

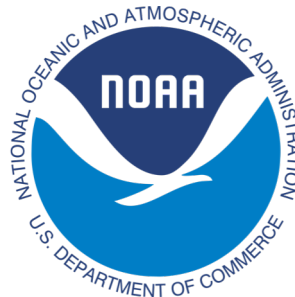
Green Infrastructure Implementation: How to Move Forward in Jacksonville

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**NORTHEAST FLORIDA
REGIONAL COUNCIL**



FEMA

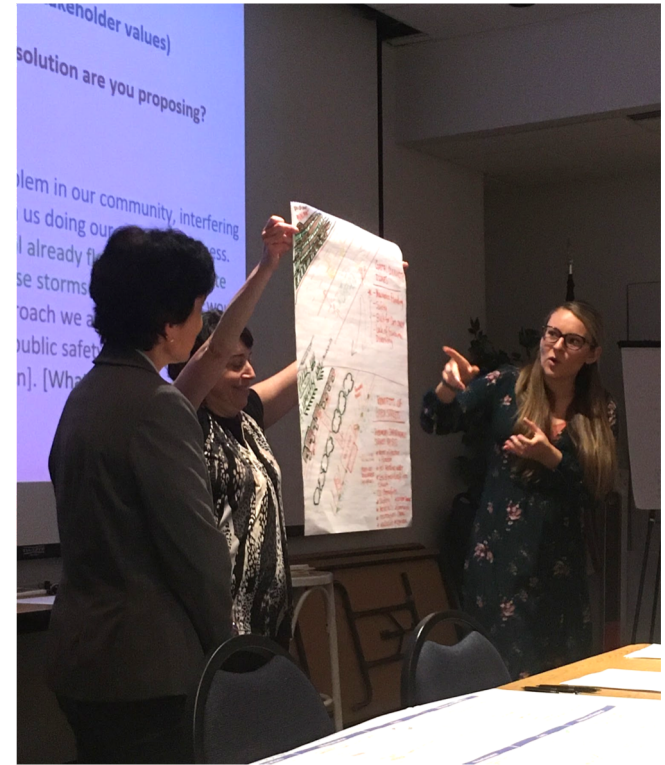
Getting to Green Infrastructure Success



Nature-Based Solutions for Coastal Hazards

Jacksonville, FL

- Coastal hazards
- Green infrastructure practices, benefits, co-benefits
- Design, maintenance, costs
- Planning, funding, partners





Police officers plow through flood waters on Hendricks Avenue in San Marco as Hurricane Irma passed Downtown in 2017, leaving flooded neighborhoods in her wake.

WITH ALL OF ITS WATERWAYS, Jacksonville is uniquely vulnerable to the impacts of floods. Much of Downtown was hit hard by Hurricane Irma, swamping waterfront businesses. So how should future development cope with these threats? What can existing businesses do? The impact on Florida's homes and businesses is huge. A report from the McKinsey consulting group showed that Florida homes at risk

of flooding could lose 15 percent of their value in the next 10 years. By 2050, the loss could be 35 percent.

The CEO of the financial asset firm BlackRock said this impact on property values will be greater than the 2008 financial crisis, The Miami Herald reported.

There are really only a few options. Existing businesses can either accept occasional floods, remodel or leave.

But new construction can move back from the waterfront or build in ways that can cope with occasional rising waters.

For instance, the mixed uses proposed for the former city hall and courthouse site would not include living units on the first two floors. And those first two floors would be built with concrete in order to better bounce back from flood waters.

But the ideal way to adjust to floods involves Mother Nature. Now have the data to prove that using natural mitigation strategies is more

economical than using the blunt instruments of bulkheads.

This was brought to light several months ago during a session sponsored by the Northeast Florida Regional Council. It was titled "Nature-Based Solutions for Coastal Hazards."

The regional council has been quietly working on businesslike, risk management strategies for flooding issues for several years. It offers free resiliency services to groups in Duval, St. Johns, Baker, Nassau, Putnam and Flagler counties.

Present at the session were members of environmental nonprofits, members of the mayor's administration and City Council Members Matt Carlucci and Michael Boylan.

Sean Lahav of the Northeast Florida Regional Council spoke about a mapping tool to determine resilience. The web address: buildcommunityresilience.com/northeastflorida.

When using nature isn't available to cope with floods, then use

physical installations that mimic nature. You can't put wetlands Downtown but we can use permeable pavement and plant more trees.

Permeable pavement can reduce stormwater runoff by up to 90 percent and remove almost all sediment, metals and pollutants.

Oyster reefs can reduce wave energy by up to 93 percent. In fact, two river reefs were established off San Marco.

"By placing material like concrete rubble, recycled culverts and even man-made structures in the river, we can provide increased surface area for food to grow, juvenile fish to hide and marine life to increase," wrote Quinton White, the Jacksonville University river expert.

These concrete structures allow barnacles at first, then oysters and finally mussels.

We're now finding out that trees soak up water.

Rainfall can be used as an asset rather than being piped back to the river.

Philadelphia is in the midst of a massive project to retain rainwater rather than send it as runoff into waterways. The Green City, Clean Waters program is a 25-year, \$4.5 billion project, reported The Washington Post.

Rainwater is diverted into rain barrels in homes, in rain gardens in parks, in roadside tree trenches in bioswales. Some owners are given breaks on their stormwater fees if they install pervious pavement in their driveways that allows rainwater to soak into the ground.

Recent studies in New York City and Toronto have documented the energy savings of green roofs.

New York City is planting thousands of trees, installing bioswales and stormwater planters, mapping progress along way. The average deciduous broadleaf tree soaks up about 100 gallons a day. Palm trees produce almost no similar benefits other than surviving high winds. For every \$1 spent on these natural alternatives is worth \$5 in benefits. Mayor Michael Bloomberg committed to planting 1 million trees.

New York City also is building over 7,000 bioswales, which are long tree pits designed to accept street runoff.

Cities are adding parks along waterfronts that can bounce back from flooding.

Living shorelines won't stop floods, that would require seawalls, but they can reduce wave damage.

There are co-benefits to waterfront parks that can be politically helpful by adding recreation, increased property values for nearby properties, improved aesthetics, improved water storage and more habitat.

That is why these strategies are an art and a science, and must be adjusted as conditions change.

For instance, natural areas can be protected, rain gardens can be used, natural landscaping can cope with both drought and floods.

All of this pays off. The Nature Conservancy estimated that wetlands reduced the property damage of Hurricane Sandy by over \$625 million.

This isn't new. For instance, the Police Memorial Building, designed by architect Robert Morgan, included a park on the roof. That was used for energy efficiency.

Marc Hudson, director of strategic conservation for the North Florida Land Trust, identified the return on investment at the "Nature-Based Solutions for Coastal Hazards" seminar.

The land trust acquires land or conservation easements, preservation benefits, agricultural concerns.

There are about a dozen land trusts in Florida, over 1,000 in the nation. This is the 20th anniversary of the North Florida Land Trust with 20,000 acres preserved. It's also a land manager.

Hudson's job is to identify land that needs to be preserved, acquire it and try to find the money. In order to convince investors and the government to provide the money, Hudson needs to show a good return on investment.

He looked at seven counties in Northeast Florida. Where do you focus limited resources? With mapping software, he looked at habitat, water quality, farms and forest preservation and recreation.

By layering maps on each of those indicators, the areas with the most potential conservation benefits were identified. In Duval County, two such areas are Black Hammock Island on the Northside and the Orange River.

A good return on investment can be found for even the most expensive property. For instance, acquiring property in Ponte Vedra Beach to protect the Guana River area paid for itself in less than five years.

That's good but other investments are shockingly better.

For instance, acquiring property near Black Hammock Island has less than an eight-month ROI. The wetlands there provide water filtration and buffering for storm surge.

Another project of the land trust is to purchase overstocked pine plantations and convert them to more environmentally friendly uses.

Packing pine plantations might look good for business, but they soak up more water, intercepting it before it can reach the aquifer.

Buying pine plantations and reducing the number of trees in the right places creates great wildlife habitat, more resilience from storms and better protection from pests and fires.

There are more environmental options in cities than many realize. Permeable pavement can reduce runoff. Planting more trees improves shade and water retention. Even parking lots can be improved with stormwater planters and greenery.

Oyster reefs offer protection from wave damage. Hybrid shorelines combine hard infrastructure like a breakwater with marsh grasses behind it.

There is so much riverfront property available for Downtown, it is essential that it be constructed for maximum flood protection. At the same time, the riverfront ought to be protected for maximum

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public enjoyment.

This blank palette awaits for smart development. We have the strategies if we only follow Mother Nature.

Turning Downtown green will be good for the environment and good for the bottom line.

MIKE CLARK has been a reporter and editor at the Jacksonville daily newspapers since 1973. He and his wife Molly live in Nocatee.

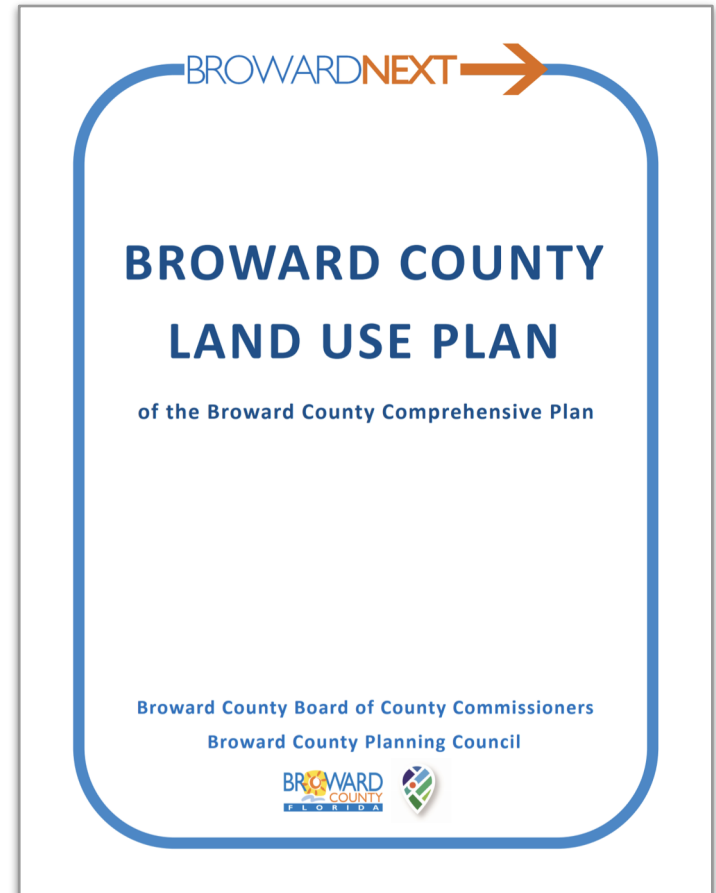


**Planning,
Regulations,
Funding &
Engagement**

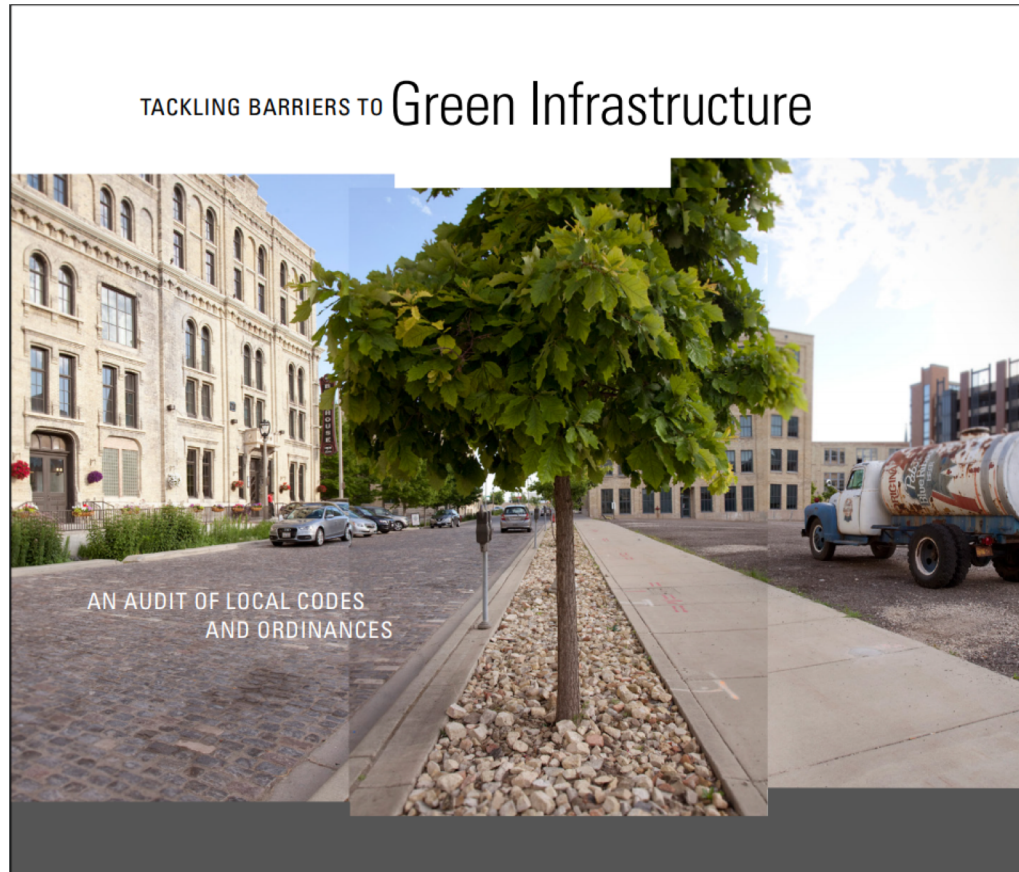
Planning

Incorporate green infrastructure into planning efforts:

- Comprehensive
- Transportation
- Capital Improvement
- Smart growth
- Conservation
- Hazard mitigation
- Stormwater
- Watershed
- Climate change adaptation
- Resilience
- Land use

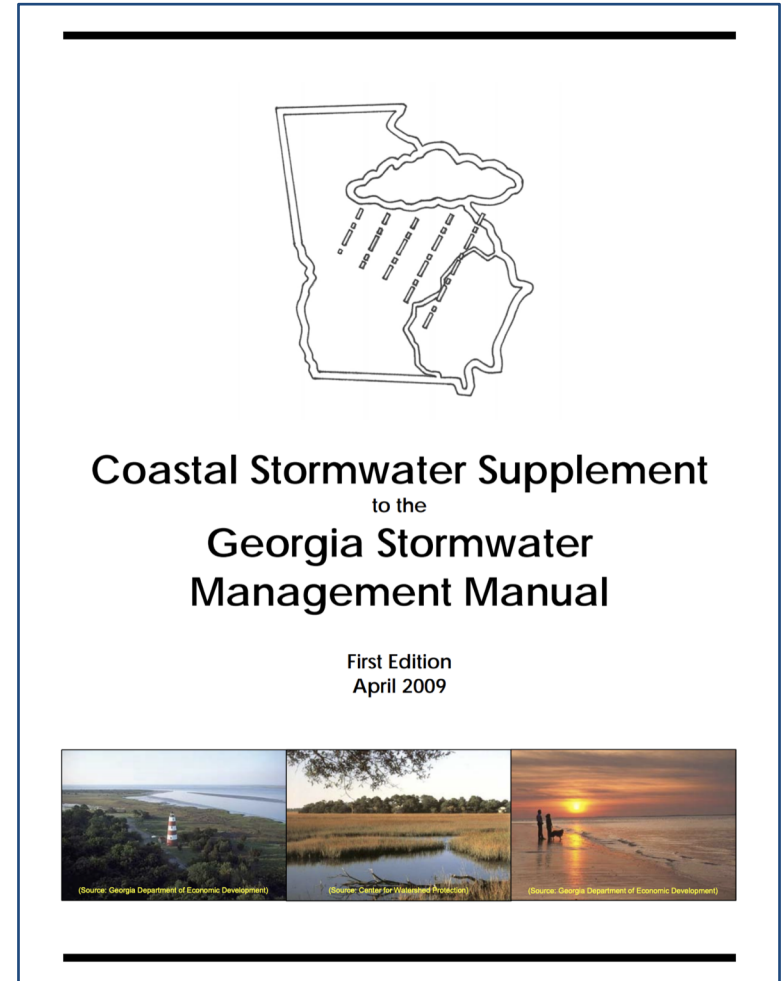
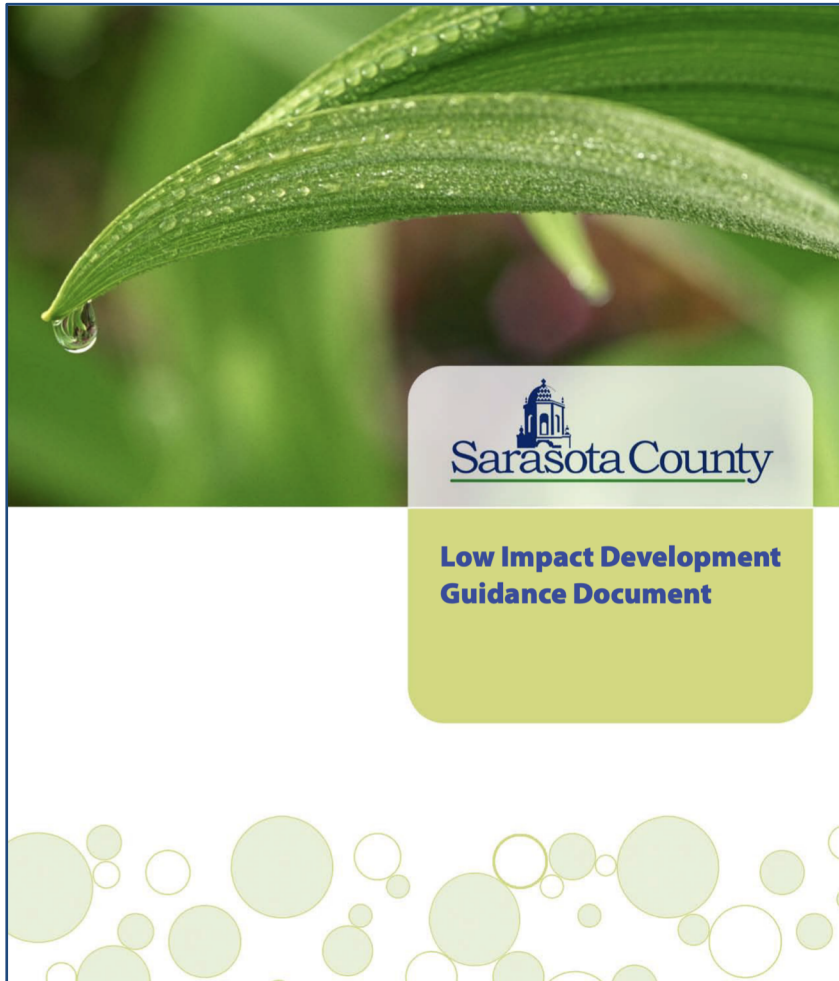


Local Codes and Ordinances



Publications.aqua.wisc.edu/product/tackling-barriers-to-green-infrastructure-an-audit-of-municipal-codes-and-ordinances/

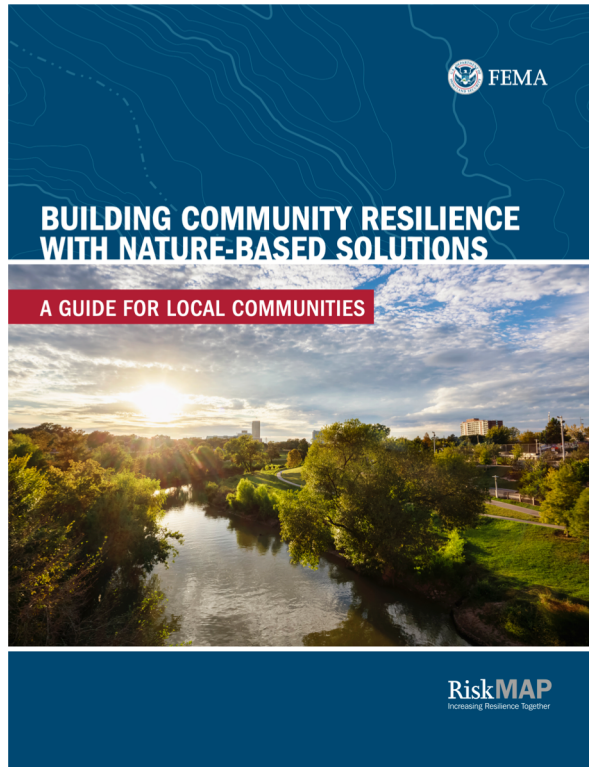
Manuals and Guidance



Cascades Park in Tallahassee



Living Shorelines





Funding, Financing & Incentivizing Green Infrastructure



Incentivizing Green Infrastructure

**Stormwater Fee Discounts,
Tax Credits & Awards**

Lower flood insurance premiums



coast.noaa.gov/digitalcoast/training/folly-beach.html

Stakeholder Engagement

- Have a plan
- Speak to their interests, not yours
- Explain the hazard risk and discuss solutions together
- Use multiple ways to communicate
- Demonstration Projects

