# New Visions. Smart Choices. Western Water Security in a Changing Climate



Photo: Daniel deMoulin

#### Hope for the American West

In the often dry, easily forgotten arroyo that is the Santa Fe River on the western edge of Santa Fe, New Mexico, there is reason for hope.

Santa Fe, one of the oldest non-Indian communities in the United States, could be a poster child for the depressing reality of climate change. Temperatures over the last two years have been higher, and precipitation lower, than at any time in recorded history. Its water supply part mountain runoff, part pumped groundwater, and part imported Colorado River Basin water is tenuous. The mountain watersheds from which much of its water comes faced the real risk of catastrophic fire. The Santa Fe River looked more like a dry gully.

A core problem in the politics and policy of climate change and the related problems of societal resiliency and sustainability is the problem of "over there". If the risks to polar bears as Arctic ice melts or the poor of the slums of Bangladesh as sea levels rise are the problem's salient features, the call to global action becomes the primary response. But while the need to mitigate greenhouse gas emissions has global elements, the need to adapt to a changing climate, and to bring resources supply and demand into balance, is at its heart a problem of local communities. It is easy to become lost in the global picture and feel a sense of hopelessness.

Even at a regional level, there is a temptation to look at the long term supply and demand forecasts for the Colorado River Basin, the enfeebled riparian ecosystems along the region's rivers, or the watersheds vulnerable to the next dry spring followed by a summer lightning strike, and feel helpless.

But across the West, there is reason for hope. This report documents the work of ten communities that aren't waiting for global solutions. They have seized the initiative, acting now to build resilience to help them cope with a changing future. Their work offers hope, along with practical models for other communities who want to act on that hope.

The stretch of Santa Fe River is a small thing. In a city strapped for water, deciding to put a slug of water left to recreate a flowing river might seem like one luxury too many. But if you

can conserve some water to support a community value, is that not the first step toward building the resilience to cope with the big problems to come?

- John Fleck, Water Writer, Albuquerque Journal



Across the American West, water managers and communities are hungry for solutions and perhaps more for inspiration. As the climate warms and weather extremes become undeniable, having a secure supply of clean and abundant water — for our communities, our economy, our environment and our farms — is becoming a huge challenge.

Carpe Diem West's new report — *New Visions, Smart Choices - Western Water Security in a Changing Climate* — spotlights successful, sustainable and economically sensible steps ten communities are taking to make sure they will have water in the decades to come.

Some of these communities are linking healthy farm practices with the health of the local water supply. Others are leaders in urban water conservation. Some are harnessing the power of nature to protect and treat water their supplies, while others are protecting the forests that are the source of their water from catastrophic wildfires.

All of these stories have common themes: the community recognized that they were facing a crisis; many people started working together; using the best science available they came up with solutions that made sense for their communities; they looked at ways they could also protect the natural environment; and they put their plans into action.

The results have generated significant savings in both water and dollars, and in flowing rivers. San Antonio has realized savings of \$84 million in seven years from their conservation programs. Communities along the Yampa River in Colorado saved their local fishing and recreation businesses - and the river that the local economy depends on. In Oregon, one utility saved \$150 million by restoring a river and creating partnerships with local farmers instead of building new water treatment facility.

The stories of these ten communities — and many other examples around the West — all tell us this: yes, climate change is overwhelming and scares the hell out of us, and yes, we can do things now to build a more secure future.

As you read these stories, we invite you to consider choices that your community could take. Choices and actions that will mean that our children and theirs will have what we enjoy now - clean, abundant water and healthy rivers and forests.

Kimery Wiltshire Carpe Diem West April 2013



## **Green Trumps Gray**Salt Lake City, Utah

Green or gray? That's the question for many Western communities: is future water supply best protected by increasing "gray" infrastructure like dams, pipes and treatment plants? Or is "green infrastructure" — harnessing the power of nature to protect and treat water supplies — the better investment? Over the past 100 years, Salt Lake City has pioneered the greener approach, saving taxpayers millions along the way, all while maintaining the city's water supply for a fast-growing population.

That famously clean water comes almost entirely from melting snow — a virtual reservoir high in the mountains east of the city. Like so many places



Photo: Garrett Smith

in the American West, it is vulnerable to the impacts of a warming climate which will cause more precipitation to fall as rain in the winter, decrease snowpack storage, and shift spring runoff peaks to earlier in the year. These changes mean that Salt Lake City could face serious shortages and water quality problems in late summer and fall.

The city has boldly established itself as a West-wide leader in green infrastructure and watershed protection using a diverse set of tools. Among the most important of these is extra-territorial authority to enforce watershed protection ordinances throughout the Wasatch Front watersheds that provide Salt Lake's water. The city uses this authority to educate the public, conserve land, and regulate land use, recreation, and other activities within the municipal watersheds. Laura Briefer, Water Resources Manager for Salt Lake City Public Utilities, notes that durable partnerships are key: "Collaboration is the bread and butter of our work for healthy watersheds and clean water," she says.

The sustainability of our water resources is critical to maintaining Salt Lake City's vibrant economy now and in the future. Salt Lake City's watershed protection strategies are key to the reliability and quality of our water supplies, and allow us to avoid significant costs and ensure the health of our community.

-Mayor Ralph Becker, Salt Lake City, UT

Salt Lake has also implemented a relatively modest surcharge on water bills, currently \$1.50, to buy watershed lands and conservation easements from willing sellers. This "Public Utilities Water Rights and Watershed Purchase Fund" now provides about \$1.5 million per year in conservation funding.

Finally, Salt Lake has entered into an innovative agreement with the US Forest Service; it pays for backcountry rangers to protect watershed lands outside of city limits, and joint funding supports watershed education for the public. In place since 1981, this agreement provides key support to protect the clean waters of the Wasatch Range.

## Getting Religion San Antonio, Texas

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A water manager in any drought-prone city in the American West might well envy San Antonio, with its access to the Edwards Aquifer, one of the largest artesian aquifers in the world. But San Antonio embodies that great maxim of conservation: there's never enough water to waste. The country's seventh largest city is a national leader and innovator in urban water conservation, with a startlingly successful program that has resulted in huge water savings.

San Antonio launched its conservation program in response to three major challenges. First, population is growing by 20,000 people a year. Second,

the Edwards Aguifer is highly regulated because it's home to a number of endangered

Photo: Nickolay Stanev

species. Third, San Antonio is in the bullseye of historic and current drought conditions. The city began with conservation pricing programs in 1994, and since then has reduced per-capita water use by 42% with a combination of education and outreach, reasonable regulation and financial incentives. The utility estimates that without this decline, they would need an additional 120,000 acre-feet per year of supply (39 billion gallons of water).

Billboards, TV and radio announcements, and educational programs in school all remind residents of the need to conserve water. As Mayor Julian Castro says, "We practice it religiously - it's part and parcel of being a San Antonian."

Turning the traditional water law concept of "use it or lose it" on its head, San Antonio has pioneered an approach likely to be adopted across the West in coming years. "Our business model is to convince our customers to buy less of our product," says Robert Puente, CEO, San Antonio Water System.

And while conservation has provided the basis for San Antonio's water success, it isn't the only factor. The city is also focused on reuse, and supplies up to 17 million gallons a day of recycled water to golf courses and industrial customers through a "purple pipeline" that circles the city. Major companies like Toyota and Microsoft are among the largest consumers of recycled water.

Now in the third year of a major drought, the city is implementing its long-range plan, looking at worst-case scenarios in case of multi-decade prolonged drought. Outdoor landscaping is the next great frontier, since the hotter and drier it gets, the more water people use on their yards.

Our job is to convince people that they can switch to plants and yards that require little water and are drought resistant - that it's the Texan thing to do.

-San Antonio's Water Conservation Director Karen Guz



# Hot Times —Cool Waters Tualatin River Valley, Oregon

Back in 2001, Clean Water Services (CWS) had a \$150 million dilemma: new wastewater discharge rules meant the 12-city water resources utility was looking at serious compliance costs. Sewage treatment plants do a good job of scrubbing the water people have used so that it's clean enough to put back into a river or lake – the problem is that these discharges are often too warm for fish and other river dwellers.

CWS was faced with a decision: install expensive, energy intensive cooling units at its treatment plants, or find another way to keep the waters running cool. So the utility asked itself an unusual question: "What does the Tualatin



Photo: McKay Creek, OR Clean Water Services

River need?" The answer was simple: more trees. Trees shade the river, stabilize its banks, and provide habitat for a diverse wildlife community.

We've become experts on the Tualatin River Watershed, and are using Mother Nature to replace steel and concrete with better solutions.

-Bill Gaffi, CWS' General Manager

Farmers and ranchers were the key – they owned much of the land along the river. So the utility, farmers, and agencies started to talk. Could they cool down the discharges, support a local farming community and make the river healthier? And they came up with a plan.

By 2010, 36 miles of rural and urban stream corridors had been restored. CWS paid farmers for 20 year leases to remove invasive species, provide better habitat, and plant hundreds of thousands of native trees and shrubs. For only \$4 million, CWS not only achieved its temperature goals and satisfied state regulators, but also added incalculable habitat and aesthetic value to the watershed.

Some farmers in the region have asked Clean Water Services to change their 20-year agreements to permanently enroll their river front land. As Lyle Spiesschaert, a farmer in the watershed recently noted in *High Country News*: "At this point, you can see all the benefits it has for your business and the health of the land."

Investing in healthier ecosystems instead of energy-intensive machinery is a win-win-win for ratepayers, local economies and the environment. CWS' programs range from native plant cultivation to temperature trading to green fertilizer manufacture. In 2013 CWS will be restoring a beautiful historic farm on the riverbank, while creating a natural wetland treatment facility nearby. All this while keeping its wastewater rates among the lowest in Oregon.

## Innovative Partnerships — Before the Fire Rocky Mountain Front Range, Colorado

The snow-capped peaks of the Rocky Mountains tower behind Denver's skyline and provide essential drinking water supplies to this large and fast-growing metropolitan area. The US Forest Service describes the Colorado Rockies — which form the headwaters for seven major U.S. river systems — as "the nation's water towers."

But the forested watersheds that are the heart and soul of those water towers are at increasing risk from wildfires, on a scale far beyond what natural conditions would produce. Fuel buildup from a century of fire suppression, bark beetle infestations, and increasingly hot, dry summers mean that Colorado's forests are primed to burn, and to burn in far more catastrophic ways than in the past. (See accompanying story "Innovative Partnerships – After the Fire".)



Photo: EdgeOfReason

In 2002, following the largest forest fire in the state's history, heavy rains sent more than a million cubic yards of ash and soil downhill and into Denver Water's Strontia Springs Reservoir, an important link in the water supply for 1.3 million people. Cleanup and water treatment from that single fire cost Denver Water more than \$40 million. This experience led to a sea change in the way the utility thinks about its water supply.

We realized water doesn't come out of the stream—it comes out of the forest. President of the Denver Water Board

In 2010, Denver Water and the US Forest Service announced the Forest-to-Faucet Partnership, agreeing to jointly fund five years of restoration work in watersheds critical to Denver's water supply. The idea was not new—but the Denver agreement is far bigger than any other example of this approach, promising treatment and protection of nearly 40,000 acres of National Forest land. The \$33 million tab is split equally between the Forest Service and Denver ratepayers.

The agreement calls for forest thinning and other projects to reduce fire on 38,000 acres in five priority watersheds. Since the agreement was signed, over 17,000 acres have been treated, and as Jim Lochhead, CEO and General Manager of Denver Water notes, "While our agreement ends in 2015, we recognize that we'll be working with the Forest Service for decades to come to protect our water supply and restore these forests."

This approach is now being replicated across the region. In 2011, another Front Range utility, Aurora Water, entered a similar agreement to split the costs of restoration work on 45,000 acres in the Pike National Forest.

## Innovative Partnerships - After the Fire Hayman Watershed, Colorado

In 2002, the Hayman fire — the largest in the Colorado's history — roared across the rivers, streams and forests of the South Platte watershed in the Rocky Mountains above Denver. After the fire, the rains came and the mountains started to slide away, loading up rivers and reservoirs with over a million cubic feet of ash and soil. Watersheds were devastated, fish and plants disappeared, and the water supply for 1.3 million people living downstream in Denver and surrounding communities was threatened. (See previous story: Innovative Partnerships - Before the Fire.)



Photo: National Forest Foundation

Seven years later the Hayman Restoration Project was launched, and today is the largest wildfire restoration program in the country. The results are impressive: one million trees planted; fish returning to restored streams; and, 17,000 acres reseeded. Hundreds of volunteers, more than 450 youth corps members, and several nonprofit partners have reduced sediment to rivers and streams by 800 tons.

A big part of the story here is the innovative partnership at the heart of the project. As part of its *Treasured Landscapes*, *Unforgettable Experiences* conservation campaign, the National Forest Foundation (NFF) pulled together Vail Resorts, Coca-Cola, the Gates Family Foundation, the City of Aurora, the US Forest Service, and many other public and private partners, including the Coalition for the Upper South Platte, Rocky Mountain Field Institute, Mile High Youth Corps. These partnerships have leveraged more than \$4 million since its inception.

The story of the Hayman Fire is one of restoration, collaboration and partnerships. As we work together to restore the landscape it also serves to restore the community's connection to the land.

-Daniel Jirón, Regional Forester, U.S Forest Service, Rocky Mountain Region

Mary Mitsos, Executive Vice President of the National Forest Foundation explained, "We need to make the investments to protect our watersheds before the fires happen, but here we weren't fast enough. This partnership is bringing the land and water back to life."

#### Water Markets Save A River Yampa River, Colorado

When drought hit the Yampa valley in northern Colorado in 2012, everyone suffered. Locals knew what was in store if the fabled river went any lower: devastation for everyone who depended on good flows, especially local recreation businesses and endangered fish. Most rivers are last in line during dry spells.

But a groundbreaking Colorado law, used here in the Yampa for first time, had just made it possible for farmers, ranchers, water districts and non-profits to temporarily "loan" water to rivers and streams in times of need. So the Colorado Water Trust put out a call: the Yampa needs water, and fast.



Photo: Cheryl Zook / National Geographic

The call was answered by the Upper Yampa Water Conservancy District in Steamboat Springs, which had water to spare. A contract with a customer had fallen through, leaving 4,000 acre-feet (1.3 billion gallons) of Yampa River water unclaimed in Stagecoach Reservoir. The deal came together and the Colorado Water Trust leased the 4,000 acre feet of the Conservancy District's spare water for total of \$140,000, or \$35 per acre-foot.

I think everyone was happy,

I didn't know of any real opposition. And the river certainly benefited. 

-Kevin McBride, head of the Conservancy District

As it flowed down the river, the leased water provided multiple benefits. It generated extra hydropower at the Stagecoach Reservoir. It provided aesthetic and recreation benefits in Steamboat Springs, helping recreation businesses avoid tens of thousands of dollars in lost revenues. Further downstream of the reach targeted for the lease, some irrigators even got more water for their crops, a welcome boost during a drought and dire economic times.

"The purpose of the lease is to maximize the beneficial use of water in Colorado," Amy Beatie, Executive Director of the Colorado Water Trust explained. "These incidental benefits make this a win-win-win-win."

The river was saved last year, and the many communities who depend on its in-stream flows made it through a punishing drought – all while paving the way for a new era of collaboration in dry times.

Adapted from Sandra Postel, "How the Yampa River, and its Dependents, Survived the Drought of 2012, Water Currents, National Geographic, October 18, 2012.

## Top to Bottom Santa Fe, New Mexico

In 2002, well into a multi-year drought, the City of Santa Fe, New Mexico, found itself in a position that no city wants to be in: water use was exactly equal to water supply - there was no wiggle room. In similar situations, many Western cities have turned to imported water - usually from far away and at considerable expense and often with controversy. Santa Fe decided to do something different.

After deploying aggressive conservation, incentive and recycling programs, the city brought it to the next level. The city called the community together in 2004 to develop a long-range plan with a big vision, and set out to



Photo: Barbara Reddoch

increase production, amp up conservation even further, and protect its water. The results: Per capita water use declined 40% in 10 years, and the city's water supply portfolio became more resilient in the face of climate change. Santa Fe has been able to serve more people with the same amount of water.

Critically, Santa Fe's plan went beyond the city limits to the surrounding ponderosa pine forests the source of 40% of its water. These headwaters are at high risk for catastrophic wildfire.

To meet this challenge, the city created a partnership with the US Forest Service to reduce fuel loads in the municipal watershed. Startup funding came from a \$7 million earmark, but now the city's rate payers will be sharing in the cost. As Dale Lyons, Water Resources Coordinator with the city notes: "Like most ratepayers, Santa Feans have historically paid for only the costs of treatment and delivery of their supply. Now they are making long-term investments to protect the source of their water supply."

In 2011, the city's Buckman Direct Diversion Project, built at a cost of \$216 million, went on line. It uses the city's supply of water imported from the Colorado River Basin via the San Juan-Chama project. The project provides a renewable supply with the capacity to deliver 15 million gallons of drinking water daily, reducing Santa Fe's reliance on non-renewable groundwater.

And finally, the city has taken a leap of faith. A cornerstone of their long-range plan includes a commitment to having a living river flow through their city.

We didn't do this because there was a water right permit requirement or threat of a lawsuit - we did this because we hope that our children and their children will be able to touch a river flowing through the heart of their community. -Claudia Bochert, Water Resources Coordinator, City of Santa Fe

## Healthy Farms - Clean Water McKenzie Watershed, Oregon

"An ounce of prevention is worth a pound of cure" is a favored adage of planners around the globe, but it should probably be the official slogan of Eugene, Oregon's innovative water stewards.

Eugene's 200,000 residents depend completely on the McKenzie River for their drinking water. And though today the McKenzie flows clean and pure from its source in the snow packs of the Cascade Mountain Range, visionaries at the city's Water and Electric Board (EWEB) are thinking far into the future.



Photo: Zack Schnepf

Though three quarters of the McKenzie's watershed is in public ownership, most of the mid-river banks are privately owned, devoted largely to farms and forest industries. Well-stewarded, those lands would provide invaluable insurance against flooding, erosion, increased water temperature, and other expected changes. So back in 2000, EWEB developed a Drinking Water Protection Plan that included two goals: (1) to help farms become more economically viable so that the land stays in production and is not sold off for development; and (2) to encourage reduced use of polluting pesticides and nitrates. Partnerships with farmers in the watershed are the cornerstone of EWEB's success.

We all want clean water, and EWEB helps me pay the difference so I can use soft pesticides and lime in my orchard instead of nitrates. I'm happy to work with them - and I think everyone around here feels the same way. Garry Rodakowski, hazelnut grower, Vida, Oregon next to the McKenzie River

These partnerships helped stave off increases in, and possibly reduce EWEB's raw water treatment chemical budget, and avoid future capital costs for new treatment processes to deal with increased algal blooms and toxins from rising water temperatures and increased sediment loads from more extreme weather events. EWEB estimates this may save ratepayers between \$60 and \$130 million by avoiding the need for expanding treatment capabilities to address degraded water quality over the next 20 to 30 years.

The utility knows that changes in climate are bringing an uncertain future: less snow, warmer water and extreme weather events – and like any smart community, they are getting ready. EWEB Drinking Water Source Protection Coordinator, Karl Morgenstern describes it simply: "Utilities have to look ahead 50 to 100 years, and that means looking at the impacts of climate change".

# Restoration Collaboration: A River for Everyone Upper Clark Fork Basin, Montana

The story of the Upper Clark Fork in western Montana is one familiar to most ranching communities in the American West. Summers are getting hotter, there's less snow in the winter, hay prices are rising, steer prices are falling, native fish are endangered, and there will be less water to go around in the future.

Complicating the mix is that the Upper Clark Fork is also the nation's largest Superfund site, the result of 150 years of mining. Sixty river miles are literally being rebuilt as mining-waste pollution is removed from the floodplain.



Photo: Clark Fork Coalition

Ranching families are leading the way to a healthier river for the future. In 1999, they formed the Watershed Restoration Coalition, and have teamed up with the Clark Fork Coalition, the local non-profit formed in the 1980s dedicated to restoration of the Basin.

The combination has proven to be potent. They have linked up with State and local partners to amplify the scope of the clean-up to include restoration of the river's tributaries. "Tributaries are the lifeblood of the river system, they provide the clean cold water that both fish and irrigators need," says Karen Knudsen, Executive Director of the Clark Fork Coalition. One particularly illustrative effort of the power of this collaboration is the restoration of Gold Creek, a key Clark Fork tributary, completed in 2011. Decades of grazing had seriously damaged the stream's banks, and the trout fishery was crashing. The creek bank, in the words of ranch owner, Bruce Thomas "looked like a billiard ball."

The Watershed Restoration Coalition, the Natural Resource Conservation Service, the Clark Fork Coalition and the Thomas family came up with a plan: get the cows out of the creek; put in piped stock water tanks; and, convert all irrigation from flood to sprinklers. The total bill, funded through five different state and federal matching sources, came to about half-a million dollars. Today the Thomas' use three-quarters less irrigation water - and abundant clean water flows through trout spawning beds in Gold Creek all year and into the Upper Clark Fork.

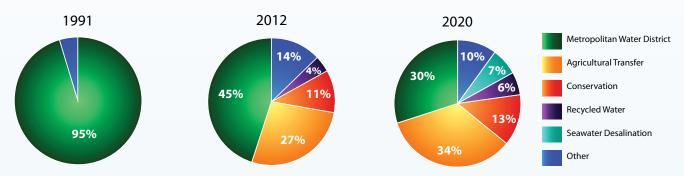
As a result of getting our cows out of the creek, vegetation and grasses are coming back and willows are shading the creek. And an unexpected boon for us – our wintering calves are now healthier and gaining weight faster.

Bruce Thomas, Owner, Thomas Ranch

These partnerships are ramping up to do more projects at a total cost of around \$25 million dollars with the goals of restoring 125 stream miles, reconnecting six streams to the main-stem of the river and removing 30 barriers to fish passage.

#### **Going Local** San Diego County, California

Sometimes pie charts are worth a thousand words. And, in the case of San Diego County, they represent millions of acre-feet of water and billions of dollars.



Twenty years ago, San Diego County was strung out – quite literally. Most of its water was imported from mountains hundreds of miles away, and the region was in the grip of an epic drought. The tipping point came when the Metropolitan Water District of Southern California (MWD) — which provided 95% of the County's supply — had to cut deliveries to by 20%.

We said 'never again' would we depend so heavily on a single water source, and we committed to a long-term strategy of diversification to protect what is today a region of 3.1 million people with a \$188 billion economy.

-Mark Cafferty, President & CEO of the San Diego Regional Economic Development Corp

Since then, San Diegans have launched a comprehensive set of strategies to move from imported water to locally controlled supplies. Today, San Diego buys only 45% of it's water from MWD, and they plan to bring that down to 30% by 2020.

San Diego County Water Authority and its 24 member agencies have leveraged low-flow bathroom fixtures, low-irrigation landscaping and behavior changes to reduce individual residential water use by 30% over the last seven years. In addition, agreements with Imperial Valley farmers to fallow lower value cropland, line canals, and transfer conserved water has reaped impressive returns - 27% of the county's water now comes from these agreements, and that is expected to grow over the next decades.

Finally, a controversial seawater desalination plant, the largest in North America, is under construction on the coast, and the county has substantially increased the availability of water for emergencies by raising the San Vicente Dam.

San Diego's experience demonstrates that for communities reliant on imported water from vulnerable ecosystems, diversifying their supply portfolios with an emphasis on local sustainability is the smart path forward.

### For more information on these success stories, please follow the links below:

Salt Lake City – Green Trumps Gray http://www.slcgov.com/node/212

San Antonio – Getting Religion http://www.saws.org/conservation/

Tualatin River Valley – Hot Times - Cool Waters http://www.cleanwaterservices.org/OurWatershed/default.aspx

Rocky Mountain Front Range – Innovative Partnerships - Before the Fire http://www.denverwater.org/SupplyPlanning/WaterSupply/PartnershipUSFS/

Rocky Mountain Front Range – Innovative Partnerships - After the Fire http://www.nationalforests.org/press/releases/haymanevent

Yampa River – Water Markets Save a River http://newswatch.nationalgeographic.com/2012/10/18/how-the-yampa-river-and-its-dependents-survived-the-drought-of-2012/http://video.nationalgeographic.com/video/environment/freshwater/yampa-river-drought-lease/

Santa Fe – Top to Bottom http://www.santafenm.gov/index.aspx?NID=1030

McKenzie Watershed – Healthy Farms - Clean Water http://www.eweb.org/sourceprotection

Upper Clark Fork Basin – Restoration Collaboration: A River for Everyone http://www.clarkfork.org

San Diego County – Going Local http://www.sdcwa.org/planning-diversifying-our-water-resources

Additional background information from Carpe Diem West is available at: http://carpediemwest.org/what-we-do/healthy-headwaters-background.

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Then it has a chance to create a society to match its scenery.

— Wallace Stegner

Carpe Diem West's network of water utilities, advocates, economists, decision makers and scientists develop collaborative solutions to address the profound effects that the growing climate crisis is having on water in the American West.

www.newvisions-smartchoices.org

