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Communication

Attitudes towards Tree Protections, Development, and Urban Forest Incentives among Florida (United States) Residents

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Abstract: Tree ordinances can be an effective means of preserving urban forests in the face of development pressures. Despite this, they also have the potential to be divisive among the public – especially when applied to privately-owned land. In this study we surveyed 1,716 Florida urban residents to understand how they value regulation and management of the urban forest. Specifically, we asked about: tree protection ordinances, incentive programs to manage or plant trees, justification for tree removal, and development. Most respondents supported tree protections, even when applied to trees on their own property or when they had the potential to limit development activities. Additionally, there was limited support for removing healthy trees for development. Respondents supported the use of funds for urban forestry efforts – particularly at the local or state level.

Keywords: green infrastructure; tree by-laws; tree ordinances; urban forest governance

Introduction

Florida (United States) is a rapidly growing state which adds more impervious surface area annually than any other state aside from Texas (Nowak and Greenfield, 2018). Past research in the Atlanta metropolitan area has shown that a 1% increase in impervious surfaces was associated with a 1.56% loss in tree canopy (Hill et al. 2010). As such, it is perhaps unsurprising that Florida also leads the United States in urban tree loss (Nowak and Greenfield, 2012). Recognizing this trend, many local governments in Florida have adopted tree protection and mitigation ordinances such as removal permits and planting requirements to limit tree loss in the face of this continued development pressure (Koeser et al. 2021). The state has been long recognized for its use of ordinances to protect trees, even on private property (Coughlin et al., 1988). Florida cities are twice as likely to have private tree protections in place compared to the national (United States) average (Koeser et al. 2021).

Beyond being commonplace, research has demonstrated the effectiveness of tree protection ordinances in limiting the impacts (e.g., canopy loss) of development and redevelopment on urban forests. Hill et al. (2010) investigated the role tree removal permits and construction and heritage tree protections played in predicting tree canopy cover among Atlanta (United States) suburbs. The authors found that the presence of these protective measures was associated with higher levels of canopy coverage (Hill et al., 2010). Landry and Pu (2010) observed that Tampa (United States) sites

developed after a series of tree protection and planting ordinances were enacted had greater canopy coverage compared to similar sites developed just prior to the addition of these laws. In a similar study, Sung (2012) found that the passage of a new law requiring permits for the removal of trees on private property led to an increase in the average tree height in the city of Lakeway, Texas (United States). More recently, Hilbert et al. (2019) found that Florida (United States) cities with heritage tree protections had more tree canopy compared to peer cities lacking these protections. When this research was expanded to incorporate more communities (n=300) and account for external factors like hurricanes, a similar benefit was observed (Salisbury, 2022).

While this kind of research demonstrates the effectiveness of protective ordinances in maintaining tree canopy, their use can be divisive. This is especially the case when local protections are applied to private trees (Zhang and Zheng 2011, Conway and Bang, 2014). In assessing the perceived importance of tree ordinances in Alabama (United States), Zhang and Zheng (2011) observed that 50% of respondents indicated that local protections were "very important: on new construction sites. This increased to 55%, when protections applied to publicly owned trees. In contrast, only 17% of the respondents indicated protections applied to individually owned yards were "very important" - with roughly as many participants selecting the lowest rating "not important" (Zhang and Zheng, 2011). Conway and Bang (2014) observed a similar division in support amongst their respondents with 43% of Mississauga (Canada) residents "agreeing" or "strongly agreeing" with a proposed tree protection by-law on private property and 29% percent "disagreeing" or "strongly disagreeing." When interviewed about their responses, several respondents simply did not want to lose control over what trees were present on their property (Conway and Bang, 2014).

In 2019, this conflict between the preservation of trees that provide benefits to the wider community and the protection of property owner rights was played out in the Florida State Legislature (Koeser et al., 2021). Submitted as a bill titled, "Private Property Rights", the eventual statute that resulted from this legislative effort preempted local tree protections for trees deemed "dangerous" by an International Society of Arboriculture Certified Arborist – allowing them to be removed without notice (permit) to the local government and without mitigation for the canopy lost. While revised in 2022 to more clearly define which trees and property types are covered through this preemption, the original intent of the statute (limiting local government oversight of private tree preservation) remains intact.

Given this shift in urban forest governance, we sought to assess the values of Florida residents as they relate to tree protections —both as they apply to publicly and privately owned trees. Specifically, we were curious about their ideas regarding three questions: who should fund tree planting and maintenance operations (Zhang et al. 2007); when is tree removal justified (Kirkpatrick paper); and whether homeowners support incentive-based policies that reward them for tree planting and retention. We suspect that the punitive nature of many tree protections (which can involve citations and fines for noncompliance) can limit their support and long-term viability. These questions were included in a survey of Florida residents, and the findings from this effort and their implications for urban forestry management are detailed below.

Methods

We conducted a survey of Florida (United States) residents to gauge their support for urban tree protections, funding, and incentives. We looked at past works to see what questions were posed in order to add more data to previously established narratives regarding public support of tree protection ordinances and by-laws. The survey was contracted through an online panel service (Centiment, Denver, Colorado, United States). We worked with this panel service to get a representative sample of the state's residents with respect to age, gender, and race given current U.S. Census estimates. Moreover, we used United States Department of Agriculture Rural-Urban Continuum Codes (USDA RUCC) to select residents living in counties with metro areas less than 250,000, 250,000 to 1,000,000, and more than 1,000,000 people. We intended to recruit a minimum of 1600 respondents for a projected margin of error of +/-3% at a 95% level of confidence. We ended up with a final sample 1,716 respondents.

We limited our survey to under 5 minutes in length (23 questions) to avoid respondent fatigue. In addition, we included an attention check question to ensure they were not responding at random. This question was, "We would like to ensure you are reading each question and responding thoughtfully. Please select green as your answer." Respondents who selected one of the four alternative color alternatives other than "green" were excluded from the reporting and analysis. Some of the questions were only pertinent to property owners. As such, we asked respondents whether they owned or rented their home - applying skip logic for renters to bypass the questions that did not apply to them (Appendix A). Other demographic information regarding age, gender, and race was derived from their account meta data – allowing us to further reduce the number of questions needed to achieve our research goals.

Data analysis was primarily conducted using descriptive statistics such as means. In some cases, differences in proportions were assessed using the `prop.test()` function in R (R Core Team, 2022). Prior to collecting responses, the survey was reviewed and declared "exempt" by the University of Florida Internal Review Board (IRB).

Results and Discussion

Respondents to this survey provided insight into their perceptions of tree retention during development. When asked if they would support or oppose protecting mature, healthy trees from removal if it meant restricting development, 66% of our respondents selected "support" or "strongly support" (Table 1). In contrast, 15% percent of respondents selected either "oppose" or "strongly oppose" (Table 1). When asked if they would support or oppose increasing development if it meant removing multiple mature, healthy trees 65% of respondents selected "oppose" or "strongly oppose" (Table 1). Only 17% of respondents responded "support" or "strongly support" development if it meant removing large trees. (Table 1).

Table 1. Support for tree protection ordinances (both on public and private property) and development among Florida (United States) residents (n = 1,716).

Question	Strongly oppose	Oppose	No opinion	Support	Strongly support
Would you support or oppose protecting mature, healthy trees from removal if it meant restricting development in your community?	6% (107)	9% (147)	19% (325)	33% (570)	33% (567)
Would you support or oppose increasing development in your community if it meant removing multiple mature, healthy trees to do it?	29% (492)	36% (611)	19% (320)	12% (207)	5% (86)
Would you support or oppose ordinances that prevent the removal of mature, healthy trees on public property?	9% (156)	14% (241)	17% (291)	34% (585)	26% (443)
Would you support or oppose ordinances that prevent the removal of mature, healthy trees on your property? ^z	14% (134)	21% (210)	12% (116)	30% (293)	24% (234)

^zOnly shown to respondents who noted they were homeowners.

When asked if they would support or oppose ordinances that prevent the removal of mature, healthy trees on public property, 60% of respondents selected either "support" or "strongly support" (Table 1). When homeowners were asked the same question with regard to protections of trees on their own property, 54% selected either "support" or "strongly support" (Table 1).

With regard to incentives, support was high among our survey takers. Four out of five (82%) homeowners said they would consider planting a tree on their property if they were offered a tax incentive as compensation for the benefits their tree provides the community. Similarly, 86% of

homeowners said they would consider retaining a tree on their property if they were offered a similar incentive.

There are examples of communities employing incentives in an effort to protect trees and promote planting efforts during site development and redevelopment (Ordóñez-Barona et al. 2021). For example, Seattle (United States), Washington state (United States), and Helsinki (Finland) all have green rating tools which provide tax rebates to developers based on the amount of greening they preserve or produce (Ordóñez-Barona et al. 2021). In Hawaii, trees designated as "exceptional" based on age, size, species, location, and other factors such as historical significance have had rather robust protections afforded to them since 1975. Recognizing that proper care is an investment in the health and longevity of a tree, the state has allowed the owners of these trees to claim a tax deduction for and maintenance costs incurred during the course of the year (Ordóñez-Barona et al. 2021).

When asked if it was important that government fund tree planting and maintenance efforts, the majority of respondents selected "very important" to "extremely important" (Table 2). Responses varied slightly based on level of government with 65% of survey takers noting it was "very important" to "extremely important" that the state provided funding for these activities. In contrast 54% (P-value < 0.001) of respondents felt similar about funding from the federal government and 55% (P-value < 0.001) of respondents felt similar about funding from their local community (Table 2).

Our findings were somewhat contrary to the findings of Zhang and Zheng (2011) when they surveyed Alabama (United States) residents regarding their preferences for funding community urban forestry programs. In their survey, respondents rated local property tax as a slightly more important source of funding than either state sales tax or state income tax (Zhang and Zheng, 2011). Interestingly, private donations were viewed as the most important funding source for financing community tree programs by their respondents (Zhang and Zheng, 2011). Similarly, Zhang et al. (2007) found that their respondents placed greater importance (69% "very important") on local government funding of urban tree planting and maintenance over state (61% "very important") and federal (52% "very important") sources.

Table 2. Responses to the question, “How important is it that the following entities provide funding for the planting and maintenance of trees on public property?” (n = 1,716).

	Not important	Somewhat important	Moderately important	Very important	Extremely important
Local community	4% (71)	16% (269)	24% (415)	33% (567)	23% (394)
State of Florida	4% (61)	10% (176)	21% (364)	34% (585)	31% (530)
Federal Government	9% (153)	15% (250)	23% (392)	27% (460)	27% (461)

When asked when it was justified to remove a tree, the two most selected answers were "the tree is diseased and could fall over/break apart" (72%) and "the tree is dead" (73%) (Table 3). Examples of interfering with existing property or infrastructure were also supported, though to a slightly lesser degree (Table 3). The least supported scenario for tree removal were "the tree is ugly/aesthetically unpleasing" (15%), the trees is in the wrong location/interferes with yard usage" (12%), "tree drops messy fruit and/or leaves" (13%) and "the tree is in the way of proposed home construction/expansion" (15%) (Table 3).

Table 3. Responses to “Which of the following would justify the removal of a mature, healthy tree in your yard or in your apartment’s common area (Check any that apply)?” (n = 1,716).

Scenario	Percentage (%)	Count
The tree is dead	73	1245
The tree is diseased and could fall over/break apart	72	1243
The tree is growing into a building’s foundation/roof	64	1094

The tree is interfering with sewer/septic	62	1071
The tree is interfering with power lines/utilities	58	991
The tree is lifting pavement/sidewalks	51	883
The tree is ugly/aesthetically unpleasing	15	257
The tree is in the way of proposed home construction/expansion	15	254
The tree drops messy fruit and/or leaves	13	218
The tree is in the wrong location/interferes with yard usage	12	205
None apply	6	103
Other (key in)	<1	7

Kirkpatrick et al. (2012) conducted a study in Western Australia and categorized their respondents into group based on their beliefs surrounding tree planting and removal. Our respondents behaved like their "practical tree lovers" and "tree hazard minimizers"—two groups who supported tree removal in cases where tree failure was a concern. The former of these two groups valued trees for their aesthetics and other tangible benefits like fruit production, provided that maintenance was not too burdensome (Kirkpatrick et al., 2012). The latter group, as its name implies, included people looking to minimize risk associated with limb failure, utility conflicts, and fire (Kirkpatrick et al., 2012). Interestingly, the observed support for our "The tree is in the way of a proposed home construction/expansion" justification for removal (15%) was similar to what was observed with Kirkpatrick et al.'s (2012) "tree hugger", "native wildlife lover", and "tree indifferent" (i.e., least likely to plant trees or view them in a spiritual light) groups when asked a similar question.

Conclusion

Overall, support for tree protections was high among our respondents. The support was relatively unwavering regardless of whether it was applied to publicly- or privately-owned trees. Moreover, respondents favored tree protections even if they limited development activities (which were viewed as insufficient justification to warrant tree removal). This noted, support was even higher for tax incentives tied to tree planting and retention, indicating that tree protections need not be punitive in nature to be effective. Future efforts should focus on identifying which incentives are sufficient to entice developers and homeowners to plant and retain trees and assess whether their associated cost is in line with what local governments are able and willing to invest in their urban forests.

Appendix A. Select survey questions on urban tree protective ordinances, public funding, and justifications for tree removal answered by 1,716 Florida, United States residents.

Would you support or oppose protecting mature, healthy trees from removal if it meant restricting development in your community?

- Strongly oppose
- Oppose
- No opinion
- Support
- Strongly support

Would you support or oppose increasing development in your community if it meant removing multiple mature, healthy trees to do it?

- Strongly oppose
- Oppose
- No opinion
- Support
- Strongly support

Would you support or oppose ordinances that prevent the removal of mature, healthy trees on public property?

- Strongly oppose
- Oppose
- No opinion
- Support
- Strongly support

How important is it that the following entities provide funding for the planting and maintenance of trees on public property?

Local Community	Not important	Somewhat important	Moderately Important	Very Important	Extremely important
State of Florida	Not important	Somewhat important	Moderately Important	Very Important	Extremely important
Federal Government	Not important	Somewhat important	Moderately Important	Very Important	Extremely important

Which of the following would justify the removal of a mature, healthy tree in your yard or in your apartment's common area? (Check any that apply)

- The tree is ugly/aesthetically unpleasing
- The tree is in the wrong location/interferes with yard usage
- The tree drops messy fruit and/or leaves
- The tree is lifting pavement/sidewalks
- The tree is interfering with sewer/septic
- The tree is interfering with power lines/utilities
- The tree is growing into a building's foundation/roof
- The tree is in the way of proposed home construction/expansion
- The tree is diseased and could fall over/break apart
- The tree is dead
- Other, namely_____

Do you rent or own your home?

- Rent
- Own

Would you support or oppose ordinances that prevent the removal of mature, healthy trees on your property? (Renters skip)

- Strongly oppose
- Oppose
- No opinion
- Support
- Strongly support

Would you consider planting a tree on your property if you were offered a tax incentive to compensate you for the benefits provided to the community? (Renters skip)

- Yes
- No
- Unsure

Would you consider retaining and maintaining an existing tree on your property if you were offered a tax incentive to compensate you for the benefits it provides to the community? (Renters skip)

- Yes
- No
- Unsure

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