

A Transformational Moment

For our nation's rivers and water infrastructure.

Clean water is essential to our health, our communities, and our lives. Yet our water infrastructure — drinking water, wastewater and stormwater systems, dams and levees — is seriously outdated. In addition, we have degraded much of our essential natural infrastructure — forests, streams, wetlands, and floodplains. Climate change will aggravate the situation, as rising temperatures, increased water demands, extended droughts, and intense storms strain our water supplies, flood our communities and pollute our waterways.

The same approaches we have used for centuries will not solve today's water challenges. We need to fundamentally transform the way we manage water.

A 21st century approach would recognize "green infrastructure" as the core of our water management system. Green infrastructure is the best, most cost-effective, and most flexible way for communities to deal with the impacts of climate change. It has three critical components:

- **Protect healthy landscapes**, like forests and small streams, that naturally sustain clean water supplies.
- **Restore degraded landscapes** like floodplains and wetlands so they can better store flood water and recharge streams and aquifers.
- **Repair natural water systems** in urban settings to capture and use water more wisely, and prevent stormwater and sewage pollution.



Tree Hensdill



istockphoto

To obtain a copy of the full report, go to www.AmericanRivers.org.

Many forward-looking communities have become more resilient to threats such as flooding, sewage pollution, and limited water supplies by embracing green infrastructure. American Rivers has conducted in-depth research on eight communities' sustainable green infrastructure approaches, and found that these approaches can provide clean water, conserve rivers and ecosystems, and provide a wide array of benefits to people and wildlife in the face of climate change. This executive summary of "Natural Security" provides an overview of these smarter, greener strategies.

About American Rivers

American Rivers is the leading conservation organization standing up for healthy rivers so communities can thrive. American Rivers protects and restores America's rivers for the benefit of people, wildlife, and nature. Founded in 1973, American Rivers has more than 65,000 members and supporters, with offices in Washington, DC and nationwide. Visit www.AmericanRivers.org.

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Paul Keleher



Natural Security

How Sustainable Water Strategies
Are Preparing Communities for
Climate Change



New York Department of Environmental Protection

The following communities have taken steps to prepare themselves in four areas where the effects of climate change will be felt most: public health, flood and storm water damage, water supply, and quality of life. In each case, these communities could achieve even more by extending their use of green infrastructure strategies and working with neighboring communities to apply these approaches throughout their watersheds.

Improving Public Health

PORTLAND, OREGON

In response to stormwater runoff and sewer overflows that have long degraded water quality and threatened public health, Portland integrated a number of green infrastructure solutions with expanded sewer and stormwater pipes. The city's "green street," eco-roof, and downspout disconnection programs, while still in early stages, currently capture 8 percent of the city's annual stormwater runoff and have potential to



City of Portland
Bureau of Environmental Sciences

absorb about 50 percent. By 2011, Portland's investments will reduce sewage overflows by 96 percent. Green infrastructure

will provide the added capacity and flexibility to minimize stormwater problems and protect public health, even as extreme storms grow more frequent and intense in a changing climate.

STATEN ISLAND, NEW YORK

To overcome the problems of septic systems leaking sewage into streams and persistent flooding caused by stormwater runoff, Staten Island constructed sanitary sewers and created an innovative stormwater system that utilizes streams and wetlands to transport and treat runoff. The program has drastically reduced flooding and improved water quality, effectively removing 65 percent of total organic carbon, 93 percent of fecal coliform from stormwater runoff, and most excess nutrients. As storms and droughts become more frequent and severe, the program will continue to protect public health, clean water and local streams.

Reducing Flood and Storm Damage

SOLDIERS GROVE, WISCONSIN

After years of major flooding in the Kickapoo River Valley, the town of Soldiers Grove decided to relocate its downtown out of the floodplain. By 1983, 49 homes and businesses had been moved out of harm's way. While massive floods in 2007 and 2008 devastated surrounding communities, Soldiers Grove remained largely protected. As climate change brings more severe storms and floods, Soldiers Grove's forward-looking relocation effort will minimize losses and keep residents safe.

BOSTON, MASSACHUSETTS

To prevent recurring floods that had caused extensive damage in Boston and neighboring communities, the Army Corps of Engineers created an innovative plan to acquire and protect more than 8,000 acres of wetlands along the upper reaches of the Charles River. Those wetlands help prevent \$40 million in flood damages every year. As precipitation increases and storms become more intense in a changing climate, wetlands will continue to provide cost-effective and natural protection against floods.



Antonio Vernon/Wikimedia.org

Securing Clean Water Supplies

CLAYTON COUNTY, GEORGIA

While most Southeastern communities experienced major water shortages during the 2007-2008 drought, Clayton County was an exception. An innovative water recycling system that filters treated wastewater through a series of constructed wetlands helped the county maintain an abundant water supply throughout the record-setting drought. While nearby Atlanta's Lake Lanier shrank to a 90-day supply of water, Clayton County maintained a 230-day supply in its reservoirs. As climate change makes precipitation more variable and uncertain, Clayton County's water capturing and recycling system will ensure a secure and reliable water supply for its residents.



Michael Buffington/Society of Wetland Scientists

SEATTLE, WASHINGTON

Population growth in the Seattle metropolitan area has strained water supplies during the past several decades. To maintain a consistent supply and ensure enough water remains in streams for ecosystem health, Seattle Public Utilities has undertaken a number of water conservation and efficiency measures. The city has reduced water consumption by 26 percent and per capita water use by 33 percent since 1990. Combined with protecting the lands surrounding drinking water sources and taking a flexible approach to planning, water efficiency and conservation measures will allow Seattle to maintain a safe and consistent supply of water even as rising temperatures reduce the snowpack that the city relies on to fill its reservoirs.

Enhancing Livability

AUGUSTA, MAINE

When the Edwards Dam was removed in 1999, the Kennebec River began to restore itself. Water quality improved and fish stocks rebounded rapidly. The river's restoration has created new recreational opportunities, boosted the local economy, and improved the quality of life in Augusta. As climate change threatens clean water and fish and wildlife, a healthy Kennebec River will be better able to adapt to changing conditions and allow Augusta to remain a vibrant community.

GRAND JUNCTION, COLORADO

Grand Junction's rivers were once forgotten places with uranium tailings, salvage yards, and a landfill along their banks. Gradually,



Jason Barlett/Maine Department of Marine Resources

local river clean-up projects turned into a valley-wide effort to reclaim the rivers as social, economic, and recreational amenities. Through the creation of riverfront trails and parks, restoration of the riverfront has helped stimulate economic growth and improve quality of life in Grand Junction. The community's restoration efforts will help keep quality of life high, regardless of the challenges brought by climate change.



City of Portland/Bureau of Environmental Sciences

In Conclusion

In sharp contrast to traditional water management approaches that rely solely on pipes, levees, and dams, 21st century green infrastructure solutions preserve and restore natural landscapes, prevent wasteful water use, and work with nature rather than against it. While traditional water infrastructure will continue to have a role, this kind of engineered infrastructure is static and only attempts to solve a single problem. It requires a huge expense to build and maintain, damages the environment, and often exacerbates the exact problem it is trying to address.

Communities that invest in a broad suite of green infrastructure approaches like the ones described above will be better prepared to confront an increasingly volatile climate by improving the health of valuable ecosystems, providing flexibility to handle a wide range of conditions and uncertainty, strengthening local economies, and securing multiple benefits.

By working with neighboring communities, cities large and small can thrive in the face of climate change.