ROARING FORK CONSERVANCY
Bringing People Together to Protect Our Rivers

March 25, 2020

Mr. Ben Wade
Project Manager
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, CO 80203

Dear Ben,

Since 1996, Roaring Fork Conservancy has inspired people to explore, value, and protect the Roaring Fork Watershed. We bring people together to protect our rivers and work to keep water in the streams, monitor water quality, and preserve riparian habitat. As one of the largest watershed organizations in Colorado, RFC serves residents and visitors of the Roaring Fork Valley through school and community-based Watershed Education programs and Watershed Science and Policy projects, including regional watershed planning, water resource policy, and stream management and restoration initiatives.

RFC graciously received funding from CWCB to support its role as a leader and hub for water education and public engagement. This funding came at an opportune time, as RFC was just moving into its brand new headquarters – The River Center. Along with offices, The River Center has a classroom, water quality lab, and informal outdoor classrooms such as Old Pond Park which sits next to the classroom, and the Roaring Fork River only a few steps from the back door. With this funding, RFC provided the following over the last two years:

- **Education Programs** reaching K-12 students, engaging our youngest river stewards in hands-on activities and guided discourse around current and ongoing water initiatives, while laying a foundation of watershed knowledge and understanding.
- **Community Outreach** aimed at college students, adults and families which included field-based programs designed to facilitate a deeper understanding of water and water resources through interaction with natural and man-made water sites.
- **Communication** with a broad spectrum of local, state, and national constituents, engaging the public around current water issues, projects, and policy through print and electronic media.

Notably, all of RFC's education programs are based on current, authentic, local and regional water issues, and thus are designed to evolve and adapt alongside Colorado's water landscape and communicate up-to-date information about local and regional projects, research, and issues.

Accomplishments for Task 1: Education programs for students from K-12

The K-12 curriculum used and developed by RFC educators focuses on river and watershed topics relevant to Colorado. Our school programs are correlated with the Colorado Department of Education Academic Standards and the North American Association for Environmental Education's Guidelines for Learning.

RFC educators taught over 8,800 students in the Aspen and Roaring Fork School Districts over the duration of this grant. Of those students, 3,790 were directly impacted by funding from this grant, over the course of 172 school programs. During the school year we were in the classroom, in the field or at The River Center with students, anywhere from 2-3 days a week. Programs ranged from water quality testing to macroinvertebrate identification, to understanding maps and tracing the path of local streams, to studying geomorphology on local rivers, identifying macroinvertebrates for a stream health assessment, to learning about the human history of water use in the Roaring Fork Valley. The complete list of programs and schools that benefitted from this funding, can be found in the Appendix I. The program descriptions can be found in Appendix 2 and 3, RFC's education brochures.

Having been in the Roaring Fork Valley for 23 years, RFC has built relationships with local schools by reaching out to teachers as well as fulfilling program requests. In addition to CWCB providing funding for these programs, we were also able to leverage those funds with funding provided by the following: Bessie Minor Swift Foundation, Pitkin County, City of Aspen, Snowmass Village Rotary Club, Town of Snowmass Village, The Thrift Shop of Aspen, school programs fees and private donations to our Children's Water Education Fund.

K-12 programs to note:

- Every year, RFC educators teach a 6-lesson watershed education unit to 4th graders at Basalt Elementary School. Lessons include Colorado water history, the importance of water, point-source and non-point source pollution and that we all live downstream, understanding life zones especially the riparian area, mapping, and seeing watersheds. These lessons take place over the course of two months and culminate with a River Day celebration that includes 6 stations that each class rotates through, outdoors. These stations include a water cycle game, human watershed activity, poetry or drawing, fish identification and biology with Colorado Parks and Wildlife professionals, macroinvertebrate identification, and fishing at Old Pond. Each student receives a River Journal in which is included a pre-post test and worksheets that correlate with each of the lessons and River Day rotations. Please see Appendix 4 and 5 for the English and Spanish version, respectively, of the River Journal.
    - The River Journal included a pre and post-test that was administered by RFC educators on the first day of in-classroom programming. School teachers administered the post-test after River Day. Most notable results from the pre-post test in 2018 show us that students:

- increased their knowledge of the three main rivers of the Roaring Fork Watershed by 16%
- were able to determine direction of flow and differentiating what towns were downstream of Basalt (vs. upstream) by 12.6%
- showed a 33.3% increase in understanding that riparian zones have the most variety of plants and animals
- showed a 16% increase in understanding how water was used historically in Colorado

Please see Appendix 6 for the pre-post test analysis by question.

- RFC made a concerted effort to reach out to the Latino community in our watershed, which comprises approximately 30% of the population. In the duration of this grant, RFC has taken over 130 English Language Learners from Basalt High School and Glenwood Springs High School to study snowpack at either Elk Camp in Snowmass or Sunlight Mountain in Glenwood Springs. This field trip enhanced their understanding of snow as Colorado's primary source of water by digging a snow pit, identifying the different layers of snow, melting snow to determine snow water equivalent, using a snow tube like the snow scientists do, and understanding the long-term economic impacts of snow (tourism, recreation, agriculture, municipal water supply). For most of them it was their first time walking in snow, riding a gondola, and almost each class it turned into an opportunity to throw a few snowballs.

Accomplishments for Task 2: Provide educational programming for adults and families.

The following were RFC's target audiences, reach and involvement:

- **Front Range Water Users**: Every year we offer the Twin Lakes Transbasin Tunnel Diversion Tour in collaboration with Colorado Springs Utilities and the Twin Lakes Reservoir and Canal Company. Participants from around the state attend this popular program, with interest increasing each year. During this program, participants learn and see firsthand how up to 40% of the Roaring Fork River headwaters are diverted under the Continental Divide to the Front Range. Staff from the Twin Lakes Reservoir and Canal Company and RFC led an informative tour of the tunnels, dams and ditches that move water east. After touring Lost Man Reservoir and the Roaring Fork collection dam & tunnel, we then rode in jeeps provided by Blazing Adventures to off-road on Lincoln Creek Road to reach our final destination of Grizzly Reservoir - to get an inside look at the almost four-mile long Twin Lakes Tunnel. In the duration of this grant, we offered this Tour twice, once in 2018 and again in 2019, reaching 54 people. In the summer of 2019 we sent a post-tour survey to the participants. Program participants were asked eleven questions after this program.

What did we learn? Field trips are not just for school children. As revealed by the survey responses which can be seen in Appendix 7, an in-person experience of these intricate water systems not only created an informed citizenry, but during the 6-hour tour, relationships are formed through shared experiences, seeing incredible water infrastructure in the middle of a wilderness area, and, we find sharing laughs throughout the day are just as important. This time together – with residents from both east and west of the Continental Divide – allows for honest, organic conversations to be had where it is realized we all desire the same thing – healthy rivers.

- **College Students** (field courses, internships, graduate projects):
    - RFC mentored two college-aged interns the last two summers. Interns helped collect water quality data as part of the Colorado River Watch program, monitored RFC conservation easements, and helped administer community outreach programs.
    - RFC educators provided six guest lectures to 81 Colorado Mountain College students in the last two years. The theme of the lectures was *Water in the West: Colorado River Issues* and the topics covered included: an overview of Colorado's watersheds and subbasins, snow as the primary source of water in our rivers, the diverse uses of water in the west (i.e. agriculture, recreation, energy, industry, municipal, environmental), and the implications of increasing populations on the water supply, specifically addressing the supply-demand gap. Students learned about the origins of the Colorado Water Plan and its purpose, and in closing discussed management of water, water priorities, and the increasing importance of water efficiencies and conservation. It is interesting to note, anecdotally, that most of these college students grew up on Colorado's Western slope, but are not aware of what a watershed is, the source or destination of their water, nor understand all of the different demands on water.
    - RFC hosted a one-day experience with students from Colorado College's Environmental Program. Professor Jean Lee brings her students to the western slope to learn about many facets of state economics, particularly as provided by the western slope. Students meet with a variety of water professionals but also with oil and gas employees getting to tour different sites involved in their business, and even tour a mine operation. With RFC, students learn more about the west slope as a water supply and along with getting a tour of the Fryingpan River Valley, Ruedi Reservoir and learning about the Fryingpan-Arkansas Project, are surprised to learn how much of their drinking water in Colorado Springs originates in the Roaring Fork Valley. Over the last two years, RFC provided this tour three times to 40 students.

- **Western Slope Residents, Businesses and Visitors**: RFC offered field-based educational programs for adults, families, community members and water professionals through its Watershed Explorations. We also initiated The

Brooksher Watershed Institute to bring water leaders to those curious about water issues throughout the west and the country via an in-person presentation about their work.

- Watershed Explorations are hands-on programs designed to bring participants to unique places in the Roaring Fork watershed, engaging them in a particular water issue via local and regional experts. Every program is designed to engage participants with people and places in the watershed that they otherwise might not have the opportunity to encounter or access. Over 700 residents, visitors, and second-home owners explored our watershed through these programs. Watershed Explorations are advertised on the RFC website, via press releases, online community and radio calendars, RFC Facebook page, and through RFC's monthly e-newsletter.
    - In the last two years, RFC offered 51 Watershed Explorations. The majority of these programs were offered for free thanks to ongoing partnerships with the City of Aspen Parks and Open Space and Pitkin County Open Space and Trails. Those two agencies contract with RFC to provide education programs on properties owned by them, yet also fulfill RFC's mission. For a list of Watershed Explorations offered, sponsoring agency, collaborating agency and program descriptions, please see Appendix 8.
    - *Tour a SNOTEL Site! Understanding Western Water* is a popular Watershed Exploration we offer annually, in either February or March. Participants learn about snow as a water supply in a brief power point presentation before carpooling to McClure Pass to visit a SNOTEL site administered by the Natural Resources Conservation Service, with whom we collaborate on this program. In addition to seeing the SNOTEL site and learning how it operates, participants also dig a snow pit, identify the different layers of snow, and melt the snow to determine snow water equivalent. While avalanche danger forced us to cancel this program in March of 2019, we offered this program in February 2020 to 14 participants. We sent out a post-program survey to see how this program helped participants understand snowpack's connection to summer river levels and water supply in the west. Though we did not receive many survey responses, what we see from those that provided feedback is that in-field experiences for adults are important to make understandable, the realities of a complex water supply in the west. Survey questions and responses can be found in Appendix 9.

- In 2019, RFC launched The Brooksher Watershed Institute. Named after long-time RFC supporters whose idea this was back in 1998, the Institute is a series of presentations with water leaders that discuss water at the regional, state, national and international levels. In the first year of The Brooksher Watershed Institute, RFC hosted seven speakers, engaging over 350 people in local, state, and national water issues and provided

opportunities to community members for one-on-one dialogue with water leaders. The following were the 2019 Brooksher Watershed Institute presenters and their presentation titles:

How to Manage the Colorado River for the New Normal (Drought) with Chris Treese, External Affairs Manager, Colorado River Water Conservation District

Plant a Seed, Grow a Snowpack: A Discussion of Cloud Seeding in the Upper Colorado River Basin with Dave Kanzer, Deputy Chief Engineer, Colorado River Water Conservation District

Restoring Critical Riparian Habitat in the Age of Invasives with Cara Kukuraitis, Outreach & Education Coordinator, RiversEdge West

50 Years of River Protection with Nicole Silk, Executive Director, River Network

1,000 miles into the future: 150 years after John Wesley Powell's journey into the arid West with Tom Minckley, Ph.D., Professor of Geology, University of Wyoming

Science Be Dammed; How ignoring inconvenient science drained the Colorado, and its relevance to the future of the Colorado River with Eric Kuhn, Retired General Manager of the Colorado River Water Conservation District and coauthor, with John Fleck, of *Science Be Dammed: How Ignoring Inconvenient Science Drained the Colorado River*

Predicting Powder and the Science of Snow with meteorologist Joel Gratz with Joel Gratz, Founding Meteorologist, Open Snow

These presentations were broadcast live via Facebook and are available to view on RFC's YouTube channel at https://www.youtube.com/user/roaringforkwatershed.

- Each spring, RFC offers River Ecology Interpretation to first year whitewater rafting guides. These three-hour, on-water trainings allow dozens of commercial river guides to learn about the Roaring Fork watershed's health, flora, fauna, water issues, "plumbing", and cultural history. Trainings are discussion-oriented and tailored to meet interests and needs of the participating guides and outfitters. Each guide receives a packet with additional resources as well. Pitkin County Open Space and Trails partially underwrites these programs.

  In the duration of this grant, 129 first-year raft guides from the following outfits went through this training: Aspen Whitewater Rafting, Blazing Adventures, Blue Sky Adventures, Elk Mountain Expeditions, Glenwood Adventure Company and Whitewater Rafting.

- The Fryingpan River Cleanup has taken place at the end of April (around Earth Day) ever since RFC became an organization. After the Basalt Lions Club feeds everyone a free, hot breakfast, volunteers head out to cleanup a section of assigned river mile on the Fryingpan River or along an area of the Roaring Fork River as it flows through Basalt. This event has become so popular, attracting over 150 volunteers annually, that we had to expand the cleanup to beyond the banks of the Fryingpan. In 2018 we had 167 volunteers and in 2019, 230 volunteers. Along with an abundance of sponsors from private donations to local and national businesses, we also give out Best of Trash awards for the following categories: Most Useful, Most Toxic, Most Unusual and Best of Trash. The 2019 sponsors and partners of the Cleanup were 5Point Film Festival, 7-11, Basalt, Alpine Bank, Anonymous, Chaco, City Market, Eagle County, Eco-Products, EverGreen ZeroWaste, Get Busy Liv'n, Jen & Cap Grossman, Jean Moore, Lions Club, Jeanie & John Morris, Lynn Nichols & Jim Gilchrist Family, Roaring Fork Club, Starbucks, Willits, Timbo's Pizza, Gerard Tomasso, Pam & Dan Turley, Town of Basalt, Susan & David Young, Waste Management.

- The best way to learn about the river is to get on it! Since 2004, RFC has hosted an annual Community River Float and Festival to teach participants about the local wildlife, water issues, riparian habitat, and point out a few of our conservation easements along the way. What makes our float unique is that each boat has a “boat ambassador” in it. The ambassadors are experts in birds, fisheries, riparian vegetation, and water law to name a few, that can answer all sorts of questions on this 2-hour fun float. In 2018, we had over 150 people participate in the float. Unfortunately, in 2019 we had to cancel the float portion due to high flows, but the festival still went on with over 100 people celebrating our rivers.

- **Other Colorado Watershed Groups/Coalitions**: Through Colorado Rural Water Association, RFC worked with Eagle River Watershed Council and Middle Colorado Watershed Council, to create the Keep It Clean West Slope Partnership. The original Keep it Clean communications campaign was developed by the City of Boulder with funding provided by the Colorado Department of Public Health and Environment through grants from the U.S. Environmental Protection Agency. After hearing the needs of our local water providers, the watershed groups and Rural Water determined the elements of the Keep It Clean campaign fulfilled the local needs very well and with a few tweaks this campaign continues to help municipal and HOA water providers with outreach initiatives in effort to educate water-users of source water protection and river health. In addition to revamping the Keep It Clean website, we also recreated a bilingual brochure with tips on how rivers can be protected at home, at work and in the community; updated a coloring book for youth; and created stickers – all of which was to be handed out in local schools and during community events. These handouts can be seen in Appendix 10. The Keep it Clean West Slope Partnership includes Eagle County, Pitkin County, Garfield County, U.S. Forest Service, City of Aspen, Town of Basalt, Town of Carbondale, City of Glenwood Springs, Town of Gypsum, Town of Vail, and Town of Eagle. Funding for this campaign was provided by all the agencies as well as grants from Colorado Department of Public Health and Environment. Additional details about this program can be found at www.roaringfork.org/KeepItClean.

  RFC also shared our education programming strategies at the Colorado Alliance for Environmental Education Conference and Sustaining Colorado Watershed Conference.

- **Citizen Science**: In response to 2018 being one of the most intense drought years in over a decade, characterized by minimal snowpack and precipitation, hot temperatures, low stream flows and the Lake Christine wildfire, RFC revamped a citizen science project originally launched in 2012— *Hot Spots for Trout* — to engage citizens to monitor local stream temperatures.

  Between June and September, 63 volunteers collected 280 temperature measurements on streams and rivers throughout the Roaring Fork Watershed. Using thermometers donated by FishPond, USA, data was submitted via cell phone app or online at CitSci.org, a citizen science platform created by Colorado State University (https://scistarter.org/hot-spots-for-trout). This information allowed RFC to gather watershed-wide data and identify areas of concern. RFC water quality staff then installed temperature loggers at four of these areas along the Lower Roaring Fork and Crystal Rivers. These loggers collected and stored stream temperature measurements every half hour, 24 hours a day, throughout the summer. Staff downloaded data weekly to monitor temperature levels and shared this data with Colorado Parks and Wildlife (CPW).

Measurements submitted by *Hot Spots for Trout* volunteers, combined with RFC's rigorous temperature logger data, helped develop a detailed picture of temperature levels and fluctuations throughout the watershed – air temperatures of 90°+ from Glenwood Springs to Aspen and river flows at 1/3 to 1/6 of average combined to elevate water temperatures to a concerning level. RFC worked closely with the Roaring Fork Fishing Guide Alliance and CPW hosting weekly conference calls discussing responses to these conditions. As a result, a new voluntary fishing closure from 2 PM to midnight was initiated, giving the trout a break during the hottest part of the day. Support and participation from the commercial fishing industry and the angling public at large was integral to the program's success.

This project highlights how data can drive action and collaboration, leading to meaningful protection for local streams and the lives that depend on them.

- **Teachers**: We conducted National Fishing in Schools Program (NFSP) professional development workshops on June 14 and September 14 in 2018, and August 6 and August 8 in 2019, training 50 teachers from across Colorado and beyond. Two of those trainings were offered in collaboration with Colorado Parks and Wildlife.

  RFC partnered with the NFSP and adopted their interdisciplinary fly fishing curriculum called *Cast a Fly, Catch a Student* into our education program offerings. The curriculum, which also includes rubrics and assessments, provides lessons designed to be taught in physical education classes of elementary, middle and high schools. *Cast a Fly, Catch a Student* educates students about fish, insects, aquatic environments, resource conservation, and stewardship through fishing, and learning the skill of casting, as the instructional tool.

  RFC owns two NFSP kits and upon completion of this 1-day teacher workshop, teachers are able to rent our kits for a nominal fee of $50, which helps us cover items that are lost or broken. Learn more about this program at http://www.roaringfork.org/education-and-outreach/watershed-education/fly-fishing-programs/.

Accomplishments for Task 3: Communication

RFC's connections in traditional and social media make it an effective clearing-house for water related information, activities and involvement.

- RFC published a biannual newsletter that provided updates on watershed science and policy projects, watershed education programs, and water-related projects in the Roaring Fork Valley and the state. This newsletter was sent to

over 7,000 individuals and families around the country. Please see Appendix 11 and 12 for 2018 and 2019 newsletters, respectively.

- RFC utilized Facebook and Instagram to communicate programs, articles, and facts about water in the Roaring Fork Valley, Colorado and the west. RFC has 3,730 Facebook followers and 1,314 Instagram followers.
- RFC maintained an updated website reflecting program offerings and project updates, which can be viewed at www.roaringfork.org.
- RFC created and emailed a monthly e-newsletter called River Notes to over 4,000 email contacts. Please see Appendix 13 for a copy of River Notes.
- RFC education staff wrote, and continue to write, a weekly river and snowpack report, that is published in The Aspen Times, disseminated to over 500 individuals through an electronic mailing, published on RFC social media accounts including Facebook and Instagram, and placed on our website. Please see Appendix 14 for an example of our weekly River and Snowpack Report.

Challenges with this project

RFC has an accomplished and talented education staff that navigate full education and outreach schedules while also engaging in diverse projects associated with working for a small non-profit organization. Coupled with the increasing demand for education programs detailed above, the most pressing challenge was capacity to deliver the quantity of high-quality education programs that our constituents need and value.

We experienced complete turnover in the education staff from when this grant started and finished. This lack of retention was mostly due to staff finding other higher paying jobs, along with some burn-out that comes with a rigorous schedule - creating and delivering new programming while maintaining the necessary baseline watershed education in schools and evening/weekend community programs.

The long-term challenge we experienced within schools is with teacher turnover. Teachers with whom we had established a good rapport over the years moved on to teach other grades or moved to other locations with a lower cost of living. Having to reestablish relationships, introductions, explaining our work and helping new teachers understand how our programs fit into their curriculum can take a lot of time for new teachers as they are already on-boarding at a new school and/or grade. To work through some of this, over the last 6 months we started meeting with principals to create longer-term educational strategies; as principals tend to remain in their positions longer then teachers in this particular valley. Our programs have started to be considered part of the curriculum, which helps with new teacher onboarding and reserves RFC educators' time to focus on creating and delivering programs.

Due to RFC education staff turnover in early 2019, we did not receive pre-post tests results from Basalt Elementary 4th graders. In addition to RFC educators not having

time to collect the results, schools teachers did not have time to administer the 2019 post-test.

In our proposal, we budgeted $2,500 to hire a third party program evaluator to provide feedback on i) our K-12 education programs and ii) performance, to optimize growth and learning amongst the staff. Unfortunately, we were not able to make that happen as we quickly found out when reaching out to evaluators that we did not budget enough funds to provide us with such feedback. In the future, we would need to budget at least $10,000 to start such a process. CWCB was kind to allow us to apply this $2,500 to additional K-12 school programs.

Thank you, CWCB, for believing in our mission and providing funding for us to do our essential work within the Roaring Fork Valley. We trust you are pleased with the way RFC utilized the funding to further Watershed Education in the great state of Colorado.

Sincerely,

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Appendix 1. Roaring Fork Conservancy, K-12 in classroom programs

DATE	SCHOOL	GRADE	CLASS	TOPIC	County	Hours	# of Students
3/1/2018	Aspen Community School	5-6	Snow Science	Snow Science	Pitkin	2	29
3/21/2018	Basalt High School	9-12	Snow Science Intro	Snow Science	Garfield	1	11
3/21/2018	Basalt High School	9-12	Snow Science Intro	Snow Science	Garfield	1	17
3/23/2018	Basalt High School	9-12	Snow Science Field Trip to Snowmass	Snow Science	Pitkin	4	31
4/2/2018	Basalt Elementary School	4	Importance of Water	Water Conservation	Eagle	1	22
4/2/2018	Basalt Elementary School	4	Importance of Water	Water Conservation	Eagle	1	20
4/2/2018	Basalt Elementary School	4	Importance of Water	Water Conservation	Eagle	1	21
4/3/2018	Basalt Elementary School	4	Importance of Water	Water Conservation	Eagle	1	21
4/3/2018	Basalt Elementary School	4	Importance of Water	Water Conservation	Eagle	1	22
4/3/2018	Basalt Elementary School	4	Importance of Water	Water Conservation	Eagle	1	19
4/5/2018	Basalt Elementary School	4	Sum of the Parts	NonPoint Source Pollution	Eagle	1	22
4/5/2018	Basalt Elementary School	4	Sum of the Parts	NonPoint Source Pollution	Eagle	1	20
4/5/2018	Basalt Elementary School	4	Sum of the Parts	NonPoint Source Pollution	Eagle	1	21
4/6/2018	Basalt Elementary School	4	Sum of the Parts	NonPoint Source Pollution	Eagle	1	21
4/6/2018	Basalt Elementary School	4	Sum of the Parts	NonPoint Source Pollution	Eagle	1	22
4/9/2018	Basalt Elementary School	4	Making Watersheds	Watershed Planning	Eagle	1	22
4/9/2018	Basalt Elementary School	4	Making Watersheds	Watershed Planning	Eagle	1	20
4/9/2018	Basalt Elementary School	4	Making Watersheds	Watershed Planning	Eagle	1	21
4/10/2018	Basalt Elementary School	4	Making Watersheds	Watershed Planning	Eagle	1	21
4/10/2018	Basalt Elementary School	4	Making Watersheds	Watershed Planning	Eagle	1	22
4/10/2018	Basalt Elementary School	4	Making Watersheds	Watershed Planning	Eagle	1	19
4/12/2018	Basalt Elementary School	4	Seeing Watershed	Watershed Planning	Eagle	1	22
4/12/2018	Basalt Elementary School	4	Watershed Life Zones	River Ecology	Eagle	1	20
4/12/2018	Basalt Elementary School	4	Colorado Water History	CO Water History	Eagle	1	21
4/12/2018	Basalt Elementary School	4	Watershed Life Zones	River Ecology	Eagle	1	21
4/13/2018	Basalt Elementary School	4	Seeing Watershed	Watershed Planning	Eagle	1	19
4/13/2018	Basalt Elementary School	4	Colorado Water History	CO Water History	Eagle	1	22
4/16/2018	Basalt Elementary School	4	Watershed Life Zones	River Ecology	Eagle	1	20
4/23/2018	Basalt Elementary School	4	Seeing Watershed	Watershed Planning	Eagle	1	22
4/23/2018	Basalt Elementary School	4	Colorado Water History	CO Water History	Eagle	1	20
4/24/2018	Basalt Elementary School	4	Seeing Watershed	Watershed Planning	Eagle	1	21
4/24/2018	Basalt Elementary School	4	Colorado Water History	CO Water History	Eagle	1	21
4/26/2018	Basalt Elementary School	4	Seeing Watershed	Watershed Planning	Eagle	1	22
4/30/2018	Basalt Elementary School	4	Colorado Water History	CO Water History	Eagle	1	19
4/26/2018	Basalt Elementary School	4	Watershed Life Zones	River Ecology	Eagle	1	22
4/27/2018	Basalt Elementary School	4	Seeing Watershed	Watershed Planning	Eagle	1	22
5/2/2018	Basalt Middle School	6	Enviroscape	NonPoint Source Pollution	Eagle	1	18
5/2/2018	Basalt Middle School	6	Enviroscape	NonPoint Source Pollution	Eagle	1	17
5/3/2018	Basalt Middle School	6	Enviroscape	NonPoint Source Pollution	Eagle	1	19
5/3/2018	Basalt Middle School	6	Enviroscape	NonPoint Source Pollution	Eagle	1	18
5/3/2018	Basalt Middle School	6	Enviroscape	NonPoint Source Pollution	Eagle	1	19
5/3/2018	Basalt Middle School	6	Enviroscape	NonPoint Source Pollution	Eagle	1	18
5/4/2018	Basalt Middle School	6	Enviroscape	NonPoint Source Pollution	Eagle	1	18
5/4/2018	Sopris Elementary School	3	Stream Trailer: erosion, slide show	Stream Dynamics - Stream Trailer	Garfield	1	60
5/4/2018	Sopris Elementary School	3	Stream Trailer: erosion	Stream Dynamics - Stream Trailer	Garfield	1	20
5/4/2018	Sopris Elementary School	3	Stream Trailer: erosion	Stream Dynamics - Stream Trailer	Garfield	1	21
5/4/2018	Sopris Elementary School	3	Stream Trailer: erosion	Stream Dynamics - Stream Trailer	Garfield	1	19
5/8/2018	Aspen Middle School	5	Stream Trailer: erosion	Stream Dynamics - Stream Trailer	Pitkin	1	15
5/8/2018	Aspen Middle School	5	Stream Trailer: erosion	Stream Dynamics - Stream Trailer	Pitkin	1	14
5/8/2018	Aspen Middle School	5	Stream Trailer: erosion	Stream Dynamics - Stream Trailer	Pitkin	1	12
5/8/2018	Aspen Middle School	5	Stream Trailer: erosion	Stream Dynamics - Stream Trailer	Pitkin	1	15
5/8/2018	Aspen Middle School	5	Stream Trailer: erosion	Stream Dynamics - Stream Trailer	Pitkin	1	16
5/8/2018	Aspen Middle School	5	Stream Trailer: erosion	Stream Dynamics - Stream Trailer	Pitkin	1	16
5/9/2018	Basalt High School	9 - 12	Stream Trailer: erosion	Stream Dynamics - Stream Trailer	Eagle	1.5	18
5/9/2018	Basalt High School	9 - 12	Stream Trailer: erosion	Stream Dynamics - Stream Trailer	Eagle	1.5	17
5/9/2018	Sopris Elementary School	3	Water Cycle	Water Cycle	Garfield	3	18
5/17/2018	Basalt Middle School	5	Coal Basin	Geomorphology	Pitkin	5	42
5/21/2018	Glenwood Springs Middle School	8	Youth River Stewardship Project	River Ecology	Garfield	2	25
5/22/2018	Glenwood Springs Middle School	8	Youth River Stewardship Project	River Ecology	Garfield	2	35
5/23/2018	Glenwood Springs Middle School	8	Youth River Stewardship Project	River Ecology	Garfield	2	20
5/25/2018	Basalt Middle School	5	Coal Basin	Geomorphology	Pitkin	5	38
8/11/2018	Roaring Fork Club	Family	Stream Trailer: erosion	Stream Dynamics	Eagle	1.5	6
8/11/2018	Roaring Fork Club	Family	Macroinverterbates	Stream Dynamics	Eagle	2	20
8/11/2018	Roaring Fork Club	Family	Dipper Program	Riparian Habitat	Eagle	1	5
8/15/2018	Snowmass Rec	Pre-K - 5	Dipper Program	Riparian Habitat	Eagle	1	8
8/16/2018	Carbondale Rec	3-6	Water Quality	Water Quality	Eagle	1.5	11
8/16/2018	Carbondale Rec	3-6	Water Quality	Water Quality	Eagle	4	11
8/24/2018	Aspen High School - ED EX	9-10	Intro to Watersheds - Fire Mitigation	Watersheds	Eagle	3	20
8/27/2018	Aspen High School - ED EX	9-12	Water Quality	Water Quality	Eagle	4	12
9/4/2018	Aspen Community School	5	Macroinvertebrates	Macroinvertebrates	Eagle	2	21
9/6/2018	St. Stephens	4 & 5	Reudi Reservoir & Dam	Dams, hydropower, CO history, water quality	Pitkin	4	29
9/10/2018	Glenwood Springs Middle School	6	Youth River Stewardship Project	River Ecology	Garfield	4	42

9/10/2018	Glenwood Springs Middle School	6	Macroinvertebrates	Macroinvertebrates	Garfield	1.5	21
9/10/2018	Glenwood Springs Middle School	6	Macroinvertebrates	Macroinvertebrates	Garfield	1.5	23
9/11/2018	Glenwood Springs Middle School	6	Youth River Stewardship Project	River Ecology	Garfield	4	48
9/11/2018	Glenwood Springs Middle School	6	Macroinvertebrates	Macroinvertebrates	Garfield	1.5	22
9/11/2018	Glenwood Springs Middle School	6	Macroinvertebrates	Macroinvertebrates	Garfield	1.5	24
9/13/2018	Glenwood Springs Middle School	6	Macroinvertebrates	Macroinvertebrates	Garfield	1.5	20
9/13/2018	Glenwood Springs Middle School	6	Macroinvertebrates	Macroinvertebrates	Garfield	1.5	21
9/14/2018	Glenwood Springs Middle School	6	Macroinvertebrates	Macroinvertebrates	Garfield	1.5	18
9/14/2018	Glenwood Springs Middle School	6	Macroinvertebrates	Macroinvertebrates	Garfield	1.5	14
9/18/2018	Basalt High School	11-12	Macroinvertebrates	Macroinvertebrates	Eagle	1	16
9/19/2018	Basalt High School	11-12	Macroinvertebrates	Macroinvertebrates	Eagle	1	16
9/19/2018	Basalt High School	11-12	Macroinvertebrates	Macroinvertebrates	Eagle	1	14
9/19/2018	Skylark School	7-9	Macroinvertebrates	Macroinvertebrates	Eagle	2	14
9/26/2018	Ross Montessori	1-3	Water Cycle	Water	Eagle	1	28
9/26/2018	Ross Montessori	1-3	Water Cycle	Water	Eagle	1	30
9/26/2018	Ross Montessori	1-3	Water Conservation	Water	Eagle	1	32
9/26/2018	Ross Montessori	1-3	Water Conservation	Water	Eagle	1	30
9/27/2018	Two Rivers Community School	2-3	Water Quality	Water	Eagle	1	22
9/27/2018	Two Rivers Community School	2-3	Water Quality	Water	Eagle	1	22
9/27/2018	Two Rivers Community School	2-3	Macroinvertebrates	Macroinvertebrates	Eagle	1	22
9/27/2018	Two Rivers Community School	2-3	Macroinvertebrates	Macroinvertebrates	Eagle	1	22
9/28/2018	Ross Montessori	1-3	Water Cycle	Water	Eagle	1	26
9/28/2018	Ross Montessori	1-3	Water Cycle	Water	Eagle	1	28
9/28/2028	Ross Montessori	1-3	Water Cycle	Water	Eagle	1	26
9/28/2018	Ross Montessori	1-3	Water Conservation	Water	Eagle	1	26
9/28/2018	Ross Montessori	1-3	Water Conservation	Water	Eagle	1	28
9/28/2028	Ross Montessori	1-3	Water Conservation	Water	Eagle	1	26
10/4/2018	Sopris Elementary School	5	Geomorphology	Geomorphology	Pitkin	2	22
10/5/2018	Sopris Elementary School	5	Geomorphology	Geomorphology	Pitkin	2	24
10/5/2018	Sopris Elementary School	5	Geomorphology	Geomorphology	Pitkin	2	21
10/18/2018	Aspen Country Day School	5	Geomorphology	Geomorphology	Pitkin	2	19
10/17/2018	Two Rivers Community School	2-3	Water Quality	Water	Eagle	1	23
10/17/2018	Two Rivers Community School	2-3	Macroinvertebrates	Macroinvertebrates	Eagle	1	23
10/25/2018	Sopris Elementary School	3	Macroinvertebrates	Macroinvertebrates	Garfield	1.5	28
10/25/2018	Sopris Elementary School	3	Macroinvertebrates	Macroinvertebrates	Garfield	1.5	28
10/25/2018	Sopris Elementary School	3	Macroinvertebrates	Macroinvertebrates	Garfield	1.5	28
10/31/2018	Basalt High School	11-12	Electrofishing with CPW	Fisheries Biology	Pitkin	5	4
11/1/2018	Basalt High School	9, 11-12	Electrofishing with CPW	Fisheries Biology	Pitkin	5	4
11/9/2018	Waldorf School	6	Enviroscape	Nonpoint Source Pollution	Eagle	2	17
11/14/2018	Youth Entity	4, 5	Macroinvertebrates	Careers in Watershed Science	Garfield	0.5	15
11/14/2018	Youth Entity	4, 5	Macroinvertebrates	Careers in Watershed Science	Garfield	0.5	15
11/14/2018	Youth Entity	4, 5	Macroinvertebrates	Careers in Watershed Science	Garfield	0.5	15
11/16/2018	Crystal River Elementary School	2	Rivers & Erosion	Erosion	Garfield	1.5	19
11/16/2018	Crystal River Elementary School	2	Rivers & Erosion	Erosion	Garfield	1.5	21
2019							
1/14/2019	Basalt Elementary School	4	Dipper Program	Riparian Habitat	Eagle	0.75	21
1/15/2019	Basalt Elementary School	4	Dipper Program	Riparian Habitat	Eagle	0.75	21
1/15/2019	Aspen Country Day School	7	Snow Science	Snow Science	Pitkin	1.5	15
1/16/2019	Aspen Country Day School	7	Snow Science	Snow Science	Pitkin	1.5	15
1/17/2019	Basalt Elementary School	4	Dipper Program	Riparian Habitat	Eagle	0.75	21
1/18/2019	Basalt Elementary School	4	Dipper Program	Riparian Habitat	Eagle	0.75	21
1/22/2019	Basalt Elementary School	4	Dipper Program	Riparian Habitat	Eagle	0.75	21
2/19/2019	Sopris Elementary School	4th	Snow Science	Snow Science	Garfield	1.5	60
3/18/2019	St. Stephens	5	Snow Science	Snow Science	Garfield	2	20
4/16/2019	Basalt High School	HS	Snow Science Presentation ELL	Snow Science	Pitkin	1	42
4/19/2019	Basalt High School	HS	Snow Science Field Trip ELL	Snow Science	Pitkin	2	27
7/24/2019	Marble Charter Camp	1-4	Macroinvertebrates	Aquatic Insects	Eagle	2	11
5/22/2019	Basalt Middle School	5	Coal Basin	Geomorphology	Pitkin	2	60
5/23/2019	Basalt Middle School	5	Coal Basin	Geomorphology	Pitkin	2	60
5/31/2019	Basalt Elementary School	4	Aquatic Insect Adaptations	Aquatic Insects	Eagle	1	23
5/31/2019	Basalt Elementary School	4	Aquatic Insect Adaptations	Aquatic Insects	Eagle	1	24
5/31/2019	Basalt Elementary School	4	Aquatic Insect Adaptations	Aquatic Insects	Eagle	1	24
5/31/2019	Basalt Elementary School	4	Aquatic Insect Adaptations	Aquatic Insects	Eagle	1	22
5/31/2019	Basalt Elementary School	4	Aquatic Insect Adaptations	Aquatic Insects	Eagle	1	24
9/4/2019	Carbondale Community School	5	Geomorphology at Coal Creek	Geomorphology	Pitkin	2	15
9/5/2019	Carbondale Community School	5	Geomorphology at Coal Creek	Geomorphology	Pitkin	2	18
9/18/2019	Basalt High School	HS	Macroinvertebrates	Macroinvertebrates	Eagle	1.5	27
9/20/2019	Two Rivers Community School	6 & 7	Enviroscape	Watersheds, Non-point source pollution	Garfield	1	26
9/20/2019	Two Rivers Community School	6 & 7	Enviroscape	Watersheds, Non-point source pollution	Garfield	1	25
10/11/2019	Sopris Elementary School	4	Seeing Watersheds with Maps	Watersheds	Eagle	1.5	28
10/11/2019	Sopris Elementary School	4	Seeing Watersheds with Maps	Watersheds	Eagle	1.5	27
10/11/2019	Sopris Elementary School	4	Seeing Watersheds with Maps	Watersheds	Eagle	1.5	26
10/11/2019	Sopris Elementary School	4	Seeing Watersheds with Maps	Watersheds	Eagle	1.5	27
10/16/2019	Two Rivers Community School	6	Enviroscape	Watersheds, Non-point source pollution	Garfield	2	50
10/17/2019	Glenwood Springs Middle School	6	Enviroscape	Watersheds, Non-point source pollution	Garfield	2	53

10/28/2019	Carbondale Middle School	5	Weather	Weather	Carbondale	1	26
10/28/2019	Carbondale Middle School	5	Weather	Weather	Carbondale	1	25
10/28/2019	Carbondale Middle School	5	Weather	Weather	Carbondale	1	24
10/31/2019	Carbondale Middle School	5	Weather	Weather	Carbondale	1	27
11/13/2019	Two Rivers Community School	6/7	Macroinvertebrates	Aquatic Insects	Garfield	1	25
11/13/2019	Two Rivers Community School	6/7	Macroinvertebrates	Aquatic Insects	Garfield	1	23
11/7/2019	Ross Montessori School	K-3	Macroinvertebrates	Aquatic Insects	Garfield	1	29
11/7/2019	Ross Montessori School	K-3	Macroinvertebrates	Aquatic Insects	Garfiled	1	28
11/7/2019	Ross Montessori School	K-3	Macroinvertebrates	Aquatic Insects	Garfiled	1	27
11/18/2019	Basalt Elementary School	K	Dipper Program	Riparian Habitat	Eagle	1	15
11/18/2019	Basalt Elementary School	K	Dipper Program	Riparian Habitat	Eagle	1	16
11/18/2019	Basalt Elementary School	K	Dipper Program	Riparian Habitat	Eagle	1	17
11/18/2019	Basalt Elementary School	K	Dipper Program	Riparian Habitat	Eagle	1	16
11/18/2019	Basalt Elementary School	K	Dipper Program	Riparian Habitat	Eagle	1	15
11/18/2019	Basalt Elementary School	K	Dipper Program	Riparian Habitat	Eagle	1	15
2020							
1/27/2020	Basalt Elementary School	4	Watershed Life Zones	River Ecology	Eagle	1	21
1/31/2020	Basalt Elementary School	4	Watershed Life Zones	River Ecology	Eagle	1	21
2/3/2020	Basalt Elementary School	4	Watershed Life Zones	River Ecology	Eagle	1	21
2/13/2020	Basalt Elementary School	4	Watershed Life Zones	River Ecology	Eagle	1	21
3/2/2020	Basalt High School	10	Snow Science Classroom Presentation	Snow Science	Pitkin	2	18
3/4/2020	Basalt High School	10	Snow Science	Snow Science	Pitkin	3	15
3/10/2020	Glenwood Springs High School	10	Snow Science	Snow Science	Garfield	2	23
3/12/2020	Glenwood Springs High School	10	Snow Science	Snow Science	Garfield	2	12

Total # of school programs taught:	**172**

	Hours:	**Students:**
Total:	**242.75**	**3,790**

Roaring Fork Conservancy's WATER Education Programs

Our Education Vision

*Our vision is that students in the Roaring Fork Valley and beyond, will gain a **connection** to our watershed. Through hands on experiences, students will learn about their rivers creating **value** and **awareness** through **exploration**.*

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Visit www.roaringfork.org to learn more.

Funding for this brochure was generously provided by

PITKIN COUNTY HEALTHY RIVERS

Outdoor Field Trips

Discover the wonders of the Roaring Fork Watershed on a field trip with Roaring Fork Conservancy! With over 30 potential field trip destinations, our educators take your students directly to the water, fostering exploration and connection to our valley's rivers. Ruedi Reservoir, the Crystal River Valley, and the Roaring Fork River itself are just a few of our favorite field trip destinations – many of which are within walking distance of local schools.

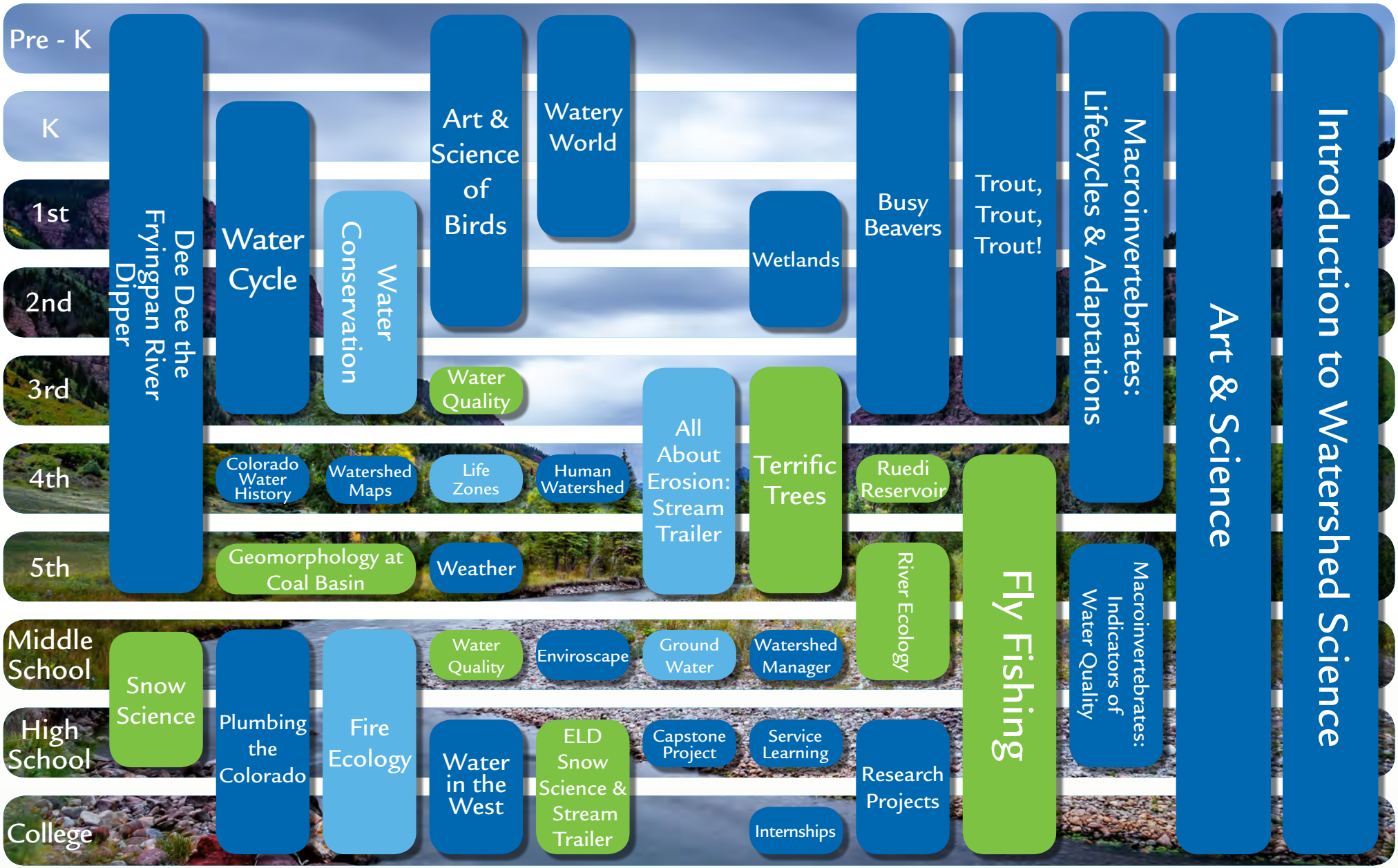
Classroom Programs

Let us bring the fun to you! Many of our education programs can be taught in the convenience of your own classroom. Roaring Fork Conservancy educators bring the river to you with all of the necessary program materials, water samples, and enthusiasm for exploratory learning.

River Center

Make Roaring Fork Conservancy's River Center your next education destination! Old Pond Park and the Roaring Fork River are just outside our classroom's back door, providing indoor and outdoor experiences with flexibility and convenience. With river access, public parks, and the Basalt Regional Library just a few blocks away, it's easy to plan additional activities in conjunction with your trip to The River Center.

Roaring Fork Conservancy Water Education Programs by Grade



Outdoor Field Trip | River Center or School | Class Location Flexible

Many RFC programs can be adapted for different grade levels or core subjects. Please contact RFC's education staff if you are interested in custom water education programs.

Descriptions of Popular Programs

All About Erosion: Stream Trailer
How does water move sediment from one place to another? What impacts can this have on our rivers? Students learn about erosion through a true story about a farmer who straightened a river. Afterward, students experiment by building river models in the Natural Resources Conservation Service Stream Trailer. Hypotheses are evaluated when the faucet is turned on and rivers models are put to the test!

Dee Dee the Fryingpan River Dipper
What is so special about that small, gray bird you see by the river? Discover the life history of the American Dipper through a reading of RFC's children's book, *Dee Dee the Fryingpan River Dipper*. A lucky student then transforms into a dipper, donning a costume featuring adaptations that allow dippers to thrive in mountain streams. Learn more about advocacy through art and habitat with a hands-on, outdoor art project.

Introduction to Watersheds
What exactly is a watershed? Students experiment with water, relief maps, and build watershed models with sand to observe how water moves across a landscape. This place-based program leads to deeper understanding by focusing on how local rivers, land formations, and communities shape the Roaring Fork Watershed.

Macroinvertebrates
How can you tell if a river is healthy? By studying the aquatic macroinvertebrates (water-dwelling bugs) that call it home! Students collect, observe, and identify live macroinvertebrates from rivers and streams in their community. Younger students learn about life cycles, adaptations, and habitat requirements. Middle and high school programs focus on assessing stream health, riparian ecosystems, and learning how to use dichotomous keys.

River Ecology
Students evaluate the health of the Roaring Fork River - while rafting on top of it! By making observations of the river's physical features and conducting water quality tests, students learn how these factors are connected. By observing real-life examples of riparian habitat, water diversions, and restoration projects, students identify healthy sections of the river and sections that could use some help.

Snow Science
How do water managers predict summer river flows? By studying snow! Learn about local snow conditions via hands-on data collection to calculate snow water equivalent and snow density. Students use the same techniques used by snow scientists to learn how much water is stored in this year's snowpack.

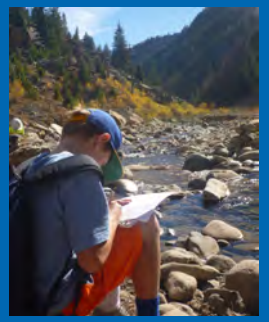
Water Conservation
Students collaborate to learn how different groups use water with props, water, and sponges to create a map of our valley and its water use. As water is used, students watch the level of the town reservoir drop. After discussing impacts this has on their community and the natural world, students are guided in identifying steps they can take to conserve water.

Water in the West
Why is water management so complicated in the western United States – and how did we get here? Students will learn about our rivers' natural processes, the history of water in the west, and the basics of Colorado Water Law. With this knowledge, students will understand how current water policies came to be and put current water issues into context.

What is water?
Students experiment with and buoyancy, liquid water, ice, and water vapor. How can these different substances all be made of water? Where do we find water in our homes and communities? Through story time and hands-on exploration of the three states of water, students understand how water is all around us and essential for life.

Internships
A limited number of internships are available to motivated college students. Gain experience conducting fieldwork, helping with outreach events, testing water quality samples, and more. Inquire about potential internships in early Spring.

How to Schedule an Education Program



Our education schedule fills up quickly, so request your program early! To ensure high-quality education programs, class sizes are typically limited to 20-25 students per lesson. Some lessons are weather dependent and only available at specific times of year. We conduct field trips rain-or-shine, so please ensure your students are prepared.

Scholarship rates for schools are $50/hour for an education series, or $75/hour for stand-alone programs. In the case we can fulfill last-minute requests (two weeks or less), a rush fee may apply. Custom education programs requiring additional preparation may cost more depending on your needs. Your school may qualify for financial assistance through one of our education grants - just ask us!

Photo by Jaspen Mackin

To schedule a program, download an Education Program Request Form available at www.roaringfork.org/education-and-outreach/watershed-education/school-programs. Email completed forms to Education Programs Coordinator, Megan Dean, at megan@roaringfork.org. Please email Megan or give us a call at (970) 927-1290 with any questions.

Elementary School Watershed Education Programs

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To schedule, please contact
Megan Dean, Education Program Coordinator
(970) 927-1290 - megan@roaringfork.org

All our Programs are . . .

- Inquiry based
- Correlated with 2020 CO Standards
- Hands-on, interactive
- Place-based - walking field trips available
- Relevant
- Current Issues/Research-based
- Fun!!!

Teacher Workshops & Professional Development Opportunities:

- National Fishing in the Schools Program
- The GLOBE Program

School Program Topics

BIOLOGY • ECOLOGY • CHEMISTRY

Aquatic Insects, Wetlands, Riparian Ecology, Dichotomous Keys, Stream Health, Science and Art, Riparian Birds and Animals, Riparian Food Chains and Energy Transfer

SOCIAL STUDIES • GEOGRAPHY

Maps, Watershed, Colorado River Issues, Water Rights, Water Quantity, Debates, Ruedi Tour, Shoshone Tour, Headwaters Diversion Tour

EARTH SCIENCE • GEOLOGY

Snow Science, Landslides, Erosion, Stream Trailer, Groundwater, Weather, Climate, Surface Water, Non-Point & Point Source Pollution

RFC Lesson Grade Level Location	Program Description	Learning Target/Standard
Erosion In Action - Stream Trailer 3rd - 6th Grade Classroom or River Center	Get your hands wet creating rivers and watching geomorphology happen in a working stream trailer. Available May through October.	• Students use models to understand erosion and human impacts • Earth's surface changes constantly through a variety of processes and forces
Macroinvertebrates K - 6th Grade Classroom, River Center, or Field Trip	Explore and identify real aquatic river insects using identification guides and brock scopes.	• Organisms have structures with different functions • Classification, interaction and interdependence • Interaction between living and nonliving • Life cycle and habitat
Busy Beavers K - 3rd Grade Field Trip	Learn all about beavers through story telling, anatomy models and exploration of beaver signs and activity.	• Organisms have structures with different functions • Classification, interaction and interdependence • Interaction between living and nonliving • Life cycle and habitat
Riparian Food Chains 3rd - 6th Grade Classroom, River Center or Field Trip	Become part of the food chain and learn about energy transfer in ecosystems	• Classification • Interaction • Interdependence
Trout, Trout, Trout! K - 3rd Grade Classroom, River Center or Field Trip	Enjoy a visit from Captain Cut-throat and learn about trout anatomy and habitat needs.	• Organisms have structures with different functions • Interaction between living and nonliving things
Dee Dee the Fryingpan River Dipper K - 3rd Grade Classroom, River Center or Field Trip	Learn all about our favorite aquatic song bird through storytelling, dress up, and habitat exploration.	• Organisms depend on their habitat's nonliving parts to satisfy their needs • Adaptations
Riparian Bird Olympics 4th - 6th Grade Classroom, River Center or Field Trip	Compete in games using the adaptations of birds while exploring their habitat.	• All living things share similar characteristics • Living things also have differences that can be described and classified
Art & Science of Birds 2nd - 4th Grade Classroom, River Center or Field Trip	Enjoy playing games using art to learn about bird anatomy and habitat needs.	• All living things share similar characteristics • Living things also have differences that can be described and classified

PLEASE NOTE: Our programs can be adapted to different grade levels and different seasons – just ask!

RFC Lesson Grade Level Location	Program Description	Learning Target/Standard
Weather Stations 4th - 6th Grade Classroom, River Center or Field Trip	Become a weather scientist by creating hypotheses and testing them with weather instruments.	• Weather changes are measured by differences in temperature, air pressure, wind and water in the atmosphere and type of precipitation
Water Cycle Game 4th - 6th Grade Classroom, River Center, or Field Trip	Become a drop of water and roll the dice to find out where you will land.	• Matter exists in different states such as solids, liquids, and gases • Matter can change from one state to another by heating and cooling
Watery World K - 2nd Grade Classroom, River Center, or Field Trip	Explore the properties and states of water through hands on activities and stories.	• Solids and liquids have unique properties that distinguish them
Water History 4th - 6th Grade Classroom or River Center	Explore real artificats from Colordao History while learning about how water shaped our past.	• Colorado History
Mapping and Seeing Watersheds 4th - 6th Grade Classroom or River Center	Use and create maps to understand earth systems and renewable resources.	• Earth and sun provide a diversity of renewable and non-renewable resources. • Earth's surface changes constantly through a variety of processes and forces
Life Zones 4th - 6th Grade Classroom or River Center	Use beautiful illustrations and activity guides to learn about the life zones in Colorado.	• Use geographic tools to research and answer questions • Connect across human and physical systems
Sum of the Parts 4th - 6th Grade Classroom or River Center	Design and plan your own piece of riverfront property while learning about human impacts on our watershed.	• Human impacts on the environment

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Middle & High School Watershed Education Programs

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To schedule, please contact
Megan Dean, Education Program Coordinator
(970) 927-1290 - megan@roaringfork.org

The Core of our Programs . . .

- Active learning
- Character growth and teamwork
- Inquiry based
- Standards based
- Hands on
- Place-based
- Relevant
- Current Issues/Research-based
- Fun!

Teacher Workshops & Professional Development Opportunities:

- National Fishing in the Schools Program
- The GLOBE Program

School Program Topics

BIOLOGY · ECOLOGY · CHEMISTRY

- Aquatic Insects (population and environmental interactions)
- Wetlands (biotic and abiotic factors)
- Riparian Ecology (food chain and energy transfer)
- Dichotomous Keys (models and systems)
- Stream Health and Water Quality (molecules and reactions)
- Science and Art (anatomy and adaptations)

SOCIAL STUDIES · GEOGRAPHY

- Maps and Watersheds (geographic tools, inferences, predictions)

Program Name	Main Subject	2020 Standards & Main Focus
Macroinvertebrates: Indicators of Water Quality (Aquatic Insects) Classroom, River Center, or Field Trip	Biology	• Populations Dynamics • Environmental interactions • Biological components of stream health • Dichotomous Keys
Cutthroat Trout Native Species & Local Adaptations Classroom, River Center, or Field Trip	Biology	• Anatomy • Genetics • Ecosystems are dynamic in nature; characteristics can vary over time • Disruptions to any physical or biological component of an ecosystem can lead to shifts in all of its populations
Wetlands River Center, Field Trip	Ecology	• Biotic and abiotic factors • Living and nonliving interactions • Biodiversity
Riparian Ecology Classroom, River Center, or Field Trip	Ecology	• Food chain and energy transfer
River Ecology Rafting Field Trip	Ecology	• Abiotic and biotic factors • Understanding how human activities and the Earth's surface processes interact.
Water Quality Field Trip, River Center	Chemistry	• Molecules and reactions • Understanding how human activities and the Earth's surface processes interact. • Chemical and physical indicators of stream health
Science Through Art Classroom, River Center, or Field Trip	Art, Biology	• Drawing from life • Rendering scientific macroinvertebrate illustrations • Observation of living systems

PLEASE NOTE: Our programs can be adapted to different grade levels and different seasons – just ask!

Program Name	Main Subject	2020 Standards & Main Focus
Plumbing the Colorado Classroom or River Center	Social Studies	• Geographic tools • Inferences • Predictions
Water Manager Classroom, River Center, or Field Trip	Social Studies	• Role of consumers • How do we use resources?
Water in the West Classroom or River Center	Social Studies	• Economic Systems • Water law and history • Reservoirs & Dams
Snow Science Field Trip (Classroom if deep snow nearby)	Geology, Chemistry, Nature of Science	• Digital information as wave pulses • Volume • Density
Geomorphology Stream Trailer & Groundwater Interactive Model Classroom or River Center	Geology	• Earth systems • Mapping • History • Natural Hazards • Geological forces
Weather, Climate & Surface Water Classroom, River Center, or Field Trip	Earth Science	• Water Cycles • Water Movement
Enviroscape: Non-Point Source Pollution Classroom or River Center	Earth Science	• Humans' dependency and impact on the environment

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EXPLORE YOUR WATERSHED

Journal

Name: _____

Teacher: _____

ROARING FORK CONSERVANCY

Basalt Elementary School - Grade 4
Watershed Education

ROARING FORK CONSERVANCY

PRE-SURVEY

1) A watershed is…
   A. a place to store your bottles of water
   B. a waterproof cover on a swimming pool
   C. an area of land where all the water flows to one place
   D. a building used for winter fishing
   E. I don't know

2) Which 3 rivers are located in the Roaring Fork Watershed?
   A. Colorado, Fryingpan, Arkansas
   B. Fryingpan, Roaring Fork, Crystal
   C. Crystal, Colorado, Gunnison
   D. Colorado, Roaring Fork, Crystal
   E. I don't know

3) Name 2 towns that are downstream of Basalt.
   A. Aspen and Carbondale
   B. Snowmass and Glenwood Springs
   C. Carbondale and Glenwood Springs
   D. Snowmass Village and Redstone
   E. I don't know

4) Which life zone has the most variety of plants and animals?
   A. pinon-juniper
   B. riparian
   C. alpine tundra
   D. sagelands
   E. I don't know

5) How was water from our local rivers used long ago?
   A. train engines needed water for their steam engines
   B. hunting beavers from the rivers
   C. watering and growing potatos
   D. all of the above
   E. I don't know

6) Which two rivers flow through Basalt?

A. Fryingpan River and Roaring Fork River
B. Crystal River and Colorado River
C. Roaring Fork River and Colorado River
D. Brush Creek and Fryingpan River
E. I don't know

7) Which town is OUTSIDE of the Roaring Fork Watershed?

A. Basalt
B. Marble
C. Vail
D. Snowmass Village
E. I don't know

8) How can people help take care of rivers and streams?

A. throw trash on the ground
B. use less water
C. pour used motor oil in the street
D. use more fertilizer on their lawns
E. I don't know

9) Where does water in the river come from?

A. white pipe on the side of the mountain
B. grocery store
C. melting snow
D. plastic bottle
E. I don't know

10) Which adaptation is shared by most aquatic life?

A. legs to walk
B. gills to breath
C. feet to run
D. noses to smell
E. I don't know

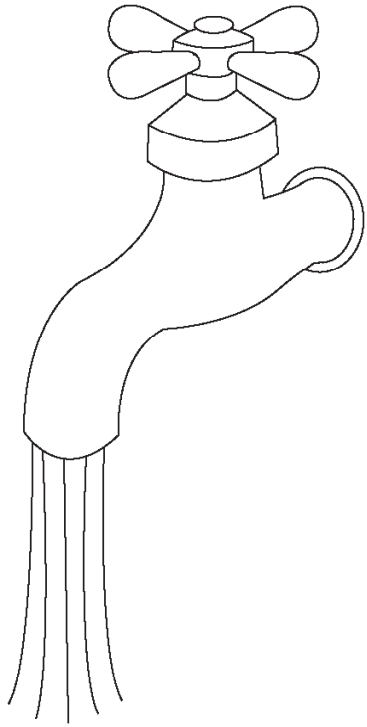
THE IMPORTANCE OF WATER

Learning Targets:

- I can identify many ways I use water and how my community uses water.
- I can identify ways I can conserve water every day.

Brainstorm! Make a list of different **ways we use water** in our lives every day. Try to think of as many uses as possible (at home, at school, at work, in town, on farms, at stores, etc.).

Think of at least one way you can use **less** water everyday.



SEEING WATERSHEDS WITH MAPS

Learning Targets:

- I can use maps to answer questions about where I live.
- I can name places and rivers in my community.

Identify 5 towns on the map.

1. _____
2. _____
3. _____
4. _____
5. _____

Find Basalt, then find Ruedi Reservoir. What river connects them?

_____

Find Carbondale. Which rivers and creeks flow near Carbondale?

_____

_____

_____

Find Aspen. Which rivers and creeks flow near Aspen?

_____

_____

_____

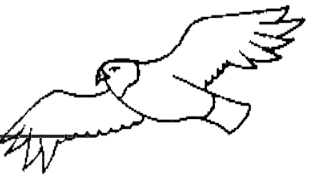
Find Glenwood Springs. Which rivers and creeks flow near Glenwood?

_____

_____

Find 2 reservoirs and write their names here:

1. _____ 2. _____



Using the Map create our watershed in your sand tray.

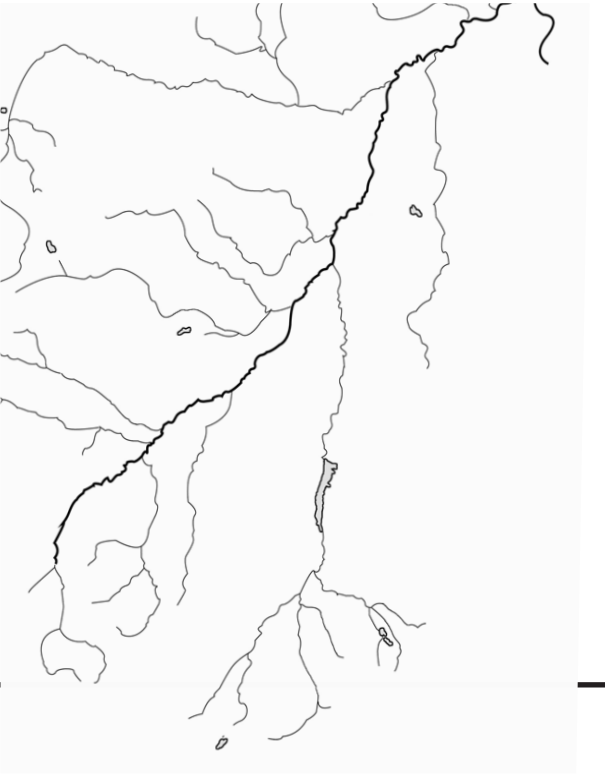
1. Form the ridges of our watershed to look like a horse shoe.

2. Draw the Roaring Fork River in the sand to create our valley

3. Draw The crystal River and the Fryingpan River in the sand.

Lable the following items

Aspen - A
Basalt - B
Carbondale - C
Glenwood Springs - G



***Challenge make Ruedi and Grizzly Reservoirs on your model**

What is the difference between a lake and a reservoir?

_____

_____

ROARING FORK WATERSHED MAP

Learning Targets:

- I can use maps to answer questions about my watershed.
- I can name places and rivers in my community.

1. Find Glenwood Springs. This is where all the water in the Roaring Fork Watershed ends up. What river does the Roaring Fork River flow into here?

_____

2. Trace the squiggly black line from Glenwood Springs around the boundary of the watershed. Where do you come back to?

_____

Bonus: What does the squiggly black line on the map represent?

_____

3. Find Ivanhoe Lake. This is the headwaters of the Fryingpan River. Follow the Fryingpan River downstream, through Ruedi Reservoir, to Basalt. What river does it flow into here?

_____

4. Find Beaver Lake. This is the headwaters of the Crystal River. Follow the Crystal River through Marble and Redstone. Which river does it eventually flow into?

_____

5. Find Lost Man Creek. This is the headwaters of the Roaring Fork River. Follow the Roaring Fork River through Aspen, Basalt, Carbondale and to Glenwood Springs. What river does it flow into here?

_____

6. Have each person in the group choose a place within the watershed. Then find the nearest river and follow it ***downstream***. Where do you always end up?

_____

7. Name the town where the Fryingpan River and Roaring Fork River meet.

_____

8. Name the town where the Crystal River and Roaring Fork River meet

_____

9. Name the town where the Roaring Fork River flows into the Colorado River

_____

Define these words:

Ridge: _____

_____

Watershed: _____

_____

_____

MAKING WATERSHEDS

Name our local watershed:

_____

Define the word **watershed**: _____

_____

_____

_____

_____

Name the three biggest rivers in the Roaring Fork Watershed:

1. _____
2. _____
3. _____

The Roaring Fork River eventually flows into which river?

_____

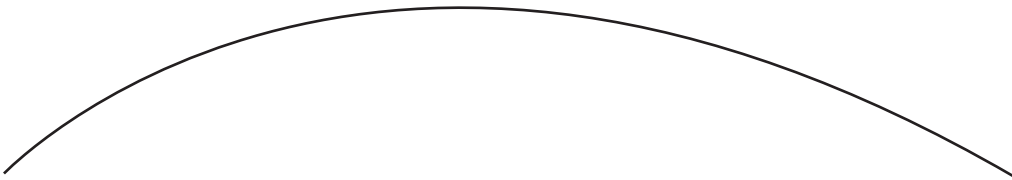
Name the town where these two rivers meet.

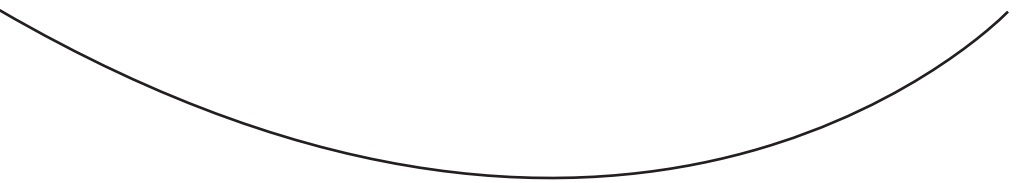
_____

What is the nearest river or stream to your house?

_____

SUM OF THE PARTS

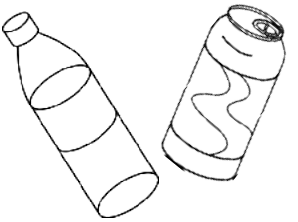




SUM OF THE PARTS

Learning Targets:

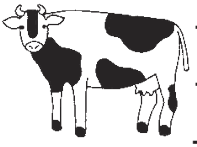
- I can name multiple ways people pollute rivers and streams.
- I can list many ways I can help to keep rivers healthy.



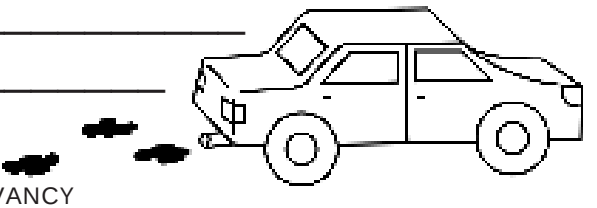
List the many ways people can pollute rivers.

Were any of these pollutants worse than others? Which was the worst?

Were any of the pollutants okay to have? Why or why not?



Is it possible to pollute the river in a way that will not effect anyone else? Explain your answer.



What can you and your family do to protect our rivers' health?

Why is it important for YOU to keep our rivers healthy?


Colorado River
Glenwood Springs
5916'
Roaring Fork River
GARFIELD
Hughes Reservoir
4 Mile Creek
Cattle Creek
Spring Park Reservoir
Roaring Fork River
EAG
Carbondale
6181'
Basalt
6610'
North Thompson Creek
Middle Thompson Creek
South Thompson Creek
Crystal River
West Sopris Creek
East Sopris Creek
Capitol Creek
Wildcat Reservoir
Redstone
7190'
Snowmass Creek
Snowmass Lake
Marble
7900'
Lost Trail Creek
North Fork Crystal River
South Fork Crystal River
Beaver Lake
GUNNISON
Yule Creek
N
W
E
S
Scale (miles)
0
5
10

Roaring Fork Watershed

ROARING FORK CONSERVANCY

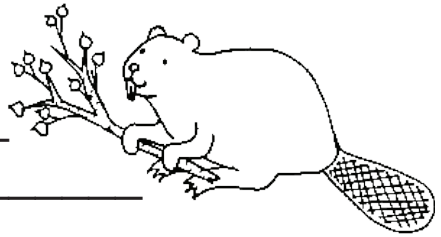
COLORADO WATER HISTORY

Learning Targets:

- I can name many ways water was used in the past in my local watershed community.
- I can describe how and why people valued water in the past in my local watershed community.

Station 1: Beaver Trapping

1. Why were beavers important to people who lived here a long time ago?



_____

_____

_____

2. How was beaver trapping related to water?

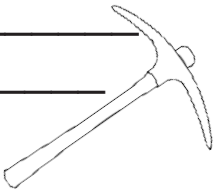
_____

_____

_____

Station 2: Railroads and Steam Engines

3. Look at the railroad map to find **railroads** and **rivers**. Were railroads built close to rivers? Why? _____



_____

_____

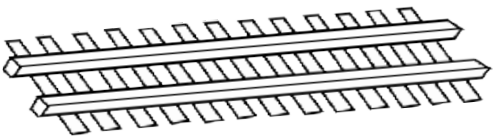
4. Water towers stored water for the trains (see picture!). Why did trains need water?

_____

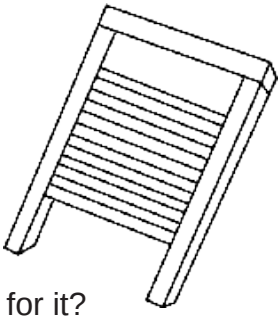
_____

5. Where does the water come from that fills the water towers?

_____



Station 3: Household Use



6. What is the bumpy metal and wood object?

_____

_____

7. What was it used for? Why is water important for it?

_____

8. Pick an item from the old catalog page. What did you choose and how does that item relate to water?

_____

_____

_____

Station 4: Refrigeration, Keeping Food Cold!
(Read the story with the photos.)

9. Before electricity, what was used to keep food cold in an old fashioned refrigerator?

_____

10. What is an old fashioned refrigerator called?

_____

11. Where did people get the ice blocks that they used to keep their food cold?

_____

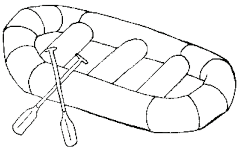
12. How is water related to refrigeration?

_____

_____

Station 5: Recreation & Play

13. What types of recreation have people done throughout history?



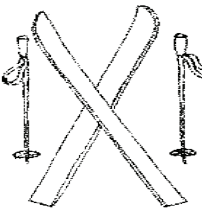
_____

_____

14. How do people make money from recreation?

_____

15. How do activities like skiing, fishing, picnicking, and swimming relate to water?



_____

_____

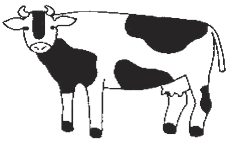
Station 6: Agriculture, Ranching and Farming

16. Historically, what types of crops were grown by farmers in our Valley?

_____

_____

17. Historically, what types of farm animals were raised by ranchers in our Valley?



_____

_____

18. How does farming and ranching relate to water?

_____

_____

_____

Colorado Water History Review

19. Did people in the past value water and healthy rivers? How do you know?

_____

_____

_____

_____

_____

20. Do we still value water and healthy rivers today? Why or why not?

_____

_____

_____

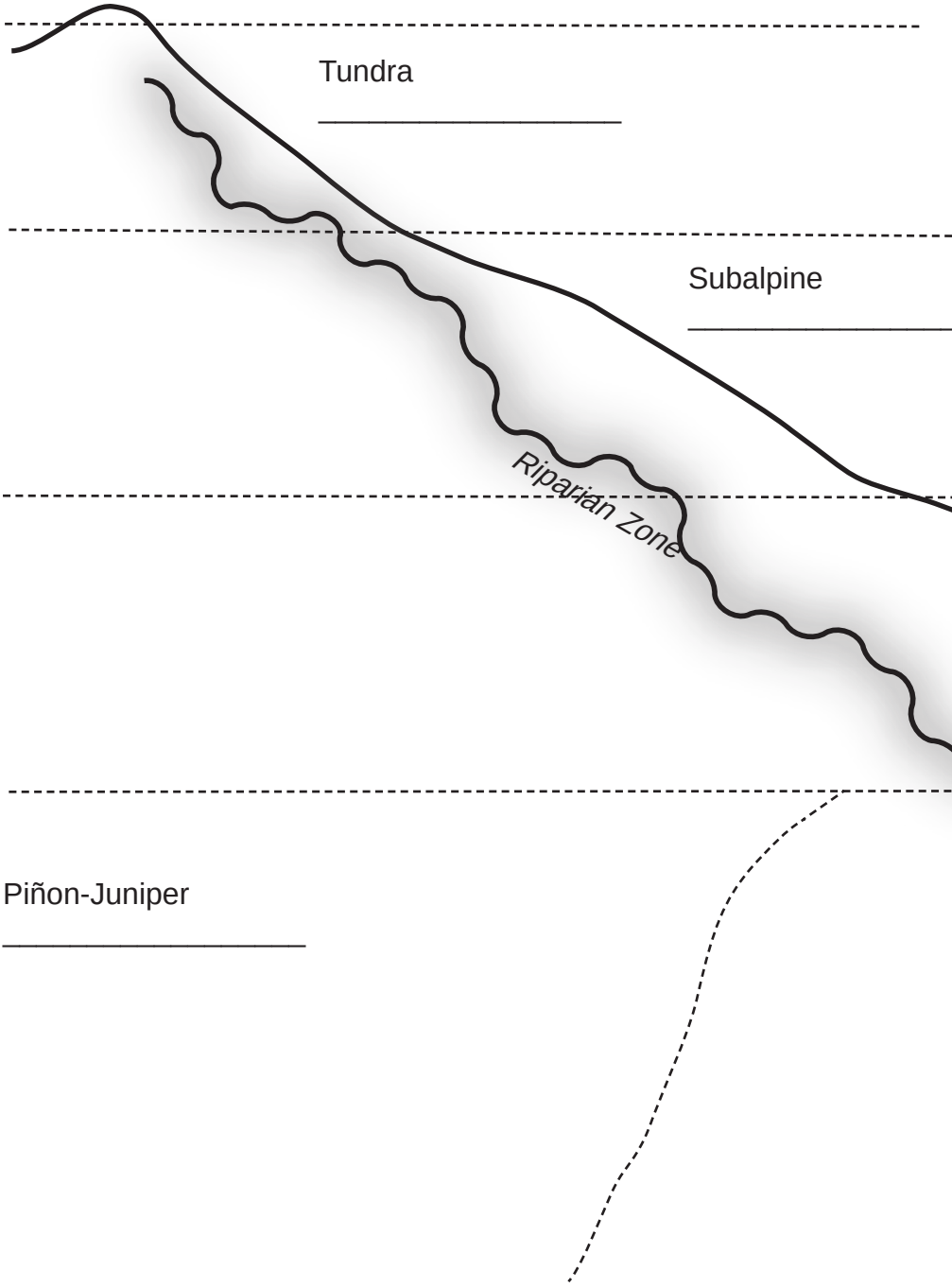
_____

_____

WATERSHED LIFE ZONES

Learning Targets:

- I can describe what the riparian zone is.
- I can compare and contrast life zones in the Roaring Fork Watershed.



1. What 3 things determine where wild plants and animals can live?

_____

_____

_____

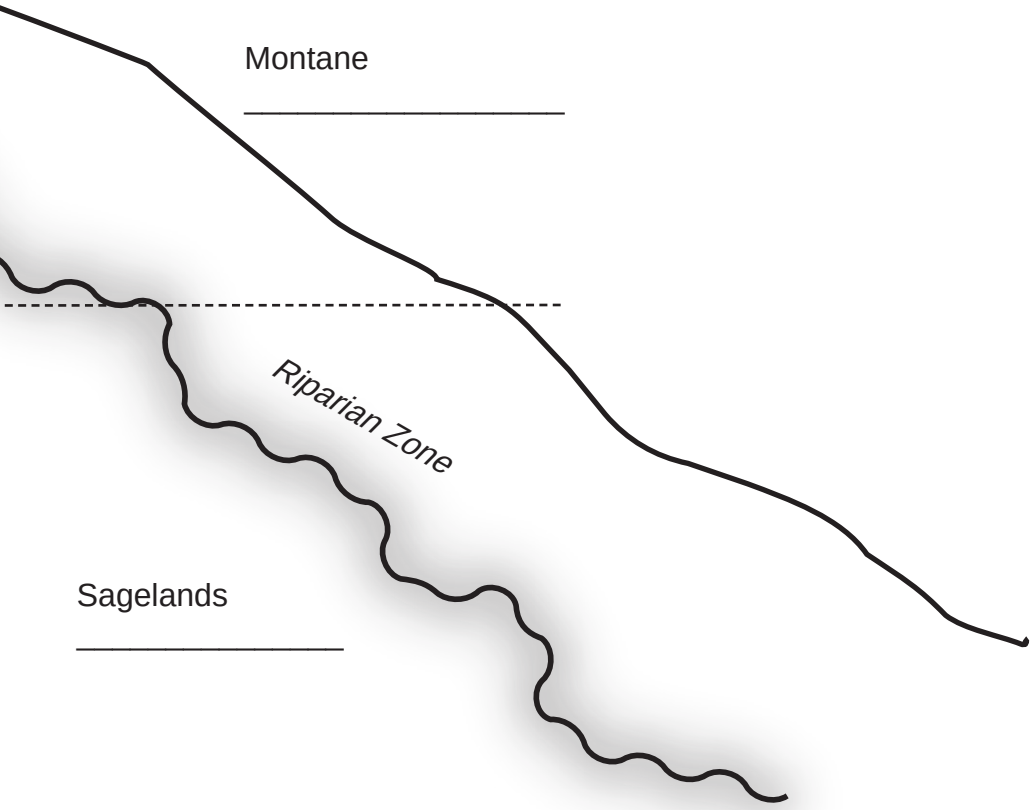
2. Define: ***Riparian Zone***

_____

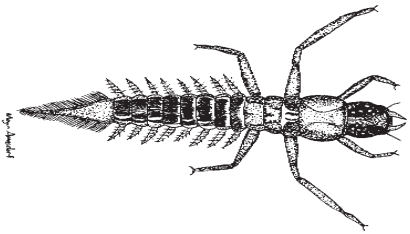
_____

_____

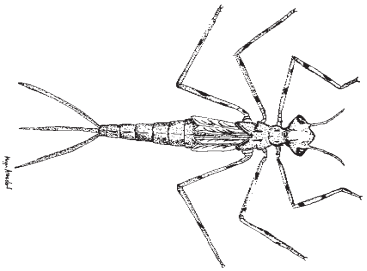
3. Draw animals and plants that live in each life zone below. Be sure to label your drawings!



Aquatic Adap



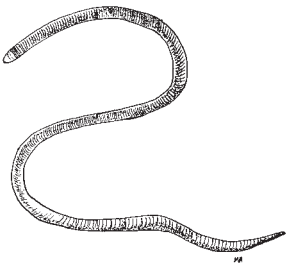
Has body segments



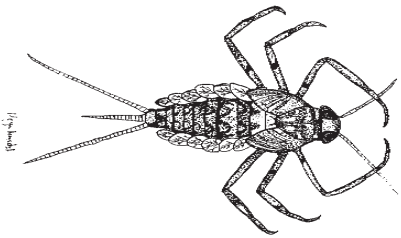
3 Tails

Shell for a home

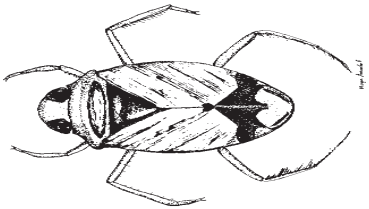
Lives under a rock



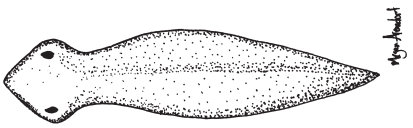
Worm-like



Has legs

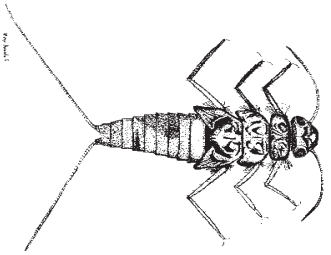
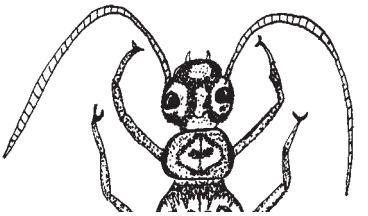
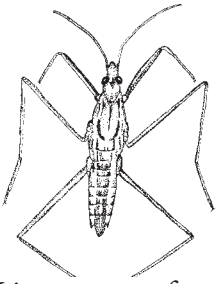
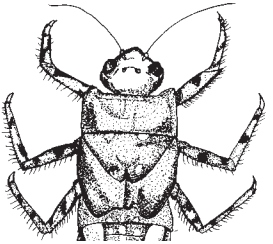
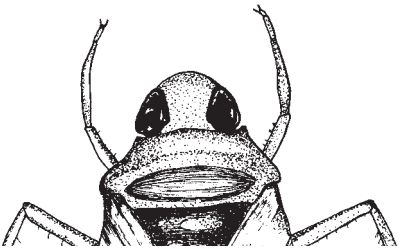
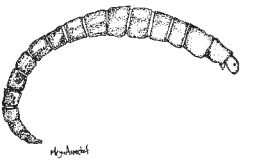


Round body



Triangular head

otation Bingo!

 2 Tails	 Has antenna
 Lives ontop of water	 Builds a home
 Has gills on legs	 Large eyes
 Green	 Is Tiny!

Macroinvertebrate Drawings by Megan Dean

INSECTS: AQUATIC LIFE FROM THE RIVER

Learning Targets:

- I can identify the body parts of an insect.
- I can name adaptations unique to different aquatic insects.

1. Draw a different insect in each box (fill the entire page with your drawing).

2. Label the unique characteristics and adaptations for each insect: ***tails, gills, legs, antennae, mouth, head, thorax, and abdomen.***

3. Describe in a few words how the bug moves: ***crawls, slides, swims, twirls, etc***.

How does this insect move?

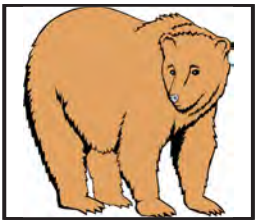
_____

_____

How does this insect move?

THE INCREDIBLE JOURNEY:

Clouds



Animal

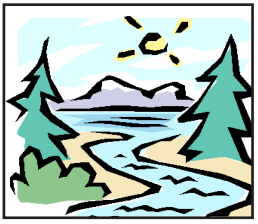
Lake

Ground Water

Soil

WATER CYCLE GAME

Ocean



River

Plant

Glacier

POST-SURVEY

1) A watershed is…
   A. a place to store your bottles of water
   B. a waterproof cover on a swimming pool
   C. an area of land where all the water flows to one place
   D. a building used for winter fishing
   E. I don't know

2) Which 3 rivers are located in the Roaring Fork Watershed?
   A. Colorado, Fryingpan, Arkansas
   B. Fryingpan, Roaring Fork, Crystal
   C. Crystal, Colorado, Gunnison
   D. Colorado, Roaring Fork, Crystal
   E. I don't know

3) Name 2 towns that are downstream of Basalt.
   A. Aspen and Carbondale
   B. Snowmass and Glenwood Springs
   C. Carbondale and Glenwood Springs
   D. Snowmass Village and Redstone
   E. I don't know

4) Which life zone has the most variety of plants and animals?
   A. pinon-juniper
   B. riparian
   C. alpine tundra
   D. sagelands
   E. I don't know

5) How was water from our local rivers used long ago?
   A. train engines needed water for their steam engines
   B. hunting beavers from the rivers
   C. watering and growing potatos
   D. all of the above
   E. I don't know

6) Which two rivers flow through Basalt?

A. Fryingpan River and Roaring Fork River
B. Crystal River and Colorado River
C. Roaring Fork River and Colorado River
D. Brush Creek and Fryingpan River
E. I don't know

7) Which town is OUTSIDE of the Roaring Fork Watershed?

A. Basalt
B. Marble
C. Vail
D. Snowmass Village
E. I don't know

8) How can people help take care of rivers and streams?

A. throw trash on the ground
B. use less water
C. pour used motor oil in the street
D. use more fertilizer on their lawns
E. I don't know

9) Where does water in the river come from?

A. white pipe on the side of the mountain
B. grocery store
C. melting snow
D. plastic bottle
E. I don't know

10) Which adaptation is shared by most aquatic life?

A. legs to walk
B. gills to breath
C. feet to run
D. noses to smell
E. I don't know

WATERSHED EDUCATION REFLECTION

Use this space for drawing and writing.