

URBAN FOREST MASTER PLAN FOR DES MOINES – Connecting the Dots

Introductory Chapter written by David Jahn, Des Moines City Forester, 2011-2020

INTRODUCTION AND MASTER PLAN SUMMARY

The recurring theme of this urban forest master plan (UFMP) is ‘CONNECTING THE DOTS.’ It may be an understatement to say that people don’t make a conscious daily connection with trees. Trees are abundant and we are surrounded by them, like the air we breathe or the light and temperature we enjoy. We don’t consciously think about them because trees are just always there. However, trees in the ‘urban setting’ are not naturally present; trees are not abundant in the city of their own accord; trees are not always healthy and strong; urban trees actually need the help of humans to thrive. We need to advocate for and intervene on behalf of trees because life in the city is tough for woody plants. Thus there is a critical need to connect residents with trees.

The only early trees native to Des Moines would have been the few species that enjoyed life along the edge of the two rivers in downtown Fort Des Moines. Their seeds may have been deposited by birds or animals arriving to take a drink, and the resulting trees found a home in the rich floodplain soil with a ready water supply and abundant Iowa sunshine. There may also have been an occasional oak savannah amongst the tall prairie grasses. Many of the balance of city trees since those settlement days were planted by early residents. Unfortunately, it seems that only when the tree requires human

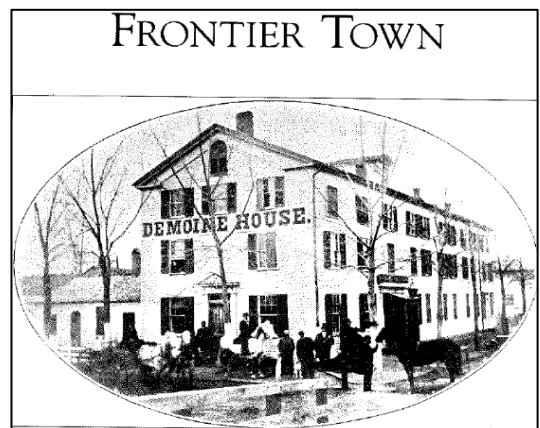


Figure 1. Originally named the Pennsylvania House, the Des Moines House opened in 1855 at First and Walnut in downtown



Figure 2. The ‘iconic’ sycamore trees of Thompson Ave. aren’t there by chance. Someone with foresight ‘connected the dots’ and planted them 80+ years ago

intervention due to insects, disease or storm damage, do we pay it any attention, and perhaps then only to grumble about the cost of repair or removal. The UFMP theme of ‘Connecting the Dots’ then, attempts to educate and inspire us toward a stronger connection in a way that will heighten our appreciation of trees and the many and diverse benefits they supply.

Residents reading the Des Moines UFMP will be challenged to consider how important trees are to daily life, and to the vibrancy of the city. Every chapter is written with Des Moines residents in mind. Local or regional data was used in each chapter, to ensure that all the information is relevant to Des Moines. Every chapter provides the strong connection



to the life-enhancing benefits of trees. These benefits include the oxygen we breathe, cooling for our city, capturing stormwater to lessen the impact of major storm events, reduced reliance on stormwater drainage infrastructure, home energy benefits such as reduced cooling and heating costs, safer walking environments, reduced and more appropriate urban traffic speeds, rain, sun, heat and skin protection, increased neighborhood security, increased retail business traffic on streets with trees, reduced harm from tailpipe emissions, softening and screening of street and building features, lower urban air temperatures, reduced road rage, lower ozone, added property value for adjacent homes and businesses, reduced blood pressure and improved overall emotional and psychological health, and a strong connection to nature and the human senses. Some of these concepts are discussed at

length in the chapters of the UFMP. See also ([http://www.walkable.org/download/22 benefits.pdf](http://www.walkable.org/download/22%20benefits.pdf)) .

Figure 3. TreeKeeper Volunteers plant trees in Meredith Neighborhood 2015 (Meredith merged with Beaverville in 2017)

SETTING GOALS FOR URBAN TREE CANOPY IN DES MOINES

Creating an UFMP is much the same process as planning a business expansion, preparing for a wedding, or in the present case ensuring a healthy urban tree canopy. Effective planning that leads to appropriate and sustainable goals typically has three components:

1. know what you have
2. know what you want
3. know how to get there

WHAT DO WE HAVE?

A city-wide tree inventory was conducted between 2015 and 2017. It captured data on 49,000 street trees and park trees in mowed and people-use areas of all parks and cemeteries. The local non-profit Tree Des Moines played a major role in gathering support and funding for this inventory. They secured a commitment from the city for half the funding, and their fundraising efforts gathered matching funds from various local entities. The data from this inventory was

the first ever captured in its totality for the public portion of the urban forest. Following are species and condition elements of the inventory.

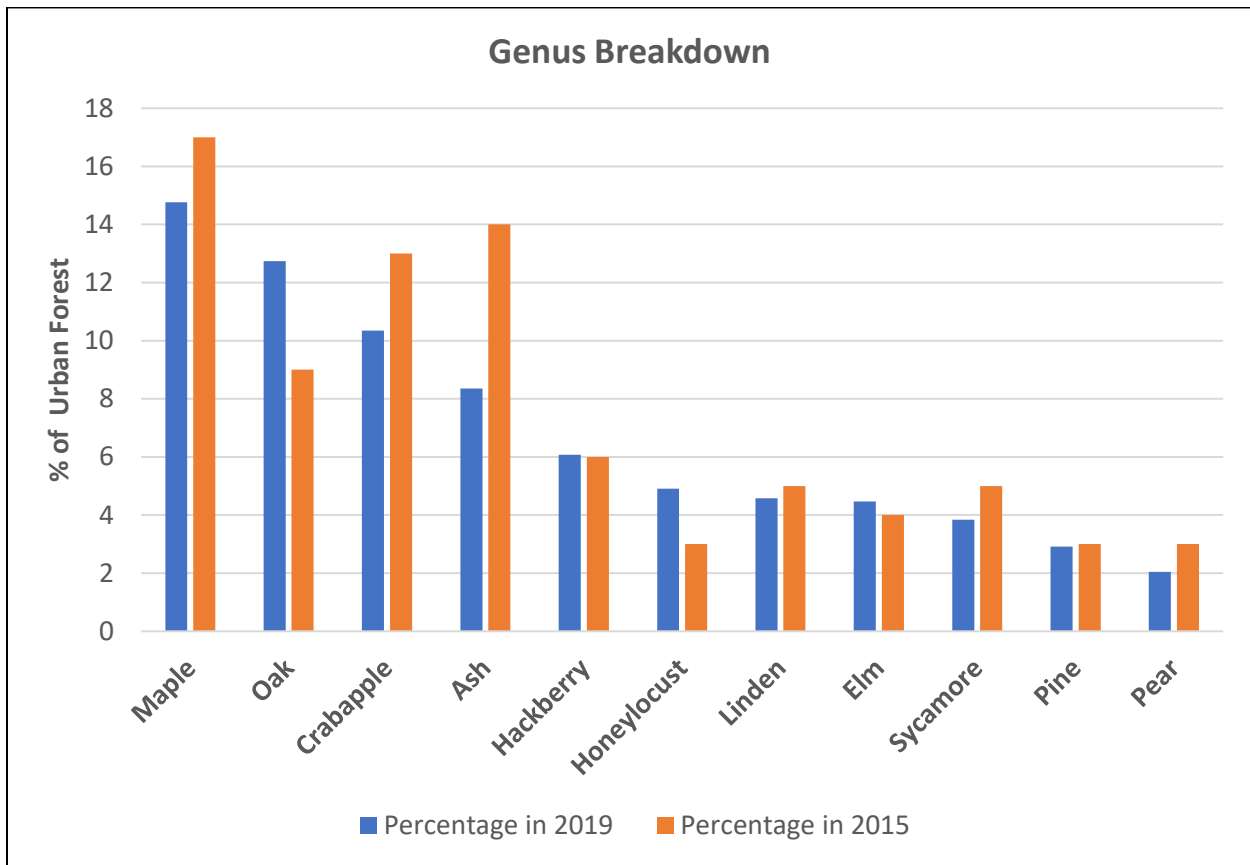


Figure 4. Genus breakdown taken from TreeKeeper8, the city tree inventory software. This graph shows only the 11 highest quantity species. Overall, there are 196 species on public property.

<u>Genus</u>	<u>Quantity</u>	<u>% of canopy</u>
Acer (maple)	7303	15%
Quercus (oak, all species)	6302	13%
Malus (crabapple)	5120	11%
Fraxinus (ash)	4133	9%
Celtis (hackberry)	3005	6%
Gleditsia (honeylocust)	2430	5%
Tilia (linden)	2265	5%
Ulmus (elm)	2212	5%
Platanus (sycamore)	1899	4%
Pinus (pine)	1441	3%
Pyrus (pear)	1013	2%

When the inventory was completed in 2017, Fraxinus (ash) represented **15%** of the urban tree canopy. In 2020, this has been reduced to **9%** due to the efforts of the city to proactively remove ash due to emerald ash borer losses.

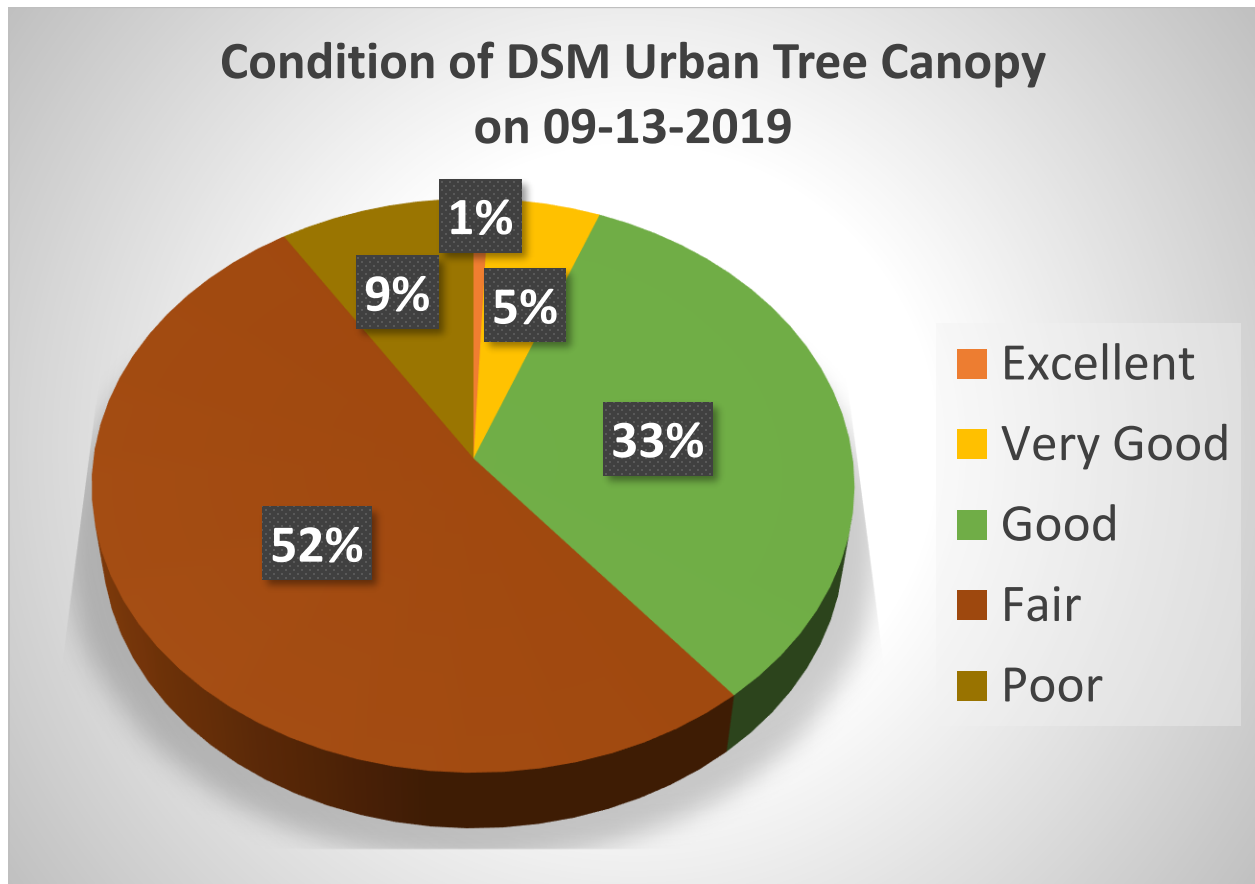


Figure 5. Condition breakdown taken from TreeKeeper8, the city tree inventory software.

CONDITION	QUANTITY
Excellent	350
Very Good	2546
Good	16250
Fair	25465
Poor	4446

The Tree Condition information (above and left) informs us that overall we have a very high percentage of trees in Fair, Good, Very Good and Excellent Condition (91%). In many cases a tree in Fair condition can be upgraded to Good when it is skillfully pruned to remove dead wood or correct poor structure.

We did not have a complete picture of our tree canopy condition before 2017, so the results of this inventory are a great encouragement concerning the health of our urban tree canopy. The City of Des Moines can confidently advance management of the urban tree canopy with the knowledge that we are not working from a deficit position.

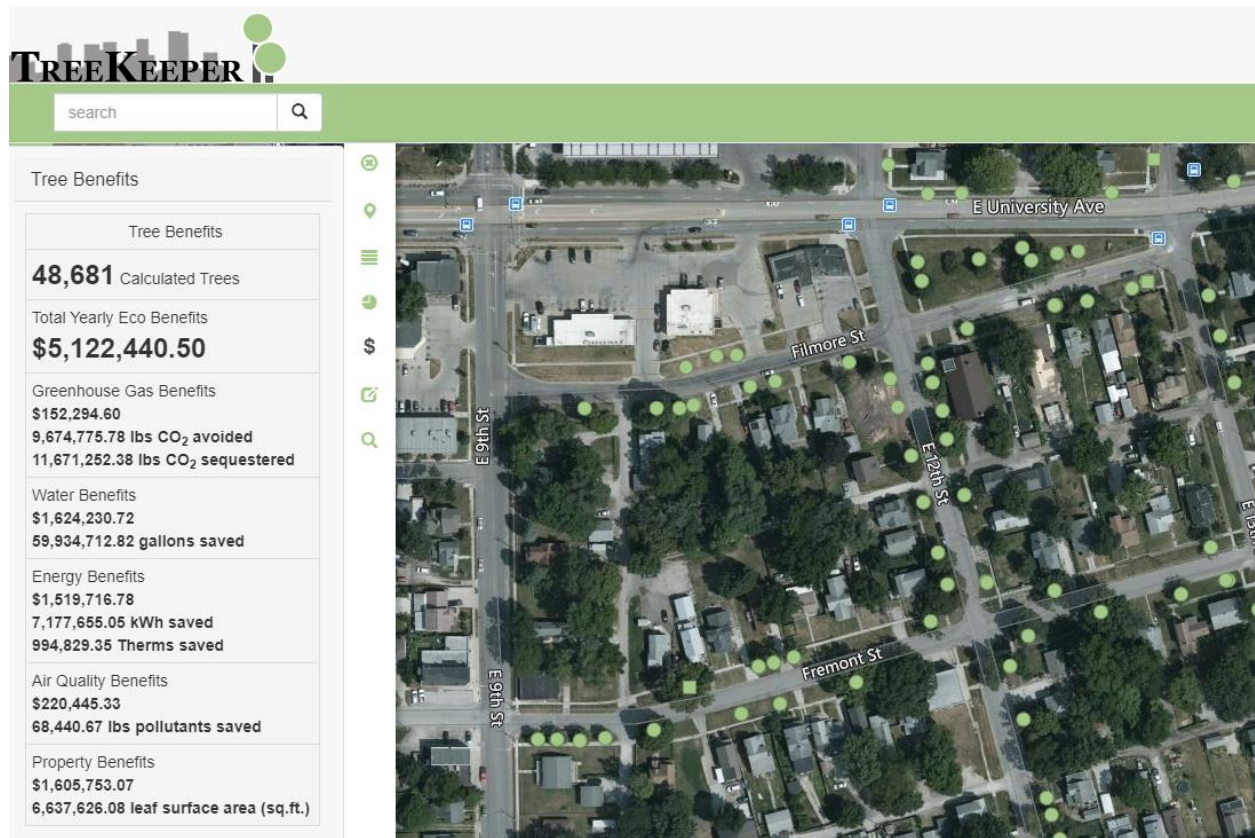


Figure 6. The above screenshot from the TreeKeeper8 inventory software shows some of the 49,000 inventoried trees in Des Moines. Residents can visit <https://desmoinesia.mytreekeeper.com/> to learn about city trees. The inventory was conducted by Davey Resource Group from Kent, OH. It was paid for by City of Des Moines with matching funds from the non-profit Tree Des Moines. This typical aerial view of the city also demonstrates that ‘private properties are the largest owner and influencer of tree canopy in the urban area.’

The green dots on the above image represent some of the 49,000 trees on public property. The left column also documents the total ecological and economic benefits of these trees, worth over \$5M annually. Consider just one of these - the water benefits. Sixty (60) million gallons of stormwater is annually kept out of the gutter, streams and rivers by the simple act of urban trees doing what they naturally do. Photosynthesis is the process whereby a tree absorbs water and nutrients from the soil, and using the energy from the sun, converts carbon dioxide into the oxygen we breathe plus sugars to sustain the tree. Additionally, some of the water that trees uptake is released back into the atmosphere for cooling. Note the \$1.6M in annual benefits due to the tree’s ability to manage stormwater.

URBAN FOREST MASTER PLAN – CITY OF DES MOINES, IA - 2020

An urban tree canopy (UTC) assessment was performed by the United States Forest Service and the University of Vermont in 2009, with a goal of identifying urban forest opportunities in the urban area of Des Moines. The finding at the time was that Des Moines had a 27% canopy cover (existing UTC on the graphic below). This was updated in 2014 to show that we had a 29% canopy cover (this increase was primarily due to annexation of properties previously outside city boundaries).

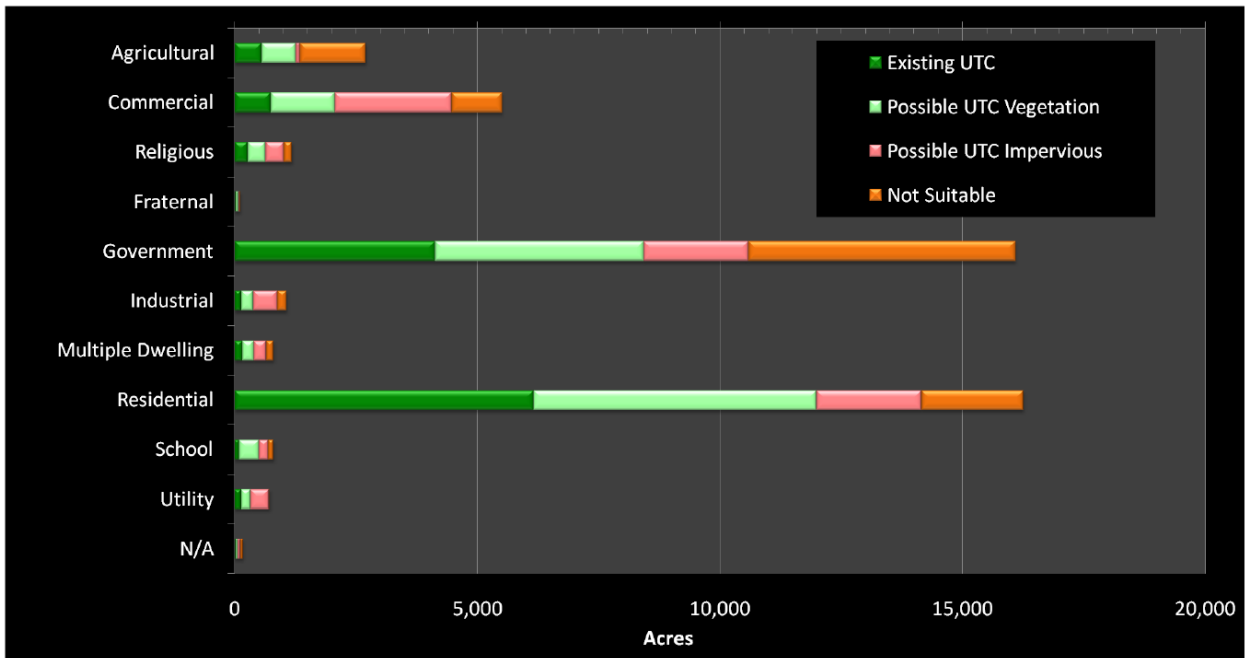


Figure 7: “Des Moines, IA. UTC metrics summarized by parcel land use. The majority of the city’s tree canopy is under the management of the city’s residential population. Residential areas also contain the highest amount of available land to plant trees but planting initiatives will be easier to institute on government land, which also has a high amount of Possible UTC” (quote from UTC Report, 2009).

The following terms lend understanding to Figure 7 above.

Tree Canopy: The layer of leaves, branches, and stems of trees that cover the ground when viewed from above.

Land Cover: Physical features on the earth mapped from satellite imagery such as trees, grass, water, and impervious surfaces.

Existing UTC: The amount of urban tree canopy present when viewed from above using aerial or satellite imagery.

Possible UTC: The amount of land that is theoretically available for the establishment of tree canopy. This excludes areas covered by tree canopy, roads, buildings, and water.

This critical information provided by the U.S. Forest Service Urban Tree Canopy (UTC) study helps to establish a baseline measurement of our tree canopy in order to forecast potential future losses and plan for canopy increase as well as improvements to canopy health.

WHAT DO WE WANT?

In the preceding discussions about our TreeKeeper inventory and the UTC assessment, sufficient data has been presented to show what Des Moines already has. The aforementioned inventory data points to 49,000 public trees with the majority in Fair to Very Good Condition. In the UTC, the 'Possible UTC' indicates that we have plenty of room to grow the urban tree canopy. This is a great place from which to launch a master plan. Now the second question; "What do we want?"

A critical component for addressing the question 'What do we want' is an urban tree canopy vision statement for Des Moines. With a cogent vision statement as a beginning point, setting, prioritizing and achieving meaningful tree canopy goals will naturally follow. An indispensable element of a vision statement sets forth what the desired outcome of the plan will be. In other words, 'what will the Des Moines urban tree canopy look like as a result of the plan?' Some parts of the following vision statement are a present reality, and other parts are vision casting as the City of Des Moines sets its sights on improvement and expansion.

URBAN TREE CANOPY VISION STATEMENT

"The City of Des Moines will be a community identified with and shaded by a 'living tree canopy.'

The urban tree canopy will be recognized as a vital,

functioning part of the city's infrastructure and will be included in the vision for all future development. Members of the entire Des Moines community will experience a healthier well-being from the urban tree canopy through reduced energy costs, reduced pollution and softened city noise. The urban tree canopy cover will be extensive and reduce the heat island effect within the city. Des Moines residents will view the urban tree canopy as an important part of the city's character and as an indicator of the city's health and livability. Relying on the Urban Forest Master Plan (UFMP), the City of Des Moines will actively encourage participation in tree planting and stewardship, preservation and protection of existing trees, promote public safety and tree health, implement cost effective planting and maintenance of trees, increase public awareness of the value of our community trees, assist metro partners to develop employment opportunities maintaining the urban tree canopy, and maximize the social, economic, and environmental benefits of the community tree canopy for current residents and future generations."



This vision statement captures the multiple benefits of trees and is intended to inspire Des Moines residents to learn about, care for and promote the urban tree canopy.

Urban trees are so important in the city that every municipality in Iowa has a tree canopy growth goal of 3% over the next 25 years. The 3% goal was established by the Iowa Department of Natural Resources, with strategic input from the Iowa Urban Tree Council (IUTC; members listed below). Tree canopy is defined as the layer of leaves, branches and stems of trees covering the ground when viewed from above. The canopy is inclusive of all public and private property trees. To meet the 3% goal, we need an additional 3800 trees planted every year. These 95,000 additional trees may sound like a lot, but the target considers the normal loss of 700-1000 trees per year to old age, storm damage or other structural and health issues. By the year 2045 we will only be doubling our current tree inventory. When Des Moines meets this 3% growth target, the city will have increased tree cover from 29% to 32% in this 25-year period.



Members of IUTC

- Iowa DNR
- U.S. Forest Service
- Iowa Department of Agriculture and Land Stewardship
- Iowa Association of County Conservation Boards
- Iowa Cities (all sizes of municipalities are represented; Des Moines is a member)
- Iowa Nursery and Landscape Association
- Iowa Colleges and Universities (representatives from Iowa State University, Drake University, and Des Moines Area Community College faculties of Horticulture, Extension, Forestry, Biology and Landscaping)
- Arboretums and Public Gardens
- Non-profits (Trees Forever and Tree Des Moines)
- American Planning Association (Iowa Chapter)
- American Parks Association (Iowa Chapter)
- American Society of Landscape Architects (Iowa Chapter)

Various chapters of the Des Moines UFMP include local research and findings about how trees currently support neighborhoods. They further demonstrate a need to spread the tree resource and benefits more equitably throughout the city. Each chapter has recommendations. Not surprisingly there is a recurring recommendation to plant additional trees to fully capture all the benefits available to us from trees. This recommendation is consistent with growing our urban tree canopy by 3%. It is also consistent with ensuring maximum enjoyment of benefits by all residents of Des Moines, and with reminding everyone why Des Moines is a 'Best City to Live In' (<https://realestate.usnews.com/places/iowa/des-moines>).

Beyond meeting 3% growth goals for the urban tree canopy, Des Moines will follow the 12 national recommendations from Vibrant Cities Lab. The U.S. Forest Service, American Forests and the National Association of Regional Councils created Vibrant Cities Lab to help city managers, policymakers and advocates build thriving urban forest programs (<https://www.vibrantcitieslab.com/>). Many allied agencies contributed to the recommendations (<https://www.vibrantcitieslab.com/allies/>).

Each Vibrant Cities Lab recommendation below is followed by bulleted descriptions of how Des Moines will strive to accomplish the same goal locally.

Recommendations from Vibrant Cities and Urban Forests: A National Call to Action

1. Create a national education and awareness campaign.

- Declare 2020 ‘The Year of the Tree’ in Des Moines
- Direct resources toward public education and awareness about the importance and benefit of trees
- Engage all forms of traditional and social media to spread the word about trees
- Host or co-sponsor tree education events and classes

2. Foster urban forestry and natural resources stewardship and volunteerism.

- Celebrate National Volunteer Day/Week with tree events
- Recognize tree volunteers with nomination for recognition by local, state and national groups
- Build on the partnership with the non-profit Trees Forever
- Continue building momentum with the Growing Futures program to plant new trees with an emphasis on job opportunities for high school and college students
- Continue to cooperate in the TreeKeeper Volunteer training program
- Promote and support corporate volunteerism

3. Create sustainable jobs in urban forestry and green infrastructure.

- Support youth job creation through Growing Futures
- Support DMACC in the creation and sustainability of a forestry job training program
- Work to close the loop on wood waste utilization in a way that creates green jobs

4. Cultivate partnerships between public and private sectors.

- Build corporate, business and residential partnerships directly and through our programs with Trees Forever
- Regularly attend Neighborhood meetings to represent tree initiatives
- Continue membership in statewide allied professional groups (Iowa Arborist Association, Iowa Urban Tree Council, Growing Futures Advisory Committee, others)

5. Develop new public administration models for urban ecosystems.

- Continue to build on existing relationships with city departments (Public Works Forestry, Engineering, Community Development, Parks and Recreation) to preserve existing trees
- Review and update ordinances to ensure trees are being preserved and maintained
- Prioritize street tree planting over park or open space planting in order to maximize tree benefits adjacent to impervious surfaces

6. Create comprehensive, multi-jurisdictional Urban Regional Natural Resource Plans.

- Be a leader and cooperator in the recently formed metro regional forestry managers group
- Cooperate with metro governments to set and accomplish common goals (The Tomorrow Plan)

7. Integrate federal agencies' green infrastructure goals.

- Adopt and facilitate local goals using trees to reduce flooding, improve water quality, reduce combined sewer overflows, increase sewer system capacity and resilience, create permanent jobs in construction and maintenance, reduce urban heat island effect, lower building energy consumption, create and restore wildlife habitat in the urban environment, provide recreation, increase property values, naturally infiltrate stormwater, and cooperate regionally to accomplish these goals (<https://www.hud.gov/sites/documents/GREENINFRASTRUCTSCI.PDF>).

8. Establish energy efficiency programs that emphasize the use of trees.

- Continue to apply for MidAmerican Energy Trees Please funds for planting trees
- Continue to follow Right Tree, Right Place planting protocols for street trees
- Provide public education to achieve energy savings with private tree planting
- Seek corporate commitments to plant residential and public trees for energy savings

9. Ensure equal access to urban forestry and green infrastructure resources.

- Work locally to provide the same degree of benefits and community safety to all areas of the city. This may mean increasing tree planting and maintenance services in traditionally underserved sections of the city
- Seek Federal funding for Environmental Justice tree planting projects

10. Support collaborative urban ecosystem-focused research.

- Continue partnerships with Iowa State University and Extension
- Partner with metro communities to study local effects of trees on stormwater benefits, public safety, the environment and public health
- Use local data to support increased funding for tree planting and maintenance

11. Encourage open access to and use of social assessment tools.

- Encourage Des Moines residents to check TreeKeeper inventory data and make recommendations for projects on their street or in their neighborhood
- Use social media platforms regularly to promote the benefits of trees and invite residents to engage in planting and pruning projects

12. Establish national Vibrant Cities Standards.

- It is now apparent that national standards may never be developed or encouraged, because Vibrant Cities Lab recognizes the need for communities to develop and execute their own local strategies for building and maintaining the urban tree canopy. Des Moines will use the 11 recommendations above to achieve the 3% canopy increase goal, to provide increased and effective public outreach with the urban tree canopy vision statement as its basis, seek appropriate levels of city funding and resources, and support non-profits and corporate partners in volunteerism and funding for planting and maintenance of trees

(The above list of 11 Recommendations are only a fraction of the total number of recommendations in this UFMP. Each chapter adds its own recommendations based upon content and response needed. For more information on the Vibrant Cities & Urban Forests initiative and to access the final report, go to <http://treesarethekey.org> . That online resource center provides a communications toolkit developed by the Sustainable Urban Forests Coalition (SUFC) as the culmination of the original process, now under the broader banner of "Vibrant Communities.")

To this point the first two questions in developing the UFMP have been answered. The first two questions are ‘What do we have’ and ‘What do we want?’ Now we must answer the third very important question, which is ‘How do we get what we want?’

HOW DO WE GET WHAT WE WANT?

The research and writing that inform the main chapters of this UFMP constitute the rationale behind increasing and properly maintaining the urban tree canopy. The chapters also inform the reader about the many benefits of trees. Now that Des Moines is striving for a 3% increase in canopy, to capture and enjoy the many environmental, health and economic benefits of trees, to increase public awareness, to increase public and private partnerships and volunteerism, and to create sustainable jobs built around tree planting and maintenance, it is necessary to provide a roadmap for how this can be accomplished. Following are the three main roadways that must be navigated to grow and maintain the urban tree canopy.

- 1- **USE EXISTING FUNDING -** First, there is already an important funding source in the City Tree Replacement Fund (CTRF). In 2009 City Council took forward-looking action to create this fund to offset tree losses due to development. When city construction projects, sewer expansion for instance, require the unavoidable removal of city trees, monies are placed into the CTRF. The Forestry Division then uses those funds to plant new trees. Currently, the CTRF provides \$200,000 annually that is used for contract planting by the non-profit Trees Forever. The program at this level of funding provides a minimum of 533 new trees including watering and warranty.
- 2- **SECURE NEW EXTERNAL FUNDING AND DONATIONS -** Des Moines needs to plant 3800 new trees annually to meet the 3% canopy increase goal, but the present planting budget only provides 533 trees. The City needs to increase planting funds to \$1 million annually. Planting trees on private property must be part of the solution, but it is the most difficult element of tree canopy expansion (see notes on Page 6, Figure 7). The City will set an annual goal of 500 trees planted on private property. To ensure this level of cooperative tree planting by property owners, the City will promote and entice such planting by offering trees at a reduced cost. The example provided here is if a ¾" caliper tree costs the city \$80 but the city sells it to the property owner at \$30/tree, the net cost to the city (\$50/tree) for this program would only be \$25,000 annually. Next, the City's partnership with the non-profit Trees Forever includes a commitment for the non-profit to raise private and corporate funds to at least double the number of trees planted. If this goal is met or exceeded it will result in an additional 500+ trees annually. This makes our new working total of trees planted an impressive 1500, but still leaves us well short of the 3800 goal. Planting the additional 2300 new trees will cost \$862,500 annually. This forecasted need is 4-5 times the amount we currently spend but considering the current ongoing loss of 15% of our canopy to emerald ash borer, it is abundantly clear that the city must take drastic steps to grow and improve the urban tree canopy as soon as possible. One potential budget allocation may come from the new Local Option Sales & Service Tax (LOSST). Several of the spending targets for LOSST are street improvements and flood prevention, neighborhood improvements, and public safety. Trees as green infrastructure and as site amenities contribute to all of these goals.

- 3- INCREASE QUANTITY AND QUALITY OF TREE MAINTENANCE - In 2016 the Forestry Division compiled necessary statistics to make the case for a cyclical tree pruning program. Remedial pruning to remove dead or diseased branches on a 7-year cycle has the effect of prolonging the life of the tree. This results in a longer-living tree with a larger canopy to help cover impervious roadways and parking lots and soak up water that is shed from structures and hard surfaces everywhere in the city. Due to budget cutbacks and staffing reductions in prior years this type of essential cyclical pruning has not been conducted since the 1970's or 1980's. The conclusion of the Forestry Division study was the recommendation to hire three additional 2-person crews with equipment to begin cyclical pruning. In 2020, the first 2-person crew will arrive and begin working on this tree protection and longevity program. When the hiring of multiple additional crews is complete, the city will marginally increase its canopy coverage to help meet the 3% goal, but more importantly the older existing trees will provide exponentially greater benefits due to the width and depth of canopy and their enormous capacity for consuming stormwater.

This is the end of the Introduction and Summary. The reader now knows what we have, what we want, and how we propose to get it. The excellent content of the chapters that follow will make the case for improving the lives of all residents by building and maintaining a first-class urban tree canopy. It is hoped that as these chapters are studied, the reader will understand and appreciate the important role that trees must play in this great city.

'May the forest be with you!'