Vol 4 Issue 2

Fall/Winter 2014

The Montana Steward

Cfwep.Org

INSTITUTE FOR EDUCATIONAL OPPORTUNITIES

Free

Clark Fork Watershed Education Program

MontanaTech THE UNIVERSITY OF MONTANA

StormWater

It All Goes Down the Drain

Ideas to Better Manage Our Storm Water

INSIDE:

Special 4-Page Storm Water Info Section

Local, State and Federal Agencies and Storm Water

Voices of the Watershed

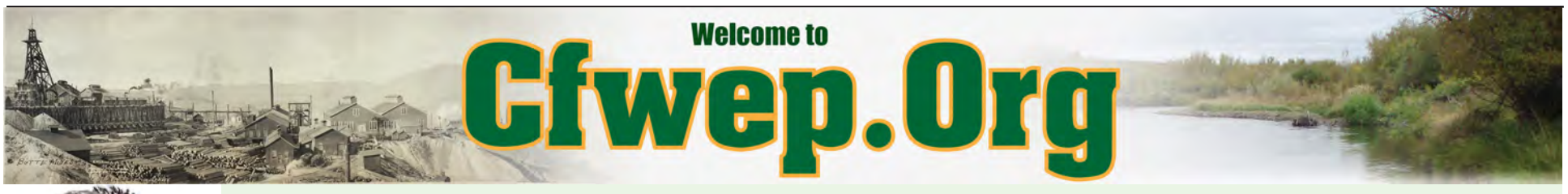
100-Year Flood Dick Gibson

WWW.EcoJazz.Org Goes World Wide

Click on WWW. Cfwep.Org for Watershed News!

Read about Cfwep.Org's 2014 Fly Fishing Camp News!

Missoula's Birds Eye View Joins Cfwep.Org



Clark Fork Watershed Education Program

University of Montana's Bird's Eye View Joins Cfwep.Org

Dalit Guscio and Dr.Erick Greene

The University of Montana is excited to continue our partnership with our long-time colleagues at Cfwep.Org. This partnership provides a unified source for watershed education in the Clark Fork drainage as it relates to damages from a century of mining. We offer both school-year programs and summer programs to children and adults throughout the Clark Fork River Basin.
Through the staff and faculty here at UM, we run three diverse programs that reach out to our community with engaging science education:

1. A **week-long watershed education program** aimed at 5th grade students in the Missoula County Public Schools, as well as Bonner and Clinton middle schoolers (administered in the spring and fall). The program is comparable to the Restoration Education Program (REP) program run by Cfwep.org to schools within the Superfund geographical site. Our program incorporates university students who train as interns – these interns learn the education materials and gain invaluable experience presenting material to school-age children in a way that is clear, simple and engaging. Our children, turns out, love the energy! University students bring enthusiasm and knowledge into their classroom and the young students welcome us.

We also offer **Two summer programs** that use birds as the catalyst to learning about the health of our watershed:

2. **Osprey program** – Through our osprey program, we study osprey chicks in nests along the Clark Fork River. These chicks, given osprey's behavior and natural history, feed solely on fish from the Clark Fork River. By taking feather clippings and small blood samples from osprey chicks, we can measure the level of heavy metals in their blood and tissue that originate from the Clark Fork aquatic ecosystem. Visits to opsrey nests with local schools and camps allow children and community members to see osprey chicks up close and see scientific research in real time. This program is

Dr.Erick Greene

by far a big-time favorite for both us and the public!

3. **Bird banding stations** – Our songbirds are also affected by the health of our watershed. Occurring in the spring and early summer, we capture songbirds at two sites along the Clark Fork drainage and collect information regarding the birds' health and breeding condition. This, in addition to number of species and individuals, provides us information about the level of biodiversity our riparian habitat is sustaining. This program is another favorite of citizens and children. How often does one get to see songbirds in the hand?

For more information, please email Megan @ megan.fylling@umontana.edu(summer programs) or Dalit @ dalit.guscio@mso.umt.edu (school-year programs).

Boom truck returning Osprey chicks to nest

Cfwep.Org Upcoming Events

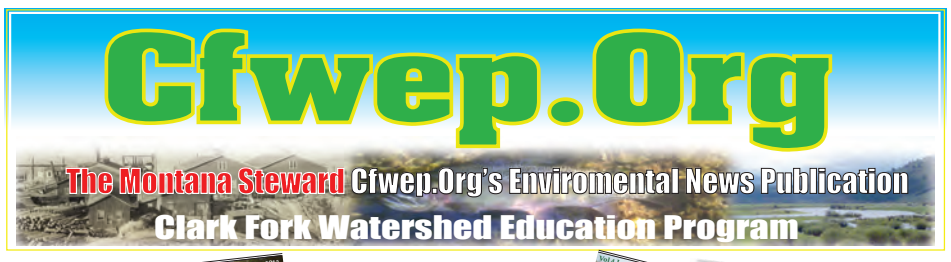
Cfwep.Org staff is in the midst of another fun-filled field season. We started off the season visiting Darcy Schindler and his 7th and 10th grade students at Drummond School. Then we transitioned into East Middle School to visit every 7th grader. It is definitely rewarding to reach all of these students. We are excited to add the Whitehall Home School group to the line-up this fall and talk to them about all things restoration and Superfund! If you would like to volunteer for any of our upcoming fieldtrips, please contact Abby Peltomaa at (406) 496-4790 or via email at apeltomaa@mtech.edu.

Cfwep.Org is recruiting another 45 teachers for the Montana Partnership with Regions for Excellence in STEM (MPRES). The MPRES project is designed to help teachers implement the K-12 Framework for Science Education and the Next Generation Science Standards (NGSS). Teachers who engage in the project will be on the cutting-edge of science education, and will be positioned to be teacher leaders in their districts after the program. The MPRES project leaders are seeking teachers who have an interest in participating in an online graduate course and regional professional learning community (PLC) meetings about the K-12 Framework for Science Education and NGSS for the 2014-2015 school year. We will be hosting an MPRES Teachers' Workshop on October 10th and 11th here at Montana Tech. For more information contact Arlene Alvarado at (406) 496-4833 or via email at aalvarado@mtech.edu.

Cfwep.Org would also like to extend to all of our friends and supporters a warm invitation to our Annual Fundraiser. The fundraiser is being held on Friday, November 14th starting at 6:00 pm at the Quarry Brewery on 124 West Broadway Street. Dust off your fanciest clothes and join us for this very special black-tie event. Please see our ad in this issue for more information.

We are also recruiting 30 teachers for our project entitled, "Bringing Research into the Classroom (BRIC): A Partnership for Research and Education in the Montana Public Schools" sponsored by a National Institutes of Health Education Partnership Award (NIH-SEPA). The BRIC project builds upon eight years of collaborative efforts between the Montana Tech Phage Discovery Program and Cfwep.Org. The project directors have designed a program of intensive teacher professional development combined with in-class bacteriophage discovery mentored by Montana Tech faculty and undergraduate students. The project goal is to equip Montana's K-12 teachers with the knowledge, skills, and dispositions to provide high-quality, health science research opportunities for students. The project starts in January with the first workshop. Please visit our website, Cfwep.Org, for more information.

Don't forget to come and see us in Missoula at the MEA-MFT Educators' Conference on October 16th and 17th. Please visit the MEA-MFT website for more information, http://www.mea-mft.org/.



Cfwep.Org is part of the University of Montana system and our offices are located in Butte at Montana Tech. We are mandated by the State of Montana to provide outreach information concerning the Clark Fork Watershed.

THE DEAD ZONE ON SILVER BOW CREEK

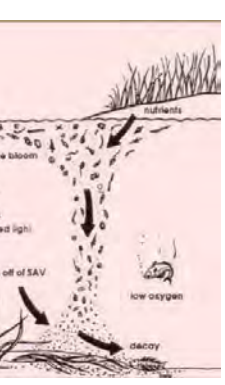
From: Students from Kennedy School

Questions: Many students expressed concern about the 'dead zone' on Silver Bow Creek near the waste water treatment plant. They asked, "What do you mean by 'dead zone?"

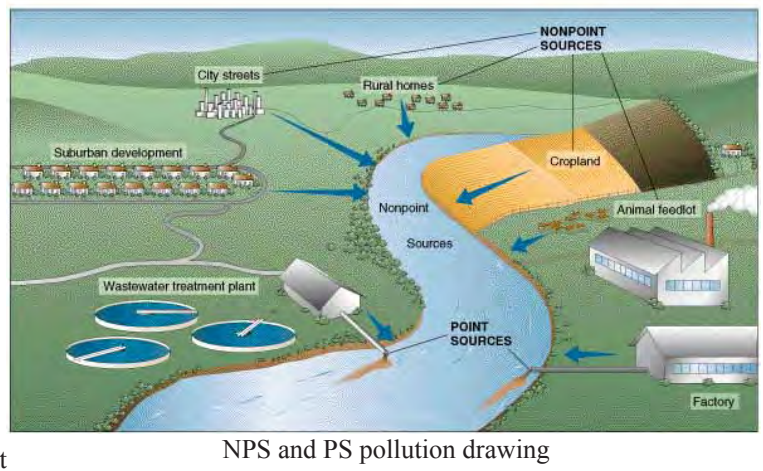
As I wrote in my last column [Montana Steward, 2014, Vol. 4 (1)], for over 100 years Silver Bow Creek was functionally dead, meaning it could not support the biodiversity typical of a Montana mountain stream. The damage to the creek was mostly due to historical mining practices. Silver Bow Creek is doing much better these days, now that mine wastes have been removed, the stream banks have been rebuilt, and the riparian habitat has been revegetated. Silver Bow Creek is certainly showing signs that it is coming back to life as evidenced by trout returning to the creek. However, all is not perfect. Data collected by several researchers, including Beverly Plumb, a graduate of Montana Tech's Geochemistry Graduate program and her advisor, Dr. Chris Gammons, has shown that Silver Bow Creek (SBC) is suffering from hypereutrophication as it flows between Butte and Rocker. This 4-mile stretch of creek that starts just below the waste water treatment plant has been dubbed the 'Silver Bow Creek Dead Zone.' In order to understand what is meant by a 'dead zone' in a stream, I will first explain the term 'hypereutrophication,' then review some basic chemistry and the biological requirements of aquatic life, most especially, trout. To understand 'hypereutrophication,' let's break this long word down into hyper- and eutrophication. Hyper- is a prefix that means 'excessive, above normal, high, or over'; so for example, hyperthermia means 'high or elevated body temperature.' Eutrophication is a word that originally meant one thing, but has now come to mean something else. Originally, eutrophication meant 'nutrient-rich' and was derived from the Greek word, eutrophia which means 'healthy, adequate nutrition.' It was used to describe the natural process of aging in lakes or ponds, as the concentrations of plant nutrients built up over very long periods of time. This aging process, however, can be accelerated by human activity that result in the input of nutrients beyond what the aquatic system can handle. Because human-caused eutrophication has become so common, the word eutrophication now has a negative connotation and has come to mean 'a very harmful increase and acceleration of nutrients' in water bodies. It is more accurate, however, to call a naturally-aging lake or pond that is nutrient-rich, eutrophic, and a water body that is experiencing excessive nutrients (more than the system can handle) caused by human activity, hypereutrophic.

Dr. Gammons and Aquatic plant overgrowth in SBC

You may now be wondering how hypereutrophication is related to the fact that Silver Bow Creek has a 4-mile dead zone. Put another way, why and how do excessive or high nutrient levels cause a dead zone in the creek? To answer that, let's review some basic plant biology. In addition to carbon dioxide, water and sunlight, plants need nutrients (food) to develop, grow and reproduce. Three of the most important nutrients plants need are nitrogen, phosphorus and potassium, and these are the three elements you find in most packaged plant fertilizers. Similarly, algae depend on these nutrients for their growth. When excessive amounts of these nutrients enter a water body, such as Silver Bow Creek, algae and plants will respond with rapid growth – much faster than would happen under natural eutrophication. As they say, "Too much of a good thing can be a bad thing." And this is true of excessive nutrients entering water bodies. Where do the nutrients come from? Excessive nutrients result from many sources - industrial and agricultural discharges into water, fertilized lawns and parks, as well as detergents, animal waste, septic systems, and also from waste water treatment plants that treat human waste. Fertilizer, human waste and animal waste are loaded with high levels of nutrients, such as nitrogen and phosphorous. When this 'plant food' enters a water body, it causes rapid growth of algae and aquatic plants, as mentioned earlier. Besides physically interfering with normal aquatic processes, such as blocking sunlight and creating obstacles for aquatic life, this excess in growth of photosynthetic organisms (plants and algae) results in lower-than-normal dissolved oxygen concentrations. Dissolved oxygen is vital for aquatic animals to survive and thrive, especially the gill-breathing insects and fish. Perhaps you are wondering why rapid growth of photosynthetic organisms in water bodies results in decreases in dissolved oxygen concentrations. To answer that, we need to briefly review photosynthesis and respiration in plants and algae. We all know that photosynthesis is how plants and algae make their food. During photosynthesis, carbon dioxide, water and sunlight (photons) are converted into sugar and oxygen. But what happens at night, when there is no sunlight? During the dark hours, plants and algae metabolize (burn) the sugars they created during daylight hours to yield energy for growth, reproduction and other life processes. Like animals, they consume oxygen in order to power their metabolic processes. Therefore, the greater amounts of plants and algae in the water, the more oxygen they consume during nighttime. An overabundance of plants and algae consumes oxygen that would normally be available to fish and insects for their metabolic processes. So, when streams, rivers, lakes and ponds experience hypereutrophication, we see plants and algae consume greater amounts of oxygen, which decreases the availability of oxygen for animals. But it doesn't stop there. The abundance of plants and algae in the water also means more dead, organic material in the water. Guess what the bacteria that feeds on dead organic matter uses to do their decomposing? You guessed it — **Oxygen!**



Aquatic plants and decreasing DO



NPS and PS pollution drawing

So, not only are plants and algae sucking up dissolved oxygen from the water, but so are the bacteria that decompose dead organisms. Dissolved oxygen levels decrease so much that the fish and insects literally suffocate. In Silver Bow Creek, a big source of excess nutrients is coming from our waste water treatment plant. Luckily for us and our Silver Bow Creek, Butte's waste water treatment plant is being upgraded to help reduce or eliminate discharges of excess nutrients. This is great news for our creek. However, another source of excess nutrients is our backyards! When we apply lots of fertilizers to our lawns and gardens, rain storms and melting snow washes lawn fertilizer away and carries it directly into our creek. There are ways to minimize your contribution to excess nutrients in stormwater. For example, the use of liquid fertilizer instead of pellets ensures that the fertilizer gets taken up by the plants in your yard and not just washed away. Additionally, time of year and time of day, and the concentration of the fertilizer are important factors to consider when applying fertilizer and protecting the creek. For more ideas on how you can help to keep our stormwater safe for our creeks, check out the Stormwater insert in this issue.

Ask Dr. A

Dr.Arlene Alvarado

StormWater

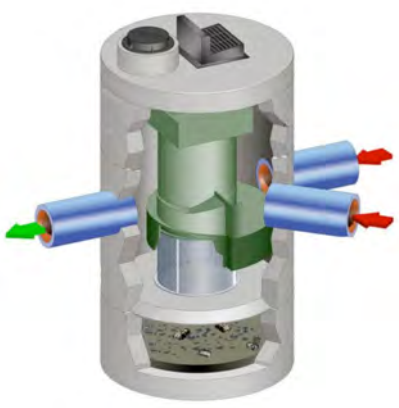
Cfwep.Org

Report Runoff

Butte-Silver Bow and other counties have stormwater ordinances that define and prohibit illegal discharges, and require citizens and contractors to comply with stormwater controls and best management practices. If you notice a construction project that is not using proper stormwater controls and sediment is flowing into a storm drain with stormwater runoff, or you notice an area that should have a trash can or pet waste receptacle, or have other stormwater-related concerns, call Butte-Silver Bow at (406) 497-6500, Monday to Friday, 8 am – 5 pm.

Hydrodynamic Devices (HDDs) in Butte-Silver Bow County

In 2013, Butte-Silver Bow County (BSB) began installation of six hydrodynamic devices (HDDs) at the base of the Butte Hill. HDDs capture approximately 70% of sediments, trash, debris, and oils in stormwater. The six HDDs are located strategically at the bottom of stormwater drainage basins in Butte. Though stormwater is not treated before entering Silver Bow Creek, HDDs are simple, yet effective, engineering tools that result in water with fewer suspended solids flowing into the creek.



BSB inspects the HDDs at least every three months, and regularly vacuums them to remove sediment and debris. Maintenance is important to ensure that the HDDs work properly. Vacuuming the HDDs prevents flooding and scour damage to the HDDs. Since installing the HDDs, the total suspended solids (TSS) flowing into Silver Bow Creek have decreased significantly, and BSB did not have an exceedance of TSS in the first reporting period of 2014.

Training for Contractors and Butte-Silver Bow Employees

Silt Fencing
Photo Courtesy of Patty Hamblock, WET

Since adoption of Ordinance No. 10-13, Municipal Storm Water Engineering Requirements, every contractor must complete a storm water permit along with the usual building permits required for a new project. Local contractors, architects, engineers, and BSB employees have been undergoing training in storm water best management practices in order to comply with the new regulations. Are you interested in attending a training? Contact Cfwep.Org at 406-496-4898 for a schedule of upcoming trainings and watch for notices in the Montana Standard.

What are the storm water best management practices? Here are a few: Construction Best Management Practices (BMP's) are used during construction and are designed to keep sediment from leaving the construction site. These interventions are meant to be temporary and are removed at project completion. Silt fencing, straw wattles, rock wattles and vegetated buffers are all methods of maintaining sediment on a construction site.

Permanent Stormwater Best Management Practices (BMP's) are part of the engineering and architectural design of a project. The Principal Engineer (PE) completes a storm water analysis as part of the permitting process. This analysis ensures that there is adequate storm water control measures in place once the site construction is complete. In other words, the new construction cannot increase water flow beyond the original conditions of the site. Permanent BMP's may include retention/detention ponds, oil/water separators installed in parking lots, stormwater storage modules, vegetated swales, rain gardens, and curbing.

Cfwep.Org

Who We Are!

Clark Fork Watershed Education Program

Cfwep.Org has been a leading provider of environmental and restoration education programs and services in western Montana since 2005. **Cfwep.Org** offers multi-disciplinary science and history programs for schools, teachers, and students in the Upper Clark Fork Basin. We also offer public education and outreach services such as tours, events, and publications that connect the public with the science and history of the amazing landscape of western Montana.

Cfwep.Org is physically located in the Health Sciences Building on the campus of Montana Tech in Butte, Montana. Our mailing address is Cfwep.Org @ Montana Tech, 1300 West Park Street Butte, Montana 59701.

Cfwep.Org is our web address. Please direct your comments and suggestions to info@cfwep.org or **Rayelynn Connole at rconnole@mtech.edu.**

The Montana Steward is a quarterly publication of the **Clark Fork Watershed Education Program**. The Montana Steward reserves the right to control its own publication schedule. Cfwep.Org is part of the Institute for Educational Opportinities at Montana Tech of the University of Montana, a 501c3 non-profit educational institution.

FREE WATER METERS

SAVE $$$ and Help Conserve Water

Why You Should Get on a Water Meter Now:

- A water meter can save $$$ on your overall waterbill. A random sampling of 30 homes saved an average of over $350.00 per year after installing a meter.
- Charge for Use of Hose and Sprinkling fees would not be itemized separately but charged based on meter use.
- Under the BSB Water Utility Division NRDP program, water meters are installed FREE, a $347.00 value.
- Water meters can also help with water conservation. As Butte gets the majority of it's public water from the Big Hole River, by installing a meter you will be helping to insure base flows in one of Montana's most pristine rivers and one of Butte's favorite rivers.
- Only 350 FREE meters are left for 2014. Take advantage of this program while you can.

All water customers who are on the flat rate billing system should take advantage of this opportunity.

Water meters are now being installed for FREE utilizing grant money from the Natural Resource Damage Program (NRDP)

To participate in the FREE water meter program
contact BSB Water Utility Divison
Jack 497-6507 or Tawni 497-6501

Eventually all water accounts will be required to have a water meter.
Act now to take advantage of the NRDP water meter program.

Become a Stormwater Ambassador

Be sure to spread the word about stormwater best practices to your friends and family.
Interested in getting involved? Contact Cfwep.Org at cfwep@mtech.edu or (406) 496-4898 to learn about our storm drain mapping and marking program. We always welcome volunteers!

Special Pull Out Section

Cfwep.Org

STORMWATER

It All Goes Down the Drain

What is stormwater and where does it come from?

Stormwater begins as precipitation. In our watershed, the precipitation is mostly in the form of snow, snow melt and spring rains. When precipitation encounters an impervious surface like pavement, concrete, or a rooftop, it flows downhill and becomes stormwater runoff.

Storm Water Facts

Why is stormwater important?

Only Rain in the Drain!

Stormwater flows down residential streets, picking up nonpoint pullution along the way. Photo Pat Munday

Stormwater runoff picks up nonpoint source pollutants as it flows downhill. Nonpoint source pollution is characterized as being any diffuse pollution that cannot be traced to a single source (like a drain pipe, ditch, or container). Rather, nonpoint source pollution comes from many different sources, and is not easily traced. It can be in the form of motor oil, paint, fertilizer, other chemicals, pet waste, cigarette butts, trash, and sediment.

Nonpoint source pollution is the largest form of pollution to our nation's surface waters, and stormwater is a leading cause of pollution in Montana (Montana DEQ 2014).

Needless to say, stormwater is a huge problem. Despite this, it is possible to prevent many of these nonpoint source contaminants from reaching surface waters by disposing of them properly.

Don't dump! The best way to prevent waste from entering our waters is to dispose of waste properly and never dump anything into a storm drain. Remember stormwater does not get treated. As we say here at Cfwep.Org, "Only Rain in the Drain!" Cleaning paint brushes in a sink, not outside, and disposing of wastes properly at the dump are two easy ways to help keep stormwater clean.

Butte-Silver Bow Stormwater Ordinance No. 10-13

The Butte-Silver Bow Stormwater Ordinance No. 10-13, was implemented to help minimize impacts to BSB's municipal system and local receiving waters both during and after construction. The ordinance ensures that developers complete an engineering analysis prior to construction and ensures proper installation of stormwater controls. The Department of Environmental Quality (DEQ) requires that each municipality over a certain population size maintain a Municipal Separate Storm Sewer System or MS4 permit. This permit drives much of what is required by in the BSB Ordinance. In addition, Butte's Superfund status adds another layer of regulation for stormwater. The BSB ordinance specifically outlines the following:

Article I: General Provisions—This section outlines the objectives and definitions of stormwater and provides BSB with the legal authority to require storm water controls.

Article II. Construction/Post Construction Storm Water Requirements—This section lists the permit requirements, defines the review times, and establishes the engineering standards for stormwater.

Article III. Illicit Discharge Requirements—This section prohibits illegal discharges and illicit connections to the storm drain system.

Article IV. Storm Water Fees—establishes a Storm Water Utility Fund.

For more information about Ordinance 10-13, visit the Butte Silver-Bow website at http://www.co.silverbow.mt.us/

Trainings are provided by Water and Environmental Technologies and Cfwep.Org for local contractors regarding the permitting requirements and storm water best management practices.

For more information, Contact Rayelynn Connole at 496-4898 or rconnole@mtech.edu.

How do different kinds of surfaces influence stormwater runoff?

Because we live in an urbanized watershed, we are surrounded by impervious surfaces. Examples of impervious surfaces include pavement, concrete, and rooftops – surfaces that do not absorb water. Conversely, porous surfaces like vegetated ground absorb water and prevent excess stormwater runoff. By increasing the percentage of our watershed covered by vegetation, or using vegetated areas as tools to trap and absorb stormwater before it reaches a storm drain, we can improve the water quality in Silver Bow Creek.

The Director's Letter

Rayelynn Connole

Fall 2014 Issue

*I*n this issue, we explore issues related to stormwater. Stormwater control and management is a pressing need throughout the nation. As our landscape has evolved to be more urbanized, impervious surfaces now dominate landscapes that otherwise retained and absorbed water. These surfaces increase the volume of water that flows into our receiving water bodies. In addition to increased water flow, the variety and number of contaminants entering the stream has also increased.

Each and every person on earth contributes to stormwater in some fashion. The non-point nature of stormwater makes management exceptionally difficult. The actions that each person takes to protect or harm stormwater are magnified throughout a given watershed. For example, in the Clark Fork Watershed, Butte is the headwaters region. Each citizen in Butte contributes to the stormwater runoff in our city. As Silver Bow Creek makes its way out of Butte, through Rocker and Ramsay and to its confluence with Warm Springs Creek, each community, home, farm, and highway along the way also contributes to the stormwater runoff in the creek. A little bit of pollution from Butte is added to a little bit of pollution from the highway, and a little bit more from each community along the way until the confluence, at which point, each little bit has magnified into a significant quantity. Imagine this magnification effect across the entire landscape of the Columbia River Watershed from Butte to the Pacific Ocean. Add a bit of contamination from each community within the watershed and soon the effect on the ocean is incredible.

In 1987, Congress mandated through the Clean Water Act that the Environmental Protection Agency (EPA) control stormwater pollution through the National Pollutant Discharge System (NPDS). The EPA instituted stormwater control measures for municipal separate storm sewer systems (MS4). Each community meeting the population threshold set forth by EPA needed to comply with the MS4 regulations. The MS4 program is designed to decrease the impact of stormwater across the United States.

Each MS4 community is required to implement six minimum control measures for its Storm Water Management Program (SWMP). The control measures are: 1) Public Education and Outreach on Storm Water Impacts; 2) Public Involvement/ Participation; 3) Illicit Discharge Detection and Elimination; 4) Construction Site Storm Water Runoff Control; 5) Post-Construction Storm Water Management in New Development and Redevelopment; and 6) Pollution Prevention/Good Housekeeping for Municipal Operations.

Butte-Silver Bow has made great strides implementing these minimum control measures in recent years. Most notably, Butte-Silver Bow has enacted a Municipal Storm Water Ordinance (No. 10-13) which addresses all of the minimum control measures other than public education and public involvement. Over the past two years, Water and Environmental Technologies (WET) and Cfwep.Org have been providing training for area contractors and Butte-Silver Bow employees regarding the SWMP, the Butte-Silver Bow ordinance, and best management practices for stormwater. Throughout this issue, you will find more detailed information about the efforts underway in our community as well as tips for individual homeowners. Each one of us needs to be mindful of our stormwater impacts. Our individual efforts can greatly impact our streams. Let's each commit to doing our part to keep our newly restored Silver Bow Creek clean and healthy!

We Love Our Volunteers!

We here at Cfwep.Org are so incredibly fortunate for the volunteers that we have. You come out time and time again to help us teach and inspire future generations. We rely heavily on you for your expertise, and appreciate that you stand with us through challenging weather conditions. We would personally like to thank each and every one of you for your outstanding commitment to our program.

We would like to give a special shout-out to our two volunteers of the year: Sarah Hamblock and David Butler. You have been selected as "Cfwep.Org's Volunteer of the Year." You both were out with us rain or shine throughout the entire season. Dave also snapped some incredible pictures of our Blacktail Creek Clean-Up Day last May. Thanks you guys!! We are so grateful for all of our volunteers – we could not have done it without all of you!

If you are interested in volunteering with Cfwep.Org, please visit our website for a list of dates at: www.cfwep.org. You can also contact Abby Peltomaa via email, apeltomaa@mtech.edu, or by phone, (406) 496-4790. Thank you in advance!

The following is a list of volunteers from our Spring 2014 field season and this Fall 2014 field season:

Matt Berzel
Vanna Boccadori
Callie Boyle
David Butler
Eyvanna Connole
Debbie Crow
Tedd Darnell
Lacey Dobyns
Kriss Douglass
Joe Griffin
Arwin Gunawan
Casey Hackathorn
Sarah Hamblock
Trevor Ivory
Garret Karnath
Jeanne Larson
Troy Lechman
Brandon McLean
Sean Milligan
Sara Rouse
Jessie Salix
Austin Timmons
Nick Tucci
Brian Varner
Logan Ward
Karen Wesenberg-Ward

Volunteerism:

Get your feet wet.

Want to Volunteer with Cfwep.Org teaching young folks about Environmental Stewardship? Call Abby @ 496-4790 for more information.

Spotlight On Partners

INSTITUTE FOR EDUCATIONAL OPPORTUNITIES

The Institute for Educational Opportunities offers a comprehensive array of programs for students and teachers. The Institute's efforts are designed to build on strengths in mathematics, engineering, sciences, technology and environment restoration while making use of existing resources. Institute staff are committed to student success. As such, students are matched with programs that meet their individual needs. There is no "one-size-fits-all" approach to student support.

Teachers interested in challenging their students by integrating more inquiry and rigor can also turn to the Institute for support. There are a number of professional development resources available to help those teachers who wish to empower their students with the tools they need to succeed in college.

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Dr. Arlene Alvarado
Montana Steward Contributors
Page 2 BEVP- **Dalit Guscio/Megan Fulling, Dr. Erick Greene**
Upcoming Events-**Abby Petaloma**
Page 3 -**Dick Gibson**
Page 4 Volunteers- **Abby Petaloma**
Page 5 Stormwater- **Emily Munday**
Rayelynn Connole, Ian Magruder, Patty Hamblock

TRIO

STEM STUDENT SUCCESS SERVICES

The Federal TRIO Programs (TRIO) are federal outreach and student services programs designed to identify and provide services for individuals from disadvantaged backgrounds. TRIO includes eight programs targeted to serve and assist low-income individuals, first-generation college students, and individuals with disabilities to progress through the academic pipeline from middle school to post-baccalaureate programs. TRIO also includes a training program for directors and staff of TRIO projects. One of these programs is Talent Search.

Montana Tech's Educational Talent Search (ETS) program will provide academic, career, and financial counseling to our high school and middle school participants and encourage them to graduate from high school and continue on to the post-secondary school of their choice. Montana Tech's ETS program currently serves 11 high schools and middle schools in the Butte, Anaconda, Deer Lodge and Helena areas. If you would like more information on the Educational Talent Search program, please call the program's Associate Director, Michelle Christianson at 406-439-2387.

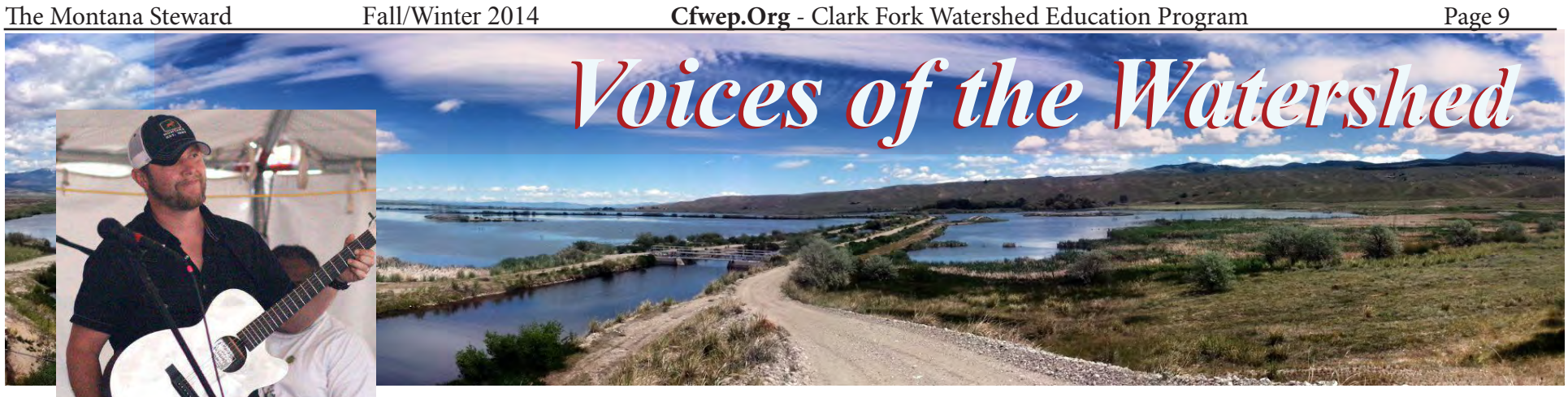
Page 9-**Rayelynn Connole**
Page 10- **Chris Doyle**
Page 11-**Dr. Arlene Alvarado**
Page 12-**Chris Doyle**

On Our Cover

Upper Photo; fs.usda.gov
Lower Photo; Brian Varner
Collage: Frank Ponikvar

Voices of the Watershed

Dr. Chad Okrusch



"Warm Springs Ponds"
Photo by Dr. Chad Okrusch

The Cfwep.Org program maintains our position as educators. The opinions and perspectives presented by the interviewees are reflective of that person and not necessarily those of Cfwep.Org or its partners. Our goal is to create an active and informed citizenry who are able to make decisions based upon scientific fact. We believe that sharing multiple viewpoints regarding the restoration process is a means to achieving this goal. We hope you enjoy the series!

For this edition of the Montana Steward, we sat down with ***Dr. Chad Okrusch*** *of Montana Tech's Professional and Technical Communications Department.*

Dr. Okrusch is also a member of the Butte Natural Resource Council (BNRC) and active with many other community groups, including serving as an active volunteer and former advisory board member of Cfwep.Org. His unique perspective and unwavering dedication to public involvement in the restoration process is reflected throughout his career, his writings, and even within his music.

Cfwep.Org: *How did you become interested and involved in the Clark Fork restoration process?*

It started in the late 1800's (laughs). It started with a love affair with the Big Hole River. I was interested in the river's ecology. For me, fly fishing was an entrance to the ecology and entomology of the stream. I was fascinated by the network and complexity of living systems. I bought specimen vials and collected my own samples of macroinvertebrates and tried to identify them.

I was asked to join the Big Hole River Foundation and, eventually, their Board of Directors. I helped with writing their mission statement and statement of values – which they still use today. It allowed me to participate in an organization that was focused on the integrity of a living system, and was doing it in such a way that they valued the human relationship to the river.

As a student at Montana Tech, I investigated the history of Montana fishing management practices. As part of that research, I interviewed Gunner Kalsta from the Big Hole and came to understand the issues facing our rivers. The experience was transformative for me. I decided to change career paths after these experiences.

Initially, I was involved in a very technocentric career. I was an early adopter of web design and creating web pages. This work was limiting for me. I wanted to study rivers, specifically, consensus councils and the way that communities make decisions about their watershed. I left for Oregon to pursue my PhD in Environmental Science and Policy. I didn't want to be in Butte at the time. Frankly, at the time Butte was sad and we weren't making much progress. When I got to Oregon, Butte was in the rear view mirror. However, when I began my studies, I realized that Butte and the Clark Fork River were exactly what I should be studying. I was able to be objective and removed from the issues, looking at them through the new lens of my studies. I realized the spectacle of Butte. It's visually mind-blowing. People were interested in the stories I would tell about Butte and I was encouraged to take my studies deeper. My dissertation became about the moral frameworks that guide our environmental laws and policy. I looked at how we say we are in law and policy and what we say we value, and then compared what is written in policy with what is implemented. In other words, do we 'walk our talk' when it comes to environmental issues? Do we have meaningful public participation in the process? I looked at these ideas in policy and law that are explicit and require that the people, who will live with the consequences of these decisions, must participate in a meaningful way. I came to the conclusion in my dissertation that you measure success of any environmental action, not only by the vitality of the on-the-ground ecological outcomes, but also by the vitality of the democratic process that led to those outcomes.

Cfwep.Org: *Tell us about your work with the Butte Natural Resource Council (BNRC). Why did this council in particular interest you?*

In the last pages of my dissertation, I discuss how we can implement public involvement policies. The BNRC gave me an opportunity to put the principles into practice, to stop being an academic observer and become a participant. The value statements that we created were in direct alignment with my previous work. The spirit of that group was exactly what was intended in policy, and the BNRC represents the success that can come when we have an active and engaged public involved.

The BNRC created a deliberative and informed dialogue with the public. People were able to be heard through this council. We wouldn't have been having the conversations about the Parrott Tailings if it weren't for the BNRC. We wouldn't have money set aside for the removal of it (Parrott Tailings), if it weren't for the BNRC. We've provided a space and time for people to share their perspectives. We have lived out all of our values with great success. I am proud of the public participation and the work this group has done. People have bought in and feel like they have been heard. Because people have been involved, they will care for the watershed and the restoration much more so than if the restoration processes were imposed upon them.

Cfwep.Org: *From your perspective, do we 'walk our talk' as you have described in terms of public involvement?*

Yes and no. In some ways, Butte is an exemplar of United States environmental decision-making. It's a combination of bureaucratic rationalism and economic rationalism. The market and the agencies (experts) make decisions. The third way, which is enshrined in the laws, is democratic pragmatism – again, the people are involved in the process.

In practice, for many of the big decisions related to Superfund here in Butte over the last thirty years, the bureaucracies, from local to federal levels, and the corporations have imposed decisions upon us. They have operated with an inertia, kind of like being steamrolled. The people would speak in fragmented voices, in small groups that would fight. They didn't have the focus or the resources to do battle with any of the agencies. The public voice was steamrolled for a long time. It has been a paternalistic practice for a long time – which is 'decided, announce, and defend' (DAD). The DAD process has been at work with the various agencies involved in Superfund in Butte. People would be given opportunities to speak about issues due to the law, but it was in appearance only because the bureaucracies and the corporations had already made a decision and would simply defend that decision in the public meetings. Public involvement was a checkbox on a list.

The Butte story is unique because of the stubbornness and obstinacy of the Butte people. We inserted ourselves into the process, despite the steamroller. We refused to accept that we had to live with the decisions made without us. The deep history of social solidarity and organization of Butte people standing up together to do battle against the corporation feeds this value. We know we have to come together in order have our voices heard. It's in our blood. It's part of who we are. In this case, we've inserted ourselves in the process at various places along the way. Examples of this insertion are the Greenway (Trails) project, and citizens standing up and demanding this creek be a cutthroat habitat. It wasn't originally in the plan to have either a Greenway or keep Silver Bow Creek exclusively cutthroat, yet because the people were loud and demanded these things, they are now part of this restoration plan.

The Butte Natural Resource Council (BNRC) was created because of those people who were willing to stand up and be heard. They told the governor that the people needed to have the lead voice in how to spend this money. We were not willing to give it to Butte-Silver Bow, or trust that DEQ (Department of Environmental Quality) would do what's right for Butte, nor could we have ARCO making the decisions. I am very proud of the work of the BNRC. We are trending toward intelligent decision-making instead of 'ad hocery.' Our ecological IQ as a community is much higher than it was in the past. We are making much better decisions now – because we have public participation.

Cfwep.Org: *You've talked about the importance of citizens coming together and being heard. Why do you think that some people don't get involved? How do we engage more of our citizens?*

It's a combination of things. It's a learned helplessness – apathy. When people have been beaten down for so long, it's hard to replenish their goodwill. Not everyone can be a consistent player; some people wear out from pure frustration and give up the cause. Another part is the collective apathy, 'Butte is just an old mining town.' That attitude and apathy doesn't inspire change or allow us to think differently about our community.

The BNRC meetings can be inspiring. People are convinced that the BNRC is doing good work. The integrity and credibility that is present within that board help persuade people that we 'walk our talk.' People are intrigued by the opportunity to be heard and make decisions together. We seek feedback from the public and we act upon that feedback

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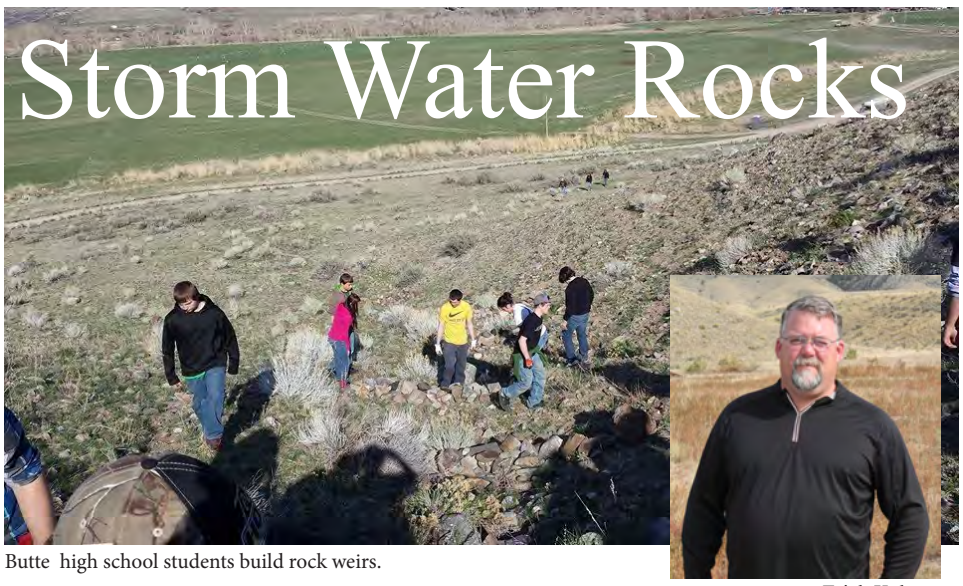
Cfwep.Org: *What's next?*

People have fought for the right things to happen; for example, the removal of the Parrott Tailings and the Diggings East Tailings are the right things. We can transform these dead and dangerous areas in the middle of our town into a vital space for the community. We could have a park complex that connects the Civic Center to the KOA with trail work and make this a vital space. The Restoration Revolution that is unfolding here is an incredible story. I am ready to pick up the story at this spot. I look forward to the day when I am driving with my daughter and point to the beautiful park complex and say, 'I remember when…' That is the legacy I hope to leave. I am proud that the community and BNRC will make that vision come true.

Storm Water Rocks



Butte high school students build rock weirs.

Erick Kalsta

Erick Kalsta is a cattle rancher in southwest Montana, near Glen. Erick's family has been in this area since the 1880's. The land has been in his family's name for four generations, since 1896.

Erick Kalsta is very knowledgeable about the area and about stormwater management. He has partnered with Cfwep.Org for many years on a number projects. Cfwep.Org gets kids out to his ranch for different learning opportunities, including conservation projects, cattle branding, and stormwater management. Many projects involve helping with the implementation of best management practices on his property. Erick has always been interested in everything related to his property and to being a cattle rancher, and is especially interested in his land's water and vegetation resources. His great grandmother and grandmother both kept journals that provide Erick with a reference to what was there before official records were kept. This region receives about seven inches of rain per year, some of the lowest amounts in the state of Montana, so it can be challenging for ranching. Erick has always been curious as to why his grandmothers' journals said that the "grasses used to be belly high to a mule" in this area, because this area now is dry and the vegetation does not grow that high in the upland habitat, even in great rain years. This is the mindset that got Erick interested in starting to look at how he could help the vegetation system on his property.

rock weirs

In the late 1800's and early 1900's, the Big Hole River was used to transport cattle and sheep to the mining camps in Bannack and Virginia City, and later on, to camps in Butte and Helena. The cattle and the sheep ate everything they could along the way. Moreover, people moved through this area with their livestock based on the most convenient time for travel, and not necessarily the best time for the vegetation. Thus, the vegetation in this region was severely damaged from over-grazing. The subsequent erosion of rich, organic soil that is needed for healthy plant communities, ended up being washed away by rain events or blown away in wind storms. All that was left was a soil that didn't have much organic matter left in it, and some undesirable plants that were capable of growing in these inadequate conditions. Erick thinks that another very important reason that the landscape in this area is not as lush as had been described by his grandmothers, is because of horses. In the early 1900's, before World War I, the horse-breeding industry was huge, and horses were constantly being raised and bred to support cavalries and for general travel. After the 1920's, the automobile became a more reliable way of travel, so the horses were abandoned and left to run wild. In later years, people were able to earn money rounding them back up. As stated in Erick's grandmother's journal, she once rounded up 750 horses in one trip around McCartney Mountain. The vegetation was eaten down to almost nothing because of the way that horses eat vegetation, and the number of horses that were running wild over the landscape. Coupled with the lack of rain in the area and the history of previously being over-grazed and having that organic soil exposed and washed away, it has been extremely difficult for the vegetation system here to rebound.

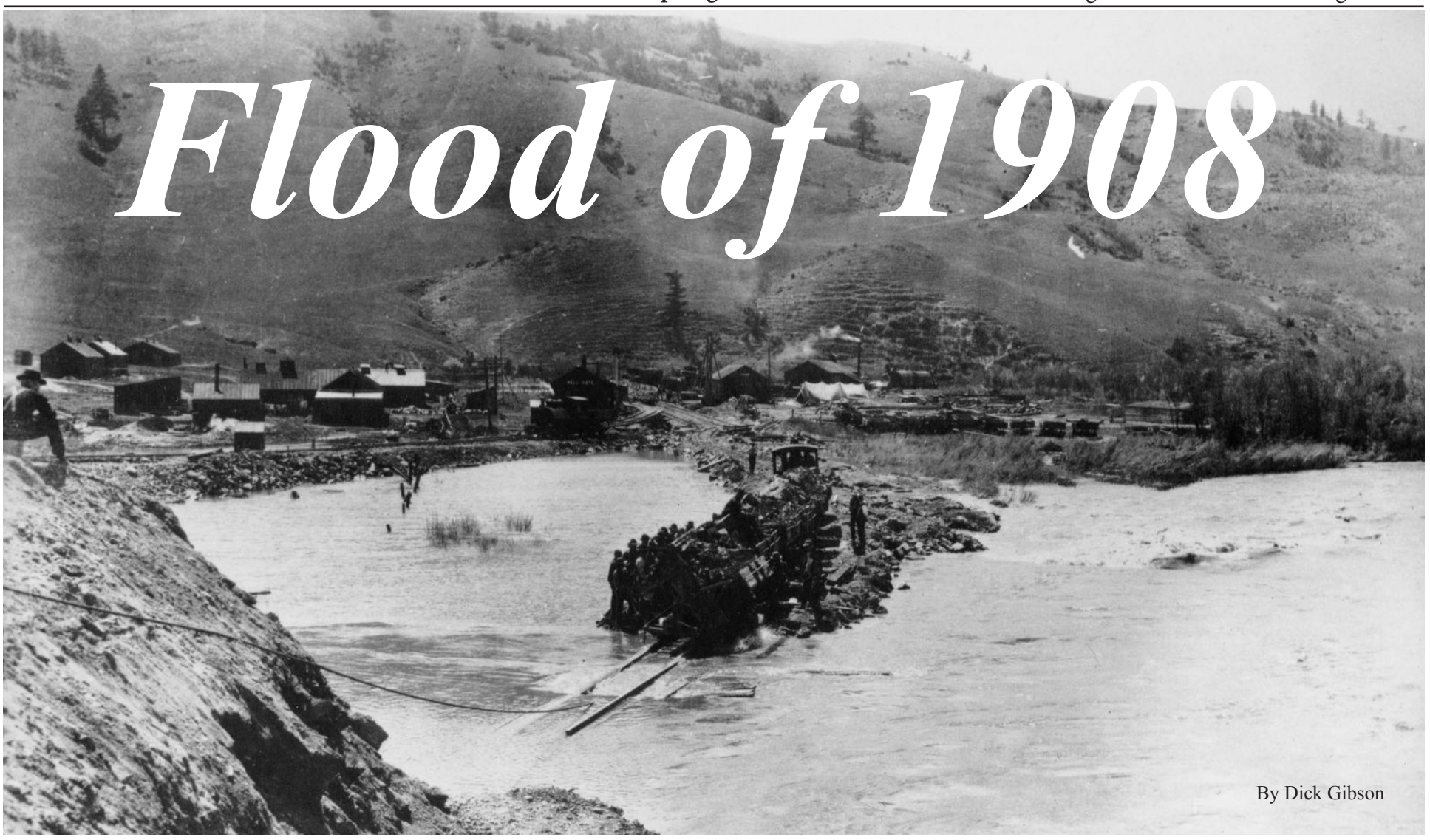
Erick is interested in building for the future, speeding up this land's process of rebounding, and making this landscape a better place for his family. He is trying to devise ways in which he can best utilize water, and one of those is through stormwater management. When this area receives rain, it is usually in the form of "gully washer events," and the organic soil is washed away to the Big Hole River. Erick has been trying to develop ways to get this water to slow down and sink into the aquifer, keeping it in the system longer. His first idea was to build a bunch of depositions along his property so that the water would collect in them, creating better forage for cattle, and allowing time for the water to sink into the ground watersystem. He wanted to try this because he noticed that there were natural depositions along his property and in those, there was about three to four times more forage available in any given year. He got together with some people and wrote a grant that proposed this. After looking at the cost of what it would take to implement this method, he thought to himself, "What is this going to accomplish? I am going to do something that no one else will be able to do because it is too expensive and not feasible. I need to do something here that is reasonably economical, otherwise no one else will try to do it." So he dropped that idea and began to implement other, smaller-scale ideas. In a steep area of his property, he built trenches with his tractor that were about sixty feet apart on the steeper slopes and one hundred feet apart in less steep slopes. The next summer, he noticed a huge increase in new vegetation and less sediment movement because the water did not have as much time and space to accumulate velocity and move soil. According to Erick, "There was an event where three tenths of an inch of rain came down in about 30 to 45 seconds, and in this repaired area, the water did not transport soil because it did not have enough distance to build velocity, but my other pieces of the property had lots of soil movement." Erick then started to look at what was being done in other parts of the world. He learned that in Nigeria there were communities that were building rock weirs which are walls that are built out of rocks in gullies or paths on land that water would flow over during a rain event. These rock weirs are intended to slow down water during stormwater run-off events; trap and hold rocks, sediment and debris behind the weir; and trap seeds and other plant matter. Erick started to build rock weirs in some of the gullies and ravines of his upland habitat. These rock weirs are accumulating more organic soil, which is great for seeds that have been caught there to grow. Plant communities are taking hold in the areas behind the rock weirs; and as they become firmly established, the roots and plants have an additional effect of slowing down stormwater. Erick worked with Cfwep.Org and Butte Silver Bow Juvenile Probation Office to get kids out on his ranch to build these walls. After just four months, the sediment that had built up behind these rock weirs was amazing. Erick believes that these little things can do a lot for anyone's property. He also believes that the plant systems that will eventually establish behind these weirs will be shrub systems. He explained, "These shrub systems will not necessarily be a good thing for me as a cattle rancher, but I believe that it will help the system as a whole in the future." Another potential benefit that Erick considers is that these rock weirs could create some moisture for the system. Rocks can retain heat into the night and as the air temperature gets colder and the rock stays warm, it can create condensation, which could add some more water to the system. There are all kinds of possibilities with these weirs, and only time will tell how they can help the system. So why do all this work, spending all the time and effort to build these rock weirs and control stormwater? Well, it has many benefits. It captures stormwater that would normally be quickly lost in a 'gully washer event,' and sinks the water into the soil so that it can be utilized by the plants. "This could possibly give you enough growth to graze your cattle on next year," says Erick. It also helps to recharge the aquifer and keeps the water running through an area for longer periods of time. It also benefits wildlife and the fish in the Big Hole River system. When this water gets into the ground water system, it enters the river at about 50 degrees F, which is a colder temperature than it would be coming off the land in a'gully washer event.' This colder water temperature helps fish species, especially grayling and trout.

rock weirs

Sediment and debris that has built up behind one of the rock weirs

Erick was asked what he hopes the future holds with respect to all of this work to control stormwater on his property. He responded, "I really want to see the vegetation back to 'belly high as a mule,' and I might not see it, but maybe with what I am doing, my kids, grandkids, or someone else's kids will see this change." Maybe in the future he will be able to use less water. Above all else he feels that just because his name is on the deed to land, he does not think he is just an owner that can do what he wants, but he feels that he has an obligation to the land to make it be the best and most abundant that it can be. What Erick had done on his property to control stormwater is something anyone can do on their property. Decreasing sediment flow and recharging some water into the local aquifer helps the entire system.

Flood of 1908



By Dick Gibson

Late May and early June, 1908, were some of the wettest days in Montana history. Rain, wet snow, and snowmelt combined to produce one of the most devastating floods to ever hit the region.

Butte was booming in 1908. For all practical purposes, the War of the Copper Kings was over, even though the Anaconda Company would not completely consolidate its ownership of nearly every mine and more until after William Clark died in 1925. After Augustus Heinze was out of the picture in 1906, money that had been tied up in litigation freed investors to build, build, build. The building boom of 1906-1907 saw some of the grandest construction efforts ever undertaken in Butte's business district.

Among the buildings erected in that two-year period were the Metals Bank, Phoenix Block, Silver Bow Club, Leonard Hotel, Napton Apartments, the Water Company building (built initially for the Intermountain Telephone Company), the Carpenters Union Hall, the First Baptist Church, St. Mark's Lutheran Church, and much more. The county's population – mostly within the built-up area of Butte – was nearly 57,000 in the 1910 census, a gain of more than 20% since 1900. And in 1908, the city directory listed 324 named mines.

With all that construction, attention was also finally paid to street paving and sidewalk construction. In June 1908 the city council was looking at a huge project to permanently pave sidewalks on residential streets all around the central business district, including much of Granite, Quartz, and Wyoming. Wooden walks were on the list for Woolman, Copper, Henry and Front, as well as much of the East Side. Street paving was in the offing for the near West Side including West Granite and Broadway, Idaho and Washington. But until the paving was completed a few years later, ruts and gullies must have been common on unpaved streets, and boardwalk sidewalks, where present, could have washed out easily.

Unpaved roads, walkways and extensive mine operations all over the Hill – just imagine 324 mine dumps, some huge, some small – meant that stormwater would likely have not just run off, it would have run off carrying plenty of dirt and debris with it. Both in the city and nearby, pretty much all the trees were gone. Summit Valley's forests, such as they were, were exploited early on for fuel in smelters, timbers in mine drifts, and wood for building construction. The land was bare. Mine tailings and sewage alike were discharged into Silver Bow Creek.

Silver Bow Creek, where it crosses Montana Street and flows between the historic slag walls from the Colorado Smelter, was highly constricted there. Upstream, wetlands had been drained to accommodate construction of smelters on the east side of the Hill, in Meaderville and points south. The stream was already nothing like the original creek that the first prospectors in 1864 likened to a silver bow glistening in the sun. There was little to prevent mass runoff and flooding.

Late May and early June, 1908, were some of the wettest days in Montana history. Rain, wet snow, and snowmelt combined to produce one of the most devastating floods to ever hit the region. On May 31, 1908 a cloudburst at Columbus took out a mile of Northern Pacific track. In Butte, there was "too much snow" for Memorial Day services, and the parade was cancelled. On June 2, Butte received 0.9" of rain, part of a storm system that affected most of western Montana and disrupted train travel. On June 2, a washout at Bonita, about thirty miles east of Missoula, resulted in a train plunging off the track, killing one man. By that day, there had been no through train into Butte for 48 hours on the Northern Pacific, whose trains were stalled in Billings and at Drummond. And it continued to rain and snow. At Elk Park on June 2, the Butte Miner reported that "the flat resembled a huge lake, and the Boulder River is a raging torrent."

June 4, 1908, was a Thursday, and the devastation really began to impact Butte. The dam at White's Ice Pond (Alcova Reservoir, where the Butte Country Club is today) failed. Water rushed down to Silver Bow Creek, already swollen, which inundated the Montana Power Company substation at Oxford and Montana Streets, where the water was four feet deep. Silver Bow Creek was reported to be a mile wide. And on June 4, the rain changed to snow. Nine inches fell that day, dropping power lines all over the city. Any power that remained to transmit was cut off to avoid electric shocks from downed lines – a team of horses from the Lavelle Livery was electrocuted at Park and Washington, and several residents narrowly escaped the same fate. "Plague of Darkness Reigns," the red-ink headline in the Butte Miner proclaimed. No street lights, no electric trolleys, no other power – except for the central business district, Park to Granite and Montana to Wyoming, most of which was served by the Phoenix Power plant in the alley south of City Hall.

Milltown Dam bursts in 1908

By June 5, the situation with railroads was the "worst in history" in the state. Problems extended from Great Falls to Billings, and Butte to the Flathead, with landslides and washouts completely shutting down train travel. The Water Plant Dam at Great Falls collapsed, Choteau was "surrounded by water," and the town of Belt was partially inundated. Passengers on the train stalled at Drummond practically ate Drummond out of food and drink over the three days they were stranded there. A man walked off a washed-out footbridge at Rocker, the first flood related death in Silver Bow County.

On Saturday, June 6, we saw "Entire Montana Now Paralyzed by Destructive Floods," according to the Anaconda Standard. The big Higgins Bridge in Missoula collapsed the next day, joining every other bridge in Missoula County. The Miner reported that William Clark's Milltown Dam at Bonner was safe, although at one point 15 feet of water was going over the spillway, and part of the structure of this brand-new dam was dynamited to allow more water to flow through.

The rainfall was not limited to Montana, but was widespread across the upper Missouri Valley. Flooding in Kansas and Missouri, especially around Topeka and Kansas City, was even more devastating to residential neighborhoods than were the floods in Montana. By June 7, the rains had slacked off, and the Miner reported that "a strange object appeared over the western part of the city, resembling a ball of fire. Later it was identified as the sun, which disappeared several weeks since." But it was another six days before the story left the front pages, and many months before a semblance of normalcy returned to the devastated communities in western Montana.

The long-term legacy of the 1908 flood was the toxic mine tailings that washed down Silver Bow Creek and the Clark Fork River. Vast quantities, enough to cover more than 1,000 acres, spread throughout the watershed and piled up behind the Milltown Dam, ultimately killing life along huge reaches of the river. Today's environmental cleanup, costing tens of millions of dollars, is necessary, not just because the mine operations were cavalier in their concern for the environment, but because one of the most intense periods of mine and smelter activity coincided with a remarkable period of rain and snow falling on a landscape that had been modified so it could not cope with the precipitation.

Cfwep.Org

StormWater Cfwep

HINTS, TIPS AND STORIES

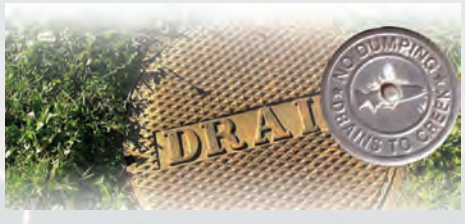
What is Special about our Watershed's Stormwater?

In Butte, soils are naturally erosion prone and unnaturally soil can contain mine waste. When it rains intensely, runoff will pick up these mine waste sediments and wash them into storm drains which flow to Silver Bow Creek. Think of Silver Bow Creek flowing through the Summit Valley bottom, recovering from years of mining impacts, seeming almost free of it's past, when the storm surge hits. Sediment pouring off the Butte Hill during a "gully washer" quickly takes the water quality in Silver Bow Creek from good to toxic for aquatic life. Butte-Silver Bow, EPA, State of Montana, and ARCO-BP are all working to clean up the creek. You can help the creek stay clean by reducing runoff from your property, yards, and driveways by considering the following:

What is a Storm Drain?

Rain flows into storm drain. Storm drains should be kept free of debris like the trash shown clogging this one. Look for Cfwep.Org storm drain markers all around town!
Photo Emily Munday

Storm drains are installed as a way to quickly and efficiently remove stormwater runoff in urban areas that could otherwise cause flooding and become dangerous, or inflict property damage.



After water flows into the storm drain, where does it go?

In Butte and many other cities and towns, water that flows into storm drains goes directly into the nearest waterway – in Butte that is Silver Bow Creek! Most people are unaware that stormwater is NOT treated at a wastewater treatment plant. Rather, stormwater flows through a series of underground pipes, and eventually discharges into Silver Bow Creek. Perhaps, you're thinking, "No way! That is unbelievable" But it's true!

Because our stormwater flows directly into Silver Bow Creek, it is important to be mindful of what goes into our storm drains. We want everyone in our watershed to be educated about stormwater and dispose of waste correctly by throwing it in the garbage or bringing it to the landfill – and please NEVER dump waste into a storm drain. Only rain in the drain!

Protect native trees and grasses on your property

Sediment clogging a gutter after a thunderstorm
Photo Dave Hutchins

- Plant native grasses, which require less watering, for areas that won't be mowed or highly trafficked.
- Control weeds.
- Route downspouts and driveway runoff to densely vegetated areas or rain gardens.
- Use gravel, crushed rock, pavers, or permeable pavement that allow rainwater to infiltrate for driveways, walkways, patios, and RV pads.
- If runnels are forming on your property, plant ground cover and shrubs or tress, and place rocks or logs in the runnel to slow the flow.
- When home projects disturb soil, use silt fences, straw waddles, or mulch to stop sediment from washing into streets and storm drains.
- Don't disturb buried mine waste (look for a change in soil color or fabric layer covering buried mine waste).
- **Excavations bigger than 1 cubic yard**, inquire whether an excavation and dirt-moving permit is required.

Contact Butte-Silver Bow Planning & Development,
406-497-6250

What Can We Do to Improve StormWater Quality?

We can all help ensure that the water draining to our creek is clean. Below are some best management practices you can implement.

StormWater and Your Home:

Prevent Precipitation from Becoming Runoff

For your next home improvement project, install a rain garden, permeable or porous pavement, and a series of rain barrels. These tools intercept precipitation and prevent it from becoming stormwater runoff.

Rain Gardens & Responsible Landscaping

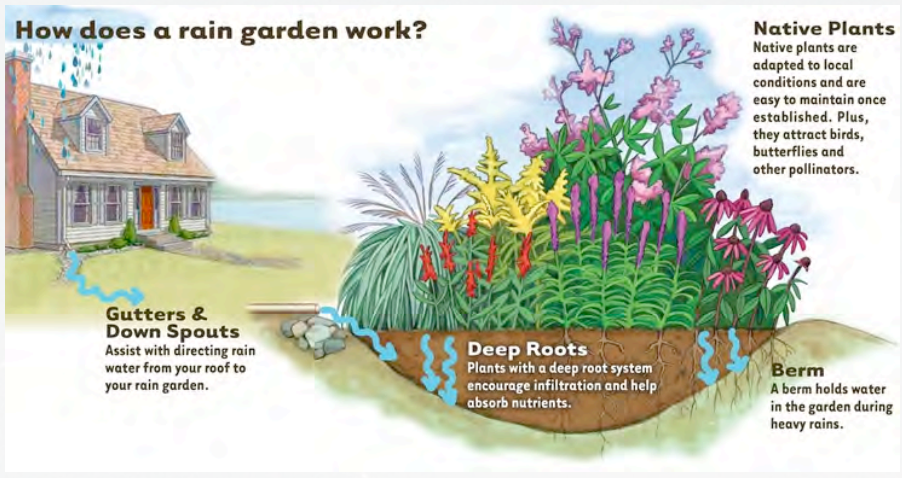


Figure courtesy of Tipp of the Mitt Watershed Council.

Why: Rain gardens have porous soil that absorb and retain precipitation, and also grow beautiful plants. Installing gravel pathways instead of cement walkways help convey precipitation to groundwater and underlying soils rather than to storm drains. Using natural fertilizers on your lawn during dry periods ensures that water running off your lawn is of higher quality. When removing lawn debris, make sure to dispose of it in the landfill or a compost pile – never in a storm drain.

Consider: Choose plants that are suitable for our climate, and engineer your yard and downspouts to drain precipitation to your rain garden. Incorporate a mix of perennial flowers that bloom in the summer, and shrubs that persist through fall and winter. Plants that attract native pollinators are also important. For lists of pollinator-friendly native plants, visit The Xerces Society for Invertebrate Conservation at xerces.org/pollinator-resource-center. Bring the list with you when visiting your favorite local greenhouse.

Rain Barrels

Why: Impervious rooftops are a huge source of stormwater runoff in urban and suburban areas. Installing a rain barrel or cistern to collect snow and rain directly and from rain gutters, serves the dual purpose of reducing runoff and gaining an extra source of water for use during dry summer months when water conservation is necessary.

Consider: Use gravity to your advantage and engineer your gutter system and lawn to drain into a series of rain barrels, and direct overflow to a rain garden. When ready to use the water you have collected, use gravity to create water pressure, siphon the water, or use an aquarium pump to direct water from barrels through a garden hose to water your lawn. Cover barrels during low precipitation times to prevent evaporation and keep mosquitos from breeding in the water.

Image courtesy Mt. Watecourse and www.howtobuildarainbarrel.com

Hiring a Contractor

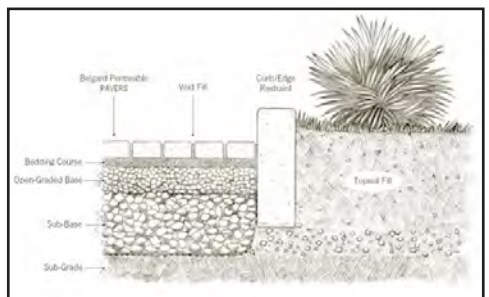
When planning a construction project, be sure to ask your contractor about how they plan to implement stormwater best management practices. Proper stormwater management during construction prevents sediment from leaving a construction site. Contractors use silt fences and straw wattles to capture sediment in runoff before it can reach a storm drain.

Permeable Pavement

An example of a permeable paver. Photo courtesy of Jane Hawkey, Integration and Application Network, University of Maryland Center for Environmental Science (ian.umces.edu/imagelibrary/)

Why: Permeable pavers eliminate standing water and runoff by absorbing precipitation and allowing it to percolate through to the underlying soil. This reduces how much you need to water your nearby lawn, while also benefitting our watershed by decreasing the percentage of impervious surfaces.

Consider: When installing permeable pavers, it is necessary to place layers of different grain sizes as a base upon which the pavers rest. Precipitation will then percolate through these layers and be retained by the underlying soil.



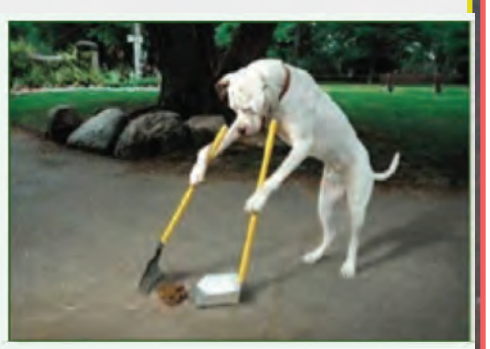
Permeable paver with various size base fills. Figure courtesy of belgard.com

StormWater and Your Vehicle

Keep your car in good working condition and avoid oil leaks. Wash your car at a car wash instead of the street to prevent soapy water from running into storm drains. Car washes must comply with water discharge ordinances that require them to properly dispose of soapy water.

Scoop the Poop

Pet waste is picked up by stormwater just like any other pollutant. It can pollute the watershed with fecal coliform bacteria and excess nutrients that harm aquatic life and that can be harmful to humans, as well. Be sure to pick up after your dog on walks and dispose of poop in a designated pet waste receptacle or trash can.



Busy Summer and Fall for Cfwep.Org

Cfwep.Org has been extremely busy these last few months, as is usual for us. We have had a number of different events that get people out and about in our watershed, and that help them learn about the restoration and the importance of a healthy river system. It is our responsibility to teach the public in the Upper Clark Fork Watershed about watershed science and watershed stewardship for our area, so that it will remain a healthy system for future generations to enjoy.

At the end of May, Cfwep.Org led a Silver Bow Creek science day with the Science Fair winners from the Montana Tech Regional Science Fair which was held back in March. We took the kids to an impacted site on Silver Bow Creek, and did stream health assessments with them such as: macro invertebrate life, water quality, and riparian vegetation. After this the kids were taken on a restoration tour of the areas of Silver Bow Creek that have been restored.

Our next big event was the very next day. We led Butte Silver Bow's Blacktail Creek Cleanup Day at Father Sheehan Park. We took the fifth and sixth grade students from Whittier Elementary, along with dozens of volunteers, and did a cleanup on a four-mile stretch of the stream, from Father Sheehan Park to the Butte Chamber of Commerce. All the garbage was collected during the morning and brought back to the park. In the afternoon, we had the kids go through educational stations. We did macro invertebrate identification, the Bull Trout Game, water quality assessment, a stormwater lesson, and also a station on recording the garbage that was found and how it impacts the health of the stream here in Butte.

On July 23rd, Cfwep.Org took a group of kids in grades K-6 from the Butte YMCA Camp out to Warm Springs Ponds for osprey banding. Cfwep.Org is partnered with the Bird's Eye View Program at the University of Montana in Missoula, and every year we provide kids for their Osprey days. The kids get to see osprey chicks up close and personal, and learn about why the scientists do this research and the things that they are testing for. It is an absolutely amazing experience for these kids, as most of them had never even seen an osprey before.

Cfwep.Org also had a unique opportunity to help organize part of a summer STEM (science, technology, engineering and math) camp for girls called MINES (Making Innovations in Engineering and Science) here at the campus of Montana Tech. Cfwep.Org led stations at the Grant Kohrs Ranch along the Clark Fork River in Deer Lodge. The girls learned about the history of mining and the impacts of heavy metals in the Clark Fork Watershed. They tested for macro invertebrate life, water quality standards, and a healthy riparian area. It was a great opportunity for them to learn science and become more informed about what is going on in this area.

One of Cfwep.Org's favorite trips of the year just completed as well, and that was the 6th Annual Southwest Montana Kids Fly Fishing and Conservation Camp. This is a three-day/two-night camp at Georgetown Lake, where kids get to learn the sport of fly fishing, as well as the conservation behind it. They also learn the importance of our watershed as a fishery, and how impacts of heavy metals have affected this area and what is being done to restore this. The kids start off the camp by fishing on Silver Bow Creek, and it is an amazing experience for them to be able to fish a stream that has been dead for over one hundred years. This year, the kids caught two beautiful cutthroat trout, and it was breathtaking. Our 2014 camp was the largest to date as we had twenty attendees, eight volunteers, and eight Cfwep.Org staff. This is a yearly event and if you would like more information please contact Chris Doyle at Cfwep.Org (cdoyle@mtech.edu or 406-498-8868).

Now, we are all done with our summer events and are moving into our fall schedule. In fall, our Restoration Education Program (REP) Program comes back around, where we go into schools in the Clark Fork Watershed and teach a 5-day lesson that includes history of mining, impacts to the Clark Fork River, Superfund, what a watershed is, and an in-the-field experience testing water quality parameters with scientists. We have seven schools on our schedule for the fall and we are super excited to get out there. Look us up on www.Cfwep.Org or Facebook, as well as listen to our radio show, the EcoJazz radio program, to find out about our upcoming events or volunteer opportunities. Get outside and explore the science in your backyard and, hopefully, we will see you out there.

We would like to take this opportunity to thank our volunteers and sponsors for the Fly Fishing Camp:

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