Georgia Tree COUNCIL

Sustaining Georgia's Green Legacy

Readiness, Response and Recovery: Managing Trees With Storms in Mind

Help communities plan better for natural disasters.

Presented By:

Green Infrastructure Center

Karen Firehock, Executive Director
Green Infrastructure Center

and

CITY OF ALEXANDRIA LOUISIANA POST DES RAPIDES

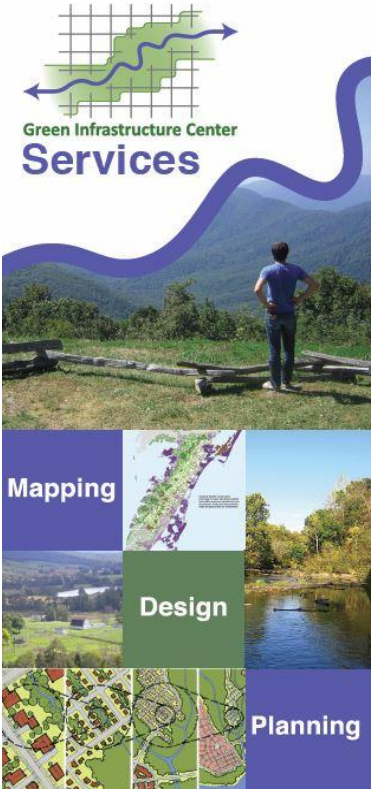
Darren Green, City Landscape Architect and Urban Forester, Public Works, Alexandria, LA

Photo credit: VA Dept. of Forestry

Thanks to our funders!

GIC works by partnering with key funders. We could not do this work without the essential funding of the USDA Forest Service and the GA Forestry Commission!

They funded GIC to develop written modules and this presentation.



The Green Infrastructure Center (GIC) is a nonprofit organization that helps communities evaluate green assets and manage them to maximize ecology, economy and culture.

www.gicinc.org

We do this by:

Mapping land cover and urban tree canopy

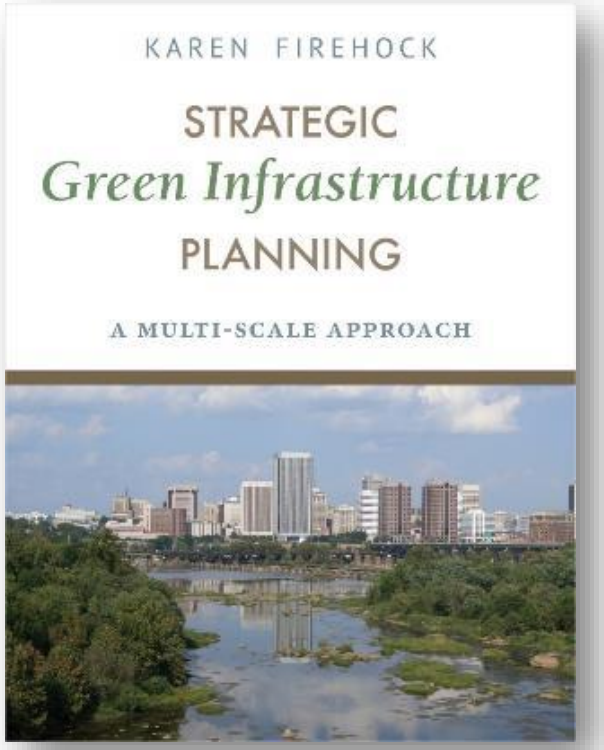
Modeling high value wildland habitats

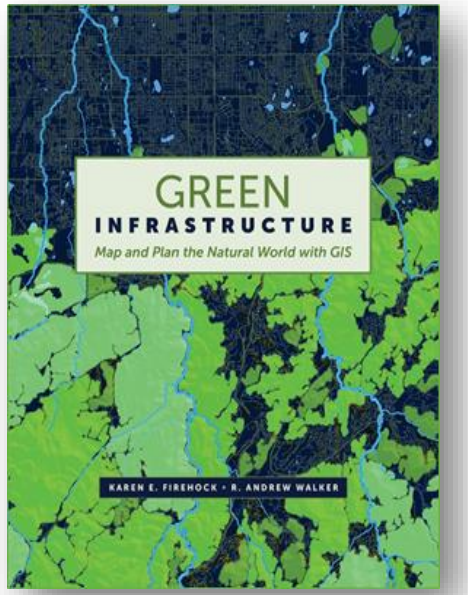
Creating strategic green infrastructure plans

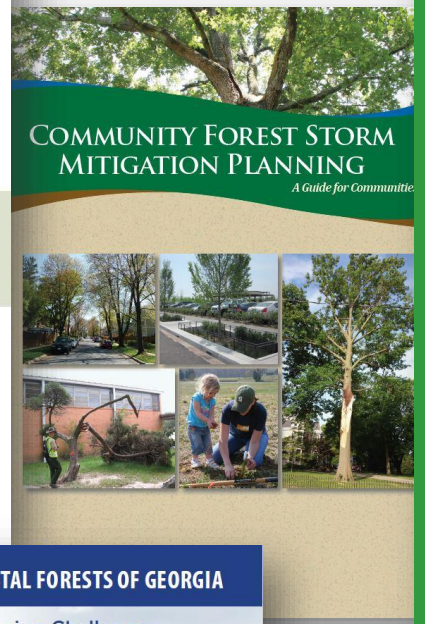
Writing, teaching and training

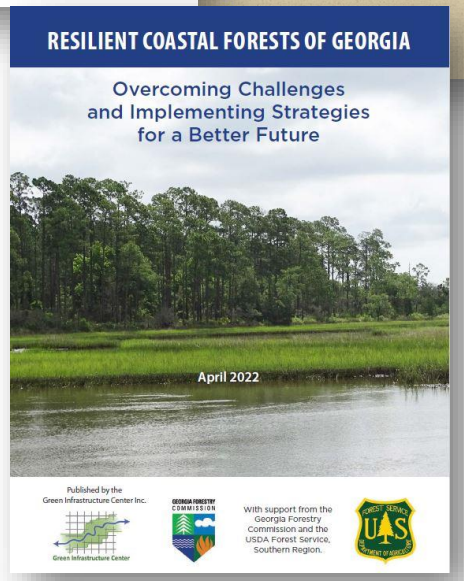
Alexandria Louisiana is a town of just under 29 square miles with a population of more than 45,000 people. Founded in 1805 following the Louisiana Purchase, it sits in the middle of today's modern Louisiana.

GREEN INFRASTRUCTURE CENTER INC.









We have books, guides and tools for green infrastructure planning at the national, state and city scale. More publications at http://www.gicinc.org/resources.htm

Agenda

- Trends & Why Plan?
- Storm Readiness
  - Tree Risk Assessment & Mitigation
  - Standing Contracts
  - Identifying Debris Management Sites
- Storm Response
- Storm Recovery

Thanks for funding support from:

GEORGIA FORESTRY COMMISSION

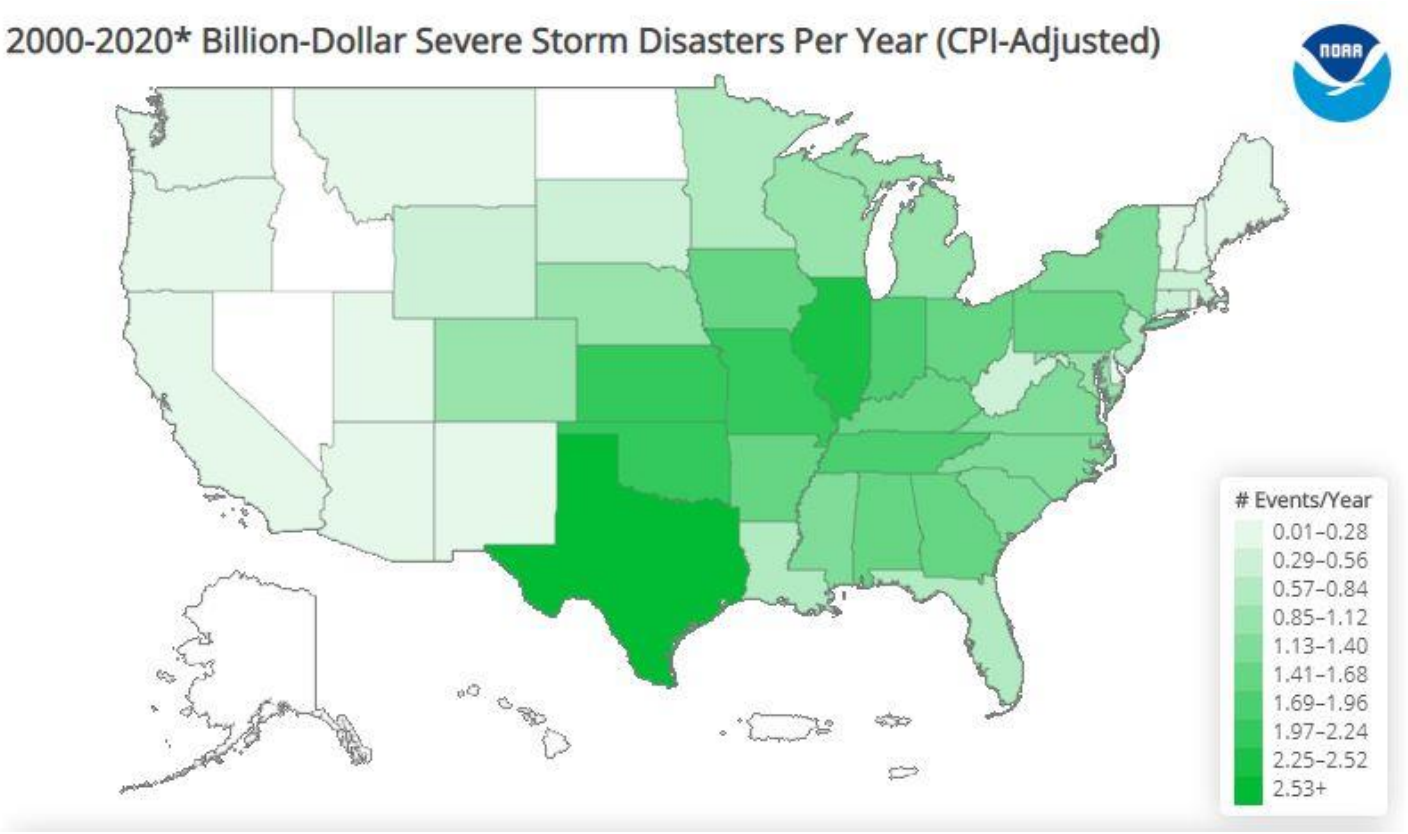
Trends

- 6X more billion-dollar severe storms during 2001–2022 (142 events) than prior 2 decades (25 events/1980–2000).
- Avg. cost of billon-dollar severe storms rose from $2.5 billion (1980–2000) to $15.4 billion (2001–2022).

https://www.climatecentral.org/climate-matters/severe-storm-supercell-and-tornado-trends-2023

- Rainfall rates likely increase with studies modeling 10-15% increase in rainfall rates within 100 km of the storm under a 2˚C warming scenario.
- Storm intensity globally will likely increase by 1-10% under a 2˚C warming scenario. This implies an increase in the destructive potential per storm assuming no reduction in storm size.

https://www.gfdl.noaa.gov/global-warming-and-hurricanes/



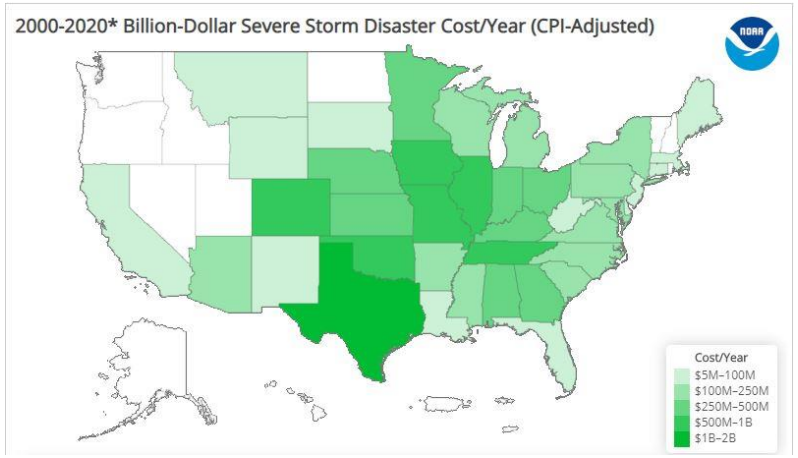
https://www.ncdc.noaa.gov/billions/mapping/freq-per-year/2000-2020

Why plan?

- Reduce tree canopy cover loss;
- Improve local, state, and federal information sharing;
- Coordinate response plans;
- Identify capacity and areas of need;
- Identify critical infrastructure; and
- Get reimbursed for debris removal and replacement for lost or damaged trees during federal major disaster declarations.

Why plan?

The price of being unprepared can be enormous!



Between 2000-2010 FEMA and local governments spent more than $8 billion in disaster-generated debris removal costs.

FEMA estimated debris removal operations account for approximately 27% of disaster recovery costs (FEMA 325 DMG 2007).

For example, in 2017 the City of Hitchcock, TX (pop. ~8000) amassed more than $500,000 worth of debris removal costs in only 5 days post Hurricane Harvey.

Storm Readiness

There are many ways you can better prepare your community's urban forest for future storms or events. This includes integrating urban forest management and planning into emergency response. Some top ways you can be better prepared are:

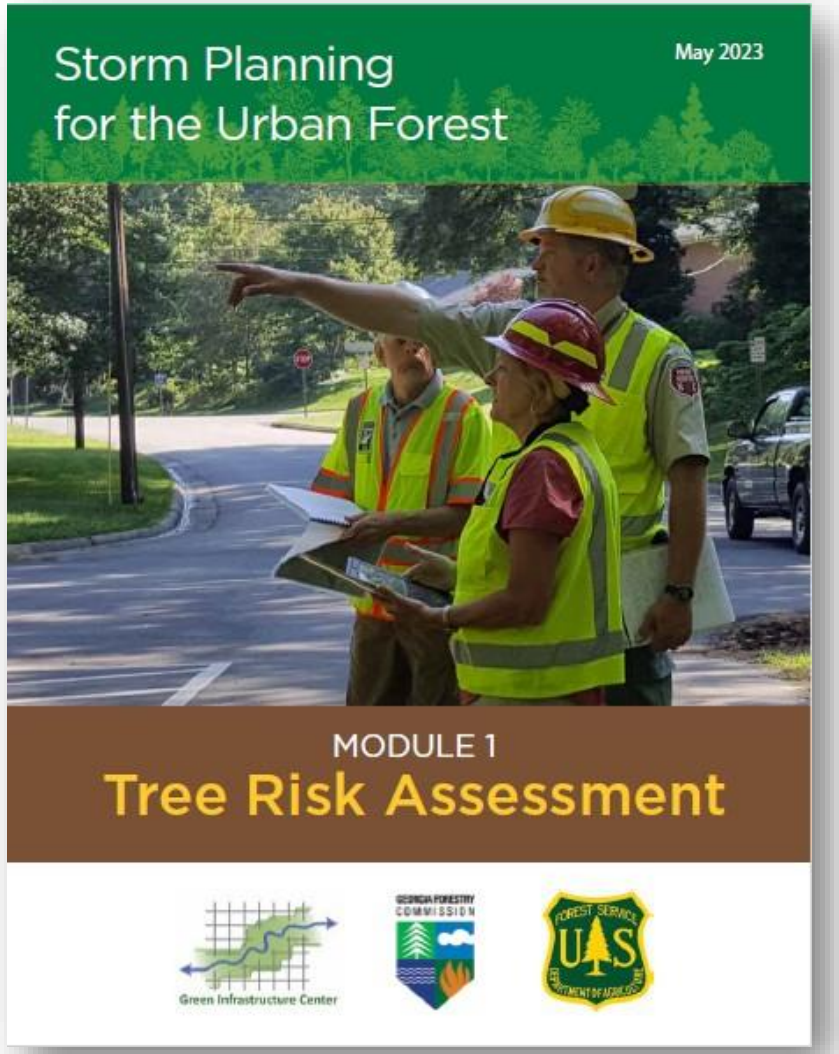
1. Conduct a tree risk assessment of public trees.
2. Develop standing contracts (also known as advanced readiness or pre- contracts).
3. Hire a consultant to develop a debris management plan, estimate debris amounts and identify and establish a debris management site.
4. Hold a mock event annually (staff may change!).

Tree Risk Assessment

Many communities have existing public tree inventories. Identifying and mitigating trees at risk of failure can increase public safety, reduce property damage, prevent canopy loss and reduce overall debris cleanup management and costs.

Tips for assessing risk for your community's public trees:

1. Identify Tree Risk Zones.
2. Conduct a Level-1 Risk Assessment in priority zones.
3. Make sure to only hire arborists with Tree Risk Assessment Qualification (TRAQ).
4. Identify areas for a Level 2 Assessment.
5. Integrate mitigation into maintenance over time.
6. Make sure to do routine maintenance and structural pruning.

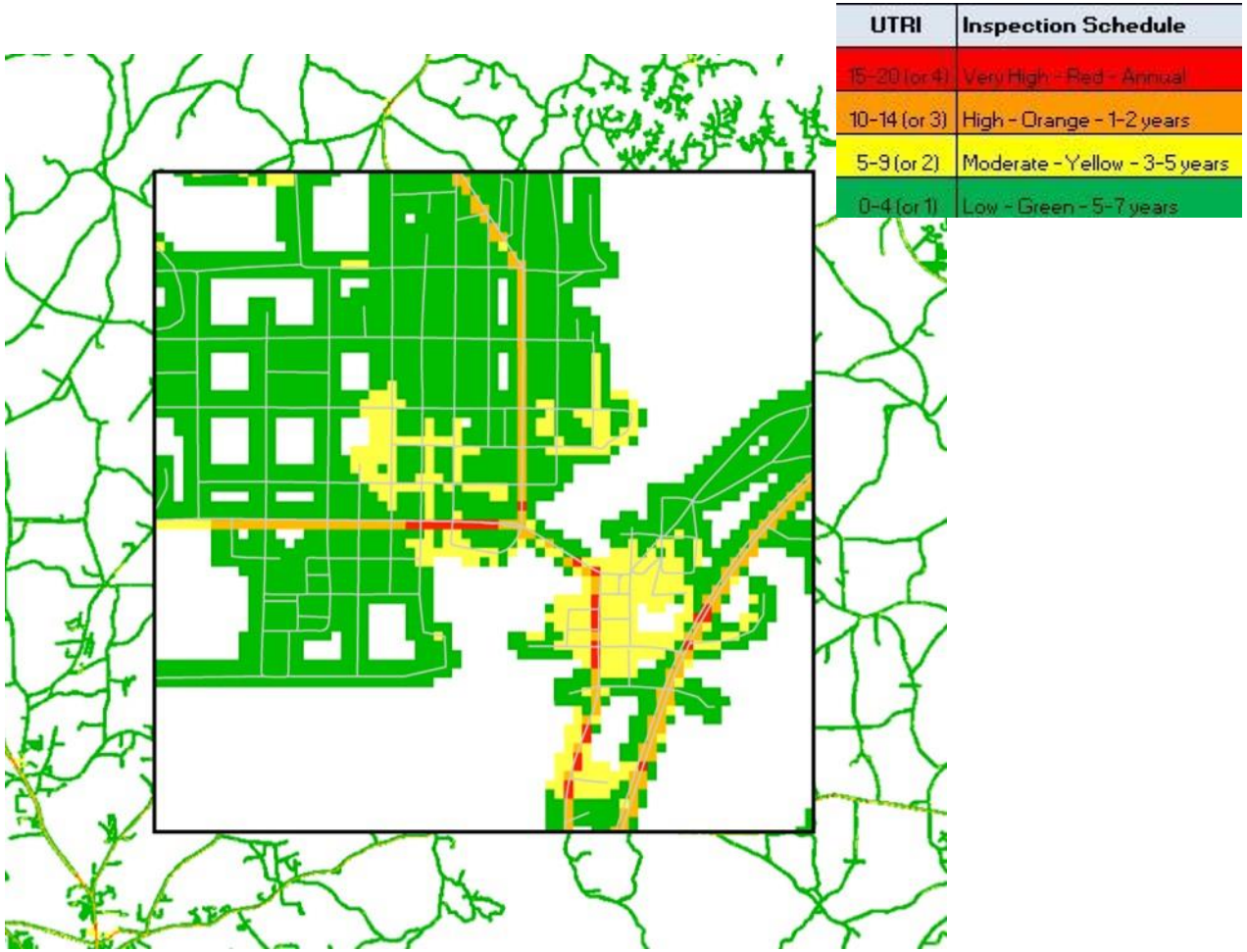


Choosing where to inventory

"The **Urban Tree Risk Index (UTRI)** is a GIS tool to help arborists and emergency management personnel define, rank and map the areas of greatest need for tree risk assessment.

If you have GIS capabilities, this model can be built to rank a community, from high to low priority, for tree risk assessment and establish routine inspection schedules.

The tool analyzes such spatial data as roads, parcels, facilities and land cover data, in order to determine areas where the highest risk of tree failure overlaps with major corridors and prioritized routes. Field verification of the index values is conducted and the values are adjusted, based on field conditions."



Instructions for building the model can be found here:
https://urbanforestrysouth.org/resources/library/ttresources/urban-tree-risk-index-model

Obtain your inspection schedule and implement!

Map ID	Street	Length (Feet)	UTRI (Raw Data)	UTRI (Adjusted Index 1-4)	Field Check and Verify Index	Mitigation Prune-Remove-None	Mitigation Complete Date (if applicable)	Inspection Schedule
563	Chapel Lakes Dr	118	20	4				Annual
410	Chapel Lakes Loop	1063	18	4				Annual
532	Chapel Rd	186	18	4				Annual
292	Chapel Rd	9	15	4				Annual
214	Chapel Rd	26	14	3				1-2 Years
489	Chapel Rd	118	12	3				1-2 Years
44	Chapel Rd	428	12	3				1-2 Years
379	Coosa River Pkwy	186	9	2				3-5 Years
204	Holtville Rd	71	9	2				3-5 Years
246	Holtville Rd	71	8	2				3-5 Years
354	Tallassee Hwy	348	6	2				3-5 Years
45	Barnes Ct	1257	3	1				5-7 Years
29	Tallassee Hwy	235	3	1				5-7 Years

Tree Risk Zones

The goal is to minimize risk through proper mitigation of critical infrastructure and property.

Example: **Niceville, FL**
Niceville, FL suffered only a glancing pass from Hurricane Michael (Category 5 storm).

- ❑ Some cleanup, but not severe, not extensive canopy loss.
- ❑ GIC helped the city better prepare for next major storm.
- ❑ City contracted tree maintenance for critical government facilities about 7 years ago, but lacked a public tree inventory.
- ❑ GIC collected tree inventory data and flagged some trees in poor condition for additional risk assessment.

Tree Inventory - Niceville

Tree inventories are a great way to document maintenance needs for specific trees and to develop management plans for optimal tree health.

Inventory flags trees that need mitigation to reduce failure risk failure during normal weather and potentially extreme weather (hurricanes and tornados would be examples of abnormally extreme weather).

GIC prioritized tree inventory around critical community infrastructure first.

CERTIFIED ARBORIST ISA™

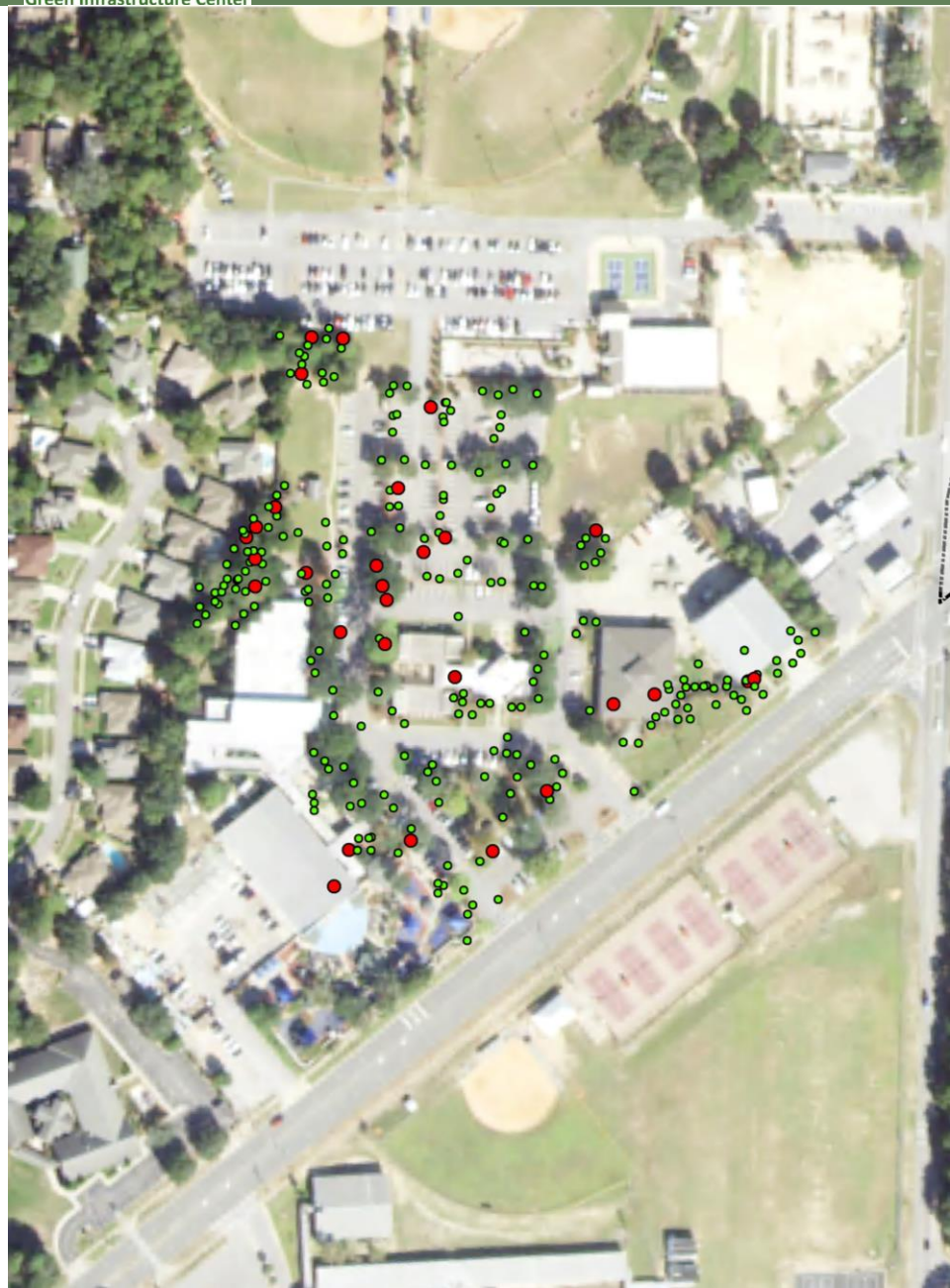
Tree Inventory

GIC's partial tree inventory did **NOT** include a limited visual inspection (Level 1 Tree Risk Assessment); however some obvious tree defects were recorded.**

37 trees in the inventory were identified as having poor or dead/dying tree structure and could be at risk of tree failure.**

29 trees were identified with a defect (girdling roots, decay, lean, wounding, etc.).**

***Note: This does not mean that other trees inventoried did not have any defects. They were just not noticed by the crew during tree inventory data collection.*



Tree Inventory

These data help support a more targeted assessment of trees that should be examined further for risk.

Example: conduct a Level 1 Risk Assessment on certain properties or populations of trees or conduct a Level 2 Basic Risk Assessment on trees flagged during the inventory.

This allows the City to potentially mitigate risk in advance of a severe storm. It also helps reduce overall liability for the City.

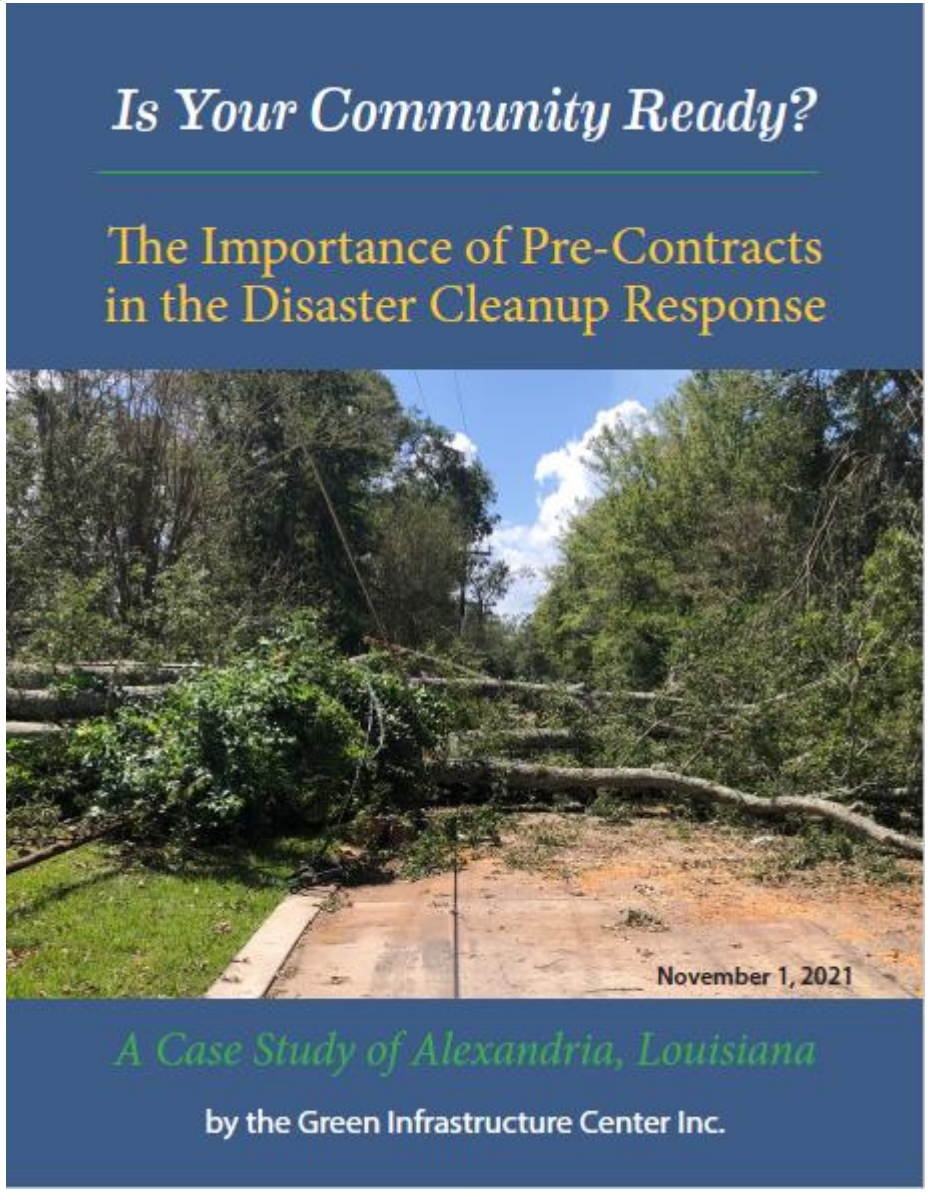
This process helps protect City assets and maximize resource use.

Standing Contracts *(also called Advanced Readiness or Precontracts)*

These contracts are established before a storm or event between municipalities and private firms that specialize in disaster response services. Contract allows a community to bid out and select qualified contractors when there is time to have a bid process and negotiate.

Why should your community have pre-contracts?

1. *Avoid delays.*
2. *Can affect federal reimbursement.*
3. *Allows for more diversion away from landfills.*
4. *Can reduce canopy loss post-event.*
5. *No obligation unless you need the services.*



http://www.gicinc.org/PDFs/Alexandria_Case_Study.pdf

Discussion Time!

Standing Contracts *(Advanced Readiness or Precontracts)*

How many of your communities have advance/standing contracts?

Are there any challenges you see to getting those in place?

Does anyone have a story to share on how they worked well (or didn't) for your city?

Standing Contracts or Advanced Readiness Contracts

Many small and medium sized jurisdictions existing procurement and contracting policies do not meet Federal standards.

What types of pre-contracts should I have in place?

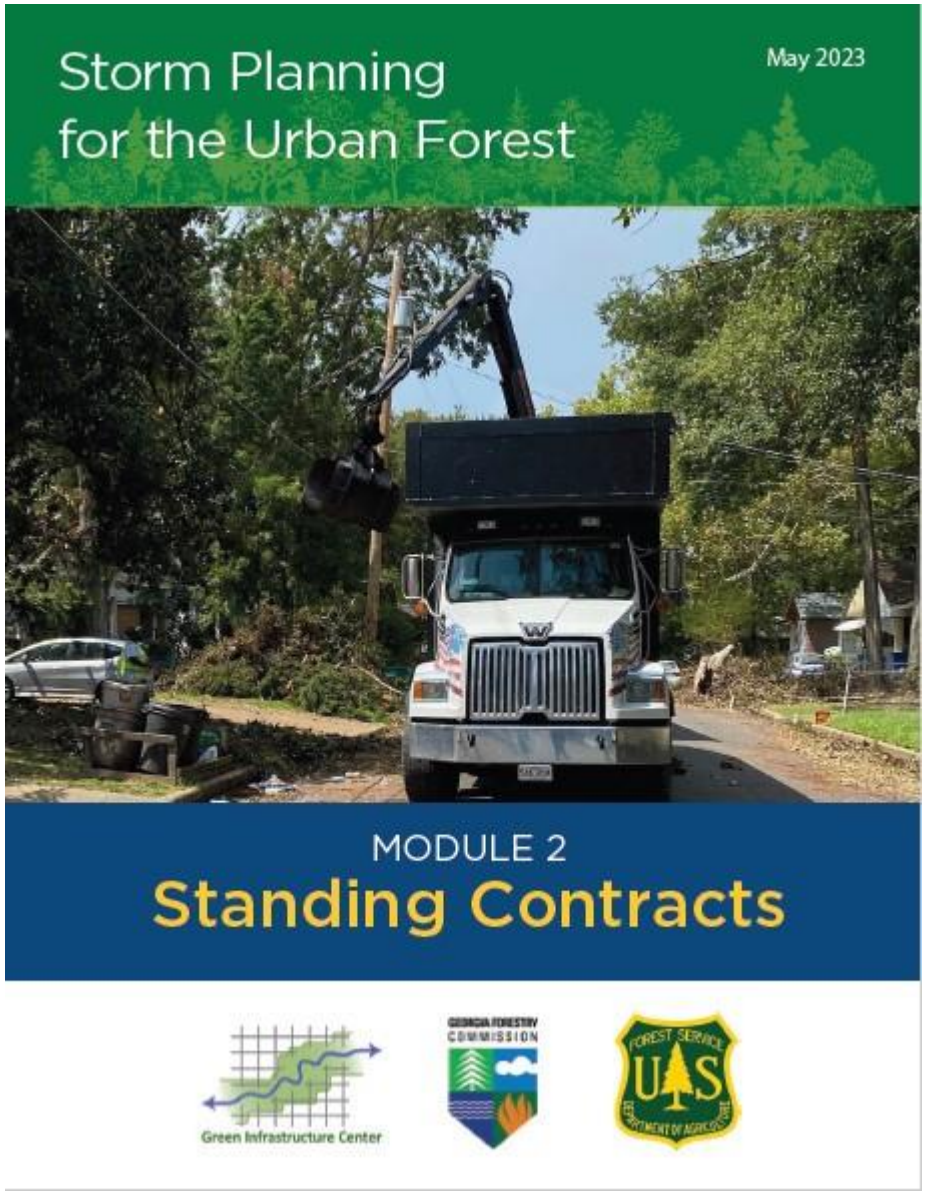
1. Hauling debris (by type, curbs, alleys, the zoo…).
2. Monitoring debris.
3. Hazard Tree Mitigation – Removals and Pruning (what is a hazardous limb? Add "as directed by city arborist")
4. Disposal (tipping fees).

Standing Contracts or Advanced Readiness Contracts

How do I start developing my standing contracts?

- Start by researching other cities of a similar size and exposure to natural disasters.
- Research required FEMA elements and state elements.
- Involve your procurement specialist and legal staff early.
- Connect with your emergency manager both at the local and state level.

ProTip: attend a multi-day FEMA training!



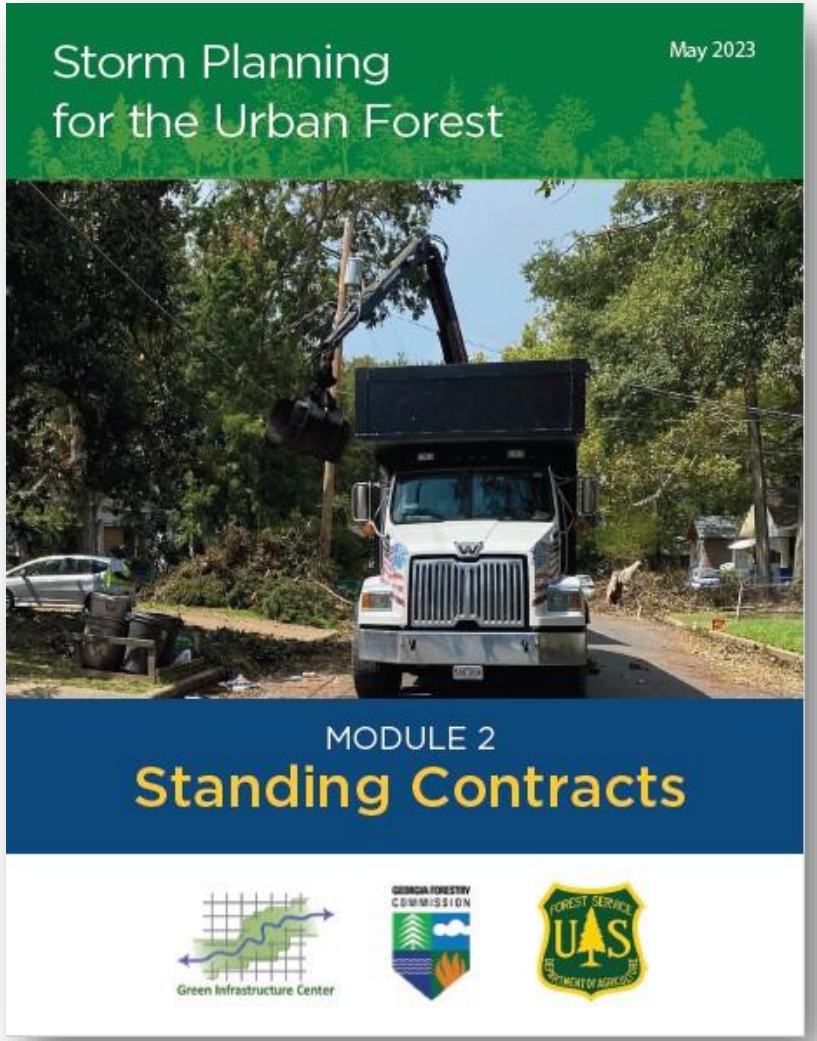
https://training.fema.gov/emigrams/2023/1777-training%20opportunity-k0202%20debris%20management%20planning%20for%20state%20tribal%20territorial%20and%20local%20officials.pdf?d=3/21/2023

Standing Contracts or Advanced Readiness Contracts

How do I start developing my standing contracts?

Criteria for federally compliant contracts include:

1. Must be of reasonable cost, competitively bid, and comply with Federal, State, and local procurement standards. Have bidders list lawsuits they have been subjected to. Make sure bids are **both** *"least cost and most qualified."*
2. Must score and rank applicants on an established set of criteria. Price ***must*** be a selection criteria for an RFP.
3. Required to state contractor is subject to FEMA reporting requirements.
4. For contracts over $100,000 must follow minimum bonding requirements (44 CFR Part 13.36(h).

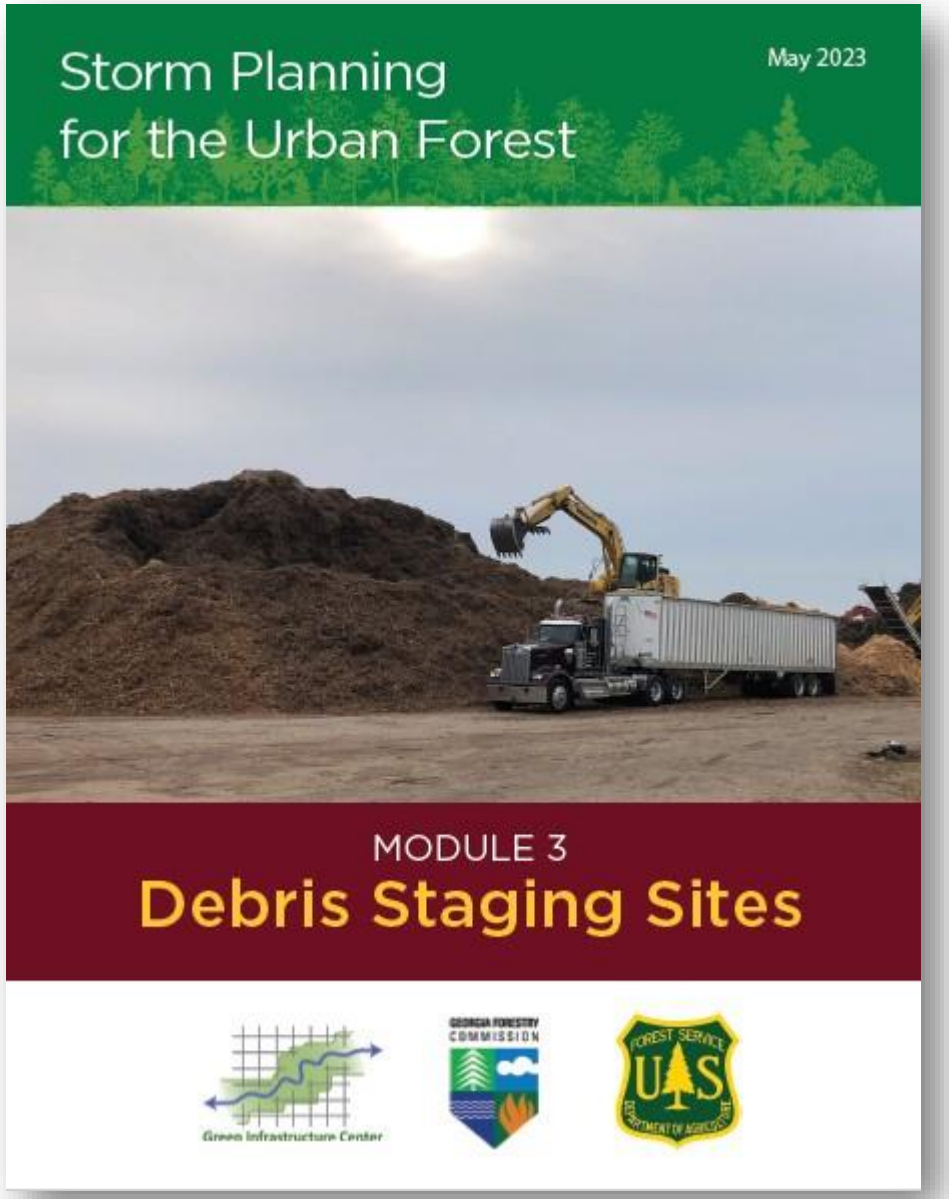


Debris Management Sites

Identify debris management sites and secure state permits in advance. *Can you do only 1 or 1,2,3 sites?*

Factors that should influence where to locate a debris management site:

- Centrally located to both the response and disposal facilities.
- Proximity to major roads. Ease of access.
- Utility hookups for managing the operation.
- Secure location or ability to install fencing.
- A large enough site to handle debris.
- If possible, avoid areas close to neighborhoods or emergency centers such as hospitals, fire and rescue (so as not to get in their way!)



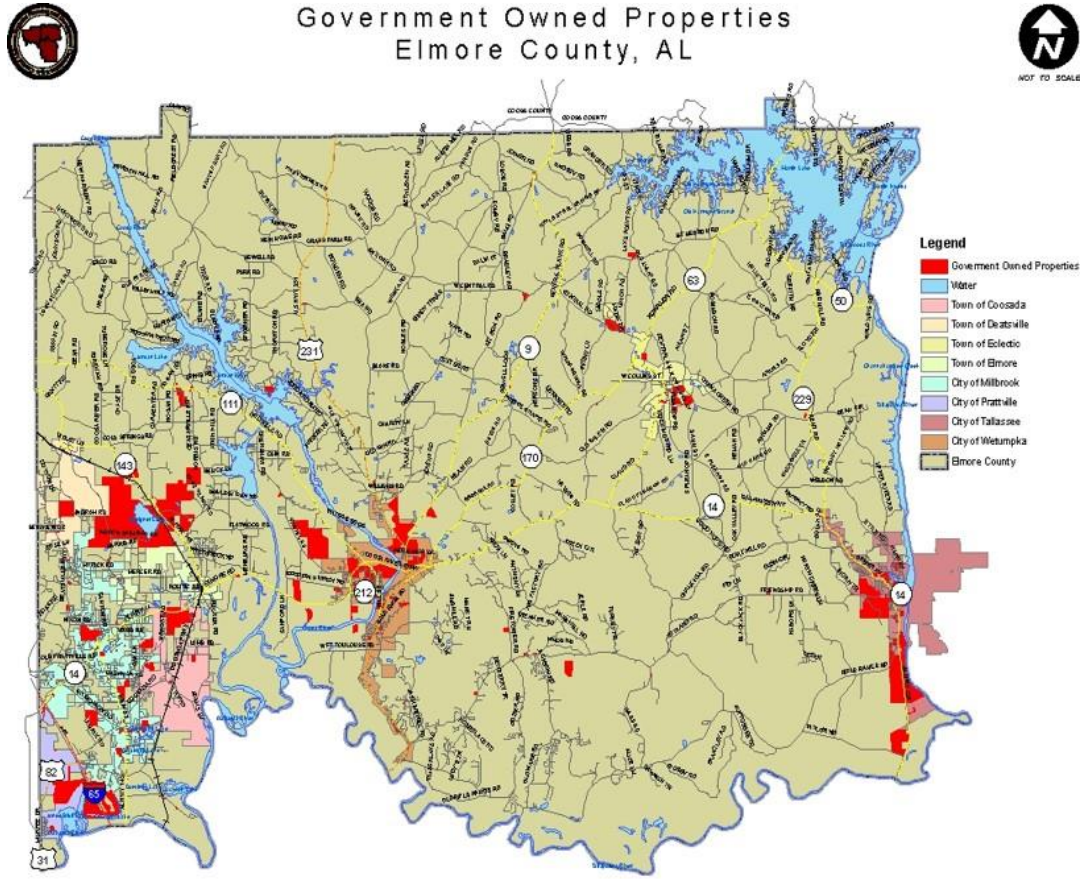
Debris Management Sites

Still more factors …:

- Be mostly or fully open (don't clear a forest to make a site!) Consider sites that remain open (e.g. a county fairgrounds). Small cities or towns may lack one large enough site and may need agreement with a nearby county.
- Avoid sites with wetlands or wet tendencies (equipment will sink or you may not get permissions to use the site due to sensitive landscapes)
- Avoid sites with potential for R,T, E species.
- Ensure you have all state environmental permits for debris management sites in advance.

Debris Management Sites

Use GIS and aerial imagery to i.d. sites



Debris Management Plans

These are technically not required by FEMA but are *strongly* encouraged.

A strong debris plan should:

1. Divert as much debris away from landfills through legitimate options.
2. Utilize volume reduction techniques.
3. Consider alternative technologies.
4. Use approved debris management sites.

Upper third storage yard in Alexandria, LA served as the debris site. It had been a landfill. Luckily only one site was needed. Finding a second site would have been difficult though!

Storm Readiness = Better Storm Response

By having many of the previous elements in place you can reduce potential storm damage, increase your debris cleanup and hazard mitigation response and ensure the long-term recovery of the urban forest.

Examples:

Standing Contracts result in faster deployment times and greater reimbursement rate by FEMA.

Standing Contracts that specify arborists can reduce overall tree loss.

Mitigation can reduce overall liability from damage.

Better coordination among departments and governments can lead to more efficient response time.

Photo credit: VA Dept. of Forestry

Storm Response

In addition to the benefits of storm readiness, there are several actions that can support a more effective storm response.

These are:

1. Having a public response plan and include who cleans up what/when.
2. Requesting support from an Urban Forest Strike Team.

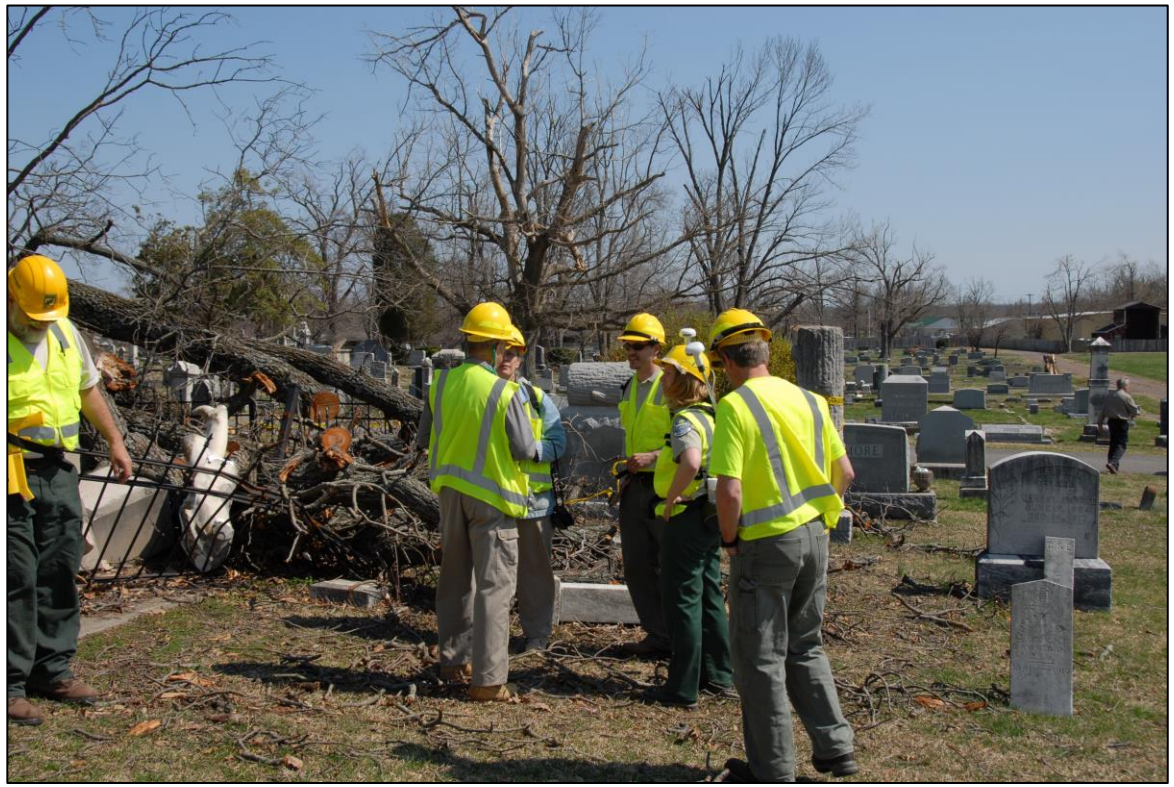


Photo credit: VA Dept. of Forestry

Public Information and Outreach

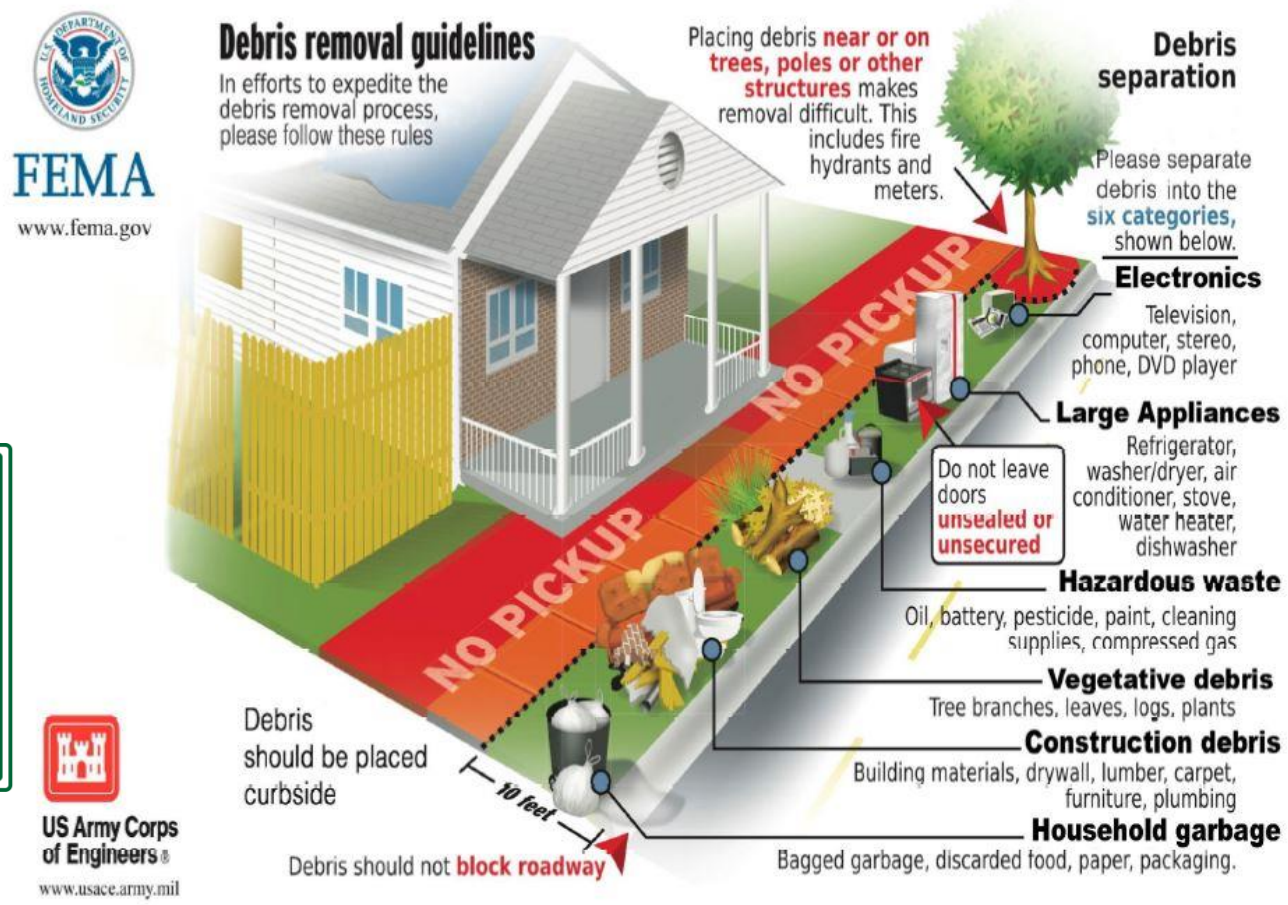
Have materials and messages ready to inform the public on what is happening and how they can be safer when helping with cleanup response.

FAQ for the public to aid in answering questions.

Example: where can I find an arborist?

https://www.treesaregood.org/findanarborist

Infographics to educate the public on debris sorting and eligibility.



ProTip: Consider what media to use. Facebook can be more useful than television (power may be out) so can they access messages best on phones? Have some segments pre-recorded to upload! Use reverse 911 too.

Public Information and Outreach

Don’t panic. If a tree is not an immediate hazard, advise the community that they can wait a few weeks or months before making their final decision.

If a tree requires immediate attention, hire a qualified arborist, especially if trees are leaning against wires, structures or other trees, if utility lines or structures are endangered or if a chainsaw is required.

Advise people to watch out for scam artists. After a storm, people claim to be tree specialists who aren’t.

This landowner has already moved debris to the curb to help with pickup and their home is not in imminent danger.

Public Complaints

Many cities have call centers (911) or a number (311) for citizens to call in non-life threatening situations, such as trees being down. In order to manage the urban forest resource and to prepare for its recovery train dispatch personnel to help the urban forest manager prioritize community response and maximize efficiency.

Sample Priority Ranking of Storm Calls:

1. Tree down, injured people caught in car or home.
2. Trees down, blocking arterial streets or emergency access.
3. Trees blocking exit from individual residences.
4. Trees split or rocking, which have a high probability of falling, causing personal injury or property damage.
5. Trees or branches fallen and fully blocking non-arterial streets.
6. Trees fallen and at rest on homes and/or automobiles.

– *Rachel Barker, ArborMetrics*

Photo credit: VA Dept. of Forestry

Urban Forest Strike Team

A team of specially trained arborists, urban foresters and GIS support that assists communities with tree risk assessment in the aftermath of a disaster.

If your state has an Urban Forest Strike Team (Georgia does) then you can request from your State Urban and Community Forest Coordinator.

Benefits of using UFST:

- Well-trained experts in tree risk assessment and mitigation.
- Provide additional resources to a cleanup response.
- Generate a Tree Recovery and Mitigation report for the community.

Photo credit: VA Dept. of Forestry

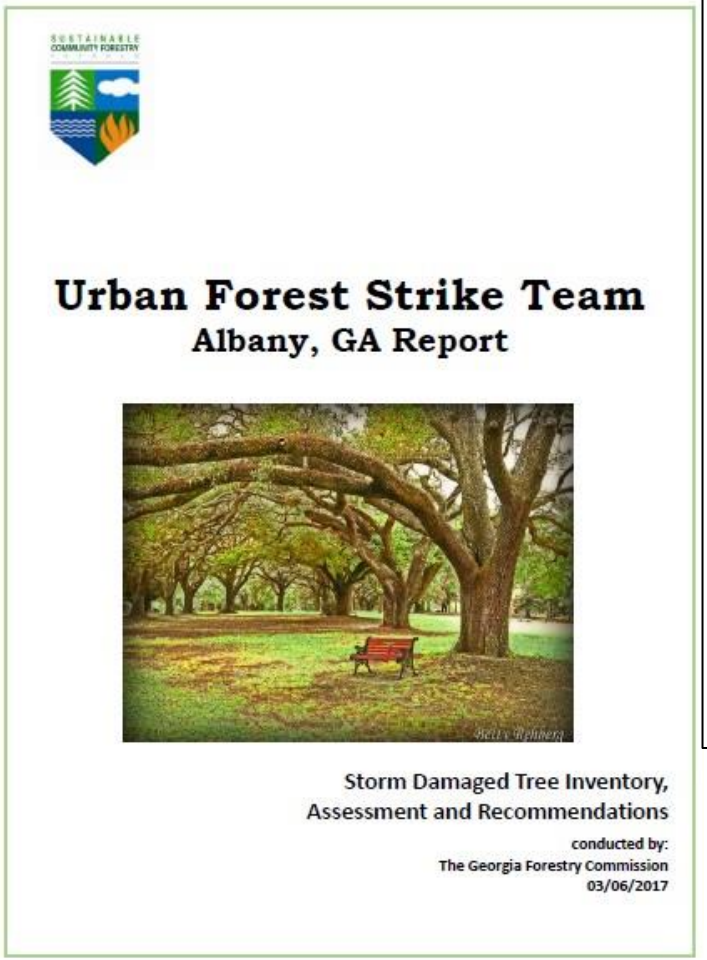
Urban Forest Strike Team

Generate a Tree Recovery and Mitigation report for the community.

Contains recommendations for immediate mitigation, but also general recommendation for long-term care.

Follows FEMA protocols.

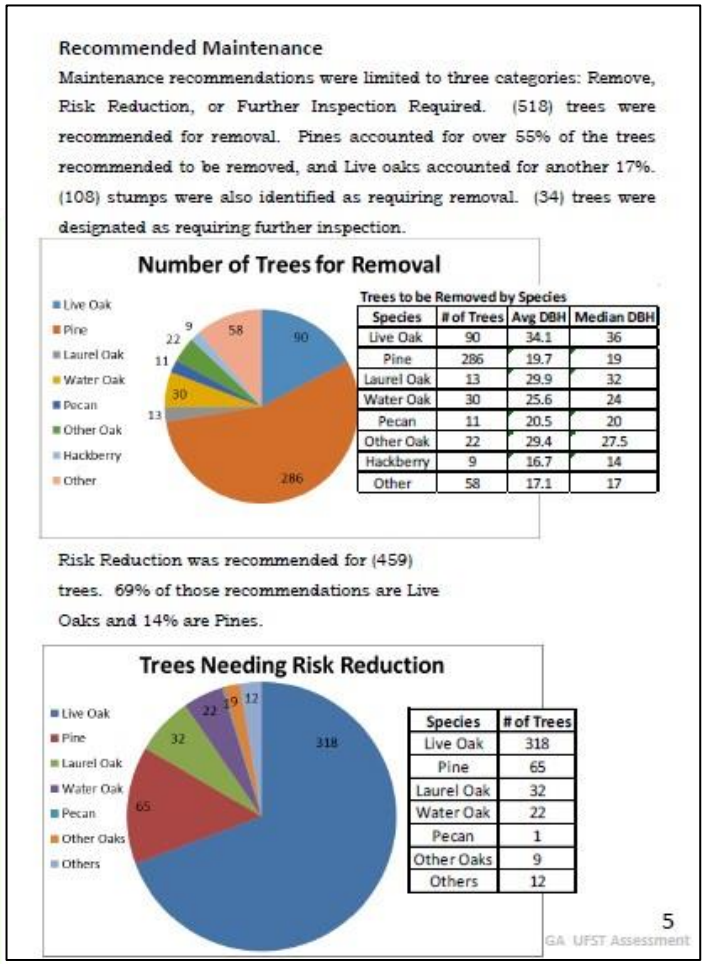
GPS, photos, species, dbh – (partial inventory)



Urban Forest Strike Team
Albany, GA Report

Storm Damaged Tree Inventory,
Assessment and Recommendations

conducted by:
The Georgia Forestry Commission
03/06/2017



Recommended Maintenance

Maintenance recommendations were limited to three categories: Remove, Risk Reduction, or Further Inspection Required. (518) trees were recommended for removal. Pines accounted for over 55% of the trees recommended to be removed, and Live oaks accounted for another 17%. (108) stumps were also identified as requiring removal. (34) trees were designated as requiring further inspection.

Number of Trees for Removal

Trees to be Removed by Species

Species	# of Trees	Avg DBH	Median DBH
Live Oak	90	34.1	36
Pine	286	19.7	19
Laurel Oak	13	29.9	32
Water Oak	30	25.6	24
Pecan	11	20.5	20
Other Oak	22	29.4	27.5
Hackberry	9	16.7	14
Other	58	17.1	17

Risk Reduction was recommended for (459) trees. 69% of those recommendations are Live Oaks and 14% are Pines.

Trees Needing Risk Reduction

Species	# of Trees
Live Oak	318
Pine	65
Laurel Oak	32
Water Oak	22
Pecan	1
Other Oaks	9
Others	12

Recover: Agenda

Storm Recovery Stories

- Case Studies
- Tree Codes
- Public Engagement

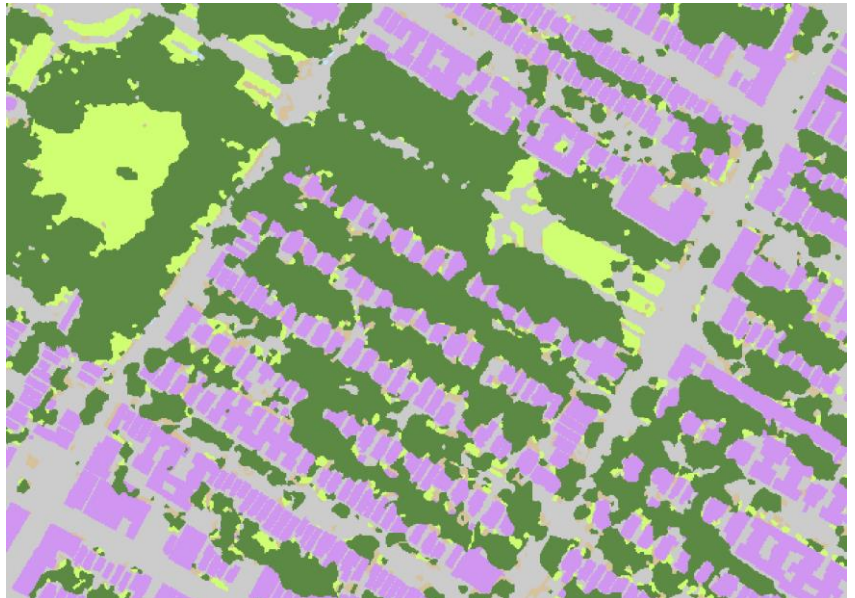
Designing Urban Spaces For Trees

Free Resources

In Urban Areas Tree Canopy Data Are Key – How much do you have?

- Aerial photos used to identify tree canopy
  - Pixel-by-pixel basis
- 1 meter resolution or better (each pixel is 1 meter by 1 meter on the ground)
- Based on latest imagery. Images from the National Agriculture Imagery Program (NAIP) are great free option for most areas: http://earthexplorer.usgs.gov/

Result: Detailed GIS (Geographic Information System) data – not just static maps – that a town or city can use for goal setting and planning!



NAIP Leaf-On

Land Cover

Potential Planting Area (PPA)

Potential Planting Spots (PPS)

Potential Tree Canopy (PTC)

Potential Land Cover

Marianna's Recovery

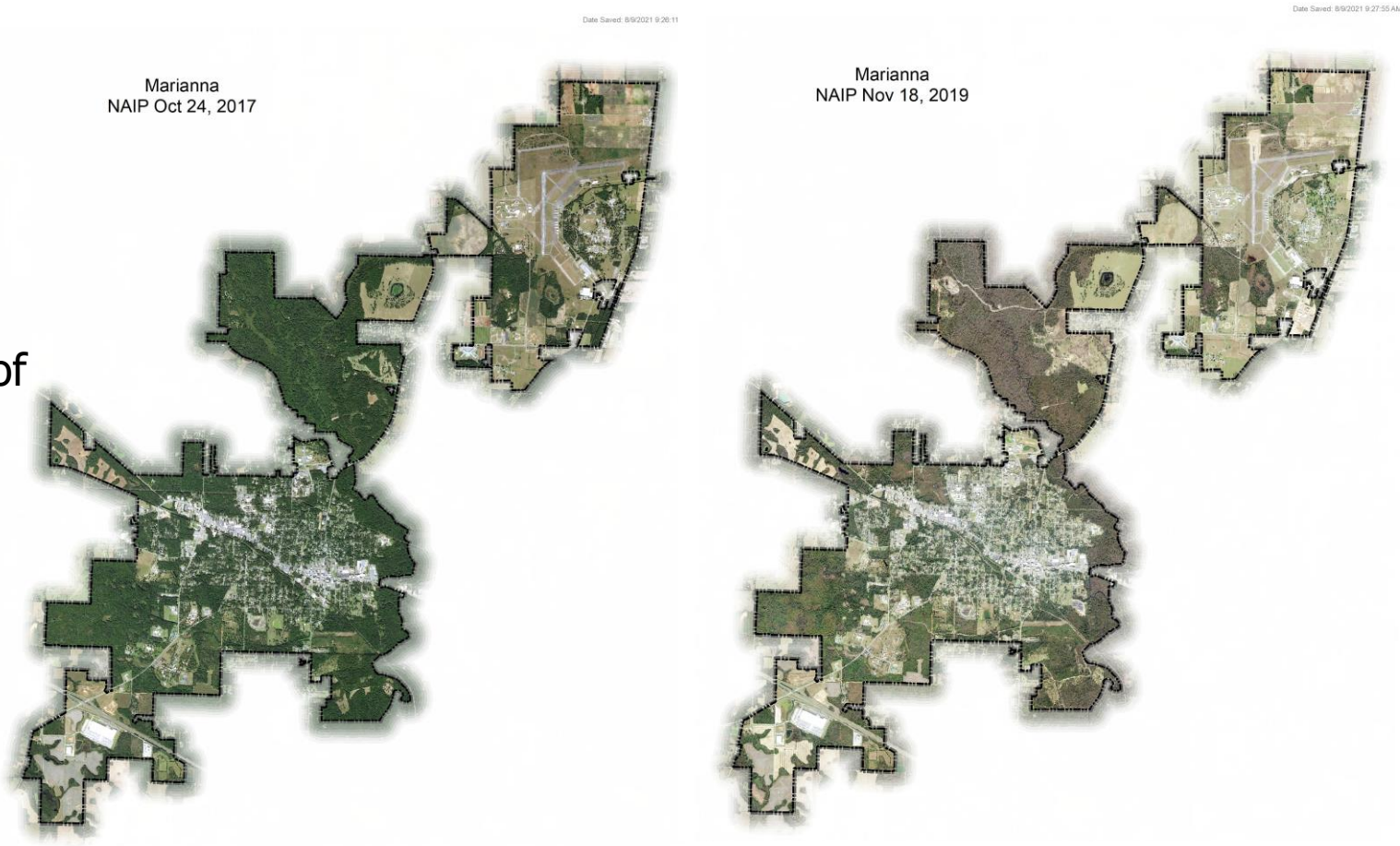
Marianna, FL got hit directly by Hurricane Michael (Category 5 storm) which devastated the community.

Using NAIP imagery from 2017 (pre-storm) and compared it to imagery collected a few months after Hurricane Michael in October of 2019…

The City of Marianna lost 20% of its total canopy as land cover and 34% of its relative tree canopy.

Two years later they were ready to start the recovery process for regaining canopy, but they did not have a strategy, defined partnerships or grassroots infrastructure.

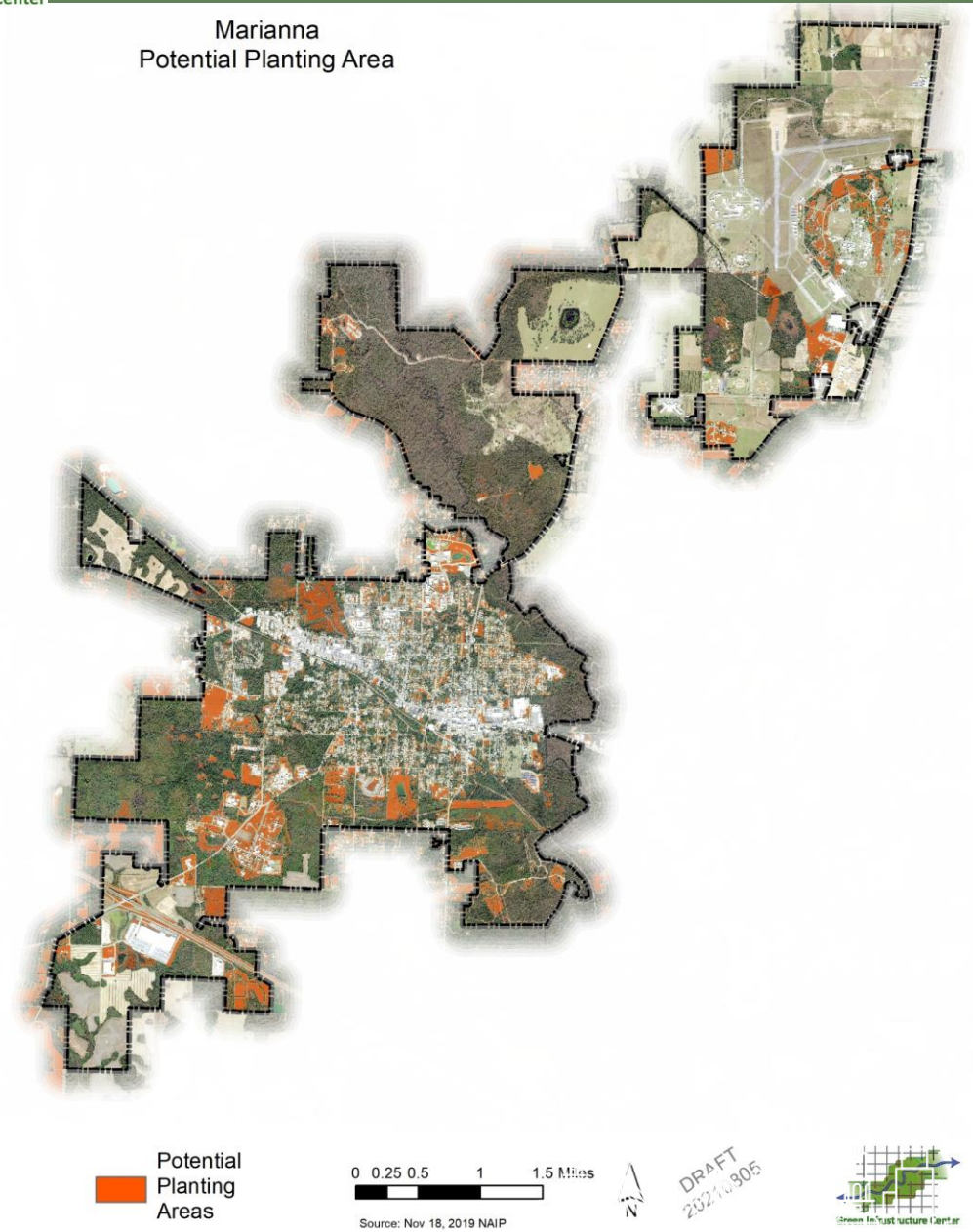
2017 → **2019**



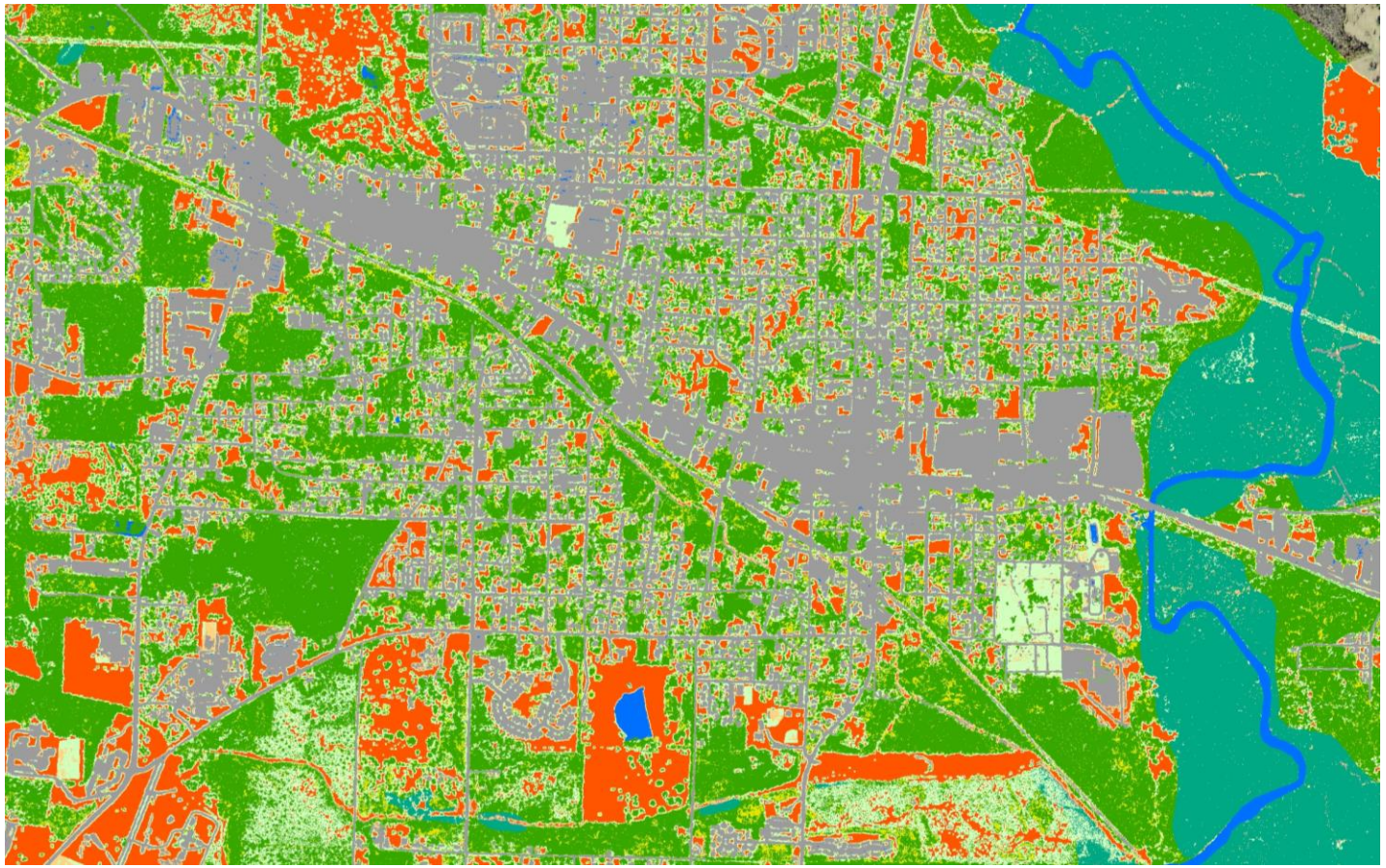
Tree canopy in 2017 was 59%. **Tree canopy in 2019 was 39%.**

Potential Planting Area (PPA)

Mapped open space shows where trees can be planted



Potential Planting Areas (PPA)



Note: PPA Available is land area necessary to plant in order to achieve full potential tree canopy.

PPA = 8.2%
PPA = 980.2 acres
Potential Tree Canopy - if 100% of PPA is planted with trees it would result in an additional 10.5% tree canopy for a new canopy total of 49%.

Example of a plantable area in the city.

The city can set a goal to recover canopy lost from Hurricane Michael and develop a strategic plan.

Tree Recovery Strategy

What are we trying to achieve?

- Replace lost canopy?
- Beautify neighborhoods or historic streets?
- Mitigate stormwater and flooding?
- Shade areas? Reduce urban heat island?
- Improve community health?
- Other cultural values?
- All of the above?

What is a reasonable goal?

GIC does not recommend planting 100% of the PPA because people want vegetable gardens, lawns, etc. GIC recommends no more than 50% of your PPA.

Source: FFN – Aerial Drone Photos Showing Views of Post-Hurricane Michael Devastation Over Marianna, Florida from 10.27.2018

A good way to start thinking about increasing tree canopy is what does a 1% increase in canopy cover look like? How many trees?

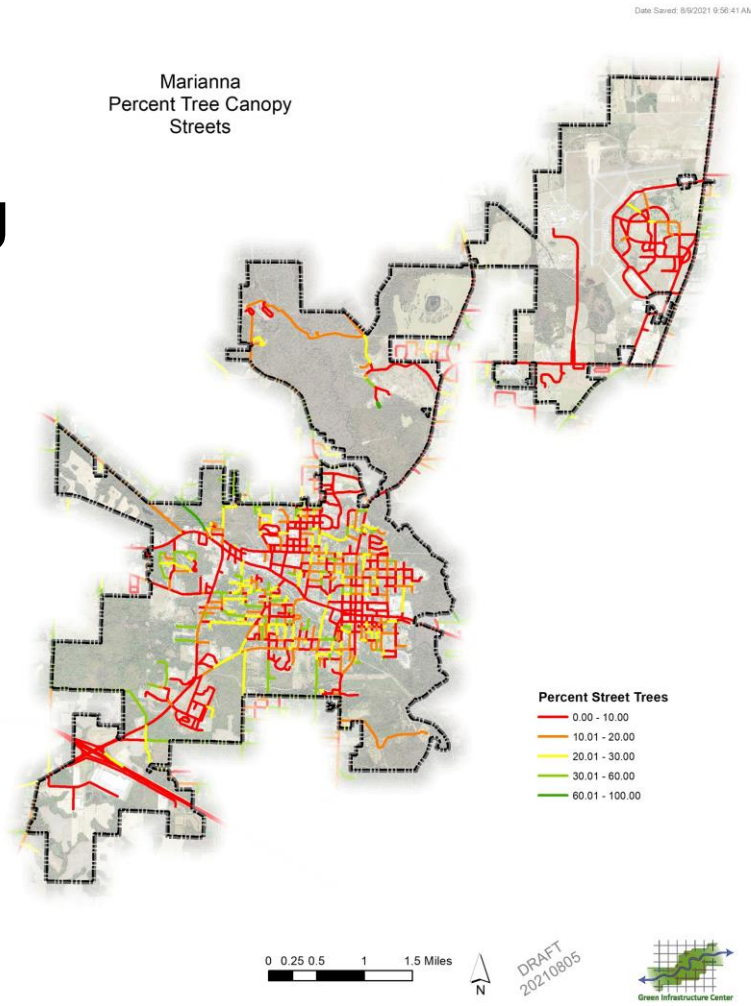
- For example a 1% increase of canopy would be around 5,800 newly planted trees or 300 trees per year over 20 years.
- While a 5% increase of canopy would be around 13,000 newly planted trees or 650 trees per year over 20 years.

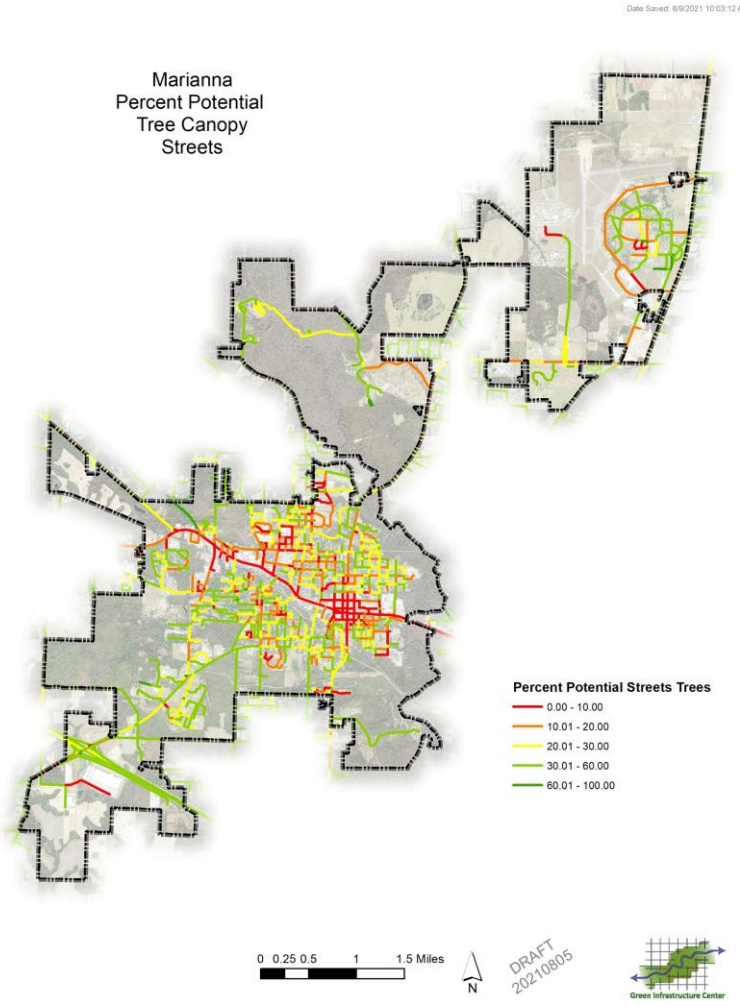
Developing a Strategic Recovery Plan

How to approach a strategic recovery planting plan:

- Watersheds
- Streets
- Schools
- Parks
- Parcels
- Zoning
- Special districts- i.e. Downtown Business District

Current → **Potential**





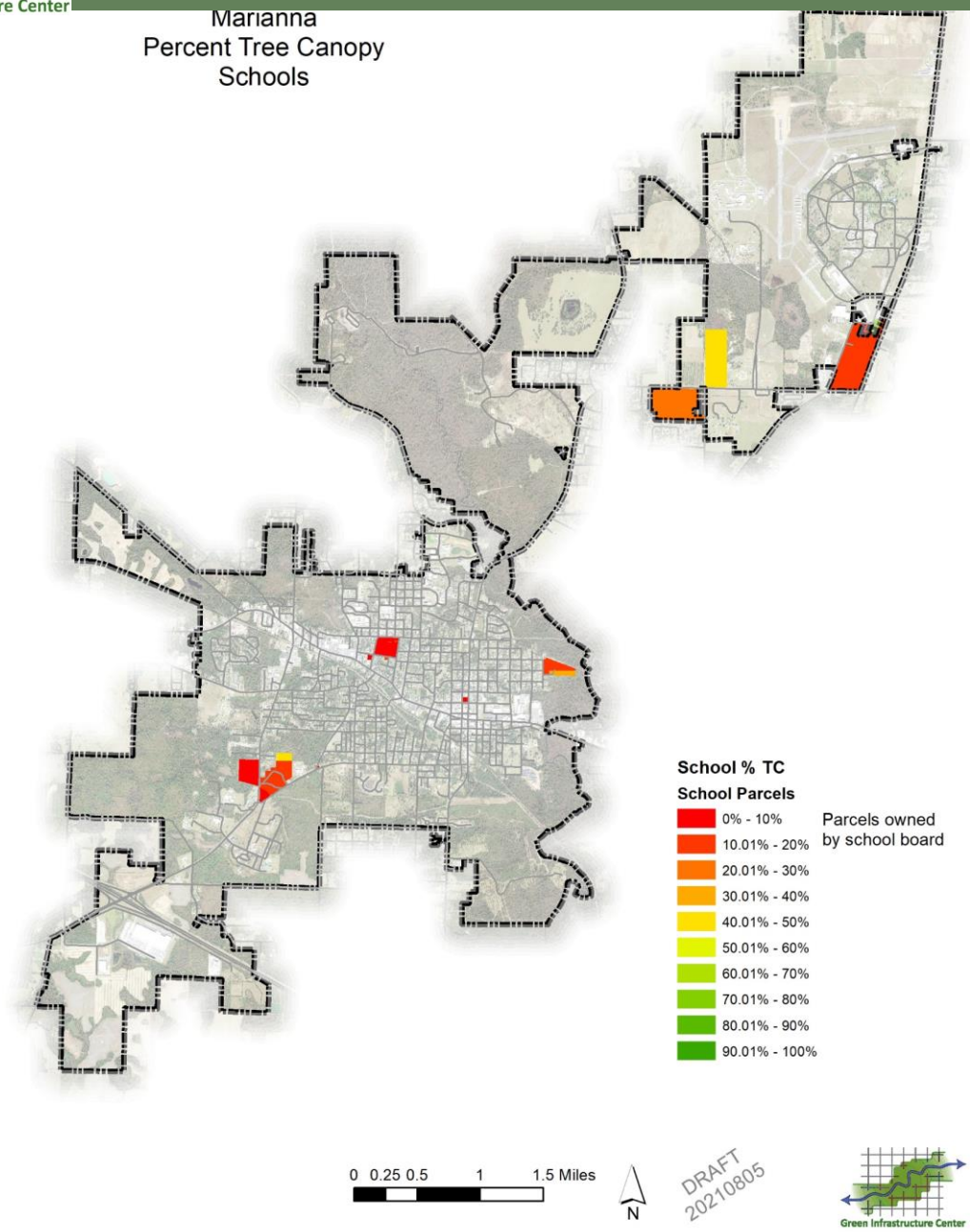
Developing a Strategic Recovery Plan

Schools are great partnership opportunities for tree plantings.

They have a lot of underutilized lawns or turf that can support healthy tree growth.

Excellent opportunity to provide outdoor education and give back to the community!

Schools



Developing a Strategic Recovery Plan

Many of the large parks have decent canopy although a few natural areas could be prioritized for restoration.

Smaller parks in or near downtown tend to have lower canopy, but some still have room for more trees.

Example Madison Street Park.

Photo of the park July 2021.

Photo rendering of what the park would look like with trees

Developing a Strategic Recovery Plan

In most cities the local government only owns or manages about 20% of the land and ROW.

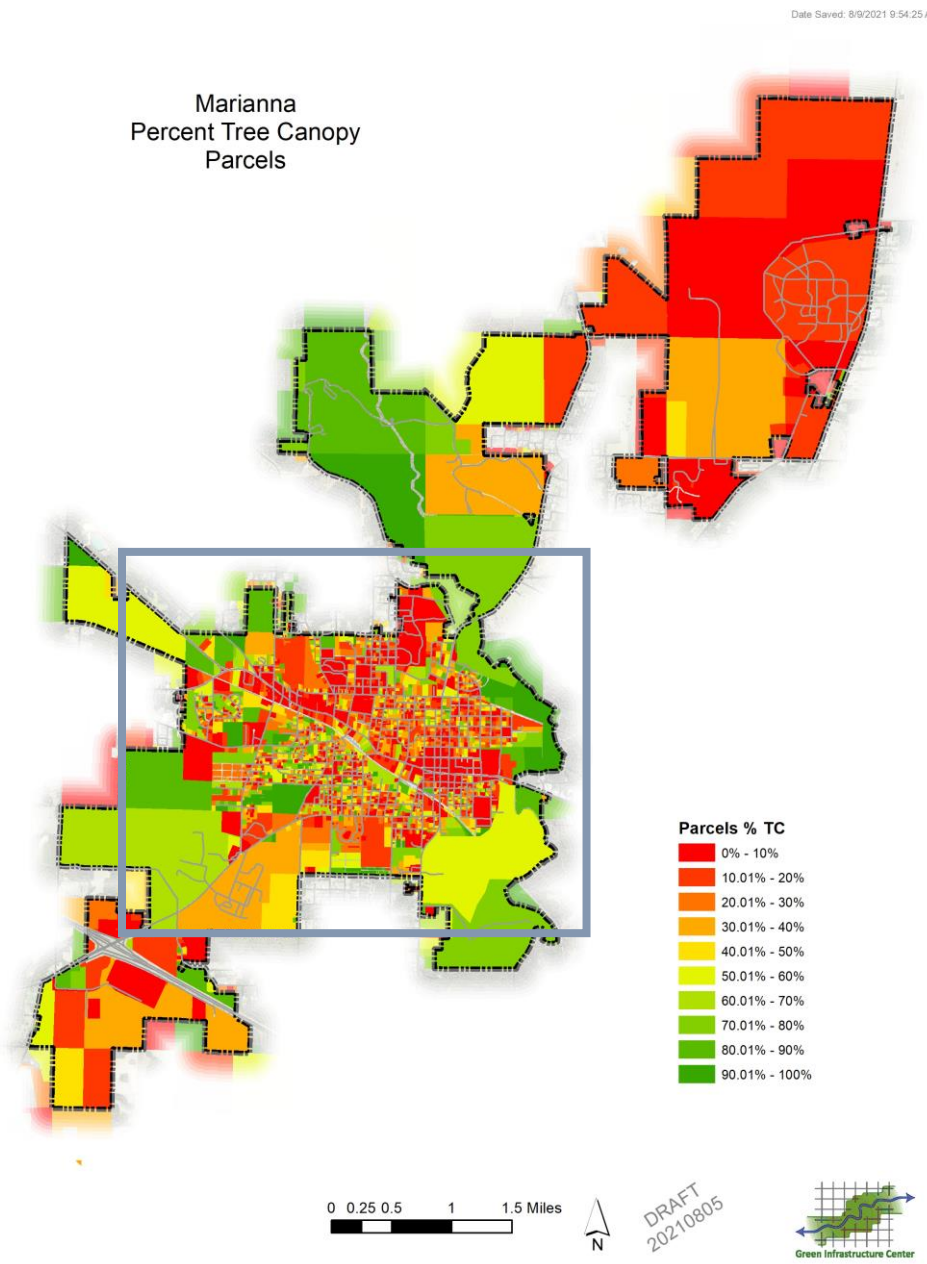
The other 80% is in private ownership.

The greatest potential for adding canopy is to private property.

Residential yards are also some of the best plantable areas in a city!

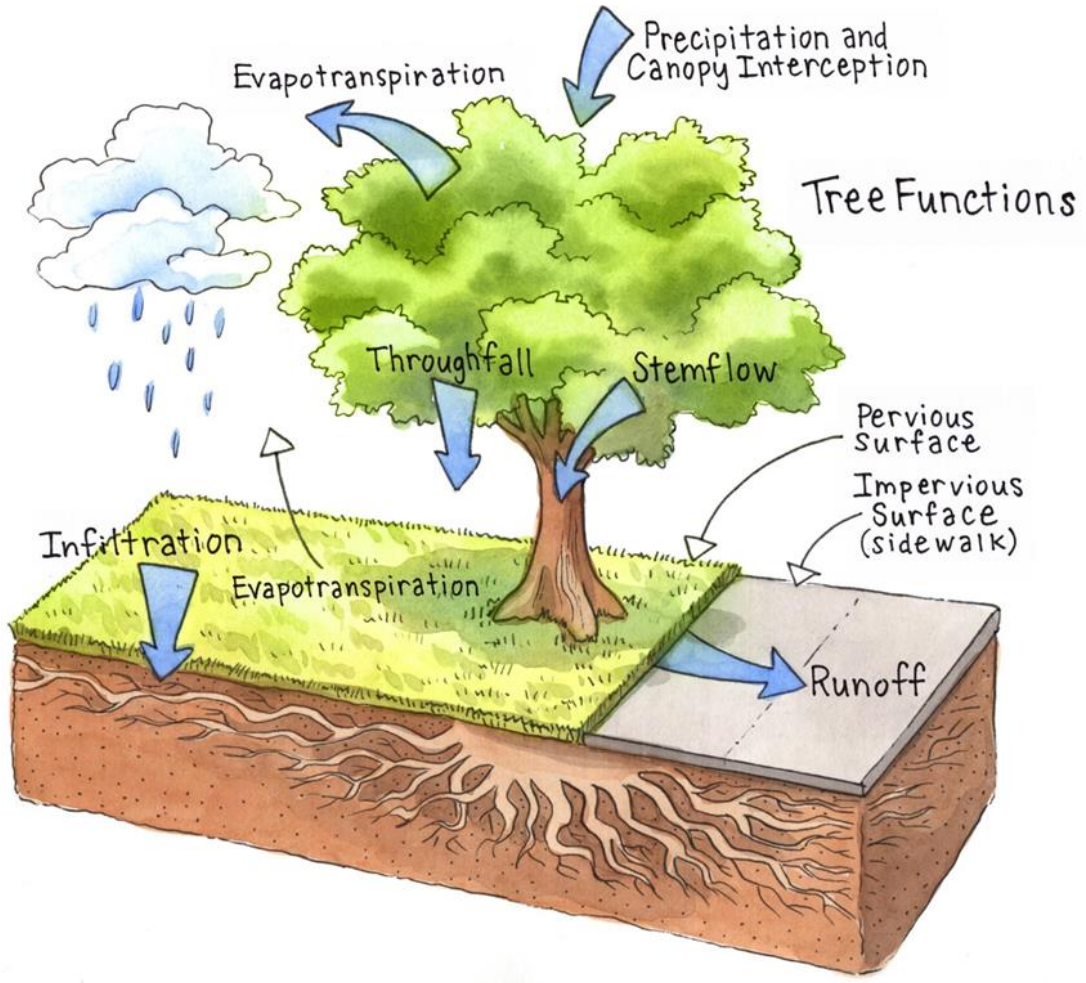
Programs such as tree giveaways are popular in communities and much less expensive strategy than the city planting alone.

Parcels

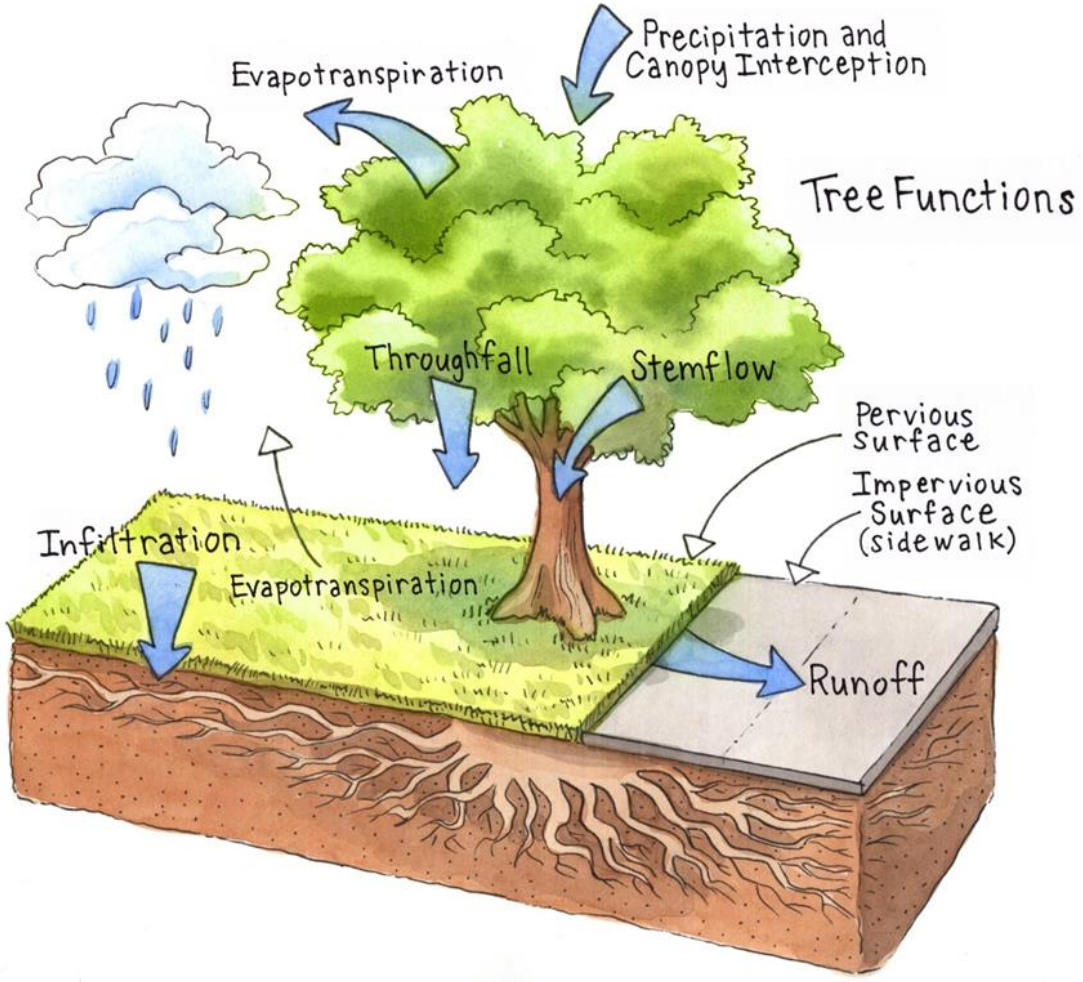


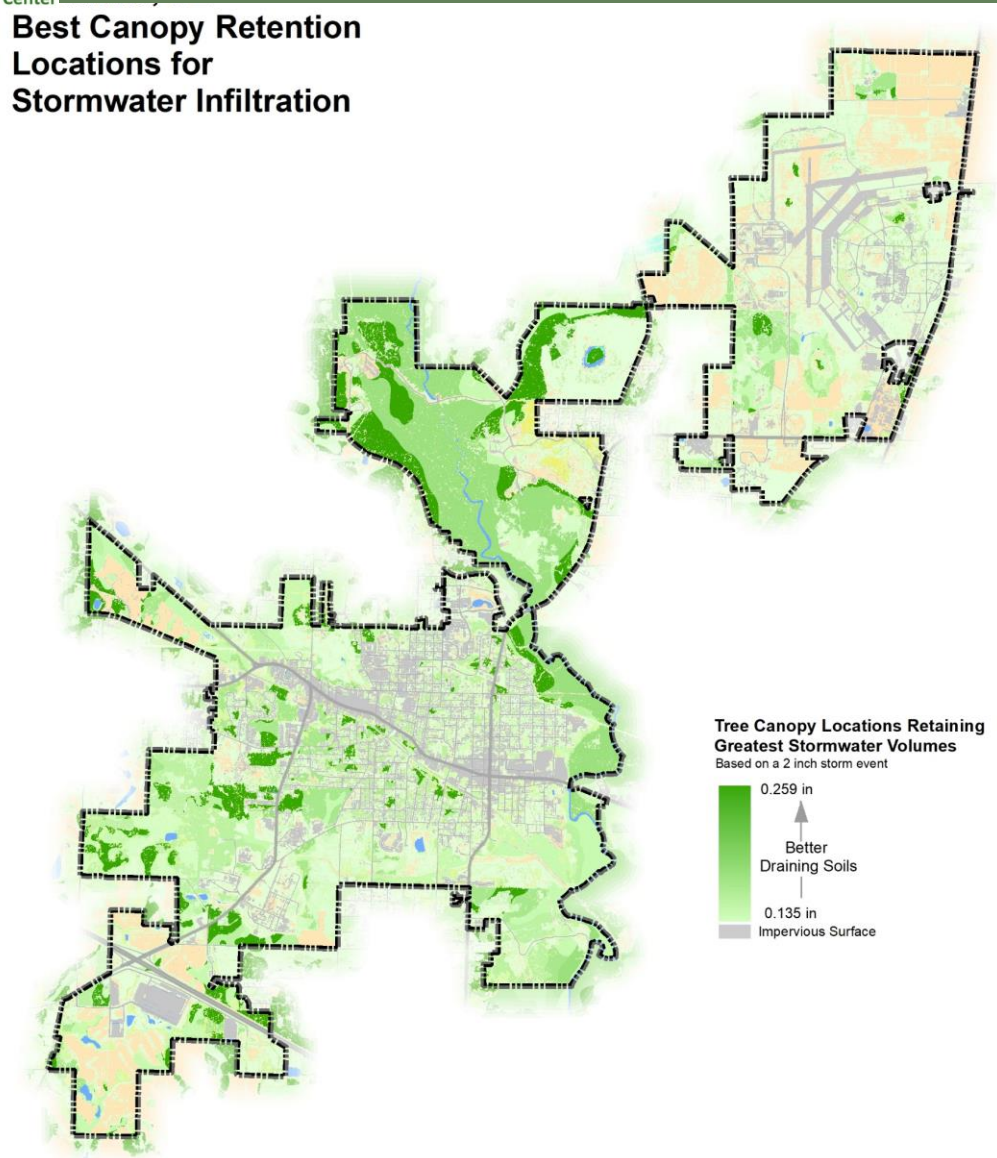
Link the city's urban trees to its stormwater infrastructure:

- With final land cover we calculated the amount of stormwater capture and infiltration the tree canopy is providing.
- Establish city trees' role as infrastructure to receive federal aid for post-storm recovery planting efforts.
- One way is to change the definition of infrastructure in the Comprehensive Plan from "man-made" to "man-made and natural elements such as trees". Or add a "green infrastructure" definition.

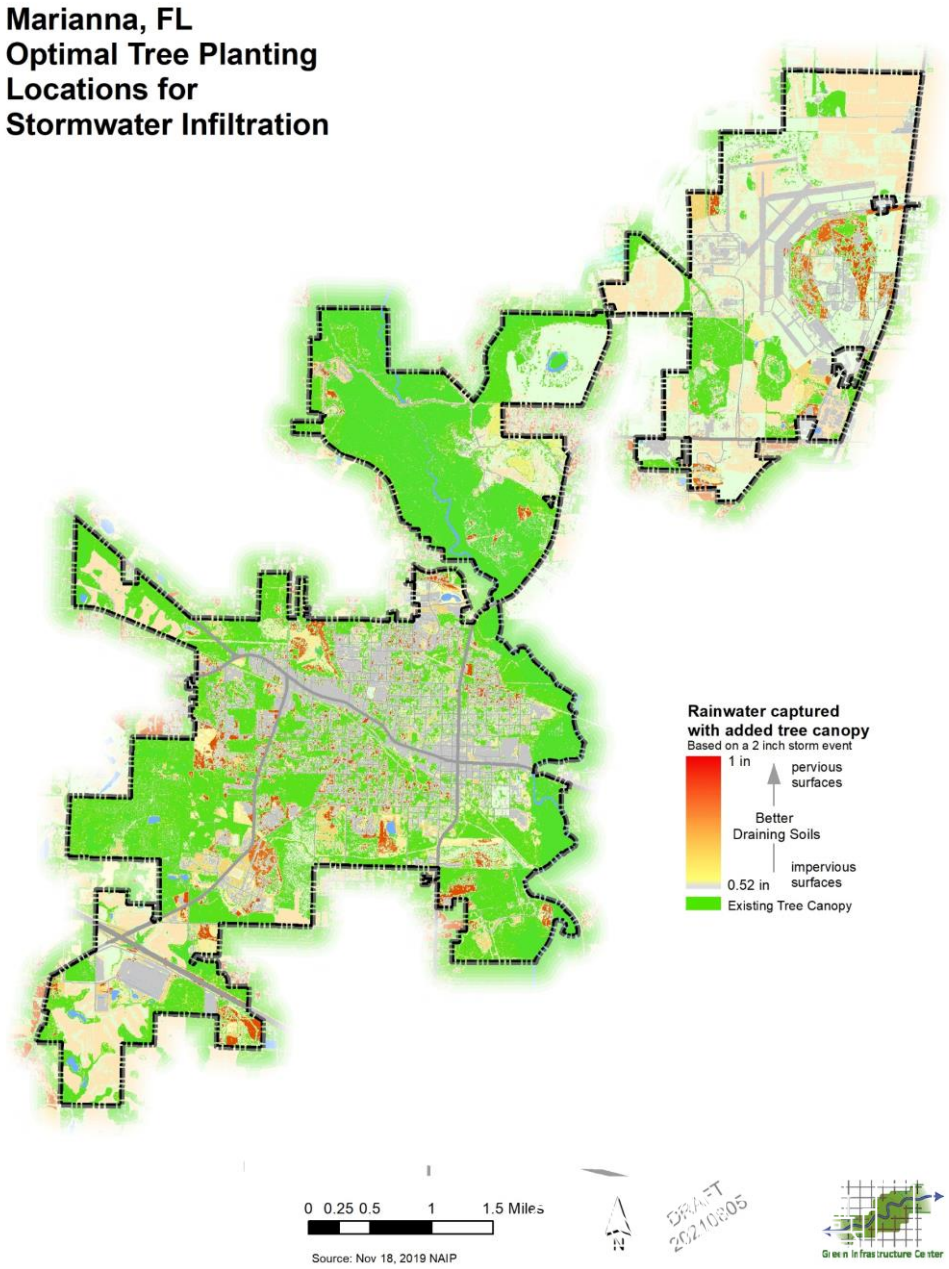


Canopy retention for stormwater



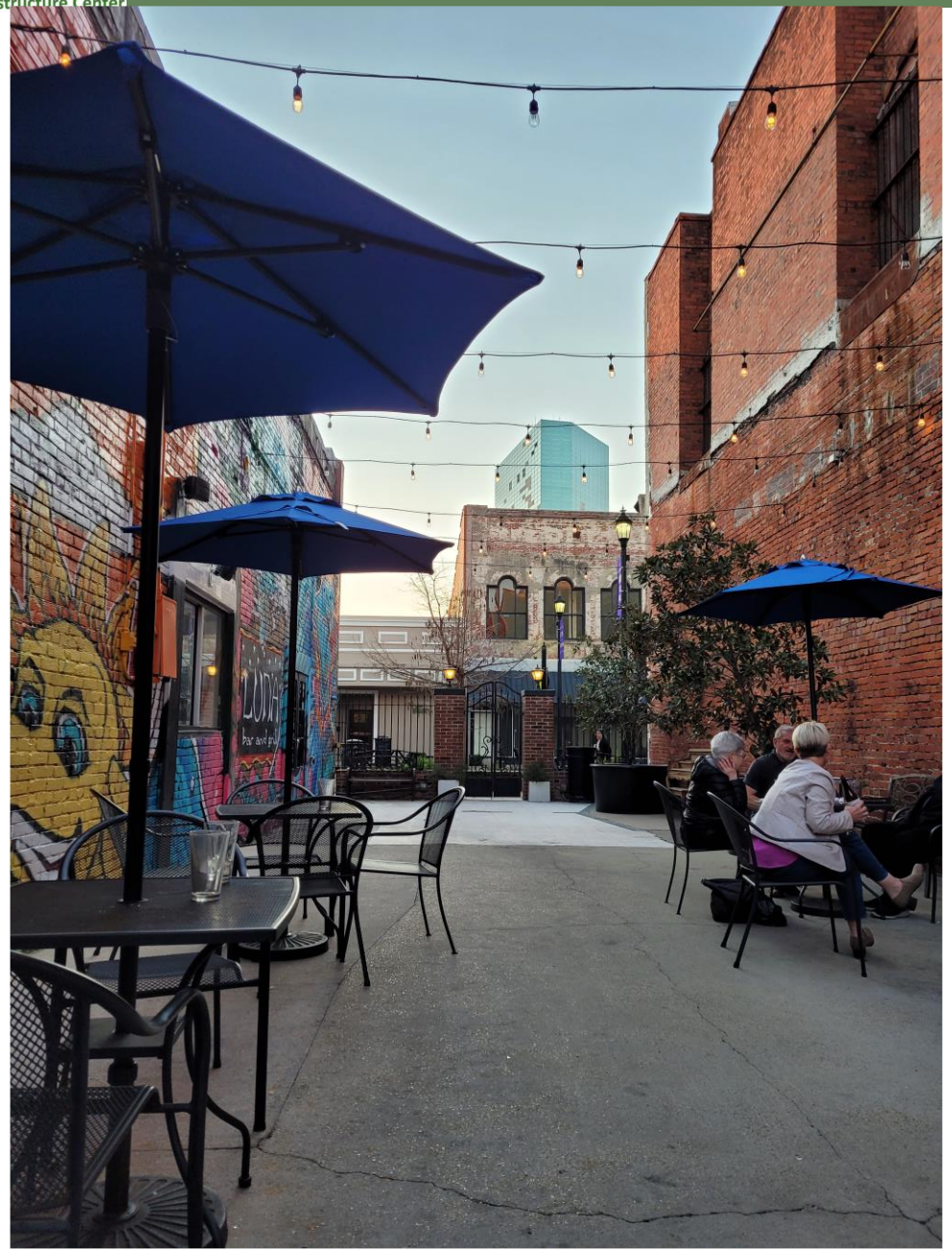


Link the city's urban trees to its stormwater infrastructure:



Canopy Budget Calculator

- How do we get there?
- Begin by thinking about what it will cost to implement and maintain new trees. So, for example, what does a 1% increase in canopy cover for the city cost?
- We have a tool for that called the Canopy Budget Calculator. If we provide GIS canopy data for your city you can have the tool.



Canopy Budget Calculator

1. The calculator tool uses the canopy cover data as inputs.
2. Local knowledge on pricing and costs for new plantings and maintaining plantings until establishment.
3. Manipulate parameters to establish various scenarios for setting the right goal.

Potential # of trees can be planted in PPA		
20' canopy	241707	41.4%
40' canopy spread	342674	58.6%
Total trees that can be fitted into available open space	584,381	
Numbers in salmon-colored cells can be changed		
Current Tree Canopy Coverage	10.6%	
Current Possible Planting Area	25.8%	6,859 acres
Additional Tree Canopy Possible	29.9%	
Max. Possible Tree Canopy Coverage	40.5%	
Total Number Trees to Cover 100% PPA	584,381	
Scenarios		
Timeframe (in years)	10	
New Tree Canopy Coverage	11%	
Tree Canopy Coverage Increase to Reach Goal	0.1%	
Percent PPA to Plant to Reach Goal	0.2%	
	Number of Scenario Trees	
Percent Canopy Trees	58.6%	3505
Percent Understory Trees	41.4%	2472
	TOTAL	5977

Who can a city partner with to plant trees?

- Many diverse partners are needed.
- Establish common goals and recruit partners in the recovery.
- Ex: Chipola College President Dr. Sarah Clemmons committed to bringing trees back to the campus with a Memorial Tree Project.

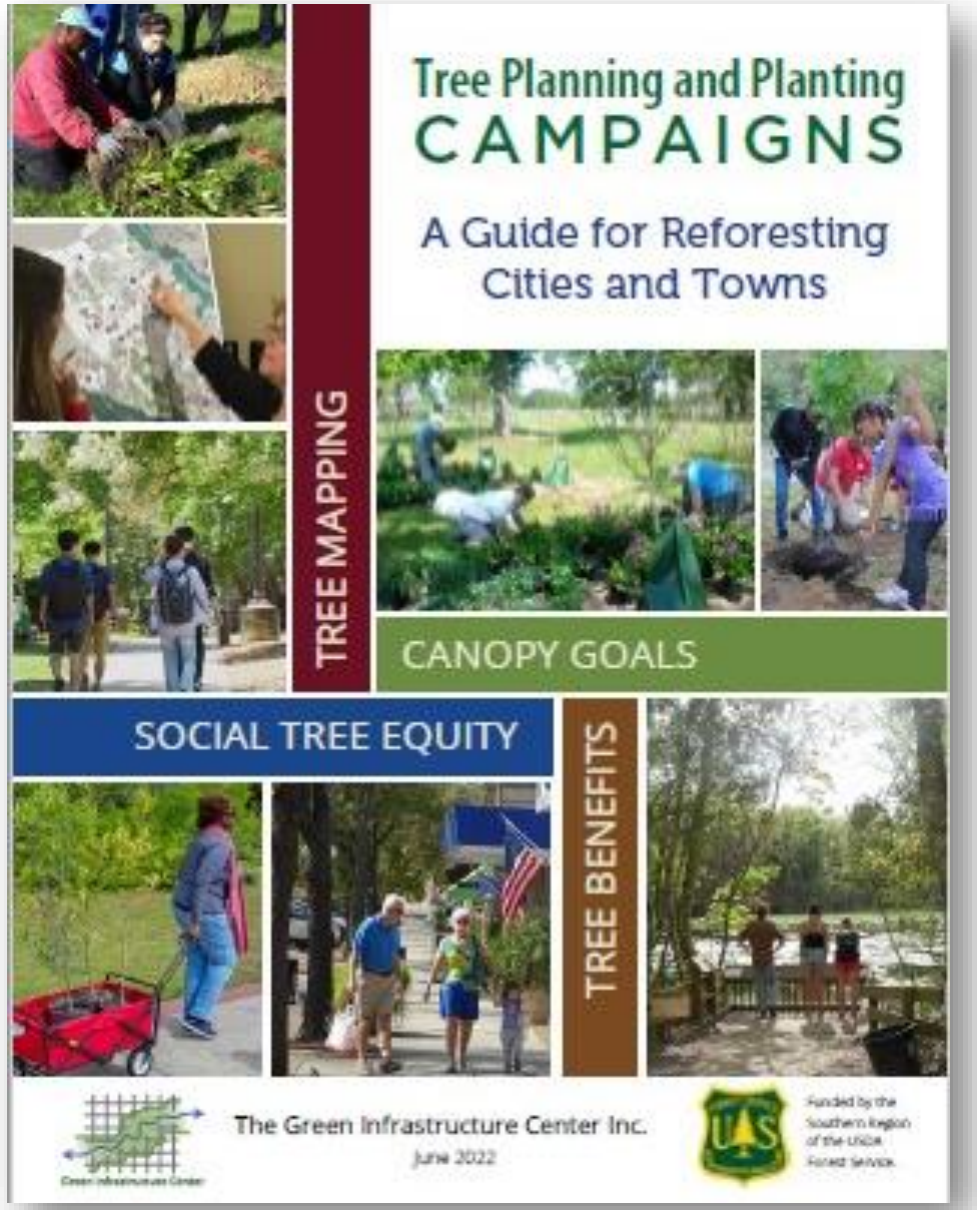
Funding your tree plantings

Increasing canopy and planting trees is not cheap especially on who is doing the work.

City costs can be more expensive compared to a nonprofit organization or residents planting trees themselves.

One cost effective way to get trees in the ground is through a tree giveaway event.

GA Forestry Commission has funds for tree plantings!



Our tree campaign guide is based on 15 years of testing and has all the arguments and methods for citizens and policy makers to break through; ***moving from wishes to direct action***.

This guide features our work and your work too! Highlighting the best methods, tools and tips from community-based urban forestry groups.

It also tackles pressing issues such as mapping urban heat islands, working in diverse communities and using the right data to make the case for urban forests. And it's free!

http://www.gicinc.org/PDFs/TreePlantingCampaignGuide_GIC_June2022.pdf

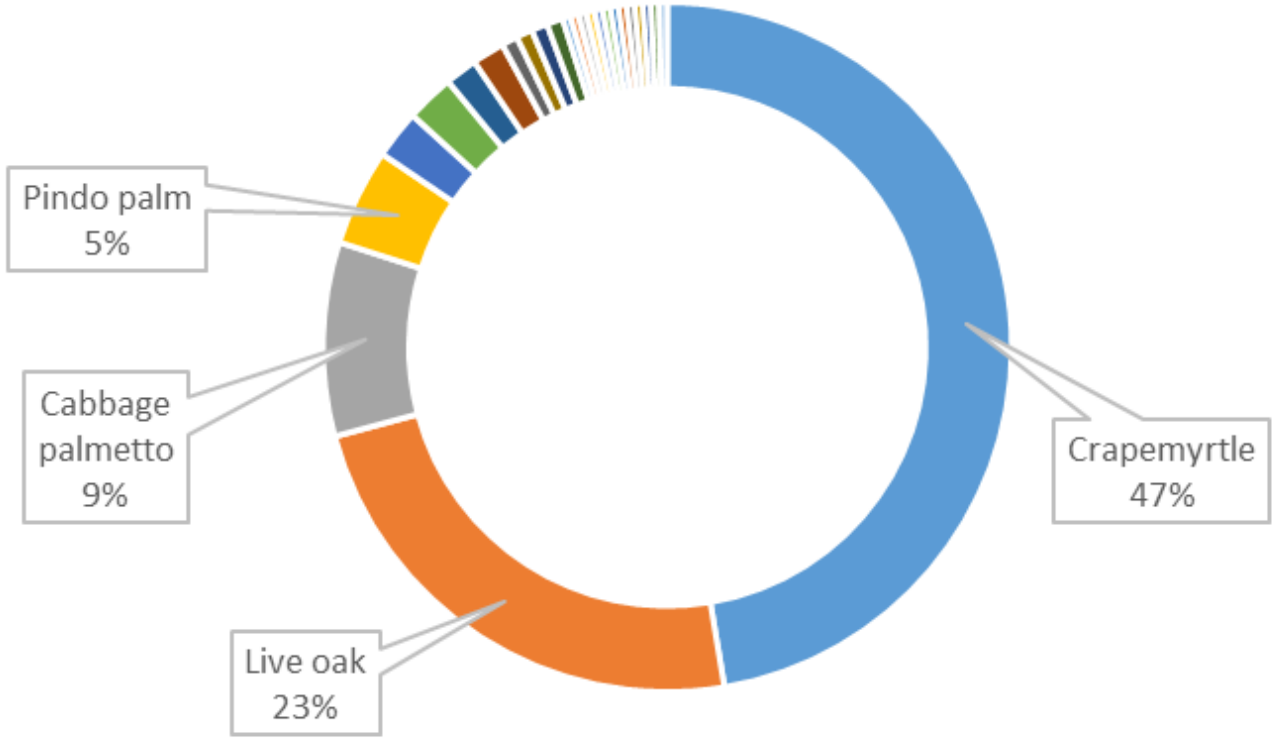
Updated Tree Inventory

- Trees removed?
- Mitigation/recovery pruning needed?
- Species
- Diameter at Breast height (DBH) for each tree trunk
- Type of Tree
  - Street
  - Park
  - Other
- Eligible for Federal Reimbursement?
- Notes

Marianna - Tree Survey Points

Tree Inventory - Marianna

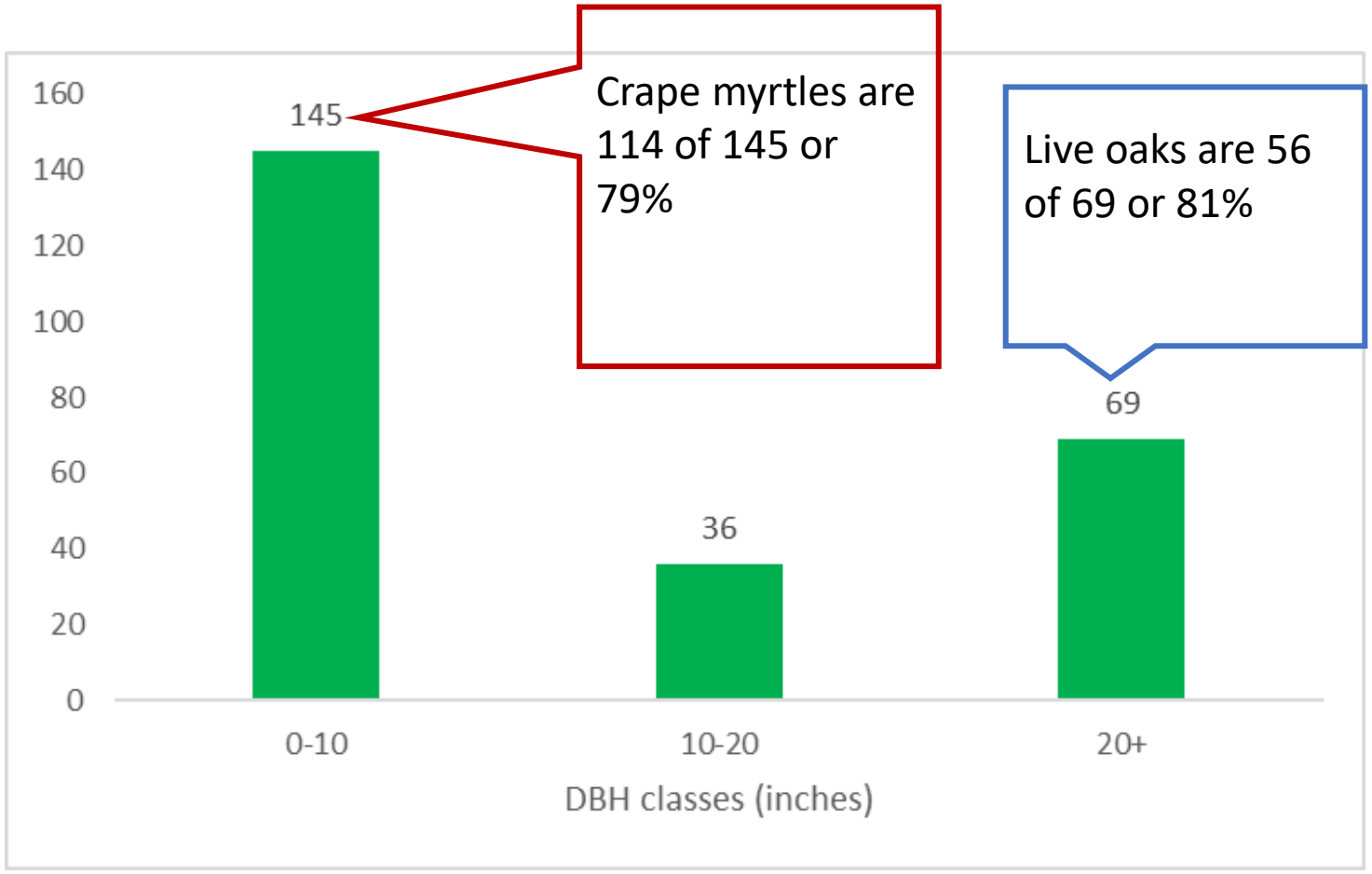
25 different species recorded in partial tree inventory, but only 4 species make up 84% of the downtown trees.



Marianna - Tree Survey Points

Tree Inventory

Marianna has a lot of very large trees and a lot of very small trees.



Marianna - Tree Survey Points

Marianna moving forward

- Diversify the urban forest and distribute species more evenly across public lands and ROWs.
- Start planting at community identified priority sites (parks and schools).
- Plant large trees and design spaces for them to grow. Example: redesign streetscape in the downtown area for trees and stormwater BMPs.
- Restart Tree Board and get Tree City USA membership status back.
- Give trees away to residents to plant on private property.

Codes and Ordinances Audit Tool Components:

- Tree Care and Protection
- Plans and Goals
- Implementation Capacity
- Monitoring Progress
- Integration
- Emergency Response
- Reducing Impervious Surfaces

Codes and Ordinances Audit Tool

Essential Elements (3 points) – this type policy or practice receives the most points because it has a greater impact on the health or management of the urban forest.

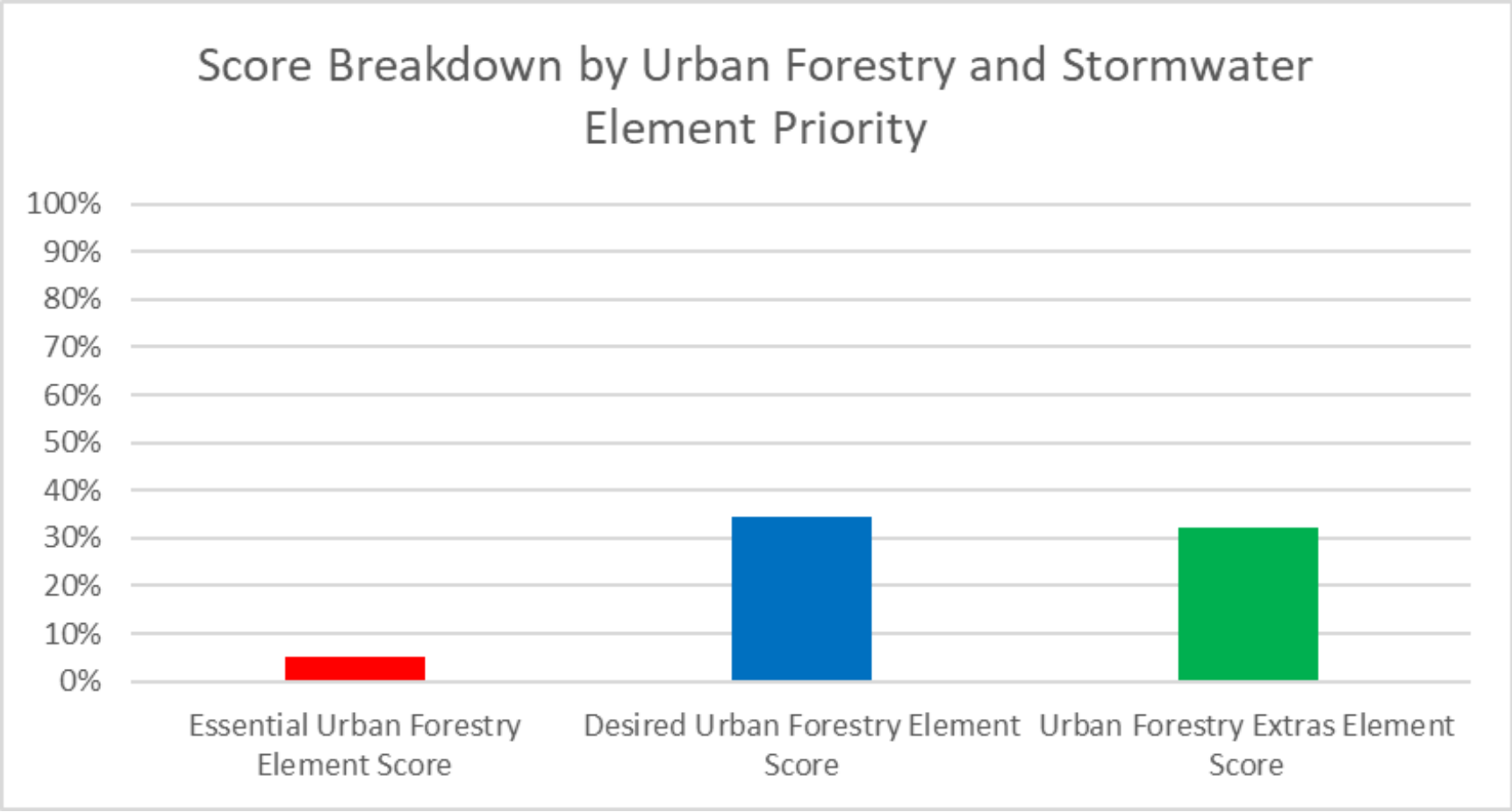
Desired Elements (2 points) – these are policies or practices we really like to see in place but are not as critically important as essential elements.

Extras (1 point) – these are extra ways a community can go above and beyond in managing their urban forest.

Example: Plans and Goals

Urban Forest Management Plan		
Desired		Does this plan include a discussion of community values of trees (urban heat island effect mitigation, stormwater benefits, quality of life etc.)?
Essential		Does the municipality outline clear measurable goals along with concrete strategies?
Extra		If an Urban Tree Canopy Assessment was performed, are the results displayed and discussed in the UFMP?
Desired		Is urban forest analysis broken into smaller units (e.g., neighborhoods) and also by watersheds?
Extra		Does the UFMP show how it also meets goals in existing plans such as Open Space Plan, Park and Recreation Master Plan, Transportation Plan, Comprehensive Plan etc.?

Summary of Results



5%

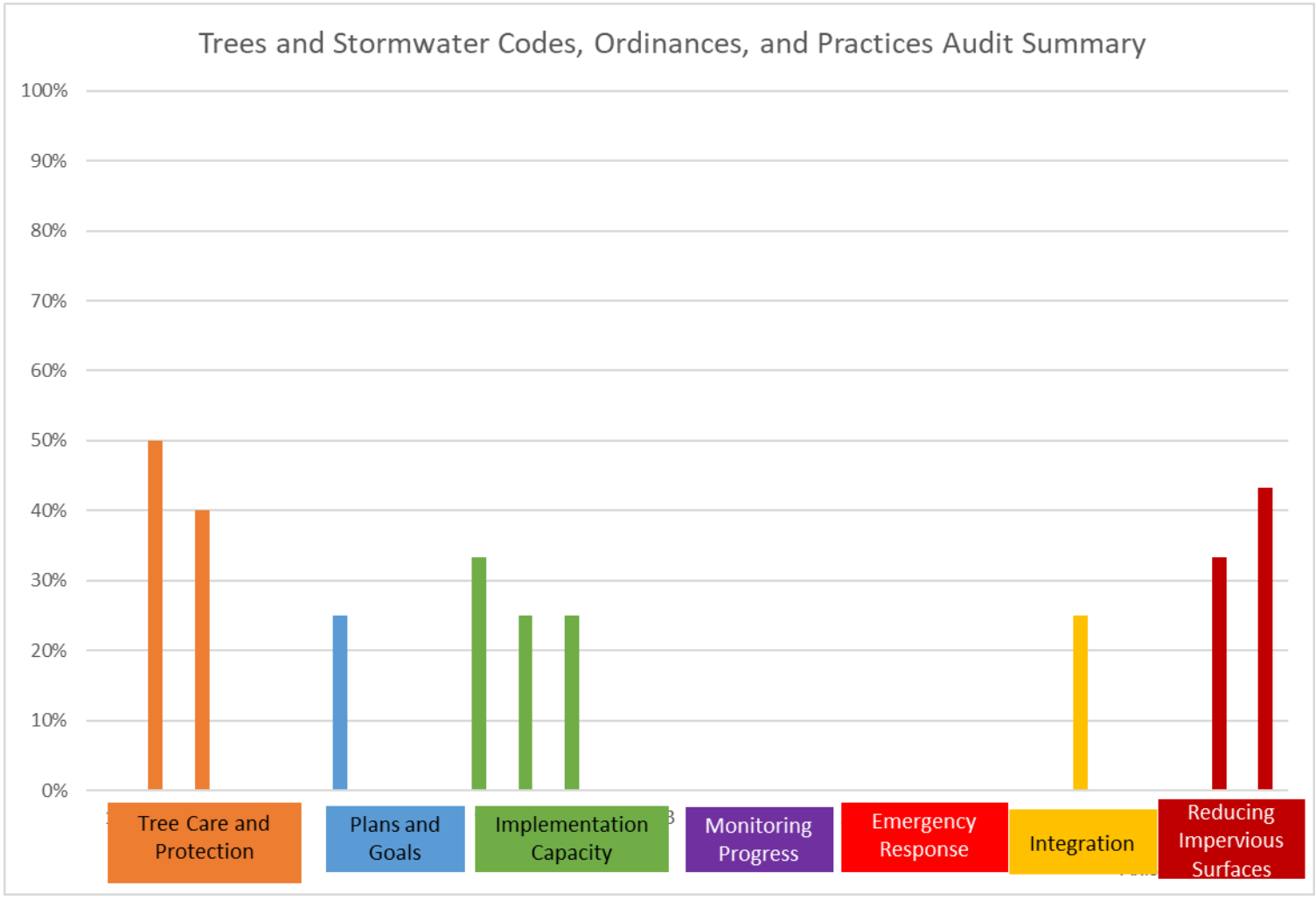
35%

32%

The city was missing a lot of the essential elements we want to see in the codes, policies and practices of the city.

The main focus with recommendations is to bring the essentials up to a higher percentage which will result in a better managed more resilient urban forest.

Summary of Results



Tree Care: 12/47 points

Plans & Goals: 2/16 points

Implementation: 7/25 points

Monitoring: 0/11 points

Integration: 4/35 points

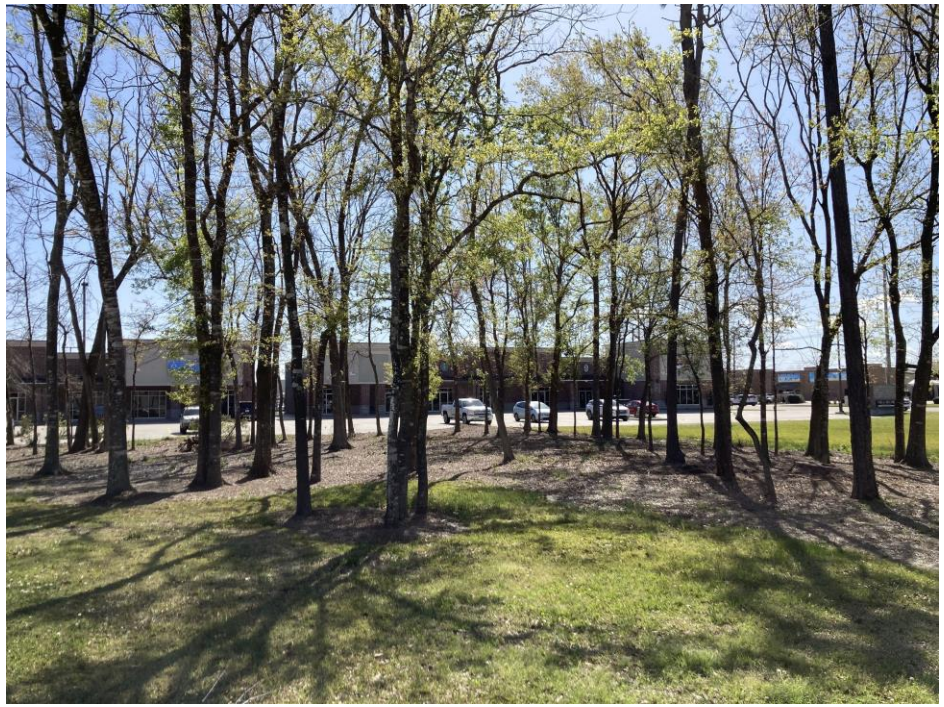
Emergency response: 0/6 points

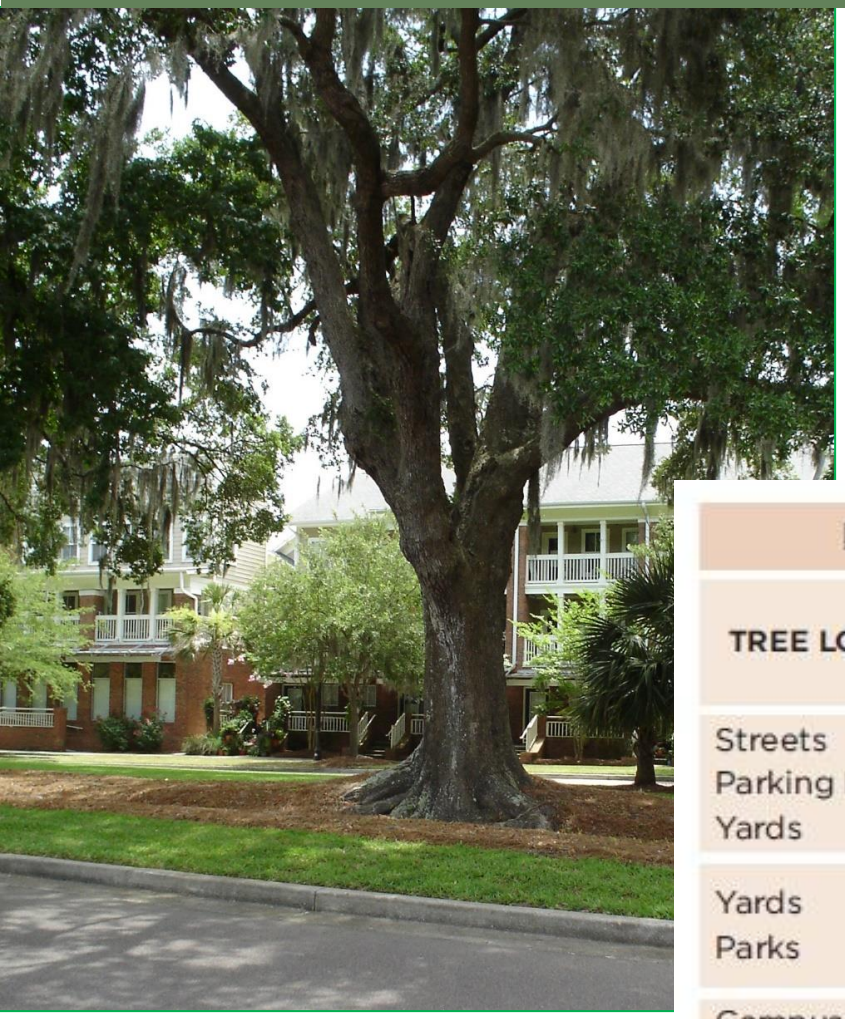
Imperviousness: 21/54 points

Urban Trees Often Need Better Care and More Room to Grow

Designing Urban Forest to be Resilient to Storms

- Consider different surface materials other than concrete (gravel, permeable pavers, etc.).
- Increase surface area and soil volume for trees.
- Plant in available open space instead of squeezing trees into narrow planting strips.
- Create root paths which allow roots to expand in the directions you want and prevents encircling roots in tight spaces.
- Plant trees in groupings (five or more) that share the same soil space.
- Plant small trees in greater density in areas where you want to reduce risk and not much planting area available.
- Consider lifespan of trees in your urban forest. Proactively assess these older trees and potentially remove especially if the species is prone to fail in high winds.
- Plant shrubs and small trees with larger ones to create layers of wind protection.





Adequate Planting Area

Rooting Space and Survival Rate		
TREE LOCATION	**SURVIVAL RATE**	**ROOTING SPACE**
Streets Parking lots Yards	64%	0 to 3 m^2 (0 to 39 ft^2)
Yards Parks	73%	4 to 7 m^2 (40 to 75 ft^2)
Campuses Parks Yards	91%	> 7 m^2 (> 75 ft^2)

Source: FR 173, University of Florida IFAS

Providing adequate room to grow and adequate planting beds are key.

This tree has what it needs and there are no overhead or underground utilities in the way of roots or limbs.

Design Techniques

This small tree has permeable pavers for high traffic areas.

The pavers can be removed as the trunk grows, while air and water can still reach the roots.

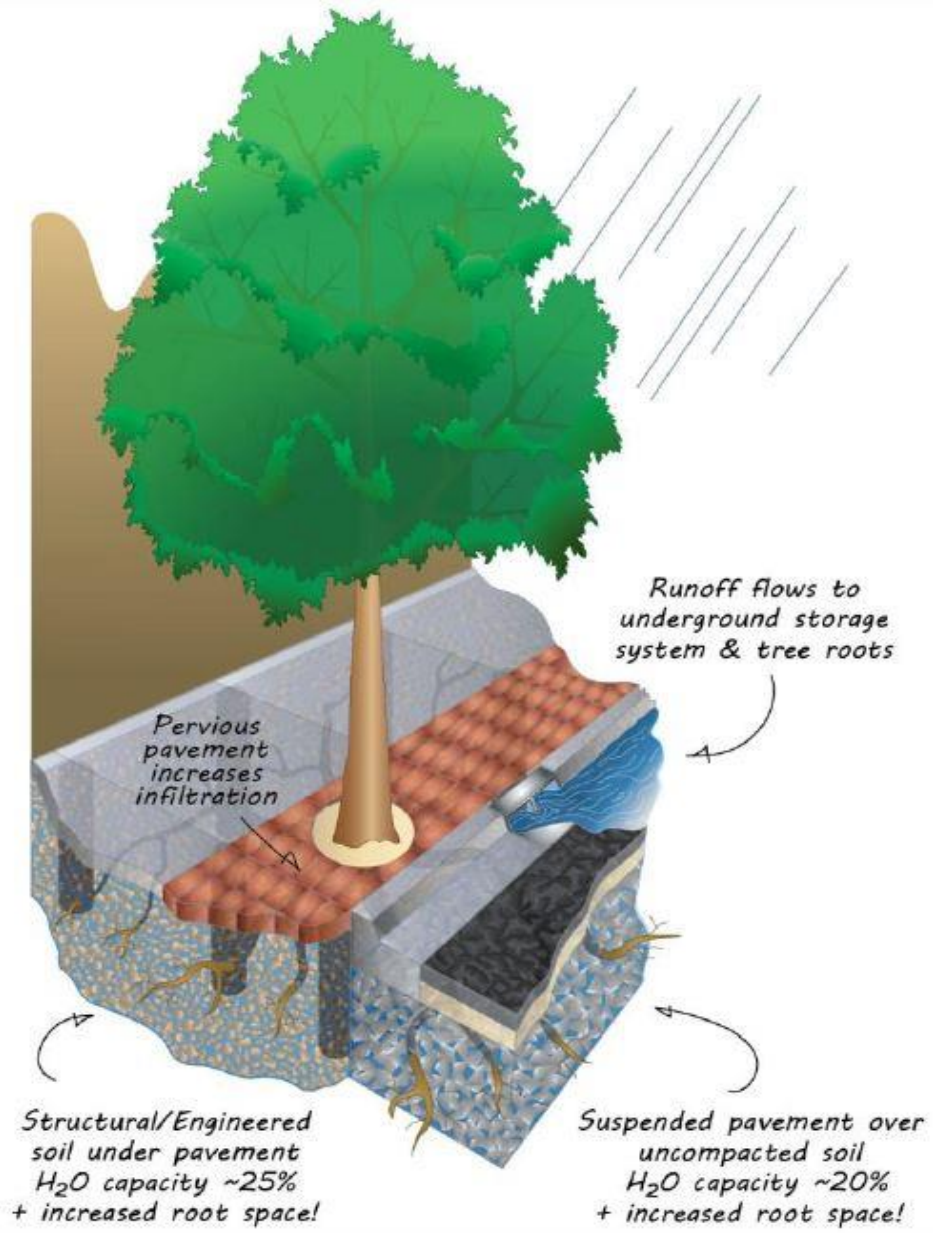
A general rule: 1000 cubic feet soil vol. per large canopy tree.

Table 1. Soil requirements for trees based on their size at maturity.

TREE SIZE AT MATURITY	TOTAL SOIL AREA*	DISTANCE FROM PAVED SURFACE
SMALL Height: shorter than 30 ft	10 ft x 10 ft	2 ft
MEDIUM Height or spread: lesser than 50 ft	20 ft x 20 ft	6 ft
LARGE Height or spread: greater than 50 ft	30 ft x 30 ft	10 ft

* Measurements for when rootable soil depth is 3 feet or greater. For soil less than 3 feet deep, smaller maturing trees are recommended.

Source: FR 173, University of Florida IFAS



Tree image, Davey Trees.

Accommodate Large Trees

Larger trees offer greater benefits – so think carefully when setting planting goals for streets!

Consider using structural soils and permeable pavement, rather than just choosing small trees! Trees will pay back your investment!

These trees were planted at the same time!

So what's the difference?

https://greenblue.com/na/ Thanks to GreenBlue Urban for these images of their work.

Long-Term Storm Recovery

1. Right Tree, Right Place!
   - Don't plant back trees that won't fit.
   - Avoid invasive trees or with poor form.
   - Ensure high quality stock.
2. Funding to Replace and Expand.
   - Infrastructure
   - Aesthetics
3. Continue ongoing tree risk mitigation and recovery pruning.
4. Use assessment data to update public tree inventory.
5. The work is never complete!

Trees are green infrastructure

Stormwater Management & Erosion Control

IMAGE #1

IMAGE #2

Which one of these pictures is infrastructure?

Good Tools! University of FL IFAS Extension

- The University of Florida /Institute of Food and Agricultural Sciences (UF/IFAS) created the Urban Forest Hurricane Recovery Program after the devastation of the 2004 and 2005 hurricane seasons.
- The main goal of the program is to foster a healthy urban forest that is more wind-resistant. The program is aimed at citizens and communities who seek to rebuild and set better management practices so that future storms are less devastating.
- The Urban Forest Hurricane Recovery Program is funded by the **Florida Forest Service** and the **USDA Forest Service, Southern Region**.

Contains:

- **Free** publications on best practices and design guidelines for increasing wind resistance in the urban forest.
- Research on tree species failure rates along the Gulf Coastal Plain.
- How to develop an urban forest management plan for storm-prone communities.
- **https://hort.ifas.ufl.edu/treesandhurricanes/**

Community Forestry Academy

- Southern Group of State Foresters
- Series of ***free*** training videos including why a community should plan for storms.
- ***Free*** resources and guides for developing plans and assessments.

https://communityforestry.academy/courses/community-planning-for-the-urban-forest-strike-team/

COMMUNITY PLANNING FOR STORM EVENTS

COMMUNITY LEADER COURSE RESOURCES

SGSF UFST Website

FEMA Debris Guide

When a Storm Hits, Are You Ready?

National Weather Service Storm Track Data (ArcGIS)

Interactive Severe Weather Maps & Apps

National Hurricane Center

Storm Ready Brochure

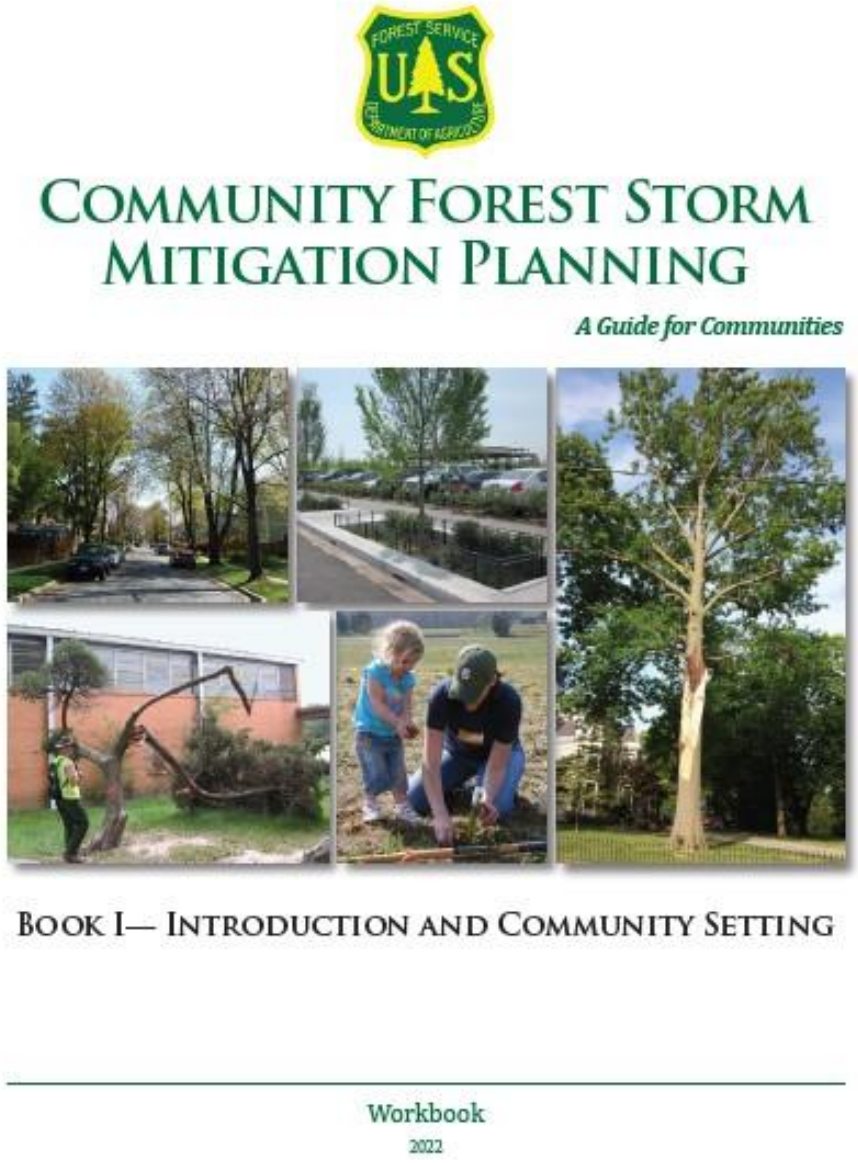
Storm Damage Mitigation – Pruning Street Trees

Forest Storm Mitigation Manual

- Community Setting
- Storm Preparation
  - Tree Canopy Assessment, Public tree inventory, tree risk assessment, storm mitigation map, and more.
- Storm Response
  - Debris diversion and cleanup, hazard tree removal and pruning.
- Storm Recovery
  - Summary of tree loss, planting site inventories, replacement plan, species selection

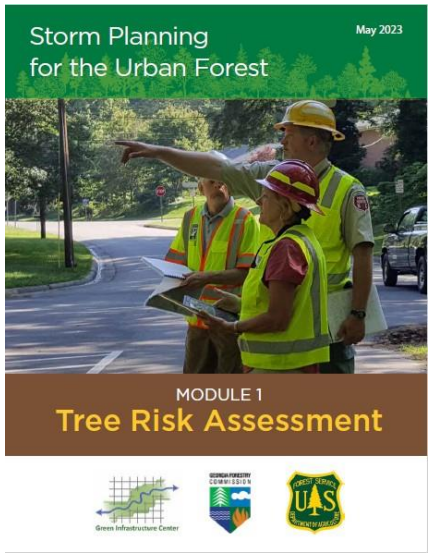
Funding Sources Available

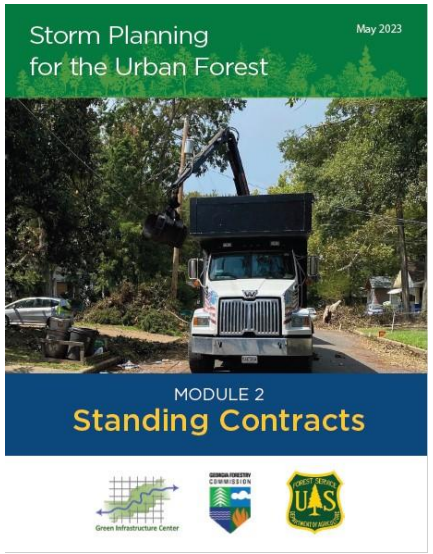
- FEMA – 404 Hazard Mitigation Funding, 406 Public Assistance Grants, Building Resilient Infrastructure and Communities (BRIC), or Flood Mitigation Assistance.

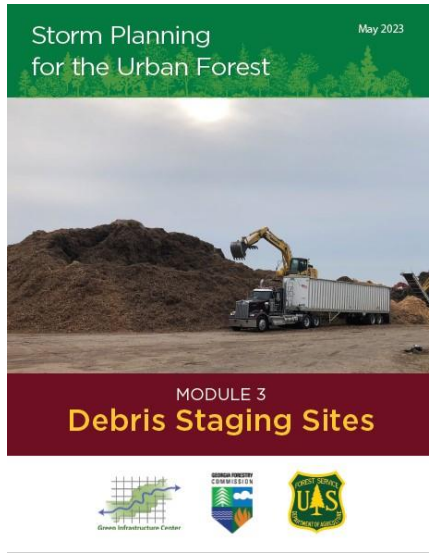


Tools Reminders!

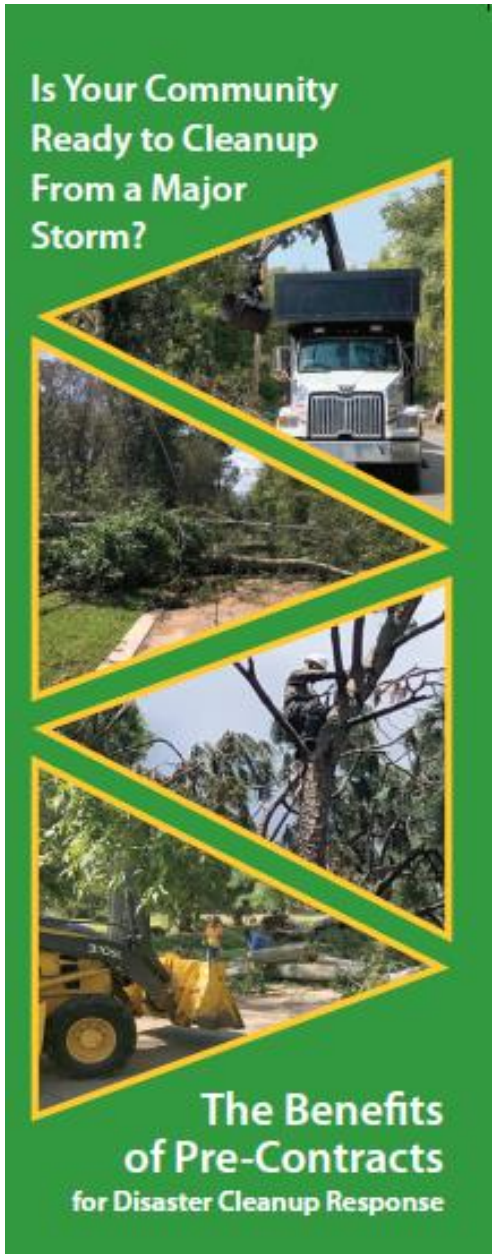
Coming soon to https://communityforestry.academy/

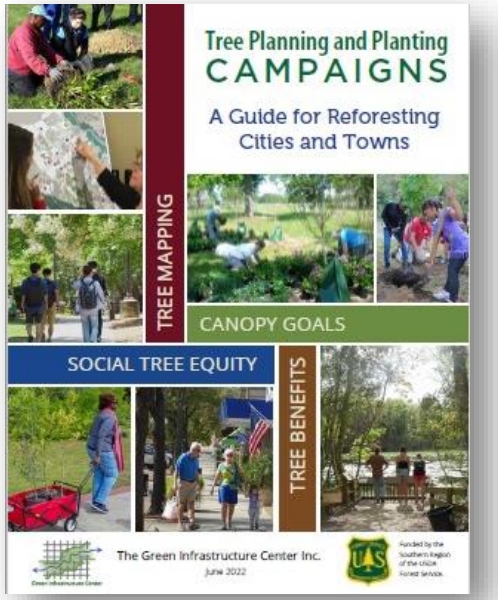


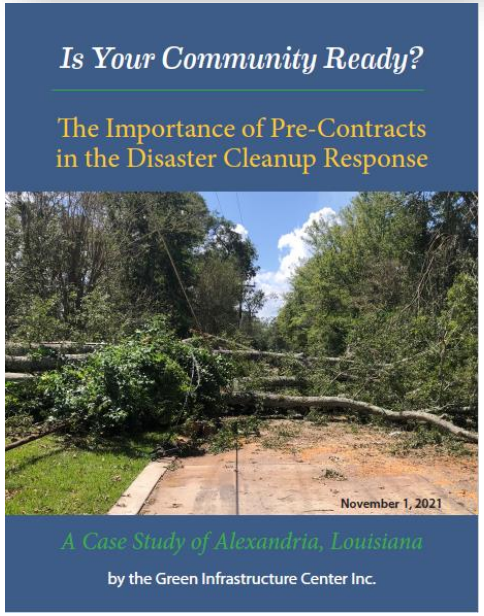




And also much more at www.gicinc.org







Questions?
Comments?

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434-244-0322
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mlee@gicinc.org
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darren.green@cityofalex.com

Extra slides if time

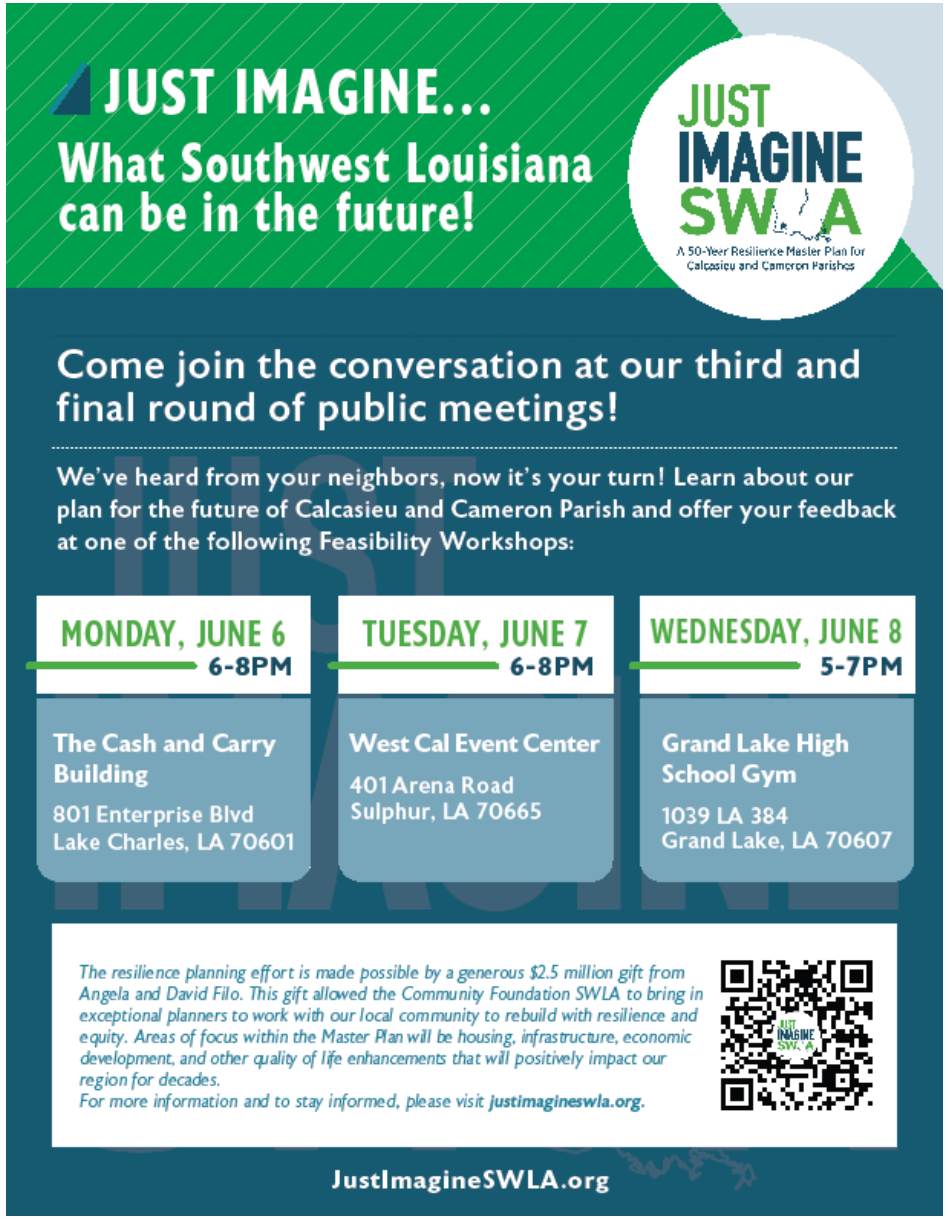
Just Imagine SW Louisiana

A regional economic and redevelopment effort spanning multiple parishes and communities in the region.

Ten regional "catalytic" projects identified and supported by a robust community engagement and participation.

The canopy recovery data, strategies and efforts were folded into this larger regional set of projects and planning.

Surveys available at open houses and distributed throughout the community at meetings and other public events by city staff gathered feedback on how residents viewed urban forest resources.



My concerns about trees are…? (check all that apply)

"Tree falling over" (17/31; 55%)

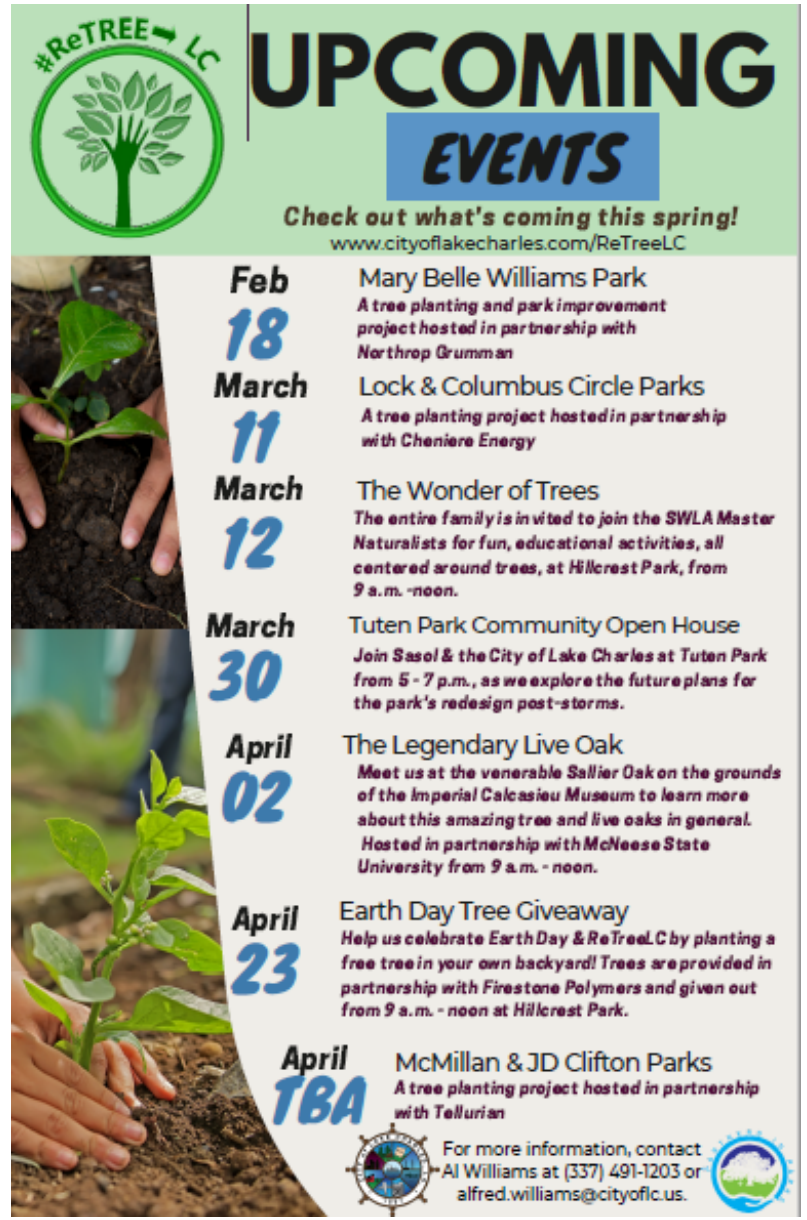
"Property damage" (9/31; 29%)
"Interference with utilities" (9/31; 29%)
"Lack of space for a tree" (9/31; 29%)
"Don't know what species to plant" (7/31; 23%)

"Don't know how to care for a tree" (4/31; 13%)
"Affording to buy a tree" (4/31; 13%)
"Being a renter and unsure if they can plant a tree" (3/31; 10%)
"Trees are messy" (1/31; 3%)

The best strategies for increasing tree canopy in Lake Charles are… (check your top 4 strategies)

Tree giveaways (19/31; 61%)
Require developers to plant more trees (18/31; 58%)
City plants more trees (14/31; 45%)
Homeowners plant more trees (12/31; 39%)

Apply for grants (11/31; 35%)
Better maintenance of public trees (9/31; 29%)
Community workshops on tree care (8/31; 26%)
Business owners plant more trees (8/31; 26%)
Establish a tree fund (5/31; 16%)
Establish a tree board (4/31; 13%)
Change the city code (1/31; 3%)



Lake Charles moving forward #ReTreeLC

- City gives away thousands of trees to plant
- Prioritized planting trees in hottest areas, for stormwater, along streets and in parks.
- Increase tree protection and mitigation in zoning and consolidate elements into public tree ordinance.
- Continue to build a coalition of partners to increase canopy back in the community.
- Create a Tree Board to advise and advocate.
- Integrate trees and BMPs into stormwater management.

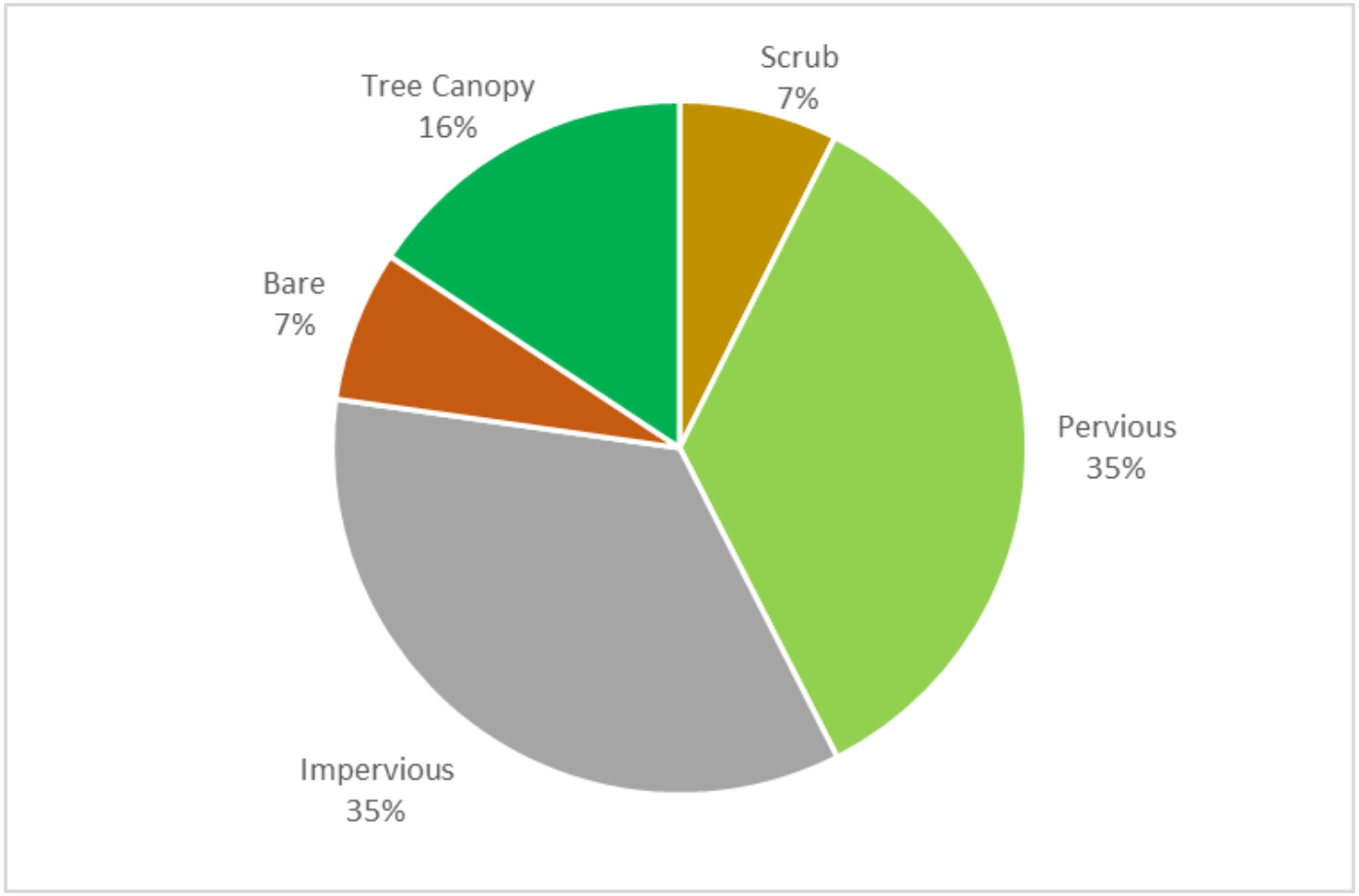
Lake Charles, Louisiana

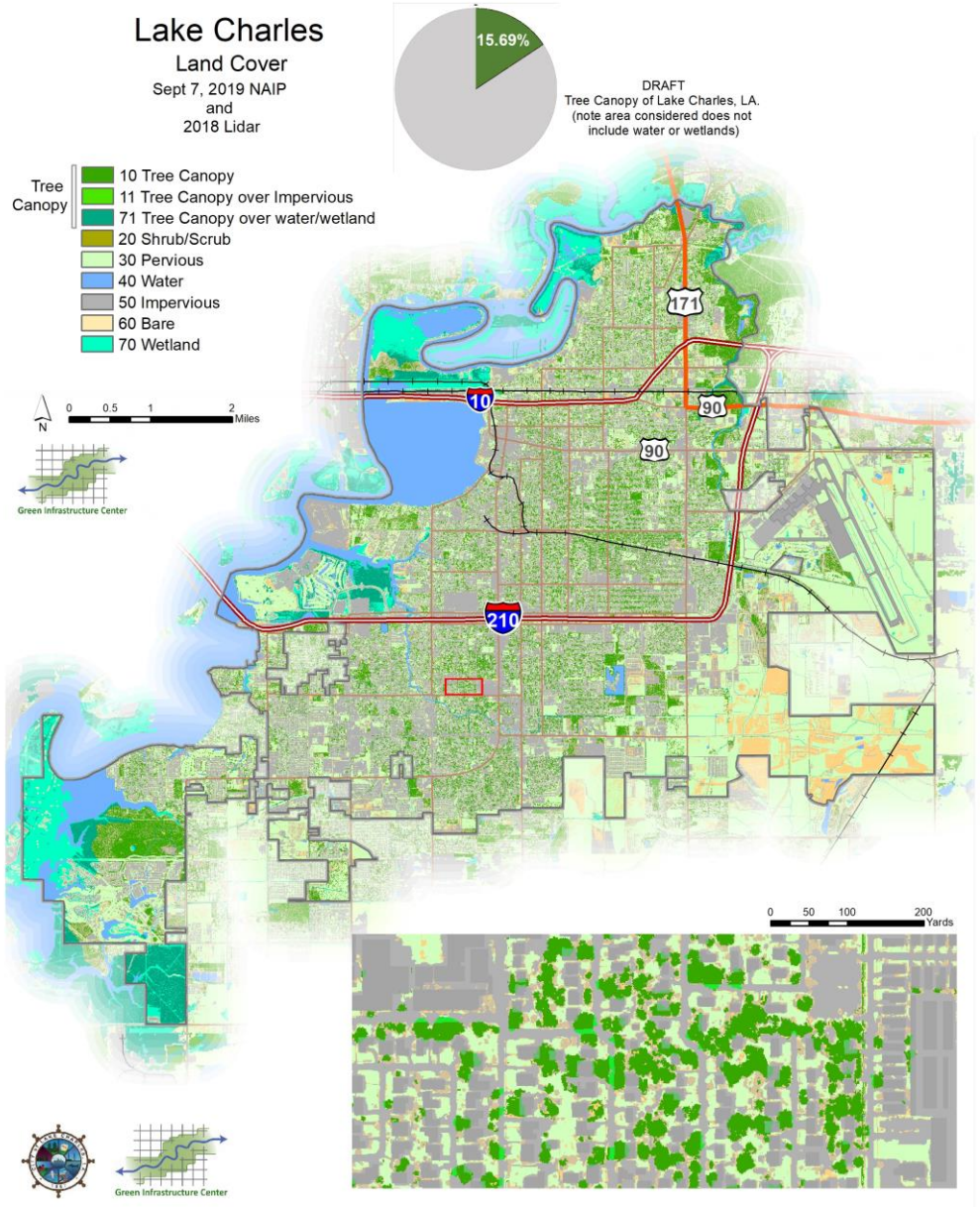
Suffered four federally-declared natural disasters in nine months between 2020 and 2021.

- Hurricane Laura
- Hurricane Delta
- Feb. 2021 Winter Ice Storm
- Spring flooding 2021

In addition to collecting data and developing strategic plantings, the city also wanted to review its codes and policies and integrate this recovery effort into its stormwater management and a regional planning initiative called “Just Imagine”.

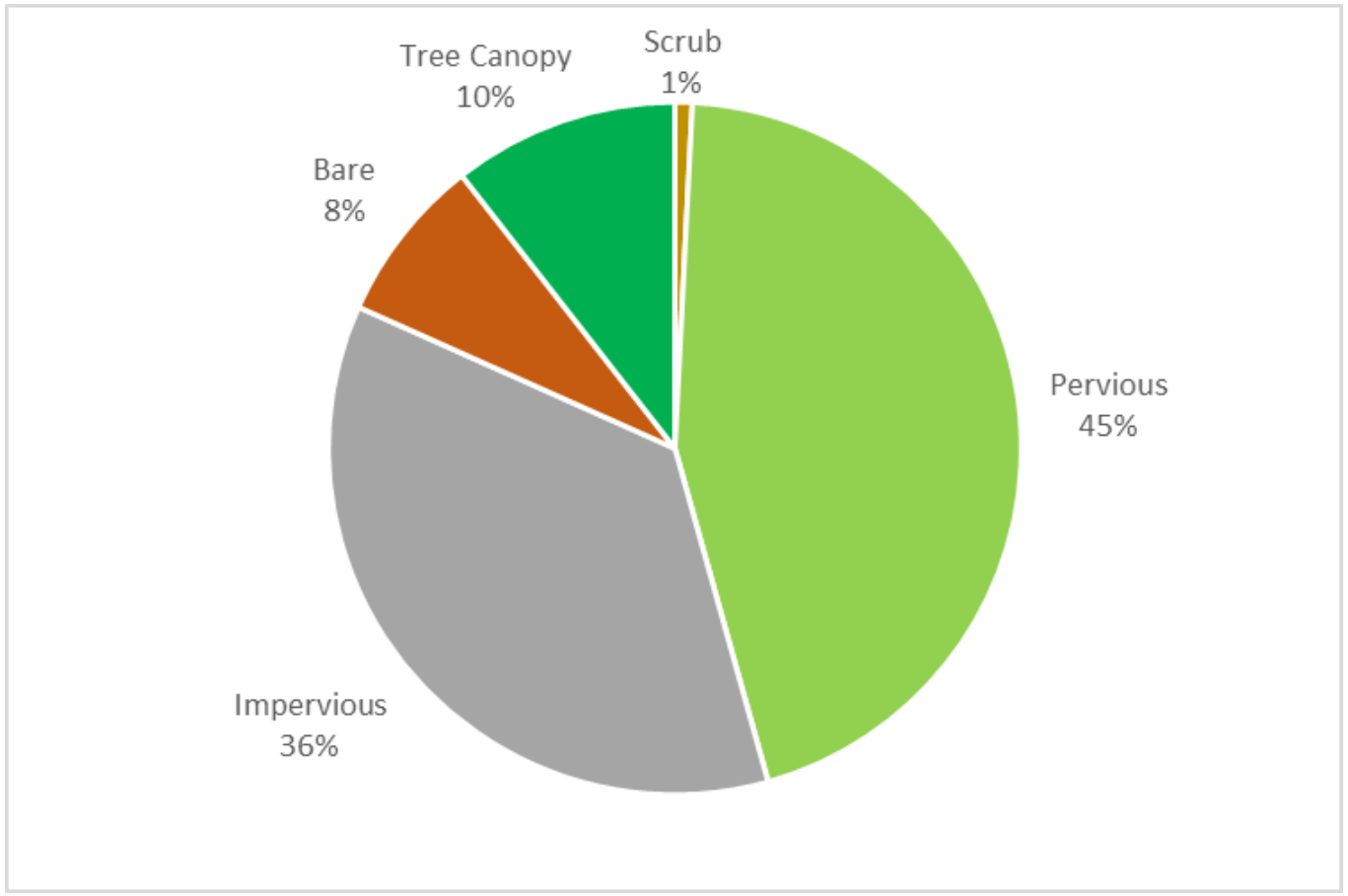
Lake Charles Canopy Final (2019)

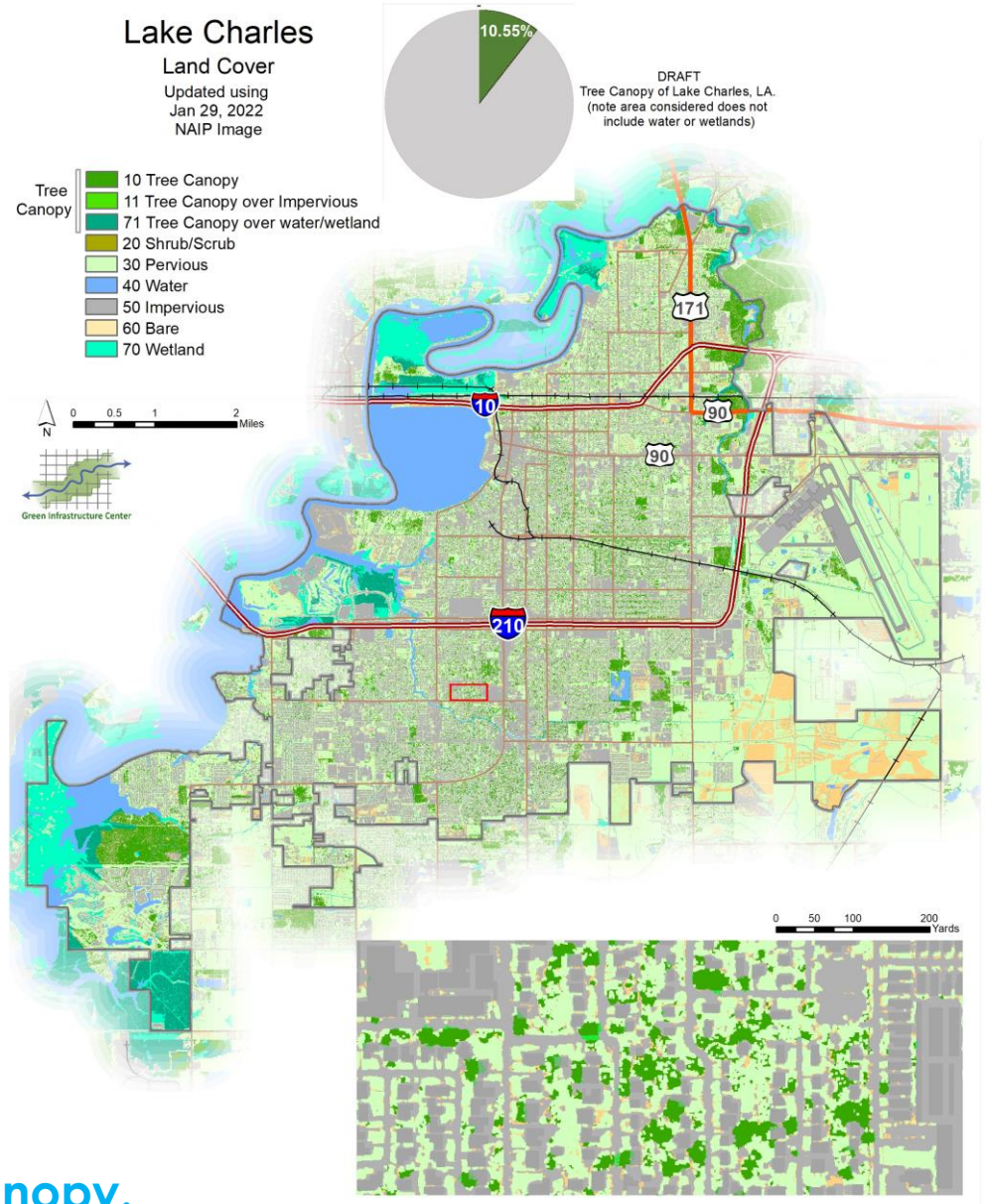




Citywide 15.69% (Final 2019)

Lake Charles Canopy Final (2022)





Citywide 10.55% (Final 2022)

Change of -5.14% The City lost 34% of its relative tree canopy.

DRAFT
4/22/2022

Background of the audit tool

GIC evaluated the city's codes, ordinances, policies and urban forest program capacity.

The audit tool was developed as part of the Trees and Stormwater project with 6 states and 12 cities in the Southern Region.

Goal was:

- Identify policies that encouraged impervious surfaces and fix them.
- Identify ways in which the urban forest could be better managed.