

Keep the River Liquid

A Finance Lab for the Colorado River Crisis

Keep
the River
Running

The Colorado River Basin is one of the most economically vital rivers in the world, supporting an estimated \$1.4 trillion in annual economic activity and about 40 million inhabitants. And it isn't just facing a water crisis – it's facing a liquidity crisis.

\$1.4 trillion

in annual economic activity

40 million

inhabitants

\$2 billion

just to cover near-term needs

As the basin that stretches across seven US states and Mexico adapts to a future with less water, it's estimated that hundreds of billions of dollars could be needed. More than 80 infrastructure projects like water recycling facilities, desalination plants, and lining canals have already [been proposed](#), running into the tens of billions of dollars. And a group of local stakeholders, Tribes and businesses have [asked Congress](#) for at least \$2 billion just to cover near-term needs.

Clearly, the cost is too great to be borne by government alone. Private capital is also needed.

But how?

At “*Keep the River Liquid: A Finance Lab for the Colorado River Crisis*,” a New York Climate Week event held on September 21, supported by Thirst Foundation and the Walton Family Foundation, and hosted by the Robertson Foundation, dozens of participants workshopped answers to this question. Their expertise ranged across philanthropy, sustainable investing, infrastructure, venture capital, climate finance, and blended finance. Their insights, ideas and concerns are highlighted in this report.

Thirst Foundation CEO **Mina Guli** -- a water advocate who had just run 2,000 miles down the entire river as part of this summer's “Keep the River Running” campaign -- gave opening remarks on the dire need for water solutions witnessed along her journey. She also

spoke about the need to develop new financial instruments that can attract commercial capital, drawing on her past experience at the World Bank, where she helped develop early carbon initiatives.

Todd Reeve, the CEO of Bonneville Environmental Foundation, and the founder of Business for Water Stewardship, shared his insights from the world of corporate social responsibility, where his work has helped return billions of gallons of water to the world's rivers. **Ted Kowalski**, Senior Program Officer of Walton Family Foundation who oversees vital water policy initiatives and formerly served as an Assistant Attorney General and chief negotiator for the state of Colorado, spoke of the need to move away from crisis management to long-term resilience.

A common rallying point for discussion was the absence of a comprehensive public-private partnership to address the water crisis. Some smaller PPPs have already tackled the issue, such as through the Carlsbad Desalination Plant in California, which has reduced Southern California's reliance on the Colorado River. Globally, examples of such partnerships abound -- such as Climate Investor Two (C12), a \$1.065 billion fund aimed at water, waste, and oceans infrastructure projects across Africa, Asia, and Latin America, established with a guarantee from the European Union's European Fund for Sustainable Development Plus (EFSD+).

Without a similar initiative to bundle projects together in the Colorado River Basin, investors have a disaggregated, wide range of projects to consider, which many participants cited as a challenge.



Keep the River Liquid

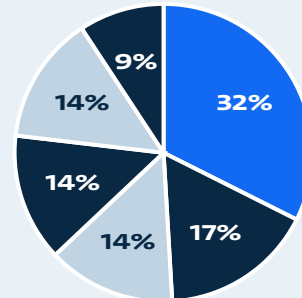
But complexity doesn't mean the capital markets aren't interested. Participants agreed that blended finance or other novel financial instruments have the capability to de-risk investments for the private market. They also found that due to the fragmented nature of solutions, there's still much work to be done on the demand side of the market, such as aggregating projects, finding ways to quantify the impact of some solutions, and re-pricing water, which is currently too inexpensive to make conservation pay for itself.

American Rivers, a nonprofit that restores waterways across the U.S., recently gave an overview of the wide basket of solutions that should be considered priorities for near-term investment:

- Conservation and efficiency projects in the municipal, industrial, and agricultural sectors, including projects like modernizing irrigation equipment, lining canals, and creating infrastructure for water recycling and reuse, transitions to less thirsty crops and turf replacement
- Investments in forests, watersheds, rivers, wetlands, and floodplains that support and add reliability to water supplies and protect downstream infrastructure from wildfires, flooding, and sediment, including wetland restoration and forest management
- Modernizing and maintaining critical water delivery, storage, and hydropower infrastructure, through measures like upgrading dams
- Support for voluntary, compensated programs to trade or bank water by having parties agree not to withdraw unneeded water from reservoirs
- Evaluating new water supply sources or augmenting existing Colorado River supplies, such as through projects for desalination, cloud seeding, groundwater storage and recovery

Priorities for Near-Term Basin Investments

Estimated Total: \$2.05 Billion to \$3.35 Billion



32% Voluntary compensated conservation

Midpoint \$875M · Range \$750M–\$1B

17% Conservation and efficiency

Midpoint \$450M · Range \$300M–\$600M

14% Natural infrastructure

Midpoint \$375M · Range \$250M–\$500M

14% Modernization and repair

Midpoint \$375M · Range \$250M–\$500M

14% New supply and augmentation

Midpoint \$375M · Range \$250M–\$500M

9% Ecosystem and system reliability

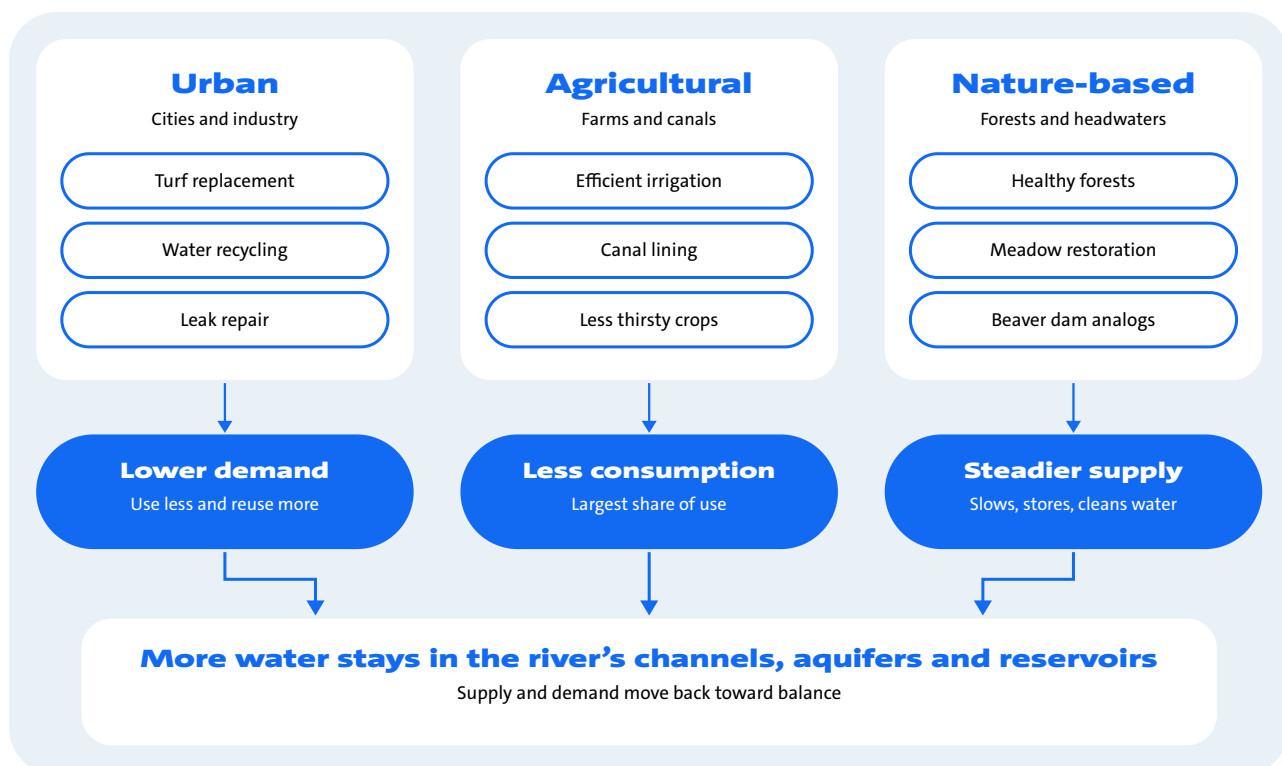
Midpoint \$250M · Range \$250M (single figure)

Percentages reflect the midpoint of each category's estimated two-year need.

Source: "Near-Term Colorado River Funding Outcomes," American Rivers

Drawing from transcripts across the forum's three breakout groups, top line findings are as follows.

Three Types of Infrastructure Upgrades Can Work Together



Urban Infrastructure

Key Question:

Water utilities are already shifting towards more conservation-friendly pricing plans that create new incentives to save water. AI leak detection startups and upgrades to pumps that help prevent water waste are helping. But there is still room to improve. How?

- **Conservation is still the expensive option.** One participant cited a large Western city concluding that urban conservation doesn't pay, and that farm water deals can free up water far more cheaply.
- **Price water closer to its true cost.** Several participants argued that raising urban rates is the most direct fix, and that not doing so should be a deliberate choice. In Montreal, where water was effectively free, metering revealed businesses running tap-cooled refrigeration units nonstop for decades.
- **PACE and on-bill financing.** Property Assessed Clean Energy (PACE) is a municipal financing tool that lets property owners fund energy efficiency, renewable energy, and water conservation upgrades with little or no upfront costs, repaying them through a special assessment on their property taxes. But water upgrades lag electricity upgrades because water savings have historically been viewed as less "predictable". The open question is whether water-saving technologies have savings as well documented as energy upgrades, so lenders can finance them at scale under similar projects.
- **Behavioral nudges and turf replacement.** Home water reports comparing households with neighbors (similar to what Oracle Utilities' Opower does for energy) could cut use among the heaviest users. Outdoor landscaping drives most residential demand. Las Vegas, Los Angeles and Phoenix run turf-replacement programs, and participants asked why every basin city doesn't.
- **Leak detection.** Acoustic meters and AI-driven detection pinpoint leaks in real time, saving both water and energy, but have yet to be scaled up in all places
- **Environmental impact bonds and pay-for-performance.** DC Water's environmental impact bond, issued in 2016, financed green stormwater infrastructure, with investor returns tied to measured performance. A similar bond could fund leak repair, paying out on verified water savings. The obstacles: the bond market prefers "vanilla" instruments, deals remain small, and many utilities lack maps of their aging pipes.
- **Credit enhancement for smaller municipalities.** Smaller towns are often weak credits or near their debt limits. A fund that buys down their borrowing costs could help, since even a few basis points matter.
- **Bundling infrastructure works.** Coordinating pipe upgrades with other utility work has the benefit of saving on the costs of excavation, and spreads costs across payers. Blue bonds were cited as a model, with a fixed share, such as 30%, set aside for conservation.
- **Insurance and reinsurance.** Lower premiums could reward water resilience. A community-level wildfire resilience pilot in the Pacific Palisades pools investment to earn aggregate premium reductions. The broader lesson: add a water layer to mechanisms that already price risk, such as insurance.
- **Industrial efficiency.** Modest investments in evaporative cooling efficiency were cited as producing three-to-four-year paybacks.
- **Communicating scarcity.** The story needs to reach people through water bills and grocery prices, not acre-foot figures, especially during wet spells, when people see water as abundant.



Agricultural Infrastructure

Key Question:

Agriculture uses roughly 70% of water, both globally and in the basin, yet has the least access to capital. That leaves a bad choice: cities buy and fallow farms in so-called "buy and dry" deals, or farmers keep using wasteful irrigation techniques because they can't afford to upgrade their equipment or experiment with less thirsty crops. What financial tools can reach farmers?

- **Offtake contracts as collateral.** Some food companies have signed three-year offtake contracts where they agree to buy food before it's grown, which helps farms secure financing for irrigation equipment. This could be expanded to cover billions of upgrades, and appeals to corporate food companies because of the risk of rising prices.
- **Crop shifting.** Alternative crops for fiber, rubber, dates and barley reportedly use about 10% of the water of thirsty crops. Alfalfa, one of the thirstiest crops in the basin, can be grown hydroponically, cutting water use sharply and allowing that water to be saved for cities. Barriers to overcome when shifting crops include "missing markets," that only exist in theory, but never materialize, and the need to create supply chains that can distribute, process and sell new products.
- **Agrivoltaics and canal solar.** Solar panels positioned over cropland and irrigation canals that create shade promise to reduce water lost through evaporation. But the economics of such projects have yet to be proven appealing, as the cost of engineering panels to be placed over canals may outweigh the theoretical cost savings
- **Irrigation-district conservation deals.** The Metropolitan Water District in Los Angeles funded upgrades to the Imperial Irrigation District in exchange for its use of the saved water, about 105,000 acre-feet a year. Such deals might be adapted to work in other locations
- **Pay-for-performance.** Payments tracked against measured reductions in water use over time may work better than one-time incentives, especially if farmers choose the way performance is measured.
- **Ownership models.** Ideas included Employee Stock Ownership Plans (ESOPs), buy-and-lease-back programs, and funds that help forward-looking farmers buy from retiring ones. A more radical idea: "public-commons partnerships" with community ownership and governance. Participants warned about the risks of consolidating farms.
- **Future price signals.** Since raising the price farms pay for water is politically difficult, participants suggested a softer step: keep today's price the same, but print on each water bill what the price *will be* at a set date in the future, for example ten times higher. Farmers will start planning for the higher prices by investing in drip irrigation, switching to crops that need less water, or taking part in conservation programs. When the higher price actually arrives, there is no price shock
- **Global markets versus local benefit.** Converting local farms achieves little if global demand keeps thirsty crops profitable, such as with alfalfa, which is grown in the basin for export. Tariffs and demand-side interventions were floated.
- **Fragmentation.** Irrigation districts can have hundreds of members, and Western water law limits the movement of saved water to new uses. Investors say they can't work farm by farm and need aggregated portfolios.
- **Using the crisis.** A hotter summer expected next year is already forcing a shift in thinking. One influential holdout can tip a whole community. One idea was an "innovation easement": a guaranteed five-year window to test new approaches.

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Nature-based Infrastructure

Key question:

If a massive wildfire or a degraded meadow can destroy 20% of our downstream water supply before it ever gets to a city or a farm, what investment framework lets us treat the upper watershed as our most critical water asset—allowing you to monetize the avoided costs of wildfire damages and water treatment?

- **Wildfire loss should be treated as a certainty.** In today's overgrown forests, loss is certain; only the timing is unknown. Costs include infrastructure damage, reservoir sedimentation and lost storage. Communicating this message can help spur pre-fire treatment, which costs pennies on the dollar compared to the costs of dealing with a fire's aftermath.
- **Downstream payers can fund upstream services.** New York City's payments to protect its Catskills watershed are a proven model. Blue Forest Conservation has created Forest Resilience Bonds where investors provide upfront capital to fund immediate forest restoration that prevents catastrophic wildfires, and downstream beneficiaries (like utilities) repay the investors over time using savings from avoided wildfire damage, with philanthropic foundations providing concessional or "first-loss" capital to make the bond appealing to larger, commercial private investors. It is scaling up with a pooled investment vehicle where investors put capital directly into upfront funding for a diverse portfolio of multiple forest restoration projects at once.
- **Private capital repaid through the rate base.** Today utilities typically treat a small slice of their risky forest each year, around 1%, because that's all their annual budget allows. At that pace, the job takes about a century, and much of the forest could burn before it's ever treated. Private investors could put up money to treat the most dangerous 10% of the utility's forest land within five years. The utility then repays the investor gradually over many years through what customers pay on their water bills. The participants argued that tackling the highest-risk areas quickly is worth far more than treating 1% a year, because it prevents the most damaging fires before they happen.
- **Use familiar instruments.** Utilities issue bonds constantly. Several participants favored plain municipal bonds over bespoke "pay-for-performance" labels that add transaction costs. A new forest catastrophe bond structure was recommended as worth studying.
- **Biochar as a business.** Clearing burn scars and beetle-killed timber is too costly to fund alone. Converting biomass to biochar, which improves soil water retention, could turn cleanup into revenue. Robotic clearing on steep terrain could cut costs.

More Upfront Capital Could Minimize Wildfire Risk

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Nature-based Infrastructure

- **Stack the value streams.** Forest restoration is expensive, and usually no single party benefits enough to pay for all of it. But the work produces many different kinds of value at once, and each one matters to a different party. Revenue can combine avoided losses, reservoir protection, carbon, biochar, habitat, hydropower and added water yield. The difficulty is the transaction cost of assembling many small contributors.
- **Link electric and water utilities.** Electric utilities treat wildfire as a top priority, and rural co-ops have real political influence. Pairing them with water utilities could pull more federal money into forest resilience. Utilities clearing rights-of-way often leave cut wood in place, a missed feedstock.
- **Soil moisture and wetland restoration.** Restoring wetlands and adding biochar can raise water tables that have dropped as much as 15 feet on farmland, potentially cutting irrigation needs by up to 20%.
- **Data-center water-positive goals.** Tech companies with 2030 "water positive" commitments could become major buyers of water benefits that count towards their pledges if projects carried a quantified volumetric water benefit. Amazon Web Services was cited as already quantifying benefits from removing water-hungry invasive plants.
- **"Natural infrastructure" as a frame.** A healthy forest does some of the same jobs as built infrastructure: it filters water, stores it, steadies the flow into reservoirs and reduces flood and fire damage. If you call it "natural infrastructure," it can compete for infrastructure budgets alongside projects like upgrading pipes, dams and reservoirs

Measurement, screening and enforcement.

Buyers need three things before they'll pay:

Screening for "80/20" projects.

Buyers want a reliable way to pick out the projects that will be the most worthwhile, producing 80% of results from 20% of efforts.

Outcome monitoring.

Ongoing measurement showing the project actually delivered what was promised, such as more water in the stream

Enforcement.

Due to Western water law, there is no guarantee that if a forest project upstream produces extra water, it will reach the city or company downstream that paid for it. Other water-rights holders along the way may be legally entitled to take it out of the river first. So payers need legal or contractual protection, for example a water right dedicated to keeping water in the stream.

- **Ready-to-fund project menus.** Right now, every restoration project tends to be designed, priced and justified from scratch. If there were a menu of standard project types, each with a known design, typical cost and expected results, investors and nonprofits could choose more quickly because they'd know what to expect.
- **Public land partnerships.** Federal agencies manage an estimated 50–70% of upper-watershed land. Partnerships with the Bureau of Land Management, the Forest Service and Tribes are essential.
- **The science debate.** The science on nature-based solutions involves tradeoffs that vary from place to place. Forest thinning, especially when paired with prescribed fire, is well established as a way to reduce wildfire severity in dry Western forests. But thinning also removes shade, which can make snow melt earlier and dry out soils, potentially reducing the water that reaches streams in late summer. The right approach depends on the site.

\$100 billion

A basin-scale fund. The boldest proposal: a "wartime-level" basin authority financed with roughly \$50 billion from frontier AI companies plus about \$50 billion in federal money. The participant estimated \$100 billion aimed at the highest-yield projects could deliver about 80% of the benefit of the roughly \$1 trillion total need.

Overarching Financial insights

In opening remarks for the workshop sessions, Bonneville Environmental Foundation CEO Todd Reeve had asked participants to consider a unifying question:

Can water savings be produced at a cost far enough below what cities, utilities and companies will pay for them that there's enough money left over to repay investors the returns they want?

In short, the day's discussions suggest the answer is yes – but with a major caveat: only in specific places, with specific structures – and not yet at the scale the crisis demands. Smaller, rural communities will often have a tougher time because they lack large customer bases to fund repayments through utility bills, and the ability to leverage economies of scale. And more concessional capital may be needed to keep building the local capacity to put deals together.

But the tools clearly exist to get there. Revolving funds, pay-for-success contracts and blended-finance deals show a path, and upgrading to some technologies, such as AI-driven leak detection and evaporative-cooling upgrades, already save more than they cost.

What's missing is the structure to connect more widespread capital in the public market to aggregated, ready-to-invest projects. Water must be priced closer to its true value, so that saving it produces revenue to repay investors. And benefits must be measured well enough that buyers trust what they're paying for.

Certainty matters too. Under the current operating framework for the river, set by the Department of the Interior in August of 2026, a 10-year

plan has been established -- but specific cutbacks to water use will be recalibrated every two years based on hydrological conditions, creating a high degree of variability in what cuts to water use could look like. Meanwhile, concerns that a battle over the framework ends up in Supreme Court adds even more uncertainty. A fight between the Upper and Lower Basins could change how much water each state, city and farm receives, making it even harder for investors to have visibility into their returns.

One idea that could help circumvent such uncertainty is having stewardship covenants that are tied to the condition of the land itself, rather than claims to water. As opposed to "buy and dry" deals, when land is purchased for its water rights, such deals wouldn't change who owns water rights, but call for water rights to stay with holders. Investors would instead own a verified improvement to the land, recorded on title, that can be priced, sold and borrowed against. Measurements include things like healthier soil, higher groundwater, restored wetlands and lower fire risk.

In conclusion, the problems of the Colorado River Basin aren't just environmental. They are economic. The river grows food, generates power, and supplies cities and communities, businesses and factories, farms and data centers.

At the root of the river's problem isn't a total lack of water – it's a mismatch between supply and demand -- one so severe it's sometimes referred to as a water bankruptcy.

As with any bankruptcy, the rebalancing of those forces requires something slightly different than pure capital – it needs [real liquidity](#).

The structured finance tools to create that liquidity exist – but more work remains to be done.