Oaks instead of palm trees? Florida's iconic palms don't cut it with climate change

November 22 2019, by Kimberly Miller

Credit: CC0 Public Domain

South Florida's palm trees are postcard promises of sighing sea breezes and sandy beaches, but the icon of the tropics may be an impractical adornment in an era of climate change.

From the regal royal palm to the sometimes shabby cabbage, the perennial symbol of the Sunshine State offers little shade to baking urban heat islands and captures minimal amounts of carbon—a greenhouse gas contributing to global warming.

As city officials look for more ways to cool concrete jungles and balance carbon emissions, the priority for new plantings is often broadleaf hardwood trees, not the idyllic palm.

Live oaks can absorb and store 92 pounds of carbon a year with a mature tree's canopy spanning more than 100 feet. That's compared to less than one pound of carbon for a royal palm and its compact crown of 15 to 20 fronds.

"People coming from up north or other parts of the country are expecting to see palm trees, so I don't see them disappearing entirely from the landscape," said Charles Marcus, a certified arborist who wrote an urban tree management plan for West Palm Beach. "But it would benefit most communities if they increased the percentage of hardwoods and I think it's something cities will have to consider."

Palms aren't even an option at City of West Palm Beach community tree giveaways, and a 2018 city ordinance puts an emphasis on using more shade trees in new construction, especially parking lots where 75% of the required trees must now be shade trees.

"We're not trying to seek out and replace palm trees with canopy trees, but we are looking at if we have to do a replacement, would a canopy tree fit," said Penni Redford, resilience and climate change manager for West Palm Beach.

Three years of studies in cities including Baltimore, Richmond, Va., and Washington by the National Oceanic and Atmospheric Administration

found that areas covered in concrete with few trees could be 17 degrees warmer than shaded areas.

The same study conducted in West Palm Beach this past August found a heat-index temperature of 122 degrees near downtown, compared to 92 degrees taken during the same time period near the wetlands area of Grassy Waters Preserve.

"These are samples taken in one time period and one day out of the year, but given the conditions, the difference is staggering," said Michael Rittehouse, sustainability project coordinator for West Palm Beach.

Trees cool the air two ways. The matrix of leaves in the canopy reduces the amount of sunlight absorbed by the ground, which limits how much warmth is radiated back into the air. Trees also cool the air through transpiration—a process where water vapor is emitted by a tree's leaves.

Large, fast-growing trees capture the most carbon. Mahogany and gumbo limbo trees with 20-inch diameter trunks at chest height remove about 80 pounds of carbon per year. The sabal palm captures less than a pound, according to Marcus' tree management plan.

But there are challenges to growing a live oak or mahogany in urban areas. Compacted soils and tiny tree holes in decades-old streetscapes are harsh environments for roots that like to spread.

In its more than $9 million makeover of three blocks on Clematis Street, West Palm Beach is using for the first time special planting structures that it hopes will allow shade trees to grow in the busy downtown. Foxtail palms were replaced with live oaks using plastic honeycomb-like cells backfilled with soil that support the sidewalk underground but give roots room to grow.

Ray Caranci, landscape planner for West Palm Beach, said a previous beautification project downtown put in the foxtail palms because the design couldn't accommodate canopy trees.

"You have to create space for the trees to grow while still supporting the engineering requirements to hold everything up," Caranci said.

West Palm Beach's goal is to have a net zero greenhouse gas emission by 2050, meaning the carbon emitted into the atmosphere is balanced by the carbon removed.

Trees are not recognized for their carbon consumption by the Intergovernmental Panel on Climate Change when considering carbon neutrality, but Redford believes they will be soon.

"We know planting shade trees is helpful, whether it's officially counted or not," Redford said.

Downtown West Palm Beach's tree canopy—a lattice of leaves and branches that cast a cooling shadow on the ground—is just 14%. That compares to a citywide average, excluding Grassy Waters Preserve of 25%.

Delray Beach's tree canopy is 23%, but ranges from 15% to 29% depending on the area.

Both cities had tree canopy assessments completed in May. Boynton Beach expects to begin an assessment by the end of the year.

Other city tree canopies range from Gainesville's high of more than 50% and Coral Gable's 47% coverage to less than 20% in Orlando and 15% in Miami.

Marcus said a canopy goal of 40% was once the industry benchmark, but it was quickly realized most urban areas could never reach that.

Instead, tree canopy assessments look to maximize plantings, identifying neighborhoods with smaller canopies so cities can target those areas.

In West Palm Beach, historic neighborhoods such as Prospect Park, El Cid and Southland Park south of downtown have tree canopies between 39% and 45 percent.

On the lower end is Pleasant City, which has a canopy of 21%. The community north of Palm Beach Lakes Boulevard includes some industrial areas, an elementary school and multiple empty plots owned by the West Palm Beach Housing Authority. About 26 acres of public and private property is available for planting in Pleasant City, according to the tree canopy assessment.

In Delray Beach's assessment, it's noted that saltwater-intolerant trees should be avoided along the Intracoastal waterway because of tidal flooding—something expected to get worse with sea level rise. Cabbage, coconut and royal palms are among several palms considered salt-tolerant.

"There will always be a place for palms; each site has to be looked at specifically," Caranci said. "It's not canopy trees at the expense of palms, it's where can we find and provide more tree canopy."

An increase in development has put a premium on large shade trees, said Jeremy Thornton, owner of JD Thornton Nurseries in Clewiston.

The average tree sold in the past was 14 to 16 feet tall, but now the demand is for 20 to 25 feet, Thornton said.

A 30-foot live oak tree with delivery and installation can cost up to $10,000.

To keep up with demand, Thornton has agreements with owners of large plots of land, such as cattle ranches, that allow him to take large trees off the property when needed.

"It definitely makes sense to get away from palm trees," Thornton said. "A large shade tree, as opposed to a coconut tree, is a statement but also can keep a property cooler."

At least one palm tree expert is less enthusiastic about the shade-tree movement.

David Fox, an urban forestry specialist with the University of Florida, said Florida's state tree, the sabal palmetto, or cabbage palm, can be good for small spaces. They can live for more than 100 years and have the highest rate of hurricane survival of any tree in the state, he said.

Live oaks were also found to have high survival rates during hurricanes because they lose their leaves quickly, have strong roots and a high root density, according to a UF Urban Forest Hurricane Recovery study.

Still, Fox is a palm fan. He gave a presentation earlier this year to the International Society of Arboriculture on why cabbage palms are the "ideal Florida urban tree."

"Clusters of palms can be inexpensively planted to provide near instant shade for less money than waiting for a large canopy tree to mature," he said. "If there is no room for a canopy tree, there is likely room for a palm."