



Monitoring the White River:

A School-Based Watershed Education Program

Summer 2021 Newsletter

Our heroes. There simply isn't a better phrase for the educators who navigated the challenges of the COVID-impacted last year and a half, and somehow continued to offer students avenues for exploration and growth.

The WRP supports the efforts of educators of all stripes by providing free content, specialist support, and other resources, featuring opportunities for hands-on, place-based ecology education. Some of our offerings are noted at right, and five of these 'units' have developed curricula that can be found on our website (<https://whiteriverpartnership.org/teacher-resources/>). All can be tailored to meet your needs and help achieve standards and proficiency goals at various levels. A key focus is to keep students engaged, having fun, and caring for resources within walking distance of nearly any location. Monitoring the White River (MWR) programs extend our work to "bring together people and local communities to improve the long-term health of the White River and its watershed", and we believe strongly in the "Partnership" portion of our name. WRP celebrates its 25th year this year!

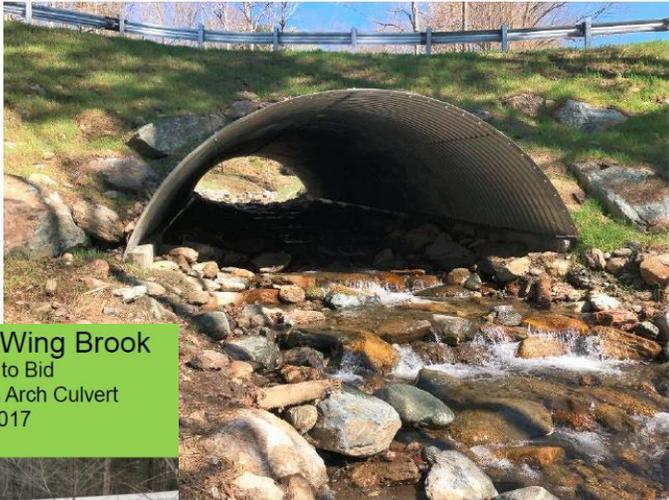
The MWR network is a group of place-based educators with a wealth of knowledge and experience. If you are among our veterans we'd love to hear how we can best meet your needs. If you're new to Monitoring the White River, have any questions, are interested in learning more about MWR program opportunities, or would like to know more about our Lending Library, please contact Dan 'rudi' Ruddell at rudi@whiteriverpartnership.org or (802) 763-7733. Updates below include CAPITAL letters for activities related to our MWR UNITS.

All of our MWR offerings are tied to our overarching commitment to the health of the White River basin and its communities, and we always have an eye to watershed protection and restoration. In most years, students are a huge part of 600-700 volunteers and partners that help plant 3,000-5,000 trees and shrubs along the White and its tributaries. It's one of the great joys of this work to have young adults recount their memories of planting with us, and seeing the results years later. We encourage and support outings and explorations based on our WATERSHED RESTORATION: TREES FOR STREAMS unit at any time of year, which explores everything from the numerous important roles that good buffers play to how to map and plan a planting. We hope to be planting with schools again during spring 2022, discussed further near the end of this newsletter!

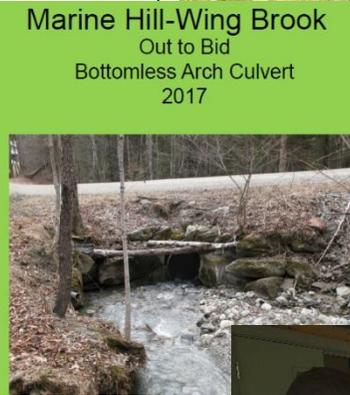
Monitoring the White River units can be tailored to address individual school goals.

- *Crayfish* – key members of river and riparian food webs and invasive species
- *Waterbugs* (benthic macroinvertebrates) – indicators of river health and water quality
- *Winter Track & Sign* – evidence of wildlife activities along river corridors
- *Trout in the Classroom* – what's needed for survival of this keystone, in conjunction with Trout Unlimited
- *Snorkeling* – in-depth exploration of the inhabitants of the pools and riffles of a restored stream, in conjunction with US Forest Service
- *Watershed Restoration* – on-the-ground projects that improve water quality and habitat:
 - Culvert replacements and retrofits
 - Trees for Streams riparian buffers and planting plans
 - Alternative stream bank restoration projects
 - *and more!*

Our WATERSHED RESTORATION: CULVERTS unit explores our growing list of culvert replacements and retrofits, a key link to better fish passage, healthier stream systems and greater flood resilience for communities. Almost everyone lives within walking distance of a culvert (though you may not be aware it's there!)



Marine Hill, 18'9" bottomless arch replaced 4' culvert Wing Brook



Marine Hill-Wing Brook
Out to Bid
Bottomless Arch Culvert
2017

We also use Greg Russ' hands-on Lane's Balance to explain some of the principles of stream equilibrium and geomorphology. Explore why rivers need functioning floodplains, and how water quality and animal habitat depend on our relationship with the streams and rivers 'round every bend.



SNORKELING with the USDA Forest Service returns in early September 2021. This popular program works primarily with grades 4-6 and is already booked for this year, but we continue to build capacity and are working on ways to help more teachers interested in snorkeling with their students. Our annual program takes place on a STREAM RESTORATION site on the West Branch of the White on the Green Mountain National Forest, where participants can see fish benefitting from large wood used to rebuild meanders and stabilize pools as well as investigate nearby macroinvertebrates ("waterbugs") on which the fish feed.



Our WATERBUGS unit is available anytime, along with other well-developed TEACHING UNITS in the TEACHER RESOURCES section of our website (<https://whiteriverpartnership.org/teacher-resources/>). Contact us to explore options for guided outings, or to inquire about our Lending Library for fieldwork. Waterbugs can be found in any stream, and can be caught with simple nets and viewed with hand lenses. Early fall is a great time for this activity, though we have come to favor spring for CRAYFISH – some of the largest of our local macroinvertebrates. All can be found year-round though, and the COVID challenges of 2020 certainly highlighted the advantages of place-based, outdoor education.



We teamed up with our friends at VINS in 2020 to make a short crayfish YouTube video at Clifford Park in Hartford, and WRP Board member Jim Armbruster (who works at VINS) helped launch a statewide Vermont Crayfish Index on iNaturalist. In combination with our Monitoring the White River Project on iNaturalist, these efforts provide real-world impacts and accessibility for the efforts of students and citizen scientists. Student crayfish work utilizing our Teaching Unit contributed to a Forest Service Ecological Risk

Screening Summary for Big Water Crayfish, only recently identified in the watershed, and we continue these important monitoring efforts in conjunction with biologist partners at the VT state lab now based in Randolph Center.

Winter programs feature our Trout in the Classroom collaboration with Greater Upper Valley and Vermont Trout Unlimited, as well as Riparian Track and Sign outings.



Profound changes in the world around us bring to mind the old wisdom that the best time to plant a tree was twenty years ago; the second-best time is now. Although we had to re-configure our 2020 and 2021 planting routines (most years involve more than 600 students and 20 teachers), we have engaged closely with the Intervale Conservation Nursery and other partners to keep planting, strengthen relationships, and look forward to planting with students again in late April-early May 2022. In addition, we have helped refine buffer planting monitoring protocols now being extended to practitioners in Germany and Australia, and look forward to sharing these and other aspects of what makes for healthy RIPARIAN BUFFERS.



Let us know if you'd like to join in spring 2022 TREE PLANTING, or schedule buffer related activities at any time of year.

As challenging as the last year and a half has been, we are encouraged by an increased embrace of the incredible outdoor resources we have near at hand, and strongly believe we take better care of what we directly experience. We are actively working with teachers, administrators and community members, who can play a vital role in supporting them, to deepen connections to the streams and rivers coursing through every nook and cranny of the unique White River watershed, increase outdoor classrooms connected with them, and encourage environmental literacy. Please reach out and stay in touch, as we are acutely aware that we can often do together what we cannot do in isolation.



We're thankful to the Wellborn Ecology Fund, Lamson-Howell Foundation, Hope Foundation, Couch Family Foundation, Greater Upper Valley Trout Unlimited, and the US Forest Service for their support of MWR programs, as well as all the committed teachers and educators we are honored to work with.



Snapshot of MWR's Watershed Education Network (participants since 2012)

<p align="center"><u>MWR Schools</u></p> <p>Barnard Academy Bethel Elementary School Braintree Elementary School Brookfield Village School Chelsea Public School Dothan Brook School (Hartford) East Valley Academy (East Randolph) Hartford Memorial Middle School Hartford Area Career and Technical Center Killington Elementary School Mid-Vermont Christian School (Quechee) Newton School (Strafford) Ottauquechee School (Hartford) Prosper Valley School (South Pomfret) Randolph Elementary School Randolph Union Middle/High School Randolph Technical Career Center Rochester School Sharon Elementary School South Royalton Elementary School Stockbridge Central School The Sharon Academy Tunbridge Central School Vermont Technical College White River Valley High School (South Royalton) White River Valley Middle School (Bethel)</p>	<p>Williamstown Middle/High School Woodstock Elementary School Woodstock Union High School</p> <p align="center"><u>Supporting Organizations & Agencies</u></p> <p>Canaday Family Charitable Trust Clear Water Carbon Fund Couch Family Foundation Ecotone Education (Verdana Ventures LLC) Four Winds Nature Institute Friends of the Winooski Greater Upper Valley Trout Unlimited Green Mountain National Forest Hope Foundation (Hypertherm) Jack & Dorothy Byrne Foundation Lamson-Howell Foundation Lake Sunapee Bank (Bar Harbor Bank & Trust) Mascoma Savings Bank Foundation Ottauquechee Natural Resources Conservation District Upper Valley Linkages for Environmental Literacy U.S. Fish and Wildlife Service Vermont Department of Fish and Wildlife Vermont Department of Forests, Parks & Recreation Vermont Water Quality Division Wellborn Ecology Fund</p>
<p align="center">Questions about MWR? Dan 'rudi' Ruddell, WRP Watershed Scientist rudi@whiteriverpartnership.org (802) 763-7733</p>	<p align="center">Visit the White River Partnership's website for White River watershed information and maps, links to Water Quality Reports and other resources, and more: www.whiteriverpartnership.org.</p>