



Bring your friends and families to come visit us!

The River Center
Roaring Fork Conservancy
22800 Two Rivers Road
Basalt, CO 81621

970-927-1290
www.roaringfork.org

EXPLORA TU CUENCA ACUÍFERA

Dairio

Nombre: _____

Maestro/a: _____



Escuela Primaria de Basalt – Grado 4
Educación sobre cuencas acuíferas
ROARING FORK CONSERVANCY

EXAMEN PRELIMINAR

1. Una cuenca acuífera es. . . .
 - A. Un lugar donde guardas tus botellas de agua
 - B. La cubierta de una alberca
 - C. Un área donde toda el agua fluye hacia un lugar
 - D. Un edificio que se usa para pescar en invierno
 - E. No lo sé

2. ¿Cuáles son los 3 ríos que desembocan en la cuenca acuífera Roaring Fork?
 - A. Colorado, Fryingpan, Arkansas
 - B. Fryingpan, Roaring Fork, Crystal
 - C. Crystal, Colorado, Gunnison
 - D. Colorado, Roaring Fork, Crystal
 - E. No lo sé

3. Menciona dos ciudades o poblados que se encuentran río abajo de Basalt.
 - A. Aspen y Carbondale
 - B. Snowmass y Glenwood Springs
 - C. Carbondale y Glenwood Springs
 - D. Snowmass Village y Redstone
 - E. No lo sé

4. ¿Qué zona tiene la mayor variedad de plantas y animales?
 - A. piñón-junípero
 - B. ribereña
 - C. tundra alpina
 - D. malezales de artemisa (sagelands)
 - E. No lo sé

5. ¿Cómo se usaba el agua de nuestros ríos en el pasado?
 - A. los trenes necesitaban agua para sus máquinas a vapor
 - B. para cazar castores en los ríos
 - C. para el riego y cultivo de papas
 - D. para todo lo anterior
 - E. No lo sé

6. ¿Cuáles son los dos ríos que pasan por Basalt?
- A. Los ríos Fryingpan Roaring Fork
 - B. Los ríos Crystal y Colorado
 - C. Los ríos Roaring Fork y Colorado
 - D. El arroyo Brush Creek y el río Fryingpan
 - E. No lo sé
7. ¿Qué poblado o ciudad queda AFUERA de la cuenca acuífera Roaring Fork?
- A. Basalt
 - B. Marble
 - C. Vail
 - D. Snowmass Village
 - E. No lo sé
8. ¿Cómo puede ayudar la gente a cuidar los ríos y arroyos?
- A. tirando basura al suelo
 - B. usando menos agua
 - C. arrojando aceite de motor usado a la calle
 - D. utilizando más fertilizantes en sus jardines
 - E. No lo sé
9. ¿De dónde proviene el agua del río?
- A. de una cañería blanca que está al costado de la montaña
 - B. de la tienda de abarrotes
 - C. de la nieve que se derrite
 - D. de una botella plástica
 - E. No lo sé
10. ¿Qué adaptación es la más utilizada por la vida acuática?
- A. patas para caminar
 - B. branquias para respirar
 - C. pies para correr
 - D. narices para oler
 - E. No lo sé

LA IMPORTANCIA DEL AGUA

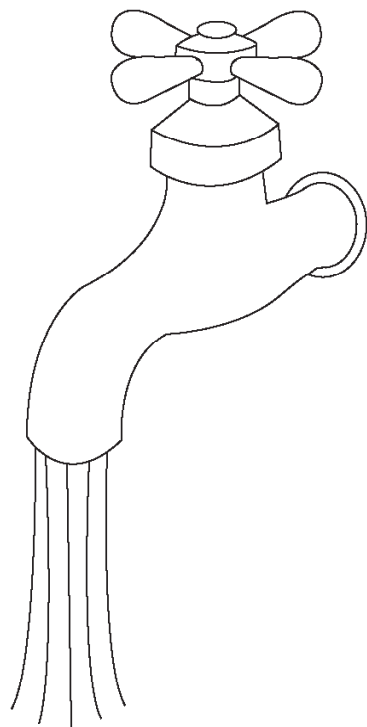
Objetivos de aprendizaje:

- Puedo identificar muchas maneras en que utilizo el agua y la manera en que mi comunidad utiliza el agua.
- Puedo identificar maneras para conservar agua todos los días.

¡Tormenta de ideas! Haz una lista con las diferentes maneras en que utilizamos el agua todos los días. Piensa en todos los usos posibles (en casa, en la escuela, en el trabajo, en la ciudad o poblado, en los campos, en las tiendas, etc.).

[illegible]

Piensa por lo menos una manera en que puedes usar menos agua todos los días.



VER CUENCAS ACUÍFERAS CON MAPAS

Objetivos de aprendizaje:

- Puedo usar mapas para contestar preguntas sobre donde vivo.
- Puedo mencionar lugares y ríos de mi comunidad.

Identificar 5 ciudades o poblados en el mapa. ★

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

Encuentra Basalt, luego encuentra el reservorio Ruedi. ¿Qué río los conecta?



Encuentra Carbondale. ¿Qué ríos y arroyos pasan cerca de Carbondale?



Encuentra Aspen. ¿Qué ríos y arroyos pasan cerca de Aspen?

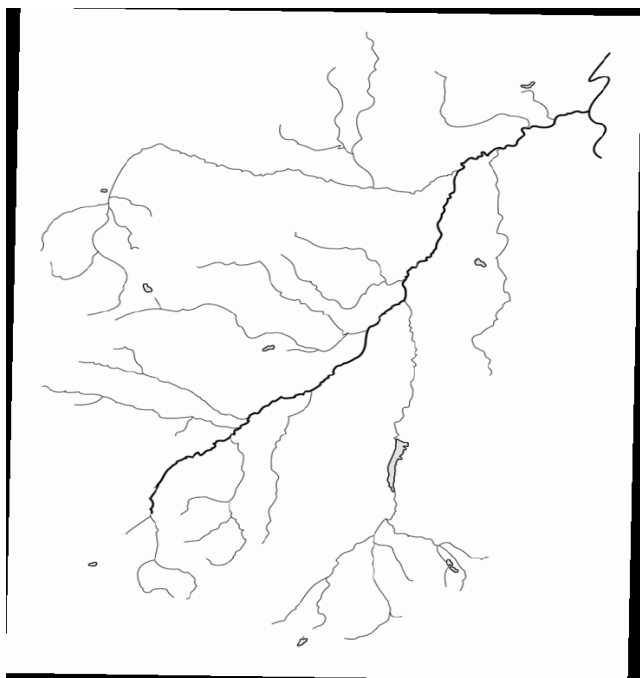


Encuentra Glenwood Springs. ¿Qué ríos y arroyos pasan cerca de Glenwood?



Encuentra 2 reservorios y escribe sus nombres aquí:

Crea nuestra cuenca en tu bandeja de arena.
Etoqueta: Aspen, Basalt, Carbondale, Glenwood



¿Qué diferencian hay entre un lago y un reservorio?

MAPA DE LA CUENCA ACUÍFERA ROARING FORK

Objetivos de aprendizaje:

- Puedo usar mapas para contestar preguntas sobre mi cuenca.
- Puedo mencionar lugares y ríos de mi comunidad.

1. Encuentra Glenwood Springs. Aquí termina toda el agua de la cuenca Roaring Fork. ¿En qué río desemboca aquí el río Roaring Fork?

2. Sigue la línea negra serpenteante que va desde Glenwood Springs todo alrededor del límite de la cuenca. ¿A dónde vuelves a llegar?

Extra: ¿Qué representa la línea negra serpenteante del mapa?

3. Encuentra el lago Ivanhoe. Es la cabecera del río Fryingpan River. Sigue el río Fryingpan aguas abajo, a través del reservorio Ruedi hasta Basalt. ¿En qué río desemboca cuando llega ahí?

4. Encuentra el lago Beaver. Es la cabecera del río Crystal. Sigue el río Crystal a través de Marble y Redstone. ¿En qué río termina desembocando?

5. Encuentra el arroyo Lost Man Creek. Es la cabecera del río Roaring. Sigue el río Roaring a través de Aspen, Basalt y Carbondale hasta Glenwood Springs. ¿En qué río desemboca al llegar aquí?

6. Haz que cada persona del grupo elija un lugar dentro de la cuenca. Luego, encuentra el río más próximo y síguelo aguas abajo. ¿Dónde terminas siempre?

7. Nombra la ciudad o poblado donde se encuentran los ríos Fryingpan y Roaring Fork.

8. Nombra la ciudad o poblado donde se encuentran los ríos Crystal y Roaring Fork.

9. Nombra la ciudad o poblado donde el río Roaring Fork desemboca en el río Colorado.

Define estas palabras:

Cresta: _____

Cuenca acuífera: _____



CREACIÓN DE CUENCAS

Nombra nuestras cuencas acuíferas:

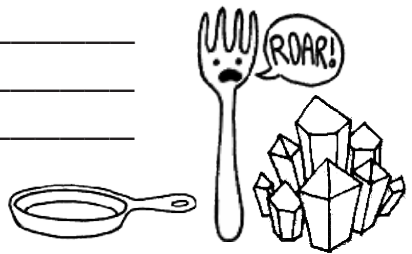
Define lo que es una cuenca acuífera: _____

Nombra los tres ríos más grandes de la cuenca acuífera Roaring Fork:

1. _____

2. _____

3. _____

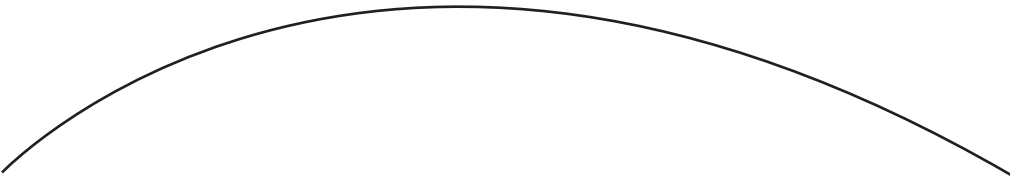


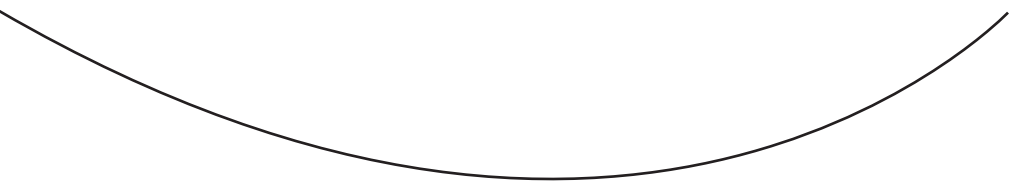
¿En qué río termina desembocando el río Roaring Fork?

Nombra la ciudad o poblado donde se encuentran estos dos ríos:

¿Qué río o arroyo está más cerca de tu casa?

SUMA DE LAS PARTES





SUMA DE LAS PARTES

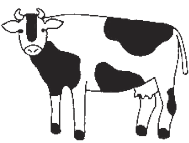
Objetivos de aprendizaje:

- Puedonombrarmúltiplesmanerasenquelagentecontaminaríosyarroyos.
- Puedohacerunalistademuchasmanerasenquese puedeayudaraman- tener la salud de nuestros ríos.

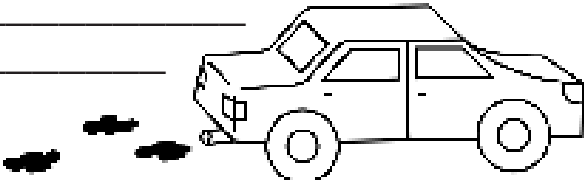
Enumera las muchas maneras en que la gente puede contaminar ríos.

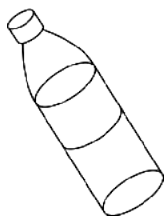
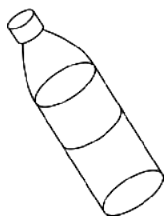
¿Alguno de estos contaminantes era peor que otros? ¿Cuál fue el peor?

¿Estaba bien tener algunos de esos contaminantes? ¿Por qué sí o por qué no?



¿Es posible contaminar el río sin que afecte a ninguna otra persona?





¿Qué pueden hacer tú y tu familia para proteger la salud de nuestros ríos?

¿Por qué es importante que TÚ mantengas nuestros ríos saludables?



COLORADO RIVER



Scale (miles)

0 5 10

La Cuenca Acuífera Roaring Fork



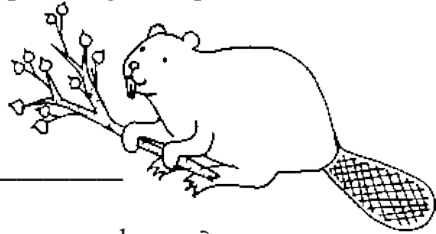
HISTORIA DEL AGUA EN COLORADO

Objetivos de aprendizaje:

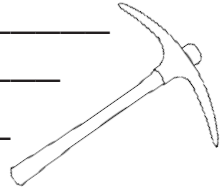
- Puedonombarmuchasmanerasenquemicomunidadsolíausarelaguadela cuenca en el pasado.
- Puedodescribircómoyporquélagentedemicomunidadvalorabaelaguade la cuenca en el pasado.

Estación 1: Caza de castores

1. ¿Por qué eran importantes los castores para la gente que solía vivir aquí hace mucho tiempo?



2. ¿Qué relación había entre la caza de castores y el agua?

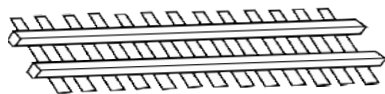


Estación 2: Trenes y máquinas a vapor

3. Mira el mapa de vías férreas para encontrar redes de vías férreas y ríos. ¿Se construían vías férreas cerca de los ríos?

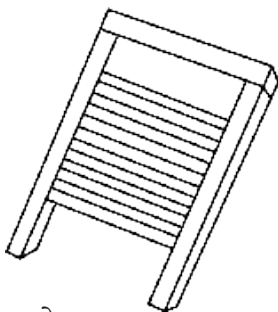
4. Las torres de agua almacenaban agua para los trenes (ver el dibujo). ¿Por qué necesitaban agua los trenes?

5. ¿De dónde viene el agua que llena las torres de agua?



Estación 3: Uso doméstico

6. ¿Qué es el objeto de metal ondulado y madera?



7. ¿Para qué se usaba? ¿Por qué era importante el agua?

8. Elige un artículo del viejo catálogo. ¿Por qué lo elegiste y cómo se relaciona con el agua?

Estación 4: Refrigeración, mantener fríos los alimentos (lee la historia con las fotos).

9. Antes que hubiera electricidad, ¿qué se usaba para mantener fríos los alimentos en un refrigerador antiguo?

10. ¿Cómo se le dice a un refrigerador antiguo?

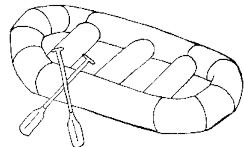


11. ¿Dónde conseguía la gente los bloques de hielo que usaban para mantener fríos sus alimentos.

12. ¿Qué relación tiene el agua con la refrigeración?

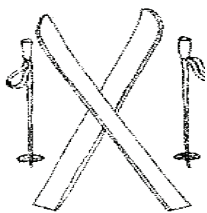
Estación 5: Recreación y diversión

13. ¿Qué actividades recreativas ha hecho la gente a través de la historia?



14. ¿Cómo se puede ganar dinero con actividades recreativas?

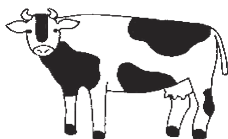
15. ¿Qué relación tienen con el agua ciertas actividades recreativas, como esquiar, pescar, ir de picnic y nadar?



Estación 6: Agricultura, ganadería y agricultura

16. Históricamente, ¿qué se cultivaba en nuestro valle?

17. Históricamente, ¿qué tipo de animales se criaban en nuestro valle?



18. ¿De qué manera se relacionan la ganadería y la agricultura con el agua?

Repaso de la historia del agua en Colorado

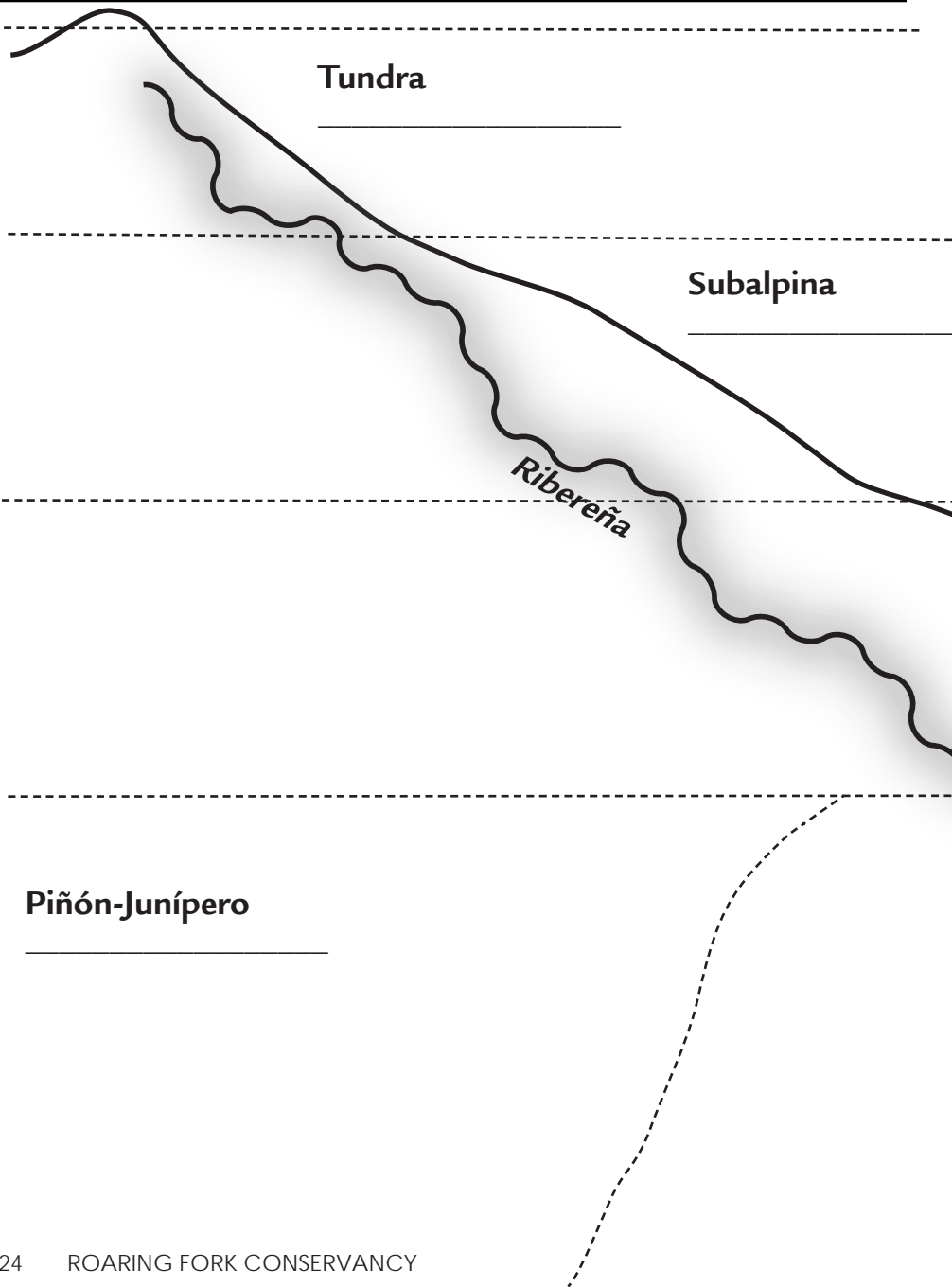
19. En el pasado, ¿valoraba la gente el agua y los ríos saludables?
¿Cómo lo sabes?

20. ¿Seguimos valorando el agua y los ríos saludables hoy en día? ¿Por
qué sí o por qué no?

ZONAS DE VIDA EN LA CUENCA ACUÍFERA

Objetivos de aprendizaje:

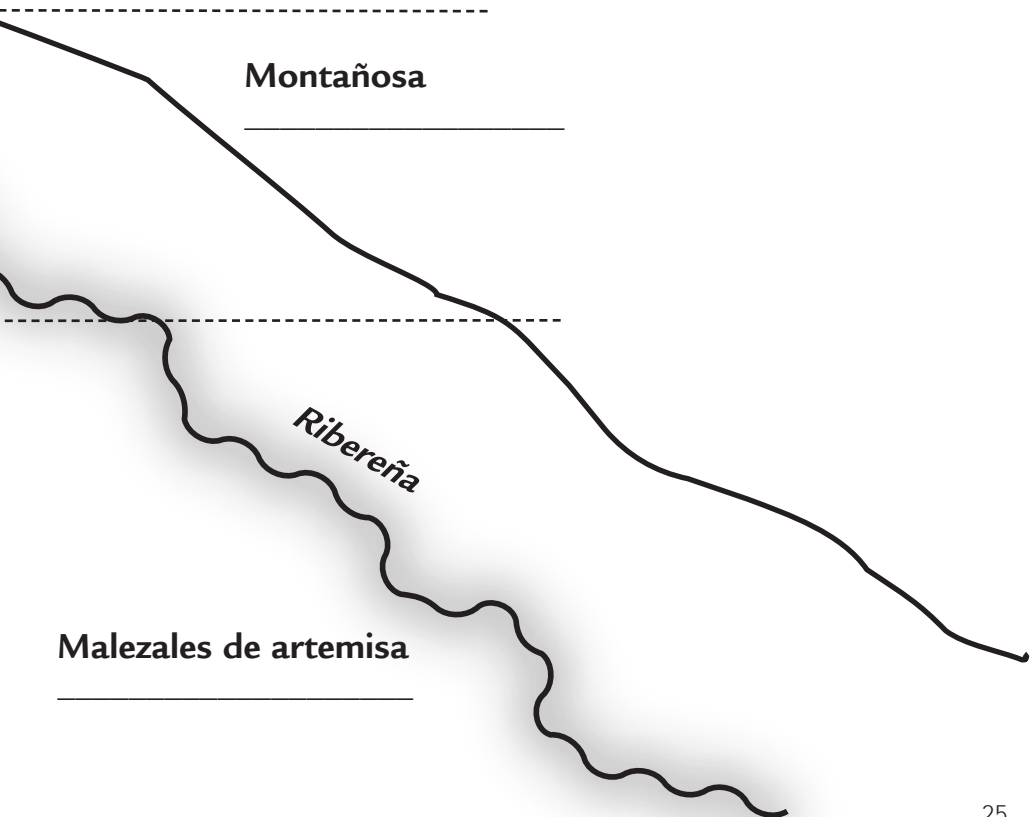
- Puedo describir lo que es una zona ribereña.
- Puedo cotejar y comparar zonas de vida en la cuenca acuífera Roaring Fork.



1. ¿Cuáles son las 3 cosas que determinan dónde pueden vivir plantas y animales?

2. Define Zona Ribereña:

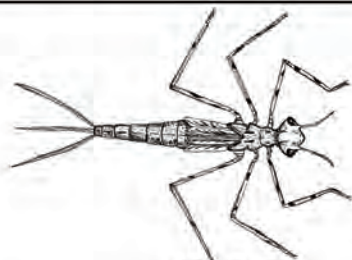
3. Dibuja los siguientes animales y las plantas que viven en cada zona. No te olvides de poner nombre a tus dibujos.



ADAPTACIÓN ACUÁTICA



TIENE SEGMENTOS CORPORALES



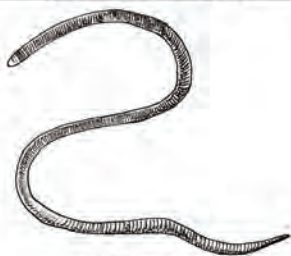
3 COLAS



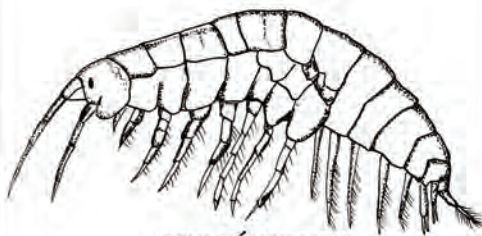
VIVE EN SU CAPARAZÓN



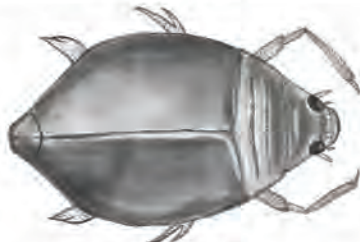
VIVE BAJO UNA ROCA



NO TIENE PATAS



TIENE MÁS SEIS PATAS

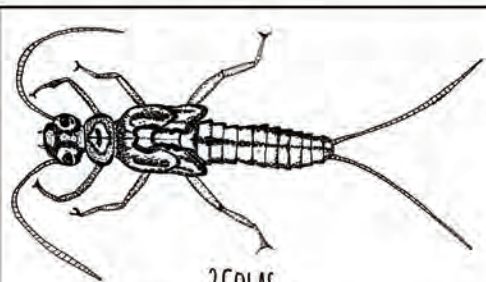


CUERPO REDONDO



CABEZA TRIANGULAR

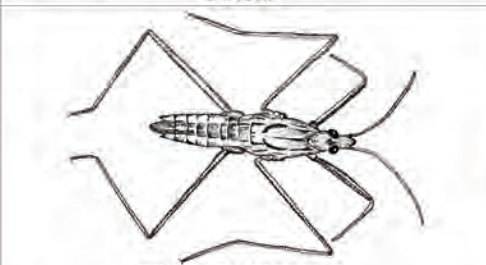
¡ADIVINANZA!



2 COLAS



TIENE ANTENAS



VIVE ENCIMA DEL AGUA



CONSTRUYE SU CASA



TIENE BRANQUIAS EN EL ABDOMEN



OJOS GRANDES



VERDE



ROJO

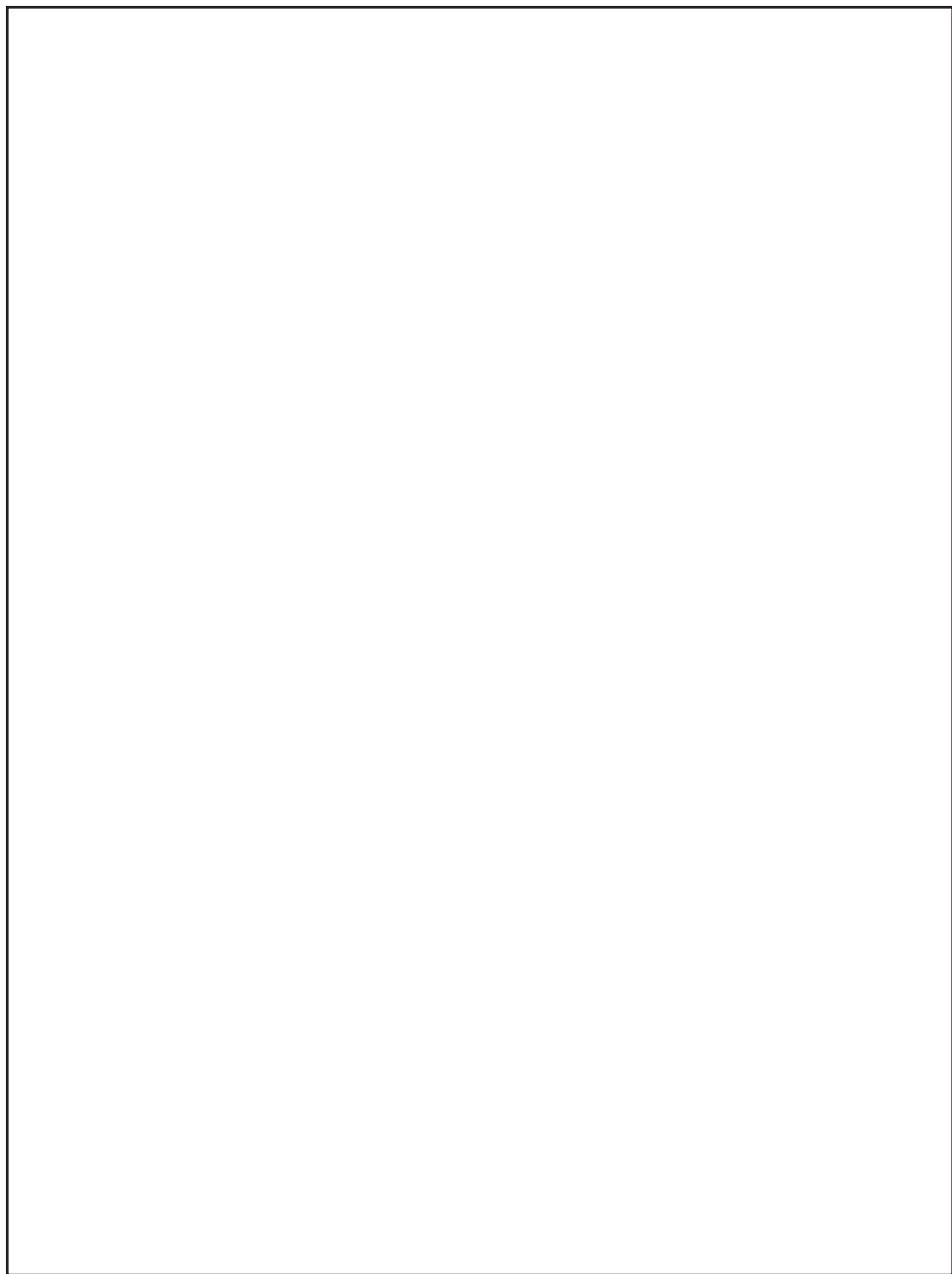
INSECTOS: VIDA ACUÁTICA DEL RÍO

Objetivos de aprendizaje:

- Puedo identificar las partes del cuerpo de un insecto.
- Puedo nombrar adaptaciones exclusivas de diferentes insectos acuáticos.

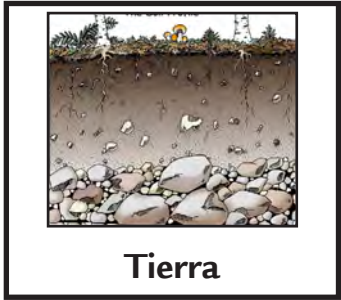
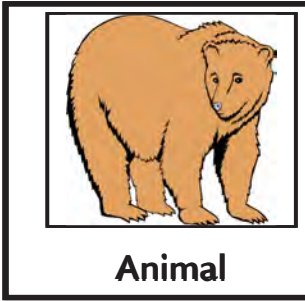
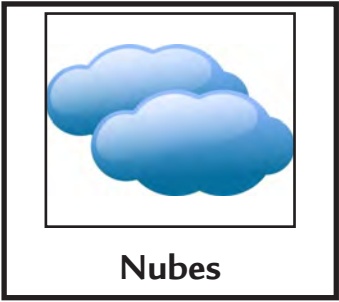
1. Dibuja un insecto diferente en cada casillero (completa toda la página con tu dibujo).
2. Indica las características particulares y las adaptaciones de cada insecto: colas, branquias, patas, antenas, boca, cabeza, tórax y abdomen.
3. Describe en pocas palabras como se mueve el insecto: reptar, se desliza, nada, da volteretas, etc.

¿Cómo se mueve este insecto?



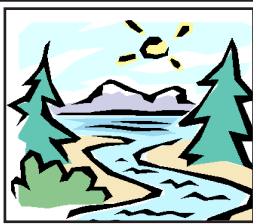
¿Cómo se mueve este insecto?

EL VIAJE INCREÍBLE – EL JUEGO DEL CICLO





Océano



Río



Planta



Glaciar

DESPUÉS DEL EXAMEN

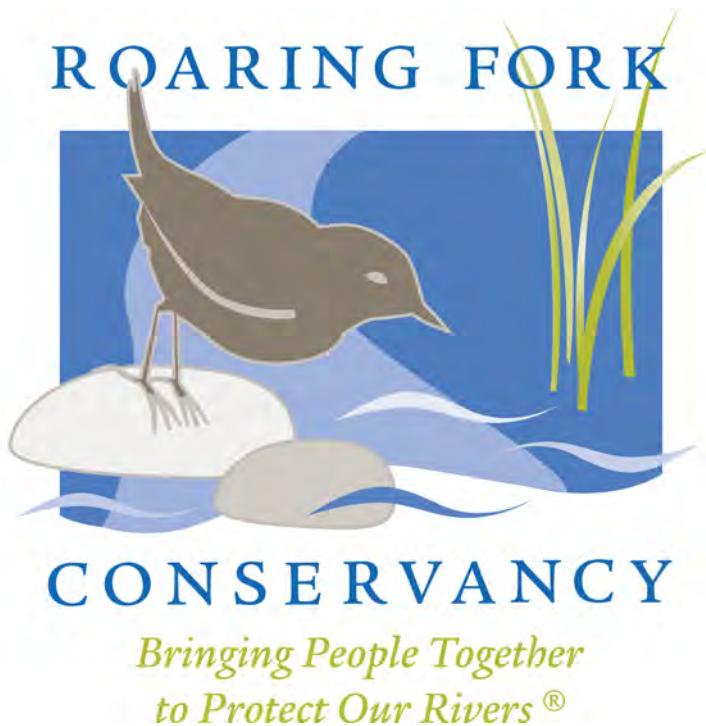
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REFLEXIONES RESPECTO A LA EDUCACIÓN SOBRE CUENCAS ACUÍFERAS.

Utiliza este espacio para dibujar y escribir.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



**¡Trae a tus amigos y familiares para
que nos visiten!**

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APPENDIX 6. Pre-Post Test Results from Basalt Elementary 4th graders

Overall

Pre Test Score Average	66.67%
Post Test Score Average	76.90%
Average Improvement	10.23%

TEST QUESTIONS

Overall

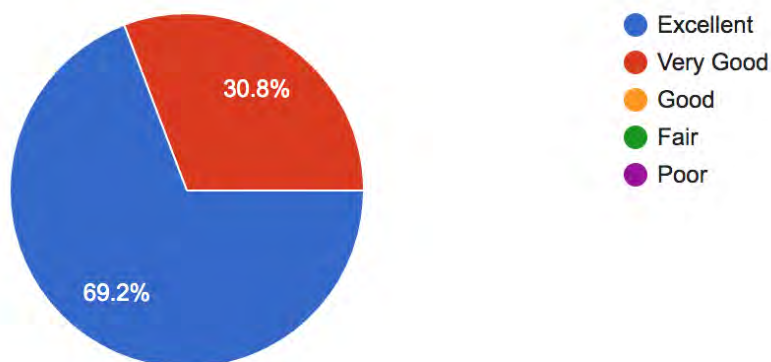
1. A watershed is . . . D. an area of land where all the water flows to one place	Question 1 Correct Pre Test	95.40%
	Question 1 Correct Post Test	98.85%
	Average Improvement	3.45%
2. Which 3 rivers are located in the Roaring Fork Watershed? B. Fryingpan, Roaring Fork, Crystal	Question 2 Correct Pre Test	63.22%
	Question 2 Correct Post Test	79.31%
	Average Improvement	16.09%
3. Name 2 towns that are downstream of Basalt C. Carbondale and Glenwood Springs	Question 3 Correct Pre Test	57.47%
	Question 3 Correct Post Test	70.11%
	Average Improvement	12.64%
4. Which life zone has the most variety of plants and animals? B. Riparian	Question 4 Correct Pre Test	22.99%
	Question 4 Correct Post Test	56.32%
	Average Improvement	33.33%
5. How was water from our local rivers used long ago? D. all of the above	Question 5 Correct Pre Test	40.23%
	Question 5 Correct Post Test	56.32%
	Average Improvement	16.09%
6. Which two rivers flow through Basalt? A. Fryingpan River and Roaring Fork River	Question 6 Correct Pre Test	71.26%
	Question 6 Correct Post Test	81.61%
	Average Improvement	10.34%
7. Which town is NOT in the Roaring Fork Watershed? C. Vail	Question 7 Correct Pre Test	70.11%
	Question 7 Correct Post Test	68.97%
	Average Improvement	-1.15%
8. How can people help take care of rivers and streams? B. using less water	Question 8 Correct Pre Test	90.80%
	Question 8 Correct Post Test	91.95%
	Average Improvement	1.15%
9. Most of the water in the river comes from where? C. Melting snow	Question 9 Correct Pre Test	71.26%
	Question 9 Correct Post Test	75.86%
	Average Improvement	4.60%
10. What is an adaptation shared by most aquatic life? B. gills to breath	Question 10 Correct Pre Test	83.91%
	Question 10 Correct Post Test	89.66%
	Average Improvement	5.75%

Appendix 7.

2019 Post Twin Lakes Tour Survey

1. Overall, how would you rate the Twin Lakes Tunnel & Diversion Tour?

13 responses



2. What did you like about the program?

10 responses

Very informative

The opportunity to meet new people interested in the watershed and transmountain diversions.

The speakers were very informative. The views were incredible

Informative

Subject matter, keeping to schedule, Kevin Lusk

We liked all the great information about this part of our watershed.

Everything

Learning about the system and getting to know the other attendees.

Varied background of the participants

I got a great opportunity to be there!

3. Is there something specific we can improve on in future programs?

4 responses

Ride through the tunnel?

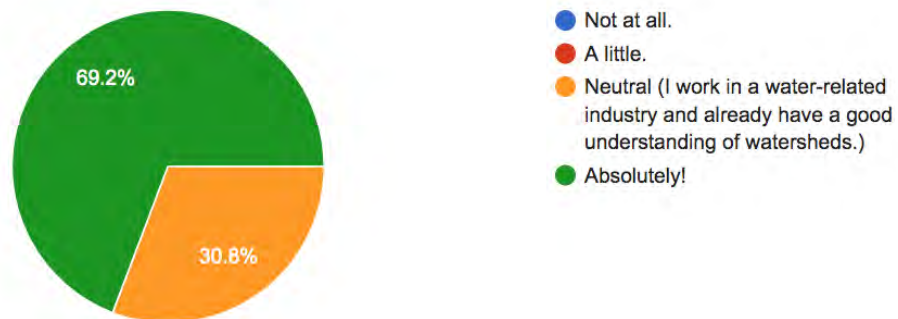
The size of the group made it hard to hear the speakers.

Can't think of anything!

Nothing! great day great wether.

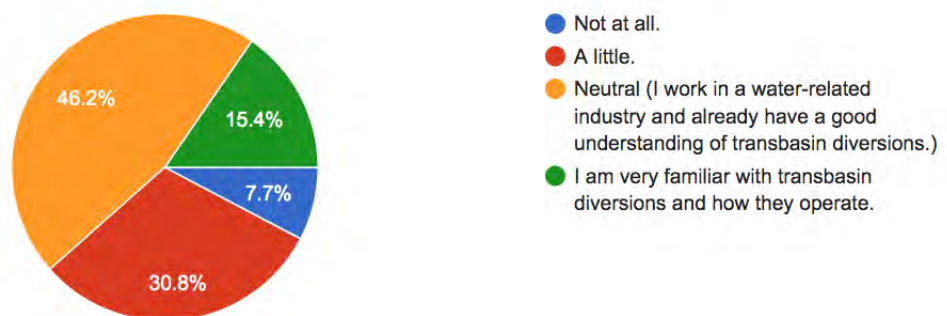
4. Was your understanding of watersheds enhanced by this program?

13 responses



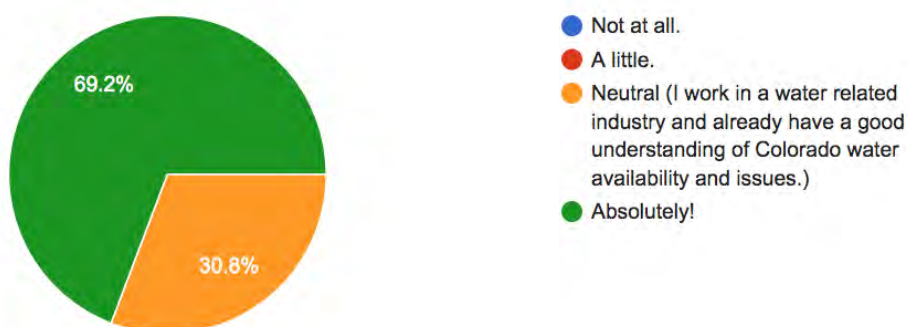
5. Prior to this program, how familiar were you with transbasin diversions and how they operate?

13 responses



6. Did this program increase your understanding of water availability in Colorado and how transbasin diversion systems operate?

13 responses



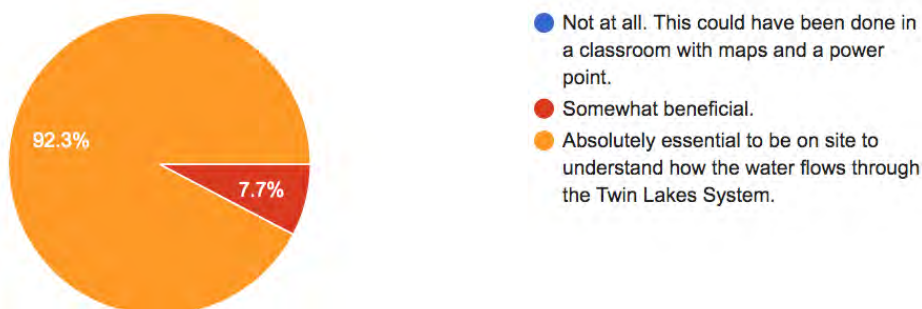
7. Was the program length...

13 responses



8. How beneficial was it to be on site (Lost Man Reservoir, Lost Man Canal, Roaring Fork Diversion Dam, Twin Lakes Tunnel & Grizzly Reservoir) to learn about the Twin Lakes Tunnel & Diversion System?

13 responses



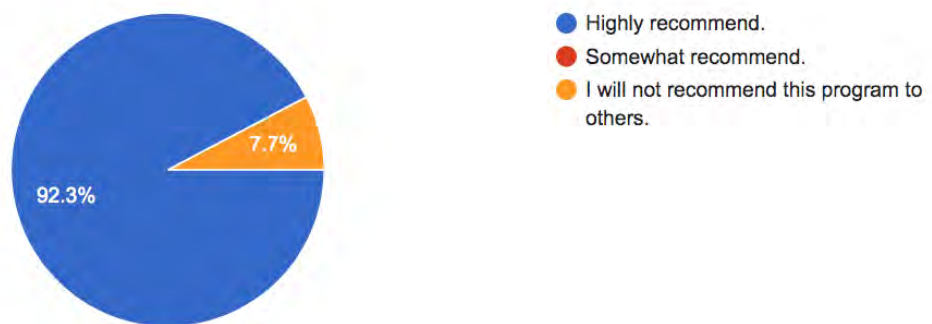
9. Have you told anyone/talked to others about your experience on Roaring Fork Conservancy's Twin Lakes Tunnel & Diversion Tour?

13 responses



10. How likely are you to recommend the Twin Lakes Tunnel & Diversion Tour to others?

13 responses



11. Do you have any other comments you would like to share about the Twin Lakes Tunnel & Diversion Tour?

7 responses

Thank you for putting on an excellent program!

It was interesting to have the gentleman from the Colorado River Group (Andrew?) attend. He provided useful information

Christina did a great job explaining watersheds. I also appreciated Kevin giving first hand information.

The speakers were enthusiastic and knowledgeable. I loved all the stories, history and seeing this part of our watershed in real time. It would not be the same if this program was done as an event in an indoor presentation.

I would love to see this offered more than one day a year. This was such a fantastic experience and to only have 28 slots available once a year, with some of the people being in the water business, leaves it relatively unavailable for the general population

Let's do on on the Upper Fryingpan!

Thank you do to it!



Appendix 8. 2018 and 2019 Watershed Explorations

Date	Program	Sponsoring Agency	In Collaboration with
2018			
February 15, 2018	Emma Open Space Snowshoe Walk, Campfire & Storytelling: <i>Watch the sunset from Emma Open Space with staff from Roaring Fork Conservancy and Pitkin County Open Space & Trails! Emma Open Space boasts 74 acres of lush wetlands, snowy fields, and is a critical migration corridor for deer and elk. Afterwards, warm up by the fire with some hot chocolate while Nina Gabianelli (Aspen Historical Society and the Roaring Fork Chapter of Spellbinders) tells stories about the native people and animals of Colorado.</i>	Pitkin County Open Space & Trails	
March 9, 2018	Tour a SNOTEL site! Understanding Snowpack and its role in Western Water: <i>Snow is a way of life here in Colorado. It is also our water supply. Come discover the relationship between snow and water during this "field trip for adults" with Roaring Fork Conservancy, Natural Resources Conservation Service, and The Marble Hub! Meet at The Redstone Inn for light refreshments and an introduction to snow science and its critical importance in water supply prediction in the west. Then we'll head out into the snow on McClure Pass for some hands-on exploration, including a visit to an official SNOTEL site, a snow course survey with the pros, and a fun comparison of water content between different layers of the snowpack.</i>		Natural Resources Conservation Service, Redstone Inn

March 13, 2018	Capitol Creek Ranch Snowshoe: <i>Join us on snowshoes through the Capitol Creek Ranch riparian area. We'll wander past beaver ponds and through aspen forests while exploring the history of the property. Capitol Creek Ranch, an iconic property that is protected by conservation easement within the Pitkin County Open Space and Trails program, was originally owned by the late Bob Child who was integral in many significant conservation efforts in the Roaring Fork Valley starting as early as the 1960s.</i>	Pitkin County Open Space & Trails	
May 3, 2018	Aspen Rain Barrel Workshop	City of Aspen Engineering Department	
May 9, 2017	High Altitude Heron Watch: <i>One of Colorado's highest known colonies of nesting great blue herons call North Star Open Space home. Join staff from Roaring Fork Conservancy and City of Aspen Parks & Open Space for an evening of heron watching at an elevation above 8,000 feet! We'll view the herons up-close with spotting scopes and binoculars.</i>	City of Aspen Parks and Open Space	
May 17, 2018	Ruedi Tour: Touring West Slope Water: <i>Curious to know more about Ruedi Reservoir and its significance in the Roaring Fork Watershed? This is your chance! Join April Long from Ruedi Water and Power Authority to learn about transbasin water diversions and how Ruedi Reservoir operates, by visiting the reservoir. We'll also gain a unique perspective of the dam and its construction from the Rocky Fork area.</i>		Ruedi Water and Power Authority
May 31, 2018	Birding Maroon Creek Wetlands: <i>Join Roaring Fork Audubon and Roaring Fork Conservancy for a brisk morning of birding at the Maroon Creek Wetlands. A ranger from City of Aspen Parks & Open Space will explain how this constructed wetland benefits people and wildlife, by being a temporary home to dozens of migratory birds during the early summer.</i>	City of Aspen Parks & Open Space	

June 6, 2018	North Star Preserve Roaring Fork River Float: <i>Take a gentle float through important wildlife habitat in North Star Open Space with Roaring Fork Conservancy and Pitkin County Open Space & Trails. We'll provide some history of North Star, discuss wildlife highlights, and discuss recent restoration activities along this mild two-hour float. Float is appropriate for ages 14 and up.</i>	Pitkin County Open Space & Trails	Blazing Adventures
June 7, 2018	North Star Preserve Roaring Fork River Float	Pitkin County Open Space & Trails	Blazing Adventures
June 14, 2018	North Star Preserve Roaring Fork River Float	Pitkin County Open Space & Trails	Blazing Adventures
June 19, 2018	North Star Preserve Roaring Fork River Float	Pitkin County Open Space & Trails	Blazing Adventures
June 21, 2018	<p>Secrets of John Denver Sanctuary: Rio Grande Wetland Walk: <i>John Denver Sanctuary is located on the edge of downtown Aspen along the banks of the Roaring Fork River and adjacent to Theatre Aspen. It's an ideal location for this beautiful garden but not many know how hard it "works" – by using proper soil and vegetation, this man-made wetland reduces pollutants in the Roaring Fork River by 96% from a third of the City storm drain system - that's the equivalent of about 15 dump trucks worth of material each year!</i></p> <p><i>Join April Long, Clean River Program Manager for the City of Aspen, and Roaring Fork Conservancy educators to tour this beautiful park and get an inside look at this state-of-the-art filtration system, modeled after Mother Nature's ability to "clean" - all while honoring one of the best musicians of our time!</i></p>	City of Aspen Engineering Department	

June 26, 2018	Deer Hill Early Summer Wildflower Walk: Join Roaring Fork Conservancy and City of Aspen Parks & Open Space on an excursion onto one of Aspen's great Open Space properties, Deer Hill Open Space. Deer Hill is a sanctuary for wildlife in one of the busiest parts of the valley - you may even pass it on your daily commute. Highlights of this walk will include 360 degree views of Aspen's topography and a stunning amount of wildflowers.	City of Aspen Parks & Open Space	
June 27, 2018	Family Nights at Filoha: Fireflies, Bats and Bugs: Roaring Fork Conservancy and Pitkin County Open Space & Trails are proud to present one of our most popular programs – Family Nights at Filoha Meadows! Spend an evening with your family playing games, catching fireflies, and learning about the local and natural history of this beautiful thermal wetland. This program is appropriate for all ages.	Pitkin County Open Space & Trails	
June 28, 2018	Family Nights at Filoha: Fireflies, Bats and Bugs	Pitkin County Open Space & Trails	
July 2, 2018	Filoha Meadows Firefly & Rare Orchid Walk: Join Roaring Fork Conservancy and Pitkin County Open Space & Trails for an evening exploration of Filoha Meadows. Located near Redstone on Highway 133, Filoha Meadows is a natural thermal wetland, providing unique habitat for rare orchids, fireflies, and many other plant and animal species. We'll tour areas typically closed to the public to learn more about these incredible species, the history of this unique area, and discuss current issues in the Crystal River Valley and Filoha Meadows. This program is appropriate for those 12 years and older.	Pitkin County Open Space & Trails	
July 5, 2018	Family Nights at Filoha: Fireflies, Bats and Bugs	Pitkin County Open Space & Trails	
July 9, 2018	Filoha Meadows Firefly & Rare Orchid Walk	Pitkin County Open Space & Trails	
July 17, 2018	Family Nights at Filoha: Fireflies, Bats and Bugs	Pitkin County Open Space & Trails	
July 18, 2018	Filoha Meadows Firefly & Rare Orchid Walk	Pitkin County Open Space & Trails	
July 24, 2018	Filoha Meadows Firefly & Rare Orchid Walk	Pitkin County Open Space & Trails	

July 25, 2018	Water in the Age of Silver: Touring Aspen's "Holden Works": Join Aspen Historical Society, Roaring Fork Conservancy and City of Aspen Parks and Open Space to discover the largest industrial site in the history of Pitkin County: a state of the art silver processing plant known as the Holden Lixiviation Works. This silver processing plant was built on the banks of Castle Creek in 1891 by Edward Royal Holden, leading to innovative and sometimes destructive uses of water resources for hydropower and waste disposal. Explore the history, the museum, and the remnants of the "Works" (including the newly reconstructed cable derrick) to learn how one of our most precious resources, freshwater, was utilized in a different era. We'll also examine the effects of time on the riparian area along Castle Creek.	City of Aspen Parks & Open Space	
July 27, 2018	Twin Lakes Tunnel & Diversion Tour: Learn firsthand how up to 40% of the Roaring Fork River headwaters are diverted under the Continental Divide to the Front Range. Staff from Twin Lakes Reservoir & Canal Company and Roaring Fork Conservancy will lead an informative tour of the tunnels, dams and ditches that move water east. We'll tour Lost Man Reservoir and the Roaring Fork collection dam & tunnel before 4-wheeling with Blazing Adventure's on Lincoln Creek Road. Our destination will be Grizzly Reservoir, to get an inside look at the four-mile long Twin Lakes tunnel.		Colorado Springs Utilities, Twin Lakes Tunnel & Canal Company, Blazing Adventures
August 8, 2018	Family Exploration at Filoha: Bring your family to explore this unique thermal wetland called Filoha Meadows, during the day. Learn about wildlife and their adaptations through games and hands-on activities in areas of Filoha Meadows not typically open to the public.	Pitkin County Open Space & Trails	

August 17, 2018	Busy Beavers of the Upper Crystal River: <i>Are beavers good for the river? Does their activity change the available habitat for local plants, birds, fish and other wildlife? Join Roaring Fork Conservancy staff and Alex Menard, The Marble Hub manager, to get answers to these questions while on a walking tour of some beautiful wetlands created by Marble's local beavers. Enjoy an afternoon in a beautiful river valley as you learn about the importance of beavers and wetland ecosystems for local wildlife and clean water.</i>		The Marble Hub
September 8, 2017	Family Exploration at Filoha	Pitkin County Open Space & Trails	
September 11, 2018	Celebrate Aspen Tap: Drinking Water Tour: <i>Celebrate Aspen's most valuable resource! Tour Aspen's high mountain drinking water treatment facility which treats water from Castle Creek. Discover where your water is coming from and learn how this plant is capable of treating up to 9 million gallons of water a day!</i>	City of Aspen Water Department	
September 19, 2018	Filoha Evening Walk: <i>Take a rare, autumn, sunset walk to enjoy the unique and beautiful Filoha Meadows before its seasonal closure. Thermal hot springs, bighorn sheep, important elk habitat, a local bat population, healthy riparian habitat, and beaver ponds are only a few of Filoha's distinctive attributes. John Groves, District Wildlife Ranger with Colorado Parks & Wildlife, will discuss elk and big horn sheep natural history, and the importance of Filoha Meadows for calving, habitat, and food. Bring binoculars (or a spotting scope) and a camera as we enjoy fall at Filoha.</i>	Pitkin County Open Space and Trails	Colorado Parks & Wildlife

September 25, 2018	Carbondale Bicycle Ditch Tour: <i>Hop on your bike and join staff from Carbondale's Water Department and Roaring Fork Conservancy as we explore the ditches that direct water from the Crystal River into Carbondale. You'll learn about the unique complexities of the town's ditch system and a little about Colorado's prior appropriation water law.</i>		Town of Carbondale Water Department
2019			
February 7, 2019	Emma Walk, Campfire, Storytelling	Pitkin County Open Space & Trails	
March 12, 2019	Capitol Creek Ranch Snowshoe	Pitkin County Open Space & Trails	
May 21, 2019	Ruedi Tour: Touring West Slope Water		Ruedi Water and Power Authority
June 4, 2019	North Star Preserve Roaring Fork River Float	Pitkin County Open Space & Trails	Blazing Adventures
June 12, 2019	North Star Preserve Roaring Fork River Float	Pitkin County Open Space & Trails	Blazing Adventures
June 13, 2019	North Star Preserve Roaring Fork River Float	Pitkin County Open Space & Trails	Blazing Adventures
June 19, 2019	North Star Preserve Roaring Fork River Float	Pitkin County Open Space & Trails	Blazing Adventures
June 26, 2019	Family Nights at Filoha: Fireflies, Bats and Bugs	Pitkin County Open Space & Trails	
June 27, 2019	Family Nights at Filoha: Fireflies, Bats and Bugs	Pitkin County Open Space & Trails	
July 1, 2019	Filoha Meadows Firefly & Rare Orchid Walk	Pitkin County Open Space & Trails	
July 2, 2019	Filoha Meadows Firefly & Rare Orchid Walk	Pitkin County Open Space & Trails	
July 8, 2019	Filoha Meadows Firefly & Rare Orchid Walk	Pitkin County Open Space & Trails	
July 11, 2019	Family Nights at Filoha: Fireflies, Bats and Bugs	Pitkin County Open Space & Trails	
July 16, 2019	Family Nights at Filoha: Fireflies, Bats and Bugs	Pitkin County Open Space & Trails	
July 18, 2019	Filoha Meadows Firefly & Rare Orchid Walk	Pitkin County Open Space & Trails	
July 19, 2019	Twin Lakes Tunnel & Diversion Tour		Colorado Springs Utilities, Twin Lakes Tunnel & Canal Company, Blazing Adventures

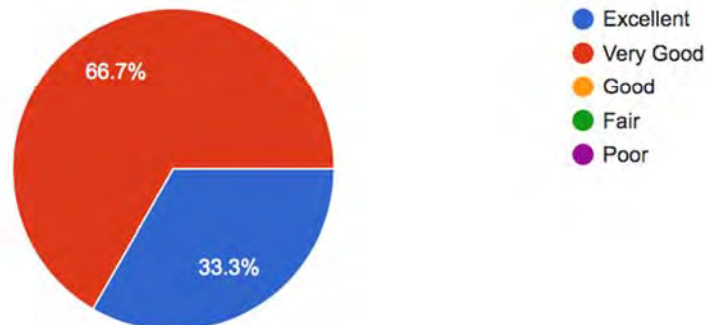
July 23, 2019	Herron Park - Insects of the Roaring Fork River: <i>If you like rivers, nature or fly-fishing, this is a perfect fit! Through a guided exploration of aquatic life in the heart of Aspen, you'll discover various types of insects that live in the water and play a key role in healthy river ecosystems. With options to get your hands and feet wet (or not!), our knowledgeable staff will be there to help identify these little creatures and correlate them to your favorite fly-fishing fly, your least favorite household bugs, and explain how they serve as indicators of healthy rivers.</i>	City of Aspen Parks & Open Space	
July 24, 2019	Water in the Age of Silver: Touring Aspen's "Holden Works"	City of Aspen Parks & Open Space	
August 8, 2019	Family Exploration at Filoha	Pitkin County Open Space & Trails	
August 13, 2019	Secrets of John Denver Sanctuary: Rio Grande Wetland Tour	City of Aspen Engineering Department	
August 14, 2019	Family Exploration at Filoha	Pitkin County Open Space & Trails	
August 21, 2019	Cozy Point Farm Tour: <i>You probably drive past it all the time...This is your chance to join Roaring Fork Conservancy and City of Aspen Parks & Open Space on an excursion onto Cozy Point Open Space. With Brush Creek running through it, this 170-acre parcel includes multiple ecosystem types and is managed for multiple uses including horses, agriculture, education, ranching, recreation and habitat preservation. Come see how the land, water and human elements work together at Cozy Point!</i>	City of Aspen Parks & Open Space	



Appendix 9. 2020 Post SNOTEL Site on McClure Pass Tour Survey

1. Overall, how would you rate the Tour a SNOTEL site! Understanding Snowpack and its role in Western Water program?

3 responses



2. What did you like about the program?

3 responses

The interactive activities in the snow

Learn lots of nerdy science stuff.

The hands on portion was very interesting. Excellent presenters!

3. Is there something specific we can improve on in future programs?

3 responses

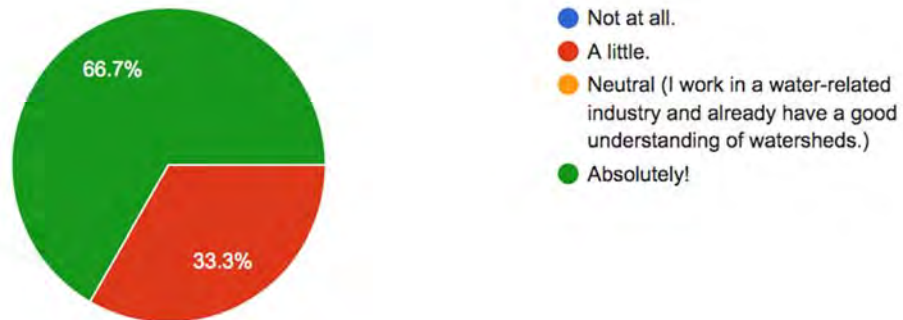
The indoor portion

Nope

Nothing at this time

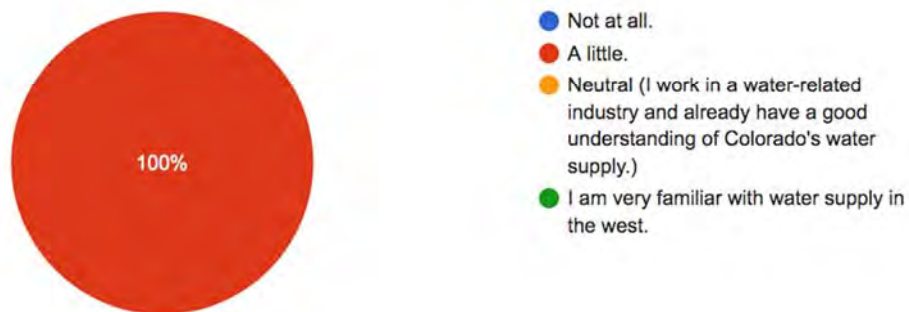
4. Was your understanding of watersheds enhanced by this program?

3 responses



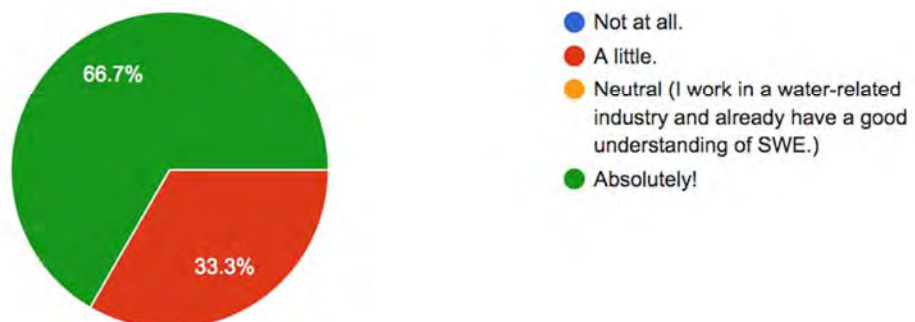
5. Prior to this program, how familiar were you with snow as a water supply in Colorado and the West?

3 responses



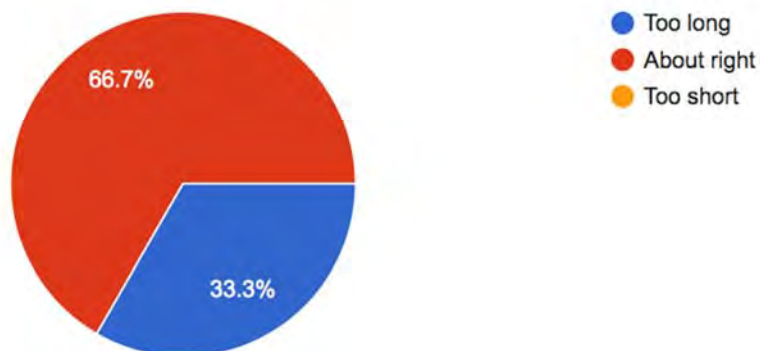
6. Did this program increase your understanding of water availability in Colorado and how river flows are predicted by looking at snow water equivalent (SWE)?

3 responses



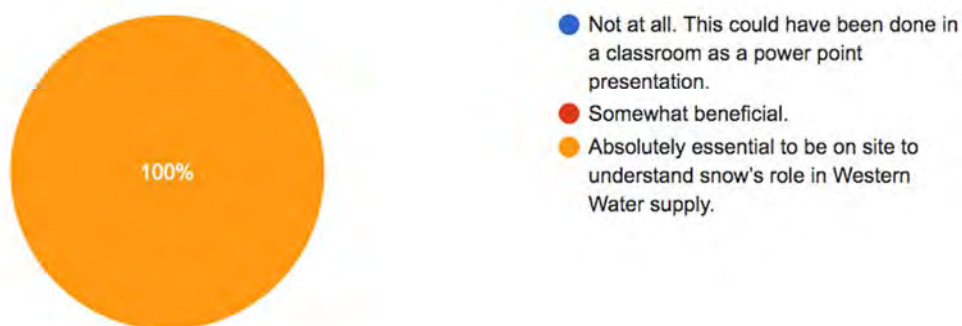
7. Was the program length...

3 responses



8. How beneficial was it to be on site - digging a snow pit on McClure Pass and touring a SNOTEL site - to learn about snow's role in Western Water?

3 responses



9. Have you told anyone/talked to others about your experience on Roaring Fork Conservancy's Tour a SNOTEL site! Understanding Snowpack and its role in Western Water?

3 responses



10. How likely are you to recommend the Tour a SNOTEL site! Understanding Snowpack and its role in Western Water program?

3 responses



- Highly recommend.
- Somewhat recommend.
- I will not recommend this program to others.

11. Do you have any other comments you would like to share about the Tour a SNOTEL site! Understanding Snowpack and its role in Western Water?

3 responses

Having it earlier in the day would be good

I thought we were going on a real snowshoeing trek! Turns out we were just a few feet off the road, which wasn't as exciting. Thank you!!!

The setting of the "classroom" portion of the outing at the Marble Hub was great, but a bit crowded. Maybe meet in Redstone in the future. It would cut down on the long drive to Marble and maybe would contribute to better carpooling.

The Adventures of H₂O Jo and Flo



Hey!
Keep It
Clean...

...Yeah-
Cause
We're All
Downstream!

A Coloring and Activity Book

Volume 1

KEEP IT CLEAN

West Slope Partners

City of Aspen
(970) 920-5080
www.cityofaspen.com/388/Stormwater

City of Glenwood Springs
(970) 384-6344
www.cogs.us

Eagle County
(970) 328-8755
www.eaglecounty.us

Eagle River Watershed Council
(970) 827-5406
www.erwc.org

Garfield County
(970) 625-5200
[www.garfield-county.com/
environmental-health](http://www.garfield-county.com/environmental-health)

Middle Colorado Watershed Council
(970) 625-1829
www.midcowatershed.org

Pitkin County
(970) 920-5438
[www.pitkincounty.com/193/
Environmental-Health](http://www.pitkincounty.com/193/Environmental-Health)

Roaring Fork Conservancy
(970) 927-1290
www.roaringfork.org

Town of Basalt
(970) 927-9013
[www.basalt.net/264/Source-
Water-Protection](http://www.basalt.net/264/Source-Water-Protection)

Town of Carbondale
(970) 963-2733
www.carbondalegov.org

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(970) 524-7514
www.townofgypsum.com

Town of Vail
(970) 479-2144
www.lovevail.org/programs/gore-creek

White River National Forest
(970) 945-2521
www.fs.usda.gov/whiteriver



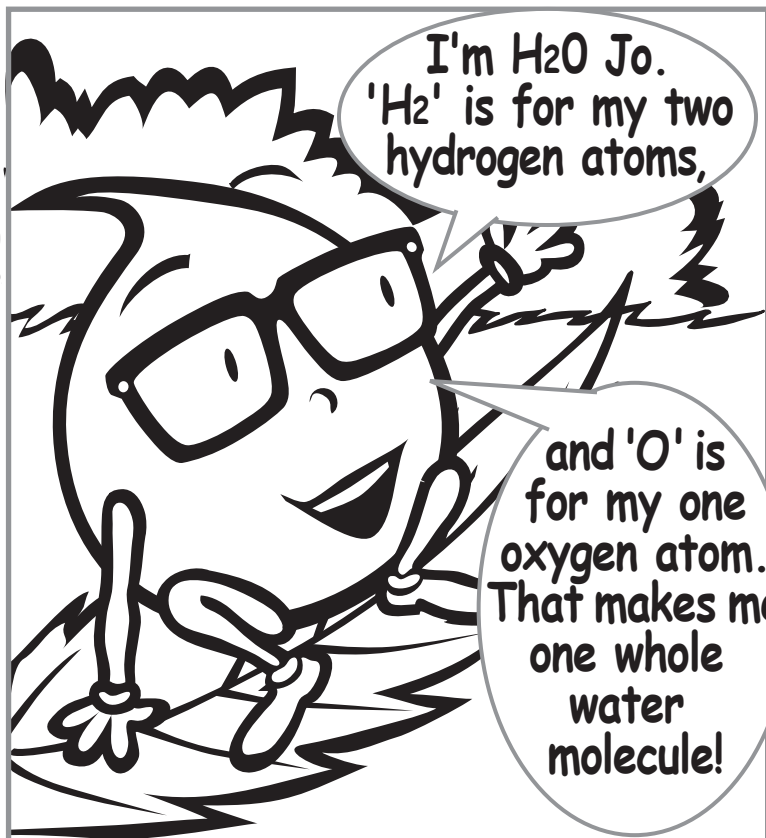
www.roaringfork.org/keepitclean

*This program is funded by the Colorado Department of Public Health and Environment
and the partners listed above.*

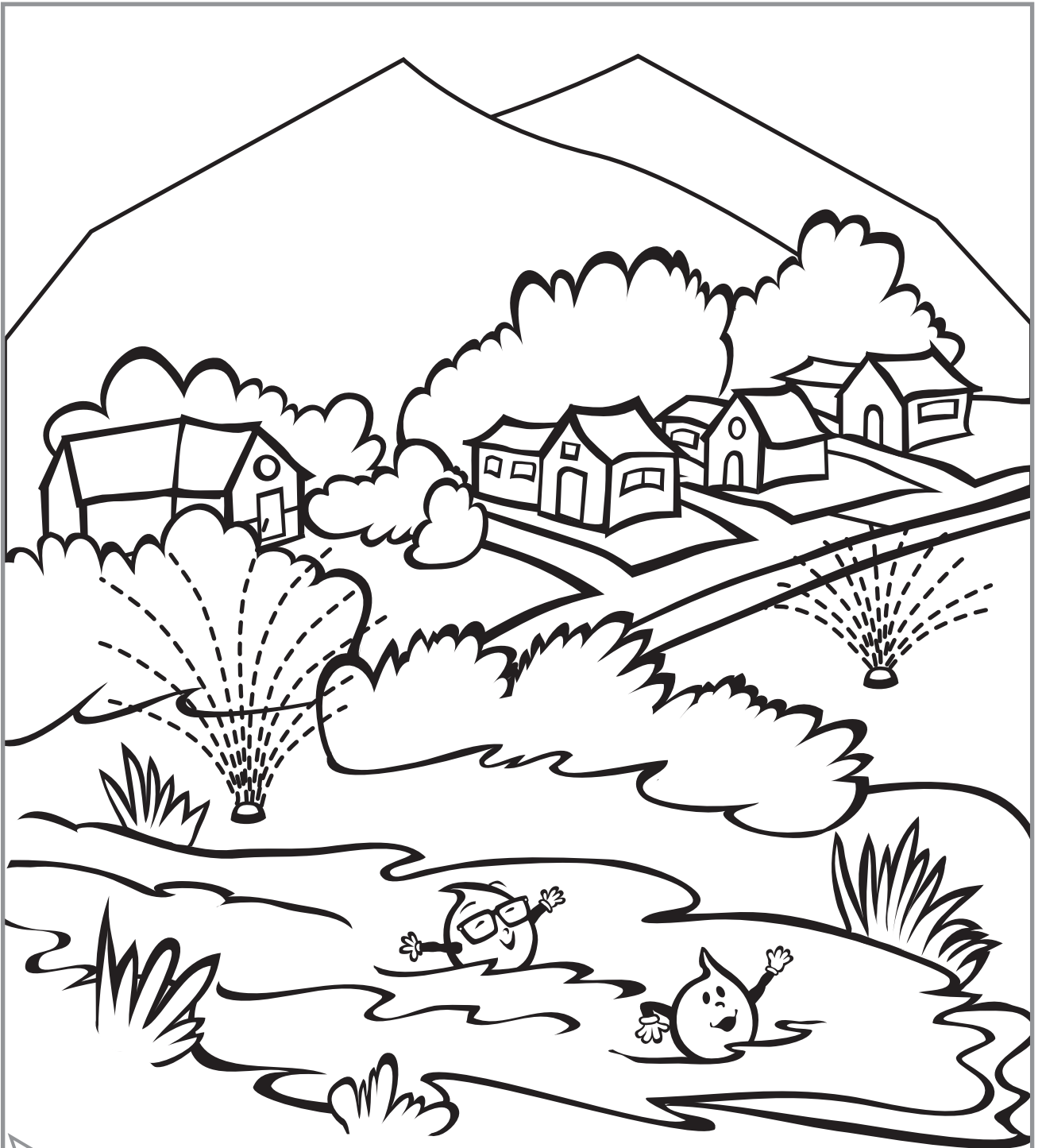
The Adventures of H₂O Jo and Flo



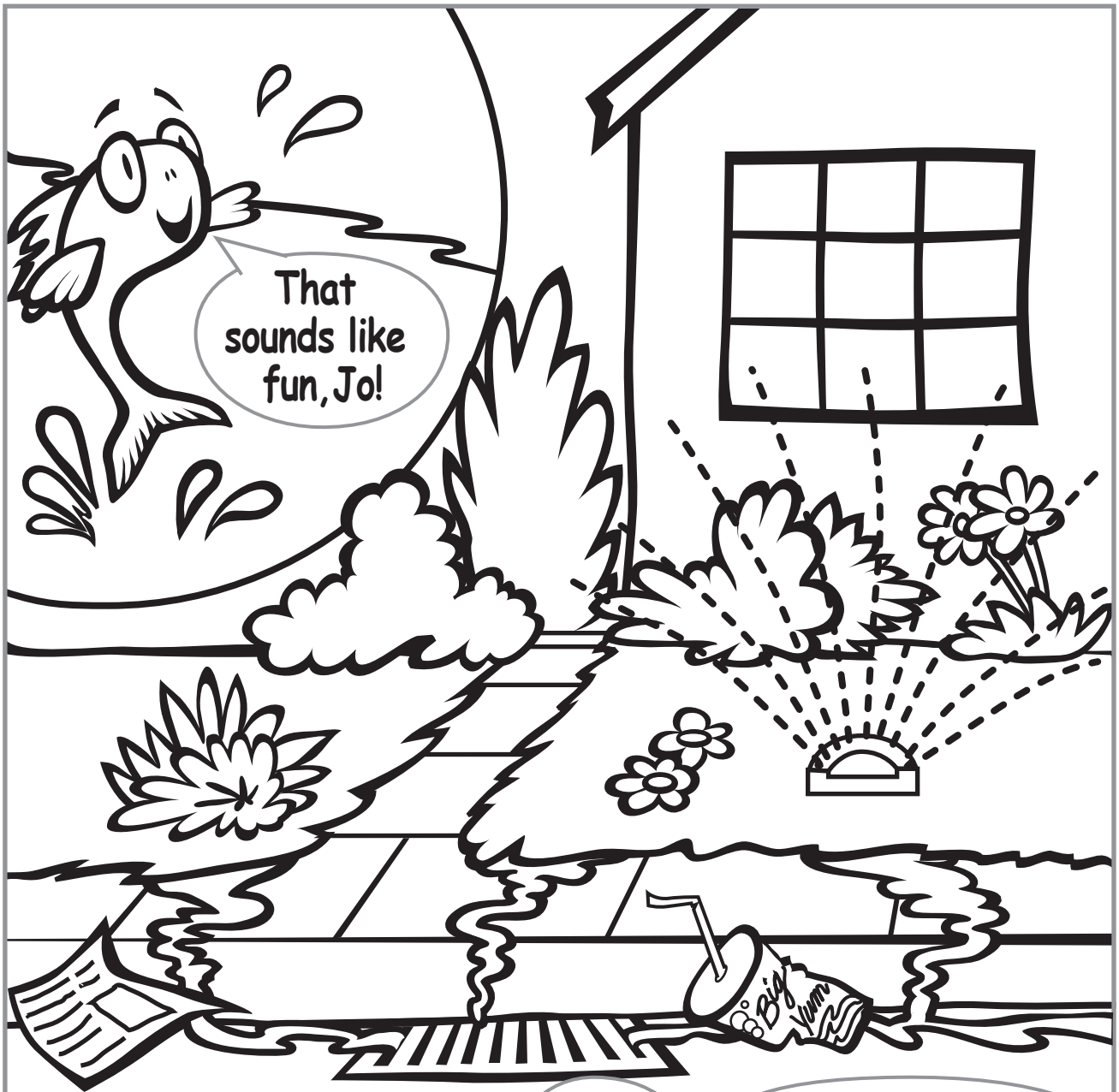








Well Flo, it all started this summer when I was playing with my cousin Splash in the park. Wow, what a lot of fun! Parks and lakes and **SPRINKLERS!** Sprinklers are soooo much fun!



It WAS fun, Flo, but I also saw a lot of things I never saw before I got my glasses.

Like what kinds of things, Jo?

I could see trash that people threw on the ground, and I could see the fertilizer that ran off the lawn into the drain where we were swimming...



And I could see
how people who
owned pets...

...and worked on
their cars sometimes
forgot and left yucky
stuff behind.

YUCK!

I want to tell everyone
to be more careful...



...because all that stuff
gets in my home!



H₂O Jo & Flo's Advice For Keeping Water Clean

Put trash in the trash can!

Trash on the ground can get into our rivers and streams.

Scoop the poop!

Pet waste contains bacteria that may end up in our rivers and streams.

Use fertilizer sparingly!

Fertilizer from your lawn can run into our rivers and streams.

Recycle used motor oil!

One gallon of oil can pollute up to one million gallons of water.

Protect riverside plants!

These plants hold soil and help filter water before it goes to our rivers and streams.

KEEP IT CLEAN

'cause WE'RE ALL DOWNSTREAM

For more tips to KEEP IT CLEAN

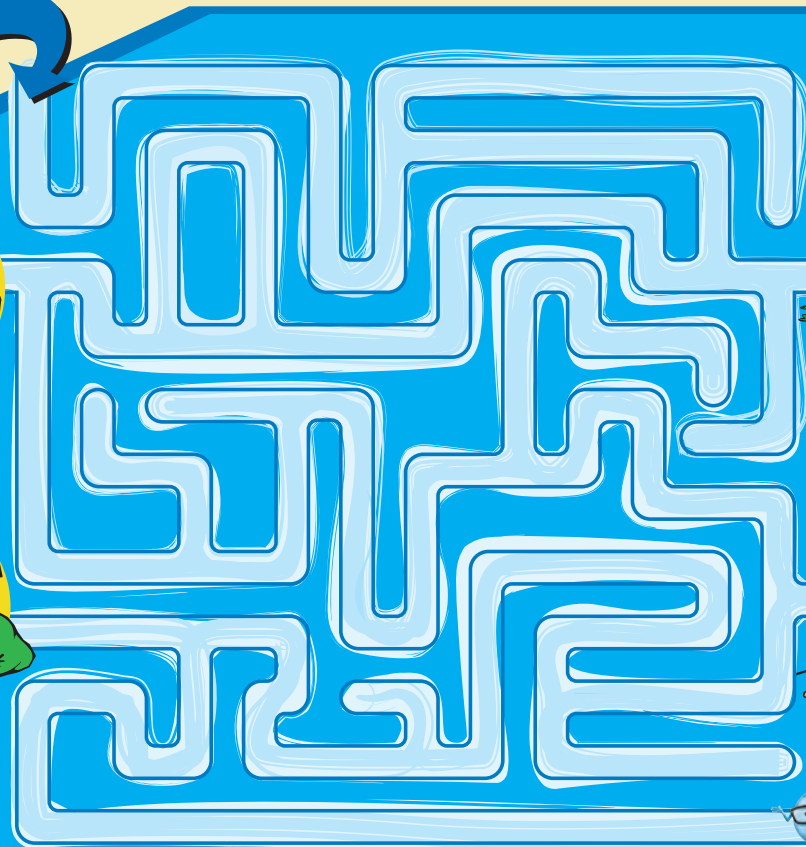
visit www.roaringfork.org/KeepItClean

KEEP IT CLEAN

on the way to the stream



- oil
- Trash
- fertilizer
- Dog poop



Find these words:

Z	W	A	T	E	R	P	N	S	C
F	E	R	T	I	L	I	Z	E	R
M	I	W	S	F	I	S	N	O	E
D	E	S	R	P	O	L	A	K	E
R	G	O	H	Q	J	T	E	R	K
I	G	E	M	H	E	A	L	T	H
N	W	A	S	T	E	P	C	B	L
K	N	O	I	T	U	L	L	O	P

CLEAN	DIRT
WATER	FISH
POLLUTION	FROG
CREEK	SWIM
LAKE	DRINK
FERTILIZER	HEALTH
OIL	WASTE



KEEP IT CLEAN

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www.lovevail.org/programs/gore-creek

White River National Forest
(970) 945-2521
www.fs.usda.gov/whiteriver



www.roaringfork.org/keepitclean

This program is funded by the Colorado Department of Public Health and Environment and the partners listed above.

KEEP IT CLEAN

'cause WE'RE ALL DOWNSTREAM



Simple things
you can do to
protect our
rivers & streams



ONLY RAIN DOWN THE DRAIN!

Remember:
**Storm drains and rivers
lead downstream to
someone's drinking
water supply!**

When rain falls onto hard surfaces like paved roads and parking lots, that water runs off into storm drains. Most storm drains empty directly into the nearest stream without any filtering of debris or pollutants. These streams may be the sources of our drinking water. View the tips to the right to see how "You Can Help!" keep our streams and drinking water supply healthy.

Throughout Colorado many water providers created plans to protect their drinking water sources. Learn how by reviewing your community's "Source Water Protection Plan" at www.crwa.net.



Additional information
and resources on how
you can Keep It Clean
are found at:

www.roaringfork.org/keepitclean

IMPACTS

Lawn and Garden

When it rains, fertilizer runs off your lawn into our streams and lakes through the storm drain system. This may harm people and animals.



Around The Home

Improper disposal of hazardous substances such as cleaning products, paint and even prescription pills can cause serious problems for streams and rivers.



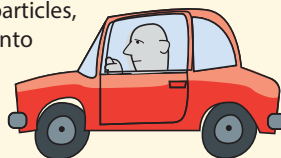
Auto Care

Washing your car and degreasing auto parts at home can send detergents and other contaminants into streams and lakes through the storm drain system.



Vehicle Travel

Driving your car adds exhaust, motor oil, rubber particles, and heavy metals into the environment. These pollute the air and water.



Pet Waste

Pet waste contains bacteria that can contaminate local streams and lakes.



YOU CAN HELP!

- ▶ Don't overwater your lawn. Consider using a soaker hose or drip irrigation instead of a sprinkler.
- ▶ Use pesticides and fertilizers sparingly.
- ▶ Don't fertilize before it rains.
- ▶ Consider using natural fertilizers, such as compost or bonemeal.
- ▶ Store landscaping materials on grass or soil.
- ▶ Sweep up litter and dirt from sidewalks and driveways, rather than using a hose.
- ▶ Direct any water used outside the home towards a natural surface.
- ▶ Prevent dirt from leaving construction sites.
- ▶ Recycle or properly dispose of products that contain chemicals, such as motor oil, household cleaning supplies and pesticides.
- ▶ Properly dispose of old prescription pills by visiting your local medication take back location or by participating in the National Prescription Drug Take Back Day (www.takebackday.dea.gov).
- ▶ Inspect septic systems every three years and pump septic tanks as necessary.
- ▶ Use a commercial car wash that treats or recycles its wastewater, or wash your car in the yard so the water soaks into the ground.
- ▶ If an oil or grease spill occurs, use cat litter or sawdust to soak up fluid and then put it in the trash.
- ▶ Pour soapy water down the sink, not on the street.
- ▶ Properly maintain vehicles.
- ▶ Reduce single-occupancy vehicle trips.
- ▶ Take alternative transportation modes when possible, such as walking, riding a bike or taking the bus.



KEEP IT CLEAN

West Slope Partners

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(970) 920-5080
www.cityofaspen.com/388/Stormwater

City of Glenwood Springs
(970) 384-6344
www.cogs.us

Eagle County
(970) 328-8755
www.eaglecounty.us

Eagle River Watershed Council
(970) 827-5406
www.ewc.org

Garfield County
(970) 625-5200
www.garfield-county.com/environmental-health

Middle Colorado Watershed Council
(970) 625-1829
www.midcowatershed.org

Pitkin County
(970) 920-5438
www.pitkincounty.com/193/Environmental-Health

Roaring Fork Conservancy
(970) 927-1290
www.roaringfork.org

Town of Basalt
(970) 927-9013
www.basalt.net/264/Source-Water-Protection

Town of Carbondale
(970) 963-2733
www.carbondalegov.org

Town of Eagle
(970) 328-6354
www.townofeagle.org

Town of Gypsum
(970) 524-7514
www.townofgypsum.com

Town of Vail
(970) 479-2144
www.lovevail.org/programs/gore-creek

White River National Forest
(970) 945-2521
www.fs.usda.gov/whiteriver



www.roaringfork.org/keepitclean



KEEP IT CLEAN

'cause WE'RE ALL
DOWNSTREAM



Cosas simples que
podemos hacer para
proteger nuestros
ríos y arroyos.



Este programa es patrocinado por el Departamento de Salud Pública y Medio Ambiente del Estado de Colorado y las Organizaciones mencionados anteriormente.

SOLAMENTE LLUVIA POR LOS DRENAJES!

Recuerda:
El agua de lluvia y arroyos se va directo al desagüe pluvial.

Cuando la lluvia cae sobre superficies duras como caminos pavimentados y estacionamientos de concreto, el agua fluye hacia el desagüe pluvial. La mayoría de los desagües pluviales se vacían directamente en una corriente pluvial la cual no cuenta con ningún sistema de filtrado o sistema de eliminación de contaminantes. Estos arroyos pueden ser las fuentes de nuestra agua potable. Observe los consejos a la derecha para ver cómo usted puede ayudar a mantener saludables nuestros arroyos y el suministro de agua potable.

En el Estado de Colorado muchos proveedores de agua han creado planes para proteger las fuentes de donde proviene el agua que es utilizada para tomar.

Usted puede contribuir aprendiendo cómo proteger las fuentes de agua en su comunidad con el "Plan de Protección de Fuente de Agua" visitando el sitio web www.craw.net



Si desea obtener más información de cómo mantener limpias las fuentes de agua potable "Keep It Clean," puede encontrarla en el sitio web:

www.roaringfork.org/keepitclean

DAÑOS AL MEDIO AMBIENTE

Césped Y Jardín

Cuando llueve, el fertilizante que utilizamos para el jardín fluye hacia los arroyos y sistemas de drenaje de tormentas, ocasionando que las personas y los animales que utilizan esta agua se puedan enfermar.



En Su Hogar

La eliminación inadecuada de sustancias contaminantes, tales como productos de limpieza, pinturas, e incluso medicinas; podrían causar serios problemas a nuestros ríos y arroyos.



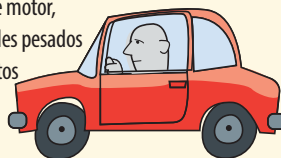
En El Cuidado De Su Automóvil

Al lavar y desengrasar las partes automotrices en su hogar, podrían enviar los detergentes y otros contaminantes hacia los arroyos y lagos a través del sistema del drenaje pluvial.



Viajando En Su Automóvil

Al conducir su automóvil se desprenden gases contaminantes, aceites de motor, partículas de hule y metales pesados en el medio ambiente. Estos contaminan el aire que respiramos y el agua que bebemos.



Desechos De Mascotas

Los desechos orgánicos de mascotas contienen bacterias que contaminan los lagos y los arroyos.



¡USTED NOS PUEDE AYUDAR!

- ▶ No riegue en exceso el pasto o césped. Considere utilizar una manguera de jardín o un sistema de irrigación por goteo, en lugar de uno de aspersión ("Sprinkler" en inglés).
- ▶ Considere utilizar lo menos posible fertilizantes o pesticidas sintéticos.
- ▶ No aplique fertilizantes o pesticidas en el césped antes de que llueva.
- ▶ Se recomienda que utilice fertilizantes naturales, por ejemplo: composta o el fabricado con huesos de animales ("Bone meal" en inglés).
- ▶ Almacene los materiales para la jardinería en el área donde van a ser utilizados.
- ▶ No utilice el chorro de agua de la manguera de jardín para remover el polvo y la basura de las banquetas y accesos.
- ▶ Cuando lave alguna superficie fuera de su casa, dirija el agua hacia una superficie natural (área de pasto o césped).
- ▶ Proteja el área de construcción para evitar que el polvo se extienda a otras zonas.
- ▶ Recicle o deseche los productos que contienen químicos en lugares adecuados, por ejemplo: aceites de carro, artículos de limpieza de casa e insecticidas.
- ▶ Deseche en lugares apropiados los medicamentos no utilizados, llevándolos a los centros de recolección de la zona o participando en "The National Prescription Drug Take Back Day". Obtenga información en la página www.takebackday.dea.gov
- ▶ Realice una inspección del sistema séptico cada tres años y vacíe los tanques si es necesario.
- ▶ Prefiera establecimientos comerciales para el lavado de vehículos automotrices, en los que reciden el agua que utilizan.
- ▶ Utilice superficies con pasto o césped para lavar su automóvil, de esta manera facilitará que el agua que se utilice sea absorbida por el área natural.
- ▶ Si ocurre un derrame de aceite o sustancia grasosa, utilice arena para gatos o aserrín, para absorber el fluido. Posteriormente deséchelo en los contenedores de basura.
- ▶ Tire el agua con jabón en el lavabo. No lo haga en las calles y banquetas.
- ▶ Mantenga su vehículo en buenas condiciones de operación.
- ▶ Utilice su automóvil de manera individual lo menos posible. Póngase de acuerdo con otras personas para compartir el uso diario de su automóvil.
- ▶ Prefiera sistemas alternativos de transporte, por ejemplo: bicicleta, autobús colectivo y caminatas.
- ▶ Sea consciente de recoger siempre los desechos orgánicos de sus mascotas ya sea al llevarlas a pasear, en su patio o en el parque. Los desechos debe colocarlos dentro de una bolsa, cerrar la bolsa y tirarlos en el bote de basura.





RIVER CURRENTS

River Centered: The Evolution of A Watershed Organization

By Rick Lofaro, Executive Director and Heather Lewin, Watershed Action Director

“Any river is really the summation of the whole valley. To think of it as nothing but water is to ignore the greater part.”

- HAL BORLAND

Do you remember where you were in 1996? Some might say that, for better or worse, Colorado and the Roaring Fork Valley was a different place back then. In case you hadn't found your way here yet, let me set the stage. The Av's had just won the Stanley Cup during their first season in Denver. Men were still racing World Cup on Aspen Mountain, and the X Games were still 5 years away. Aspen Highlands had just banned the historic ski patrol deck jump, Aspen Skiing Company's lift ticket prices "boldly passed the \$50 mark" and City Market in El Jebel was relatively new. Meanwhile, the Roaring Fork Club was taking shape, and consequently, so was Roaring Fork Conservancy (RFC). In the beginning, RFC's mission was to protect and enhance riparian areas located throughout the Club's property and develop a plan for the 3 miles of river that flow through Basalt. Soon after the creation of the organization, however, founding board members acknowledged that truly protecting the Roaring Fork River also meant protecting all the water that flows into it. RFC's mission was subsequently expanded to include the entire Roaring Fork Watershed. And so, a watershed organization was born.

Tim O'Keefe, RFC's first education director, provides an introduction and overview before a float through North Star Nature Preserve in 2006. RFC educators still provide this program and it continues to be one of the most popular spring program offerings.



Education and Action: Finding Our Purpose

After RFC established itself as the first group focused solely on river and water issues in the Roaring Fork Watershed, we were ready to spread our wings. Realizing that a critical component of water protection and conservation is fostering the connection between the people of the valley and the rivers, we implemented an education program. By teaching water specific lessons in local schools and taking on 24 local water quality monitoring sites through Colorado River Watch, we found effective ways to begin to reach the community and share the river's story. When we could not take students to the river, we brought the river to the classroom with aquatic macroinvertebrates, water quality samples, and hands-on water-focused lessons. Within a few years, we developed a reputation as a highly effective watershed education organization. As the curriculum expanded to cover a broad range of water related and watershed issues, we realized that education, while essential, was only part of the puzzle.

“If you have a river, then you should share it with everyone.”

- CHEN GUANGBIAO

Sometimes amazing things happen when teaching. Often, the teacher learns as much as or more than the students. While teaching about the watershed, we learned that we needed to

(Continued on page 2)

not only share a message of conservation and protection, but we also needed a more in-depth understanding of the unique challenges that the Roaring Fork River and its tributaries face. Sharon Clarke, the first Watershed Action Director, often reminded us that “the breathtaking beauty of the Roaring Fork Watershed may deflect our attention from critical ecological challenges.” Images of clear running mountain streams with anglers and rafters suggest a healthy and vibrant resource but its sustainability is not guaranteed. We realized that our job was to protect and enhance the invaluable resources here in the Roaring Fork Watershed.

Sharon’s vision and persistence deserve much of the credit as RFC’s focus expanded from education and water quality to include both watershed science and water policy development on a local, regional, and statewide level. We have carried and built upon her legacy in the years since she left. So, what does that mean? It means that RFC leads, participates, and partners in watershed and stream management planning to strategically improve watershed health. We participate in the Colorado Basin Roundtable, and write letters to local, state, and federal entities using science-based facts to support healthy waterways. It means we embarked on studies like the Roaring Fork Watershed and Crystal River Management Plans to engage stakeholders and accomplish on the ground work built on scientific

research. It means we try to take the lead on water issues and bring diverse stakeholders together on projects that benefit the community and the river.

“Boundaries don’t protect rivers, people do.”

– BRAD ARROWSMITH

Collaboration and Community: Finding our Home

Growing from a small organization with one employee narrowly focused on a 3 mile stretch of river, RFC’s current full-time staff of seven now engage in all aspects of watershed protection: education, science, policy, and community. In the summer of 2018, RFC will take its organizational foundation, created through two decades of progress, into a new location, The River Center. There, we will continue to realize new opportunities to enhance and elevate our work on the watershed and our community’s ties to it. With an update to the RFWP and implementation of the CRMP in progress, and more in-school and community programs rolling out every day, we couldn’t be more excited to continue to grow, learn and engage in our new home.



Above left: RFC’s water quality staff and volunteers currently monitor 22 stream sites on a regular basis and submit the data to Colorado River Watch. RFC monitors more sites for River Watch than any other single entity in Colorado. **Above right:** Sharon Clarke, RFC’s first watershed action director, stands on the banks of the Crystal River with representatives from American Rivers, after they named it one of America’s most endangered rivers in 2012. **Right:** A popular part of our education programs for youth and adults alike is identifying and looking at live aquatic macroinvertebrates under a microscope!





2018 RIVER CONSERVATORS:

WOODY CREEK DISTILLERS Mary & Pat Scanlan and Mark Kleckner & Tracey Snow

By Sarah Woods

Roaring Fork Conservancy will honor Mary and Pat Scanlan and Mark Kleckner, founders of Woody Creek Distillers, and Tracey Snow, as our 2018 Robert Billingsley River Conservators at the 19th Annual River Rendezvous on July 11, 2018.

After years of pursuing their own careers, these three longtime friends came together to follow their dream - create a line of spirits whose quality is a lasting legacy for the community, their families and friends. Woody Creek Distillers is proud to use produce grown on their family farm in Woody Creek and neighboring farms.

From seed to bottle, it's all done in the Roaring Fork Watershed.

Pat and Mark feel where they make the spirits is as important as how they make their spirits. They know that growing and sourcing their produce locally not only makes for the best ingredients, it's also good for the environment. The team is dedicated to protecting and enhancing the natural resources of Woody Creek. Their distillery is a low-emissions facility using the most efficient distillation technology available. The waste from their raw products goes back to the Scanlan family farm in Woody Creek as compost, or to local ranches as livestock feed.

When they founded Woody Creek Distillers they knew they wanted to make nothing but the finest craft spirits, each with a unique taste and character that was true to the origins of that spirit. It is a standard they hold themselves to every day. They grow and harvest some of their own

ingredients, like potatoes for their premium vodka. They also only source their grains from trusted Colorado farms, like the rye in their 100% rye mash whiskey.

They distill every spirit they make in their own custom Carl stills. They never use neutral grain spirits, or blend with base spirits from other distillers. Rest assured that every bottle produced by Woody Creek Distillers is truly handcrafted to the highest standards.

Early on, Pat saw the opportunity to use the unique farm land within the Roaring Fork Valley and especially Woody Creek, in a sustainable fashion to grow world-class potatoes to create their award winning vodka. Agricultural property that sat idle since the 1940's was rejuvenated, including the use of legacy irrigation sources like the Salvation Ditch in Woody Creek. Woody Creek Distillers also revived farming on land leased from Pitkin County Open Space and Trails, bringing back agricultural vibrancy to idle valley properties.

The state-of-the-art distillery in Basalt is rife with thoughtful design and engineering. From the beetle-kill pine elements in the tasting room and barrel storage facilities, to fully sustainable production processes, Woody Creek Distillers exemplifies conservational and environmentally sound operations. All heating and cooling is done within closed loop systems, using hot water produced during the distilling process for heating, while using incoming water for cooling prior to production with zero discharge. Finally, 100% of the stillage, the leftover grains and solids from distillation, are used for cattle feed and nutritional enhancement of farm land.

The Woody Creek team are true conservationists and environmentalists and have supported Roaring Fork Conservancy for many years. Congratulations, Woody Creek Team!



Thank You

to ALL the volunteers and sponsors
who made our 20th Annual
Fryingpan River Cleanup a success!



Photos by Dale Armstrong & Christina Medved



2017 Annual Report:

*How Do We Bring
People Together to
Protect Our Rivers?*

Looking back on 2017, perhaps our biggest milestone was captured in a single shovel full of soil: the monumental groundbreaking of the River Center in Basalt. Though the wait was long, the pouring of the River Center foundation came at the perfect time.



We invite you to read through our 2017 accomplishments in our 2017 Annual Report. Thank you for your continued support that makes our work possible!

View the report at

<http://www.roaringfork.org/about-us/>



2018 BUSINESS MEMBERS: Thank you for supporting essential river research, education, and conservation work!

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Casey Brewing and Blending

Crystal Fly Shop
Footsteps Marketing
Incline Ski and Board Shop
K&W Concrete
The Romero Group
Trout Bandits
20/20 Eyecare

Watershed Explorations

2018 SUMMER & FALL EVENTS CALENDAR

MAY

- 17 Ruedi Reservoir Tour:
Storing West Slope Water
- 31 Birding Maroon Creek Wetlands

JUNE

- 2 14th Annual River Float
- 6 North Star Preserve
Roaring Fork River Float
- 7 North Star Preserve
Roaring Fork River Float
- 14 Fishing in Schools
Teacher Workshop
- 14 North Star Preserve
Roaring Fork River Float
- 19 North Star Preserve
Roaring Fork River Float
- 20 Lazy Glen Open Space Opening
- 21 Flowers & Filtration:
Rio Grande Wetland Walk
- 26 Deer Hill Early Summer Wildflower Walk
- 27 Family Night at Filoha Meadows:
Fireflies, Bats, and Bugs
- 28 Family Night at Filoha Meadows:
Fireflies, Bats, and Bugs

JULY

- 2 Filoha Meadows:
Firefly & Rare Orchid Walk
- 5 Family Night at Filoha Meadows:
Fireflies, Bats, and Bugs
- 9 Filoha Meadows:
Firefly & Rare Orchid Walk
- 17 Family Night at Filoha Meadows:
Fireflies, Bats, and Bugs
- 18 Filoha Meadows:
Firefly & Rare Orchid Walk
- 24 Filoha Meadows:
Firefly & Rare Orchid Walk
- 25 Water in the Age of Silver:
Touring Aspen's "Holden Works"
- 27 Twin Lakes Tunnel & Diversion Tour

AUGUST

- 8 Family Exploration at Filoha Meadows
- 11 River Center Grand Opening
- 17 Family Exploration at Filoha Meadows

SEPTEMBER

- 7-8 Crooked Creek Wetland Planting
- 8 Family Exploration at Filoha Meadows
- 11 Aspen Tap: Drinking Water Tour
- 19 Filoha Evening Walk: Elk & Bighorn Sheep
- 25 Carbondale Bicycle Ditch Tour

Registration opens 3 weeks prior to program date.

For program information and to register visit: www.roaringfork.org/events



COME FLOAT WITH US!

RFC's Community River Float & Festival
Saturday, June 2, 2018

TICKETS:

Float & Festival: \$50 (\$40 for RFC Members)
Suitable for ages 12+

Festival Only: \$30 (\$25 for RFC Members)
All Ages Welcome

REGISTER BY MAY 30 at

<http://www.roaringfork.org/events>



Roaring Fork Conservancy spent the last 22 years bringing people together to protect our rivers. We are thrilled that as we move into our next 20+ years, the River Center will provide us a home in which to bring together visionaries, researchers, policy-makers, elected officials, and academic researchers to discuss regional, state, and national water issues and share ideas with the broader community. As the demand for our science, policy and education expertise increases, the timing is perfect for growing in our capacity!



Save the Date

FRIDAY, AUGUST 10
RIBBON CUTTING & GRAND OPENING

SATURDAY, AUGUST 11
COMMUNITY OPEN HOUSE



THE RIVER CENTER

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Fireflies at Filoha Meadows

Kristen Doyle, Watershed Educator

Last June, I found myself guiding a group across a timeworn bridge, past a seemingly old barn, into a meadow along the Crystal River. I exhausted my botanical knowledge leading a search for rare orchids, and my explanation that the “old barn” was actually a fabricated set from a little-known Disney movie seemed to squash some of the scene’s romanticism. As dusk settled in, I wondered if the show we were all anticipating was about to happen, or if I would need to awkwardly explain that it was too cold, too rainy, or too early in the season for our performers to reveal themselves. Then I saw it – a soft light emanating from just a few feet away. As the group fell silent, another light pulsed in response from across the field. And then another. Before long, Filoha Meadows was alight with the soft green glow of fireflies.

Fireflies, also known as lightning bugs, are neither flies nor true bugs, but beetles (Coleoptera). Hatching from eggs, firefly larvae are voracious predators of slugs, snails, and soft-bodied insects. These larva live underground and are capable of producing a light of their own. In the late spring of their second year the larvae pupate, a process akin to a caterpillar creating its chrysalis, before emerging as the adults we are accustomed to seeing. The dazzling display of light is actually a mating call, signaling to others they are “single and ready to mingle.” These flashing patterns differ between species, and are also used by scientists to identify who is who. However, not all “come hither” flashing patterns end happily ever after – the females of some species mimic the flash patterns of others, and then viciously attack and consume their would-be lovers. After mating, female fireflies gently lay their eggs in soft, damp soil, and the life cycle begins anew.

The presence of these copulating coleopterans at Filoha Meadows and other thermal wetlands is a mystery. Fireflies typically live at lower elevations, and while populations have been found at hot springs throughout Colorado, these populations are isolated with miles of arid mountains between them. One theory is that as homesteaders developed the west, fireflies in the east took advantage of irrigation ditches and canals, expanding their range. Dr. Larry Buschman, an entomology Professor at Kansas State University with over 20 years of firefly experience, finds that explanation lacking. Fireflies only persist near permanent, year-round water sources, with many populations found in remote areas reached only by wilderness backpacking. Buschman suggests in his *Field Guide to Western North American Fireflies* that thousands of years ago, when the climate of the American West was wetter, these burly beetles made their way across the continental divide and dispersed into damp forests and wetlands in the West. As the climate became drier, available habitat shrank leaving pockets of fireflies lingering on in our remaining springs and marshes, isolated from each other and subsequently developing their own local adaptations.



Clockwise from top left: Adult *Photuris* firefly and the light organs of the male, female, and larva. Photos by Dr. Larry Buschman.

Because of this, Buschman believes the population present at Filoha Meadows (currently identified as *Photuris* spp.) may actually be its own sub-species. This uniqueness and isolation also makes the relic population at Filoha meadows vulnerable and vital to protect, as there are no nearby populations possible of reestablishing themselves. While these fireflies may create more questions than answers, one thing is certain: the fireflies at Filoha meadows continue to sparkle for spectators, helping RFC inspire people to explore, value, and protect not just the Roaring Fork watershed, but all creatures big, small, and bright that call it home.



Viewing fireflies during a Filoha Meadows program.

Interested in seeing these fireflies yourself?

Attend one of our July Filoha Meadows programs, FREE thanks to Pitkin County Open Space & Trails. Details, including dates and registration, can be found at www.roaringfork.org/events.

Staff & Board Flows



Matthew Anderson, Watershed Action Intern

Matthew is an Environmental Science and Resource Management major at the University of Washington in Seattle. This is his second summer assisting the RFC Watershed Action team with water

quality and conservation easement monitoring. Matthew was born and raised in Basalt.



Johnny Cronin, Director of Donor Relations

Johnny's experience building relationships with donors and fundraising for conservation programs, including The Nature Conservancy and Houston Wilderness, follows a successful

career as an entrepreneur. Johnny's background dovetails well with RFC's 22-year mission of inspiring people to explore, value and protect the Roaring Fork Watershed. Graduating from Texas Tech with a degree in Public Administration, Johnny appreciates the busy intersection that is conservation, "friendraising" and governing these sometimes complicated issues. Johnny, his wife Vicki, and his entire family are respectfully dedicated supporters of the amazing outdoor opportunities Colorado provides.



George W. Kelly III, RFC Board Member

Born and raised in Canton, Ohio, George W. Kelly III moved to Colorado upon graduating from St. Bonaventure University with a degree in Marketing in 1998. After starting his career with East West Partners in

Vail which eventually took him to Lake Tahoe, George and his wife Stacey were drawn back to Colorado and the Roaring Fork Valley, an area that has become home. After a career in leadership roles with East West Partners and Aspen Skiing Company George decided it was time to start his own business. In 2011 George founded Organic Return, an Award Winning Digital Marketing Agency with local and national clientele. Organic Return is a member of 1% For The Planet and focuses on working with hospitality, real estate and business-to-business companies throughout the United State. George lives in Basalt with his wife Stacey Kelly and two kids; four-year-old George IV and six-year-old Audrey.



April Long, Watershed Plan Coordinator

April is a water resources engineer with 16 years of experience assisting local governments with stormwater management programs. For the last decade, April has served as the Stormwater

Manager and Clean River Program Manager for the City of Aspen. She started this program and has grown it into a nationally recognized program for its progressive and creative approach in regulation and award-winning design, construction, and performance of water quality improvement facilities. While she continues her role with the City of Aspen, April is also the principal of her own private contracting business, Colorado Watermark, LLC, where she specializes in strategic planning for water resources and watershed master planning and implementation. April is working with RFC staff to re-engage stakeholders in the update of the 2012 Roaring Fork Watershed Plan. Originally from Alabama, April has a degree in Biosystems Engineering from Auburn University. She spends her free time near the water, too – hiking, camping, skiing and rafting with her family and friends.

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is published biannually by Roaring Fork Conservancy. 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. Roaring Fork Conservancy is an independent 501(c)(3) not-for-profit organization registered in the state of Colorado.

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RIVER CURRENTS

An Unforgettable Summer...

By Rick Lofaro, Executive Director

While it could be said about any summer and every summer, the summer of 2018 was truly an unforgettable one in Basalt and the Roaring Fork Valley. A record dry winter devoid of any serious snowfall or honest powder days gave way to a spring with below average runoff across the watershed. In May and June river flows peaked early, absent the roiling torrent we often see and anticipate in late spring - the kind of runoff that sweeps the stream of last year's sediment and algae, and overtops its banks to saturate the riparian habitat, allowing the 'green ribbon of life' to thrive. The kind of winter our mountain ecosystem relies on, one with robust snowfall that remains in a high elevation frozen reservoir and slowly releases over a warming spring, is less and less common.

By late June, river levels were dropping fast, and water temperatures were rising to a concerning level. Enter Hot Spots for Trout, a Roaring Fork Conservancy (RFC) citizen science temperature monitoring program (see related article on page 12). River flow levels throughout the watershed were 1/3 to 1/6 of average, and summer was shaping up to be hot and dry.

Weeks of 90°F plus temperatures in Glenwood Springs, Basalt and even in Aspen, exhausted even the Roaring Fork Valley's tolerance for sunny days. RFC worked closely with the Roaring Fork Fishing Guide Alliance and Colorado Parks and Wildlife by holding weekly conference calls to discuss how to respond to these conditions. As a result, the Hot Spots for Trout program was expanded to a new voluntary closure program from 2 PM to midnight on some area rivers, giving the trout a break during the hottest part of the day. The response from the commercial fishing industry and

the angling public at large was fantastic, and most everyone was reeled in by 2 PM.

On June 29, in the midst of monitoring the already stressed rivers, RFC loaded the final boxes from the old rental office and officially moved into the River Center. Four days later, on the evening of Tuesday, July 3, the Lake Christine fire ignited ¼ mile from the River Center. The fire fighters, the first responders, the community response and all of the events are truly unforgettable.

Words cannot describe it, but if you were here you know, saw and have a unique story of just how heroic the effort was to save our towns. Yet, all the while we kept thinking about the river.



Roaring Fork River behind the River Center on July 20, 2018. The flow was 285cfs whereas one year ago on the same date it flowed at 1,050cfs.



It was very stressful for everyone to see our beloved rivers struggle through summer. Tourism, agriculture, and municipal water supplies, all suffering in a dire time of need. Now that we are into fall and still lacking precipitation, there is talk of a Colorado River Compact Call, the ultimate repercussion of years of drought and water

shortage. The water struggle is real and never so pressing as today. So, start the snow dance and prayers now, and hope for a better snow year, ski season, water year and a rejuvenation of our rivers... so that we can try to forget about this past summer.



What happens after a wildfire?

A LAKE CHRISTINE WILDFIRE UPDATE

*Steve Hunter, Civil Engineer/Hydrologist,
White River National Forest, United States Forest Service*

On the July 4th holiday in 1994, I was a fly fishing guide floating down the Colorado River staring at a small plume of smoke which would become one of the worst tragedies in wildland firefighting. I did not know it then but the South Canyon Fire would have an effect on my life and career. Fast forward 24 years to July 3, 2018, I again found myself staring at a plume of smoke of what would become the Lake Christine fire.

Like most valley residents, I followed the incredible efforts of local, state, and federal firefighters and first responders. I spent the 4th of July watching the aerial assault on the fire from tankers, heavy helicopters and single engine air tankers as the smoke would turn into impressive pyrocumulus clouds in the afternoon.

As the firefighters gained containment on the fire I knew the work of the U.S. Forest Service was far from over. I am the Burned Area Emergency Response (BAER) coordinator and specialist for the White River National Forest. I worked to mobilize a BAER team for the fire when the fire was still actively burning. Due to the busy fire season in the West, several team members were coming off other fires to assist while others were here locally.

A BAER team is composed of scientists, engineers and other specialists whose main objective is to rapidly assess post-fire conditions to determine the level of potential risks to life and safety, property, critical natural and cultural resources. The team conducted analysis in the field and used science-based computer models to rapidly evaluate and access the burned area.

The team uses satellite imagery to create a soil burn severity map which categorizes the burn in areas of unburned, low, moderate, and high. The amount of moderate and high soil burn severity help to determine post-fire hydrologic and geomorphic response.

Debris flow modeling is done by the United States Geological Survey (USGS) to help determine the risk of such events occurring. The BAER team worked with interagency partner's including the Natural Resource Conservation Service (NRCS) who worked with private property owners in preparing for increased runoff and potential flooding.

The BAER team analysis helps determine the appropriate post-fire treatments for the area. Treatments for the Lake Christine fire included noxious weed detection and eradication, seeding and planting, improving drainage features on roads and trails, hazard trees, signage, and storm patrols.

At Left: High soil burn severity on the top of Basalt Mountain with hazard tree. Soil burn severity helps determine post-fire hydrologic and geomorphic response.

Roaring Fork Conservancy is leading the effort on the long-term restoration.



There will be the continued risk of flooding, sediment and debris flows with any significant rain or snow events. The last BAER assessment on the White River National Forest was the Coal Seam fire in 2002. In 2018, there were four BAER assessments on the White River National Forest.

For additional information about the Lake Christine fire and other wildfires, please visit InciWeb which is “an interagency all-risk incident information management system” and can be found at <https://inciweb.nwcg.gov/>. More specifically, the Rocky Mountain Region can be found at <https://inciweb.nwcg.gov/incident/5928/>. Stay tuned to post-Lake Christine fire volunteer efforts in 2019!

There are three phases of wildfire recovery:

1. Fire suppression repair
2. Emergency stabilization – Burned Area Emergency Response (BAER)
3. Long-term recovery and restoration

Fire suppression repairs took place for over a month until fire crews demobilized at the end of September. BAER restoration work has begun as well, and this work will continue through the fall of 2018 and resume in the spring and summer of 2019.

Roaring Fork Conservancy is leading the effort on the long-term restoration. A team of experts from multiple jurisdictions met at the end of September to begin plans for addressing and prioritizing recovery and restoration efforts.

The Lake Christine fire changed the landscape that we were all used to. Portions of the fire that were lightly burned were greening up in August and will recover quickly. Areas that burned the hottest will take decades to recover though ground vegetation should begin to reestablish in one to two years.



Above: US Forest Service BAER team soil scientists and hydrologists analyzing soil burn severity on the Lake Christine fire.

Top Right: Aerial image shows a mosaic of high, moderate, and low/unburned burn severity on Basalt Mountain above Upper Cattle Creek.

Bottom Right: Aerial image of mostly high burn severity. Helicopters help BAER specialists rapidly access the entire fire to verify burn severity. The team then targets specific areas to analyze on the ground.

A COLLABORATIVE CLEAN-UP

Matthew Anderson, Watershed Action Intern

In 2015, RFC embarked on the Cattle Creek Stream Health Evaluation, intended to understand and address impaired conditions on the stream as designated by the State of Colorado. This included significant water quality monitoring, stakeholder outreach, fundraising, and collaborative efforts up and down the stream. That work continued this summer as 23 individuals from RFC, the Bureau of Land Management (BLM), Garfield County, and Rocky Mountain Youth Corps (RMYC) partnered to address concerns on BLM property along Lower Cattle Creek, a tributary to the Roaring Fork River.

The two-day project started with trash removal in a heavily littered riparian area. The enthusiasm and energy of the high school-aged RMYC volunteers kick-started the work, and soon, trash was being found everywhere, including in the trees! The bulk of findings included hundreds of bullet casings and shotgun shells, beverage bottles, and clay pigeons, while more unusual items such as a DVD player, car seat, and leaky oil container were also found. In addition to trash removal, an old fire pit was dismantled, the ash shoveled away, and a large wood pile was removed to discourage future fires. A few lucky RMYC volunteers donned hip waders and searched the stream itself for unwanted trash – which they found! Finally, BLM staff strategically placed boulders to discourage vehicular access to the creek while still allowing walk-in access.

On day two, approximately 450 yards of barbed wire was removed. This fencing was no longer in use and posed a hindrance to wildlife attempting to access the creek. RMYC's previous fencing experience was invaluable at this stage; their record-time removal of the fencing allowed more time for further trash cleanup. In total, 2,260 pounds of trash and debris were removed from Cattle Creek and the surrounding riparian habitat during the two-day work project.

This project was an excellent opportunity for RFC to continue working with Garfield County and the BLM in addressing the health of Cattle Creek. Additionally, the project allowed RFC to provide some knowledge and context about local watersheds to RMYC volunteers. The youth learned about the importance of riparian habitats in Colorado and quickly connected this project to river conservation. Projects such as these foster partnerships and provide meaningful, educational, and fun opportunities for youth from inside and outside the valley to interact with the Roaring Fork watershed.

Top Right: Removing unnecessary barbed wire fencing.

Middle: So many shotgun shells and bullet casings.

Bottom: We found a muffler. Hope the car got out okay!



Not Your Typical Science Class

Liza Mitchell, Education Programs Manager

What were the most memorable moments of your childhood? Surely they weren't sitting in the classroom.

While traditional education might not top the charts of a young person's life, discovery often does. RFC's new Youth River Stewardship Project combines interdisciplinary, place-based lessons about watershed science with a float trip on the river!

RFC's emphasis on field education aligns with a significant body of research showing how effective field-based experiences are in building students' sense-of-place, self-efficacy and environmental literacy. Targeting middle school students, RFC has partnered with several local schools and rafting companies to overcome traditional barriers to getting kids on the river. Once on the river, students work with each other and RFC educators to test the water quality of the river, assess riparian health, and learn to observe the intersecting dynamics of humans and nature.

Research suggests our country's youth spend less time outside, are less interested in natural resource careers, and participate in fewer outdoor recreation activities*. By providing opportunities for students of all backgrounds to connect with nature through a guided, educational rafting experience, RFC educators expose these students to careers in natural resources as well as recreation and establish authentic understanding of how healthy rivers benefit local ecosystems and economies. Water resources in the West are threatened by increasing population, climate change, and development; it is vital we prepare the next generation of citizens with the knowledge needed to make informed environmental decisions and take appropriate action at all levels.

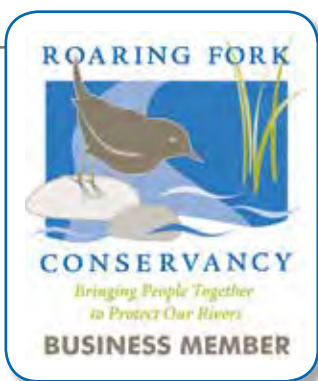
With grant support from Paddle Nation, RFC educators have spent over 31 hours in direct student instruction through the Youth River Stewardship Project, helping over 300 local students get on the river and conduct scientific assessments of river health!

Objectives of RFC's Youth River Stewardship Project

- Ensure youth of diverse backgrounds get to know and experience their local rivers
- Convey the importance of healthy rivers to our environment and economy
- Give students opportunities to do hands-on, field-based science research on the river
- Inspire the next generation of environmental stewards and water professionals

* Hager, S., Straka, T., & Irwin, H. (2007). What do teenagers think of environmental issues and natural resources management careers? *Journal of Forestry*. 105(2), 95-98.

Louv, Richard. (2005). *Last Child In The Woods: Saving Our Children From Nature-deficit Disorder*. Chapel Hill, NC : Algonquin Books of Chapel Hill.



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PHOTO: ANNA STONEHOUSE, THE ASPEN TIMES

Thank You

Each year, at our annual River Rendezvous fundraiser, a “Paddle Raise” is held to raise funds for specific RFC programs. This year the River Rendezvous planning committee decided to break with tradition and dedicate the paddle raise to the First Responders that kept our community safe during the Lake Christine Wildfire. Starting with \$10,000 from Alpine Bank, over \$120,000 was raised between the River Rendezvous on July 11 and the following weeks. The Lake Christine Wildfire was a difficult time for many in our community and we are all so grateful to the first responders from Aspen to Carbondale for their heroic actions!



Promoting Roaring Fork Watershed Pride!

RFC partnered with local artist, storyteller and environmental advocate, Sarah Uhl, to create a story map of the Roaring Fork Watershed. More accessible than a topographic map, this piece of art is incredibly accurate, thanks in part to aerial tours of the watershed with EcoFlight. It features the “important places” of the Roaring Fork Watershed – the rivers, tributaries, lakes, reservoirs, mountain peaks,

towns, and iconic landmarks that are all inexorably linked within our watershed.

The original story map is on permanent display at the River Center, but if you want to show some pride in the Roaring Fork Watershed, make a donation to RFC and receive one of the maps as a thank you gift.

\$35 donation = 12” x 16” print

\$55 donation = 24” x 36” print

Where the Water Meets the Land: Impacts of Drought on Agriculture

Elizabeth Chandler, Owner/Operator, Golden Eagle Ranch, New Castle, CO

The Lake Christine wildfire, low river flows, stressed fish, and reduced recreation are all well publicized results from the hot and dry summer. Less understood is the effect the hot and dry summer has had on agriculture.

Agriculture depends on water to raise crops and grow livestock. Without water, agriculture cannot survive. Think of what happens when you forget to water your houseplants for a week or two. When given water they just don't come roaring back to life; it takes a while for them to recover and then they are usually not quite as healthy as before. Now think about our pastures and hay fields that haven't received irrigation water or significant rain since early June. These fields didn't produce a very robust hay crop this summer and will not be able to provide fall feed for livestock. The longer term question is what will they produce next year even with good water?

The law of supply and demand holds true for agriculture. The high demand and low supply made hay extremely expensive this year, resulting in early sales of livestock and a deep culling of the mother herd. This increased supply of livestock at the market exceeds the demand and results in lower prices. The secondary issue is the reduced numbers in the mother herd. It will take multiple years for ranchers to build their herds back up to a profitable size. This reduces the buying power of ranchers and causes other businesses to also have reduced profit margins. Farm supply stores, equipment dealers, and trucking businesses will all be impacted, but so will restaurants and recreation businesses.

This is not the first extremely dry year from which agriculture has had to recover, but it is the hottest and driest year ever in our area. The combination of hot and dry magnify the effects of each other. The hot weather increases the evaporation from streams and lakes, increases the water needed by plants to produce, and lengthens the period of time plants need water. The best prediction from climatologists is this weather pattern may be our new normal. The uncertainty adds to the stress: Will rain come and the drought be over, or are the climatologists right that hot and dry weather is our new normal?

The emotional impact of working hard to tend your livestock and land only to have it lost to circumstances beyond your control is difficult to appreciate. It is hard to wake up every morning to dry fields knowing that you will have to sell off livestock that you have spent years raising. You worry about how long it will take for your fields to reestablish themselves - if you get good water next year. Will there be snow? What if next year is as dry as this one? Can we keep the ranch? Should we just sell off now? How much can we sell and still have a chance to survive if we get snow? The list of questions goes on and on, but the real point is that a drought is very stressful. It is about the survival of your livelihood, your way of life, your family's heritage.

Tourism, recreation, wildlife, and agriculture are all interrelated. Wildlife depends on irrigated lands for winter pasture. Recreation and tourism both benefit from the open space and green fields that agriculture provide. Agriculture benefits from the recreational and tourism based economy. The hot and dry year has had a negative impact on all of these areas. A good water year will restore recreation and tourism, but it will take several years for our fields to regain full production and to build the livestock herds back up to current numbers.

At left, photo by Katherine Dessert. At right, photo by Tim O'Keefe





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1. RFC staff with Governor Hickenlooper. 2. Children use microscopes to get a close up view of the aquatic insects!
 3. Guests tour Old Pond Park. 4. Guests tour the River Center Water Quality Lab. 5. Using the River Center classroom to update guests about the Lake Christine wildfire. 6. RFC Board Members. 7. Celebrating at the donor reception, the Edwin & Jenny Long Murphy family. 8. Former Governor Bill Ritter talks to RFC's Director of Watershed Science & Policy, Heather Lewin, and Director of Community Outreach, Christina Medved. 9. Governor Hickenlooper meets Sarah Uhl, the Roaring Fork watershed map artist, along with RFC Education Programs Manager, Liza Mitchell, and executive director, Rick Lofaro. 10. Governor Hickenlooper is presented a Roaring Fork Watershed Map by executive director, Rick Lofaro, and RFC board president, Pat McMahon. 11. Franklin Carson, RFC board president Pat McMahon, RFC National Council Members Carter Brooksher and Judy Baum, with Governor Hickenlooper. 12. RFC executive director, Rick Lofaro, along with Mr. John Stulp, Special Policy Advisor to the Governor for Water and Chairman of the IBCC at State of Colorado, Vice President of RFC National Council Carter Brooksher, and former Governor Bill Ritter during the Ribbon Cutting. Photos provided by Dale Armstrong, Christina Medved and Diane Schwener.



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Grand Opening · August 10-11, 2018
The River Center



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Creative and Cooperative Water Management Benefits the Fryingpan River

Heather Lewin, Director of Watershed Science & Policy

As the 2018 water year comes to a close, there likely won't be too many sad goodbyes. A warm, dry winter gave way to a hot, dry summer - and all that goes along with it from fire to drought. This summer, good news about water seemed about as hard to come by as a rain storm. However, hard times breed cooperation and innovation, particularly in water management. As we have seen throughout this summer, the management of Ruedi Reservoir plays a critical role in not only the Roaring Fork watershed, but the whole Colorado Basin.

Ruedi Reservoir was built as compensatory storage for the Fryingpan-Arkansas Diversion project. Put simply, Ruedi Reservoir holds water dedicated to Western Slope use in order to offset water sent to the Eastern Slope via transmountain diversion from the Fryingpan headwaters. Beyond a certain amount of water being held as "reservoir water" - water which is not released downstream - water in Ruedi is dedicated as either "fish water" or "contract water." Fish water is stored in Ruedi and released throughout the spring and summer to help four threatened or endangered fish species that live in the Colorado River and require additional water in an area near Grand Junction known as the "15-Mile Reach." Contract water was sold by the Bureau of Reclamation (BOR) to recover the costs of building and operating the dam. Contract water is held by a variety of entities from municipalities to HOAs, with the largest shares belonging to Ute Water Conservancy District, Colorado River District, and Exxon Mobil Corporation.* However, for most local residents, Ruedi unlocks the door to Basalt's recreation economy; from flatwater recreation on the reservoir to fishing on the Fryingpan. Those who live in the area are often concerned that these local interests are overlooked in Ruedi management efforts.

While it's true that recreation economy was not the purpose behind Ruedi's creation, there is no denying its value. In 2015, RFC commissioned an economic study with Colorado State University that showed recreation at Ruedi adds \$3.8 million to the local economy. The same study found that keeping winter flows in the Fryingpan

at a minimum of 70cfs, to lessen anchor ice formation and impacts, adds \$1.5 million to the economy. Avoiding anchor ice also has ecological benefits. Anchor ice can freeze and scour macroinvertebrate habitat, having negative effects on not only the insects, but also the fish and birds who eat them. However, without a water right on the Fryingpan or contract water in Ruedi, RFC has

found it challenging to ensure this minimum flow is met in low snow years. Conversations with the BOR have had positive results, where managers work to keep water at environmentally beneficial flows. However, this arrangement comes with no guarantee as many decisions that regulate Ruedi water management involve specific uses and target areas, and are complicated by the utilization of water stored in multiple reservoirs around the state to meet these needs.

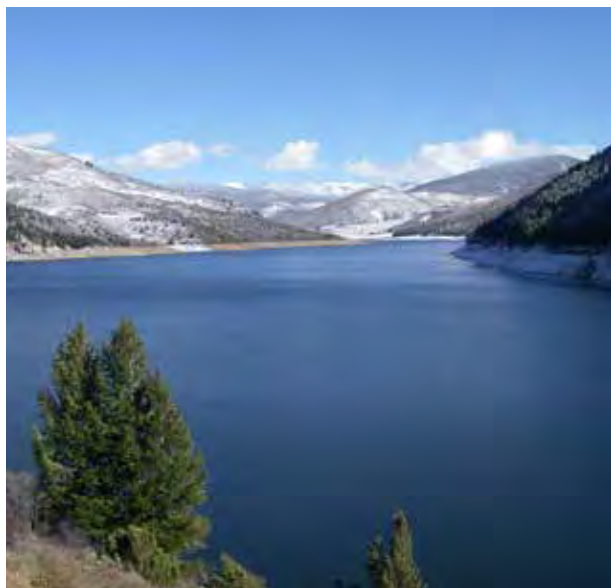


Fryingpan River by Barry Mink

Ensuring winter minimum flows are met consistently requires creativity and cooperation. RFC approached the Colorado River Water Conservation District ("River District") last summer with the possibility of coordinating a lease of some of their contract water for winter flows. Each contract has a specific target water use, and it is difficult to operate outside the uses specified in the contracts. Fortunately, some of the River District's contracts included winter environmental flows as a specified use. However, water is not free, and leasing water comes at a cost. This is the first environmental contract water lease that the River District has ever participated in, requiring staff to ask their governing board to both allow the lease, and price it the same as an agricultural water lease. With River District Board approval, the lease was then brought to the Colorado Water Conservation Board's (CWCB) Stream and Lake Protection Section, who has money available to lease water for environmental benefits. With both boards' approval RFC helped secure 3,500 acre feet of water to supplement winter flows. CWCB staff is now returning to their board to ensure that any of that 3,500 acre feet that is not used during the winter becomes available to the 15-mile reach this summer.

Continued on page 11

RFC continues to work with both the River District and CWCB to discuss creative management options to help meet local needs. For example, the River District re-allocated their reservoir releases for the Grand Valley from other reservoirs and sent additional water down the Fryingpan in July. That release provided flow benefit not only to the Fryingpan, but also the Roaring Fork, where flows were low and temperatures were high. This water, while meeting a downstream use, was able to benefit a local use as well. At a time when water management is as important as ever, we are hopeful that this sort of creative management strategy, designed to meet multiple uses will serve as an example for the future.



*Gardner-Smith, Brent. (2016, April 17) *Who Owns the Water in Ruedi Reservoir?* *Aspen Journalism*, retrieved from <https://www.aspenjournalism.org/2016/04/17/who-owns-the-water-in-ruedi-reservoir/>.



Boulder Boat Works Raffle Winner!

As part of our River Center Grand Opening ceremony on August 10 and 11, RFC raffled off a beautiful Boulder Boat Works Pro Guide drift boat package valued at \$18,000. We were thrilled to pull the winning ticket of Nancy Reinisch and Dr. Paul Salmen of Glenwood Springs. RFC called and emailed Nancy to inform her she had won. This was her email response –

“YAHOOOOOOOO!! Please call me! I bought this ticket for my husband’s 65th birthday and for being the best cancer caregiver ever to me! I am screaming for joy! Oh my gosh, oh my gosh!! Thank you, thank you! Please call me, unless of course, you don’t want to hear screaming!!!”

A perfect ending to a perfect Grand Opening weekend. Nancy, now at age 65 and in the midst of a second battle with metastatic breast cancer, reached a career high by completing her 100th triathlon in 2018. Paul received the kind of birthday present fly anglers dream of. Now he and Nancy can row off into the sunset and enjoy their new Boulder Boat in the same valley where they live, where the boat was made, and where the boat belongs - on the gold medal waters of the Roaring Fork River!

Staff & Board Flows



Matthew Anderson, Watershed Action Intern

Matthew returned to RFC for a second summer to assist our Watershed Science & Policy group. Matthew was born and raised in Basalt and is currently a junior in the Environmental Science and Resource Management program at the

University of Washington in Seattle. Matthew helped conduct water quality field-work, data management, maintained in-stream temperature loggers, and monitored conservation easements throughout the Roaring Fork watershed.



Mercedes Wilson, Executive Assistant/Office Coordinator

As a recent transplant to Basalt, Mercedes welcomes the opportunity to work protecting the Roaring Fork Watershed. Living by the Mississippi and the Indian Rivers forged her passion

for water. Having spent time in Thailand, Italy and Nicaragua served to further her interests in riparian rights, conservation

and wildlife. Mercedes looks forward to supporting RFC’s mission with her management and administrative skills. Mercedes is also Spanish Bilingual with a Master of Science in Disaster, Resilience and Leadership. During her free time, Mercedes enjoys spending time with family, rafting and fishing.



Michelle Schindler, RFC Board Member

Michelle joined the RFC board in 2018. She is an attorney with the Matthew C. Ferguson Law Firm, P.C. in Aspen, Colorado, where she concentrates her practice in real estate and commercial litigation. Michelle grew up in

Madison, Wisconsin and then attended Northwestern University, where she earned her degree in Environmental Sciences. Prior to going to law school, Michelle worked for 5 years in environmental advocacy and the non-profit sector. After attending law school at Loyola University of Chicago, Michelle started her legal career in Chicago, Illinois and several years later moved to the Roaring Fork Valley. Michelle resides in Basalt, Colorado.

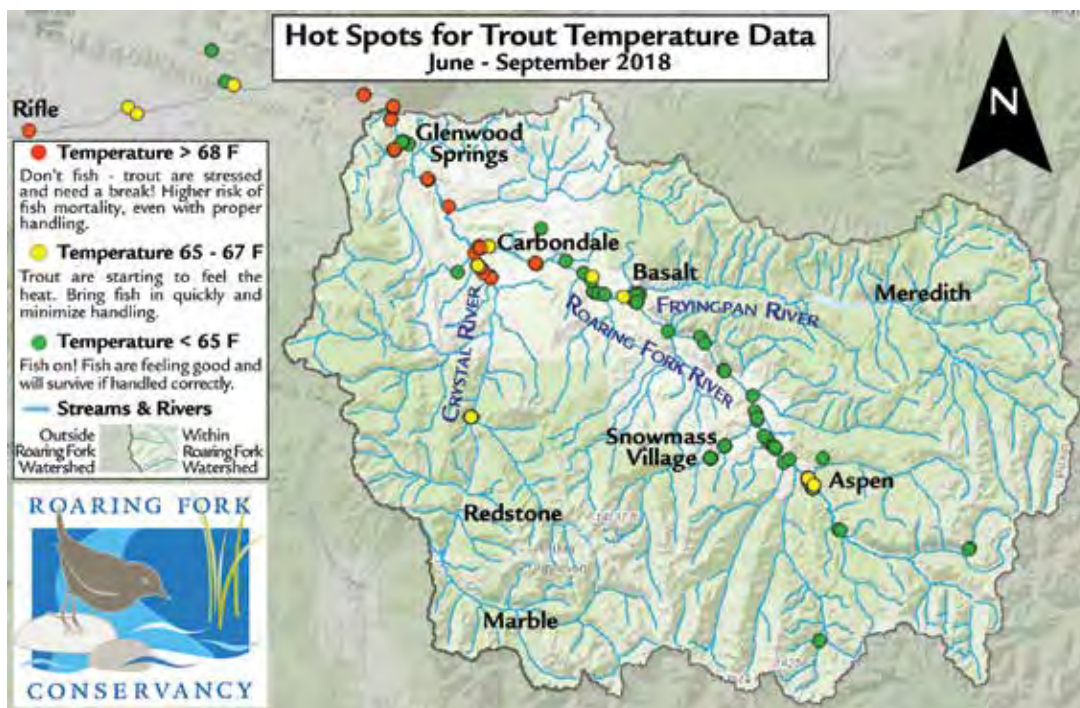
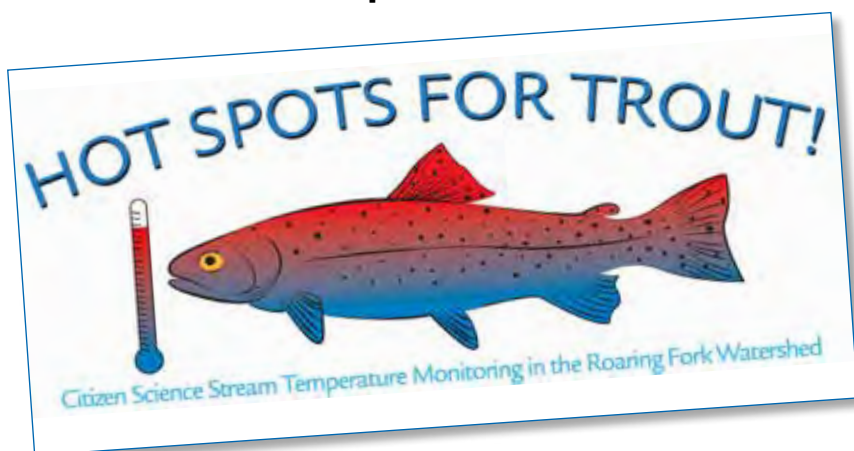
Citizen Scientists Keep a Pulse on River Temperatures!

Kristen Doyle, Watershed Educator

As water temperatures increased and drought persisted this past summer, RFC restarted a citizen science project, Hot Spots for Trout, to monitor local river and stream temperatures.

From June to September, 63 volunteers submitted over 280 observations throughout the Roaring Fork Watershed. That's over 1,000 individual measurements! This information allowed RFC to identify areas of concern and collect additional data where needed. The measurements taken by our Hot Spots for Trout volunteers also helped RFC collaborate with Colorado Parks and Wildlife (CPW), resulting in voluntary fishing closures from 2pm-midnight, giving fish a break in the hottest part of the day.

The data submitted by our volunteers suggests those fishing closures may have prevented a considerable number of trout mortalities. The combined stress of angling and warmer water can be enough to kill, even when anglers follow proper catch-and-release techniques. Stream temperatures were mostly within a healthy range for trout in the Roaring Fork upstream from Basalt (below 65° F). Downstream was a different story. Afternoon water temperatures below Carbondale often crept above 68° F – the temperature at which CPW asks anglers to pack it up and fish another day.



Special thanks to the Roaring Fork Fishing Guide Alliance and the Roaring Fork Valley Fly Fishing Club, whose members stepped up to volunteer and get the word out, CitSci.org, and fishpond, inc. who provided thermometers.

Effects of Water Temperature

Chad Rudow, Water Quality Program Manager

Water temperature can impact both chemical and biological processes in rivers. Chemically, it directly influences pH levels, the speed of chemical reactions, and oxygen levels. In particular, warm water holds less oxygen than cold water, limiting the supply available for aquatic life.

Biologically, higher temperatures increase the rate of energy production and oxygen consumption in fish and aquatic insects. This can cause significant stress on organisms as they require increasing levels of oxygen, which are already limited in warmer water, to maintain body functions.

19TH ANNUAL

River Rendezvous

ON THE BANKS OF THE FRYINGPAN

JULY 11, 2018



2018 River Conservators were Mary & Pat Scanlan and Mark Kleckner & Tracey Snow (pictured here)



Jennifer & Scott Thompson, Basalt & Snowmass Village Fire Chief, with Heather & Greg Knott, Basalt Chief of Police.



Edgell Pyles, Marianne & Dick Kipper, and Marty Pickett enjoy themselves on the banks of the Fryingpan River.



Crosby Vail and Kory Ross attending the trout release tank.



Rick Lofaro, executive director of RFC, with the Boulder Boat Works drift boat raffled off this summer.



Basalt Police Chief Greg Knott and Fire Chief Scott Thompson were honored at this year's River Rendezvous.



Dane Brooksher, Pat McMahon and Judy Baum



Alexandra George, Emily Davis, Sam Broom and Anna Schwinger



Sarah & Robert Woods at their final year of organizing River Rendezvous. RFC will always be grateful for their contributions and service.



Carter Brooksher with Harry and Bonnie Kloosterman and Kathy and Jerry Pettit.

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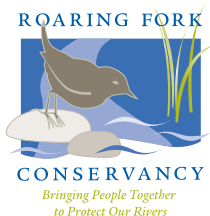
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