an accredited

Main Street program, was formed in 2007 and assisted in the revitalization of downtown. Today there are increased housing options and local coffee shops, bakeries, restaurants, and a theater all within walking distance of the Riverwalk, truly making this area a destination. And the Riverwalk will double its length to be a total of 3,140’ by the end of 2021 and will link downtown to another asset, the Hopewell City Marina. The marina not only offers a launch for paddling and motorboats but serves as a public green with summer concerts and events. The Riverwalk will offer a safe way to connect parts of town that are currently difficult to navigate on foot. This new connectivity will certainly increase visitation among locals and tourists alike.

Through the years we have seen that it is people working together, in pursuit of a common goal and with respect for our natural environment, that is making our scenic rivers and the public spaces along them a place for all people to enjoy and benefit from now and for generations to come.◆

If you want to learn more about the Appomattox River, join the *Regional Renewal & Riverfront* session at the RMS Symposium on April 14, 2021, at 2:30pm (EST).

Heather Barrar is the Regional Trails Program Director for FOLAR. Heather is trained as a forester and arborist but has spent most of her career as a suburban planner making connections across all sectors to address community concerns and improve the quality of life for all. She is excited to work in a regional role to address active transportation, land conservation, economic development, environmental stewardship, and climate change by building the Appomattox River Trail.



Hopewell Riverwalk. Photo: Daniel Jones



The author paddling by one of many Soak Creek cliffs.

Protecting Natural Treasures – Big and Small, Near and Far, Now and Forever

by George Lindemann

This year, the New River Gorge Park and Preserve became the 63rd national park. The designation had bipartisan support. The National Park Service has managed the river since 1978 when President Carter designated it a national river. While the new national park designation won't materially change the current management, the federal park status has already raised the gorge's profile.

I am a middle-aged paddling enthusiast with a home in Eastern Tennessee. I have always thought about heading north to West Virginia but haven't yet done it. After reading countless national stories about the recent designation, I am determined to paddle the New River this spring. And I will bring my wallet with me. The Outdoor Industry Association estimates that \$9 billion per year is spent on outdoor activities in West Virginia. And studies show that the national park designation could boost New River trips by as much as 20 percent. Count my family and me among them!

Like most designations, the newest national park did not have unanimous support. Anglers and backcountry hunters objected to the loss of hunting lands, yet compromise was

eventually reached. After years of negotiations, 10 percent of the gorge was named a national park, and the remaining 90 percent remained a national preserve and river, where looser regulations allow for more activities. Designations of any kind do not come easily. Stakeholders have valid concerns that must be addressed.

While National Park designation is the gold standard of conservation, there are so many other federal and local designation programs that are very important. Local designations are perhaps even more important than more famous national parks and rivers because they are our backyard playgrounds. Tennessee was one of the first states to create its scenic rivers program, the same year the federal program was established. There are seventeen scenic rivers currently designated and monitored by the state. The most recent addition was the Piney River (2020), which flows freely through the Cumberland Plateau (and nearly into my backyard). Every designation has a backstory, including the New River, and they are surprisingly similar. Natural beauty, rare species, and concerned activists and landowners attempting to conserve rare natural resources while remaining sensitive to different needs and interests.

The Piney River and its tributary Soak Creek (designated state wild and scenic in 2016) flow through remote gorges on the Cumberland Plateau's eastern edge. The area is full of waterfalls, sinkholes, and bucolic valleys. Even though the Piney watershed exists between Chattanooga, Nashville, and Knoxville, it remains a hidden natural gem. While there are no charismatic mammals, many endangered and threatened species call the watershed home. Tangerine Darters, Hellbenders, and Purple Bean Mollusks all live in and around the river gorge. Rare forest botanicals and plants such as Wild American Ginseng, Golden Seal, and Lady Slipper Orchids can also be found in these gorges. It would seem evident that protecting the watershed would be good for the environment and the local economies, but the above facts did not persuade all stakeholders. One landowner, for example, wanted to support the effort, but his two elderly sisters were nervous that the designation would prevent development and reduce land values. The research says otherwise, but only time will tell. And the entire designation was nearly derailed. Fortunately, creative solutions were reached and both rivers are now protected forever. Locals (my family included) take advantage of ample safe parking, clean picnic tables, and flowing, fresh water. Out-of-county cars are abundant, and most need to buy gas and snacks locally. The newest state wild and scenic rivers attract river people and connect people with other designated natural areas. Designations don't exist in a vacuum and feed on each other.

Paddlers and swimmers who visit the Piney might notice signs in the parking lot for Tennessee's Cumberland Trail State Scenic Park. Once completed, the linear state park will extend over 282 miles and wind its way through 11 Tennessee counties. It will also meander by other scenic areas, some of them with significant landmark designations. In the mid-1960s, the federal government focused on protecting the country's important ways and spectacular landscapes. The National Natural Landmarks Program (NNL) aims to preserve sites "illustrating the geological and ecological character of the United States." Both public and private lands are eligible for this designation. To qualify, the location needs to exemplify a unique natural feature. Tennessee has thirteen registered NNLs, and several are located on the Cumberland Plateau. Grassy Cove, for example, was designated a national natural landmark in 1973. The area in Cumberland County is a green valley that features 10,500 acres, including significant karst formations. Underneath the grass and trees are caverns and sinkholes (not all sinkholes are wrong) considered some of the best in the country.

My farm shares a property line with Grassy Cove. When I purchased the property, the NNL designation was not even mentioned. I don't believe the real estate agents were aware of the importance of this amazing property. I witnessed a similar phenomenon surrounding another nearby NNL, Piney Falls in Rhea County. This area is valued for its spectacular waterfall and extensive hiking trails. Given the time commitment and ecological significance of the designation, NNLs must be celebrated and promoted. The second half of the National Natural Landmarks Program's mission is to "enhance the scientific and educational value of sites . . . to strengthen the public appreciation of natural history, and to foster a greater concern for the conservation of the nation's natural heritage."

Sadly, this is not always the case. Piney Falls has been an NNL since 1973. Soak Creek — the waterway designated a Tennessee Scenic River in 2016 — intersects with the Piney

River and Piney Falls State Natural Area. It also runs alongside the Cumberland Trail. During the designation process for Soak Creek, Piney River, Piney Falls NNL, Grassy Cove NNL, and the Cumberland Trail State Park were all mentioned as contributing factors of the designation. Piney Falls, which flows into Soak Creek, is spectacular and deserves more attention. Grassy Cove is a must-see destination for any area tourist. And they all can and do interconnect.

Past generations did the heavy lifting for various state and federal designations. National Parks, National Wild and Scenic Rivers, National Natural Landmarks, and other state and local designations are all interrelated. To access federal benefits, rivers must first be designated "significant" at the state level. A designation leads to awareness of an area's natural importance and leads to more activist excitement. Another creek local to my Cumberland Plateau home is White's Creek. It is an established class III kayak destination and is partially protected by various conservation easements. Local paddler and conservationist Steve Scarborough has devoted decades to preserving White's Creek. He needs help, and the New River National Park, hundreds of miles away, might be a helpful boost. Positive conservation stories add to the momentum, as politicians and other stakeholders certainly read the newspapers.

Another Southeast river in need of a new designation is the Nolichucky. The Nolichucky River flows freely from North Carolina through two National Forests as it crosses the Tennessee/North Carolina state lines. The river gorge is an ecotourism treasure for river enthusiasts, anglers, hikers, and horseback riders. It is also one of the last large dam-free rivers in the Southeast. The stretch contemplated for designation runs through federal lands, yet some stakeholders are not in favor of Wild and Scenic status. Agricultural interests are concerned that the designation will invite new rules which might change the status quo. Water is a crucial commodity for farmers, and their concerns threaten to derail the designation. Somehow, as was the case for the New River's national park designation, all stakeholders need to address each other's concerns. Only so much nature is left, so river enthusiasts, environmentalists, and outdoor lovers can't let this one slip by.

Some argue that regulation can take care of our rivers. Regulation can preserve our environment, but the regulators need help. There are so many different government programs that already exist and are designed to highlight special natural attractions. Designated natural areas ensure their preservation and a vibrant tourist economy — two sides of a coin in hand. No special river or creek is too small, and there is an achievable designation for your local under-appreciated natural wonder. My neighbors and I got the job done for Piney and Soak Creek. You and your neighbors can protect your treasures as well. ♦

George Lindemann is a businessman, philanthropist, and conservationist who believes that natural resources are to be protected for the future but accessible today. He is the Conservationist of the Year for Tennessee in 2017 and received the 2018 Communitas Award for Social Responsibility.



Signs Point to Safe Travels and More Good Times on Hiwassee Blueway

by Mark Engler

New streamside mile markers to make for happier, less hazardous water trail excursions along Tennessee's first state-designated scenic river.

Most of the time, a languid weekend float down Southeast Tennessee's Hiwassee River below the Highway 411 bridge in Polk County is a fairly leisurely affair. Watching the river valley's bucolic, mountain-backed rural landscape go bobbling past is virtually guaranteed to cleanse away the stress and worries of life on the go.

But sometimes, things can go wrong on the water — particularly when moving currents are involved. No matter how docile and flat a river's surface may appear, mishaps can quickly turn into serious misfortune if proper safety precautions and danger preparedness weren't considered beforehand.

Hiwassee/Ocoee State Park Manager Angelo Giansante says local law enforcement, rangers and rescue personnel who respond to river distress calls “see a little bit of everything” when the sultry season hits and the overheated hordes start making a mad dash for cooling streamflows.

Trips down the Hiwassee's lower sections are usually relaxing and typically end happily. But when something goes wrong — and sooner or later it usually does — emergency responders get called into action.

“Sometimes people pass their pullout, or sometimes they put in too late and then it gets dark on them and they get lost and afraid,” Giansante said. “Sometimes they get hung up on trees that are down and don't know how to deal with that.”

A large, downed limb or semi-submerged snag can pose a particularly hazardous situation because it acts like a “spaghetti strainer” when solid objects pass by, Giansante said. “A tree in the water is like that — only for people instead of spaghetti,” he said. “And a lot of people don't even know they're dangerous.”



Safer paddling means always knowing where you are — even in the middle of nowhere. Ranger Angelo Giansante, manager of Tennessee's Hiwassee/Ocoee Scenic Rivers State Park, shows off one of the new, soon-to-be-installed mile markers that will help serious boaters and pleasure floaters alike more accurately track their location along a popular stretch of Southern Appalachian moving water. Photos: Mark Engler

When people get “strained” from their boat or raft, or stranded below their takeout ramp — or for whatever reason could use a friendly extraction from a perilous situation — getting help on the way is made difficult when, as is often the case, the distressed person doesn't have a very good idea of where he or she even is.

But beginning this coming season, river users and rescue responders alike will have additional tools at their disposal to make it easier and faster to launch a potentially lifesaving bailout where one is needed in a hurry.

Easy-to-see mileage markers are being installed along the Hiwassee's banks so that people can keep better track of their location at any given time on the water.

“The markers will let us know pretty close to where they are if they call and

need assistance,” Giansante said. “A lot of times, people don't really have any idea at all where they are. And they think that we can find them using their cell phone because they've seen movies where that happens. But in a lot of these areas out here, where you don't have very good reception, you don't have the towers to triangulate and make that possible.”

Even when people calling aren't entirely sure of their whereabouts, if they can relay the most recent river-mile marker they remember passing, it'll help responders narrow down their location.

Don't Get Lazy About River Safety

There aren't whitewater rapids along the Hiwassee below the state park, but that doesn't mean it can't be

dangerous, Giansante said. It's the river's seeming placidity that can lure folks into complacency. They think that because the surface is smooth and the pace is slow, maybe they don't need to wear lifejackets, he said. Or maybe they'll load up on a makeshift sort of “vessel” that doesn't really have any business being on a mighty Appalachian mountain river.

“I kind of look at being on the river as similar to being on a motorcycle,” Giansante said. “Motorcycles are a lot of fun, but you need to have the basics down to enjoy them fully without getting hurt.”

The Hiwassee's popularity has been increasing the past several years. But like a lot of out-of-the-way outdoor destinations, its appeal dramatically surged in 2020. It was deluged with packs of pandemic-plagued pleasure floaters seeking to socially distance from mask mandates and metro multitudes.

Lynne McClary, Polk County's chamber of commerce director, doesn't live far from the Highway 411 boat ramp

that accesses the Hiwassee Blueway's meandering midsection. She said it wasn't uncommon last summer to observe legions of river-users' cars overflowing the parking area and lining alongside the busy four-lane highway's shoulder.

“We saw huge increases in people being on the water beginning in June and July,” said McClary. “We saw a 30 percent increase in our river traffic from the previous year — and that was on the Hiwassee alone.”

So when Polk County got its chunk of funding from last year's federal Coronavirus Aid, Relief, and Economic Security (CARES) Act, McClary called up Southeast Tennessee Tourism Association director Jenni Veal to hatch a plan for spending the grant in ways to serve both tourism promotion and public safety. Together, and with input from local first-responders, river conservation advocates, and the state park's staff, they hit upon the mile marker idea.

“There were a number of rescue calls

last year that were difficult to manage,” McClary said. “When the dispatcher would ask their location, callers would have no idea. There was even one rescue call that came in — they were hung-up or lost or something — and they didn't even know the name of the river they were on.”

Hoping for Happy Returns On River Investment

Obviously the mile markers probably won't cut down on the occasionally careless things people sometimes do when they get to having a really good time, but Veal said anything that'll improve people's situational awareness and emergency preparedness is going to encourage water safety, and probably save lives in the long run. Another project Veal is passionate to advance is mapping out all the low-head dams in the region in hopes of alerting people to the presence and menace those “drowning machines” pose to unsuspecting boaters and swimmers.

Policing against dangerous predicaments on the water is important, said Giansante, but motivating people to take steps to better protect their own well-being will also help avoid accidents and pitfalls that might have the unwanted effect of discouraging them from further waterborne adventure-seeking.

“I truly believe that the river and the outdoors are for everyone,” he said. “But people can't enjoy being outdoors if they don't have a good experience — sometimes a bad experience can ruin someone's desire to get outside and enjoy nature for a very long time — even the rest of his or her life.”◆

Like many out-of-the-way outdoor destinations across the country, Tennessee's Hiwassee River and surrounding tributaries, forests, and mountains saw huge increases in recreation visitation last year as summer vacationers and weekend wanderers looked to spread out and avoid close-contact with crowds. Land managers, waterway safety advocates, and regional tourism proponents anticipate that trend will continue in 2021.

Mark Engler is a freelance writer for ExploreTRV. This story was submitted by the Tennessee River Valley Stewardship Council — a seven-state 501c3 nonprofit geotourism coalition, and a member of the National Geotourism Council. The project's primary funder is the Tennessee Valley Authority.



Reducing Sewer Overflows to Improve River Health and Recreation in Richmond, Virginia

by Justin Doyle

From the Alleghany Highlands and Blue Ridge Mountains to the Chesapeake Bay, riverside parks and access sites along Virginia's James River provide people with opportunities to connect with nature and nurture their bodies through outdoor recreation. The COVID-19 pandemic has emphasized the importance of our riverside parks as over six million people flocked to them with fewer indoor places to go for recreation and enjoyment last year. Richmond, Virginia's beloved 600-acre James River Park System saw 2.1 million visitors in 2020, making it the most-visited attraction in the Richmond region. For context, this high level of visitation exceeded annual visitation to most National Parks in the United States.

Richmond is a major city in Central Virginia, situated on the fall line where Virginia's rolling piedmont meets its coastal plain. The Falls of the James, created by the convergence of the African and North American plates, is a scenic stretch of river located largely within the city limits that drops 105' over the course of seven miles. This dramatic geographic feature creates opportunities for river recreation including whitewater rafting, kayaking, canoeing, fishing, and tubing. At the heart of Richmond's vibrant outdoor recreation scene are two Class IV rapids —Hollywood and Pipeline rapids. This urban whitewater is unique to Richmond and is a reason why so many people visit its James River Park System.

A concern among local river users is that water quality is adversely impacted by stormwater runoff and sewer overflows. Richmond was founded in 1742 and continues to depend on outdated sewer infrastructure technology to manage stormwater and wastewater. This old sewer system is not conducive to year-round river recreation as heavy rainfall events, increasing in frequency as a consequence of climate change, can degrade water quality and make the river unsafe for recreational use. During his first campaign for Mayor of Richmond, Levar Stoney stated, "It is 2016, not 1816. We should not be worried about clean water for our citizens. This needs to be a public health and an environmental priority." Mayor Stoney's call-to-action refers to Richmond's combined sewer system, archaic infrastructure that funneled 1.8 billion gallons of untreated sewage and stormwater

to the James River after significant rainfall events in 2019. Sewer systems that combine wastewater and stormwater into the same pipes are common in older cities across the United States — and Richmond is one of three cities in Virginia with a combined sewer system. The cities of Alexandria and Lynchburg also have combined sewer systems and, like Richmond, are working to fix them. Richmond's combined sewer system dates back to the late 1800s and serves roughly a third of the city. The other two thirds of the city are served by a separated system in which wastewater and stormwater are piped independently.

During dry weather conditions, wastewater is piped to Richmond's recently upgraded wastewater treatment plant with a capacity of 140 million gallons of water per day to undergo treatment before returning to the James River. During wet weather conditions, stormwater enters the combined sewer system via storm drains. If stormwater overwhelms the system's capacity, typically after heavy rainfall, stormwater and wastewater cause an overflow that enters the James River. Sewer overflows impair water quality and threaten the health of river users.

While Richmond has made significant progress in reducing the frequency of combined sewer overflow events and amount of pollution entering the James River (by upgrading its wastewater treatment plant, constructing retention basins, separating pipes, and installing green infrastructure to manage stormwater), these overflows persist and should be completely eliminated for the sake of both the health of the river and the community.

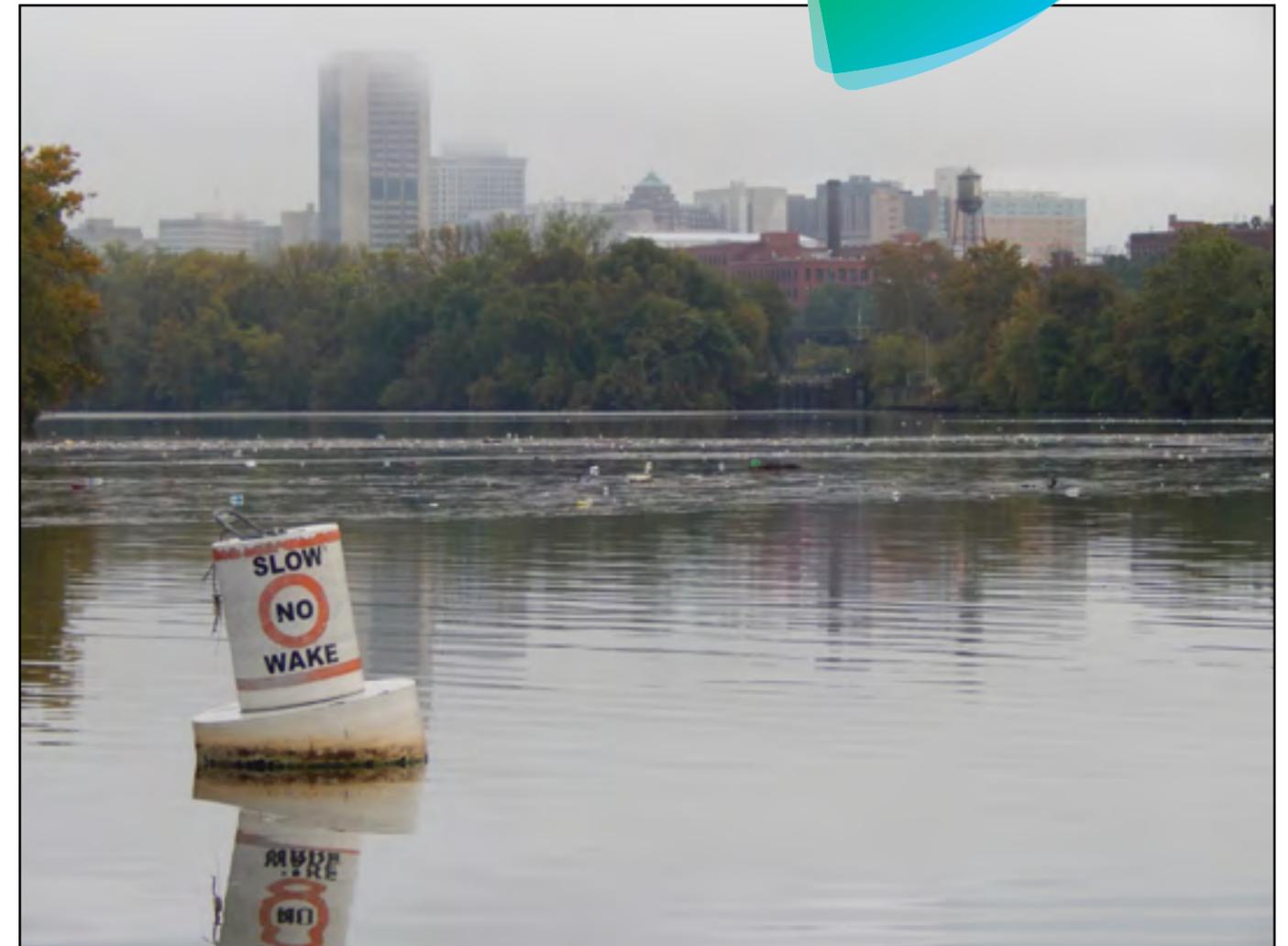
Today, 91% of the annual volume entering the combined sewer system is treated and the Department of Public Utilities continues to improve the system. Implementation of Richmond's Long Term Control Plan is underway and a real-time decision support system that optimizes operations during rain events by using capacity within the system was recently implemented. Senate Bill 1064, which was passed by the Virginia's General Assembly during the 2020 session and signed into law, establishes a 15-year timeline for planning and project implementation to upgrade the combined sewer system. The Department of Public Utilities has been working on an interim plan that details all known actions Richmond can initiate by July 1, 2022. This interim plan is due

to the Virginia Department of Environmental Quality by July 1, 2021, and it will include an estimated timeline, estimated project costs, resulting water quality improvements, and proposed funding sources. Ten projects that will reduce annual overflow volume by 182 million gallons have been identified to date.

Hundreds of millions of dollars have been invested by the city of Richmond and Commonwealth of Virginia to reduce the frequency and volume of overflow events to date. More funding, possibly hundreds of millions of dollars, is needed to eliminate overflows. By bringing state and local officials together to address the issue, the James River Association — a local nonprofit advocate for a healthy and accessible James River — is optimistic a combination of state and local funding can pay for projects that largely eliminate sewer overflows and ensure the James River is safe for recreation 365 days a year. ♦

Justin Doyle is the James River Association's Community Conservation Manager and resides in Richmond, Virginia.

Sewer overflows impair water quality of the James River and threaten the health of river users in Richmond, Virginia. Photo: Justin Doyle



The mission of the James River Association is to be a guardian of the James River.

We provide a voice for the river and take action to promote conservation and responsible stewardship of its natural resources.





Black History Along the Middle James River

The James River at Maidens Landing, Powhatan County.

by Julie Buchanan

Posted on February 16, 2021

[Virginia Dept of Conservation and Recreation](#)

The James River is where many events related to the African-American experience occurred. Whether sources of pride or pain, these events are central to our national, shared narrative.

A new trails plan by the Virginia Department of Conservation and Recreation traces some of this history near the James between Lynchburg and Powhatan County, or the Middle James region.

The goal of the [Middle James Segment Plan](#), released in late 2020, is to highlight key sites so that they may be protected, restored, and experienced as part of the larger James River Heritage Trail corridor.

Freedom is a major theme.

“The story of the people of the Middle James River watershed is one of a struggle for independence and a reminder of what it means to be free,” writes plan author and statewide trails coordinator Jennifer Wampler. Carter G. Woodson, the man known as “the father of Black history,” was certainly familiar with this struggle. He was born near the James in the tiny town of New Canton. While no home or birthplace remains, we know he was born in 1875 to parents who began their lives in slavery. Woodson went on to become a Harvard-educated scholar and

foremost expert on the contributions of African Americans. In 1926, he launched the first organized Black history celebration, the precursor to Black History Month. One site in the region that symbolizes the struggles and achievements of African Americans is the Anne Spencer House and Garden Museum (1313 Pierce St, Lynchburg, VA).

Lynchburg is connected to the Harlem Renaissance through poet Anne Spencer. She was a prominent figure in literature, plus a civil rights activist, librarian, and gardener. Spencer was born in Henry County in 1882; her father was formerly enslaved. She attended the Virginia Theological Seminary and College in Lynchburg and later settled in a Queen Anne-style residence in a neighborhood full of prominent and successful African Americans. Spencer’s lyric poetry is influenced by race, religion, and nature — themes that are explored and interpreted throughout the Anne Spencer House and Garden Museum.

Other sites include:

- ~ Dr. Robert Walter “Whirlwind” Johnson House, Lynchburg
- ~ Carver-Price Legacy Museum, Appomattox
- ~ Bremo Slave Chapel, Bremo Bluff

Bremo Slave Chapel, now part of Grace Episcopal Church, Fluvanna County.

Photo: [David Hoffman](#)

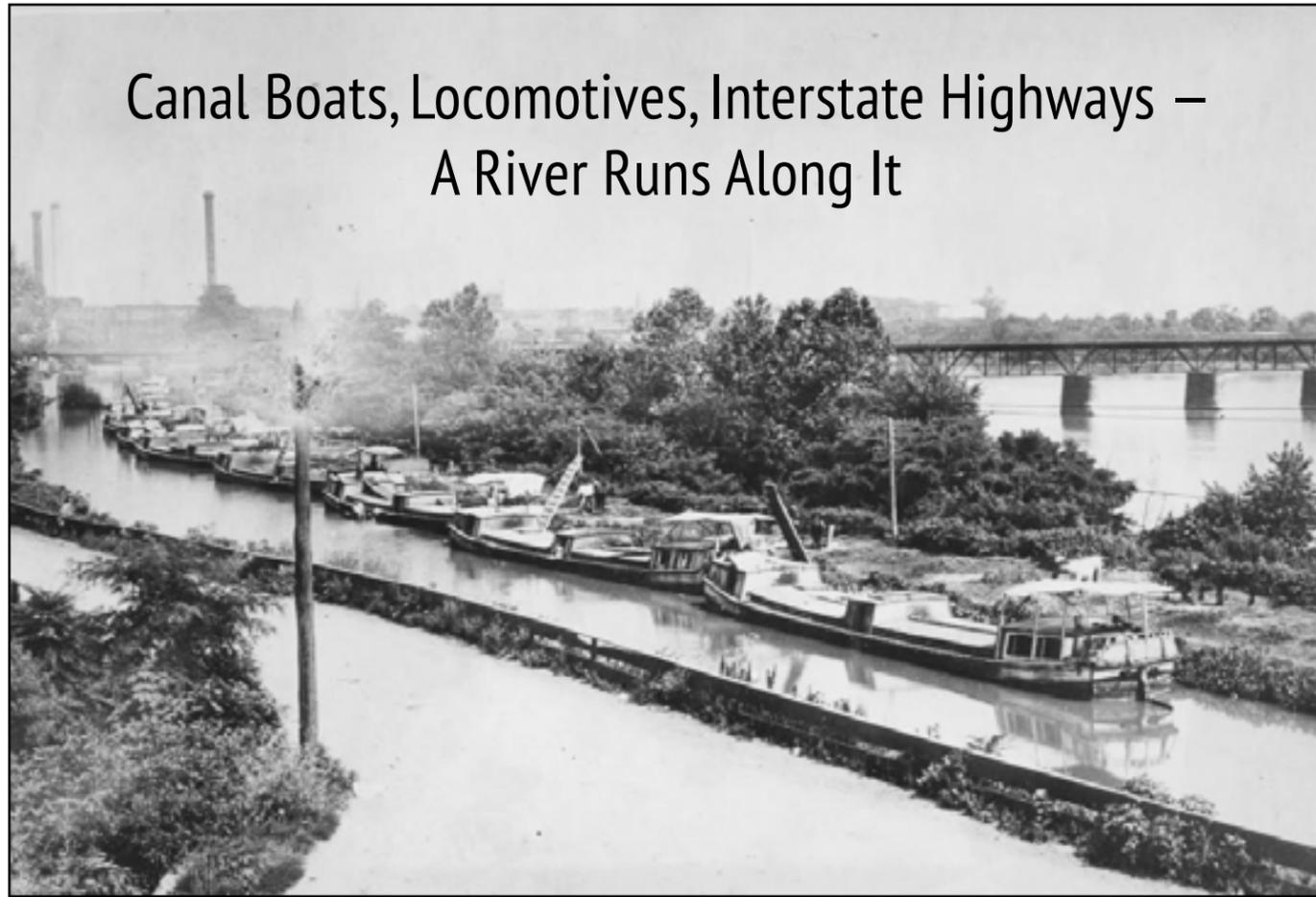


While still mostly conceptual through the Middle James, the James River Heritage Trail, pictured here in Amherst County, could provide an active transportation alternative throughout the watershed. Photo: Jennifer Wampler

The Anne Spencer House and Garden Museum in Lynchburg, VA. Photo: Ryan Trapp, Virginia Tourism Corporation



Canal Boats, Locomotives, Interstate Highways – A River Runs Along It



Canal boats lined up at Georgetown. Courtesy: National Park Service

by David J. Hirschman

In the fall of 2019, I rode my bike along the C&O towpath and the Great Allegheny Passage, following rivers for most of the journey. The C&O traces the banks of the Potomac River from Georgetown in Washington D.C. to Cumberland, MD. Travelling at the “speed of bike” is suitably slow to allow one to ponder the landscape, how it got to be the way it is today, and how transportation infrastructure has intersected with the river corridor over the years.

I stopped at various exhibits to learn about the history of the canal system. At the visitor center in Cumberland, MD, one can walk into a scale replica of a canal boat and learn about the boats, the engineering of the canal system, and the everyday life of those who lived and worked along the canal. Most exhibits along the way included archival photos. After viewing many of these exhibits, it became clear that the river of those days was something completely different than the bucolic, forest-lined river corridor I was experiencing from my bike seat.

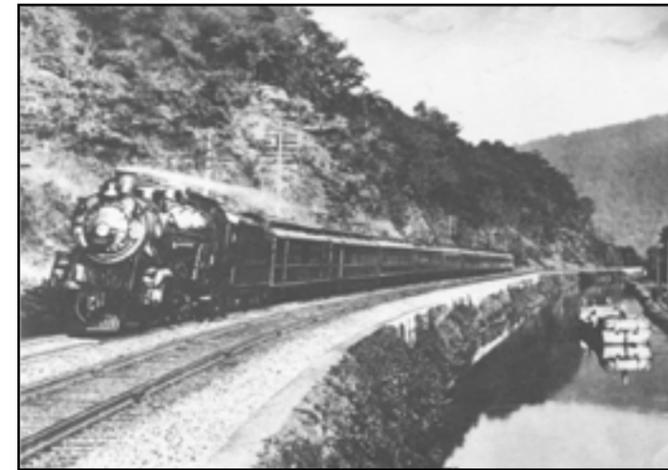
Some of the old photos showed nary of tree or shrub in what was clearly an industrialized landscape. It was hard to tell from the black and white archival photos, but the river looked like it had taken quite a beating from the assembled boats, mules, wagons, roads, towns, storage yards, construction zones, and worksites. The river corridor and canal were bustling construction zones from 1828 to 1850 — the first spadeful of dirt was turned by President John Quincy Adams in 1828, on July 4 no less.

And then came the railroads that carved out tracks along

the riverbanks and built numerous bridges and tunnels. Our rivers were indeed bustling linear commercial corridors. Today’s planners bemoan that our recent automobile-oriented developments have turned their backs to the local waterways. Indeed, many urban river corridors today offer views of the backsides of shopping centers and factories, along with infrastructure both old and new.

However, it is also clear that when we *did* face the river, it was because it was necessary and expedient for the commercial enterprises of the day. Certainly, the people and towns along the river had intimate knowledge of its water, but were also in a position to use those waters roughly in pursuit of various commercial ventures and as a repository for waste products. Periodic floods and droughts set up an adversarial relationship whereby more engineering was needed to try to control the system that had its wild, unpredictable (and economically-destructive) side.

When commerce moved from the rivers to the interstate highways, the river corridors in many ways became forgotten landscapes. Eventually, the rail trails and other trail systems replaced the industrialized landscape, the forest grew, and the stewards of these systems (e.g., National Park Service and advocacy groups such as the C&O Canal Trust) rehabilitated the locks, toll houses, and other structures so that we could learn about the engineering feats of our forebears, which were indeed impressive. Notably, water quality improvement driven by the



Archival photo of a canal boat alongside a locomotive, demonstrating the evolution of transportation systems that both relied on the river corridors. Courtesy: National Park Service.

Clean Water Act allowed river corridors to become more inviting for recreation and interpretation. As for interstate highways, they certainly were no godsend for the rivers. Their impacts tend to extend many miles downstream with stunning volumes of uncontrolled stormwater and associated pollutants. This is our modern legacy of transportation infrastructure and rivers.

The C&O canal began construction nearly 200 years ago. What do you think our interstate corridors will look like in another 200 years? In a fit of whimsy, when some unimagined clean and mighty transportation system replaces the interstates, I imagine the old corridors becoming the long-distance trails systems of the future. Trail enthusiasts of that time will ride along and view historical exhibits showing 18-wheelers, traffic

jams, and smog-choked skies. The future recreationalists will muse, “what were those people thinking?” It is my sincere hope that bicycles will still be around, and they will be the best way to explore these future interstate linear recreation parks (at the “speed of bike” of course).

The interstates shifted the hubs of commerce and transportation away from the river corridors (except for railroads that still use these corridors – day and night – as you will learn if you camp along the C&O), and brought problems of their own for waterways. Transportation systems, while exhibiting incredible feats of engineering and ingenuity, have been tough on our rivers from era to era. Given that we are inclined as a species to get from one place to another, we will have to exercise our collective creative forces to bring more harmony between transportation infrastructure and rivers.

I would like to conclude with a pitch for the C&O Canal Trust, the official nonprofit partner of the Chesapeake & Ohio National Historic Park. Together, these organizations raise funds to preserve, restore, interpret, and educate communities about the canal system. ♦

For more information and historic photos:

~ <https://www.canaltrust.org/>

~ <https://www.nps.gov/choh/index.htm>

David J. Hirschman, Principal, runs Hirschman Water & Environment, LLC — a consulting firm in Charlottesville, VA.

If you have not walked or biked through the 3,118 foot-long Paw Paw Tunnel near Oldtown, MD, it is an experience not to be missed. Photo: David Hirschman



State River Programs Working Group – Popular Programs, Problematic Name

by Risa Shimoda and Lelia Mellen

Since spring 2020, the River Management Society has held virtual conversations with professionals — river, greenway, outfitter, recreation, tourism, water trails, planners, managers — whose community, region, state and federal rivers are benefiting from the experience of peer-to-peer sharing. Our goal has been to facilitate an open forum to support the work of managing rivers and share best practices. We have sought to tackle common issues by asking questions, sharing solutions and as a result, building camaraderie. These conversations have been free and open to members and non-members on the second Tuesday of the month from 3:30 - 4:30 p.m. Eastern Time. During the late spring and early summer 2020 we hosted webinars to share the results of Confluence Consulting’s survey which tracked the COVID-19 responses. With the looming questions last spring of how those working on rivers were handling COVID-19 and the rush of people flocking to the outdoors, our May webchat had over 100 people join the conversation. We thank members Michele Tremblay, Bob Stanley, John Wenck and David Cernicek for their thoughts and participation during these sessions.

Once we felt river managers were balancing pandemic response protocols and visitation as best they could, we took on the serious issue of asking how members and colleagues might tackle the homogeneity of outdoor recreation and specifically, the organizations that manage rivers.

Waiting for someone else to challenge the effects of cultural inequity? *The moment to create positive change in your river world is now, and it depends on you.*

Members of RMS and the State River Programs Working Group were invited to virtual meetings in July, August and September to discuss how we might understand the need for change in ourselves, our workspaces, and with partners. Recordings of these meetings were not shared afterwards, making it easier for participants to speak freely and share their thoughts on this important topic.

Nathan Burrell, Deputy Director, Government and Community Relations, Virginia Department of Conservation and Recreation, shared how his state agency is reviewing every practice to try to reduce bias and institutional racism. He shared, “The moment to create positive change in your river world is now, and it depends on you. Our tank is on empty so anything we do to improve the culture is a step in the right direction.” Nathan’s mantra is **Listen. Learn. Act. Repeat.** Moses Chun and Lelia Mellen, NPS Rivers, Trails and Conservation Assistance Program, also shared their respective workplace initiatives.

On another call, instead of having a guest speaker, we aimed at sparking a conversation amongst ourselves, to learn and listen. One story was shared of how a river manager was upset by a litter-strewn riverbank. She turned to the first person she saw and asked the woman to pick up her trash. It happened to be a black woman who responded to the request indicating she felt she was being singled out because of her race.

In September 2020 we asked members for input regarding the complex issue of workplace equity. Members who self-identified as a manager or leader (66%) or employee or team member (44%) responded to several topics to help us learn how they perceive their working environment to be and how they feel prepared to pursue new thinking and change in their organizations. The group rated how their organization was doing on several initiatives:

- Over two-thirds (69%) indicated their organization needs to increase access to resources / outreach to non-traditional, marginalized groups.
- 62% felt their organization needs to be hiring, mentoring, promoting, providing safe work environments.
- Over half (56%) believe they need to invest in DEI awareness in monoethnic work environments, and well over one third (38%) believed they need to addressing institutional barriers where DEI isn’t a priority.

Survey Respondent Suggestions

- Address in signage, education, outreach and opportunity.
- Revisit management plans for equity.
- Address the elitist nature of volunteer programs which tend to only be readily available to those who can afford to get themselves to the location, work for nothing or very little all summer. and in some situations find their own housing in small rural communities. These are not things that seem accessible to diversity candidates.
- Increase diversity among employees and clients: hire more non-white staff, especially guides and attract non-white guests and groups.
- Purposely invite underserved people to participate in public processes.
- Improve representation of diverse backgrounds in our staff, board, and partners.
- Better incorporate DEI in project work.
- Increase access to river recreation to non-traditional and marginalized groups.
- Instill interest in Natural Resource Management in high school and college students to encourage the future workforce, early.
- Have the ability to hire minorities and other non-white men. Currently, there is no program that prioritizes minority hiring.
- Initiate a sense of empathy among those who are privileged and don’t realize how it affects their sense of urgency.

Over half of the respondents indicated they felt empowered to make change. Those who indicated they did not feel they were empowered to make change noted it is because they do not hold a position of influence or have limited access to those who do. One person offered, “I feel like my voice is small.”

RMS paused this series in late September in response to the Executive Order 13950 on Combating Race and Sex Stereotyping which barred federal agencies, federal contractors, and recipients of federal grants from conducting diversity and inclusion training that promotes “divisive concepts” involving any form of “race or sex stereotyping” or “race or sex scapegoating.”

The controversial Order, which took effect on November 21, 2020, also required the Office of Federal Contract Compliance Programs (OFCCP) to establish a new complaint hotline and required affected employers to incorporate references to the Order in their government contracts and submit copies of their diversity and inclusion training materials to the OFCCP for review. The OFCCP confirmed that training on unconscious or implicit bias was prohibited by the Order “to the extent it teaches or implies that an individual, by virtue of his or her race, sex, and/or national origin, is racist, sexist, oppressive, or biased, whether consciously or unconsciously.”

On January 20, 2021, a new [Executive Order](#) ordered agencies to “root out” systemic racism and other forms of discrimination both in the workplace and in their public-facing programs.

A few people shared that working for the government is context for not feeling empowered to make change. One person described the government as “a machine that moves slowly and hates realistic assessment of its flaws” and where, “no one gets bonuses based on making management aware of issues.” Further, comments pointed out policy and process barriers: resistance, institutional racism, the overreach of national policy and many layers of barriers which prohibit the prioritization of hiring a diverse workforce, including “hiring currently eligible candidates, let alone retaining them.” “New ideas are not welcomed. Tradition is strong in my organization and this limits our ability to be inclusive.”

Folks were then asked, *‘Which types of guidance or resources would be helpful to you to improve DEI in your organization?’*

- Two thirds of the respondents asked for ‘discussions with other river managers about what’s working’ and ‘outreach strategies and marketing materials highlighting diversity in the outdoors.’
 - 44% indicated policy and procedural change in hiring and promotion would help.
 - Well over one third indicated the following would be helpful:
 - Hosting training with an expert for my organization.
 - Printed resources that can be shared with their team.
 - Advice from DEI professionals on specific strategies in our monthly RMS state river manager discussions.
 - A culture shift with management, Board of Directors, or team.
- (continued)*

The Arkansas Headwaters Recreation Area in Colorado has welcomed new visitors with their Life Jacket Loaner Program.



One member in the rural south feels individuals of color may not want to move to Appalachia or even visit, but doesn't blame them in today's environment. It is important to share that our perspectives varied quite a bit. One person shared "No change is needed. The only thing that needs to be done is this whole DEI thing needs to disappear."

From November 2020 to March 2021, the State River Programs Working Group hosted issues important to river managers across the country:

November 2020 - Responding to the Ever-Growing Love for River Recreation - *While "access" to rivers is a public benefit, how are we river managers addressing new visitor populations?*

River managers experienced unprecedented levels of river use in 2020 as the weather warmed and most traditional avenues of entertainment were not available. While nearly all organization and agency systems were stressed beyond any recent years, a new (as of January 2020) waterway fee enabled the Oregon State Marine Board (OSMB) to both support its operational needs and award over \$400,000 in grants, including those supporting creative and innovative local projects that promote safe boating and educational programs. We learned about this successful program, as well as the impact of COVID-19 (and the record-breaking derecho in August) on Iowa's water trails. The third panelist was Aaron Deters from Kansas who is suggesting the possibility of a fee assessed to paddlesports equipment that would fund states' access, safety services and clean water initiatives.

Conversation Starters:

- Jeanine Belleque – Boating Facilities Manager, Oregon State Marine Board
- John Wenck – Water Trails Coordinator, Iowa Department of Natural Resources
- Aaron Deters – Project Manager, Jupiter Environmental

December 2020 - COVID brought the masses outdoors — whose education, awareness, and need for rescue got our attention. So what's the 2021 plan for safety on your river? *Unprecedented river traffic in 2020 was accompanied by new needs for safety and rescue, calls for signage, and public education. Managers reflect on 2020 and share how they are planning for an as yet COVID-19 influenced season in 2021.*

Conversation Starters:

- John L. White – Branch Supervisor, Visitor and Resource Protection, Niobrara National Scenic River
- Dave Cernicek – WSR/Special Uses/Partnerships/ River Ranger, Bridger-Teton National Forest
- Leslie Kobinsky – Concessions Management Specialist, Canyonlands National Park

January 2021 - River Access for Non-traditional River Users

While "access" to rivers is a public benefit, how are we river managers addressing new populations of visitors? We have seen visitation blossom on rivers re-watered by hydro relicensing recreational releases, newly accessible through new and improved launch sites and water cleaner than decades past.

Growing crowds have challenged the capacity of communities to host visitors who have never before floated moving water, even prior to the pandemic response. Panelists, from county representatives to federal agencies, shared how their communities have addressed crowds, tubes, and other impacts of new legions of human powered river craft users.

Conversation Starters:

- Beverly Lopez – Assistant Director, WORD of Comal County, TX
- John Kreski – Arkansas Headwaters Recreation Area
- Stephan Bastrzycki – River Steward, Farmington River Partnership Wild and Scenic River

February 2021 - Managing User Conflicts: Separation, Changed Norms, or Uneasy Truce? *Conflicts between groups are among the toughest challenges faced by resource managers. What makes a conflict? What are the solutions? Why is it important to solve conflicts before tackling other problems?*

We explored these topics and solutions from the perspective of veteran researchers and analyzers of river recreation.

Conversation Starters:

- Bo Shelby and Doug Whittaker – Confluence Research and Consulting

March 2021 - States and Local vs. Federal River Management / Guidance – How have they resembled each other or not?

What do local or state-based and federal river managers love, or not love, about working with each other? What do partners and outfitters love about working with federal and state oversight or administering agencies, and not?

We learned from three very different perspectives what river leaders should know about state vs. federal governance of our waterways; how partnerships have created a new model of coordinated river management; and how outfitters are but one large constituency on rivers, now popular among kayak anglers and other 'new' users.

Conversation Starters:

- Dave Schade – Director, Division of Agriculture, Alaska Department of Natural Resources
- Liz Lacy – Partnership Wild & Scenic Rivers Coordinator, National Park Service
- David Brown – Executive Director, Tennessee Paddlesports Association

The conversations about managing river facilities and use have been recorded and posted on the RMS [River Training Center Video Channel](#).

This series of monthly calls has been enlightening and helpful in learning and sharing with one another. At the end of 2020, we gathered those who had generously presented in this series, and they said they were eager to return to the equity, diversity and inclusion conversation (that we had to stop in the fall). In response, we will double up and host two monthly calls from May through September. The 2nd Tuesday will continue to focus on traditional river manager topics, and we will add the 4th Tuesday to talk about how we can change the culture of our river agencies, businesses, and practices. *(See schedule.)*

April 2021

The 2021 River Management Symposium will be taking place, so we will not be hosting our series. However, we will have a workshop on equity and learn about a brand new program in Virginia to address inequality. We will also learn a few exercises that can open important conversations and accelerate awareness and confidence around establishing cultural shifts in organizations. We hope you will join us at the Symposium! More than 60 presenters will explore similar topics to those covered in these conversations, but in greater detail. We are also excited about our virtual field trips, silent auction and awesome opportunities to network, learn, and build new skills. *(continued)*



On the River
2nd Tuesday (3:30-4:30 pm EST)

Access, Signage, Capacity, New Use, COVID-19, Funding

Gearing Up Personally
4th Tuesday (3:30-4:30 pm EST)

Equity, Diversity, Inclusion, Code Switching, Bias

May 11, 2021

Messaging for river users who ignore signs and drown.

May 25, 2021

Cultural Competency Core Concepts – how cultures form, the importance of perspective switching, the nature of cultural change.

June 8, 2021

User Capacity – Practices, Regulation, Tradeoffs.

June 22, 2021

Navigating Identity – Looking at how we define ourselves.

July 27, 2021

Understanding Difference - Developing an awareness of how cultural differences influence us.

August 24, 2021

Exploring Cultural Values - Comparing values to be able to begin to negotiate differences.

September 14, 2021

What 'best practices' have you adopted and will continue?

September 28, 2021

Communicating Successfully – Learning and practicing to communicate in various situations.

October 12, 2021

Again: how are we paying for new access sites?

November 23, 2021

Does our hiring outreach, vetting, staff evaluation strive for and reward more inclusiveness and diversity? If not, where do we find that diversity lens?

December 28, 2021

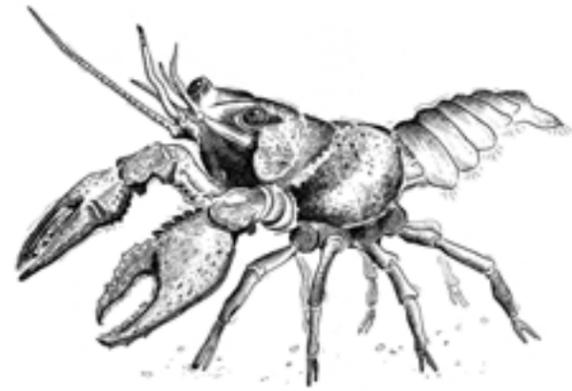
Building Teams – Developing trust with allies to support oneself, and one's organization.

Lastly, this group began with state river managers — as a way for them to network with one another, share experiences, and learn who their peer river managers are. We began calling this the State River Programs Working Group. However, we realized that the benefits of this network extend beyond just state agencies — we have had county officials, outfitters, special river district personnel, state, and federal employees. We want to be inclusive. Thus, we polled those who have been involved and after an elaborate weight system of counting the votes (thanks Risa!), we have a new name:

River Management Roundtable

Tune in to one of our next calls — we welcome all! Links to register for the series are sent out via the RMS News Digest, and posted on the RMS [River Management Roundtable](#) page. ♦

The Farmington River Coordinating Council utilizes both paid and volunteer River Stewards to interface with visitors.



VCU Freshwater Fridays Keeps Learning REAL

by James Vonesh

Last spring, Center for Environmental Studies (CES) faculty Dan McGarvey, James Vonesh, and adjunct instructor and Chesapeake Bay Foundation Staff Scientist Joe Wood envisioned a new collaborative course block focused on freshwater science and policy dubbed “[Freshwater Fridays](#).” Freshwater Fridays includes three integrated 500-level topics courses – SCENIC NATURAL RESOURCES POLICY & ASSESSMENT, co-led by Vonesh and Lynn Crump, Scenic Resources Coordinator for Virginia Department of Conservation and Recreation, STREAM SURVEY METHODS led by McGarvey, and VIRGINIA WATER QUALITY ISSUES & CAREERS led by Wood. The purpose of block scheduling these courses over nine hours every Friday was to enable the courses to develop a more immersive and integrated curriculum whereby instructors can teach not only course-specific content but highlight the overlap across disciplines and to facilitate our ability to integrate day and weekend trips to increase opportunities for hands-on place-based [Relevant Experiential Applied Learning](#) (REAL).

Adapting to the times

Student enthusiasm was high during spring registration — enrollment quickly filled. Then the pandemic hit. “The pandemic forced educators around the country to rethink how they were going to teach their courses this fall,” said Vonesh. “Since our courses were fundamentally based on experiential hands-on, in-person learning, often off-campus, we faced some unique challenges. We had to take Freshwater Fridays back to the editing table and see if we could still deliver something that resembled what we had promised safely and in compliance with health guidelines.”

After input from across the university and from the students enrolled, a revised Freshwater Fridays emerged. Wood’s WATER QUALITY ISSUES course moved online, with Wood focusing on bringing regional leaders in water policy to the class through Zoom. McGarvey split his fish and aquatic invertebrate identification labs, which require extensive microscope work, into two sections to maintain social distancing. Since they were unable to obtain a large enough room for all the students to meet together on campus while maintaining social distancing, they scheduled some classes in city park pavilions. Rather than the fieldwork initially planned across

could meet us,” Vonesh said. “Having the James River and the city park system within walking, biking, or driving distance of campus was key to our being able to retain many of the experiential elements.”

To maintain other elements of the course, they needed to develop new partners. On their scenic assessment field day on the James River below New Canton, safely transporting students between the put-in to the take-out presented a particular challenge. Normally, 12-passenger vans would have been used, but those wouldn’t have allowed sufficient social distancing. Instead, Richmond-based Riverside Outfitters helped out with access to their full-sized school bus which



Matt Perry of Riverside Outfitters provided a socially distanced shuttle option and also spoke to the students about his perspective, as a local outfitter/business owner, on the value of the VA Scenic Rivers Program. Photos: James Vonesh

all Virginia’s major physiogeographic regions, which would have required overnight trips, the focus shifted to sections of the James River and tributaries that could be visited in a day.

While fieldwork itself is not contraindicated by health and safety guidelines, being outdoors is generally thought to be less risky than being indoors when it comes to exposure to coronavirus — but transportation to field sites became the bottleneck.

“We needed sites where students

enabled the course to maintain social distancing measures during the short shuttle.

Pathways to freshwater careers

Wood’s WATER QUALITY ISSUES course focuses on putting students face-to-face with environmental professionals to give students a chance to see the opportunities and challenges that may face them in their future careers. The course has focused on how the

Clean Water Act has played out in Virginia, including gaps in protection and successes. Students engage with water quality experts from NGOs and state and federal agencies. Several VCU Environmental Studies alumni have spoken to the students, offering tips and advice for transitioning from student to professional. For example, last week CES alum Will Isenberg, who works on developing water quality plans at the Department of Environmental Quality, spoke to students and offered tips on pursuing employment in the environmental field.

In-person meets virtual in scenic assessment

In SCENIC NATURAL RESOURCES, students are introduced to scenic resource concepts, policy, and assessment while engaging deeply in this topic through a course-embedded research project in collaboration with the Virginia Scenic Rivers Program. Scenic resources are important to both quality of life and the economy and may be subject to local, regional, and national legislation. The scenic value of a landscape is based on human perception of the intrinsic beauty of land form, water form, and vegetation in the landscape, as well as any visible human additions or alterations to the landscape. Assessment of scenic value often involves an in-person field evaluation. However, digital media are increasingly used to archive viewshed appearance and contribute to the assessment process. Focal research questions for this class are: *To what extent can we rely on digital imagery when assessing scenic value? Do scenic resource assessments based on field observations and those based on digital imagery produce similar results?*

To address these questions, the class teamed up with landscape architect Lynn Crump, who runs the Virginia Scenic Rivers Program, and local entrepreneur and outdoor enthusiast [Ryan Abrahamsen](#), of Richmond-based Terrain360, to study the 10.5-mile section of the James River between New Canton and Columbia. [Lynn explained](#) that the local community had requested this section be evaluated for possible state scenic designation to help attract more ecotourism to the region. Ryan shared his vision for using technology and high-quality imagery to create virtual maps of our natural treasures to attract people into the outdoors. He also walked the class through the iterative development of his raft-mounted “[Google Streetview](#)” camera equipment which he has used to create virtual maps of many mid-Atlantic rivers, including the [James River from source to sea](#).



Dr. Dan McGarvey demonstrates using a clinometer to measure stream gradient.

“It was touch and go as to whether we were going to be able to conduct the scenic assessment,” Vonesh said. “There were a lot of moving parts to coordinate. The VCU Outdoor Adventure Program was leading the trip and providing safety training, boats, and other gear. Riverside Outfitters had a narrow window when their bus was available for the shuttle assist. Terrain360 needed clear weather to deploy their “Google Streetview” camera equipt raft. Lynn Crump was juggling her availability to meet us in the field. Everything was in place... then the remains of Hurricane Sally rolled through the evening before the assessment. We only made the call to go for it 24 hrs in advance — but fortunately, the skies cleared as we arrived at the put-in and the day was perfect.”

Student Courtney Coates said: *“The coolest thing to me was getting to talk to Lynn and Ryan about their careers and seeing how passionate and happy they are. I liked hearing about all the other components of Lynn’s job, and the careers she has had in the past. We were so lucky to have a beautiful day on the river, perfect for learning and seeing our guests out in the field!”*

As the team floated downstream Lynn guided the students in visual assessment every couple of miles and students recorded their ratings on an ArcGIS Survey123 phone app specifically developed for the course. Simultaneously, Terrain360 captured the full panorama view of the entire section — enabling the course to re-float and re-assess this river segment in a virtual

environment (to float the river with the class in Terrain360 [click here](#) and hit *play*). By examining the correlation between scores students made in-person in the field with their scores made at the same georeferenced location viewed through the Terrain360 virtual environment we can begin to quantitatively address the relationship between field and digital imagery based assessments.

Student Josh McCauley summed up the day: *“Whether collecting live data using a phone app, having friendly canoe battles,*

admiring some guerilla art, or identifying native and non-native vegetation, canoeing the James River from New Canton to Columbia was an entirely unique experience for me.”

Biodiversity of the Rockfish River

McGarvey’s STREAM METHODS course focuses on sampling and identification of common fish and aquatic macroinvertebrates found in Virginia rivers and streams. To develop basic proficiency in these skills, Freshwater Fridays students participate in McGarvey’s fieldwork on the South Fork

of the Rockfish River, a tributary of the James River, in Nelson County. McGarvey started studying the Rockfish to establish a baseline benchmark for river health prior to planned development in the region associated with the Atlantic Coast Pipeline project — a project that was canceled earlier this past July. However, the work continues to inform our basic understanding of how stream foodwebs are structured. Students, wearing chest waders, spent the day working in and around the river. They deployed block nets using seines up and downstream to isolate a focal reach, and then used backpacking electrofishing to conduct multiple depletion pass sampling runs to quantify fish abundance and diversity (see timelapse GoPro360 videos by clicking [here](#) and [here](#)). Students were taught best practices for anesthetizing fish before processing, how to used keys and guides to identify the fish, and how to weigh and measure individual specimens before releasing them (IACUC AD10000441). They also learned how to use a Hess sampler to measure the abundance and diversity of stream benthic macroinvertebrates. Dr. McGarvey and his lab recently published a video-supplemented article in the Journal Of Visual Experiments (JOVE), which provides a roadmap for this widely used approach to sampling stream biodiversity ([McGarvey, D. J., Woods, T. E., Kirk, A. J. 2019 Modeling the Size Spectrum for Macroinvertebrates and Fishes](#)

[in Stream Ecosystems. doi:10.3791/59945](#)). If ever there were an “immersive” learning activity, this is it! Over two days of effort at two sites on the South Rockfish, the team sampled nearly 1000 fish of 23 different species! When asked the total number of fish species in Virginia, McGarvey, responded, “There is no single, correct answer to that question. In Virginia, the official number of primary, native freshwater fish species was 210, as of the 1993 publication of Jenkins & Burkhead’s *Freshwater Fishes of Virginia*, the authoritative text. More recent taxonomic work has almost certainly pushed the number up by 10-20 species. But, extirpations have likely offset that. Also keep in mind that probably 1/3 of the 210 estimate is endemic to the Tennessee River, which is only a small fraction of southwest VA.” So it seems likely that the class got to see a nice slice of eastern Virginia’s fish diversity as part of the class. ♦

Dr. James R. Vonesh is Assistant Director & Director of Undergraduate Studies at Virginia Commonwealth University.

Dr. McGarvey’s STREAM METHODS students learn how to use a Hess sampler to measure the abundance and diversity of stream benthic macroinvertebrates in Reedy Creek, Forest Hill Park, downtown Richmond, within walking distance of VCU campus.



Using Technical Core Competencies to Assess and Develop Training Curriculum for River Rangers

by Colter Pence and Indigo Scott

The Hungry Horse-Glacier View Ranger District of the Flathead National Forest, in Montana, manages the North Fork and Middle Fork of the Three Forks of the Flathead Wild and Scenic River. Staff within the program consists of a river manager, two to three seasonal river rangers, and a river intern. Year-round work consists of various Wild and Scenic River Act compliance elements, administering Special Use permits, facility management master planning, and adaptive management for increasing river recreation visitation. Prime recreation visitation is in the summer season, and field operations consist of river patrols, river access site maintenance, law enforcement,

education and interpretation, and social and resource condition monitoring. All three classifications of Wild and Scenic Rivers are present, providing a wide-ranging river environment, including a stretch in the Bob Marshall and Great Bear Wilderness Areas, and large sections of the rivers which form the boundary between the Flathead National Forest and Glacier National Park. As such, there is frequent work with partners including not-for-profit friends groups and National Park Service staff and volunteers.

Training and development for all levels of river management staff has included a range of field-based skill development and programmatic awareness building, but has not been developed in a systematic manner; content development

has been reactive – responding to training needs as they occur rather than following an organized curriculum development plan. Focus has been on orienting people new to the program and specific practical functions, not framed around greater knowledge, skills, and abilities (KSAs) development. The district hosts an annual river training, and opportunities for self-directed learning are available in the form of a small resource library. The [Technical Core Competencies – River Management Specialists and Non-Specialists](#) document from the Interagency Wild & Scenic Rivers Coordinating Council (Technical Core Competencies) provides an interagency framework for evaluating the KSAs necessary for effective river management; as the

program’s manager and lead river ranger, we saw an opportunity to evaluate our program and training in order to broaden and deepen our training curriculum. We are sharing with you our approach, so that you can consider using the Technical Core Competencies framework to further develop the KSAs and training curriculum of your river’s staff and program capacity.

First, we broke out the group we wanted to initially focus on, in this case field-going river rangers and interns (or in the language of the white paper, “entry level river management specialists”) — though our process could be adapted for any level of expertise. For each of the eight competency areas, we selected those competencies which applied to the entry level river management specialists and assigned them a number such that 1.1 would be the first element listed in competency area one, 1.2 would be the second element and so on. With this focused list of competencies, we then set out to analyze how well our river program was providing direct training and independent development opportunities for each competency.

For our assessment we created a table with four columns: first the competency itself, then where it was currently covered in our training, then additional resources we had available, and finally a column for brainstorming how to improve our training and available resources. We then began working through the document filling in where each competency was covered, either in our annual river training or our reference library. Whenever possible we included hyperlinks directly to the materials we had referenced. We used yellow to highlight those boxes that remained empty even after we had thoroughly catalogued our existing resources. This made it easy to scan quickly through the list and see where we needed to improve. This document provided two things: a catalogue of existing trainings and resources, and a framework for improving our existing river ranger training.

Part two of our project was to begin to fill in resources for those competencies we had not been covering well or at all. Some of these boxes were relatively easy to fill. For example, competency 3.8 “knowledge of steps required in conducting the NEPA [National Environmental Policy Act of 1970 (NEPA)] process.” We reached out to the district NEPA coordinator who was able to provide us with the information we needed to make a slide to add to the annual training as well as a more in-depth document for our resource library to which we could refer rangers interested in learning more (such as short video and readings on the topic). This also helped to fill in the gaps for competency 3.10 “ability to discuss and educate the public about river management planning concepts.”

Other empty boxes raised interesting questions about our goals as a program. Competency 4.12 “ability to act decisively and calmly under conditions of emotional and physical duress,” 8.7 “ability to employ listening techniques,” and 8.8 “skilled at working as a member of a team” were all clearly crucial to being an effective river ranger. However, we found these broader less tangible skills more difficult to locate trainings for, than something like say competency 4.2 “knowledge of regionally appropriate ‘Leave No Trace’ principles and ethics” for which there was a clearly defined curriculum and goal. These competencies sparked interesting conversations — *How do we teach this? Do we have the expertise? Where should we prioritize teaching as opposed to seeking out applicants who already have the skills?* These conversations are ongoing.

The process of working through the competencies and our materials also created an opportunity to focus our trainings and make better use of existing materials. For example, for the 50th Anniversary of the Wild and Scenic Rivers Act of 1968 (WSRA) Colter had created a presentation about the role of the Three Forks of the

Flathead in the creation of the WSRA that covered many of the “knowledge of” competencies from competency areas one and six. She had presented this at river trainings some years, but not every year as the presentation was quite detailed and represented a significant time commitment. In examining our training materials through the lens of the Technical Core Competencies, we found that we could take many of the materials prepared for this presentation (slides and speaking notes) and include them in our annual training. In this case we used the Technical Core Competencies to narrow and prioritize what information needed to be highlighted in an area where we had plentiful information and materials.

This led into the third part of our project — using the Technical Core Competencies to provide structure for our existing training. Over the years we had created a number of training presentations, some for a particular topic, others for a particular group or year. But finding any given slide or piece of content meant remembering which presentation contained the most updated version, and then finding where it had been filed. To better organize our existing materials, we created a PowerPoint presentation for each competency area. Into these PowerPoints we copied the best parts of the existing presentations. We also made new slides for those KSAs for which we had new materials. Once completed, the idea is that each of these PowerPoints can either be presented as a stand-alone presentation, a module in a larger presentation, or serve as a source to select particular competencies for a particular audience using our assessment document as an index.

We began this project in the fall of 2019, anticipating that it would be applied to our 2020 river training in mid-June. However, we found ourselves using it as a resource in a way we never could have anticipated. Like many other agencies, the COVID-19 global pandemic brought a great deal of uncertainty to the early part of our field season. With interns and

Practicing with throw ropes on the Middle Fork of the Flathead River in Montana.



Competency Area Six from Core Competencies

6. Natural, Cultural and Recreational Resources Management and Monitoring — (River Management Specialists) - KSAs needed to manage and monitor natural, cultural, aesthetic/visual, and recreational resources within designated Wild and Scenic Rivers and other non-designated river corridors.	
Entry Level	<p>Knowledge and understanding of:</p> <ul style="list-style-type: none"> • plant and animal species common to the area • species of special concern including threatened and endangered or non-native invasive species • the story of human occupancy of the area • aesthetics/visual resource management • monitoring approaches and data collection methods • threats to biophysical, scenic, social and cultural resources • best management practices for protecting water quality and other river-related resources • recreation values of the river corridor • local and state zoning, ordinances, rules and regulations within river corridor <p>Ability to:</p> <ul style="list-style-type: none"> • work with resource management specialists to assist in inventory and monitoring of biophysical, scenic, social, and cultural resources • identify and report violations

FNF's Competency Area Six Evaluation

6. Natural, Cultural and Recreational Resources Management and Monitoring				
		Training	Resources	Improve by:
Knowledge of:	6.1 Plant and animal species common to the area	- Bear Awareness Training - Fish and fisheries briefing by district Fish Biologist	- FWP - MT Fishing Regulations - Forest resource specialists - Flathead Watershed Sourcebook	
	6.2 Species of special concern including threatened and endangered or non-native invasive species	- Orientation weeds training - Bear Awareness Training	- Weeds field guides - Didymo white paper - Food storage order - Flathead Watershed Sourcebook	- add slide on didymo to training - Mountain Goats - Harlequin Ducks
	6.3 The story of human occupancy of the area	- 3 Forks History	- Books in resource library - WSR History video - <i>Wild River Pioneers</i> (Fraley) - <i>Great Bear, Wild River</i> - Flathead Watershed Sourcebook - <i>Run Wild, Run Free</i> (video)	- Awareness of Conservation Easements and Fee Title Acquisition Program - currently exists as a slide in training, but can be improved
	6.4 Aesthetics/visual resource management		- 3 Forks ORV Document: Scenery	- Could we adapt the scenery presentation from the CRMP public meeting for this purpose?
	6.5 Monitoring approaches and data collection methods	- HHGV River Ranger Training - Monitoring Training	- Monitoring tips and tricks document	- see above RE cultural resources
	6.6 Threats to biophysical, scenic, social, and cultural resources		- 3 Forks ORV Document: Ethnographic and Historic - Flathead Watershed Sourcebook	

rangers coming from out of state and a two-week quarantine order, we found ourselves needing to provide useful training and work that could be done virtually. Our competencies assessment document meant that we had a readily available list of trainings and resources including online classes, videos, and readings.

While this exercise helped us to uncover gaps in our training, and identify resources that we could add to our training library, it also validated much of our existing training, particularly the classroom portion. Many of the KSAs described in the Technical Core Competencies document had been added to our training curriculum over the years, and by analyzing our training and resources through the lens of the Technical Core Competencies, we could affirm that we were on the right track.

Using concepts from the Technical

Core Competencies document we evaluated existing training curriculum and expanded the quantity and quality of that curriculum by organizing it around a framework of KSAs for entry level river management specialists; see the Flathead National Forest KSA Program Evaluation ([click here](#)). We have identified gaps in the existing training and are now able to focus on filling those gaps and locating resources. The training is now organized in a manner which can be pulled out for compartmentalized on-demand use or kept intact for full programmatic coverage. We hope that our process can be helpful to other river managers seeking to improve their program's overall capacity and training program, and engage in higher quality, professional river management. ♦

Colter Pence, Wilderness, Wild & Scenic Rivers, and Trails Program Manager; and Indigo Scott, River Ranger, work on the Flathead National Forest, in Montana.



Learn more about Technical Core Competencies by reviewing the PowerPoint presentation provided on October 25, 2018, in Vancouver, WA: [click here](#)

Learn more about the knowledge, skills and abilities river managers should have, and where to find training, in the Summary of Interagency Training Needs and Available Resources (2019) document from the Interagency Wild & Scenic Rivers Coordinating Council: [click here](#)

Forest Service training with Glacier National Park volunteers.



Glen Canyon Dam as a conservation tool – can a major river impoundment improve the native fish community?



Glen Canyon Dam, the hydroelectric dam that separates Lake Powell from the Grand Canyon, as seen from downstream. Photos: Lindsay E Hansen

by Lindsay E Hansen

Introduction

The Colorado River is a symbol of the intrepid American West, and hosts a small richness of morphologically unique native fish species adapted for life in turbid and flood-prone water. The river drains eight percent of the continental United States and flows through eleven national parks and monuments, including the Grand Canyon (American Rivers n.d.). Although known for being iconic and remote, the Colorado River is fragmented by large hydroelectric dams, such as the Glen Canyon Dam that separates the Grand Canyon portion of the river from all upstream reaches (Schmidt et al. 1998).

Freshwater fishes represent one of the most globally imperiled groups of animals and exhibit some of the highest rates of extinction (Cooke et al. 2005). While large hydroelectric dams are often seen as disastrous for freshwater fish population stability, conditions in the Grand Canyon may suggest an alternative perspective. River modification and climate change in the entirety of the Colorado River Basin has supported invasive fish success, but cold water from Glen Canyon Dam has led to

the artificial maintenance of native fish communities in the Grand Canyon. Although impassable hydroelectric dams make for less than ideal river recreation for humans and blocked migrations and novel habitat for fish, at least for the success of native fishes they may not be so bad.

Fish assemblages in the Grand Canyon Colorado River

Within the Grand Canyon reach of the Colorado River, only eight native fishes are known to have historically inhabited the mainstem of the river: humpback chub (*Gila cypha*), razorback sucker (*Xyrauchen texanus*), bluehead sucker (*Catostomus discobolus*), flannelmouth sucker (*Catostomus latipinnis*), speckled dace (*Rhinichthys osculus*), Colorado pikeminnow (*Ptychocheilus lucius*), roundtail chub (*Gila robusta*), and bonytail (*Gila elegans*) (National Park Service 2018). Of these eight fishes, three (bonytail, roundtail chub, and Colorado pikeminnow) have been extirpated in the past 50 years, and humpback chub and razorback suckers are listed as endangered

on the Endangered Species Act (Dauwalter et al. 2011, National Park Service 2018).

Over 60 species of non-native fishes dominate the biomass of the Colorado River Basin, many of which were introduced in the late 19th century by the U.S. Fish Commission, a precursor to U.S. Fish and Wildlife Service (Carothers 2000, Dauwalter et al. 2011). At least 13 of these species occur within the Grand Canyon, including cold-water adapted rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*) that thrive just downstream of Glen Canyon Dam, and warm-water adapted fish such as common carp (*Cyprinus carpio*), channel catfish (*Ictalurus punctatus*), striped bass (*Morone saxatilis*), and green sunfish (*Lepomis cyanellus*) thrive in Lake Powell and exist in small numbers within the Grand Canyon (Lechleitner 1992). Non-native fishes may have deleterious impacts on native fish abundance and richness through predation and competition with natives for food and niche space (Seegert et al. 2014).

the Colorado River as a whole are only made up of 10% native fish, the Grand Canyon hosts a fish community with 25% natives by abundance (Carothers 2000).

This increased abundance of native fish in the Grand Canyon may be supported by the novel food sources generated as a result of the dam's water releases, simultaneously degrading natural fish habitat while creating new opportunities for population growth. The penstocks of the dam, or the sluices or floodgates that regulate the flow of water moving through the dam, are located deep enough that the thermocline of water in the reservoir prevents mixing of warm surface waters with colder, deeper water, and leads to a constant release of that cold water into the Grand Canyon (Foster 2016). Average suspended sediment load has precipitously declined as a result of entrapment in the reservoir, leading to a shift in food web dynamics and a narrowing of the river channel. The cold water released from the reservoir has a higher concentration of nutrients (C, N, P)



Above: The humpback chub is a native fish to the Colorado River. Right: The green sunfish is an example of a warm-water adapted invasive species that is blocked from colonizing the Grand Canyon by Glen Canyon Dam.



Advantageous impacts of Glen Canyon Dam on native fishes

When construction of the Glen Canyon Dam was completed in 1964, the Colorado River's flood frequency and magnitude was immediately altered, and river connectivity promptly severed (Schmidt et al. 1998, Sabo et al. 2018). While Glen Canyon Dam has been shown to block historical migration routes of native fish, this fish barrier serves as a safety net to protect native fish populations within the Grand Canyon from invasion of warm-water adapted non-native fish that are abundant upstream of Lake Powell (McKinney et al. 1999, Carothers 2000). The physical barrier created by the dam has created an "unintended and serendipitous consequence of a delay in the overwhelming and irreversible dominance of non-native fishes in the Grand Canyon" (Carothers 2000). The dam likely blocks most invasive fish, but some individuals are able to survive being pulled through the dam and end up in the Grand Canyon. While fish assemblages of

than warmer waters would have (Schmidt et al. 1998). Paukert and Rogers (2004) saw an increase in macroinvertebrate abundance and a larger euphotic zone during consistent water flows, an increase in productivity that

may provide benefits for native fish by alleviating some food limitations (Paukert and Rogers 2004).

Climate change

Climate models predict an average global atmospheric temperature increase between 1.4 °C and 5.8 °C over the next 100

years (Christensen et al. 2004). A 2 °C temperature increase will cause a 10% drop in precipitation and 20% reduction in runoff, which could lead to a 10% reduction in annual flow through the Colorado River Basin (Nash and Gleick 1991, Christensen et al. 2004, Jaeger et al. 2014). Since the early 2000's, an ongoing drought has caused the water level in Lake Powell to decrease. This brings warmer surface waters closer to penstock openings, and has led to an increase in water temperature within the Grand Canyon, up to a decadal average of 15 °C from the post-dam construction average of 8 °C (Zielinski 2010, Ward et al. 2017). Over this same two-decade time period, native fish abundance has increased dramatically within the Canyon, likely because the warmer water conditions encourage more successful native fish survival and spawning (Ward et al. 2017).

The warming of river waters due to drought conditions may allow warm-water adapted invasive species such as green sunfish, smallmouth bass, and walleye to colonize the Grand Canyon reach. Although there is a significant trout sport fishery in the Canyon, trout are not considered a particularly problematic species because they do not directly compete for niche space with any native fish and thrive in cold water. Warm-water invasives pose a greater threat to native fish, especially the endangered humpback chub, because they fill the same ecological role and may outcompete or directly predate native species (US Bureau of Reclamation 2016). That being said, because the Glen Canyon Dam is such an effective fish barrier, this impasse protects the Grand Canyon from invasion by exotic fish even with warming water temperatures due to climate change and drought (Carothers 2000).

Conclusion

The eight native fishes in the Grand Canyon face threat of extirpation or extinction as a result of non-native species invasion and habitat destruction. While much of this habitat degradation has been attributed to the construction of Glen Canyon Dam upstream of the Grand Canyon, the dam has had unintended positive consequences that have helped protect and support fish assemblages in the canyon that are high in abundance of native species. Novel flow, turbidity, and temperature conditions created by dam operations may support algal growth and aquatic invertebrate production in a largely food limited system. With climate change, drought conditions will warm the water flowing through penstocks and into the river, allowing native fish a more natural temperature regime and encouraging regular spawning and increase survival of juvenile fish. Although some invasive fish may also have the potential to benefit from these warmer water conditions, the dam acts as a physical barrier preventing invasion of the Grand Canyon from invasive species upstream. ♦

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How dirty is your river?

by Bud Hoekstra

Begging your pardon, I repeat, rivers are dirty places and getting dirtier all the time, because rivers handle waste.

Plastic is a visible offender of wild and scenic luster — about 80% of marine plastic emanates from land-based sources, brought to bear by riverine currents. So great is the problem globally that the European Commission has set up a research program to monitor riverine litter.

Users of rivers, even those people who champion rivers, think of litter as unseemly but innocuous; however, the truth may surprise you. In one of the very few studies of terrestrial litter (a Lake Lorne, Victoria, study in Australia), 19% of the 211 injuries to beach-goers were caused by litter. 95% of dead fulmars in Europe that washed ashore had plastic in their gullets. A study of an adopt-a-highway program in the Northeast U.S., using volunteers to pick up the litter, cost taxpayers 18 cents per item collected. Pockets, if not persons, are harmed, and litter is deadly to wildlife.

Plastic is forever — that's the environmental fate of the 6 million tons of it that accrue in the ocean every year — and rivers take it there. Beachcombers may find a rusty can of aerosol spray, labeled “malathion” in Russian, beached in the sand of California's coast, having accidentally been dropped from a passing Russian freighter, but the menace of plastic is largely riparian — high river water dislodges it from its resting spot, and water-borne litter flushes ocean-ward eventually.

Rivers drain watersheds, and drainages come in two types: 1) those natural watercourses which we want to retain as wild and scenic rivers; and 2) artificial streams, namely roads and highways. The contrast is stark. Forests and grasslands are natural sponges absorbing rain into the ground; clean water is our most important forest product. But we don't build roads for surface-spreading, recharge, and infiltration — we engineer them to channelize runoff with culverts, pavements, ditches, and curbs.

The water cycle, according to Aldo Leopold, is a “round river.” Ocean

water evaporates, atmospheric streams whisk inland, elevations and climate condense the pattern into rain, rainfall soaks into the ground and leaches into creeks and streams. Rivers thrice-remotely recycle the droplets that fall from the sky. We short-

circuit the natural state of the round river — we engineer roadways for runoff, not recharge. The USDA Natural Resource Conservation Service's staff exhort building rural roads with “crowns and outsloping curves” so that water runs into infiltration zones where it can percolate and recharge wells.

1940, if we roughly named a year, began the decline of rivers that amassed plastic — plastic lives forever, a permanent monument of waste and anti-wealth. Sure, NIMBY-ists pick up their polluted oxbows and riffles, but the problem remains largely intractable. The litter itself loses form, breaking down into finer and finer pieces, into polymeric nano-flakes that invade our food chains and nature's own food web. Destruction is there, even when we can't see it.

As plastic breaks down, it oozes “plasticizers” — estrogenically active chemicals that make hard plastic fibers flexible instead of brittle. Estrogens are known to affect zebra fish in exposures of as low as 5 nanograms per liter, and your brain development as a child depends on right dosages of these hormones in amounts even lower — physiologically active in picograms per liter. Ordinary tap water exhibits trace estrogenic activity near 7 nanograms per liter, and rivers often carry loads in micrograms, resulting in intersex fish. Thank you, Mr. Plastics for your environmental contributions!

Outfalls of highway culverts contribute plastics and other toxins. Benzopyrenes in cigarette smoke are among the most potent carcinogens



known, but rubber tires can release dibenzopyrenes that are 30-100 times more carcinogenic. Highways are artificial watercourses that empty into natural rivers — natural systems no longer self-cleanse of these new manufactured toxins.

Human occupation of the environment falls into three roles: doffers, dumpers and doers. *Doffers* are mindless recreationists that flip candy wrappers or soda cans out a car window or off a beach blanket. *Dumpers* (known as *fly tippers* in Britain) roll up to a river and unload the bed of a pickup. *Doers* are the NIMBY-ists and Not-in-My-Backyard-ers who recognize the problem and are satisfied with casual cleanups once or twice a year.

One of the great ironies of the day is trailside doggie bags — dog poop is manure, dog poop biodegrades, but the plastic sacks are forever... monuments to our life and times. Dog poop can carry microbes like *Toxicare*, but plastic doggie bags are coffin-cells that prevent nature's job of decomposing poop.

Ask yourself... “Which is worse — poop or plastic?” The truth is that waste treatment plants are only 95% effective, and human hormones like our bodies' estrogens, and drugs like ethinylestradiol, the birth control estrogen, escape processing and bash our bodies' delicate endocrinologies. Your glass of tap water — as well as rivers — contains minute traces of urine, that's a fact. But we bag dog poop, and we spike our rivers with a wake of artificial plastic ‘poop’... clueless of the consequences. When will we ever learn? When will we ever learn? ♦



Outdoor Recreation in the Great Ohio River Basin

Three Voyageur Canoes finishing a 250-mile canoe trip on the Ohio River, Louisville, KY. Photos: John Nation

“By 2025, our Basin-wide welcome will be ‘nation-wide known’ as a regional destination for enjoying the solitude of headwater creeks, excitement of scenic rivers and streams, myriad of wildlife explored by tributaries, and cultural history (Recreation Working Group’s vision).”

by Dr. David Wicks

This past year the Ohio River Basin Alliance (ORBA), with support of the U.S. Army Corps of Engineers and ORSANCO, released the Plan for the Ohio River 2020-2025 — comprised of these six interdisciplinary goals:

- Abundant Clean Water
- Healthy and Productive Ecosystems
- Knowledge and Education to Inform Decisions
- Nation’s Most Valuable River Transportation and Commerce Corridor
- Reliable Flood Risk Management
- World-class Nature-based Recreation Opportunities.

ORBA has established a working group for each goal. Each working group is identifying synergistic activities that, with additional federal and community support, will protect, enhance, restore, and make more accessible the Basin’s waterways. Concurrently, jobs and businesses will be created that will enhance the economy and contribute to a higher quality of life for

disadvantaged communities in the Basin.

Several recreation-related activities include working with the River Management Society’s National Rivers Project to have a digital mapping platform for the 120 plus river trails in the Ohio River Basin. This overview map, in addition to helping plan for recreational resources, would promote and recognize existing digital maps by the Ohio River Recreation Trail and the Tennessee Riverline among others.

We are working with the Army Corps to inventory and explore future public uses of the 50-plus abandoned lock houses on the Ohio and its tributaries. In addition to river access, the lock houses could provide significant opportunities for historical interpretation and environmental education. In recent years, the Lewis and Clark National Historic Trail was expanded to include the length of the Ohio River and most recently, the 67th National Park was established in the Basin — the New River Gorge National Park and Preserve! On the state level we have begun a Basin-wide review of the State Comprehensive Outdoor Recreation Plans (SCORP) to identify and prioritize water-

related recreation. On a local level, the National Park Service and the Ohio River Recreation Trail are hosting Rivertown Reviews — “a fresh set of eyes to enhance local outdoor recreation opportunities.” In the long run, we are seeking to develop an extensive set of publicly accessible greenways and blueways across the entire Basin.

The Recreation Working Group includes an impressive list of members appointed by the ORBA Steering Committee, including representatives from the Ohio River Recreation Trail, River Management Society, American Canoe Association, USGS, U.S. Fish and Wildlife, Coast Guard, U.S. Army Corps of Engineers, National Park Service, regional government organizations, ORSANCO and the Ohio Kentucky Indiana Regional Council of Governments, state fish and wildlife and tourism officials, local community and tourism organizations, as well as the bike and boating community. Over 100 organizations have appointed members on the other five working groups focused on implementing the Plan for the Ohio River Basin.

To communicate our work to the broadest range of stakeholders, we have developed the Ohio River Discussion Series. A Webinar platform to explore the ORBA’s work, the Ohio River Discussion Series is hosted by ORSANCO, the Ohio River Basin Alliance, the Foundation for Ohio River Education, and the Ohio River Recreation Trail. Our last webinar was on recreational safety on the Ohio River: check it out on [YouTube](#).

At the 2009 Ohio River Basin Summit, a key message emerged that the Ohio River Basin was at a disadvantage securing attention, leverage, and federal funding for the water resource needs because of lack of clear priorities communicated with a unified voice. With ecological funding as an example, we have seen this to be true. We believe that this collaborative, comprehensive long-term approach on a watershed level being communicated with a unified voice through ORBA will elevate recognition of the economic and ecological importance of interrelated goals in the Ohio River Basin. Just look at what was accomplished with billions of dollars of federal investment that, in the past decade, has been dedicated to ecological restoration in The Great Lakes Restoration Initiative and the Chesapeake Bay Foundation. The 204,000 square mile Ohio River Basin has the same types of challenges as those watersheds, requiring appropriate attention and federal support. For more information, check out the ORBA’s [overview video](#), ORBA’s Facebook page,

Plan for the Ohio River Basin



The 204,000 square mile Ohio River Basin.



The Ohio River at West Point, KY.

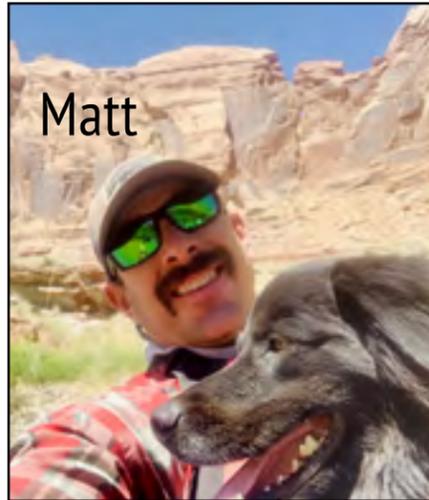
or join us on future webinars in the Ohio River Discussion Series. To see the Plan for the Ohio River Basin, or to join ORBA, go to ORBA’s website. We can realize the plan, but it will take all of us working together.◆

David Wicks, Chair of the Nature-Based Recreation Working Group, can be reached at david.wicks@louisville.edu for questions and additional information.

RMS Southwest Chapter Officers (2021-2023)

Matt Blocker – President

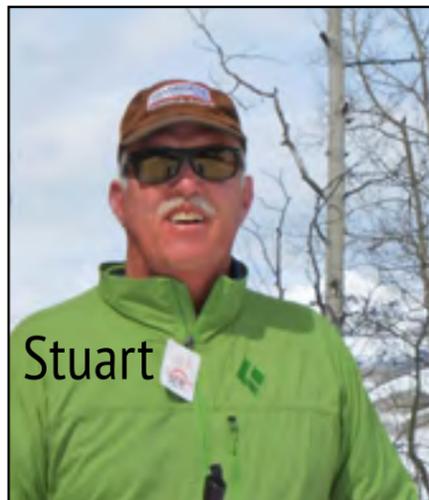
Recently the Southwest VP, Matt will be continuing the efforts of RMS to connect folks passionate about rivers in the region. His BLM career has always been connected to rivers — from his first job out of college patrolling the Crooked River to the Blackfoot and Madison rivers in Montana, and recently where he truly fell in love with river management, along the Desolation and Gray Canyons of the Green River in Utah.



Matt

Stew Pappenfort – Vice President

Stew moved to Salida, CO, in 1977 — selling artwork was not paying the bills, so he took a job as river guide — spending 13 seasons in the outfitting sector before being recruited by the Arkansas Headwaters Recreation Area as a river ranger and later River Ranger Supervisor. He was promoted to Senior Ranger in 2003, overseeing all law enforcement activities at AHRA, and remained in this position until retiring in 2018. He has been a member of RMS

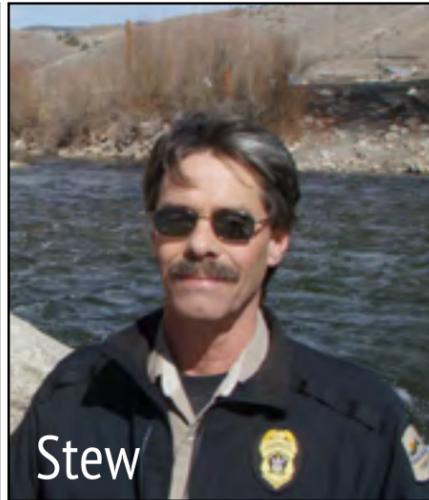


Stewart

since 1995 when the organization was known as the American River Management Society and has helped organize, facilitate and host several River Ranger Rendezvous events as well as chapter river trips. When asked about his professional milestones, he says “I share that my greatest accomplishment was receiving the River Manager of the Year Award in 2016 from the River Management Society.” One of his fondest memories is having chatted with then Governor Hickenlooper while boating him down Browns Canyon during the National Monument dedication in 2015.

Stuart Schneider – Secretary

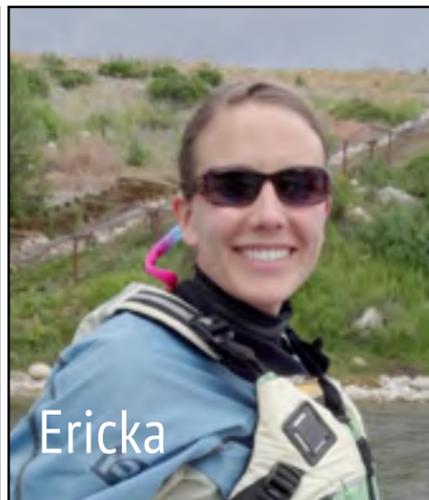
Stuart has been floating rivers since he was a kid in Missouri and has been active in RMS for 20 years. He worked for the National Park Service from 1979 to 2012. His first park was Ozark National Scenic Riverways, and he served RMS as a Midwest Chapter officer while was in the position of Chief Ranger for the Niobrara National Scenic River. He moved to Colorado to serve as the Associate Field Manager for the BLM (2013-2019) at the Gunnison Field Office before retiring in 2019. Stuart lives in Gunnison, CO, and floats the Taylor and Gunnison rivers regularly.



Stew

Ericka Pilcher – Trip Coordinator

Ericka is excited to rally chapter members for some river fun — hopefully an in-person trip in 2021. She lives in Golden, CO, and enjoys spending time outside on family adventures! She works for the National Park Service (NPS) as a program manager for the Rivers, Trails and Conservation Assistance Program based in Denver, CO. Previously, she has



Ericka

worked for Boulder Open Space and Mountain Parks, the NPS Natural Sounds and Night Skies Division for Bryce Canyon National Park conducting acoustical research and monitoring, and for the NPS Denver Service Center (DSC) as a community planner on the Visitor Use Management Team. While at DSC, she served on a variety of project teams to support our national parks — with emphasis on visitor use management, wilderness stewardship, and Wild and Scenic River planning. She holds an M.S. in Parks and Protected Areas Management and a B.S. in Conservation Biology.



See you on the river!
Removing gorse from an arm of Cleowox Lake near Florence, OR.



Bill, left, with family in Washington Park, Anacortes, WA.



As a volunteer for Save the Oregon Dunes, Bill is putting their new reciprocating saw to good use, trimming Scotch broom at North Jetty of the Siuslaw River.

“For those working in river management, RMS is a great resource. I really appreciated professionals from so many different organizations being part of RMS. If you have questions or issues, it is easy to get answers and a variety of perspectives. Whether it be through emails, the journal, or symposiums, you always had a variety of ways to learn new information and get questions answered. The river trips were always fun and informative as well. It was great to be a member for 25 years!”

– Bill Blackwell (retired)

Welcome!

New RMS Members

Professional

Lauren Bonatakis, Natural Resource Specialist
National Park Service, Boston, MA

Jennifer Boyd, Professor
University of Tennessee at Chattanooga, TN

Sam Carter, Host & Producer
The River Radius Podcast, Dolores, CO

Lili Koch Colby, Business Development Rep - Paddlesports
Mustang Survival / The Wing Group, Plymouth, MA

Sarah Lange, Recreation Planner
Mt. Baker-Snoqualmie National Forest, Everett, WA

Nicole Hersch, Regional Planner and Community Designer
New River Valley Regional Commission, Fairlawn, VA

Tom Hicks, Attorney at Law
San Francisco, CA

Lindsay Larson, Conservation Projects Manager
Housatonic Valley Association, Cornwall Bridge, CT

Todd Lookingbill, Associate Professor of
Geography and the Environment
University of Richmond, Richmond, VA

Bridget Moran, Conservation Associate
American Rivers, Bellingham, WA

Shane Morgan, Watershed Manager
White Clay Wild & Scenic River Program, Landenberg, PA

Martin B. Overholt
Bowling Green, OH

Richard Smardon, Professor Emeritus
SUNY College of Environmental Science and Forestry
Syracuse, NY

Jack West, Policy and Advocacy Director
Alabama Rivers Alliance, Birmingham, AL

Associate

Errol Baade, CEO/Part Owner
Jack's Plastic Welding, Aztec, NM

Dennis Devine
San Antonio, FL

Rachel Ellis
Flagstaff, AZ

Erik Hazelton
Woodstock, CT

David Joseph Hirschman, Principal
Hirschman Water & Environment, LLC, Charlottesville, VA

Jeff Hongsermeier, Owner
Waterland Maps, Madison, WI

Christian Kelly, Digital Asset Management Fellow
Washington, DC

Alicea Louise Kingston
St. Maries, ID

Julie A. Lawson, Project Manager
National Park Service, Brecksville, OH

Priscilla Ashley Macy-Cruser, Principal
ReCreate Consulting, LLC, Salem, OR

Cassidy Lee Quistorff, Communications Fellow
National Park Service, Klamath Falls, OR

Leighton Powell
Scenic Virginia, Richmond, VA

Nonprofit

Katya Koepsel
Adventure Scientists, Bozeman, MT

Aimee Petras, Programs Director
Farmington River Watershed Association, Simsbury, CT

Jaime Polhamus
Lower Farmington River & Salmon Brook
Wild & Scenic Committee, Simsbury, CT

Sally Rieger
Lower Farmington River & Salmon Brook
Wild & Scenic Committee, Simsbury, CT

Government / Corporate

Ryan Besser, Aquatic Habitat Management Specialist
Bureau of Land Management, Taos, NM

Kelly Chase-Veach, Recreation Planner
USDA Forest Service, Portland, OR

Earl Brad Cownover, Recreation Planner
USDA Forest Service, Portland, OR

Howard Covey, Park Facilities Supervisor
City of Lynchburg Parks and Recreation, Lynchburg, VA

Cullen Hardy, Recreation Technician
Bureau of Land Management, Casper, WY

Shawnee Hinman, Special Uses Program Manager
USDA Forest Service, Portland, OR

Thomas Ibsen, Developed Recreation Program Manager
USDA Forest Service, Portland, OR

Zach Jarrett
Recreation Trails, Travel Management,
Dispersed Recreation & Shooting Sports
USDA Forest Service, Portland, OR

Katy Kuhne, Outdoor Recreation Planner
Bureau of Land Management, Casper, WY

Michael L Lukens
Bureau of Land Management, Taos, NM

Pamela Mathis, Public Affairs Officer
Bureau of Land Management, Taos, NM

Randy Roch, Lower Gorge Manager
Bureau of Land Management, Taos, NM

Karen Schroyer, Director, Recreation, Lands and Minerals
USDA Forest Service, Portland, OR

Barry Weinstock, Assistant Lower Gorge Manager
Bureau of Land Management, Taos, NM

Mark Wolf, President
Fireside Industries, Inc., Surprise, AZ

Lisa Yager, Resource, Stewardship and Education
St. Croix National Scenic Riverway, St. Croix Falls, WI

David Thomas Zabriskie, Deputy Refuge Manager
US Fish & Wildlife Service, Galena, AK

Student

Sydney Widauf
Northern Arizona University, Flagstaff, AZ

Erica Paige Byerley
Northern Arizona University, Flagstaff, AZ

Eric Stuart
Appalachian State University, Sugar Grove, NC

Ashley G Gries
University of Wisconsin-Madison, Monona, WI

RMS Northwest Chapter

June is National Rivers Month! Share Your Celebration Experience!

The RMS Northwest Chapter challenges RMS members to celebrate National Rivers Month (NRM) with a brief story and photo of your celebration experience.

This is a great opportunity to stay connected and learn during this time when our regular RMS group events have been shelved. Your story of a river trip, hike, or volunteer activity would be a tribute to the connection we have with clean water, wildlife habitat, recreation, energy, and life.

The Northwest Chapter will compile a "scrapbook" of NRM outdoor experiences — and then post on the RMS website and social media. We also will run a feature article in the RMS Journal.

Together, let us celebrate National Rivers Month!

Please send materials to:
NW Chapter Secretary – Martin Hudson
hudsonread@centurytel.net

Deadline: July 1, 2021



Thank You!

RMS Training Symposium Sponsors and Partners



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PACIFIC

(vacant)

MIDWEST

(vacant)

Canadian River Management Society

Contact: Max Finkelstein
tel (613) 729-4004 / dowfink@gmail.com

RMS is fueled by the amazing energy of its members – and, chapters are always looking for leaders who care about the management of rivers. Potential chapter officers are team players who love working with others and believe a regional dialogue would help local members and the organization as a whole – are you ready to serve?

Membership in RMS makes a great gift for a colleague or friend!

RMS is a non-profit professional organization. All contributions and membership dues are tax-deductible.



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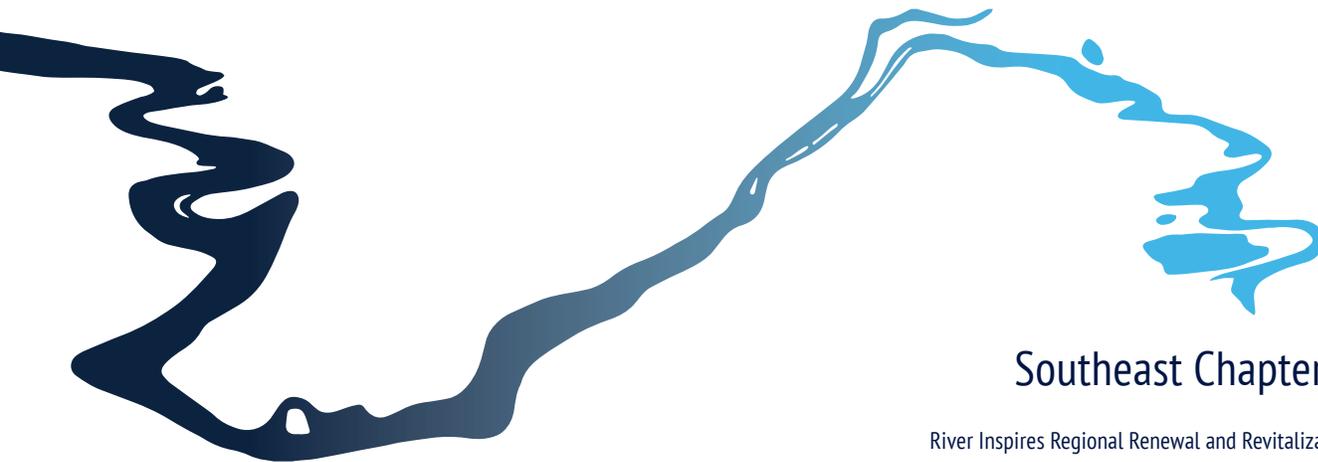
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RMS Journal Submission deadlines:

Summer 2021	Vol. 34, No. 2	Midwest	May 1
Fall 2021	Vol. 34, No. 3	Southwest	Aug 1
Winter 2021	Vol. 34, No. 4	Northwest	Nov 1
Spring 2022	Vol. 35, No. 1	Northeast	Feb 1
Summer 2022	Vol. 35, No. 2	Pacific	May 1
Fall 2022	Vol. 35, No. 3	Alaska	Aug 1
Winter 2022	Vol. 35, No. 4	Southeast	Nov 1

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