

UNCERTAIN FUTURES

**Integrating Land and Water Planning
in an Era of Climate Volatility**

By Heather Hansman

“CLIMATE CHANGE IS WATER CHANGE.” It’s an adage that has caught on in certain circles, as our shifting global systems affect every part of the water cycle. In the United States, that has looked like record drought and aridification in the West, massive flooding in the Midwest, and superstorms in the East. Those climatic changes have also created secondary impacts, like land subsidence, longer wildfire seasons, and contaminated water supplies. And all these effects are complicated by factors ranging from population growth to aging infrastructure.

As these impacts hit every corner of the country, planners and water managers are finding new ways to address them, working together to build resilience in the face of an increasingly volatile climate.

Planning for a future that could include an unpredictable combination of drought, flooding, pollution, and other water-related issues takes a significant shift, says Bill Cesanek of the American Planning Association’s Water and Planning Network. “Historically, U.S. communities have dealt with land use planning and water management in separate silos,” Cesanek says. “But now we know we have to manage them using an integrated approach.”

Traditionally, he explains, water departments and planners have often worked within different geopolitical boundaries, management structures, and timelines, even as their work has overlapped on the ground. But with communities growing rapidly, especially in the South, and climate change exacerbating water-related risks, planning is becoming more complex, and the need for collaboration more urgent.

“We need an integrated and multidisciplinary approach,” agrees Brenda Bateman, director of the Oregon Department of Land Conservation and Development. Bateman is chair of the American Water Resources Association’s Land

and Water Specialty Conference, an event focused on connecting land and water for healthy communities. “These problems are so thorny that if we try to solve them one by one, or in a vacuum, we end up with solutions or results that don’t stick. They’re tied together regardless of how our budgets and bureaucracies work.”

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The goal of improving planning and resource management processes so they are more integrated, resilient, flexible, and creative is complicated by regional differences—“what works in California won’t necessarily work in New Jersey,” Cesanek says. And since the nature of climate volatility means what works in California today won’t necessarily work in the future, planners and water managers have to prepare for many possible scenarios. “In the planning world, it used to be, ‘let’s envision the highly desirable future we want, and build to that,’” says Jim Holway, director of the Lincoln Institute’s Babbitt Center for Land and Water Policy. “Now we have to put in place policies that will be robust across different futures—not just desirable ones—and bring in programs that are more adaptive. This is a shift in approach.”

Anticipating potential futures and changing practices to account for uncertainty is tricky, but not impossible. And despite the local nature of planning and resource management, shared practices and strategies can work across the country. Here’s how three communities facing different challenges are adapting their approaches and practices to prepare for a changing future.

New Orleans: Living with Water

Few cities have spent as much time and energy fighting water as New Orleans. The city was built on a natural levee along the Mississippi River, a prized location that offered obvious economic and environmental benefits. But centuries of efforts to engineer the river and drain the surrounding swamps led to land subsidence so severe that some neighborhoods are up to 11 feet below sea level, making them prone to frequent flooding. New Orleans is also one of the rainiest places in the country, with five feet of annual precipitation, and is vulnerable to the increasingly strong hurricanes that frequent the Gulf Coast.

When Hurricane Katrina hit in 2005, inundating 80 percent of the city, it explicitly revealed a truth that had been gradually coming to light: New Orleans couldn't use its historical approaches to fight the stronger storms and rising waters of climate change. It had to think differently.

"Katrina was a tipping point," says Ed Blakely, a global urban policy expert who led the city's recovery effort. Blakely says the city's previous approach to water—attempting to overpower it rather than planning around natural streamflow and flood patterns—reflected a common urban pattern in the United States: "We have not used history to plan settlement."

As the urgent work of recovery got underway, a new approach to long-term planning began to emerge as well. With support from a state community resilience fund powered by federal disaster recovery dollars, the region's economic

development organization, Greater New Orleans, Inc. (GNO) commissioned a project that would help the city reimagine its relationship to water.

Inspired by the Dutch approach to water management, which hinges on collaborating across disciplines and viewing water as an asset, the Greater New Orleans Urban Water Plan drew on local, national, and international expertise, envisioning nature-inspired systems and strategies that could help manage stormwater more effectively and contribute to the health of residents, ecosystems, and the economy. The green infrastructure proposals in the plan ranged from small-scale retrofits like bioswales and permeable pavement to the more comprehensive, strategic use of parks, canals, and waterways to slow and store water (Waggonner & Ball 2013).

The ambitious plan intentionally focused on physical space, not policy or politics, explains Andy Sternad, an architect and resilience expert who was a lead author of the plan for New Orleans-based firm Waggonner & Ball. It won acclaim from organizations including C40 Cities and APA, which gave it a National Planning Excellence Award in 2015, in part due to its collaborative nature. "Planners have been instrumental in communicating with designers and engineers about the spatial, socioeconomic, political, and cultural impacts of the plan," APA noted in its award description. "They have also been successful in integrating the Urban Water Plan with the Louisiana Coastal Master Plan and other local planning processes."

"The water plan facilitated a new way for us to approach water, locally and regionally," says

Centuries of efforts to fight water are giving way to a new philosophy in New Orleans. Credit: pawel.gaul via E+/Getty images.





This illustration from the Greater New Orleans Urban Water Plan shows how redesigning streets with elements like rain gardens and pervious pavement can help slow and store stormwater. Credit: Waggonner & Ball.

Robin Barnes, a New Orleans–based economic recovery and resilience consultant who is the former executive vice president and COO of GNO, Inc. “It provides us with information and schematics and instructions about everything from materials to specific demonstration projects, and it illustrates how living with water can work.”

Barnes has been a director on the Sewerage & Water Board of New Orleans (SWBNO) since 2014, and says she has seen the plan’s guiding philosophy seep into operations citywide and regionally. The idea of living with water can be seen in everything from stormwater storage requirements for new construction and pilot projects funded by the SWBNO to broader initiatives such as the Gentilly Resilience District, a multi-pronged effort to reduce flood risk and support revitalization across an entire neighborhood. The city has received significant federal funding for green infrastructure, including a major award from the U.S. Department of Housing and Urban Development’s National Disaster Resilience Competition.

The city’s master plan envisions that by 2030, New Orleans will become “a city that celebrates its relationship to water” (City of New Orleans 2018). The plan prioritizes water conservation, sustainable stormwater management, and the protection of wetlands and other areas needed for water storage. It endorses land use approaches that were key elements of the post-Katrina rebuilding effort, says Blakely, such as density, infill development, and building on high ground.

Recommendations like those are constructive outcomes of the devastation caused by Katrina. So are community-level conversations about water management and resilience that continue to evolve, led in part by the Water Collaborative of Greater New Orleans, which formed after the release of the water plan.

Like many cities, New Orleans has faced challenges as it works to implement these ideas, from the pandemic to political transitions. There is still much work to be done, but other flood-prone places across the country have begun to embrace the New Orleans mindset; Sternad and his Waggonner & Ball colleagues have brought the Living with Water approach to cities including Houston, Miami, Charleston, Hampton, Virginia, and Bridgeport, Connecticut.

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Evans, Colorado: Preparing for Scarcity

The northern Colorado city of Evans has a population of 21,000, a projected growth rate of 3 percent per year, and a reliable supply of water from the region's river basins. But demand for water is projected to come close to the limits of that supply by the end of the decade, especially as the state faces drying and warming due to climate change. As the city grows, its municipal departments are trying to work together to make sure that demand doesn't exceed supply.

"We're going into a period where we have increasing demand for water, but the pie is shrinking," says Anne Best Johnson, former community development director in Evans. "It's one thing to divide up a growing pie, but it's harder and harder to divide a shrinking pie."

In 2019, the city completed a Municipal Water Efficiency Plan, a guide for its water conservation measures (City of Evans 2019). That plan identified 34 water conservation activities that the city will prioritize for implementation, ranging from outdoor watering and landscape design ordinances to requirements for things like wind and rain sensors for new developments,

and water-efficient fixture retrofits for existing buildings. If all the steps are implemented, projections suggest the city could see total water savings of up to 17 percent by 2028 compared to projected demand.

Around the time the water plan came out, city officials started their decadal update of the city's comprehensive plan. "The timing was important because these documents guide the city for anywhere from 10 to 30 years," says Justine Schoenbacher, the city's water conservation coordinator. Both planning processes incorporated cross-departmental input and extensive public outreach, Schoenbacher adds: "The fact that both plans were updated in a time of heightened awareness around water resource issues was beneficial." She says the timing and collaborative approaches allowed the city to seamlessly integrate the plans and address water resources comprehensively.

Johnson—who left her role in Evans in early 2023 for a similar role in nearby Berthoud—says city officials were able to build principles from the Municipal Water Efficiency Plan into the comprehensive plan, which includes a chapter on water conservation and stewardship, as well as instructions for incorporating water conservation principles into planning (City of Evans 2022).

Aware of rising water demands and shrinking supplies, the City of Evans incorporated drought-tolerant landscaping in a road-widening project completed in 2022. Credit: City of Evans.





The city is phasing in water-wise landscaping (left) at the Evans Community Complex (right), with support from the Denver Botanic Gardens and Northern Water Conservancy District, the regional utility. The project serves conservation and public education goals. Credit: City of Evans.

This puts Evans on a solid path toward a sustainable water supply. But the city didn't do it alone. Johnson says support from other organizations helped the small city maximize its efforts. In 2018, as officials were working on the municipal water plan, they participated in a Growing Water Smart workshop hosted by the Sonoran Institute and the Babbitt Center, which allowed them to learn from other communities and create their own action plan. The city also participated as a pilot community for a Water and Land Use Metrics program coordinated by the Sonoran Institute, which helped them measure their local water conservation data. To help implement their Growing Water Smart action plan, they received technical support from WaterNow Alliance and Western Resource Advocates to administer a water efficiency audit program and a community-wide fixture replacement and installation program. Schoenbacher says that has been key in helping them make tangible progress, and in educating the community about the application and benefits of the water efficiency plan.

As they put the plans into practice, Johnson says city leaders are trying to be proactive and clear about their goals, by talking to the community and gathering data to show what's working well. "A lot of time, money, effort, and citizen input went into our guide for moving forward," she says. "We don't want to have a comp plan that just sits on the shelf." Johnson says the city started with the easiest projects, like fixture

retrofits, to show the community that reducing water use didn't have to be painful. Then they started to bring in some of the bigger pieces. Using those tools, they're confident that they can balance population growth and new development while decreasing citywide water use.

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"Change can be very threatening to people. If you offer them opportunities to have success, then you're going to be seen as a community that encourages business while being respectful of your environment and limited resources," Johnson says. Evans, she adds, "wants to have an opportunity to grow and change when it's not a reactionary situation."

Schoenbacher says that's true across the region, where communities need to be planning for scarcity. Communication and early thoughtful action are both key for being prepared, she notes: "We adhere to the motto that's happening across the West: we need to be doing more with less. We're thinking about that potential gap between supply and demand in the long term. What changes can communities make now to preserve our rights and ability to grow in the future?"

Golden Valley, Minnesota: Thinking Beyond Boundaries

A decade ago, planners and water engineers in the Minneapolis suburb of Golden Valley worked in different departments on different floors of city hall. “There was general agreement on the direction that the city was moving, but there was minimal coordination,” says Planning Director Jason Zimmerman. To facilitate communication and collaboration in this city of 22,000, which relies primarily on redevelopment to accommodate growth, the city combined planning, engineering, and inspections into one department, creating an open-concept office on a single floor of the building. Today, Zimmerman says, “there is close communication between planning and engineering staff, in relation to redevelopment projects in particular. . . . Planning decisions always acknowledge the requirements and challenges associated with water.”

Those challenges have increased as climate change makes storms in the region stronger. “New flood elevations due to more intense rain events have created challenges for properties in low-lying areas,” Zimmerman says, noting that planners carefully evaluate aspects like grading when reviewing site plans, in light of the increased runoff caused by extreme weather.

As Golden Valley continues to adjust its practices to meet evolving needs, a state-enabled regional planning agency, the Metropolitan Council, is helping the city address pollution, plan for flooding, and protect the quality of its creeks and lakes by thinking beyond boundaries.

Golden Valley buys its water from the city of Minneapolis, as part of a joint agreement with two other nearby suburbs, Crystal and New Hope. The Metropolitan Council oversees wastewater



Golden Valley City Hall sits beside the Minneapolis suburb's 170-foot-tall water tower. Credit: City of Golden Valley.

collection and treatment infrastructure and water supply planning across the area, a relatively unique arrangement that helps communities learn from each other. “We’re working with our partners in the region to make sure we have sustainable supplies for the growth that is planned,” says Judy Sventek, Met Council’s manager of water resources. “People think of Minnesota as a water-rich state with 10,000 lakes, but we do have water supply limitations” including differences in the types and quantities of water communities can access.

In 2005, the council created a Water Supply Planning Unit to bring communities together from across the region. A decade later, this work shaped updates to regional water policy reflected in the 2040 Water Resources Policy Plan—which directly influenced Golden Valley’s 2040 Comprehensive Plan and its goals of responding to new and changing development, future water demands, and changing weather patterns (Metropolitan Council 2018, Golden Valley 2020).

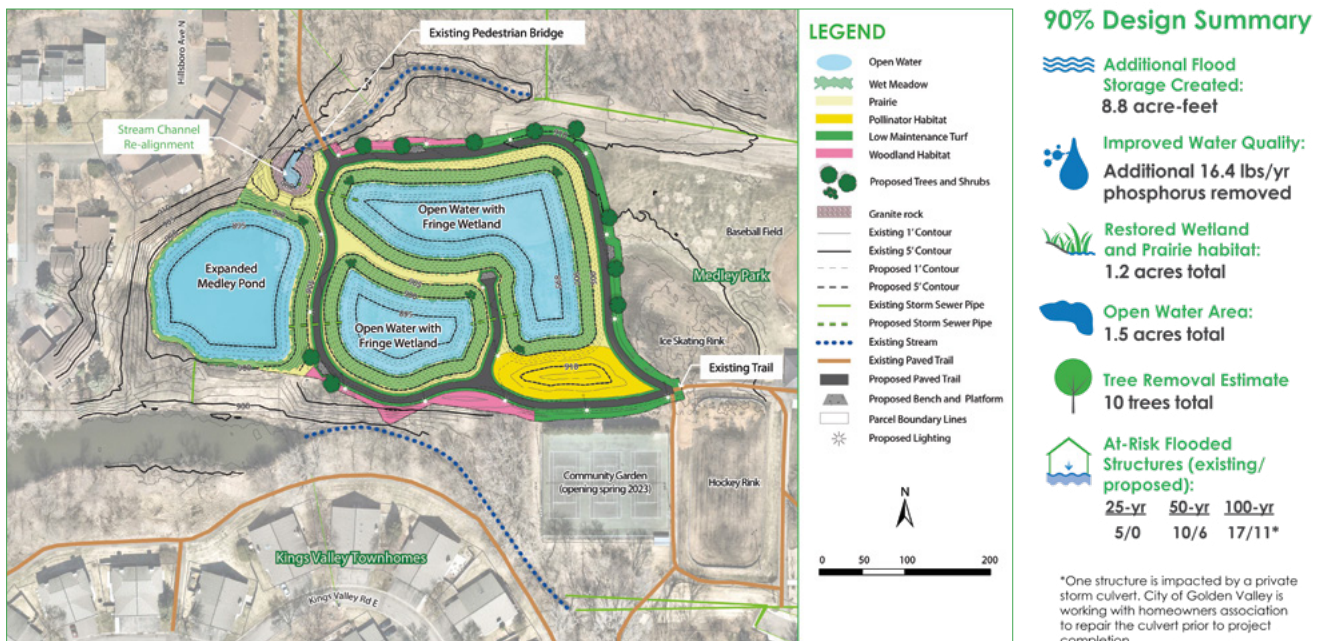
Planners and water engineers in Golden Valley used to work in different departments on different floors of city hall. Creating a combined department and an open-concept office helped facilitate communication and collaboration.

“In the ’80s, when most people lived in the urban core around Minneapolis and St. Paul, most residents and businesses relied on surface water,” Sventek says. “Now 75 percent of residents in the metro area are using groundwater from wells in the suburbs. We’re thinking about the implications of this change as cities continue to grow outward, and we’re looking at how climate change affects water supply.”

Lanya Ross, a Met Council environmental analyst, says the council’s regional vision can help communities like Golden Valley make long-term water-supply plans in the face of changing climate and population dynamics. It also serves as a hub of data on issues like regional groundwater modeling and flooding impacts, which individual communities might not have access to or might not normally consider. In Golden Valley, where Bassett Creek is a critical waterway, leaders can use this shared information to see where stormwater management projects can be most helpful, and how redevelopment projects can help with flood control.

“We can look at the entire region: how do we plan for sustainable water resources together and how do those interactions happen,” Ross says. In the face of climate change, communication among neighboring communities can be particularly important on the supply side. It can lead to sharing tools and resources to protect source water, monitor aquifer levels, and address contamination from pollutants like phosphorus and nitrogen that come from agricultural runoff.

Sventek says other states and organizations have looked at the Met Council’s approach, especially on the supply side, because planning for watershed health is becoming more relevant and necessary. Having an entity that plans for a region and addresses issues across local boundaries is also helpful for transferring knowledge and thinking about the big picture, she says—and that shows up in the way places like Golden Valley are planning for the future.



Design plans for a stormwater improvement project at Golden Valley’s Medley Park. City officials partnered with the local watershed management commission on the project, which aims to reduce flooding and improve water quality while offering economic, recreational, and educational benefits. Credit: City of Golden Valley.

RESOURCES AND FURTHER READING



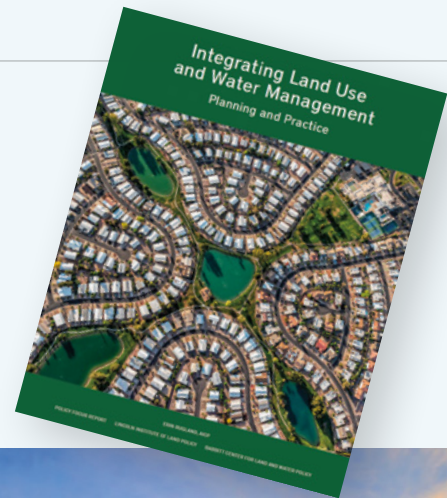
A combined team from the cities of Evans and Greeley, Colorado, attended the Growing Water Smart workshop in 2018. Credit: Sonoran Institute.

The **Growing Water Smart** program introduces communities to strategies and tools that can help them integrate water and land use planning to better adapt to change and uncertainty. A joint program of the Sonoran Institute and the Babbitt Center for Land and Water Policy, Growing Water Smart has reached more than 80 communities in Colorado, Arizona, and Utah, and is expanding to California and along the Mexican border this year.

To learn more, visit www.growingwatersmart.org or watch the video at www.lincolnst.edu/growing-water-smart.

To learn more about how communities are incorporating water into their planning processes, check out ***Integrating Land Use and Water Management: Planning and Practice***, a Lincoln Institute Policy Focus Report by Erin Rugland.

Available at www.lincolnst.edu/publications/policy-focus-reports/integrating-land-use-water-management.



Connecting land and water for healthy communities is the theme of this year's **American Water Resources Association summer conference**, to be held July 17–19 in Denver. The planning committee for this event includes representatives from the Lincoln Institute's Babbitt Center and many other organizations, agencies, and institutions working to advance the integration of land and water planning.

To learn more, visit www.awra.org.

Denver, Colorado. Credit: f11photo via iStock/Getty Images Plus.



Hard Decisions Ahead

The need for big-picture, long-term thinking by policy makers across the country is clear.

“There isn’t a place that is not subject to some form of disaster in the United States, be it drought, cyclones, or tornados. We’ve seen flooding year after year,” says Blakely, who led the Hurricane Katrina recovery effort in New Orleans. “We need to be catching up to the game, not adding to the destruction.”

The threats are different from place to place and ecosystem to ecosystem, but there are broadscale ways to address climate-related disasters. Communities can store and reuse water, instead of relying on manmade infrastructure to fend it off. They can plan for uncertainty, anticipate a range of futures, and implement adaptable long-term plans. They can also collaborate and work across boundaries to manage resources regionally, build resilience, and increase flexibility.

To stay ahead of the game, planners and water managers need to implement changes now, working across departments to integrate land and water planning. “We made a lot of choices that have kicked the can down the road by saying, ‘We’ll do more monitoring or regulation at a later date.’ That time has arrived,” says Bateman, chair of this year’s AWRA conference (see sidebar). “We’re going to have to make some hard decisions. We’re going to need leaders who are willing to make those decisions based on science.”

Holway says organizations like APA, AWRA, the American Water Works Association, and the Babbitt Center can help communities build the capacity they need to implement solutions by providing tools and support, and by helping them connect across geographic and bureaucratic boundaries. “We’re not trying to predict the future, we’re trying to prepare for a range of potential future conditions. Building that awareness and working in new ways can start to change the narrative and lay the groundwork for implementing necessary programs,” he says.

“As you look forward, disasters are going to be a constant. They’re going to come one after another, and if that’s the future, we need to prepare for that.” □

Heather Hansman is a freelance journalist, *Outside* magazine’s environmental columnist, and the author of the book *Downriver: Into the Future of Water in the West*.

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