

WHITE PAPER



# Establishing an Urban Forest Master Plan for Marco Island

Let's plant 10,000 trees in ten years

Prepared by the  
Marco Island Beautification Committee

## Executive Summary

# 10%

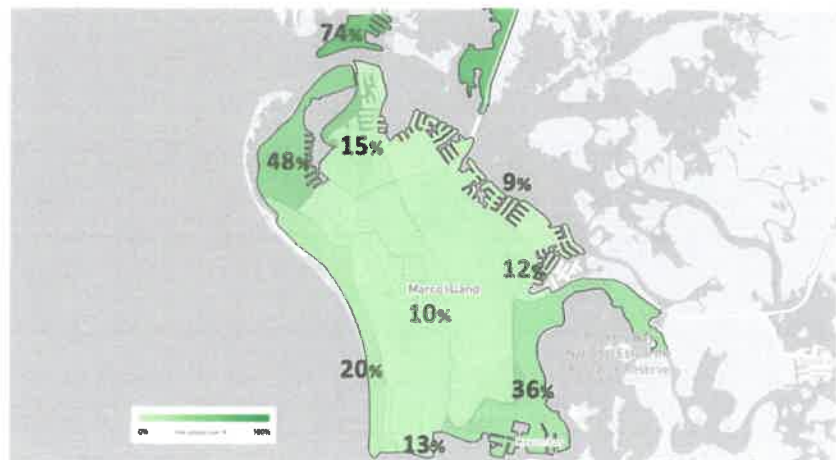
Most of Marco Island's tree density is only 10%, lower than any area of Naples and well below the national average is 27%.<sup>1</sup>

Marco Island's trees are a vital part of its green infrastructure that provides economic and environmental benefits. These benefits come in the form of significant measurable value to:

- Stormwater management
- Pollution and chemical and fertilizer runoff
- Public health improvement
- Energy use reduction
- Air pollution abatement
- Public safety
- Aesthetic appeal

and our overall quality of life. Like many communities in Florida which are experiencing exponential growth, the ecosystem, economic, and social services from trees become more important to Marco Island each year as the population increases and economic development continues.

Unfortunately, Marco Island has not established a master plan for the management of this dynamic, living natural resource. Further, our tree canopy coverage leaves room for significant improvement (Figure 1). The island's tree density is extremely low, with most areas achieving only 10% coverage, lower than any area of neighboring Naples and far below the national average of 27%.<sup>1</sup>



*Figure 1. The island's tree density is extremely low, with most areas achieving only 10% coverage, far below the national average of 27%*

When the island was developed, the Deltona Corporation developed a master plan for the island which included lining the streets and courts with trees, as evidenced by mature plantings of Cuban royal palms along streets like Fairlawn Court. The Deltona Corporation desired to create a small-town environment on Marco Island with tree-lined streets and sidewalks. But, by 1976, serious legal problems emerged, and the Deltona Corporation spent years in litigation, teetering on the brink of bankruptcy, and tree planting came to a halt.

Today, Marco Island maintains 121 miles of paved road, most of which are devoid of avenue plantings (Figure 2). We must pick up where the Deltona Corporation left off and finish lining our streets with trees. We must establish best practices in tree planting, preservation and maintenance and foster a sense of stewardship among our residents.

# 121

miles of paved roads are maintained on Marco Island, most of which are devoid of avenue plantings.



*Figure 2. A tale of two streets: When the island was developed, the plan called for lining the streets and courts with trees, like the native Cuban royal palms along streets like Fairlawn Court. The work was never completed leaving neighboring Chestnut Court devoid of tree plantings.*

While the world talks about the negative impact of urbanization, Marco Island will be talking about we are expanding and enhancing our natural resources, attracting more wildlife and plant life, and improving the quality of life and living for our residents and guests. Marco Island will represent a model for how a community comes together to create a vibrant urban forest, a canopy of trees where none existed.

We have the opportunity to fulfill the small-town environment envisioned when Marco Island was developed, create important sustained value for our residents, and leave a legacy for generations to come.

# 50%

reduction in automobile crashed in areas where medians are planted with trees.<sup>2</sup>

## The value of trees to Marco Island

Since the beginning of time, trees have provided us with two of life's essentials: Food and oxygen. Today, as areas like Marco Island become more urbanized, their value increases as we discover benefits which are essential to sustain our growth and our way of life:

### Safety

- **Reduce traffic speeds and reduce crashes by up to 15 mph.** Street trees create vertical walls framing streets, providing a defined edge and helping motorists guide their movement and assess their speed. Speed reductions of 3 to 15 mph are typical on streets lined with trees vs. unlined streets.<sup>2</sup>
- **Reduce road rage.** There is strong, compelling research that motorist road rage is diminished in green urban areas compared to stark suburban areas.<sup>3</sup>
- **Create safer walking environments.** By creating visual walls, street trees protect pedestrians on city sidewalks, similar to a guard rail.<sup>4</sup>
- **Reduce automobile accidents.** Urban area medians with trees are safer than those without trees. Medians with trees reduce crashes by 50% or more.<sup>5</sup>
- **Increase property security.** With more pleasant walking environments, residents increase time outdoors, leading to walking, talking, gardening and association with neighbors, thereby increasing owner-led surveillance of homes, blocks, neighborhood plazas, businesses and other civic spaces. Homeowner surveillance reduces the burden on city police resources.

Environment

- **Reduce runoff into our canals.** Using native Cuban royal palms as an example, a planting of 10,000 trees will intercept 2,150,000,000 gallons of water and reduce runoff by an additional 190,000,000 gallons during their lifetime, significantly reducing the amount of nitrogen and other chemicals that flow into our waters. Just two royal palms intercept and reduce runoff by 5,850 gallons of water every single year, the equivalent of an average swimming pool<sup>6</sup> (Figure 3).
- **Reduce water pollution.** Trees allow water to flow down the trunk into the earth, and they absorb the first 30% of most precipitation through their leaf systems. Water then evaporates back into the atmosphere, dramatically reducing water runoff and flooding.<sup>7</sup>
- **Reduce harmful tailpipe emissions.** Using magnolias as an example, a planting of 10,000 trees will sequester 340,000,000 pounds of CO2 and deliver the avoidance of an additional 90,000 pounds of CO2 during their lifetime. Just four magnolias will eliminate 4,830 pounds of CO2 every single year, the equivalent of an average automobile<sup>8</sup> (Figure 3).



**Reducing runoff and erosion.** Using native royal palms as an example, a planting of 10,000 trees will intercept 2.2 billion gallons of water and reduce runoff by an additional 190 million gallons during their lifetime. Nitrogen and chemicals are absorbed by the trees, mitigating harmful flows into our canals. Just two royal palms intercept and reduce runoff by 5,850 gallons of water every single year, the equivalent of an average swimming pool.<sup>6</sup>

Ten thousand trees will dramatically reduce CO2, runoff and electricity demand on Marco Island



Figure 3. Ten thousand trees provide significant value to Marco Island, reducing runoff, chemicals and fertilizers, and sequestering CO2.



# 15%

increase in property values when trees are present.<sup>10</sup>

## Revenue and costs

- **Trees pay for themselves.** For a planting cost of \$250-600 (includes first 3 years of maintenance) a single street tree returns over \$90,000 of direct benefits in reduced street maintenance, energy costs and other factors.<sup>9</sup>
- **Property values increase.** Property values increase by 15% when trees are present.<sup>10</sup>
- **Businesses increase revenue.** Business show 12% higher income streams when their buildings and parking areas are landscaped with trees.<sup>11</sup>
- **Trees reduce air conditioning costs.** A properly shaded neighborhood, mostly from urban street trees, can reduce energy bills for a household by 35% to 50%.<sup>12</sup>
- **Trees lengthen pavement life.** Street trees can add from 40-60% more life to costly asphalt.<sup>13</sup>

## Why trees matter to Marco Island

### FINANCIAL & HEALTH

\$90,000 of direct benefits for every tree ([Burden](#))

50% reduction in air conditioning costs ([Burden](#))

Lengthen pavement life by 40% to 60% ([Burden](#))

12% higher income streams for businesses ([Wolf](#))

15% increase in home or business value. ([Wolf](#))

33% lower odds of rating general health as "fair" or "poor" ([Phys.org](#))

ADHD and stress reduction in adults and children ([Wolf](#))



*A large tree can absorb nearly 250,000 gallons of runoff and rainfall in its lifetime*

### ENVIRONMENT

Reduce CO<sup>2</sup> the equivalent of 26,000 car miles per one acre of trees ([Tree People](#))

Prevent water pollution by 30% allowing water to flow down the trunk into the earth ([Burden](#))

Oxygen for 18 people, per one acre of trees ([Tree People](#))

50% reduction in UV-B radiation ([Tree People](#))

5 to 15-degree temperature reduction ([EPA](#))

Increase wildlife and natural pest control ([Tree People](#))

## Well-Being and Community

**Air quality increases.** A single acre of trees produces enough oxygen for 18 people.<sup>14</sup>

**Trees protect our skin.** Trees provide a 50% reduction in harmful UV-B radiation.<sup>15</sup>

**Temperature reduction.** Trees contribute to a 5 to 15-degree temperature reduction under and around the canopy.<sup>16</sup>

**Wildlife and natural pest control increases.** Trees reduce the need for harmful pesticides and chemicals by creating an environment for natural pest control from birds, reptiles, animals and beneficial insects. Trees host complex microhabitats. When young, they offer habitation and food to amazing communities of birds, insects, lichen and fungi. When older, trunks provide the hollow cover needed by species such as bats, tawny owls and woodpeckers. Trees provide an environment for endangered birds and animals. One mature oak can be home to as many as 500 different species.<sup>17</sup>

**Trees help reduce blood pressure and improve overall emotional and psychological health.** Trees have a calming and healing effect on ADHD adults and teens.<sup>18</sup> Visual exposure to settings with trees has produced significant recovery from stress within five minutes, as indicated by changes in blood pressure and muscle tension.<sup>19</sup>

**Trees produce civic pride and unity.** Trees as landmarks can give a neighborhood a new identity and encourage civic pride. Trees dramatically enhance the aesthetics and distinctive character of a place and can be used as an educational resource and to bring groups together for activities like walking and bird watching. Trees are invaluable for children to play in and discover their sense of adventure.

# 5-15°

temperature reduction  
under and around the  
canopy.<sup>10</sup>

## Present Situation



**Low tree coverage severely impacts the runoff of harmful chemicals into our canals.** Our lack of tree coverage contributes to flooding and soil erosion, and limits the opportunities to provide financial and wellness benefits to the community. Further, it leads to inequity in neighborhoods, suppressing property values and other financial and wellness benefits.

When Marco Island was developed, the Deltona Corporation developed a plan for the island which included lining the streets and courts with trees, as evidenced by mature plantings of Cuban royal palms along streets like Fairlawn Court. At present, the City has not established an urban forest master plan to improve the tree canopy on the island, nor has it prioritized a green infrastructure program to improve the quality of life and sustainability of our limited environmental resources. Issues on the island include:

**Insufficient tree coverage.** Marco Island's insufficient tree coverage leaves room for significant improvement. Marco Island's tree density is extremely low, where most of the island has only 10% tree coverage. This percentage is lower than the lowest average in neighboring Naples and a fraction of the national average, which is 27%. Low tree coverage creates runoff into our canals, soil loss from erosion and limits the opportunities to provide financial and wellness benefits to the community. Further, it leads to inequity in neighborhoods and suppresses property values and other financial and wellness benefits.

**Lack of priority.** Establishing a green infrastructure plan has not been prioritized by the city. Further, the city does not employ a city arborist to oversee, manage and measure the annual benefits a green infrastructure program will provide.

**Substantial gaps in roadway plantings.** Most of the island's streets have not been planted. In areas where they have been planted, lack of a master plan has led to inconsistent aesthetics where multiple species are planted side-by-side within a single block, give the appearance of poor city planning.

**Lack of community awareness.** The community, at large, is unaware of the benefits a canopy of trees will provide to Marco Island, including the impact on the water quality in our canals, reducing runoff and erosion, reducing electricity costs and improving overall wellness. Further, they lack an understanding of the ordinances and permitting processes to plant trees, particularly in the swales in front of their homes and businesses.



## Desired Situation

The desired state dramatically enhances Marco Island's image with tree-lined streets and a stunning urban forest that creates a sense of well-being which enriches residents and guests in every way. The program will provide a way for us to grow sustainably, reduce runoff and harmful chemicals into our waterways, improve air quality, reduce energy consumption and increases property values. In the desired state:

1. A city arborist leads the development of a master plan and ensures its success
2. The development and sustainability of the urban forest is prioritized and integrated into the island's ordinances and adjacent agencies and activities
3. The community is actively engaged to champion and benefit from the program
4. The small-town vision and aesthetics envisioned when the island was developed, lining every street and creating a canopy on the island, is fulfilled.

### **Ten Thousand Trees in Ten Years: A campaign to kick off our commitment to Marco Island's green infrastructure**

We should establish a campaign to plant 10,000 trees in ten years. A campaign will galvanize the community, promote unity, attract business and provide significant financial, environmental, aesthetic, well-being and safety benefits.

Ten thousand trees will be able to:

- Line 250,000 feet of roadways (Marco has 638,880 feet)
- Reduce runoff equivalent to 5,800 swimming pools per year
- Sequester the CO<sub>2</sub> of 1,750 vehicles every year
- Save up to 1750000 kWh of energy annually

A campaign will help Marco Island develop publicity (and potential funding) for the island a place where residents are actively working to improve water and air quality, restore trees that have been lost to Florida, and create a model small-town community that is a model for others.



**How far will 10,000 trees go?** Planted at an average of 25 feet apart, 10,000 trees will line 250,000 feet, or 47 miles, or roadways. Marco Island maintains 121 miles of paved roads. Deducting existing trees, intersections and driveway entrances, 10,000 trees will provide full canopy coverage for most of the island's streets.

Conceptual images show the dramatic impact in aesthetics and the sense of well-being we will achieve on Marco Island:



Sunbird Court Today



Sunbird Court Concept

*Sunbird Court could be lined with royal poincianas, palms or other broadleaf trees.*



Tahiti Court Today



Tahiti Court Concept

*Tahiti Court was started with native Cuban royal palms, but never completed.*



Bayport Avenue Today



Bayport Avenue Concept

*Bayport Avenue could be lined with tamarinds or other broadleaf trees.*





Partridge Court Today



Partridge Court Concept

*Partridge Court was started with native Cuban royal palms, but never completed.*



Bald Eagle Drive Today



Bald Eagle Drive Concept

*Bald Eagle Drive represents a mix of disparate species and massive gaps in plantings.*



Tahiti Court Today



Tahiti Court Concept

*Alternate concept of Tahiti Court lined with coconut palms.*

# 26%

In just the past 20 years, Florida has lost 26% of its overall tree coverage

## High-Level Solution

In the past 20 years, Florida has lost 26% of its overall tree coverage. With an established master plan for an urban forest, Marco Island can lead Florida as a model for green infrastructure in the state and improve its reputation as a city that is actively improving the environment.

Marco Island tree coverage should strive to exceed the national average of 27%. At present, most of the island has achieved only 10% coverage. We must strive for consistent tree equity across the various neighborhoods on Marco Island.

### **Assess our current state**

- Commit to the plan and contract an arborist for the city to oversee the program
- Establish an inventory of street trees and identified gaps in arterials and surface streets

### **Develop a master plan**

- Assign the arborist to work with the Marco Island Beautification Committee and other groups to establish a master plan for the island's streets and green spaces, including objectives, strategy, tactics, measurements and cost/benefits
- Develop a tree preservation and planting ordinance guide
- Reduce the friction for builders, businesses and homeowners seeking to voluntarily plant trees
- Establish programs to encourage growth, like Adopt a Tree programs
- Prioritize a program commitment to plant a minimum of 10,000 trees in the next ten years

### **Execute the plan**

- Seek funding and grants from organizations and government agencies
- Complete arterial tree planting
- Plant side streets
- Educate builders, businesses, and homeowners on tree planting

## Solution Details

Establishing a master urban forestry plan for Marco Island will require focus in multiple areas:

- 1. Establish a comprehensive urban forest planting strategy**  
Contract a certified arborist to develop a comprehensive urban forest planting strategy in cooperation with the Marco Island Beautification Committee, including a map of streets with proposed trees for consistency.
- 2. Establish an initial target and campaign to plant 10,000 trees in ten years**  
Develop a campaign to plant 10,000 trees in ten years, completing the lining of all streets on Marco Island.
- 3. Increase outreach, engagement, and education to the community**  
Encourage preservation and voluntary planting of trees on private property. Engage the community with education and outreach efforts to ensure all stakeholders appreciate the value of Marco Island's trees and tree stewardship.
- 4. Cultivate and nurture relationships with business and corporate partners**  
Establish and strengthen relationships with nonprofits, business groups, volunteer organizations, and individuals who share vision and goals for Marco Island's urban forest through collaboration with their businesses and corporate headquarters. Develop programs and identify opportunities to team to achieve the goals of the program.
- 5. Identify funding strategies and opportunities**  
Identify and secure funding, both short-term and long-term (sustainable), for the establishment, preservation, and maintenance of trees on Marco Island. Possible sources include, but are not limited to, revenue from the general fund, assessment districts, corporations, developer contributions and other state, federal, and local sources. Host Adopt-A-Tree and fundraisers in collaboration with regional and national partners.

# 30%

to 50% reduction in air condition costs in a properly shaded neighborhood.<sup>12</sup>



# 12%

higher income streams for businesses when their buildings and parking areas are landscaped with trees.<sup>11</sup>

**6. Integrate into community planning**

Ensure tree planting and preservation of our streetscapes are deemed essential green infrastructure elements. Expand and simplify city tree regulations, policies, planting and preservation standards. Preserve existing wooded parks and natural areas, and expand tree planting in parks, natural areas and other public open spaces. Collaborate with other city groups to ensure the green infrastructure is part of their overall plan. For example, new development, public works and parks and recreation should be aware of and participate in the overall advancement of the Marco Island urban forest.

**7. Standardize policies, ordinances and best management practices (BMPs)**

Ensure maintenance practices continue to improve the quality of tree canopy in Marco Island to maximize potential benefits. Establish ordinances to promote the improvement of the canopy and protect and sustain the existing tree plantings on the island.

**8. Integrate data collection and record keeping with planting, pruning and tree removal**

Increase the capacity and efficiency of urban forestry management through the collection of relevant data. Collecting this data will aid leadership in making decisions regarding the most immediate concerns to be addressed.

## Measuring success

The Marco Island Urban Forest Master Plan should include goals and actions which can be measured to determine the success of its implementation. As new information becomes available, the Urban Forest Master Plan should be updated accordingly.

### Annual Plan Review

The Urban Forest Master Plan should be a tool that will guide management and planning decisions over the next decades. The goals and actions should be reviewed annually for progress. The plan presents a long-range vision and target dates are intended to be flexible in response to emerging opportunities, available resources and changes in community expectations. Therefore, each year specific areas of focus should be identified. This can inform budget and time requirements for related groups and stakeholders.

### Community Satisfaction

Perhaps the greatest measurement of success for the program will be its ability to provide measurable, sustained value for the citizens, businesses and visitors to Marco Island. The program must include ways to measure value and monitor public support using surveys and other feedback loops. Ultimately, the program must continually align with the community's vision for the urban forest.

### Resource Analysis

To illustrate progress and measurable success of the program, data should be collected to capture changes to tree conditions, species diversity, benefits and overall resource value towards the plan goals. These studies should be performed every decade.

### Canopy Analysis

Changes in the canopy, positive from planting or negative from storm events, development, or pests, must be measured using GIS analysis to illustrate changes in canopy cover. This data will inform canopy goals and monitor attainment. A canopy study should be conducted every decade or after major canopy-impacting events.



**Trees produce civic pride, unity and good health.** Trees give neighborhoods identity and encourage civic pride. They bring groups together for activities like walking, exercising and enjoying nature. Trees also have a calming and healing effect on ADHD adults and teens.<sup>18</sup> Visual exposure to settings with trees has produced significant recovery from stress within five minutes, as indicated by changes in blood pressure and muscle tension.<sup>19</sup>



**Monitoring the health of the community.** An annual report will include the structure, benefits and value our residents are deriving from the program. The report will serve as a document to engage stakeholders and help them understand the value the program is creating for them and increase participation from affiliate groups. The report should highlight successes, issues and stumbling blocks. This information can be used to pursue additional project support and funding.

### **Annual State of the Urban Forest Report**

An annual report, including the numbers of trees planted and removed and changes to the overall urban forest should be delivered to the City Council. The report should include the structure, benefits and value the city is deriving from the program. The report will serve as a document to engage stakeholders and help them understand the value the program is creating for them. The report should highlight successes, issues and stumbling blocks. This information can be used to pursue additional project support and funding.

### **Revisions**

Continual monitoring, analysis and revisions to the plan will keep stakeholders informed and engaged. By organizing data into specific components, including status reports and survey data, will help the city remedy specific areas of weakness, and buttress areas of strength. Revisions to the plan should coincide with major events, including discovered pests or diseases, storm events, infrastructure changes and/or significant policy, regulation or community master plan changes.

## Summary

We have the opportunity to leave a living legacy on Marco Island. We can fulfill the vibrant small-town community atmosphere the Mackle brothers envisioned when they developed this paradise we enjoy. By lining our streets with magnificent trees and planting a canopy in our neighborhoods, we will improve the waters in our canals, reduce automobile emissions and mitigate the impacts of increased growth. We will increase property values, improve traffic to our businesses, reduce air-conditioning costs and lengthen pavement life. Our trees will make our neighborhoods more desirable for outdoor activities and provide new adventures for our children. Trees will provide visual barriers to improve safety on our streets and sidewalks for our residents and guests.

Now is the time for the city to prioritize a green infrastructure program. The program must include the establishment of an urban forest master plan which creates a rich and diverse canopy of trees on the island and finishes the lining our roadways.

While others talk of how Florida has lost 26% of its tree coverage in the past 20 years, Marco Island will be seen as a model community in Florida, where the citizenry is improving its environment, protecting its precious endangered species and leaving their community better off than they found it.

Establishing this program on Marco Island will improve every area of life for its residents and create a legacy that will last for many generations.

## About the Author

David Leaser is a resident of Marco Island and a member of the Marco Island Beautification Committee. He is a senior executive in the IT industry and the author of four books on botanical subjects. He can be reached at [david.leaser@gmail.com](mailto:david.leaser@gmail.com).



**Creating a legacy and making Marco Island memorable.** Our tree planting initiative will establish Marco Island as a place where its citizenry is creating a beautiful environment where residents thrive, visitors create memories and children explore new adventures. Marco Island will become known as a model community in Florida, where the residents are actively improving their environment, preserving their natural resources and leaving their community better off than they found it.

## End Notes

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- <sup>1</sup> [American Forests Tree Equity Score](#)
  - <sup>2</sup> [Burden: Reduce speeding with speed humps and other traffic control techniques, 2015](#)
  - <sup>3</sup> [Cackowski, Nasar: The Restorative Effects of Roadside Vegetation: Implications for Automobile Driver Anger and Frustration, 2003](#)
  - <sup>4</sup> [Burden: Urban Street Trees, 22 benefits](#)
  - <sup>5</sup> [R. Ewing, Caltrans Study, circa 2003](#)
  - <sup>6</sup> [I-Tree Planting Calculator](#)
  - <sup>7</sup> [Burden: Reduce speeding with speed humps and other traffic control techniques, 2015](#)
  - <sup>8</sup> [I-Tree Planting Calculator](#)
  - <sup>9</sup> [Burden: Reduce speeding with speed humps and other traffic control techniques, 2015](#)
  - <sup>10</sup> [Wolf: Business District Streetscapes, Trees, and Consumer Response, 2005](#)
  - <sup>11</sup> [Wolf: Business District Streetscapes, Trees, and Consumer Response, 2005](#)
  - <sup>12</sup> [TreePeople research](#)
  - <sup>13</sup> [Burden: Reduce speeding with speed humps and other traffic control techniques, 2015](#)
  - <sup>14</sup> [TreePeople research](#)
  - <sup>15</sup> [TreePeople research](#)
  - <sup>16</sup> [EPA.gov](#)
  - <sup>17</sup> [TreePeople research](#)
  - <sup>18</sup> [Wolf: Green Cities, Good Health, USDA, 2010](#)
  - <sup>19</sup> [Ulrich, Texas A&M University: Science Magazine, 1984](#)

## More resources

Overview presentation: <https://bit.ly/MarcoIslandTreesPesentation>

Overview video: <https://bit.ly/TenThousandTreesForMarcoIsland>