

**South Platte River Urban Waters Partnership (SPRUWP)**  
**QUARTERLY MEETING**  
**September 5, 2018, 9:30 am – 12:30 pm**  
**USFS Rocky Mountain Regional Office, 1617 Cole Boulevard, Building 17**  
**Meeting Summary - DRAFT**

*Attendance:* Cassie Adams, Jennifer Boussetot, Dana Coehlo, John Duggan, Stacey Eriksen, Elaine Hassinger, Austin Krcmarik, Jon Novick, Jayla Poppleton, Colleen Rathbone, Lisa Romano, Donny Roush, Catherine Schloegel, Sam Stein, and Keith Wood

*Facilitation:* Sam Haas, Calley Schubert

**ACTION ITEMS**

Dana Coehlo	<ul style="list-style-type: none"> <li>Email Sam information on Nature Narratives workshops.</li> </ul>
Jennifer Boussetot	<ul style="list-style-type: none"> <li>Email Sam contact information for her husband so that he can be invited to any future meetings.</li> </ul>
Jayla Poppelton	<ul style="list-style-type: none"> <li>Email information on the water flood tour event to Sam so that she can share it with the group.</li> </ul>
John Duggan	<ul style="list-style-type: none"> <li>Email Sam paper on Integration of Water Resource Protection and Land Use so that she can send it out in the monthly email.</li> </ul>
Sam Haas	<ul style="list-style-type: none"> <li>Sam will send out a doodle for subgroup meetings.</li> <li>The next SPRUWP quarterly meeting will be held on November 7.</li> </ul>

**PARTNERSHIP UPDATES**

SPRUWP partners provided updates on their organizations' current work priorities.

**Tri-County Health Department-Water Quality- Elaine Hassinger**

- The Tri-County Health Department's Water Quality staff are currently conducting a project to sample the water quality of private wells within a half-mile radius of oil and gas operations. They have been working on the project for eight months and have not had any VOC's show up in the samples.
- The Tri-County Health Department's Water Quality staff are collecting samples at private wells, at the request of homeowners, to be analyzed for prefluorinated compounds which have been found in source water supplies in the Commerce City area. The local water supplier is treating the water to concentrations below EPA's Health Advisory (HA) levels.
- The private well sampling is part of a concerted effort by CDPHE, EPA, and TCHD to determine extent and possible source of the contamination. Perfluorinated compounds in drinking water supplies has been and up-and-coming issue in various locations throughout the country. These compounds are persistent in the environment and have been linked to public health effects.
- As a side note: Neither TCHD nor Adams County has the authority to set MCLs; only EPA can do that. According to the EPA, it can take as much as a decade for them to develop and set

MCLs for drinking water contaminants. In the meantime, water providers can treat water supplies to meet the HA for their customers.

#### **Denver Public Works - Donny Roush**

- Donny Roush has worked with students on implementing civic action projects, this year, he has started working with four new high schools.

#### **Environmental Protection Agency (EPA)-Stacey Eriksen**

- Stacey Eriksen submitted a proposal to receive funding from EPA's Office of Research and Development for pre- and post-monitoring of the impact of green infrastructure on human health in the Sun Valley area. The proposal includes using natural capital tools, EPA's enviro atlas, and some modeling efforts to look at current conditions on the site. She found out a few weeks ago that they got selected and is working on finalizing the project management plan which will predict how things will be improved after the site is developed.
- Stacey volunteered the SPRUWP group to provide feedback on some of their findings.

#### **U.S. Forest Service (USFS)-Lisa Romano**

- Lisa Romano has stepped into the Urban and Community Forestry program manager role.
- Cassie Adams usually works as a partnership coordinator in South Carolina but is currently here in Denver working with Claire Harper.

#### **Colorado State Forest Service- Urban and Community Forestry Program-Keith Wood**

- The Urban and Community Forestry Program is working on a landscape-scale restoration grant proposal that will be submitted in the next few weeks and will act as a great tool to find areas where they would like to implement projects. Keith Wood is helping to build on the proposal with information from the Upper South Platte Partnership.
- The Urban and Community Forestry Program is bringing on a new Forester to fill the water program specialist position.

#### **Metro Denver Nature Alliance**

- Dana Coehlo has stepped into a new role as the Director of Metro Denver Nature Alliance (Metro DNA) where she is doing nature-based work and environmental education.
- There is a ballot measure in the City and County of Denver coming up to vote on parks and rivers funding. There is a conference call this afternoon with Councilman Jolon Clark on the issue.
- Metro DNA will be hosting a collaborative project titled "Nature Narratives" where partner organizations share their stories.
- *Dana will send details on these workshops to Sam Haas, who will share them with the group.*

#### **Colorado Department of Public Health and Environment, Source Water Protection-John Duggan**

- Colorado Source Water Protection continues to try for the best quality water before they bring it in for treatment.
- They are working closely with USFS on Wildland Fire Decision Support System (WFDSS) work.
- They recently received funding to identify public water system infrastructure. This knowledge will be helpful when risk-informed decision-making is necessary.
- A paper is in the works on the integration of water resource protection and land use that will be information they add to their comprehensive master plan.

### **Water Education Colorado-Jayla Poppleton**

- Water Education Colorado is hosting a flood anniversary tour on September 18<sup>th</sup>; the tour will be a day-long bus tour that will run from Loveland to Estes, Estes to Lyons, and back to Loveland. On the tour, they will be looking at restoration projects and discuss the cost of restoration.
- Water Education Colorado is working on the next issue of *Headwaters Magazine*, which will focus on water reuse.
- Water Education Colorado will host a public-focused event on water reuse. The event will display pumpkins grown with recycled water to demonstrate the potential and opportunities for reusing our water supply. *Jayla will send information on this event to Sam so that she can share it with the group.*

### **Denver Water- Austin Krcmarik**

- Denver Water is shifting from a conservation-focused plan to a water efficiency plan as is evidenced in their Denver Water One Water campus.
- Denver Water is looking at how they can use rainwater and alternative sources on their reuse site.

Denver Department of Public Health and Environment-Jon Novick  
Denver Water Quality report coming out soon and will be in a story map format.

### **Colorado State University -Jennifer Boussetot**

- Jennifer's husband is a stormwater engineer and is currently working on Sanderson Gulch; this project has some interesting water quality issues. *Jennifer will share her husband's contact information with Sam so that she may invite him to the next SPRUWP meeting.*

### **GREEN ROOFS PANEL DISCUSSION**

An expert panel discussed various components of green roof systems, including the Denver Ordinance, potential environmental benefits, and case study outcomes.

- Jennifer Boussetot (Colorado State University)
- Austin Krcmarik (Denver Water)
- Jon Novick (Denver Department of Public Health and Environment)

### **EPA Green Roof Research**

Jennifer Boussetot, Special Assistant Professor in the Department of Horticulture and Landscape Architecture at Colorado State University and member of the Green Roofs Review Task Force, provided a presentation on the data that she has collected and the overall environmental benefits of green roofs.

- Jennifer has researched green roofs for 12 years and wrote her dissertation on EPA's green roof.
- Jennifer teaches a course in green roof culture. Her perspective on green roofs is that they are a dynamic ecosystem on top of buildings; green roofs are designed to fulfill a specific function, they are a living element, and that aspect often does not register with people.
- Jennifer's research has shown her that green roofs are about managing water, temperature, and energy.

- Green roofs bring many benefits to society, to building owners, and to plant and insect species.
  - Green roofs can increase a roof's membrane lifespan by five times.
  - Green roofs create a habitat for plant and insect species that are facing extinction.
  - They bring the benefits of nature back to society.
- The EPA green roof is grown in trays because it was added on late in the design of the building. Due to this shallow root system it needs some irrigation, but has been sustained on five inches of irrigation a year. EPA's building stormwater vault was reduced in size because of the green roof. It is smaller by approximately 14 parking spaces, which is useful to a developer.
- Jennifer has researched the use of solar panels in conjunction with green roofs. She discovered a symbiosis between the photovoltaic (PV) array and the green roof plants. PVs have an optimal temperature of 75 degrees and shut off at ~110 degrees. Summer roof temperatures can reach 170 degrees and winter temps can be 80-90 degrees.
- Jennifer has researched environmental conditions on green roofs compared to other roofs and found that green roofs significantly reduce the building temperature.
- Denver has the 3<sup>rd</sup> worst urban heat island effect in the US. Green roofs can decrease the temperature by 8-10 degrees.
- The most significant air quality benefit of green roofs comes from decreasing ozone formation and reducing the urban heat island effect. Green roofs are cooler beneath the PV and produce healthier plants than in exposed areas. Cooler buildings decrease peak energy in the afternoon when coal fired power plants have to increase electricity production.
- Jennifer has researched the small green roof at Denver Botanic Gardens, where she worked on studying 112 plant taxa with minimal water. It uses ~7 inches/year. The large, two-acre Children's Garden green roof at Denver Botanic Gardens is an intensive green roof 6-18 inches deep and is heavily watered. It costs up to hundreds of dollars per square foot because it is an intensive green roof. The plants bloom earlier because the roof is warmer.
- The price tag of green roofs can be very high; however, you can use native soils and native plants with no irrigation at all.

### **Green Roof Initiative- Implications to Denver Water**

Austin Krcmarik, water conservation specialist at Denver Water and member of the Green Roofs Review Task Force, provided a presentation on water demands of green roofs and the new Denver Water One Water campus.

- Austin described his first interaction with green roofs at the Denver Botanical Gardens. Since then, his perspective has evolved to view green roofs as an ecosystem with particular design goals; they should always be changing and adapting.
- Denver Water joined the task force from an environmental risk standpoint. Most green roofs use very little potable water and do well once they are established.
- When looking at sedums and low-water-native plant species, Denver Water found that green roofs would be an additional demand of 500-acre-feet per year of potable water, which is an insignificant amount.
- Denver Water has designed a new campus, Denver Water One Water, that will increase their efficiency both indoors and outdoors. While the Denver Water's One Water campus ideas were implemented pre-green roofs initiative, they have the same thinking of reducing their environmental footprint.

- The new site will be taking black water and reusing it on site to flush toilets and for irrigation use outside. Rainwater will be captured and stored in a 75,000 gallon cistern underground, which will be able to satisfy their annual irrigation demand. The size of the cistern will be relatively shallow and wide.
- Denver Water had to file an augmentation plan with the state engineer's office that predicted how much rainwater would be captured and detailed how they would add that back into the stream.
- Denver Water modeled many different scenarios to ensure that their cistern would be able to satisfy the annual irrigation demand; they looked at plant health, average evapotranspiration (ET) and rainfall.
- Potable water will be used for cooking, washing hands, and initially to go into the toilets.
- There will be an on-site water treatment plant that treats black water to be just shy of drinking water standards.
- Return on investment (ROI) on this project is around 30 years. Most developers look at a 3-year ROI.

### **Green Roof Review Task Force**

Jon Novick, Environmental Administrator in the Department of Public Health and Environment and member of the Green Roofs Review Task Force, provided a presentation on the imperviousness of buildings. Denver is doing a study with NOAA on rainfall and nitrogen and phosphorous.

- Green roofs prove beneficial in many ways:
  - They can capture and hold stormwater, thus preventing flooding;
  - They can ensure green infrastructure is functioning as it is intended to infiltrate stormwater;
  - They help with building energy usage because the layer of soil and plants are acting as insulation and as shading;
  - They put green spaces back into the areas where there are no green spaces.
- From a water quality perspective, the information is still unclear as to how big of a benefit green roofs provide.
- Jon presented his findings on two types of buildings, a downtown hotel and an industrial facility out by DIA. The hotel was 100% impervious, and the industrial facility had a high percentage of imperviousness. Impervious surfaces accumulate water quickly that runs off and prevent it from infiltrating into the ground.
- The downtown hotel was a particularly good candidate for a green roof because it had no available space to infiltrate stormwater on the ground. A green roof creates a way to add some imperviousness to the site and retain some of the water, rather than having it all go underground in a retention vault that is later released.
- If you put 100% green roof coverage on both buildings, it would leave you with 1% site imperviousness on the hotel and, because of driveways, parking lots, and sidewalks, 30% on the industrial facility.

### **The panel provided a brief overview of the ordinance and the timeline of its development and revision.**

- The original ordinance was a citizen-led initiative modeled after Toronto's green roof initiative. The difference between the Denver initiative and Toronto's initiative is that Denver requires existing buildings to participate, making it the first in the world to do so.

- Between March and August in 2017, Brandon Rietheimer and 60 volunteers collected the 8,000 signatures they needed to make the November Ballot.
- Initially, Mayor Michael Hancock opposed the initiative, but when it passed, the City pulled everything together very quickly to form the 22-person Green Roofs Review Task Force.
- The initiative went from just being based on green roofs to including several compliance pathways. There is a list of sustainable options so that you can decide what suits your way of thinking and your property best.
- There is still a lot to understand on what is needed to make the program work—from simple things such as how to define the size of the roof to the footprint of parking garages extending past the building; there are a lot of moving pieces to figure out.
- The timeline for this project is going to be long. There is an advisory committee that is going to review the plan. It will be a couple of years until anything is implemented.
- A couple of permit requests have come in, including a project by Coors, but because of all of the implementation issues, it has been challenging.
- Money was the primary issue that was raised during the Taskforce discussions; the cost of replacing a roof with a green roof is high. However, building a sustainable green roof adds value to the building and increases rents for the owner.
- Weight loading and insurance coverage have also been big issues.
- Saturated weights are ~ 8 pounds/inch dept. Majority of roofs can handle a 4 inch deep green roof.
- From the water perspective, Denver Water is waiting for it to be fully enacted before they make changes to their operating rules.

### ***Clarifying Questions***

SPRUWP members asked several clarifying questions about the panelist's presentations on the Green Roofs Initiative. Questions are indicated in italics, with the corresponding answers below in plain text.

*What is being planned for the National Western Complex?*

Half of the full-acre rooftop will be designated for research and demonstrations, while the other half will be green roof.

*Just like rain barrels, how would green roofs impact Colorado water laws for return flows?*

Denver Water was initially concerned about the retention of water on rooftops, but it is under the standard 72-hour rule and would be no different than incidental capture. Green roofs are designed to drain very rapidly and meet the standards of not holding water that does not belong to you.

*Is there a rebate or incentive program for replacing Kentucky Bluegrass with native species?*

The best example of a program like that would be in the City of Aurora. The ROI is 30-45 years, which makes it difficult for a utility to take on. Denver Water works with Garden in a Box. Each garden covers 150-200 square feet, and Denver Water provides \$25 rebate per garden for the first 1,000 or so boxes sold.

*Will best management practices be required or will there be monitoring requirements?*

There is a list of requirements that will make sure people do not plant green roofs and forget about them. Part of the plan is to have maintenance requirements and some documentation.

*What would the property owner have to pay for stormwater fees with or without a green roof and is there any economic benefit in that regard?*

That is one area that there is a struggle; Denver Water is separate from the City Public Works Department that manages stormwater. On a site development plan, there will be open space requirements and water quality requirements that are separate from green roof requirements; the challenge is to bring those together and make it beneficial for the building owner.

*What is the big goal? What is the "how"?*

The big goal is to mitigate climate change and create more green spaces in a rapidly densifying urban area. Brandon's platform on this was the reduction of the urban heat island effect and improvement of air quality. There needs to be more research, and that is why more studies are being done.