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River Management Society
Supporting Professionals
Who Study, Protect, and Manage
North America's Rivers

Stewarding an Urban Stream

Our Nonprofit's Work in Mill Creek Watershed

by Mekayle Houghton

Compact staff, project partners, and volunteers performed crayfish sweeps ahead of Mill Creek dam removals.

When we close our eyes to imagine Tennessee's valuable ecological resources, we don't see Mill Creek. Mill Creek flows from Nolensville, Tennessee with its proliferation of subdivision construction, under I24, along car dealerships, through big box parking lots, behind strip malls, past the Nashville airport and finally into the Cumberland River. Yet, Mill Creek and the habitat it provides are considered by Tennessee's State Wildlife Action Plan (SWAP) as a very high priority. At the same time the potential of urban growth to harm aquatic habitat over the next 20 years was determined to be very high in the SWAP.

Many groups are working to reduce that risk while enhancing and restoring this ecological gem. In reality, four years ago the flow of Mill Creek was so obstructed that species migration and recreational use was near impossible.

Through the Mill Creek Connectivity Project, the Cumberland River Compact and its partners opened roughly 28 miles of water within the Mill Creek Watershed through 3 dam removals on Mill Creek's main-stem, 1 dam removal on Sevenmile Creek, and 2 dam removals on Cathy Jo Branch. The length of Mill Creek's mainstem is safe and paddle-able, except during the driest parts of the year. For the first time in over one hundred years, Mill Creek and its tributaries are flowing freely.

In 2015 the Cumberland River Compact began to inventory dams and ground truth the dam register. Roughly 37 miles of streams were walked by volunteers equipped with smart phones to record and photograph existing dams. Overall, we found 16 small dams and many additional man-made flow obstructions.

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Executive Director's Eddy

It was 2015.

The mid-summer, mid-morning knock on the RMS door was surely a delivery person, though I could not recall having ordered anything recently, or the mail carrier with an item that would not fit in the mailbox. Instead, a circumstance awaited that was foreign to my previous experiences and somewhat daunting.

A tall, slim Caucasian gentleman stood, moderately presentable in his not-too-long, barely combed brown and slightly greying hair crowning an expressionless face, wrinkled white t-shirt, khaki pants and sneakers. After confirming I represented the River Management Society and offering, "These are legal papers," he hurriedly added "Have a good day," and walked off abruptly.

The document server had handed me a subpoena commanding the production of any and all forms of communications related to the proposed Pebble mine in Bristol Bay, Alaska between 2004 and 2014, and to do so in a two-week period. Needless to say, this posed a potential challenge for this lean organization whose mission keeps us outside the battle lines of environmental disputes. It looked like we might have been drawn into one this time. Calls between current and past Alaska Chapter leaders Melissa Blair, Dave Schade and President Helen Clough ensued, and we collected information that included correspondence and materials related to the 2011 Interagency Workshop co-hosted with the Submerged Lands Management Conference in Girdwood, Alaska. RMS submitted these relevant documents in time and have not heard from anyone since on this topic. The immediate attention given to this by our awesome volunteer leaders was characteristically responsive and thorough. However, the heroism in the rapid development and timely submission of our response belongs with our legal advisor to the RMS Board of Directors John Putnam, recently recruited by colleague Lori Potter, and his Associate Nate Hunt, a seasoned environmental lawyer who had recently joined him on staff at Kaplan, Kirsch & Rockwell, LLP. Their calming pragmatism and suggested approach, and their effort to proceed with our prepared response was swift and smooth. This may have been a soft pitch to these veterans, but their having taken care of the challenge to the RMS was a tremendous gift of time and expertise. We thank them still for the assistance from time to time, the most recent when I had a chance to meet Nate in person for the first time this year, who with Bob Randall, has offered to step in as legal advisor to the RMS Board of Directors.

RMS has been extremely fortunate to be able to call on our legal advisors for both tactical assistance as mentioned here, and sage advice on matters that we believe might loom. We have been able to call on such expert assistance since our early days, thanks to Lori, John, Bob and Nate's predecessors, Dave Ryan and Ken Ransford.

I hope RMS is not soon again 'served papers' even if, as was in this case, we are clear of any worrisome legal exposure. If we are, however, we are in good hands.

Note: Our organization also misses Ken Ransford as our pro bono financial advisor, in addition to supporting us with legal advice. Our bookkeeper and accountant are reliable, but also provide substantial advice for a fee. If you know a river-runner and accountant who might enjoy guiding us as we grow, don't hesitate to be in touch, as he or she could save us time and effort with process and procedure. ◆

Risa Shimoda
Executive Director

Changes in Ex-Officio RMS Board Members

RMS owes a many thanks to John Putnam who has provided sage legal advice for several years. Shortly after he agreed to serve in an ex-officio capacity on the board, we received a subpoena in litigation involving the Pebble Mine in Alaska. John and his colleagues stepped up and provided guidance on how to respond with the least adverse impact on our organization. Since then John has regularly reviewed a variety of documents for us. John is now Director of Environmental Programs at the Colorado Department of Public Health and Environment. It is a key position in which he will lead the state's efforts to implement groundbreaking new Colorado laws and programs to counteract climate change. While with Kaplan, Kirsh and Rockwell, he advised commercial and recreational boaters, and was a national expert on the Clean Air Act and transportation law. We wish John well in his new position and sincerely appreciate all his good work on behalf of RMS.

Nate Hunt and Bob Randall, both attorneys at Kaplan, Kirsh and Rockwell, have stepped in to be ex-officio legal advisors replacing John and Lori Potter. Nate provided much help on the Pebble Mine subpoena. Nate's experience includes a broad range of environmental and administrative law issues. He has extensive experience in litigation and regulatory compliance under the Clean Water Act and National Environmental Policy Act. Nate previously served as a Senior Attorney at the Southern Environmental Law Center where his practice focused on environmental litigation along the Georgia Coast.

Bob Randall joined Kaplan, Kirsch & Rockwell in January after 11 years at the Colorado Department of Natural Resources, and, before that, 11 years practiced environmental law in the non-profit sector in Alaska and Colorado. While at Colorado DNR, he had the privilege of sitting on both the Colorado Water Conservation Board and the Colorado Parks and Wildlife Commission. Bob also worked closely with RMS Southwest Chapter President Rob White and others at Colorado Parks and Wildlife on river management issues, including instream flows, recreational access, flood recovery, and river restoration. ◆

Photos courtesy of Kaplan, Kirsch and Rockwell, LLP.

John Putnam

Nate Hunt

Bob Randall

High Definition Stream Surveys:
A New Method to Managing Rivers and Streams

by E. Parham, J. Parham, D. Shuman, T. Biddle and B. Connell

As water resource professionals, we are often tasked with balancing the needs of people with the needs of nature. While these requirements often appear to conflict, justifiable compromises may be found which sustain economically viable and environmentally beneficial long-term solutions. The High Definition Stream Survey (HDSS) method provides water managers with an integrated suite of stream corridor information to support effective decision-making. By employing advances in automation and technology, HDSS enables the continuous collection of geo-referenced imagery with instream, streambank, water quality, and bathymetric data over long reaches. HDSS delivers to managers and stakeholders more data, faster and at lower cost as compared to traditional methods. As a result, the HDSS platform transforms featureless blue lines on a map into data-rich, 1-meter resolution GIS layers representing numerous instream and streambank parameters. These parameters can be combined in informative ways to create powerful decision-support tools allowing for a new holistic approach to river and stream management.

Effective management is critical to maintaining long-term viability of rivers and streams which supports the growing needs of human society without compromising the integrity of the waterway. Traditionally, aquatic resource managers were required to make management decisions based on few short sample sites (several 100 m) within a stream system. Conditions at these sites were then extrapolated to represent an entire stream. It was typical to make management decisions on entire streams with data representing less than 5% (and in many cases <1%) of the overall stream. Using HDSS, we now collect measures of stream conditions consistently throughout the stream system. No longer are we extrapolating data to "guess" conditions in miles and miles of unsurveyed stream, instead we now have high-quality data to accurately prioritize management actions throughout the stream.

The obvious benefits of HDSS are its speed, versatility and ability to capture the data required to address a nearly endless suite of issues in a single survey. When compared to traditional stream survey methods, the HDSS method is *fast*. For example, we surveyed 125 miles of the Duck River, TN in only 7 days with a two-person crew. Complete survey coverage of such a long stretch of river would not have been feasible using other stream survey methods. The HDSS approach is *versatile*. The method can be used in dry artificial drainages, intermittent streams, wadeable creeks and boatable rivers. The results of the surveys can integrate with multiple different models and support numerous management needs. The HDSS method provides *better data*. While traditional survey methods may require separate surveys for habitat suitability, streambank condition or impact assessment, a single HDSS survey would address the data needs for all of those requirements and more. Most importantly, achieving these improvements in speed, versatility and application using HDSS actually *costs less* than traditional survey approaches, an important consideration in a time of diminishing budgets for resource management needs.

HDSS dashboard provides the viewer with a continuous 27-mile assessment of the Collins River allowing for a thorough understanding of river conditions. Included in the dashboard are high definition videos recorded directly in front of and under the boat (underwater) and left and right bank, a map that identifies the current location, date, time, GPS coordinates, depth under the boat, and sidescan sonograph.

By rapidly gathering continuous stream corridor information, the HDSS approach is applicable to answering a wide range of management questions. In our experience, certain questions typically arise when river and stream management issues are discussed. We have all likely heard or asked one or more of these questions:

- How do we get the best information to our watershed planning group to make effective and informed decisions?
- Do we have a list of the priority problem areas (complete with pictures and location) within our river system?
- What is the cost/benefit analysis of possible mitigation actions to comply with permit requirements?
- What are the environmental impacts of alternative project scenarios?
- Where is suitable habitat for species of concern found in the river system?

With HDSS, we now have the answers. The examples below highlight the applications and benefits of the High Definition Stream Survey technique and how it has helped to address the needs of local, state, federal, and private institutions in answering these typical management questions.

How do we get the best information to our watershed planning group to make effective and informed decisions?

A broad watershed planning group concerned with Big Canoe Creek in Northern Alabama included federal (The U.S. Fish and Wildlife Service), state (Alabama Department of Conservation and Natural Resources and Geological Survey of Alabama), non-profit (The Nature Conservancy, the Coosa Riverkeepers and Friends of Big Canoe Creek), and local landowners. They planned to remove Goodwin's Mill Dam from the Big Canoe Creek to eliminate a barrier to fish and mussel movement. Given the high cost of dam removal and subsequent stream restoration, it was important to document stream conditions before and after the dam removal to ensure that improved habitat conditions resulted. One problem when attempting to document changes resulting from dam removal using traditional transect surveys is that the changes to the stream can occur over a broad area upstream and downstream from the removal site. This makes determining the placement and number of transects extremely subjective. More transects over a wider area likely will document changes more effectively, but this comes with a high cost to the monitoring budget. To solve this problem, the HDSS method was used to document pre- (2013) and post- (2016) barrier removal conditions. Each HDSS survey collected data for both streambanks and instream conditions along three miles of stream, centered on the dam site. Given the rapid data collection capabilities of HDSS, field data collection was completed in less than ½ day for each survey. HDSS data was used to delineate habitat type, substrate type and embeddedness, depth, bank full depth, bank angle and height, bank erosion potential, and riparian diversity. These parameters were used to document trends in sediment movement, stream geometry, and habitat conditions by comparing pre- and post-removal conditions. The results were used to not only show improvements from this dam removal project, but also to help planners predict impacts for future projects. This project highlights the strength of the HDSS approach to efficiently gather a wide range of river corridor information to support a range of stakeholder needs.

Do we have a list of the priority problem areas (complete with pictures and location) within our river system?

The Paint Rock River is one of Alabama's most biologically diverse aquatic systems. The Nature Conservancy (TNC) and Tennessee Valley Authority (TVA) teamed up to help protect and restore this Alabama jewel. Due to fiscal limitations and the extensive area of interest, prioritization was necessary to ensure that areas in greatest need of protection and restoration were identified. The HDSS approach was used to efficiently gather high resolution, geo-referenced data over 53 continuous miles

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The versatile HDSS platform allows it to be used in small rivers using boats, to shallow streams using a backpack.

of the Paint Rock River and its tributaries in three days. HDSS survey data was used to continuously assign bank condition scores and habitat type (pool, riffle, run). Bank condition scores were prioritized, highlighting the ten best areas in need of protection and the ten worst areas in need of restoration. Decision support tools, developed from the HDSS data, and geo-referenced, high-definition video were layered onto GIS maps to clearly communicate the issues to and among the stakeholders. TNC and TVA used the HDSS prioritization to select and restore habitat that met their criteria for greatest need. HDSS also provided managers and stakeholders with baseline data and video of bank conditions that are reviewable in the future for conservation action. This project highlights the strength of the HDSS approach to collect the data at a longitudinal scale necessary to prioritize and support your management action at a fraction of the cost and time as traditional methods.

What is the cost/benefit analysis of possible mitigation actions to comply with permit requirements?

Many municipalities have permit requirements associated with municipal stormwater sewer systems (MS4). Part of an MS4 permit includes documenting the problem areas to identify and address issues that may be contributing to stream impairments. There are several survey methods to conduct "stream walks," but most are slow and only focus on documenting problems. We have used the HDSS approach to rapidly gather all important stream information throughout a municipality's waterways. The HDSS geo-referenced data collection platform can be mounted on backpacks for surveying shallow or dry waterways and on small boats to survey deeper stream segments. This flexibility allows for the collection of consistent resolution data on any sized natural stream or man-made drainage. The results of the data collection can be used to document both sewer outfalls and stream conditions in a single survey. By documenting the type, extent, and severity of the problems, we can estimate the cost and potential ecological lift gained by the action. For the city of Athens, TN, we were able to document priority areas for trash cleanup (inexpensive), streambank restoration (moderately expensive) and possible dam removal (most expensive) to allow the city meet permit requirements and budget for different management actions. In addition to meeting permit requirements, the high-definition video allowed city managers to view and better understand problem areas without needing to visit the difficult-to-access stream locations. Overall, the HDSS was a well-suited and successful approach for cost/benefit analyses on future management cases.

What are the environmental impacts of alternative project scenarios?

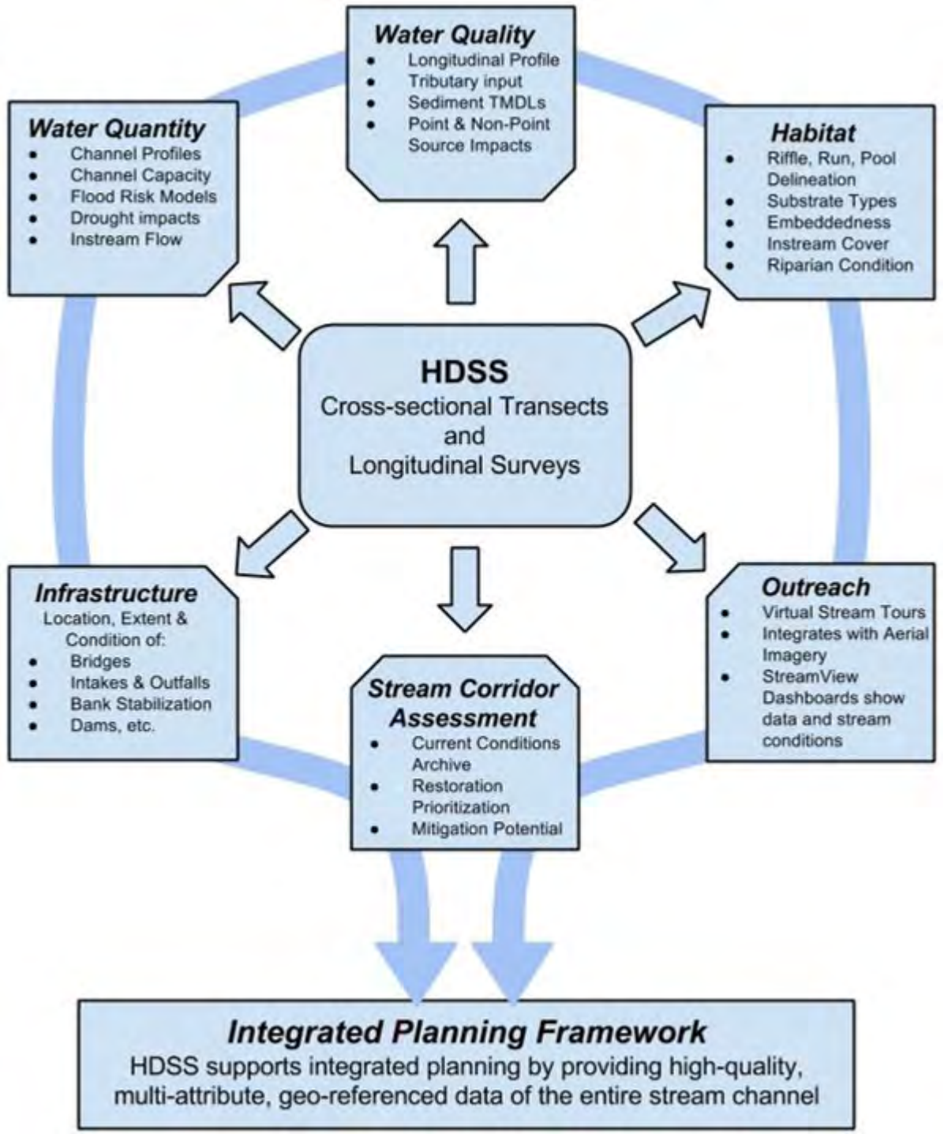
The Ala Wai Canal is an artificial waterway created in 1928 which drains streams that run through central and east Honolulu, HI, to the ocean. Damage from flood events lead to the development of the Ala Wai Canal Flood Mitigation Project. The goal of this US Army Corps of Engineers (USACE) project was to reduce the risk of flooding within the Manoa area of Honolulu. The project was focused on holding back or diverting peak flood flows to lessen the impact of a flood event and was expected to have an impact on aquatic habitat of native Hawaiian stream animals. The HDSS platform was used to survey long stretches of Manoa, Palolo and Makiki streams in the Ala Wai watershed from sea level to the upper reaches in order to document stream channel conditions. This data was integrated into the Hawaiian Stream Habitat Assessment Procedure (HSHEP) model to quantify the impact of mitigation scenarios on native species habitat. HDSS fieldwork uncovered problems such as barriers to fish migration, failing retaining walls, and point-source pollution locations while also documenting the location and extent of suitable habitat for native stream species. HDSS delivered the necessary data for subsequent models to address cost/benefits of different mitigation scenarios and allowed for the selection of actions that were less costly to the public and resulted in much larger fish habitat improvements. This project highlights how collecting a wide range of data using the HDSS approach consistently throughout multiple streams in a watershed improved scenario testing and environmental impact decision-making.

Where is suitable habitat for species of concern found in the river system?

Cold water releases from the Center Hill Dam support a high-quality trout fishery and recreational paddling opportunities (kayaks and canoes) in the lower portion of the Caney Fork River, TN. The USACE manages the flow releases from Center Hill Dam to support power production and flood control. The USACE planned to upgrade its generation capacity at Center Hill Dam, and as a result, may change the volume and duration of the generation flows from the dam. The Cumberland Chapter of Trout Unlimited (TU), Tennessee Wildlife Resource Agency (TWRA), and Tennessee Department of Environment and Conservation (TDEC) were concerned about the potential negative effects of the flow changes and were seeking ways to improve water quality, trout habitat and fishing success for anglers.

The HDSS platform was used to collect continuous, geo-referenced data on 27 miles of the Caney Fork River corridor downstream of Center Hill Dam to its confluence with the Cumberland River. HDSS data was captured on both riverbanks, depth, water quality, habitat type and bottom characteristics of the river channel. Concurrent with HDSS data collection, electrofishing surveys were conducted, allowing habitat availability (HDSS data) to be tied with habitat use (electroshocking data). Data captured during this survey allowed for the development of habitat suitability models for trout as well as suitability models for fishing access (wading and boat), supporting both management applications and recreational angler needs. HDSS data provided TU, TWRA and TDEC with complete documentation of river corridor conditions, information on the trout population, prioritized locations for trout enhancement projects, and fishing maps to improve angler success. This project highlights how HDSS results can be used to document the distribution and extent of fish habitat and also help prioritize management actions to improve habitat conditions.

Knowing which management actions are most important is made easier when you have clear, comprehensive documentation of the current conditions within your entire stream system. The HDSS technique can be deployed to collect better data, providing stronger support for the most appropriate management action and making you more successful at protecting and improving your streams and rivers. ◆



HDSS allows for a single survey to gather information for numerous user groups for multiple applications. HDSS documents infrastructure for permits, precise bathymetry measurements for water quantity and quality modeling, and habitat parameters to prioritize mitigation work and protect and conserve aquatic resources.

To find out more about the HDSS approach and its applications, please visit our website at TruttaSolutions.com

Footprints students aboard a batteau in Lynchburg, Virginia. Photos: James Vonesh

Footprints on the James

by Lara Koebke, *Footprints* student

At Virginia Commonwealth University, there is no other program like *Footprints on the James*. What other summer course offers students the chance to embark on an expedition-style journey along 200 miles of the James River, camping and paddling every day while earning credit for classes in biology and environmental science where they learn about the very same river they are living on? Experiential is one way to describe it; an experience is the true essence of what *Footprints on the James* is.

In the program's 5th year, 12 selected undergraduate students, including myself, took part in this unique opportunity to travel along the James River over 19 days and learn about its ecology and how to plan and execute a successful outdoor expedition through two courses, Natural History of the James River and Expedition Planning & Management, led by professors Daniel Carr and Katie Schmidt, respectively. The group came mostly from biology backgrounds, but also included one English major and a political science major, though we all had the shared goal of diversifying our education with Footprints' adventurous and engaging approach that couldn't be found in any other classroom on campus. Our classroom was the outdoors, where we found the best way to learn about an environment is to live in it.

Much like a standard college class, we were assigned readings about biology and outdoor leadership that were then discussed as a group, and also had the individual requirement of writing a daily journal to reflect on our experiences and readings. We also attended lectures and worked alongside other knowledgeable professors and experts across various fields, including Drs. Paul Bukaveckas and Stephen Macininch of the VCU Center for Environmental Studies; Steve Hummel from the Virginia Department of Environmental Quality; Professor Jonathan Moore from the VCU Biology Department; Lynn Crump from the Virginia Scenic Rivers Program; and, the Conservation Police from the Department of Game and Inland Fisheries.

Unlike the average college class, however, our class went further, getting up close and personal with the James. Experiential in every sense of the word, we were able to apply our education in real time by observing the river and its wildlife, weather, and wetlands, interacting with them hands-on in order to truly connect with and appreciate our subject matter. Sea kayaking the Lower James from Richmond to Jamestown, then paddling by canoe and batteau on the Upper James from Lynchburg back to Richmond, we stopped at many places of rich natural heritage along the way, such as Dutch Gap Conservation Area, Presquile National Wildlife Refuge, and VCU's Rice Rivers Center, where we learned how to identify plants, test water quality, and set up game cameras to capture animal sightings. Many diverse species were seen that some of us had never encountered before, such as osprey, prothonotary warblers, and insects like dobsonflies and dragonfly larva. One especially memorable moment was watching Dr. Matt Balazik of the VCU Rice Rivers Center working with the once-threatened sturgeon population, finding and tagging four juvenile fish in one day, a positive sign for their resurgence. These experiences were supplemented by further lectures and readings that went deeper into the science behind these ecosystems.

Not only did the class learn about the ecology of the James, we also were able to see the human impact on the river firsthand and become aware of our effect on the health and future of the river and its occupants. On the Lower, where the river is wider and channelized to allow for cargo ships, many instances of industry were visible, including wastewater dumping sites and the factory that produced the toxic kepone spill in Hopewell, Virginia, in 1975. The group also visited areas of historical importance, such as the early European settlements of Henricus and Jamestown for interpretive tours about colonial life and how their surrounding environment affected the success of these settlements. The most unique and exciting experience, however, was the opportunity to float down the Upper on a batteau, a replica of the kind of flat-bottomed boat used in the early 19th century to transport tobacco from plantations along the James across the region. This firsthand experience was critical to our understanding of how influential the batteau was to the development of industry along the James and the state of Virginia to where it is today.

All the while, the students and professors lived and studied together, paddling every day and camping every night in remote places, and practicing how to effectively lead an outdoor expedition together by reading about the history and theories of outdoor leadership, then applying the skills that we learned to our own trip. Despite some not having any prior background in the outdoors before, our group could not have functioned any more smoothly than we did, with everyone sharing in daily camp duties such as preparing food for the entire group and cleaning dishes in an exceptional display of teamwork and cooperation. Though everyone was there for a new, exciting educational experience, we also happened to take lasting friendships and good memories out of our shared time together as well!

Our journey concluded in Richmond with a day of whitewater rafting in the city's iconic rapids, led by VCU's Outdoor Adventure Program, before culminating in an extensive final exam to test what we had learned from the course, having become well-versed in multiple topics and skills that were acquired on the expedition. Every participant had something positive to say about their time in *Footprints on the James*, all looking forward to further involvement with the James and keeping up with each other after the class was over. In addition to the new knowledge we gained from the program, we also discovered newfound appreciation and awareness for the river that runs through our city that we hope we can use to inform others and benefit the future of the James. The future of the *Footprints* experience looks bright as well, developing further every year as more students become curious in seeing the James that they think they know in its entirety for themselves, fulfilling *Footprints'* true mission of searching and discovering new perspectives and understanding, all wrapped up in one grand adventure. ◆

Graduate teaching assistant Katie Schmidt gives a paddling lesson to students.

Footprints students having fun on a stand-up paddleboard on the James River.

Southeastern Universities Team Up for Rock Pool Ecology Field Course Focused on the *Wild and Scenic* Chattooga River

Course participants (L-R: Corey Day, Joshua Armstrong, Sarah Goodnight, and Ginevra Walker) pause to enjoy local entertainment as they sample rock pools at "Bull Sluice" rapid on Section III of the Chattooga River. Photo: James Vonesh. For more course photos visit: https://flic.kr/s/aHsmEWbmYG

by Brian Byrd (Western Carolina University) and James Vonesh (Virginia Commonwealth University)

Virginia Commonwealth University (VCU) and Western Carolina University (WCU) offer the River Management Society's River Studies Leadership Certificate for students that fulfill the requisite river-focused coursework and a river-related professional project. Recently the universities teamed up at the Highlands Biological Station (https://highlandsbiological.org/) in the Southern Appalachian Mountains and conducted an intensive field course on riverine rock pool ecology. Over the course of two weeks, ten students and three faculty members examined major theories of community ecology and tested their applicability to understanding observed patterns of aquatic macroinvertebrate biodiversity in Southern Appalachian riverine rock pools, primarily on the southeast's archetypal "Wild and Scenic" river—The Chattooga River.

Through a combination of lecture, lab, and fieldwork, students actively characterized the physical features of the rock pools and their associated macroinvertebrate fauna. Formal lectures and group discussions explored biodiversity metrics, ecosystem connectivity, habitat selection, ecological statistics, and hydrogeology. Students read seminal scientific studies that provided a theoretical framework for them to use as they established their own research questions to explore as a part of small collaborative teams. During the first week, students diligently collected data from more than 100 rock pools. New study sites were established on section III of the Chattooga at Warwoman and Rock Garden rapids via whitewater canoeing. As a culminating experience on the last day, the students formally presented their findings based on their own data collection and analyses.

This course was part of a larger National Science Foundation funded project at VCU that investigates predator diversity, pest regulation, and invasion resistance with riverine rock pools as a model system. VCU and WCU faculty recently teamed up to use community ecology approaches to understand the impacts of an invasive mosquito species (*Aedes japonicus*) in riverine rock pools. A native rock pool specialist mosquito (*Aedes atropalpus*) is not known as an important disease vectoring species. However, the invasive mosquito is known to transmit La Crosse encephalitis, a viral disease that is found in much of the southern Appalachian region. Thus, an increase in the distribution and abundance of the invasive species may have public health consequences. Furthermore, mosquitoes were the dominant taxa found in the riverine rock pools and the ecological factors that influence or regulate their distribution and abundance are relatively unknown. Intensive field courses with authentic project-based research experiences are recognized as "high impact" learning practices. This inaugural rock pool ecology course not only provided rich student learning experiences in the classroom and on the river, but also advanced the science of riverine rock pool ecology. ◆

A New Experiential Course in Scenic River Policy and Assessment

by James Vonesh, Lynn Crump, Jesse Boardman, and Ryland Stunkle

Last fall Virginia Commonwealth University teamed up with Virginia's Scenic Rivers Program to develop a new graduate level course supporting VCU's River Studies and Leadership Certificate curriculum titled *Scenic Resource Policy & Assessment*. The course was developed by Lynn Crump, Registered Landscape Architect and Virginia Scenic Resources Coordinator, and Dr. James Vonesh, Assistant Director of VCU Center for Environmental Studies, and drew upon the expertise of guest experts across a wide range of fields. Lectures spanned aesthetics, landscape architecture, environmental policy, environmental technology, economics, freshwater conservation, and water quality. The goal of the course is to enable students to develop a better understanding of the cultural, ecological, and economic value of scenic resources, the local to national level policies that govern scenic resource management, and how scenic resources are evaluated. Students were challenged to put classroom learning into practice by conducting an on-site scenic assessment of a 10-mile segment of the Lower Chickahominy River from Walkers Dam to River's Rest Marina.

The field assessment, conducted from canoes, was based out of the VCU Rice Rivers Center and was supported by the VCU Outdoor Adventure Program. RMS RSLC and OAP student trip leaders Rachael Moffatt and Thomas Tedesco coordinated the field logistics from route planning, risk assessment and safety, to camp meal planning. The Chickahominy River is a coastal plain tributary to the James River with headwaters northwest of Richmond. Although only 140 km long, the Chickahominy has featured prominently in our nation's history. In 1607, Captain John Smith sailed up the Chickahominy from Jamestown to find a passage to the Pacific and was captured by the Chickahominy tribe and taken to meet Chief Powhatan where, according to legend, he was rescued by Powhatan's daughter, Matoaka (Pocahontas). In commemoration, the Chickahominy is part of the national Captain John Smith Chesapeake National Historic Trail. In the 1860's during the American Civil War, the river and surrounding swamps proved a major barrier to Union forces set on capturing Richmond in two consecutive campaigns. Today the flooded cypress forest and expanses of flowering lily pads lining the river provide access to wildlife viewing and good fishing. During the survey students saw endangered Atlantic sturgeon breaching and numerous bald eagles, osprey, and great blue herons.

Following the field assessment, students honed their writing and teamwork skills as they worked to produce a technical report and Storymap that integrated their remote sensing and spatial analysis with their field assessment. Students then had the opportunity to present their findings (https://arcg.is/1TrTLX) to the Richmond and Crater Regional Planning District Commissions which are currently engaged in a larger study of the economics of natural resource conservation in the Lower Chickahominy watershed. In this way the course had impacts beyond the classroom. ◆

Lynn Crump leads a post-field trip discussion of scenic assessment at the VCU Rice Rivers Center. Photos: James Vonesh. For more photos, visit: https://www.flickr.com/gp/vonesh-balcomb/TJ6fME

VCU students Grace Smith and Thomas Tedesco paddling among the cypress trees along Lower Chickahominy during the field component of the scenic assessment.

Avoid the Soggy Bottom

by David Noble

On a recent morning of a bluebird like day (the absence of clouds in the sky), twenty members of the Tellico Village *Soggy Bottom Kayak Club* made their way out of bed in the pre-dawn hours to load their kayaks on the top of their cars or trailers to travel to Tugaloo Beach in the village, in the heart of East Tennessee. That was their designated gathering spot to join others in making their way down the Little Tennessee river to the Tanasi Clubhouse for breakfast. Most members of this club are between the ages of 55 and 85, are retired and normally don't pull themselves out of bed at this early hour, generally for the reason that they don't have to. But today was different because they were going to paddle for one hour upstream and one hour downstream to enjoy the river and an absolutely beautiful day.

Members of the club have chosen to explore the sport of kayaking because they believe that kayaks are easier to transport and are less wind resistant than a canoe, although canoeists, paddle boarders and others using motorless transportation down the waterways of Tennessee are welcome to join. The name, *Soggy Bottom*, was chosen for their club namely because it is a condition that most try to avoid while kayaking, other than folks using a sit upon (another type of watercraft that is self-bailing, allowing water to pass through the hull of the watercraft).

The kayak was first used by the indigenous Aleut, Inuit, Yupik and possibly Ainu hunters in subarctic regions of the world. In Inuit, it is a word meaning canoe with a skin cover on a light framework, made watertight by flexible closure around the waist of the occupant and propelled with a double-bladed paddle. It is generally a small boat resembling this description, made commercially of a variety of materials, including plastic, Kevlar, fiberglass or acrylic.

The *Soggy Bottom Kayak Club* is dedicated to promoting all paddle sports including kayaking, canoeing and paddle boarding. Activities are planned to allow participants the opportunity to explore the natural resources of the state of Tennessee and beyond but focus on the waterways managed by the Tennessee Valley Authority. Two years age, a group from the club made their way to Arkansas to paddle the Buffalo National River. Past trips have included paddling the Tennessee, French Broad, Clinch, Holston, Powell, Little Tennessee, Caney Fork, and Cumberland Rivers and most any other waterways in Tennessee. Often these opportunities are found in Tennessee's state parks like the Caney Fork running through Edgar Evins State Park just east of Nashville. Future plans include exploring the Obed, Red, Chickamauga and Hiwassee Rivers. There is no shortage of beautiful waterways in Tennessee. The *Soggy Bottom Kayak Club* supports a number of efforts to monitor and improve waterways found to be threatened.

Breakfast paddle to Tanasi Restaurant on the Little Tennessee River. Soggy Bottom Kayak Club welcomes all ages, even grandchildren!

Many of the club's trips have involved seeing a number of plant and wildlife communities. The upper stretches of the Tellico Blueway are dotted with osprey and eagle nests in the spring and well as numerous blue heron who often lead paddlers downstream as they move with the progress of the paddlers. The population of long nose gar in the French Broad River has always been particularly interesting as they are a very funny looking fish with extremely long noses, hence the name. Beaver and the occasional otter can also be seen on the rivers and lakes of east Tennessee.

The club does not take the waterways we enjoy for granted. Can you imagine our existence without clean bodies of water? Good water quality does not happen by accident. Every chemical we use on our lawns and gardens to produce green lawns and beautiful gardens potentially negatively impacts the water quality. Several years ago, the Watershed Association of the Tellico Reservoir had to take legal action to prevent the Madisonville Sanitary Sewer District from dumping inadequately treated sewage from being dumped into the Little Tennessee River. WATeR teamed with the Blount and Monroe county soil and water conservation offices to work with local farmers in Loudon, Blount and Monroe counties to restrict access to rivers and streams by dairy and beef cattle herds to lessen damage due to soil erosion and agricultural waste.

When TVA acquired land to form Tellico Lake decades ago, they allowed farmers direct access to the lake to water their cattle. This entailed building fenced lanes from their pasture to the lake. To assure access during the winter when the lake elevation was lowered six feet for additional flood storage, this required extending the fencing 50 feet or more into the lake from the summer shoreline. However, these fenced lanes become submerged by as much as six feet during the remainder of the year when the lake is at full pool.

WATeR is working with TVA, local cattlemen and local cattleman's associations to provide better methods for watering cattle that removes the safety hazards, removes a source of pollution from the lake, eliminates bank erosion, and provides a healthy source of water for the cattle.

There are several compelling reasons from both the farmers' and public's standpoint why these fenced watering lanes need to be replaced with modern watering stations:

- A submerged fence is a hazard to boaters and recreational tubing and skiers;
- Cattle pollute the water by defecating and urinating directly into the lake;
- Cattle erode the shoreline as they enter and leave the lake;
- The direct access to the lake is unhealthy and hazardous to livestock often resulting in injury and/or death to older/weaker animals. Younger calves that may become mired in mud or entangled in the fencing causing exposure, exhaustion, pneumonia, or possible drowning.

The first step in the process is to identify locations of fenced lanes extending into Tellico Lake for watering cattle. Working with landowners, a team composed of members of TVA, NRCS, Soil Conservation Districts, UT Extension Service, and WATeR can evaluate a design, estimate cost, and provide financial support for the appropriate installation of upgraded stations. The goal was to provide better site-specific livestock water stations, restoration of the shoreline, and provide a riparian buffer of AG friendly vegetation.

Many sections of the lake shoreline are prone to erode from wave action such as generated by wind and boat wakes. Such erosion is unsightly and result in land loss, trees toppling into the lake, and increased turbidity. Various methods are available to armor the shoreline to prevent such erosion. Selection of the method involves a balance of cost and aesthetics. WATeR created a demonstration of various techniques for armoring shorelines along the water edge between the Tanasi Restaurant and entrance to the boat docks in Tellico Village. Included in this demonstration are reaches of riprap, coconut rolls, two types of rock gabions, and vegetation.

Another example of local residents taking action was a three county clean up, supported by *Soggy Bottom* volunteers, where over 350 volunteers joined forces with the Tennessee Valley Authority regional manager to pick up litter adjacent to and in waterways. Over thirteen tons of litter was collected, an amount twice the amount collected the previous year. How can we get people to understand that littering and dumping in the watershed negatively impacts quality of life as well as the economic vitality of property values?

So as you can see, this club is more than simply a paddling club. They are also dedicated to protecting and improving the waterways of this great state. They support efforts of groups like WATeR and the TVA due to the fact that they exist to monitor water quality to ensure that our waterways remain ecologically healthy. Anyone can support these efforts.

Membership in *Soggy Bottom* is open to anyone having an interest in these paddle sports. Cost of membership is not a barrier to join because there is no fee. Benefits of participating in club's activities include meeting people of similar interests, improving overall fitness levels, gaining local knowledge of available natural resources and experiencing all out fun.

Trips are planned throughout the months of April through November but if the weather allows members may be found paddling in any month. Trips are planned by volunteer guides who pre paddle a selected waterway to make themselves aware of the area and any potential hazard needing attention. Most paddles include an opportunity to share a meal, making conversation and sharing experiences. The annual schedule of individual trips is detailed on the *TellicoLife* calendar of events found on the internet, with directions for travel and transportation. Every effort is made to match people without the gear to transport their vessel with people that can take an extra boat or two. The club's goal is to never have a situation where an individual cannot participate because they have no way to get to the particular site of the planned activity.

If you are out navigating the waterways of East Tennessee, you won't find these folks shooting the Bald River or dropping into the Bald River Falls but you may find them scouting out a Class I or II rapid looking for a little excitement, just a little. ◆

Welcome Northwest Chapter Officers!

We are all very excited and eager to be supporting the **Northwest Chapter** members for the next three years, and look forward to interacting with as many RMS members as we can! Please feel free to contact us with questions, suggestions, or to introduce yourself! Hopefully we will get the chance to see some of you out and about, on or along a river. Thank you for this opportunity!

Lisa Byers (ID): Chapter President

It all began in 2010, after I drove from Maryland to California for a SCA river recreation internship with the Forest Service on the Klamath River. I worked with Dave Payne, a Pacific chapter member, and he introduced me to RMS by taking me to a River Ranger Rendezvous event held on the Rogue River. I was in complete awe with all of my new experiences that summer. I decided I wanted to continue to pursue land management work, specifically relating to rivers.

I have since worked as a River Ranger on the Rogue in Oregon, Payette in Idaho, Situk in Alaska, and I just recently moved back to Idaho to work as a River Ranger on the wild section of the Main Salmon. (Please say hello if you see me out there!)

I continue to be active with RMS by attending chapter events, participating in a RMS internship, annually updating the online River Permit documents, and have volunteered at and attended the past three symposiums. Like many of us in RMS, I just have an extreme passion for rivers (well…all bodies of water) and I want to share this passion with others in a way that is hopefully beneficial towards the protection and management of rivers. RMS has helped me grow tremendously as I move forward in my career path. I am very excited to be in a leadership role as President of the NW Chapter and I look forward to connecting with members and providing guidance along the way.

My favorite river to kayak is the South Fork Payette in Idaho, and a very close second is the North Fork Smith in California.

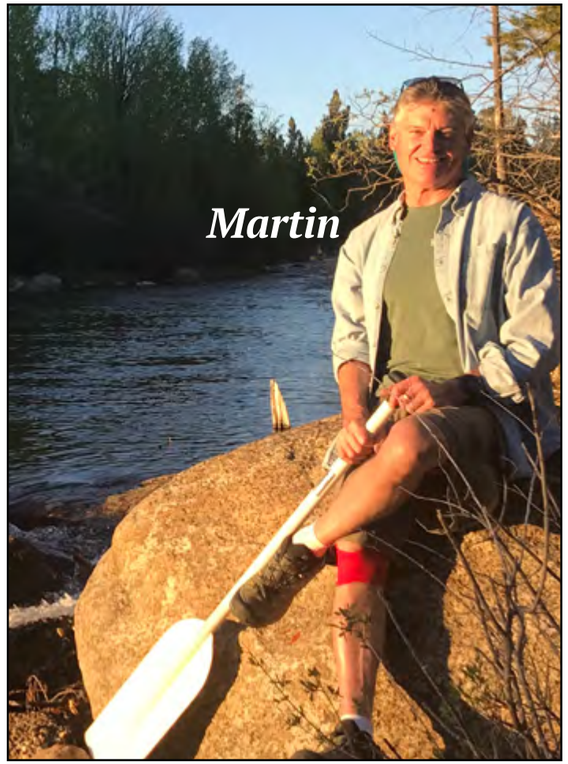
Joni Gore (WA): Events Coordinator

Originally from the San Francisco Bay Area, I earned a B.S. in Hydrology at University of California Davis. While earning my degree, I became a Class III whitewater rafting guide (through the university's outdoor program) on the American and Klamath rivers in California. After graduating, I moved to Washington and am currently a Wild and Scenic River Fellow with the National Park Service in Seattle. In Fall 2019, I will return to school for a Masters in Applied Geosciences at the University of Washington in Seattle. I am incredibly excited to not only explore the rivers in the Pacific Northwest, but also to engage others in river management. As the new Events Coordinator, I am totally stoked to bring Northwest Chapter members together — on and off the river! My new favorite Northwest river is the Skykomish, a state scenic river that runs year round.

Joe O'Neill (ID): Vice President

I grew up in Davenport, Iowa, alongside the Mississippi River. I attended Scott Community College in Bettendorf, Iowa, and received an AA in general studies (1991). I then graduated from the University of Montana School of Forestry with a B.S. in Recreation Resource Management (1995). Before graduating I did an internship on the Smith River for Montana Fish, Wildlife & Parks (FWP). Once I took my first river patrol trip down the Smith that summer, I was hooked on rivers. I worked for the next nine years as a FWP river ranger and river program manager on the Smith River. In 2004, I started work as the River Manager/ Outdoor Recreation Planner for the Bureau of Land Management (BLM) in Vale, Oregon, managing the Owyhee River for about a year and a half. In 2006, I was hired as the BLM Lower Salmon River Manager/Outdoor Recreation Planner in Cottonwood, Idaho, where I've been ever since.

I met my wife Debby in Cottonwood — she and our 23 year old stepson, Jake, both love to float the Salmon River with me. I have been a member of RMS since 1999 and a few years later became a lifetime member. I was the NW Chapter treasurer for a few years starting around 2005. I have hosted numerous RMS NW Chapter floats, RRR Rendezvous in 2017, and have been on the awards committee for RMS. I have a passion for protecting our rivers and the adjacent lands to those river. I have a long history of being a volunteer for the community where I live. I support RMS and what it stands for and its members. I feel I have some vast experience that can help RMS and the NW Chapter as the vice president. I love rafting rivers, camping, hunting, barbequing, and hosting gatherings.



Martin Hudson (WY): Secretary

I became enamored with flowing water at the young age of four, while frolicking in Clear Creek near Winslow, Arizona. Many river, backwater, and ocean paddling experiences later, I earned an A.A. in Fish & Wildlife Management in Goldsboro, North Carolina. Following eight exciting years of work with the South Carolina Natural Resources Department, I returned to college and received a B.S. in University Studies, Wildland Recreation Resources Management at the University of Southern Illinois, Carbondale. I escaped from studying at every opportunity to explore the many fine rivers of Arkansas, Missouri, and Wisconsin.

After graduation, I journeyed to Oregon to "work" as a BLM Recreation Technician on the Rogue River. After numerous BLM assignments, including a short stint with the USFS and three glorious years in SW Oregon, my wife Dayle and I settled in Ely, Nevada. As a BLM Outdoor Recreation Planner, I fell in love with the peaks, streams, and history of the Great Basin. After eight years, we then migrated to Pinedale, Wyoming, where I worked as manager of BLM's recreation program. Dayle and I guided our two kids through the wilds of Wyoming and on to early adulthood. My passion for free-flowing water is but one of my extracurricular pursuits. I enjoy triathlon, Nordic racing, birding, fishing, bird hunting, and volunteering for Lions Club.

Currently, I'm exploring the pathways of retirement after BLM. As a lifetime member of RMS, I feel indebted to reinvest a bit of what RMS and my career has given me. The personal relationships and good work experiences draw me to maintain my connection with RMS. It's an honor to continue my commitment as the Secretary of the NW Chapter of RMS. Thank You! ◆

Northeast Chapter

Adirondacks Trip

September 6-8, 2019

Join us for a three-day fall paddling trip in the beautiful Adirondack Mountains of upstate New York! We will paddle a section of the Northern Forest Canoe Trail from Long Lake to Tupper Lake, NY. Paddlers will be exposed to open water paddling on Long Lake and easy river paddling on the Raquette River. If you are interested in participating or would like more information, please contact Trip Coordinator Walter Opuszynski, wopuszynski@gmail.com or Chapter President Emma Lord, emma_lord@nps.gov.

Photo: Emma Lord

Northwest Chapter

Lower Salmon River

September 27-30, 2019

Are you wondering what kind of fun river trips you could do this fall? Come float the Lower Salmon River in northern Idaho! This 4-day float will be hosted by the BLM Cottonwood Field Office in partnership with the RMS Northwest Chapter. Keep a lookout on the RMS website for details as they become available and don't hesitate to contact any of the NW Chapter officers with questions.

Southeast by Judy Culver

The River Management Society (RMS) is proud to host the 'Mountain Creeks to Metro Canals' Symposium in Richmond, Virginia, May 12-15, 2020. This biennial river management symposium will feature robust training, panel discussions, field learning, and networking opportunities centered on the following core competencies of river management: mountain and rural river science; visual resource management; technology's role in decision making; partnership and community building; river management legislation and policies; urban river renewal issues, infrastructure and economics; and, water trails/blueways and riverine trails.

RMS is partnering with the Virginia Scenic Rivers Program, who is celebrating its 50th Anniversary and Virginia Commonwealth University, one of RMS' River Studies and Leadership Certificate (RSLC) Institutions! We expect a significant contribution by RSLC students and other students and partners for whom rivers have changed community mindsets and core economies.

Sponsorships play a critical role in providing opportunities for young professionals and students to attend and participate. If you are interested in learning more about our sponsorship package, please contact Risa Shimoda at executivedirector@river-management.org.

We are also currently seeking to recruit a few members for the Marketing Committee to help with social media efforts leading up to and during the symposium. If you are interested in helping a little or a lot, please contact Judy Culver (judyculver@fs.fed.us). ◆

Welcome!
New RMS Members

Professional

Kelleen Lanagan, Graduate Student,
Colorado State University
Fort Collins, CO

David Michaels, River Ranger
US Forest Service, Groveland, CA

Matt Moses, Owner
USA Raft Adventure Resort
Erwin, TN

Bob Randall, Attorney
Kaplan, Kirsch & Rockwell
Denver, CO

Christina Wilkinson
Silvaculture Forestry Technician
US Forest Service, Groveland, CA

Student

Jacob Carleson, Western Washington University, Sequim, WA

Taylor Ratcliffe, University of Vermont, Garrett Park, MD

Associate

Tara Lamb, Sonora, CA

Julia Rogers, Stewardship Coordinator, Hudson Highlands Land Trust, Poughquag, NY

Nancy Stoner, President, Potomac Riverkeeper, Inc., Washington, DC

Organizational - Corporate/ Government

National Park Service
Washington, DC

• Krista Sherwood, Conservation and Outdoor Recreation Programs

• Ina Hysi, Injury Prevention Specialist

• Heather Passchier, RTCA, Program Manager

USDA Forest Service
Wilderness and
Wild & Scenic Rivers
Washington, DC

• Tangy Wiseman, Resource Assistant

Virginia Department of
Conservation and Recreation
Richmond, Virginia

• William Conkle, Park Planner

• Jett Johnson, Grant Administrator

• Kristal McKelvey, Grant Administrator

• Danette Poole, Director, Planning and Recreational Resources

• Roberta Rhur, Environmental Program Planner

• Debbie Skeens, Program Support Tech

• Jennifer Wampler, Environmental Program Planner

Southwest by Tappan Brown

Swiftwater Course A Success!

The River Management Society Southwest chapter held a swiftwater training course (May 22-24) in Salida, Colorado, on the Arkansas River, with the assistance from Arkansas Headwaters Recreation Area (AHRA). The course was instructed by the staff from Sawatch Rescue with a River Rescue Certification provided by Sierra Rescue.

The course was a dynamic, hands-on water rescue course specifically written and designed for river professionals and others who work or volunteer in swiftwater settings. A total of 20 participants attended from several different agencies including: rangers from Yampa and AHRA Colorado State Parks, firefighters from Salida Fire Department and Tallahassee Fire Department, river rangers from the Montrose and Fruita Bureau of Land Management (BLM) districts, the BLM Outdoor Recreation Planner for Safford, AZ, a medic from Chaffee County EMS, and a ranger from the US Forest Service. Many of the participants work closely together on river incidents that occur along the Arkansas River corridor.

The Arkansas River from Leadville, CO, to Lake Pueblo is one of the most heavily commercially rafted sections of a river in the United States and also attracts tens of thousands of private boaters each year. This section of the Arkansas is also unique because many of the river miles are next to or near a highway. Vehicles in the river is a common occurrence in addition to more traditional swiftwater emergencies. Participants in the course were trained to address these events safely and effectively. With many swiftwater emergencies it takes several first responders to resolve the incident. With varying levels of swiftwater experience, many of the participants realized how they would be most beneficial to a response. While sometimes it may be necessary to jump in and swim in swiftwater, often times it is necessary to have qualified respondents on shore setting up different rope systems, being a safety officer, providing shore-based safety, relaying critical information, or setting up an incident command. With a combination of classroom and field time, all participants finished the course with an increased skill set to handle swiftwater emergencies, and a better understanding of the complexity of swiftwater incidents. Remember, always wear your life jacket when working or playing on or near swiftwater. ◆

Swiftwater crossing using a wedge technique to access an injured party trapped on a rock. Photo: Rob White

Pacific Chapter

Issues for Rivers of the Pacific Slope

by Christina Wilkinson and Bob Stanley

Above: Bob Stanley. Photos: Glen White

The Pacific Chapter of RMS and the Stanislaus National Forest hosted *Issues for Rivers of the Pacific Slope*, a symposium and river trip on April 19-21, 2019, at Camp Tuolumne Trails, near Groveland, California. Speakers discussed topics ranging from the geology of the Tuolumne River canyon, it's biota and ecosystems, to climate change and its precipitation and fire effects on canyon systems. Also addressed were issues of access and human empowerment, dam removal on the Eel River, and the successful effort for state Wild and Scenic designation for the Mokelumne River.

Camp Tuolumne Trails was the backdrop and host venue. The camp is on the rim of the Tuolumne River Canyon with views into the canyon and the 2013 Rim Fire which burned 260,000 acres, almost 1/3 of the Stanislaus National Forest, highlighting the issues surrounding climate change.

U.S. Forest Service District Ranger Jim Junette of the Groveland Ranger District kicked off Friday night, welcoming us to the Stanislaus National Forest. Keynote speaker Dr. Bob Wilkinson from UC Santa Barbara discussed the socio-political development of water policy in California. The rest of the evening and next day were devoted to a wide range of speakers covering 14 topics, with about 40 folks attending. After dinner Saturday evening, a live sound monitoring identification of bats, led by Lisa Murphy, was celebrated by many.

On Sunday, the group boated the Tuolumne River to see the March 2018 Microburst in the Tuolumne

Left: USFS employees (left to right) Bob Stanley (head river ranger), Jim Junette (Groveland District Ranger), and Christina Wilkinson (silviculturist).

Below: Keynote speaker, Dr. Robert C. Wilkinson, professor and senior Lecturer Emeritus in the Environmental Studies Program, at the University of California, Santa Barbara, speaks on opening night.

Photos: Paul Jarvis

Canyon and see firsthand the thousands of acres stripped to bedrock by the torrential downpour that may have reached 8 inches per hour. An event like this had not been seen in recorded history on the Tuolumne, and these types of downpours are being witnessed in various places with increasing frequency. At the end of the river trip, the group observed the infamous Wards Ferry Bridge Take Out, a difficult and dangerous place to remove boats from the water inside a reservoir. A broken ankle injury during the trip exercised our medical and evacuation skills for our injured sister who is now recovering and will be back to work with us soon.

Photography for the weekend was handled by Glen White, Christina Wilkinson, and photographers Ty Childress and Paul Jarvis. The symposium was organized by Risa Shimoda, Bob Stanley, and Christina Wilkinson who served as MC.

Tuolumne Trails, who provided a great meeting space and meals, allowed us to change our schedule and plan due to the prospects of high water, and offered free camping on their grounds. We also wish to thank many who volunteered their services, time, and equipment: ARTA, Sierra Mac River Trips, and boat operators Ryan Arsenault, Chris Condon, Guy Henderson, Dane Hennessey, Karl Schneider, and Scott Schoettgen. ◆

RMS Note: Bob Stanley and Christina Wilkinson worked tirelessly for many months to offer this super successful weekend. Since we are well into baseball season, they 'knocked it out of the park!'

Using Deliberation to Address the Challenges Faced by Our Nation's Rivers

by Jessy Stevenson

When I was 18 months old, my parents snowshoed 32 miles into the heart of the Bob Marshall Wilderness (in Montana) where we spent the months of January through April living next to the South Fork of the Flathead River. I made the journey in a backpack on my mom's back and spent that winter in a tipi with my parents and our two canine companions. Before I knew that rivers had names, I learned what it was like to fall asleep to the sound of rushing water. Before I understood how rivers shape our landscapes, they shaped experiences that would instill in me a deep love for wild places and eventually form my land ethic.

I spent the rest of my youth on a small homestead in rural, northwest Montana. Growing up surrounded by an abundance of natural resources meant that conflict was also abundant in our small community. My parents worked hard to protect the places they valued, but above all they taught my sister and me to listen. Listen to the land and listen to the people. Seek to understand the things we each value and how they drive us to act the way we do. They taught us that listening is a form of respect and that solving complex problems starts with learning about and developing respect for the things we might not understand. Besides ingraining a love for telling and listening to stories, this lesson has influenced my education and passion for working in conflict resolution and place-based education.

Over the past two years, opportunities to learn about and work in place-based education and conflict resolution have become entwined with my interest in rivers and the unique challenges they face. In the summer of 2018 I was part of the 4th Biennial Student Congress on Public Policy for Land Management, a group of young people tasked with addressing and providing action-based recommendations for issues faced by our nation's rivers and trail systems. From there, I received a scholarship to attend the 2018 River Management Society Symposium, a gathering of educators, policy-makers, managers, advocates, guides, recreationists, and people from across the nation with wide-ranging connections to rivers. River stories were traded in place of business cards at the symposium, filling the spaces between forums and presentations. I met Sarah Johnson, founder of Wild Rose Education, after a presentation on the River Studies & Leadership Certificate, quickly striking up a conversation on the value of place-based education before heading off to our afternoon workshops. A few weeks later, in the process of crafting an internship for my last semester as an undergrad, Sarah and I got in touch through the River Management Society. I wanted to work on a meaningful project that combined rivers and either education or conflict resolution, and Sarah had an idea that combined all three. We set up an internship through the University of Montana and created a plan to work virtually on a project - Sarah from her office in Colorado and I from Montana.

Jessy and her mother, Lyndee Stevenson, and dogs Bob and Skookum near Big Prairie in the heart of the Bob Marshall Wilderness - January 1995.

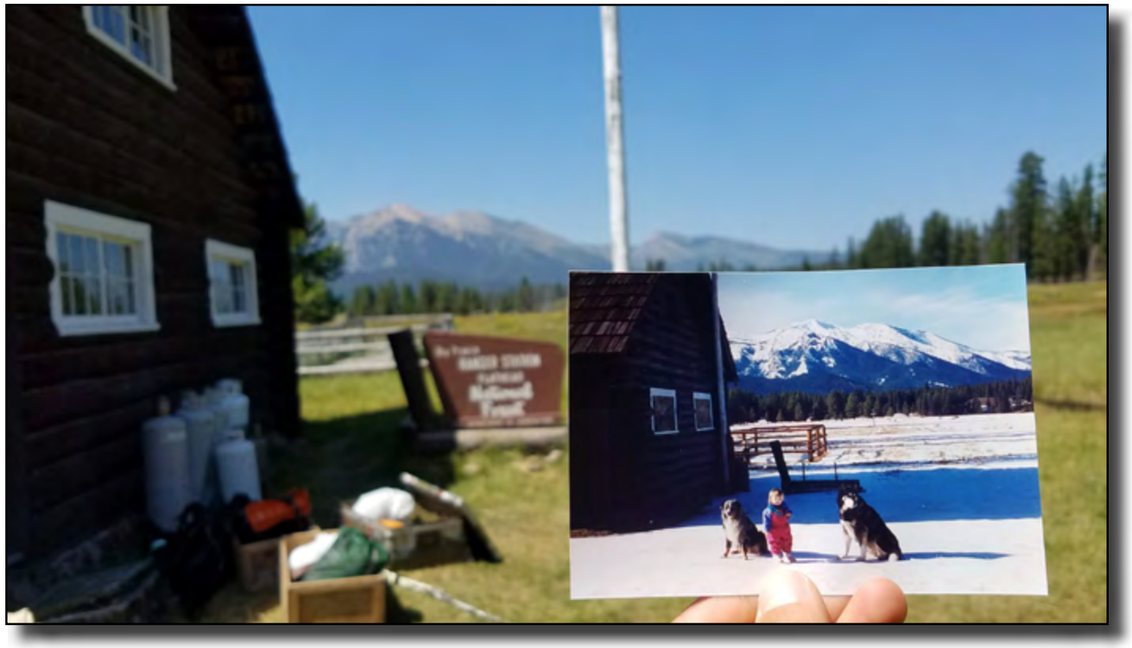
Over the next five months Sarah and I worked together to create a deliberative forum guide that focuses on addressing the challenges faced by our nation's rivers. Deliberation is a method of communication that involves thoughtfully identifying and considering options from multiple perspectives. Recently, a number of frameworks or 'guides' have been created to help facilitate deliberative forums, in which interest groups gather to discuss options for addressing challenging issues. The role of deliberation in working to address environmental issues focuses on ensuring that all interest groups contribute to the creation of and can identify with at least one of the options discussed in the forum. In a world where education is growing more specialized and societies are growing more individualized, deliberation can provide an interdisciplinary approach to solving complex problems and building connections between otherwise divided groups of people.

Jessy Stevenson on a peak below Old Baldy Mountain in the northern Bob Marshall Wilderness - September 2017.

The process of building our own deliberative forum guide began with an anonymous survey that was sent to an array of people across the nation, asking them to discuss their own relationships with rivers as well as their concerns for the future of those rivers. Responses from the survey helped us to shape a working draft of the deliberative forum guide, named Let's Talk Rivers. The guide introduces the challenges of increasing demands on our nation's rivers and lists three potential options for addressing those demands, each with a set of possible focus areas and trade-offs. While this guide takes the idea of an open framework one step further by addressing specific issues identified by real people across the nation, it is meant to be adapted.

After developing a comprehensive first draft of the guide and making edits based on comments and suggestions from a number of people throughout the process, we held a practice forum to test the framework. Sarah organized the forum, inviting an array of people with various connections to rivers as well as a trained facilitator with experience moderating deliberative forums. Unable to make the trip to Colorado, I joined the forum virtually. Sarah and I observed, taking detailed notes on parts of the framework that seemed to work well and those that needed improvement. Without a specific, local issue to tackle, the practice forum remained broad and didn't fully encapsulate the diversity of perspectives usually present in this type of deliberation. Even so, observing the framework in action made it clear that inherent biases are almost always present and can exist in ways that are impossible to see until pointed out by someone else. Overall, participants in practice forum provided crucial feedback and were invaluable to the development of this project. We are honored to have worked with so many incredible people along the way and hope that this tool will be valuable to communities of all types; changed, adapted and shaped to help address the complex challenges faced by their rivers.

Rivers are dynamic systems. They create change and shape the places and people who depend upon them. The same should be true of education and the ways in which we approach solving complex challenges in a changing world. Collaboratively creating *Let's Talk Rivers* has been both challenging and inspiring. The process has reminded me that approaching the unknown with humility and listening are still the most valuable steps in solving any problem. I am now a graduate of the University of Montana, having



A photo from winter 1995 held where it was taken 23 years earlier at the Big Prairie Ranger Station in the Bob Marshall Wilderness - July 2018.

Jessy and her father, Mike Stevenson, on the banks of the South Fork of the Flathead River - April 1995.

earned a B.S. in Resource Conservation with a double major in Environmental Studies and a minor in Wilderness Studies. I look forward to continuing to learn and work in the fields of education and conflict resolution, using the tools developed during this internship along the way. Rivers and wild places have shaped who I am and will continue to play crucial roles in my work and education.

There is a place, in the rhythmic wildness of rushing water, where there seems to be some balance. There's a clarity there, a constant stillness among the rumble, a quiet as the rest of the world is drowned out. And so, to rivers is where I return, letting opaque green fingers wrap around doubts, fears, stress and uncertainty, listening to the water and, for a few minutes, ceasing to search for truth in the world. ◆

A New Flood of Hydrologic Data

by Kelly Bessem

According to FEMA, flooding is the most damaging natural hazard in the U.S. and around the world. Most flood damage occurs in cities due to urban drainage issues, and such damage is projected to increase along with climate change induced extremes and urban sprawl. The observation and forecasting of streamflow and floods in the U.S. is typically focused on relatively large rivers, through agencies such as the USGS. It rarely covers fine scale urban streams, streets, and basins. Satellite remote sensing and traditional gauges are not practical for this application. Crowdsourced data provides an opportunity to get data in cities at the human scale, by engaging people using technology during flooding events.

The FloodAware project at Northern Arizona University (NAU) and Arizona State University (ASU), along with the CrowdHydrology and MobileHydrology affiliates, aims to improve the stream of crowdsourced data sources as well as their utilization in models that are used to predict and inform flood response. NAU students of Dr. Ben Ruddell's Complex Systems Informatics Laboratory (CSIL) completed a survey of existing crowdsourced data sources and developed a plan for implementing a citizen science project that provides water level data in Flagstaff, AZ.

As part of the larger CrowdHydrology (texts) and MobileHydrology (QR codes) network, the FloodAware team students at NAU installed 20 citizen science gauges at or nearby frequently flooded areas throughout Flagstaff, AZ. At each site, people can either text in the current water level or send in a photo of the gauge. A computer then processes the red and blue stripes in the gauge image to produce a numerical water level. People can view a hydrograph produced with these levels on the CrowdHydrology website. By doing something as simple as sending a text or photo, the general public can contribute to improving the models that help scientists, emergency response teams, and decision-makers respond to flooding.

This work is funded by a grant from the National Science Foundation, "SCC: Community-Based Automated Information for Urban Flooding" (#1831475). The opinions expressed are those of the researchers, and not necessarily the funding agencies. The field work in Flagstaff, AZ, was led by Dr. Benjamin Ruddell, Dr. Eck Doerry, and Kelly Bessem of Northern Arizona University, with support from the staff of the City of Flagstaff, Arizona, the Aspen Valley golf club, and the broader project's research team. ◆

Kelly Bessem completed her Masters in Climate Science and Solutions at Northern Arizona University, an RSLC member school, in June 2019 and will be working with the NPS high elevation lake monitoring crew for the summer.

Additional information:

Capstone Presentation: https://www.cefns.nau.edu/capstone/projects/CS/2018/HydroCitizens/pdfFiles/documents/Final_Capstone_Presentation.pdf

Hydro Citizen: https://www.cefns.nau.edu/capstone/projects/CS/2018/HydroCitizens/

FloodAware info sign above a wash at the corner of N Switzer Canyon Dr and N Turquoise Dr in Flagstaff, AZ.

FloodAware gauge along the Sinclair Wash Trail near the Rio de Flag Wastewater Treatment Plant in Flagstaff, AZ.

Wild and Scenic Rivers, Forever

by Randy Welsh, with contributions from Bob Wick
(compiled by Risa Shimoda)

What's better than spending a day with your Wild and Scenic River buddies next to a free-flowing river? It's spending the day together celebrating the release of the new Postal Service Wild and Scenic River Forever Stamps. On May 21, 2019, the US Postal Service unveiled the new Wild and Scenic River Forever Stamps at Tumalo State Park, just outside of Bend, Oregon. This set of stamps highlights twelve Wild and Scenic Rivers around the country, and showcases the photographic talents of Michael Melford, Tim Palmer, and Bob Wick.

Bob Wick and his captivating image of the Deschutes River.

Local dignitaries and representatives of the Postal Service, Forest Service, Bureau of Land Management, Fish and Wildlife Service, and National Park Service attended this program kickoff. I was fortunate to be there representing our own River Management Society. Dave Moryc was on hand from American Rivers, and Tim Palmer as the elder statesman of Wild and Scenic Rivers and one of the photographers, rounded out the speakers. Each of us provided brief comments about the Wild and Scenic Rivers Act, the people who managed these rivers, and their importance in American life. The stamps are beautiful and I hope that everyone goes out and buys them for all their postage needs!

RMS recently spoke with Bob Wick (Bureau of Land Management) regarding his involvement with the project:

RMS: Bob, how did you learn about the US Postal Service Wild and Scenic Rivers Forever Stamp project to commemorate the 50th Anniversary of the WSR Act, and how would you describe your involvement?

Bob: I was contacted by a contractor (Photoassist) in the spring of 2018. Photoassist works with the USPS to research and develop new stamps. They asked for images of Wild and Scenic Rivers for consideration to use on the photos. I probably sent 20 or so images for consideration. My involvement was limited to providing images that represented geographical and other diversity in the system and that could fit well with the other images being considered for the stamp sheet. It was an iterative process and they have an art director and other staff that work with the USPS on the final decisions. Once the stamp release was announced in December 2018, USPS representatives called for input on locations for a first-day-of-issue ceremony. Only one post office in the country can have the first day of issue postmark. USPS has several criteria in determining locations and Bend, Oregon fit the bill on all of them. It was great to see the local agency offices and partner groups participate in planning and holding the event.

RMS: Do you know the other two photographers whose works were also used? Do you love them?

Bob: I love all of the images — it's pretty hard to have an image "pop" when it is reproduced at such a small size, but I think the chosen images all stand out. I do not know Michael Melford but have seen his work in National Geographic; unfortunately, he could not make it to Bend for the event. On the other hand, I have known of Tim Palmer since I purchased my first book of his on the Youghiogheny River in 1984 when I was still in college. I knew Tim was from Pennsylvania, but in all of the years that I had followed him and his works, we never crossed paths until this event, and I learned that we grew up less than ten miles from each other along the banks of the Ohio River in southwestern Pennsylvania — a non-free-flowing workhorse of a river that boasts a series of locks and dams from where it forms in Pittsburgh until it empties into the Mississippi. He is so inspiring and knowledgeable about all things rivers that I hope we get to meet again!

RMS: What does it mean to you for both your work to be utilized as it is in this project, and for Wild and Scenic Rivers to be honored in this way, through a special edition of Forever Stamps?

Bob: There could be no better combination, from my perspective. I have had a deep love of rivers since my childhood, and it was an honor to have my images included on several stamps. As an aside, for two of the stamps that used my images — Deschutes and Upper Missouri — the BLM has stewardship responsibilities.

The third image used from my work is of the USFS managed Clarion River in Pennsylvania. A number of people have asked me how a BLM photographer is responsible for this image. I have visited the Clarion with my family almost every year since I was a kid, and I took my camera along on a family visit in 2017 to get some images for our interagency 50th Anniversary outreach efforts. I was particularly excited that the US Postal Service used that particular image, for it was the first free-flowing river that inspired me in my youth and led to my pursuing a natural resource stewardship career.

RMS: Do you know how long the WSR stamps will be available?

Bob: It is my understanding that the USPS prints a set amount and sells them until they run out, so there is no specific end date at when they will no longer be available. For those who can't find them in their local post office, they can be purchased, along with other WSR stamp memorabilia, on the USPS website. ◆

USPS online store to purchase this limited edition set:
https://store.usps.com/store/product/buy-stamps/wild-and-scenic-rivers-S_571504

Support RMS, American Whitewater, and River Network by purchasing prints of one of seven images taken by Bob Wick and Tim Palmer that were used for these commemorative stamps.
Prints mailed right to you will be available for a limited time.
See www.river-management.org/wild-and-scenic for details!

Randy Welsh, past RMS Board Treasurer, speaks at the ceremony.

USPS announcement:
https://about.usps.com/newsroom/national-releases/2019/0521-beauty-of-unspoiled-waterways.htm

The ceremony included the following (L to R): Brad Chalfant (Executive Director, Deschutes River Land Trust), Lisa Sumpton (Director, Oregon Parks and Recreation Department), Steve Thede (Superintendent, Niobrara National Scenic River), Bridget Moran (Field Office Supervisor, US Fish and Wildlife Service), Tim Palmer (photographer, historian), Joe Corbett (Chief Financial Officer and Executive Vice President, US Postal Service), Linda Clark (Associate State Director, BLM Oregon/Washington), Randy Welsh (USFS retired, Past RMS Board Treasurer), Glen Casamassa (Pacific Northwest Regional Forester, USFS), David Moryc (Senior Director Wild and Scenic Rivers and Public Lands Policy, American Rivers), Gena Goodman-Campbell (City Councilor, Bend, OR). Photos courtesy of Bob Wick.

The River Management Society's

River Training Center

by Steve Storck

After many years of discussing it, the River Management Society (RMS) officially opened the River Training Center (RTC) for operation in October 2018. The Center is a virtual and traveling training program that delivers river management professional development courses throughout the U.S. While RMS has always prided itself on providing training opportunities through the biennial River Management Society symposia, River Ranger Rendezvous, River Studies and Leadership Certificate (RSLC) Program, and other workshops, the RTC coalesces these training functions under one umbrella facilitated by the hiring of a full-time training coordinator. With funding support from the Bureau of Land Management, US Forest Service, and National Park Service, training coordinator John Gangemi was hired in late 2017 to begin building the philosophical framework and business model for the RTC, and develop a focused training program for the 2018 RMS Symposium in Vancouver, Washington.

A Wild and Scenic River Focus

Similar in function to the Arthur Carhart National Wilderness Training Center, which provides wilderness education programs to support the management of federally designated wilderness areas, the RTC has a core curriculum focused on supporting the management of Wild and Scenic Rivers (WSRs) under the Wild and Scenic Rivers Act. With a growing inventory of WSRs and an aging and shrinking Federal resource management workforce, the RTC provides an important function of knowledge transfer from retiring river management professionals to developing managers and future graduates who will fill their ranks in protecting America's most pristine waterways. In cooperation with the Interagency Wild and Scenic Rivers Coordinating Council (IWSRCC) the RTC has adopted the group's WSR training curriculum and is taking the lead in identifying WSR management training needs, training new workshop facilitators and organizing WSR related workshops across the country. The vision for this partnership was conceived under the leadership of recently retired IWSRCC Chair and Forest Service WSR Program Director, Jackie Dietrich, who continues to support the RTC WSR training operations as advisor and curriculum specialist. Mollie Chaudet, another recent retiree from the USFS, serves as the RTC's lead WSR instructor and program area lead. Mollie's more than 25 years of work experience managing WSRs in central Oregon serves as key inspiration for a suite of WSR training courses being offered by the RTC in 2018–2020. In addition, Mollie is playing a key role in training new WSR management workshop instructors. Between fall 2018 and spring 2019 eight instructor development workshops and seminars have been provided by the RTC to begin the development of a new cadre of WSR trainers. Through this effort more than 40 senior and apprentice trainers have started work on developing their training skills and familiarizing themselves with the WSR training curriculum. In support of these training efforts, Sarah Johnson of WildRose Education in Montrose, CO, instructed a first-of-its-kind series of interactive, online instructor development workshops to build general instructor competencies of the group. Additionally, the RTC is coordinating the formation of curriculum development teams to revise WSR training modules and in-person training materials for Section 7(a) - Water Resource Project Management and WSR Eligibility and Suitability Assessment and Management.

Serving the River Management Community

While the central focus of the RTC is the delivery of WSR training, the broader vision of the center is to be the leader of innovation, professional learning, and best practices for all river professionals. In keeping with the RMS mission to *support professionals who study, protect, and manage North America's rivers*, the RTC is dedicated to providing ongoing professional development programs, access to river management information, and to lead education collaboration efforts designed to advance the field. A guiding framework for this effort is the *River Management Core Competencies* (Grussing, Krumpe & McLaughlin, 2018) developed by an interagency panel under the leadership of Dr. Ed Krumpe from the University of Idaho, College of Natural Resources.

River Management Core Competencies

1. Laws, Policies and Regulations for River Management
   a. Wild and Scenic Rivers Act history, law, regulation and policy
   b. FERC Licensing Processes
   c. Water Rights
2. River Management Planning
3. River Management Field Skills
4. Visitor Use Management and Monitoring
5. Natural, Cultural and Recreational Resources Management and Monitoring
6. River Information Management Skills
7. Collaboration and Engagement Techniques

Reference: Grussing, Krumpe & McLaughlin, 2018. *Core Competencies for Professional River Management*. Presentation conducted at the 2018 RMS Symposium, Vancouver, WA. Retrieved from https://www.river-management.org/assets/Symposia/2018/Program/Training/Presentations/Core%20Competencies%20for%20River%20Management%20Professionals%20-%20LuVerne%20Grussing.pdf.

Working from this structure, Dr. Steve Storck, current RMS Training Coordinator, is leading curriculum development efforts to address the highest need areas in river management training. Examples of this work are upcoming courses in river access point planning and development, harassment prevention and response in river settings, drone mapping of river projects, and visual resource management in river corridors. Plans are underway for a more comprehensive needs assessment to identify educational gaps, preferred program delivery methods, and revenue models that will help build a successful and sustainable training program.

The Next Generation of River Management Professionals

Helping current river management professionals to perform their jobs more efficiently with the latest tools and methods is a key focus of the RTC, but equally important is working with the higher education community to ensure that there is a well-prepared entry-level workforce of graduates entering the field. To this end the RTC coordinates the RMS River Studies and Leadership Certificate (RSLC) program which currently has nine member schools who offer the RSLC curriculum. These programs brought 14 students to the 2018 RMS Symposium to make presentations, present posters, and to develop relationships with future employers. The program is growing and, with the help of sponsors, can see more students at the 2020 River Management Training Symposium which is being held in Richmond, VA, at Virginia Commonwealth University, whose Center for Environmental Studies is one of the leading RSLC programs.

Upcoming Opportunities

The RTC has come a long way in a very short time and it doesn't look like it is slowing down in the near future. Training events for the fall and spring are already on the books and the phone has started to ring for those looking to host their own regional trainings. Solidifying meaningful curriculum, recruiting and developing trainers, and marketing the program are simultaneous endeavors. Opportunities exist for RMS members to participate in upcoming scheduled trainings (see listing), join the RTC team as a curriculum advisor or instructor, or as a workshop sponsor to address a management need in your organization or region. The RTC is particularly interested in those recent or soon-to-be retirees who'd like to share their rich background and experience with future leaders in the river management field. Exciting times as we work together to protect and help the public appreciate and enjoy our nation's river waterways. ◆

For more information on the RMS River Training Center, visit: www.river-management.org/training or contact Steve Storck, RMS Training Coordinator: training@river-management.org

An overflow crowd attended the October 2018 RTC Instructor Training workshop in Vancouver, WA, led by John Gangemi, Sarah Johnson and Mollie Chaudet. Photo: Risa Shimoda

RTC Training Schedule

October 22-23, 2019 - Managing Wild and Scenic Rivers in Wilderness, Bend, OR

November 5-7, 2019 - Comprehensive River Management Planning, Inyo National Forest, CA

Fall 2019 - Managing Wild and Scenic Rivers, Anchorage, AK

Spring 2020 - Comprehensive River Management Planning, Mark Twain National Forest, MO

Spring 2020 - Section 7 - Water Resource Project Review and Management, Northern California

Spring 2020 - River Access Point Planning and Development, Midwest

May 12-15, 2020 - River Management Training Symposium, Richmond, VA
- Visual Resource Management in River Corridors
- Drone Mapping of River Projects
- River Access Point Planning and Development

*(**Mill Creek**, from page 1)*

Only 1 of these dams was accounted for in the Army Corps of Engineers National Inventory of Dams, which inventories larger, regulated dams across the country. Most of the dams we found in Mill Creek were built to provide water to farms that once populated the area. Some of these dams were known to natural resource managers and some were not known. All were barriers to fish and macroinvertebrate passage.

The Cumberland River Compact began to develop a program to systematically restore free flow to Nashville's urban waters. We prioritized Mill Creek because it is a significant river corridor with critical habitat and threatened species. The Nashville Crayfish is endemic to Mill Creek, and we find populations of the streamside salamander there, too. We found many partners in this work who shared our goals. Perhaps our biggest champions have been the Nashville Zoo Conservation Staff, Heritage Biologists at TDEC and TWRA's Chief of Biodiversity.

The work was done with a mix of funding that included private Cumberland River Compact funding, Maddox Charitable Fund, US Fish and Wildlife grant and cooperative agreements with the Department of the Interior. Many partners provided in-kind donations of time and materials.

This work has dovetailed nicely with Tennessee Scenic River Association canoe access builds on Mill Creek's mainstem. The Cumberland River Compact has been fortunate to help TSRA with a number of access builds along Mill Creek and host monthly meetings of the TSRA's Access Committee. There are now six access points on Mill Creek's mainstem.

The most satisfying days of this project followed months of work on permit applications. They were the days we gathered for crayfish sweeps before the physical removal of the dams began. Together natural resource professionals and volunteers worked to clear the upstream and downstream worksites of federally endangered Nashville Crayfish. We were thrilled to find substantial quantities (470) of Nashville Crayfish.

As Nashville continues to grow, Mill Creek provides a peaceful escape. These six dam removals will improve water quality and habitat along public lands. The two dam removals on Cathy Joe are on the Nashville Zoo's property.

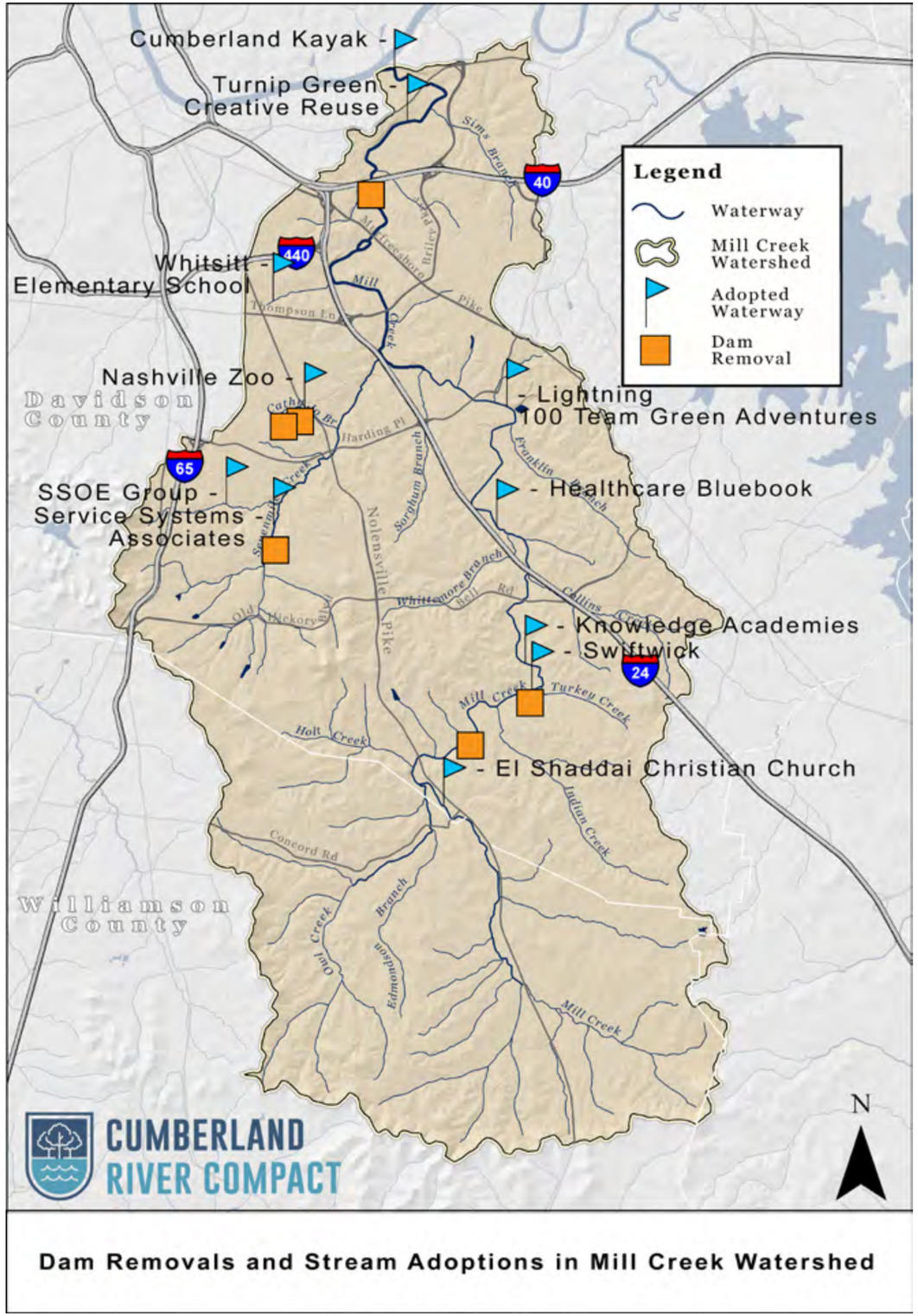
Excavators were used to break apart and remove obsolete dams in Mill Creek.

Mill Creek flowing freely after a dam removal.

The Sevenmile Creek dam was behind the Edmondson Branch Library. Mill Creek Park is adjacent to Culbertson removal and Orchard Bend Park is next to the Chandler Cove dam removal site.

A second component of the Mill Creek Connectivity Project is to connect local residents to this valuable resource. The Compact's stream adoption program engages people in stewardship activities. In Mill Creek eleven groups have adopted a stream segment. 13.35 miles of stream are adopted. In 2018 there were 19 stewardship events including clean-ups and riparian buffer plantings. 226 Volunteers spent 670 hours working in Mill Creek last year. 4,850 lbs of trash and 875 lbs of recycling were pulled out of Mill Creek and its tributaries. And last but not least, 500 tree seedlings were planted by adopters.

We believe that this project is unique in many aspects. Beginning with volunteers walking Mill Creek and its tributaries to find dams and ending with local residents making a long-term commitment to stewardship through the steam adoption program. All along the way, we find residents discovering an ecological treasure in an urbanized neighborhood. Whether it is the biologist, the kayak enthusiast or the Whitsett student, after discovering Mill Creek, people grow to love it. The Cumberland River Compact is proud to be part of Mill Creek's restoration. ◆



Dam Removals and Stream Adoptions in Mill Creek Watershed

The Powerful Reach of Freshwater Landscape Partnerships

by Gillian Bee

Film is a powerful tool in helping to raise awareness and break down challenging external social factors across large spatial scales. Since 2015, members of the Tennessee River Basin Network (hereafter, Network) eagerly awaited the completion of a regional film which would act as the hook to catch and hold the attention of its audience when it comes to the unparalleled aquatic biodiversity found in the streams and rivers of the Tennessee River watershed. The film, *Hidden Rivers*, produced by Freshwaters Illustrated, was completed in Spring 2019 and working in partnership with the film's producers, the Network coordinated a broad sweeping roll-out of the film throughout Tennessee, Georgia, North Carolina, and Virginia. And the film delivered. Audience members gasped as they witnessed, many for the first time, the beautiful and often hard to grasp underwater life found within their streams and rivers. Who knew mussels fool fish into carrying their offspring? Or that hellbenders fight? Many of the screenings were sold-out, leading to impromptu second screenings at some locations. Post screening, conversations led by local citizens and conservation professionals brought what was discussed in the film down to the local level. Might there be an upsurge in recreational snorkeling numbers this year?

Just as significant as the power of film, are the people dedicated to protecting the Tennessee River watershed's aquatic biodiversity. The Tennessee River Basin Network works to bring partners together so when opportunity knocks, like the creation of *Hidden Rivers*, a Network members' reach can go far beyond the counties or states they work in. The collaborative effort of Network members in this recent film roll-out has proven shared priorities can reach across the 105,960 sq km extent of the Tennessee River watershed. It also has confirmed that a pre-existing and engaged Network can significantly increase efficacy during the current conservation culture of a decrease in funding and increase in work to do. The Network will be convening in August for its annual meeting and members will be discussing what is next for its partnership with Freshwaters Illustrated. The hope is to continue to use the film to successfully raise awareness and inspire action within the Tennessee River watershed. See you in the river! ◆

To learn more about the film Hidden Rivers:
http://hiddenrivers.org/

To learn more about the Tennessee River Basin Network:
https://applcc.org/projects/trb

A hellbender holds a water snake in its jaws. The hellbender (Cryptobranchus alleganiensis), also known as the hellbender salamander, is a species of aquatic giant salamander endemic to eastern North America.
Credit: David Herasimtschuk / Freshwaters Illustrated

Paddle Georgia

by Joe Cook

Cheating death. As I watched our Paddle Georgia Navy venture down the Withlacoochee and Suwannee rivers for a week, swinging from rope swings, leaping from cliffs, running rapids and swimming beneath limestone bridges at Charles and Lafayette Blue springs, I thought of this phrase.

Sure, all of these endeavors were low risk-high reward activities for adrenalin junkies young and old. None of us were truly cheating death, but the adventures sure got our hearts thumping. That thrill of adventure is what drives us to wild rivers.

I also thought of Joe Kidd, a long-time Paddle Georgia participant who died June 13. At 77 on Paddle Georgia 2017, Joe was still jumping off cliffs and swinging from rope swings…much to my dismay. Try as I might, I could not talk the stubborn old cuss off a high cliff once he got there. A leap for him (and the endeavor to reach the high riverside plateau) was, in fact, high risk for the oft off-balance senior. He did not die the way he probably would have liked…paddling down a river. Dementia took him in a hospital bed.

Joe's life paralleled the plight of Georgia's rivers, and in his relationship to those rivers, we find a road map for us all. A native of Newnan, he learned to swim at Hilly Mill Creek Falls near the banks of the Chattahoochee. He played in that creek and fished the river throughout his youth until upstream pollution drove him and his friends away.

During Paddle Georgia 2014, when we ventured on the Chattahoochee, he returned to the river of his youth and witnessed first hand its revival. A river that was once so fouled you couldn't fish in it was once again an inviting destination. Between 1970 and 2014, citizens essentially demanded that the pollution be stopped, and by and large, it has been. Sure, there's still work to be done, but now, Georgia River Network and others are working to establish a water trail on reaches of the Chattahoochee downstream from Atlanta that at one time was written off as a cesspool.

Joe was a part of this change. During his later years as he got involved in paddling the state's rivers, he was a frequent volunteer for local watershed groups and gave generously of his time and money. Upon his death, family members requested donations to Chattahoochee Riverkeeper in lieu of flowers.

Joe Kidd runs a rapid on the Etowah River during Paddle Georgia 2017. Photo: Joe Cook

Fresh on the heels of the news of Joe's death, I came to the Withlacoochee with an intense sense of gratitude born from the realization that I was one of the lucky ones. In addition to Joe, we lost other Paddle Georgia veterans during the past year. Blue-shirted John Councilman from Columbus and the burly medic John Gugino from the Athens area will never paddle with us again. And each year, it seems one of our family misses the journey due to health issues. During this year's trip we all sent well wishes to Mitt Connerly who is undergoing treatment for leukemia.

As we leapt from high places into the Withlacoochee and Suwannee's blackwater, we might have felt invincible when we bobbed to the surface, but we know that life is fleeting. We will pass on, but the rivers will ceaselessly flow. And, there lies our responsibility.

Our rivers can flow full and healthy or they can flow depleted and polluted. We determine their future. To insure that our children and our children's children have access to the same "life-cheating" experiences we enjoyed during Paddle Georgia 2019, we must commit not only to "suck all the marrow" out of life (as Joe Kidd did)—but also to protect those rivers until we can cheat death no more. ◆

Note: Joe Cook, Paddle Georgia Coordinator, originally posted this article on the Paddle Georgia blog. Paddle Georgia 2019 took place June 15-21 along 92 miles of the Withlacoochee and Suwannee rivers. Paddle Georgia is an annual 7-day trip on a different river each June for paddlers of all skill levels and ages. The trip features nightly camping, catered meals and a chance to explore, relax and learn about rivers.

Paddle Georgia 2019
A Project of Georgia River Network

Northern Arizona University
Brings Campus and Community Together

by Katie Guetz and Sarah Smith

The 2nd Annual Student Water Symposium at Northern Arizona University took place April 18-19, 2019. The purpose of the Student Water Symposium is to provide a space where students from all disciplines as well as community members can gather to collaboratively address the growing demands and challenges facing this critical resource. This year over 200 people attended to see a combination of 52 undergraduate and graduate students from across the university present on water-related topics including dam development, governance, climate change, restoration, indigenous rights, and more. Additionally, 22 evaluators from NAU and the Flagstaff community volunteered their time to provide feedback to student presenters. Outstanding student presentations were recognized with awards and prizes donated by local businesses and organizations.

This year's theme, *Water E-Quality: The Quest for Protections and Access*, was highlighted by our evening events. The opening night included a screening of two short films related to fracking and water quality, *Water Warriors* and *Coconino*. Additionally, we were honored to host hydrologist Dr. Karletta Chief from the University of Arizona as our keynote speaker. Her talk, *When the River Turned Yellow: Responding to Diné Concerns in the Aftermath of the Gold King Mine Spill*, drew on both western and indigenous science.

The Student Water Symposium Committee works under the supervision of Dr. Denielle Perry in the School of Earth and Sustainability to make this university-wide event possible. Student organizers of the event include undergraduates and graduates from across campus, many of whom are part of RMS's River Studies and Leadership Certificate program. Next year we hope to involve even more university and community members in order to expand this important event. To sustain the symposium, we rely on the support of external organizations.

We thank our generous sponsors and volunteers for helping make this year's event another success. ◆

For more information, please visit www.naustudentwatersymposium.com or contact denielle.perry@nau.edu.

Katie Guetz and Sarah Smith, both graduate students at Northern Arizona University and part of RMS's River Studies and Leadership Certificate, organized the 2019 SWS.

River Studies and Leadership Certificate students from NAU's School of Earth and Sustainability visit the Wild and Scenic Klickitat to see salmon spawning on the way to the 2018 RMS symposium. Photo: Denielle Perry

2020 River Management Training Symposium

RICHMOND, VIRGINIA | MAY 12-15, 2020

Call for Presentations

DUE: MONDAY, SEPTEMBER 9, 2019

The River Management Society is proud to be hosting our biennial training symposium against the backdrop of the 50th anniversary of Virginia's Scenic Rivers Program. Join your colleagues in river management trainings, best practice presentations, posters, information-packed field workshops and fascinating evening programs. We invite you to submit your 2020 River Management Training Symposium: *From Mountain Creeks to Metro Canals* abstract **by COB Monday, September 9, 2019**.

We welcome presentations and panels from river management professionals (e.g., managers, planners, academics, consultants, or students) that show how you, your organization, and/or the profession are protecting or enhancing river values. Come help us learn about innovations, creative approaches, successes, and visions for the future of sustainable river management!

Our objectives for this symposium are to:

1. Share current and cutting-edge research in the disciplines of river ecology, watershed science, recreation planning.
2. Connect river managers across geographic regions.
3. Spark interdisciplinary conversations.
4. Provide opportunities for attendees to sharpen skills, share accomplishments, investigate questions and build new alliances.

We are seeking proposals that fit within one or more of these program themes:

1. **Mountain and Rural Rivers (Management Issues and Science)**: Applied research and management practice in applying ecological, biological, geomorphologic or social frameworks to river management especially in headwater areas.
2. **Urban Rivers (Urban Renewal, Infrastructure, Issues and Economics)**: How rivers contribute to a community's identity and economic well-being.
3. **Management Technology Tools:** New technologies and how they are being used in transforming river management.
4. **Policy and Practice (State and Federal River Management Legislation, Policies and Systems)**: The next river protection initiative - will it come from cities or states? Emerging policy or legislation that impacts how rivers are managed.
5. **Partnerships and Community Building**: Initiatives and successful models that join river management agencies, scientists, universities, advocacy groups and/or communities to support river projects and protection.
6. **Water and River Corridor Trails**: The relationship of trails to river management, resource protection, recreational use and public support.

Presentations can take any of the following forms:

Single: Presentations will be 30 minutes in length, including time for questions or discussion. Podium, laptop, projector, screen, and audio will be provided.

Panel sessions: Presentations will be 90 minutes in length. Panelists will be provided the same support as single speakers. If needed, a moderator will be assigned to manage question-and-answer sessions.

Posters: Posters will be displayed during the reception and poster session the evening of Tuesday, May 12.

Submission instructions

Include a brief description of the presentation, limited to 300 words. For panels, please also be prepared to provide the name, affiliation, *short* biography, and contact information for each panelist and/or moderator. ***Abstract submission deadline is September 9, 2019***.

All presenters are expected to register for the symposium, pay registration fees, and attend at least the day of the presentation.

Priority will be given to presentations that address the following River Manager Core Competencies:

1. Laws, Policies and Regulations for River Management
   a. Wild and Scenic Rivers Act history, law, regulation and policy
   b. FERC Licensing Processes
   c. Water Rights
2. River Management Planning
3. River Management Field Skills
4. Visitor Use Management and Monitoring
5. Natural, Cultural and Recreational Resources Management and Monitoring
6. River Information Management Skills
7. Collaboration and Engagement Techniques

River Manager Core Competencies were drafted through a collaboration of agency, academia and NGO partners over a 5-year period under the guidance of Dr. Ed Krumpe from the University of Idaho, College of Natural Resources. The core competencies provide a framework of the knowledge, skills and abilities needed to implement river management stewardship, law, regulation and policy as deemed by the authors and a broad panel of reviewers who have worked extensively in the river management profession. (See Core Competencies for River Management. Grussing, Krumpe & McLaughlin, 2018)

Abstract evaluation

Abstracts will be evaluated by the Program Committee for relevance to the conference theme and session tracks, quality, level of audience participation, relevance to current trends and issues, continuing education credits qualification, and consistency with River Management Society's Mission.

QUESTIONS?
If you have questions regarding your submission please contact the RMS Training Coordinator, Steve Storck, training@river-management.org, 301-616-0307.

Join us in Richmond Virginia as a sponsor

Connect with our audience of over 200 attendees who are responsible for the direct or indirect purchase of outdoor goods, equipment and consulting services.

TAKE A LOOK AT THIS YEAR'S SPONSORSHIP AND EXHIBITOR INFORMATION

Who will be attending Mountain Creeks to Metro Canals?

- City, county, state and federal outdoor recreation and river managers, planners, researchers and administrators
- University faculty and students
- Public agency decision makers and policy makers
- International professionals and academicians
- Private sector planning and design consultants
- Conservancies and land trusts

Venue

The symposium will be held at Virginia Commonwealth University and adjacent venues. Hotel reservations for the symposium will open in early spring 2020.

About RMS

The River Management Society (RMS) is a national nonprofit professional organization whose mission is to support professionals who study, protect, and manage North America's rivers. RMS advances the profession of river management by providing a unique variety of forums for sharing information about the appropriate use and management of river resources. RMS continues to build its base of expertise in all aspects of river management and stewardship including an ecosystem approach to recreation, water quality, riparian health, and watershed management. Besides creating multiple opportunities each year for river professionals to learn, train and network, RMS is growing partnerships that will help river professionals serve both our river resources and the people who use and enjoy them.

From top: The James River flows through downtown Richmond, Virginia, Virginia Tourism Corp.; James River Railway Bridge, Virginia Tourism Corp. Page 2: Field Trip, River Management Society; Poster Session, Meredith Meeks. Page 3: Presentation, Sarah Johnson; Rafting Field Trip, River Management Society.

River Management Society

DCR Virginia Department of Conservation & Recreation

VCU

Virginia Scenic Rivers Program 50 Years 1970-2020

A Little Litter Adds Up To Big Problems For Wildlife

Decades-old problem only getting worse for habitats, wildlife

A raccoon gnaws on a red plastic cup. Tennesseans have submitted hundreds of photos of trash across the state as part of a litter awareness campaign. (Eddie Johnson / Tennessee Wildlife Federation)

By Mike Butler, CEO, Tennessee Wildlife Federation.
Reprinted with permission (5/21/19).

Litter is not at all a new problem. But, as study after study shows, the problem is far worse than we knew. It is again coming into focus as an issue we must address for wildlife, the great outdoors, and ourselves. As a state and a country, we have long focused on the visible effects of litter. The eyesores along river banks and road shoulders. The plastic rings from drinks cans around the necks of fish and wildlife. These issues were at the heart of campaigns that many will know from decades ago, such as the "Tennessee Trash" commercial and the iconic single tear down the cheek of Chief Iron Eyes Cody.

Forty years later, the problem has barely improved—in Tennessee at least. In fact, a recent study showed that the Tennessee River contains more microplastics per gallon of water than any other river tested in the world. It's dumping 32 million pieces of it into the Ohio River every second. That is to say nothing of all the non-plastic litter.

During that same time, we've learned so much more about the less visible, but more harmful and widespread effects our litter has on our natural resources and wildlife. More often we're seeing wildlife with stomachs filled with trash to the point that it can no longer eat actual food.

After decades of litter that sinks in water—glass, cans, and heavier plastics, such as those used for drink bottles—we're now seeing the structure of our lake and river beds change. They are less able to provide the foundational habitats water ecosystems need. This negatively impacts the entire food web, and could reduce the number and size of various species, including highly sought after sportfish. There is even evidence of bioaccumulation. That's when large wildlife contain large amounts of litter because its small prey had consumed small amounts of litter—all the way down the food chain. This is made worse because we also now know plastics absorb toxins that are then released into the wildlife and livestock that eats it.

At the same time, litter costs Tennessee government and businesses an estimated $22.5 million each year. Though there are some positive signs that more awareness about the issue of litter will curb bad behavior, education alone doesn't seem to be a sufficient fix. Until more real reforms take place, reducing and cleaning up litter must be a personal responsibility each of us takes on. Especially those of us who love Tennessee wildlife, water, and wild places. ◆

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Southeast Chapter Focus