

Municipal Forestry in Texas: The Application of a Unique Combination of Performance Metrics

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The purpose of this research study was to assess the current state of municipal forestry programs in Texas using widely accepted measures of program size and activity. This study was designed to be repeated in the future so that Texas can track changes in municipal forestry activity over time, emulating the success of such efforts in California and Oregon. However, we employed a unique combination of measurements based on a review of 17 similar studies (see references) that assessed urban forestry activity and/or spending at the state, regional, or national level. Measurements were also adapted from the US Forest Service (USFS) Urban and Community Forestry Program's reporting system that state urban forestry coordinators use to compile information for the USFS.

We adapted the measurements for use here that would assess municipal forestry program size and activity, rather than practitioner opinion as several other studies have done. Measurements were selected which would assess the elements of a municipal forestry program deemed critical for success based on the literature and personal experience as a municipal forester. This new combination of measurements is worth repeating in other states as they represent a potential standard set of measurements, ideal for comparing against other states and within a given state over time.

We measured four major factors 1) municipal forestry program success, 2) municipal spending on urban forestry activities, 3) quantity of assistance received from the State Urban Forestry Program, and 4) the population of each city. **Table 1** below shows these four major factors in the left-hand column, and the associated survey questions in the right-hand column.

Table 1: Survey questions used for this study

Categories	Survey Questions
I. Demographics	
A. City Population	1) What is the name of your City? (Answer: open-ended) 2) What is your City's population as of the most recent Census data? (Answer: open-ended and will be the number of the residents in that City)

B. City Budget	3) What was your City's annual budget during fiscal year 2012 in dollars? (Answer: open-ended and will be a dollar value)
C. U&CF Program Budget	4) How much did your City spend during fiscal year 2012 on Urban Forestry activities? (ex: tree planting, tree removals, tree pruning, urban forestry staff, tree care contracts, one-time special projects, etc) (Answer: open-ended and will be a dollar value)
D. Tree Population	5) How many trees are on public property in your City? (Answer: open-ended and will be a value or they will circle Don't Know).
II. U&CF Program Elements	
A. Staffing Level	6) How many full-time equivalent employees (FTEs) are dedicated to urban forestry in your City? (note: increments of 0.25 are acceptable for example an employee who spends half their time on urban forestry responsibilities would be 0.50)? (Answer: open-ended and will be a value in increments of 0.25)
B. Tree Ordinance	7) Please check all that apply. Does a tree ordinance exist that: A) establishes either a tree board (commission), or a forestry department/urban forester position? (Answer: yes or no or don't know) B) provides guidance on planting, maintaining, and removing trees on public property (planting 10ft from fire hydrants, 20 ft from street corners, etc)? (Answer: yes or no or don't know) C) regulates the removal of large trees on private property (requires a permit)? (Answer: yes or no or don't know) D) requires trees on private property to be protected during construction? (Answer: yes or no or don't know)

C. Advocacy	8) Does a tree board or tree commission currently exist? (Answer: yes or no or don't know) 9) Does a non-profit group currently exist that regularly facilitates or donates tree planting or tree care on public property? (Answer: yes or no or don't know)
D. Management Plan	10) Is a Comprehensive/Master Urban Forest Plan mandated or required by your tree ordinance? (Answer: yes or no or don't know) 11) Does a Comprehensive/Master Urban Forest Plan currently exist? (Answer: yes or no or don't know) 12) If a Plan does exist, was it primarily written by in-house staff or contracted out? (Answer: in-house or contracted or don't know) 13) If a Plan does exist, is it updated regularly (every 2-5 years)? (Answer: yes or no or don't know)
E. Tree Inventory	14) A) Does a street tree inventory exist? (Answer: yes or no or don't know) B) If yes, is the street tree inventory a sample or comprehensive inventory? (Answer: sample or comprehensive or don't know) C) If yes, was the street tree inventory performed in-house or contracted? (Answer: in-house or contracted or don't know) 15) A) Are street trees on a proactive maintenance cycle? (Answer: yes or no or don't know) B) If yes, how many years in length is the street tree maintenance cycle? (Answer: 3, 4, 5, 6, 7, or other open-ended, or don't know) C) Is street tree maintenance contracted, in-house, or both? (Answer: in-house or contracted or both or don't know) 16) A) Does a park tree inventory currently exist? (Answer: yes or no or don't know) B) If yes, is the park tree inventory a sample or

	comprehensive inventory? (Answer: sample or comprehensive or don't know) C) Was the park tree inventory performed in-house or contracted? (Answer: in-house or contracted or don't know) 17) A) Are park trees on a proactive maintenance cycle? (Answer: yes or no or don't know) B) If yes, how many years in length is the <u>park</u> tree maintenance cycle? (Answer: 3, 4, 5, 6, 7, or other open-ended, or don't know) C) Is park tree maintenance contracted, in-house, or both?
F. U&CF Program Position within the City	18) Counting up, if the Mayor/City Manager is #1, what number is the employee in charge of trees on public property? (for example: mayor #1, parks director #2, urban forester #3 - the answer would be 3) (Answer: 1, 2, 3, 4, 5, 6, 7, or other open ended or don't know) 19) Where is the individual housed who is responsible for trees on public property? (Answer: Public Works Dept., or Parks and Recreation Dept., or Parks, Recreation, and Forestry Dept., or Street Dept. or Urban Forestry Department or other open ended or don't know)
III. Assistance from State-level Program	
A. Financial Assistance	20) In FY 2012, how many times has your U&CF Program received financial assistance from the Texas A&M Forest Service – Urban Forestry Program? (Answer: open ended value of the number of times assistance was received)
B. Technical Assistance	21) In FY 2012, how many times has your U&CF Program received technical assistance or advice from the Texas A&M Forest Service – Urban Forestry Program? ? (Answer: open ended value of the number of times assistance was

	received)
C. Educational and Training Assistance	22) In FY 2012, how many times has your U&CF Program received educational or training assistance from the Texas A&M Forest Service – Urban Forestry Program? (ex. Number of employees to attend annual conference) (Answer: open ended value of the number of times assistance was received)

The questionnaire was distributed to 241 cities in Texas, all population 5,000 or greater (about 33% response rate). Statistical analysis of data consisted exclusively of descriptive statistics and cross tabulation. Repeating this study in the future for the same population would generate data allowing for statistical significance to be assessed within the same measurement over time, greatly increasing the value of repeating the study.

Cross tabulation is a method of displaying descriptive statistics that allows for trends to be easily identified between two variables. **Table 2** below is an example of a cross tabulation table used in the analysis of this study. It shows the average spending on urban forestry activity in a city broken down by the four city size categories used throughout this study (small 5,000-29,999, medium 30,000-99,999, large 100,000-499,999, and mega 500,000+).

Observing **Table 2** some trends emerge immediately. Small and Large cities have similar average spending on urban forestry per capita and spending on urban forestry as a percent of the city's total budget. Medium and mega cities have very similar average spending on urban forestry per capita, but mega cities spend much less than medium cities on urban forestry as a percent of the city's total budget.

Table 2: Average spending displayed by city size

City Size	\$ per Capita		Total % of City Budget	
	Respondents	Average	Respondents	Average
Small	26	\$7.10	22	0.62%
Medium	23	\$2.11	21	0.29%
Large	13	\$6.21	12	0.69%
Mega	4	\$2.06	4	0.08%
Overall	66	\$4.88	59	0.48%

Results and Discussion

Expenditures on urban forestry activities are low compared to the findings of related literature. On average, Texas cities of any size are spending less on urban forestry per capita today than the average U.S. city was spending at any period previously recorded; 1974¹, 1980², 1986³ or 1994⁴. If the Arbor Day Foundation's Tree City USA expenditure requirement of \$2 per capita (set in 1974) is adjusted for inflation, it rises to \$9.38 in 2012 dollars; only about 13% of respondents meet or exceed this adjusted value.

There appears to be a strong connection between a city receiving assistance from the Texas A&M Forest Service and those cities currently possessing the measures of municipal forestry program success. However, only 14% of respondents indicated they had received financial assistance (grants, scholarships to conferences, etc.). In contrast, many more respondents indicated they had received technical assistance/advice or educational assistance such as support for attending conferences, etc. (51.7% and 49.1% respectively). Note that the mission of the Texas A&M Forest Service – Urban Forestry Program is to “to help build *self-sustaining* urban forestry and tree care programs...” (emphasis added) –not to *fund* local programs.

Some measures of municipal forestry program success were more common among Texas municipalities than others. Strong tree ordinances were among the most common, including municipal codes that protect trees on private property during construction activity (48.1%) or regulate the removal of trees on private property (43%). Tree boards (41%) and non-profit groups (40.3%) were both fairly common as well, though not as prevalent as expected considering they cost little or nothing beyond the time of dedicated volunteers.

Urban forestry management plans were very uncommon (13.2%) and there appears to be a strong connection between high expenditure rates and management plans. Plans were most common among large cities (pop. 100,000-499,999). Inventories of street trees (20.3%) or park trees (22.2%) are also uncommon, whether they are comprehensive or sample inventories. The same connection to high expenditure rates seen with management plans can't be made here with inventories. Many municipalities reported to be on proactive tree maintenance cycles despite the lack of any inventory at all – 47.1% indicated that their street trees and 59.7% that their park trees are on a proactive maintenance cycles.

There is no single city in Texas (that responded to this survey) that can be held up as an example of having an all-encompassing municipal forestry program. However, there are many cities that have many of the elements of a successful municipal forestry program. For example, The Woodlands is a large community of about 105,000 outside of Houston which spends about 5% of the city's total budget on urban forestry activities (about \$43 per capita). They have a master urban forest plan that is updated regularly and they regulate the removal of trees on private property. However, The Woodlands has no tree board or advocacy group, and no inventory of their trees at all. They don't require trees on private property to be protected during construction and the individual responsible for urban forestry is eight steps removed from city leadership.

¹ (Ottman and Kielbaso 1976)

² (Giedraitis and Kielbaso 1982)

³ (Kielbaso et al. 1988)

⁴ (Tschantz and Sacamano 1995)

Despite having no single ‘shining example’, the prevalence of many of these critical elements of a successful municipal forestry program is encouraging. Comparing these results from Texas to results from Massachusetts isn’t ideal because Massachusetts has state laws regarding tree protection and a long history of local tree wardens, but local ordinances are still implemented regularly in Massachusetts and there is little other recent data to compare to.

Rines (2007) found that 41% of communities had advisory or advocacy groups, which is very similar to the results found in Texas (41% tree boards, 40.3% non-profit advocacy). However, inventories were much more common in Massachusetts (62%) than in Texas (20.3% street trees, 22.2% park trees), as were management plans (MA 36%; TX 13.2%) and ordinances requiring the protection of trees during construction (MA 69%; TX 48.1%). However, the presence of general tree ordinances was very similar (MA 64%; TX 58.2%).

Kuhns et. al. (2005, 287) performed a survey of Utah communities and found that 53% of respondents had sought assistance from Utah State University County Extension service and 36% had sought assistance from the state-level urban and community forestry program (Forestry, Fire and State Lands – Urban and Community Forestry). For comparison, 54.8% (n=62) of Texas communities received at least one of the three categories of assistance (financial, technical, or educational).

Summary

There isn’t much data to compare against these results from Texas and so state urban forestry coordinators in all states should begin performing this type of municipal forestry program assessment regularly, possibly using the set of measurements presented here. The USFS Urban and Community Forestry Program should consider requiring this of their state coordinators, and possibly supplementing the existing system with the measurements presented here.

Based on the best data available, Texas communities are below average on spending on urban forestry activities. The presence of ordinances and advocates/advisors seems to be normal, but the presence of management plans and inventories is disappointing. As the results from Texas indicate a connection between spending and the presence of management plans, increasing spending may result in more management plans – about half of those communities with management plans indicated a contractor was primarily responsible for creating the document.

The Texas A&M Forest Service – Urban Forestry Program seems to be reaching municipal forest managers about as much as should be expected. The results of the amount of assistance received strongly represents their strategy of using their budget primarily for staff to advise and educate local urban forest managers, as opposed to ‘funding’ them through grants and other means.

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