Third Annual Cobre Valley Water Forum

HEALTHY FORESTS HEALTHY WATERSHED

Nov. 12-13

COBRE VALLEY WATERSHED PARTNERSHIP

THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE & LIFE SCIENCES
Cooperative Extension
Gila County

COLLEGE OF AGRICULTURE & LIFE SCIENCES
COOPERATIVE EXTENSION
WATER RESOURCES RESEARCH CENTER

Third Cobre Valley Forum on Water: Healthy Forests, Healthy Watershed

November 12-13, 2020

Summary Report

Contents

This report provides forum background and brief summaries of the presentations and discussions from the Third Annual Cobre Valley Water Forum on November 12-13, 2020. You can find more information at: wrrc.arizona.edu/Cobre-Valley

Agenda, speaker bios, and prep materials from the Third Annual Water Forum can be found here: https://wrrc.arizona.edu/events/conference/third-annual-cobre-valley-water-forum-healthy-forests-healthy-watershed

The virtual forum was recorded and is available to view through the links below:

Day 1

Part 1: https://tinyurl.com/CV-WaterForum-Day1-Part1
Includes remarks and presentations from Chris Jones, Sammy Gonzalez, Mary Lata, Michael Seronde, Paul La Farga, Ashley Hullinger, and Victoria Hermosilla
Part 2: https://tinyurl.com/CV-WaterForum-Day1-Part2
Includes remarks and presentations from Ben Downer, Thea Wilshire, Linda Oddonetto, Melissa Steele, and Glen Lineberry

Day 2

Part 1: https://tinyurl.com/CV-WaterForum-Day2-Part1
Includes remarks from Victoria Hermosilla and Tim Humphrey, as well as panel discussion among Dee Randall, Adam Bromley, Stephen Flora, Lori Brown, and Carl Melford
Part 2: https://tinyurl.com/CV-WaterForum-Day2-Part2
Includes remarks and presentations from Jessica Asbill-Case, as well as the Virtual Field Trip featuring Glen Lineberry and Amanda Bickel representing Miami Junior-Senior High School

Introduction to the Cobre Valley Water Forums

The Cobre Valley Water Forums have been an annual event in the Globe-Miami area since 2018. Each year has focused on different themes, but the main goal of the forums is to spread water awareness and collect watershed directives and priorities from the local communities in order to inform and develop the **Cobre Valley Watershed Partnership**.

In 2020, the Cobre Valley Water Forum went virtual with the theme: *Healthy Watersheds, Healthy Watershed*. On November 12-13, 2020, over 60 people tuned in to learn about and support forest health in their watershed. Over a dozen speakers shared information and specific recommendations to help us evaluate our role in the changing reality of forests, fire, and watershed health. The intention of this report is to make lessons from the forum as accessible and useful as possible by summarizing discussions, while also maintaining the richness of commentary and details.

Forest and ecosystem health are of extraordinary importance – for everyday life and the long-term vitality of the Cobre Valley region. By connecting how forests and uplands impact our watershed, wildland urban interface, and water resources, the Third Annual Water Forum highlighted paths forward in addressing areas of need.

Aiming to build awareness of local water resources and build capacity to plan and manage water resources challenges in Cobre Valley since 2015, the **University of Arizona Water Resources Research Center (WRRC)**, **Gila County Cooperative Extension**, **US Bureau of Reclamation**, and many other partners and community members around Cobre Valley, have contributed time, resources, and expertise to watershed resilience in southern Gila County. The new Cobre Valley Watershed Partnership (CVWP) is both a result of these efforts and steward of next steps to take meaningful action in the watershed. Together all these partners made the 2020 forum possible.

While we look forward to getting back to an in-person format, we were pleased with the advantage of receiving audience feedback throughout the two day the event. Real-time comments and questions from the forum chat box are recorded throughout this report.

Chat box questions and comments from participants are recorded in the sidebar of this report.

PAST FORUMS

The water forums emerged from WRRC's stakeholder-driven community assets assessment in 2016-2017, which indicated the usefulness of public forums to increase coordination and communication around water among natural resource managers and stakeholders. Since then, three annual water forums have been convened in the Cobre Valley.

FORUM ONE

September 6, 2018: Over 50 decision-makers and water managers in Globe-Miami and the surrounding region decided on top priorities and areas for possible collaboration to enhance the water resilience of the region.

FORUM TWO

April 9, 2019: We continued the discussion, receiving updates from working groups and partners on water-related activities, and highlighted the interconnectedness of the watershed while exploring water supply and demand in Cobre Valley.

Next Steps

As we all know, the work does not stop when the forum is over; of course the opposite is true. Now is the time to put recommendations into action. Pulling from the two days of discussion and presentations, the following list summarizes actionable items that were referenced at least three times throughout the forum, as well as identifies partners to support those efforts. Please email hullinger@arizona.edu with suggestions of strategies related to these actions or necessary partners to be involved.

Recommended actions derived from forum feedback and discussion	Page number reference
Increase outreach in the community to implement specific education and engagement ideas (specific topic areas referenced throughout this report)	Pages 5, 10, 16, 18-19, 23-24
Potential partners: Cobre Valley Watershed Partnership, USFS Tonto National Forest, Bullion Plaza Cultural Center and Museum, UArizona Water Resources Research Center (WRRC), others	
Identify and implement forest thinning and restoration initiatives	Pages 6, 19, 21, 23-24
Potential partners: USFS Tonto National Forest, Gila County Emergency Preparedness, Cobre Valley Watershed Partnership, others	
Increase monitoring and restoration/removal of invasive grasses in the watershed	Pages 6, 10, 23
Potential partners: USFS Tonto National Forest, Cobre Valley Watershed Partnership, Uarizona CES, Gila County Cattlegrowers, others	
Increase land and water stewardship through trails development and maintenance	Pages 9, 11, 23
Potential partners: Cobre Valley Collaborative Recreation Team, Cobre Valley Watershed Partnership, Globe-Miami Chamber of Commerce, City of Globe, others	
Support local partners in collaborative projects and in development of proposals	Pages 5, 10-11, 13, 22, 23-24
Potential partners: Uarizona Water Resources Research Center, Cobre Valley Watershed Partnership, USFS Tonto National Forest, Gila County IDA, City of Globe, Town of Miami, others	
Pursue various funding opportunities, seeking assistance from the appropriate agencies	Pages 10-11, 22, 23
Potential partners: Gila County, Cities and Towns, and Tribes, with assistance of Cobre Valley Watershed Partnership, Uarizona Water Resources Research Center, various non-profits, others	
Develop a vision of what the local community wants for their forest and watershed to guide comprehensive policies and plans	Pages 10, 16, 22-23
Potential partners: Cobre Valley Watershed Partnership, Town of Miami, City of Globe, Gila County, San Carlos Apache Tribe Forestry Department, USFS Tonto National Forest, and many others (everyone)	

Recap of Day 1: November 12

Brief summaries of the presentations are provided in the sections below. Recordings are posted at: wrrc.arizona.edu/Cobre-Valley

To start the forum, we requested some information about the makeup of the audience:

- About 50% of forum participants lived in the Cobre Valley.
- 100% of participants lived in Arizona.
- About half of the audience had participated in past water forums. For the other half, this was their first Cobre Valley Water Forum.
- 100% of participants understood the concept of a watershed, with most people defining it as a land area that drains into larger water bodies and a few people thinking more broadly as "anywhere that rain falls."

09:07 Paul La Farga, UA WRRC
Looks like most everyone is calling in from Arizona!

09:20 Victoria Hermosilla, CVWP
Fun Bee Fact from the USDA: Honey bees are the "work horse" of US agricultural pollination in that they facilitate the reproduction of more than 120 crops. Honey bee pollination alone adds more than $15 billion in value to agricultural crops each year, and helps ensure that our diets include ample fruits, nuts, and vegetables.

The first presentations and speakers provided context for the forum, starting with an assessment of the changing role that wildfires present communities, and ongoing work in the community. In his opening remarks, **Mayor Sammy Gonzales** made a special point of looking around the (virtual) room to note the tight-knit community. As an elected official and as a junior high school social studies teacher in Miami, he was glad to see so many people at the table to learn more about their watershed and the environment.

Day 1 Keynote: Role of Wildland Fire and Changing Fire Regimes Around Communities

Mary Lata, Fire Ecologist, US Forest Service Tonto National Forest

Dr. Lata focused on the Tonto National Forest, but the data in her presentation are representative of the Globe Ranger District's situation. This presentation covers a little bit of ponderosa pine evergreen, a little bit about the interior chaparral, and a fair amount about the Sonoran Desert.

09:38 Victoria Hermosilla, CVWP
Check out the Fire Lab here: https://www.firelab.org/

All our ecosystems are off balance to a certain degree in the Tonto National Forest, along with the frequency of fire. For instance, in the woody systems, there is more woody encroachment and more fuel build up. When fires do burn in those areas, they are going to be more intense and hotter. This all affects the hydrology of the watershed.

In this part of Arizona, we find most of our forests in the upper elevations, which have a very significant impact on the downstream areas. It's helpful to think about the whole system in parts: 1) the desert, 2) the forest, and 3) what is going on between the first two systems. In particular, desert systems have experienced significant changes.

The last year was an exceptional fire season. In 2020, over 300,000 acres burned, which is an extraordinary number of acres. We should keep in mind that in some higher elevation areas where the fires were not as severe, the burned acres produced beneficial results. These fires got a lot of work done for us. Without these fires, forest managers would have to actively implement prescribed fires.

On average, a ponderosa pine-evergreen system in this region should fall into a range of one to 60-year fire return interval, with 60-years being somewhat exceptional. We are now seeing a 115-year fire return interval, which is longer than it should be, leading to more severe and devastating fires. After arresting wildfire for decades (estimated at 100 years in some places), understory woody species have grown to a density that is not natural, providing fuel for high intensity fires. High intensity means higher flame heights that burn hotter and can kill ponderosa pines.

However, from the perspective of the watershed, so many acres burning all at once – even if it is beneficial fire – can cause increased runoff and flooding in some areas, and potentially impact water quality.

Frequent fires occur in lower elevations where they should not, while fire seldomly returns to higher-elevation areas that need to burn to avoid excessive fuel build up. Driven by the colonization of invasive grasses, desert systems that traditionally only experience fire events once every 450 years have been transitioning to a grass/shrub fire system, which burns more frequently. This has negative impacts on our native vegetation and historic ecosystem.

We can manage fires in the desert by selectively using low-severity and low-intensity prescribed fires to strategically burn invasive grasses before their seeds are viable, and selective grazing. Selective grazing could also create temporary fire breaks but may be challenging to implement because it requires intensive management.

Communities should understand that fire is inevitable, and it is not pretty but it is natural. Along with building a better understanding of fire, our public needs to be engaged with decision making around managing fire. Compromises will be necessary, but the public should be involved in decisions about how their public lands look. Communities must balance the damage from prescribed fires with the overall health of the entire system. We need to learn how to deal with fire.

We are seeing fire in systems that have not had fires in 100 years, impacting ecosystems that we value. Creative thinking is necessary, and the community should be involved in answering questions about management options moving forward.

09:55 Ashley Hullinger, UA WRRC
These invasive grasses almost sound unbeatable, like they're built to succeed and spread. Are there good proven ways to slow them down? It seems to be accepted that they are here to stay.

09:58 Kenneth Steel
I was wondering the same thing, Ashley!

10:01 Melissa Steele
Aren't there groups in Tucson who gather and pull grass all day, like weeds? Is that helpful?

10:05 Paul La Farga, UA WRRC
Yes, Tucson Clean & Beautiful is among one of the groups in Tucson that pull weeds https://tucsoncleanandbeautiful.org/buffelgrass-education-removal/

Forest to Faucet: How Forests Impact the Watershed

This session, moderated by **Michael Seronde** from UArizona Water Resources Research Center (WRRC), related current science and planning initiatives that seek to further collaborative watershed planning and action in Pinal Creek Watershed – otherwise known as Cobre Valley.

Benefits and Risks of Forest Health in Cobre Valley

Ashley Hullinger, Research Analyst & Paul La Farga, Graduate Research Assistant, UArizona WRRC

Since 2015, the WRRC has been working collaboratively with the Gila County Cooperative Extension and Gila County IDA to gather community water priorities and help establish a watershed partnership in the Cobre Valley. Over the past year, the WRRC's research efforts have focused on developing a better understanding of the benefits and vulnerabilities of ecosystem services in Cobre Valley in order to support education, decision making, project development, and natural resources management.

What does 'watershed' mean to you? Viewing the world from a watershed perspective provides a unique planning opportunity to look beyond jurisdictional boundaries and land ownership to consider the activities that may impact your community and environment, both negatively and positively. One way of measuring impacts to watershed health is to assess the underlying ecosystem services (ES) that provide endless benefits to humans, from water filtering and erosion control to firewood and carbon sequestration. The first phase of the WRRC's research has been to establish the status of key ecosystem services in the Cobre Valley, such as the economic benefit of having trails in the region. Information about the status and benefits of ES will be released as a report installment in January 2021 for review among stakeholders and the CVWP Science Coordination Committee. The next step is to evaluate the vulnerability of these benefits and risks including severe wildfire and exceptional drought. According to the Arizona Department of Forestry and Fire Management, 90% of the Cobre Valley is considered at high or extreme fire risk, and exceptional drought was experienced for the first time in Cobre Valley since 1980 during October 2020, based on US Drought Monitor data. This information will be included in a second installment of the report, which will evaluate vulnerability of ecosystem services and top risks, to be released in April 2021. The final installment of the report will assess trends and future scenarios, to be released in fall 2021.

10:20 Christopher Jones, UA CES
Ecosystem Service: Habitat for wildlife mean a lot to me spiritually. I get to see so many different kinds of birds everyday where I live.

10:20 Victoria Carella
Healthy riparian corridors and wildlife corridors.

10:21 Christopher Jones, UA CES
A watershed is a land area that drains to the low point!

10:21 Roberto Reveles
Need communicate value of this watershed to Phx metro area in building public policy support for the watershed area which lacks political support.

10:28 Victoria Hermosilla, CVWP
Learn more about the value of trails in Arizona here: https://aztrail.org/economic-value-of-trails-in-arizona/

10:28 Victoria Hermosilla, CVWP
Learn about this tool here: https://www.itreetools.org/

Providing Ways for the Watershed to Come Together

Victoria Hermosilla, Coordinator, Cobre Valley Watershed Partnership

Starting with the basics, a watershed partnership is a voluntary alliance among vested stakeholders who share a common bond in that they would like to see their watershed improve water quality and maintain or improve the quality of life. As a new organization, funded by Bureau of Reclamation's WaterSMART program, the CVWP has been developing its mission, goals, and leadership over the last year and a half. CVWP goals are designed to fit the unique circumstances of the local watershed, based on past WRRC stakeholder engagement and further validated by the

CVWP stakeholders. These goals include addressing the priority areas of system efficiency and wise utilization of resources, economy and development, recreation and environmental stewardship, and water awareness. The partnership is working toward these goals in different ways, such as targeted working groups and development of the Watershed Action Plan. However, nothing is possible without community support. The CVWP aims to provide a variety of ways for community members to engage with their watershed. CVWP is already actively conducting education and outreach activities, as well as watershed clean-up events. Additionally, as an official 501(c)3 non-profit organization, the CVWP can serve as a fiscal agent to apply for and administer a wide range of grant projects. We look forward to obtaining the necessary resources and support to implement projects that help the community reach its goals and benefit the watershed. To get involved, contact Victoria Hermosilla: cobrewp@gmail.com

10:45 Paul La Farga, UA WRRC
Contact Regina Ortega: 808-373-0032 for clean up!

Shared Reactions and Questions from Day One Sessions Seen Through Zoom Breakout Rooms

Midway through Day One, forum participants broke out into five separate discussion groups for a chance to share reactions, questions, and takeaways for action. Participant responses from all five groups are summarized and organized in the circles below. Reactions and questions centered upon fire, drought, and invasive species, as well as the lessons to be learned. Overarching themes for "Action" clustered around the need for collaboration among a diversity of participants and increased communication with the public.

Reactions and Questions

Takeaways for Action

Forest to Vibrant Community: How Forests Impact Human Health

This session, moderated by **Ben Downer** from UArizona Cooperative Extension, illustrated the efforts of local leaders to both build community and increase stewardship of natural resources.

Creating Love of Place Through Recreation: Cobre Valley Recreation Masterplan Proposal

Linda Oddonetto, Economic Development Director, City of Globe; Thea Wilshire, Chairperson for Recreation Subcommittee; and Melissa Steele, Economic Development Specialist, City of Globe, Cobre Valley Collaborative

What makes a place loveable? What is it about certain places that we are proud to say we're from there? Dr. Thea Wilshire and Linda Oddonetto, with assistance from Melissa Steele, discussed the background and drive of their Recreation Masterplan Proposal to improve access to the outdoors and encourage a high quality of life in the Cobre Valley.

11:06 Thomas Foster
Great book!! I have a copy.

Dr. Wilshire started big with Eric Klinenberg's book *Palaces for the People*, which discusses the role and value of social infrastructure. Social infrastructure refers to the shared public places like parks, plazas, libraries, trails, and other spaces that are open to everyone. These spaces drive love of place. Peter Kageyama's *Love of Cities* and *Love Where You Live: Creating Emotionally Engaging Places* make the point that to really love where you are, it has to grab you emotionally. Lastly, Jack Scultz' *Boomtown USA: The 7-1/2 Keys to Big Success in Small Towns* focuses on rural America and how every single community has its own asset or its own area of unique strength, different than other places.

11:14 Victoria Hermosilla
What different kinds of recreation do you enjoy in your community?

11:15 Thomas Foster
Hiking and exploring.

11:15 Kenneth Steel
Bicycling!

Our strength is the phenomenal natural beauty and access to nature that we have in the Globe-Miami and San Carlos region. That's why increasing access to recreation and the outdoors would also increase love of place and help us socially connect through infrastructure.

Along with education and housing, recreation has been identified as a community priority through various stakeholder engagement processes led by City of Globe and other local entities in partnership with organizations like RCAC and Pinnacle Prevention. One of these processes, the Cobre Valley Collaborative, established a recreation subcommittee to figure out actionable, strategic plans that identified SMART goals. A key next step to realize recreation goals was to establish a Recreation Masterplan, which would look at existing resources, necessary resources, how people are using the resources, and where the community wants to go next.

City of Globe is seeking various funding sources to support the Masterplan and other community development efforts, including a grant from the National Park Service and a grant from Freeport-McMoran that was matched by Gila County. Funding will help build the Masterplan, but buy-in and direction from the community is necessary to determine what goes into the plan and how to direct the funds. we believe that if people are out in the watershed if they are experiencing nature if they are out of doors, they are going to be more committed to show up for clean-ups and willing to invest in different ecological preservation and restoration projects that we need for the health of our watershed. This overlapping recreation priority with the Cobre Valley Watershed Partnership is an opportunity for joint work in the future.

Preparing the Next Generation of Water Stewards and Increasing Community Water Resilience

Glen Lineberry, Principal, Miami Junior-High School

Under the direction of Principal Glen Lineberry, Miami Junior-Senior High School has implemented an innovative program to set kids up for life, teaching things like where food comes from, why we have clean water in some places and not others, and how everyday decisions have big impacts. The goal is to embed a sense of place that reflects the realities of contemporary life. Forum participants thanked Glen for building a model program that tackles diet, environmental stewardship, and life skills development.

Referring to the social infrastructure mentioned in the last presentation, schools sometimes feel like we are the one piece of social infrastructure left standing. We have over 500 students on a compact campus for all preK-12 students, with a service area of about 1,200 square miles. Students are from directly in Miami and further afield in Top-of-the-World, Roosevelt, and east of downtown San Carlos. Three-quarters of kids qualify for free and reduced lunch, with the federal government covering all school lunches in a normal year. Several years ago, we began a self-directed project to improve the school, addressing the physical environment as well as curriculum, and instruction.

A part of this work is our Career and Technical Education (CTE) programs, which is designed to provide hands-on learning experiences dovetailed with English, math, and science. Multiple programs are currently being integrated into core academic instruction, including agriculture, construction, culinary arts, education professions, graphic design, journalism and software development. These programs prepare students with fundamental skills for living, while creating pathways to jobs and college degrees. This program teaches workplace skills and offers leadership trainings – the soft skills that make a difference for years to come. CTE also brings in more funding for the school, which allows us to pursue different projects.

We have undertaken a vision and plan to improve the entire campus, including the academic buildings, gymnasium, and all the land around the site including a large, open unused field. The vision is to have a campus cooled by hundreds of trees as part of the orchard and a working farm with animals, practicing sustainable production methods. To achieve this vision, we have implemented a plan to install a working orchard and farm, implement rainwater harvesting, and give ownership to the students through tree adoption and working of the farm.

Project Harvest helped us install a large rainwater runoff capture tank to begin feeding water to some small garden spaces here on campus. We are in the process the process of ordering more tanks. Trees Please has helped us obtain the trees, restore the large wash to the north of the school, improve drainage, and control run-off to prevent flooding in the parking lot. This reconfiguring of the “local” watershed has allowed us to hold water for multiple uses, including a restored riparian area, rather than letting it run off. We've planted about 350 trees and shrubs in the last two years using Groasis Waterboxxes, which are basically buckets that are buried in the ground with the tree. The Waterboxx system collects and holds precipitation to water the trees over time in order to combat desert conditions and assist with reforestation. Starting with 2 ½

11:26 Victoria Carella
Glen - wonderful!

11:27 Thomas Foster
Check with Chris Jones [about a well]

11:29 Christopher Jones, UA CES
ckjones@arizona.edu: feel free to reach out to me; thanks for the shout out Tom!

11:28 Mary Lata
Glen - what an amazing program/school! That's really fantastic! I'm so impressed!

11:30 Lori Brown
What a great program.

11:32 Linda Oddonetto
So cool!! Glen, thank you and your staff for your efforts.

11:29 Linda Gross
Yes! What a great example of what rural education can imbue to kids! Great presentation Glen!

11:29 Sheryl Cormack
That's wonderful. Thanks Glen. Can't wait for the fieldtrip!

gallons of water for most plantings, we do not have to irrigate with additional water in the first year. We will plant another 100 to 120 trees.

The Agriculture (Ag) program plays a big part in realizing this vision, in coordination with the other CTE programs. Run by Amanda Bickle, who teaches the agriculture and biology program, the farm will involve experimental gardens using traditional Native American gardening techniques. Some experimental projects will teach kids about water retention and plant growth. The culinary arts program will use the produce from chickens, goats, and the orchard trees and the other plants housed onsite. We will also use these supplies to send food home to about 70 families in need. A cheese making project pulls in construction students to build out the facilities and design business students to market the products. The school is also in the process of embedding climate science and environmental stewardship programs into the curriculum for all students. The science curriculum will integrate a greenhouse and a weather station (both in the works). One challenge has been finding a contractor to drill a well, which would be powered by a solar pump in order to supply irrigation water for the farm. As we start the full farming operations, we are working to locate internship and externship opportunities for students as a pathway to employment.

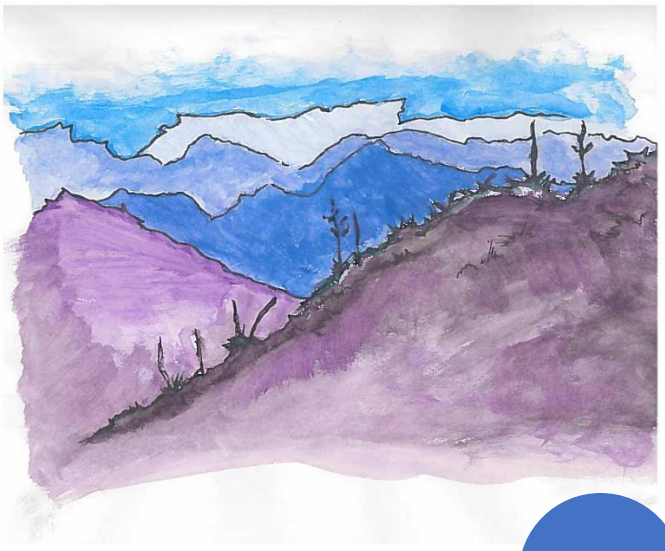
This generation is going to bear the brunt of the climate change impacts, which will have immense implications for their lives and for their children, as well as for their health, employment, and quality of life. This generation needs to understand where and how food is produced, along with the nutritional and health components and the implications for the environment. Principal Lineberry is grateful for the partnerships that have helped thus far and is interested in any other possible collaborations.

11:38 Roberto Reveles
Glen, wonderful presentation and should be shared with our MHS Reunion mailing list.

Watershed Through Art

As the final event of Day One of the forum, we asked participants to vote on concepts for a new logo for the Cobre Valley Watershed Partnership. The art pieces that inspired the logo concepts were created by local artist (and so much more) **Carrie Curley** – see her Featured Artist profile in the Speaker Bios Packet. Concept 2 was favored as the logo design among the group with 67% of people in agreement. Participants also provided helpful suggestions and feedback in order to retain Ms. Curley's vision and represent the local natural beauty. We thank Ms. Curley for sharing her beautiful work that represents a deep connection to the natural world and watershed.

Carrie Curley's original artwork is shown below. The logo concepts based on her work are shown on page 15.



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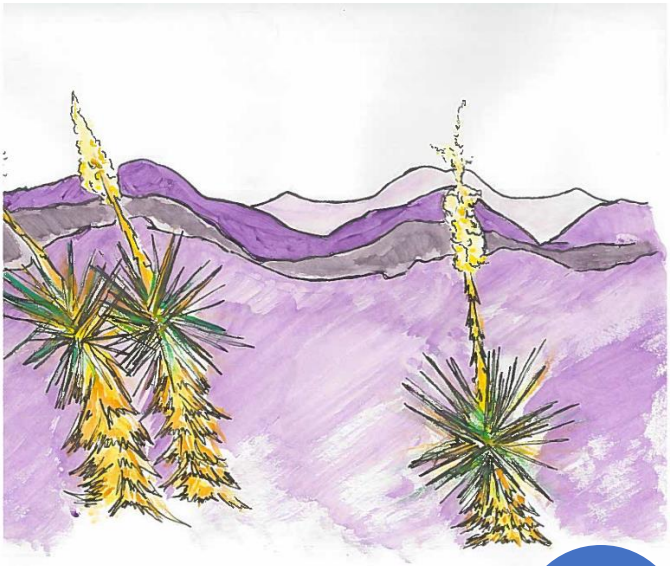

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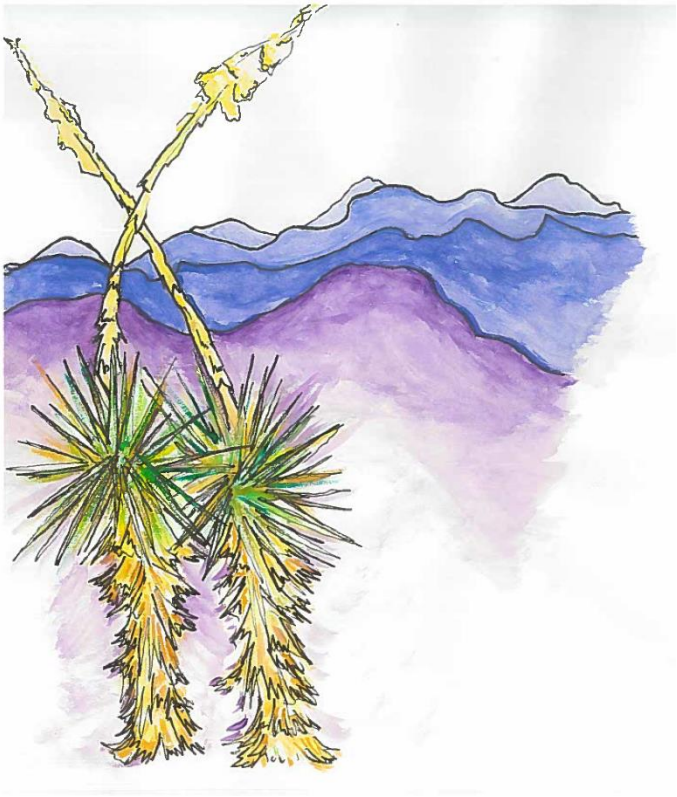
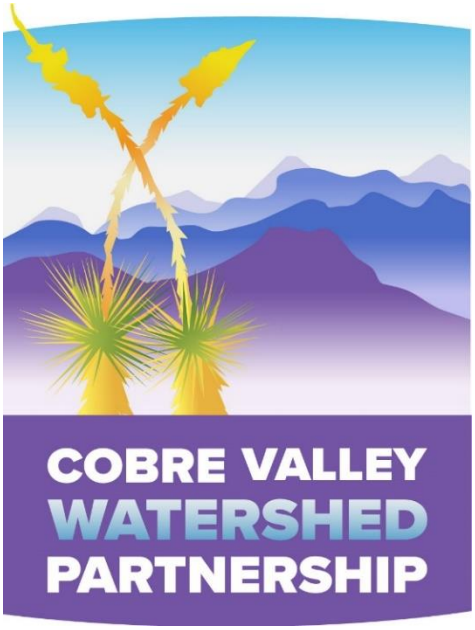


3

Through a live poll, forum participants voted for Concept 2 as the CVWP logo. Suggested changes to the logo from participants were conveyed to the UArizona WRRC graphic designer for consideration.

1

2



3

11:45 Christopher Jones
Presenters can't poll; I vote for #2!!!!!

11:45 Melissa Steele
I like #2

11:46 Victoria Hermosilla
Yeah, also vote for 2, add that in!

11:46 Mary Lata
I love them all, but I like 2 best.

11:47 Ben Downer
Could we incorporate more of the hand drawn aesthetic of the artist's original sketches? I really like the vibe of the pen and watercolors.

11:48 Joe Miller
Perhaps combine plant elements from option 2 into the more landscape version?

11:48 Glen Lineberry
Agreed. Much more of CC's vision in those, and they should still be reproducible.

Recap of Day 2: November 13

Brief summaries of the presentations are provided in the sections below. Recordings are posted at: wrrc.arizona.edu/Cobre-Valley

Starting the day with purpose, **Gila County Supervisor Tim Humphrey** presented a big picture perspective of the roles of partners and activities in the watershed. He applauded the efforts of so many people and organizations who keep cattle grazing, forests healthy, and our water clean. Gila County knows that we must manage water wisely because we do not have much of it in the West. We are faced with many challenges - especially today - but thinking to the future, it is important that we continue to learn and work on water together.

Day 2 Keynote: This is What It Means to be a Fire-Adapted Community

Jim Morgan, Fire Chief, Pinetop Fire District

The keynote presentation from Fire Chief Jim Morgan provided both overview information and specific recommendations about becoming a firesafe communities, based on his experience in northern Gila County.

Fire Chief Morgan reminded us that while striving for community risk reduction of wildfire, we must first change our own behaviors before community-wide change is possible. Even though fire is part of the White Mountain ecosystem, the community was not very engaged in decisions at first. For instance, there was not a single firewall-designated community in the White Mountains. Morgan spoke of the shift in community culture that was necessary to make a dent on wildfire and risk reduction. Once the public understood that it is not possible to put a fire engine at every house during a catastrophic event, they saw the best hope of protecting their property was through vegetation management and coding for fire restrictive construction. Chief Morgan hopes that the town of Pinetop-Lakeside will have a revision and an updated urban interface code in the next few months to improve vegetation management and codes.

9:21 Victoria Hermosilla, CVWP
Learn more about the National Cohesive Wildland Fire Management Strategy Here: https://www.forestsandrangelands.gov/strategy/

Panel: Comparing Lessons of Mitigating and Responding to Wildfires

We brought together regional and national leaders in forest and land management to shed light on threats associated with the Wildland Urban Interface (WUI), impacts of wildfires to our communities and economic activities, and steps to become fire adapted for long-term watershed health. **Chris Jones** moderated our panel of knowledgeable guest speakers, drawing from different points of view and expertise.

Panelists included: **Dee Randall,** Forest Manager, San Carlos Apache Tribe; **Adam Bromley,** District Ranger, US Forest Service - Tonto National Forest; **Stephen Flora,** Senior Hydrologist, Salt River Project (SRP); **Lori Brown,** Owner, Brown Ranch, Tonto Natural Resource Conservation District (NRCD); and **Carl Melford,** Emergency Manager, Gila County Health and Emergency Management.

Dee Randall launched the panel with a vision for pre-settlement forest and landscape conditions as a guide to resource management and long-term planning for forest and watershed health on San Carlos Apache Tribal Lands. A common reference point for these forest conditions would be to think of Aldo Leopold's passages describing the land before western settlement. The San Carlos Apache Tribe started their Integrated Resource Management Plan in 1992, which required a common vision among federal agencies, tribal entities, and reservation resource managers. Through this process, the Tribe decided that the benchmark for their vision is for the reservation is to resemble pre-reservation conditions. Aspects of desired future conditions were derived from accounts of Tribal Elders and Tribal

9:57 Paul Buck
San Carlos and the Tonto NF have a great cross-boundary project going on and that may be something to discuss in this section as well.

members, describing many large pine trees, water from springs, rivers had many cottonwood trees, fish, beaver ponds, wild spinach and wild onion, and plentiful grass. Returning San Carlos Apache landscape to closely resemble pre-reservation conditions ensures a positive ecosystem for future generations. It was mentioned that when conditions are similar to those described by Apache Elders and when traditional plants and animals return with healthy and vigorous populations, they will know that they are on the correct path to managing the land correctly.

These management goals are balanced alongside the function of a working forest that provides timber sales and firewood, as well as hunting and camping permit sales. The key to managing the landscape effectively is collaboration. Problems do not stop at barbed wire fences; resource management does not stop at Tribal, private, city, county, or state boundaries.

Adam Bromley picked up where Dee Randall left off, reiterating that the landscape does not stop at jurisdictional boundaries. Everything is connected from an ecological perspective, stretching through numerous landowners and land management objectives. Bromley reminded the audience that federal land management agencies like USFS that are not local to the geographic region, so decisions that are made in other parts of the country influence what happens around Cobre Valley. Our land management agencies are not independent and must answer to various chains of authority, with many people from outside the state impacting priorities, funding availability, and management decisions. Thinking about what needs to get done on the ground, our biggest challenge is outreach in the community in order to get the necessary support for implementing what the land needs.

One of the biggest challenges is balancing all uses and interests to form a functioning ecosystem. Bromley also described a common scenario in which people are deeply passionate about certain issues, but they get distracted by the overall connectivity of the system. Bromley understands the public participation is challenging but hopes that the CVWP can help with outreach into the community to get started on some of the ideas that came from previous presentations.

Stephen Flora provided a history of the Salt River Project (SRP) and explained how wildfire impacts the watershed and affects water supplies. Flora explained how Arizona's extreme climate can be unpredictable, but that drought and flooding have been around for centuries so that plans for these droughts and floods have been made. Flora explained that forest fires and wildfires have an impact on the resilience of the forest to manage drought, impacting your water supply and creating problems with the debris flow that happen afterwards. After the Woodbury Fire in 2019 there was an exceptionally large flash flood event that saw inflow into lower reservoirs that are much smaller, which caused large releases from SRP. They have been part of the Forest Restoration Initiative (4FRI) to get fire back to a more natural state because these flash floods that occur after wildfire negatively impacts SRP water supply. Forest restoration is a question of paying some now or a lot later and is dependent on both public and private partnerships. Restoration helps prevent catastrophic fire, water contamination, reservoir sedimentation, and infrastructure damage, as well as a host of other long-term benefits to combat drought and climate change. Flora concluded by highlighting the importance of collaborative partnerships to allow SRP to move forward to plan for future events and protect forest resilience.

Lori Brown, H4 farm and fifth-generation ranch owner, spoke from a lifetime of personal and professional investment in rangeland health and youth education. She described the various roles that her ranch plays in the Tonto Basin. One of these roles is education – for the past 11 years, Brown has been engaged in agriculture education, giving farming and mining lessons to numerous fourth graders throughout the years. She also teaches students how water is not only used for livestock, but also for the wildlife as well. Brown mentioned how they develop springs, keep tanks clean, and run pipeline and put water all over the ranch. She even runs water to pastures that are not being grazed on to nourish wildlife. The ranch also serves recreational purposes for many campers who want an escape from the Valley. Brown's presentation emphasized the important role that private landowners play in resource management. It is important that ranchers and land management agencies collaborate

in order to ensure the good health of our water resources. Landscape-scale issues require cooperation and are not just one person's problem.

Carl Melford described how Gila County Emergency Management works with a variety of partners and agencies to respond to the threat of wildfire and the flooding events that follow. He showed a video that illustrated the power of debris flow and the kind of ecological communities that should be prioritized for treatment. This kind of information is not meant to incite fear, but rather to promote respect for these watershed systems. These floods claim lives, so preparation and mitigation should happen at all levels – from the individual to jurisdictions and inter-agency.

Panel Discussion

This segment of the forum provided opportunities for the panel and audience to respond to questions and delve into more details. Panelists emphasized some of the following bulleted points, but the discussion summary below is a worthwhile read and full of valuable information.

Takeaways:

- Communication and engagement with the public on forest and watershed management are necessary to establish the public awareness and support to move forward on both smaller and larger projects.
- Partnerships are essential to tackle landscape-scale issues in Arizona. While working among various jurisdictions is difficult, the funding and management actions must be coordinated among landowners and natural resources managers to be effective.
- Successful partnerships are built on common understanding, as well as shared goals and objectives, to achieve mutual benefits for the affected stakeholders.
- Forest management is a long-term commitment and planning effort, not one-and-done. The more mitigation and restoration work that is done now will mean less resources and negative economic and environmental impacts later.
- Forest, ecosystem, and watershed health are paramount to secure groundwater supplies.

Chris Jones started out the discussion with a question for the entire panel:

In general, what is one thing that the public should understand about the effect of recent fires on the watershed, both past and future?

Adam Bromley: One of the biggest things to understand is what we mean when we say fire is "good."

Fires are natural events. However, human beings have altered our environment to make fires behave "unnaturally" in that they are much more severe than they used to be.

If we use prescribed fires to reintroduce fire into these ecosystems, I think people should understand *why* we may have to make some sacrifices in order to get back to a more natural state. Fire has become what it is due to human impacts on the landscape.

Even with low intensity fires, we see effects on everything from recreation opportunities to post-fire flooding. Prescribed fires will have the same impacts, so it is important for the public to understand the possible sacrifices.

10:28 Paul Buck
For federal agencies, is land management policy beginning to address human impacts on the environment in terms of how to address these new norms? E.g. fire and climate change.

Stephen Flora: To follow up on that, the public needs to understand the kind of flooding that can occur. Especially in the case of fires in lower elevations, the system might not bounce back as quickly as in upper elevations with ponderosa pine forests. These longer lasting effects in lower elevations impact overall forest resilience and the changing environment. While Arizona is already experiencing variable weather between droughts and floods, we may have more extreme droughts and floods. Preserving, restoring, and maintaining healthy forests will help to mitigate some of the impacts of these extreme events.

The forest health comes back to the resilience of the watershed, as well as the groundwater supplies. Fires will increase flooding and run-off, which decreases infiltration and negatively impacts the ecosystems as well as the groundwater supplies.

Carl Melford: Showing images of post-fire flooding is not intended to incite fear but to demand respect of these watersheds and encourage people to practice situational awareness. For instance, the Woodbury Fire caused a tragic incident in which a flash flood killed 10 people – this was a direct result of a wildfire.

In the video of flooding after the Pinal Fire, it was clear skies and a sunny day around me. Seeing those floodwaters rushing through. For the people that recreate or travel in burn scarred watersheds, know what the elements are like and be aware of your environment.

Lori Brown: People do not realize the impact of rain on burned watersheds as flooding moves downstream. We live on Slate Creek, which crosses Highway 87. There are six 12-foot tunnels that transport water under the highway. After the Willow Fire burned this area in 2004 and it rained, the water almost ran over the highway. The water goes down Tonto Creek and drains to Slate Creek, which creates this backup.

Now, with the Bush Fire and almost 200,000 acres burned, I fear the post-fire flooding is going to be tremendous. With the way the watershed drains down to the Slate Creek, we should probably pray it will be a somewhat dry year.

Dee Randall: Our ideas of fire management and fire behavior have changed since the 1920s and 1930s. There is much work to be done beyond just reintroducing fire. Mechanically, we are talking about a lot of thinning and harvesting timber to mimic what wildfire once accomplished.

As a civil culture that has a stake in the management of the land, it is going to take a while for people's ideas about the forest to change. People expect the forest to be thick and full, and they think that is how it is supposed to be. I grew up looking at it like that, but it is not right – it is unhealthy. The forest lives, and we have to think about not just treating it once but treating it over and over and over again. We are going to be treating it until the end of time.

10:42 Michael Burgoyne
How much does it cost for current fire management of mechanical thinning and prescribed burns?

10:46 Victoria Hermosilla, CVWP
Hi Michael, prescribed burns can cost around $100/acres. Hand thinning can cost ~$100-$300/acre, and Mastication (chewing up overgrown forests) can cost ~$500/acre. These are approximated costs from a conversation I had with Ranger Bromley a few weeks ago. What this can do, however, is allow different sized grants to be applied to different sized projects. No forest treatment project is too small!

10:49 Michael Burgoyne
Thank you, Victoria. Is hand thinning when they remove the timber for timber production? Like when they sell the lumber?

10:50 Victoria Hermosilla, CVWP
Ranger Bromley will probably correct me on this, but I believe hand thinning is applied when large timber equipment is not appropriate for the landscape. So, steeper terrains, or more tree-specific areas. I believe the timber can be sold and/or collected post-treatment from a variety of these treatment types.

10:51 Adam Bromley, USFS
Hand thinning is generally the removal on non-merchantable material 1-5" in diameter. This material is generally piled and burned or lopped and scattered and then burned. Anyone wanting to talk about forest thinning options I can talk to you for hours. Just get a hold of me and I'll be happy to answer any questions you have.

This means planning forest management in 20- to 50-year intervals, not just year to year. We need to be ready for what will happen down the line, because the forest grows back and wildfire will happen again.

This relates to water. Everyone in Arizona knows that we have a limited supply of water that enters the watershed as rain. We must also realize that having a healthy watershed improves our aquifers and groundwater supplies.

We need to let the public know that we are not just doing this work for current residents of the watershed, but for the future.

The next question in line for the panel was pulled from the audience:

10:28 Linda Gross
Does anyone here have the cost to AZ taxpayers of the fires we've had in the last 5 years? What is the central agency tracking costs?

Adam Bromley: Without the figures in front of me, the answer is specific to the fire and what costs we are talking about (e.g. strictly financial costs compared to indirect costs). As a rough estimate, the Tonto National Forest has probably spent more than $50 million on fire this year. The Griffin Fire cost about $10 million alone, and the Bush Fire was far more expensive – without considering others such as Sawtooth, Central, and a few others. The Polles Fire, which not only cost financially, but cost us in the fatality of a pilot.

This all adds up, so we are talking about millions of dollars annually – and tens, if not hundreds, of millions of dollars over five years.

Joe Miller, Trout Unlimited (forum participant): The actual total cost would be more millions, at least 10 to 20 times greater than the cost of preventing fires and managing fires as they occur. The long-term costs are enormous. The true purpose of forest management is protecting the watersheds.

Stephen Flora: There have been economic analysis to look at those costs if catastrophic fire in terms of different kinds of impacts on the environment, water, recreation, etc. You can pay a little now to manage the forests, but the cost of these post-fire impacts can be much more later. You have to consider all different types of agency expenditures: administration, coordination efforts, emergency management, and so on. Those type of things add up, as well as the losses to the environment and other aspects of daily life and the economy.

Lori Brown: It's not just about what fires cost, but Arizona taxpayers are paying for more than the fire itself. The firefighting is mostly federally funded. The State and counties are responsible for things like fence repairs, where much of the taxpayer dollars are spent. Fires cost us at the local level, because we are the ones who are rebuilding guardrails, replacing infrastructure, and dealing with the flooding. As an individual and a rancher, my expenses are enormous.

Adam Bromley: These huge indirect costs have economic impacts, especially to the local communities. Arizona taxpayers are absorbing the cost of new guardrails and other rebuilding efforts. It all adds up to additional millions of dollars.

Additionally, to clarify, fires are federally funded, which are also taxpayer dollars. The State is not necessarily paying for the fire itself unless there is a cost-share agreement in place.

Joe Miller: One other taxpayer-related issues on the table right now concerning the Arizona Corporation Commission: removal and disposal of biomass. Forests have both productive timber that can be used and sold, as well as the biomass – smaller stuff that has to be removed and disposed. The only viable way to do that in Arizona currently is to convert that biomass to electrical energy. We are limited by only having one plant in the State, which is significantly slowing down restoration in Arizona.

Arizona Corporation Commission could help address this issue by requiring power companies to use more of that fuel source, but it is not as effective as solar or natural gas. However, burning biomass in a proper power plant for energy is better for the climate – rather than letting it be burned openly in the forest where it produces up to 40% of the total particulates introduced into the atmosphere around the world. I hope that all the folks here can express their opinions to the newly elected Arizona Corporation Commissioners to please address this issue.

Carl Melford: Be aware that there are measures in place to help soften the economic blow from these events, absorbing some costs for local taxpayers and passing it up as needed. These are local measures at the county level, whereas direct costs from the fire and incident management team are built in on a federal level as described earlier.

There are so many costs and economic impacts related to fires that is necessary for the county to accurately track their costs on each individual event. This is a difficult task, because there are so many moving parts. For instance, moving debris after a flood is a cost, not only for the personnel but for the vehicles (e.g. bulldozers).

We track our costs carefully. If we reach a certain dollar amount, we log that amount. Once we have an emergency declaration for an event, we can bill the State for reimbursement for that amount on a county level. The State can then file a declaration of emergency and seek reimbursement from the federal government. This chain of emergency declarations can somewhat absorb or soften the blow of costs for the local taxpayers.

10:52 Carl Melford
A private culvert downstream of the Pinal Fire was clogged by cut firewood from a campsite. The clogged culvert resulted in the complete destruction of a small private bridge. The cost to repair this bridge was thousands of dollars. This could have been mitigated by removal of firewood that was left behind by campers. Estimated mitigation cost $0.00. Food for thought.

The final question for the panel was:

How can we strengthen partnerships, and what do we need for better partnerships?

Dee Randall: As an example, the San Carlos Apache Tribe's Forestry Department are working with the Tonto National Forest on a very large watershed improvement project: 240,000 acres, half on the reservation and half on the Tonto. Working with so many different jurisdictions is difficult, but it is necessary for all of us.

For this project, different treatments are planned, both mechanical thinning and prescribed burns. We are not going to be able to treat certain areas, but we have to go into it thinking about the spotted owls in the canyons. How are we going to treat the canyons? How are we going to treat areas that we cannot manage mechanically? What about the very thick and heavy spots that have not burned in so long that they will burn hot when prescribed fire is applied? Along with mitigation measures, all this work will require forming partnerships and pulling together funding for the mutual benefit of both the Tonto National Forest and the San Carlos Apache Reservation.

One of the biggest parts of a good partnership is making sure that we are heard and that our goals and objectives match. There are many ways for us to support each other, such as moving forward with environmental assessments. Currently, we are working together to complete all the environmental documentation requirements.

Stephen Flora: SRP works with the Forest Service, USGS, National Weather Service, and other agencies for emergency response, forest restoration, and habitat restoration on mostly a large scale. However, it is important to engage the impacted stakeholders on a smaller scale while understanding how agencies play a role and respond. We need to find common goals between agencies, communities, and various other entities, as well as ensure communication and knowledge of how agencies work. If communities understand the impacts to their area and the assistance that is available, they can start building support for smaller projects. Increased public awareness and community involvement is a first step in working toward joint solutions and funding pathways to mitigation projects.

Lori Brown: Partnerships are important. On my allotment, 24 miles of pipeline got burned in the Bush Fire. To replace it, just the pipeline costs about $110,000, not including labor. The Mule Deer Association are volunteering their time and to help us lay the pipeline core through our allotment.

This provides water for our cattle, but we can also start getting water out for the wildlife. The wildlife has no water right now. When they are crossing the highways to Tonto Creek, which is dry, they get hit on the highway. It is important that a partnership is helping more than just us.

Adam Bromley: "Partnership" goes back to the reality that ecosystems do not stop at jurisdictional boundaries. [Partnership] takes everyone here today. It does not matter whether you are a mountain biker, an environmentalist, a rancher, or a fire manager. We all have a stake in the watershed and need to look at an entire ecosystem approach without jurisdictional boundaries. The only way to do that is to build partnerships, and this group is a prime example of a way to build those connections and get started. It is not going to be fast or easy, but we have to do what we can to adapt to our changing environment, ensure clean water to drink in the future, and protect public safety.

As a partner, the Forest Service can work with the State and the Tribes, which is relatively easy for us to do. There just has to be a desire and a funding source to do so. The Forest Service is not a money-rich agency, so the funding must come from somewhere. Groups like the Cobre Valley Watershed Partnership are a good way to pass on information about how we can partner and the best route to proceed.

Some of these projects can be small. Doing something is better than doing nothing at all – whether it is 10 acres or 10,000 acres – and working together to do it, so we can try to get our environment into a state that we can all benefit from it to some degree.

Chris Jones: I am glad that we are part of the Cobre Valley Watershed Partnership, so that we can deal with some of these real issues.

Interactive Breakout Rooms: Getting Behind a Project – What will it take and how do I fit in?

Our panel and previous forum speakers primed us for active breakout room discussions led by facilitators prepared to lead action-oriented conversations on a variety of focus areas.

Opportunities for New Trails and Trail Maintenance

Facilitated by Sheryl Cormack, USFS; Ben Downer, UArizona Gila County Cooperative Extension; and Michael Seronde, UArizona WRRC

The discussion at this breakout session focused on identifying priority areas for trail improvements and other recreation needs for the community. Participants spoke to the need for improved signage both on the trails themselves and in town to help guide recreators who may not know how to easily access regional trailheads. Trail maintenance and suitability were also raised as issues – some trails are not sustainably built and/or managed, and some are not well suited for more casual recreators. Breakout room facilitators Sheryl Cormack and Ben Downer suggested a future recreation field trip to demonstrate common trail sustainability issues. Let's all go mountain biking or hiking!

If anyone is interested in volunteering or talking recreation on the Globe Ranger District, please reach out to Sheryl Cormack: Sheryl.cormack@usda.gov

Ecosystem Services to Policy

Facilitated by Ashley Hullinger, UArizona WRRC

As we are seeing ecological communities change, we have to consider countless factors and deliberate our goals and practices among all stakeholders and land managers. This is no easy task. The effects of climate change make this job even more difficult. For instance, it is even harder to bring areas back after the fire with increased temperatures and changes to soil chemistry. One useful method to help the process is to compare historic aerial photos to current photos in order to visualize the target for how you should manage (e.g. San Carlos Apache Tribe have performed this study). More communication and liaison between agencies and landowners about what can be done to improve ecological conditions amid confusing bureaucratic limitations could also be helpful. Local governments and agencies should continue to foster and promote partnerships with ranchers who help manage the landscape and benefit their communities.

Invasive Grasses

Facilitated by Victoria Hermosilla, CVWP

This breakout group discussed the 10 square mile grazing allotment held and managed by Pinto Valley Mine, Capstone. Mr. Ralston noted weed-free certified feed for the cattle, and the importance of protecting the watersheds from invasives. The group discussed actions citizens can begin taking in order to be more protective of their watersheds. Two main take-aways are: 1) Fire-Wising the community from the individual residence all the way up to the whole community level by learning more, complying with recommendations, and consulting with local fire departments; and 2) finding more opportunities for outreach and education. The group at the water forum is small compared to the larger community, which needs to have more opportunities to understand everything discussed at the forum.

Wildland-Urban Interface and Tools

Facilitated by Chris Jones, UArizona Gila County Cooperative Extension

The discussion focused on the raised awareness of the Globe-Miami wildfire risk following the recent Salt and Griffin Fires in August 2020. Wildfire has not typically been a major risk in the area in the past. In response to recent weather patterns, nonnative invasive annual winter grasses, especially red brome, became established throughout Cobre Valley and lower elevations in Gila County in the past few years. The group discussed how people do not

really understand the danger. It is time to change the way we think about wildfire as local problem. Adaptation measures include how individual property owners manage their own properties, and how community properties can be managed for wildfire. Globe Fire Chief Robison mentioned how we could look at Payson as a model. Payson recently adopted a Fire Adapted Community Code. Gila Community College is a potential partner: they teach fire and fuel management classes. Barry Johnson is the instructor. Dea Funka from APS mentioned a student learning process that may be applicable. Rights-of-way and defensible space around utility poles help to provide fuel breaks. She also listed several "tools" to help the community mitigate for wildfire, including the AZ Fire Adapted Communities Network; Firewise USA; WIU codes; and interagency support from partners like AZ Dept. Fire & Forestry Management and FEMA. There was general agreement to initiate some meetings with the fire chiefs, Emergency Management, ADFFM, and APS to explore next steps to help Cobre Valley mitigate and prepare for wildfire.

Education and Outreach

Facilitated by Paul La Farga, UArizona WRRC

Rich with constructive dialogue, friendly discussion, and engaging historical anecdotes, this group quickly agreed that better communication would help us move forward to garner more community involvement in rainwater harvesting. While many people might work "in their own silos," when it comes to communicating with others there are opportunities to build on the existing network to include larger audiences that are connected through programs and institutions. We should create a collective message to break down these silos and develop an action plan to identify specific tasks and to assign to promote and distribute information would be needed.

Closing Remarks: Increasing Water Supply Reliability through Partnerships and Funding Opportunities with the Bureau of Reclamation

Jessica Asbill-Case, Water Resources Program Manager, US Bureau of Reclamation

Jessica Asbill-Case closed out the forum with information about funding and partnership opportunities from the US Bureau of Reclamation (Reclamation). The WaterSMART Program provides a framework to support water supply reliability for multiple water users in the face of various realities such as growing populations, restoration needs, and drought. WaterSMART aims to increase water supply reliability through investments and attention to local water conflicts, while supporting water conservation and water **management** improvements to help meet competing demands for water. Leveraging federal and non-federal funding, with generally a 50% cost share, this program relies on collaboration with stakeholders to develop local solutions to water supply issues. Jessica and other Reclamation staff can work with communities and other water dealing authorities to figure out the best option for them. Contact Jessica Asbill-Case if you have questions: jasbillcase@usbr.gov

Successful proposals are available on the website for each program:

Basin Studies
Basin Studies: https://www.usbr.gov/watersmart/bsp/index.html
Reservoir Operations: https://www.usbr.gov/watersmart/pilots/index.html
Applied Science Tools: https://www.usbr.gov/watersmart/appliedscience/index.html

Title XVI
https://www.usbr.gov/watersmart/title/index.html

WaterSMART Grants
Water and Energy Efficiency Grants: https://www.usbr.gov/watersmart/weeg/index.html
Small-Scale Water Efficiency Grants: https://www.usbr.gov/watersmart/swep/index.html
Water Marketing Strategy Grants: https://www.usbr.gov/watersmart/watermarketing/index.html

Field Services
https://www.usbr.gov/waterconservation/

Drought
https://www.usbr.gov/drought/

Cooperative Watershed Management Program
https://www.usbr.gov/watersmart/cwmp/index.html

Virtual Fieldtrip

The Forum concluded with a Virtual Field Trip of the rainwater harvesting and tree planting efforts taking place at Miami Junior and High School. Principal Glen Lineberry and teacher Amanda Bickel guided viewers through the school grounds and discuss how they are teaching valuable skills and stewardship values to their students, along with providing a better environment for learning and adding to the urban tree canopy of Miami, Arizona. The Virtual Field Trip featured the Miami High School in a pre-recorded homegrown video touring their grounds along with the rainwater harvesting and tree planting work going on there. Despite bandwidth limitations affecting video quality, we were happy to share a peek of this work and consider how it will grow under the direction of Glen Lineberry in partnership with Trees Please and a variety of other partners.

If you are interested in getting involved or providing assistance to Miami Junior and High School, contact Glen at glineberry@miamiusd40.org.