Session 3.2

Do the right thing: Planning, designing and managing the urban forest to strengthen its resilience to external shocks.

Chair: Livia Shamir

World Forum on Urban Forests

2nd World Forum on Urban Forests

Washington DC, 2023

Session 3.2: Do the right thing

Look up: Shifting the urban forest composition in Washington, DC to enhance climate resilience

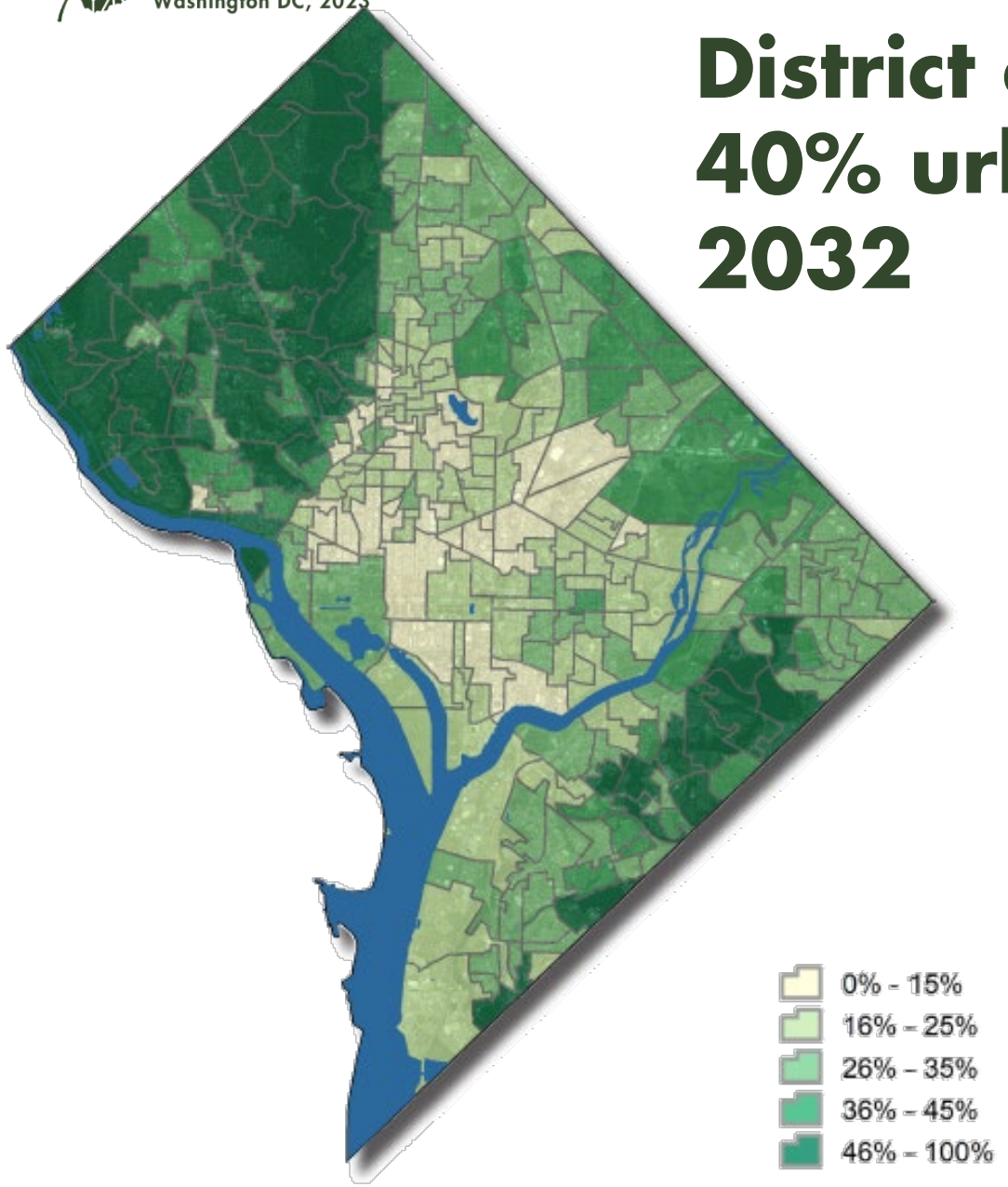
Presented by

Kasey Maria Yturralde, PhD

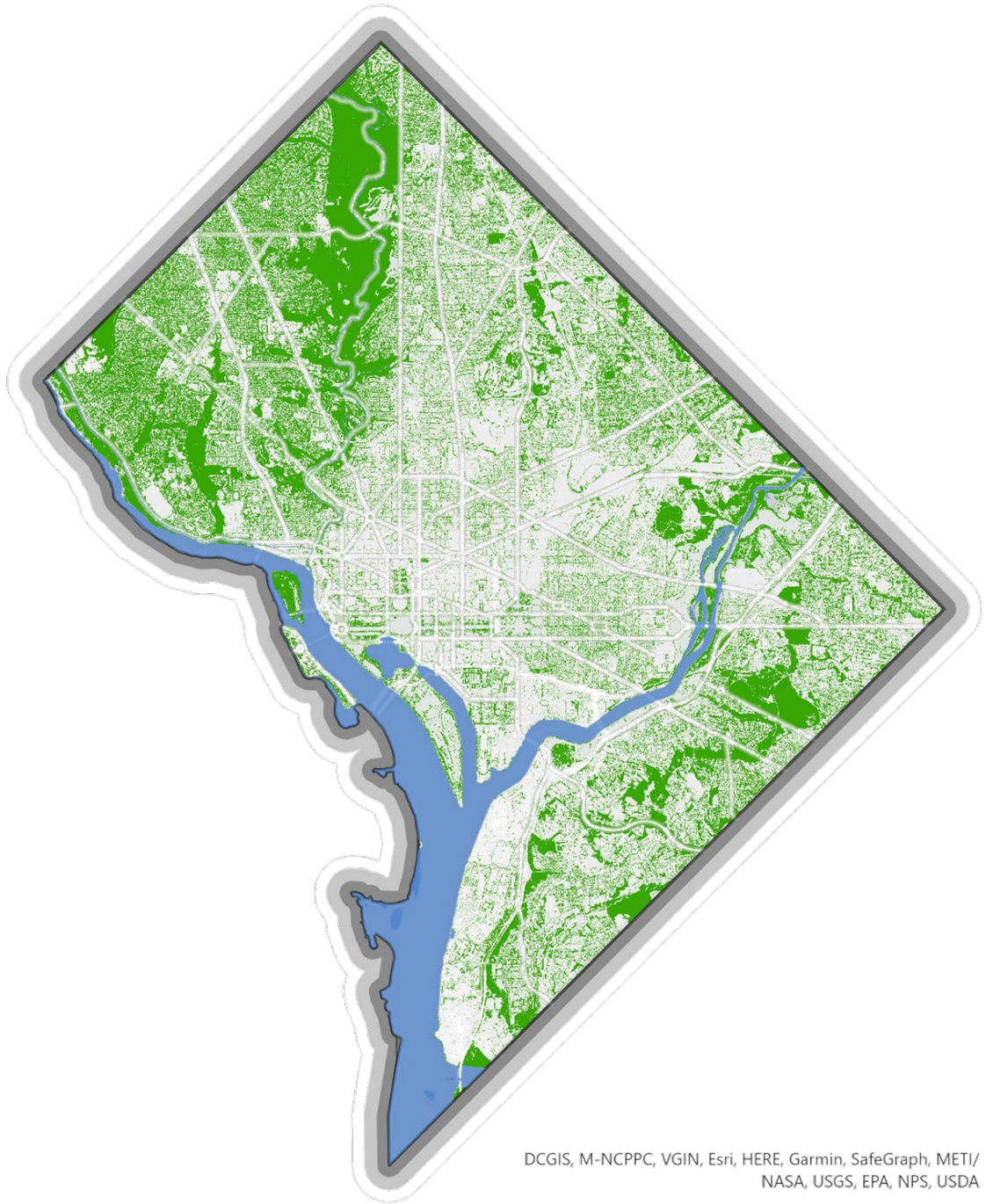
Urban and Community Forestry
US Forest Service

Presenting on behalf of
Urban Forestry Division
District Department of Transportation

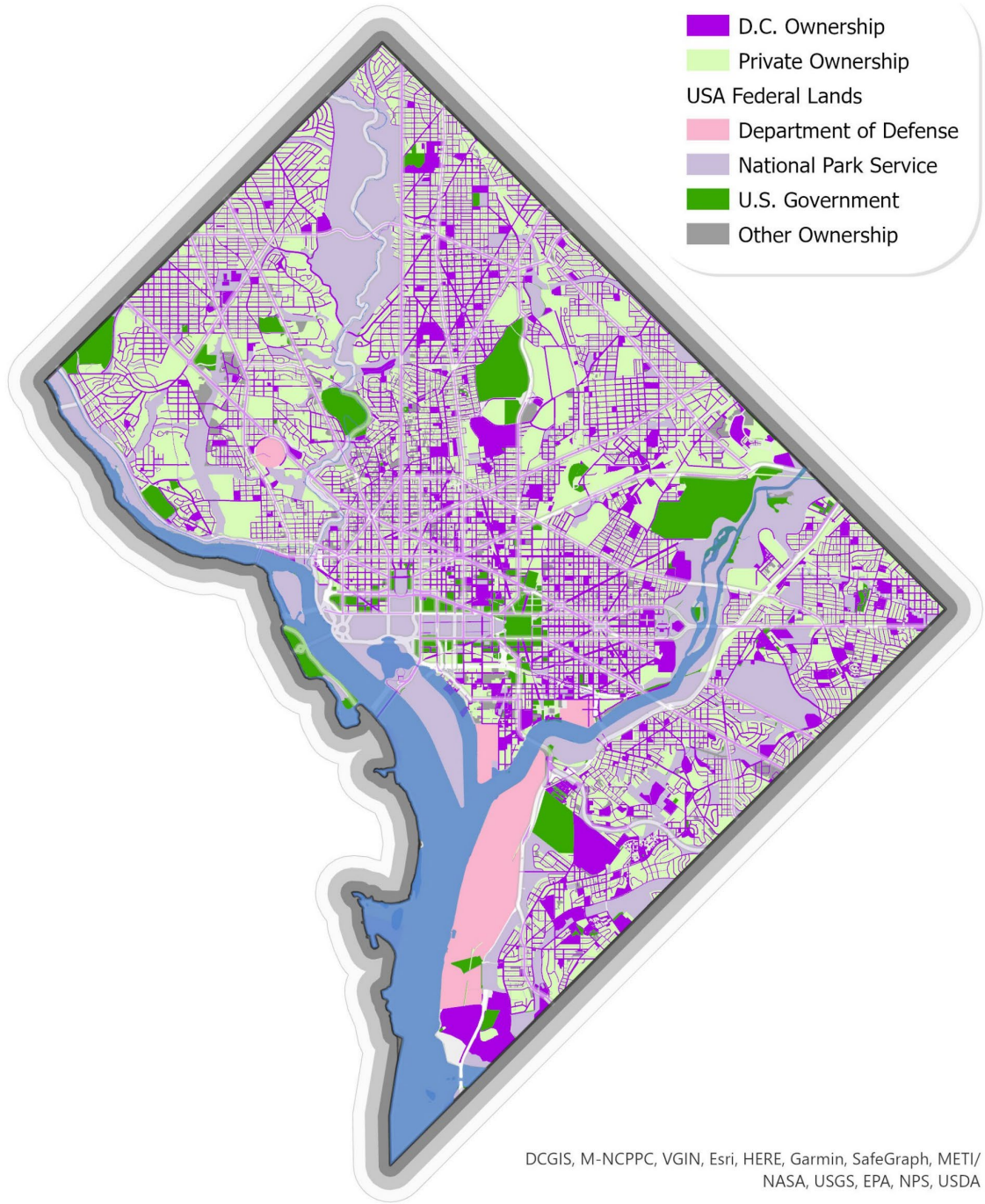
District of Columbia
40% urban tree canopy cover by 2032



- **Direct management**
  - –Trees on city property
  - –Public space permits
  - –Emergency response
- **Indirect management**
  - –Tree ordinance
- **Partnerships**



DCGIS, M-NCPPC, VGIN, Esri, HERE, Garmin, SafeGraph, METI/
NASA, USGS, EPA, NPS, USDA



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Benefits of Urban Forests in a Changing Climate

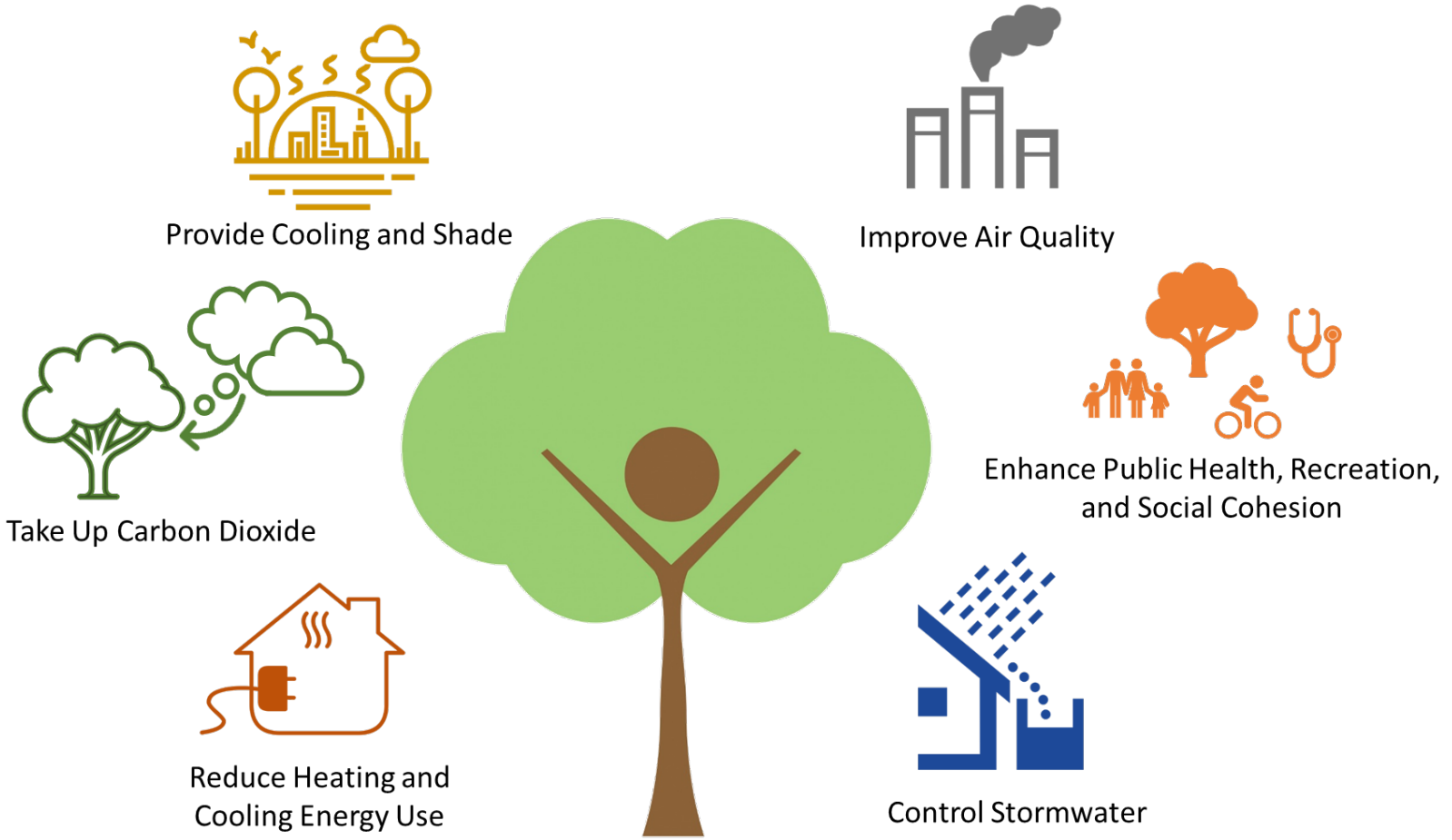


Figure adapted from Northern Institute of Applied Climate Science

Climate change and urban trees

- **Direct impacts**
  - Drought
  - Extreme heat
  - Extreme weather events
- **Indirect impacts**
  - Shifts in insect range and phenology
- **Response of trees**
  - Changes in phenology
  - Change in growth rates

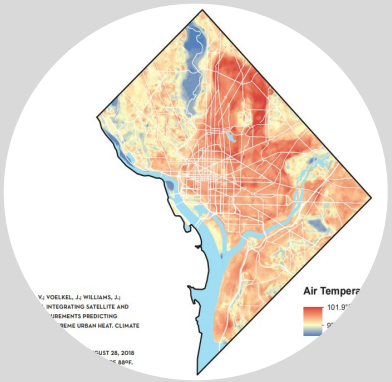
Photo: District Department of Transportation

Photo: Dr David Ellsworth, Western Sydney University

Climate change in the District of Columbia

Climate change and urban forest management in the District

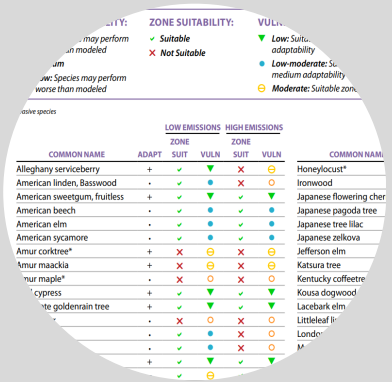
2019



Urban heat mapping

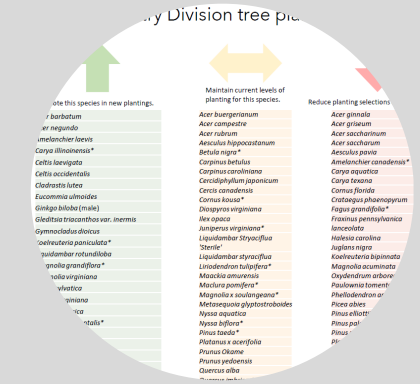
2020

2021



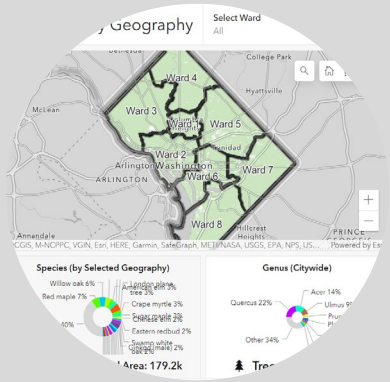
Assessing climate vulnerability and adaptation planning

2022

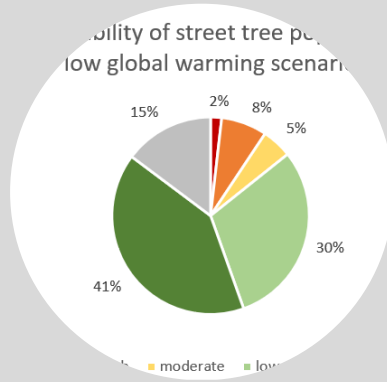


Prioritizing tree species

2023

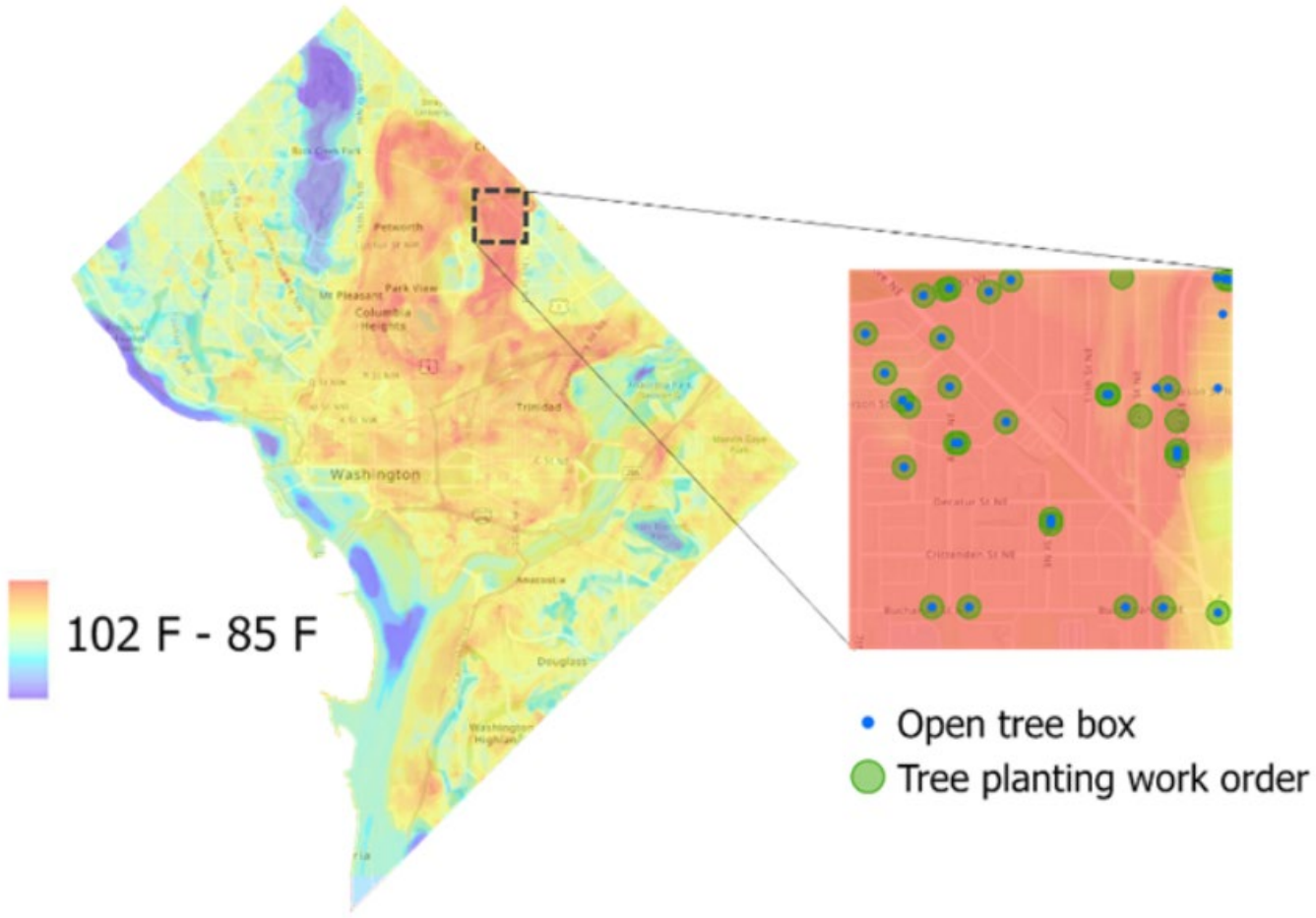


Decision support tool: implementation



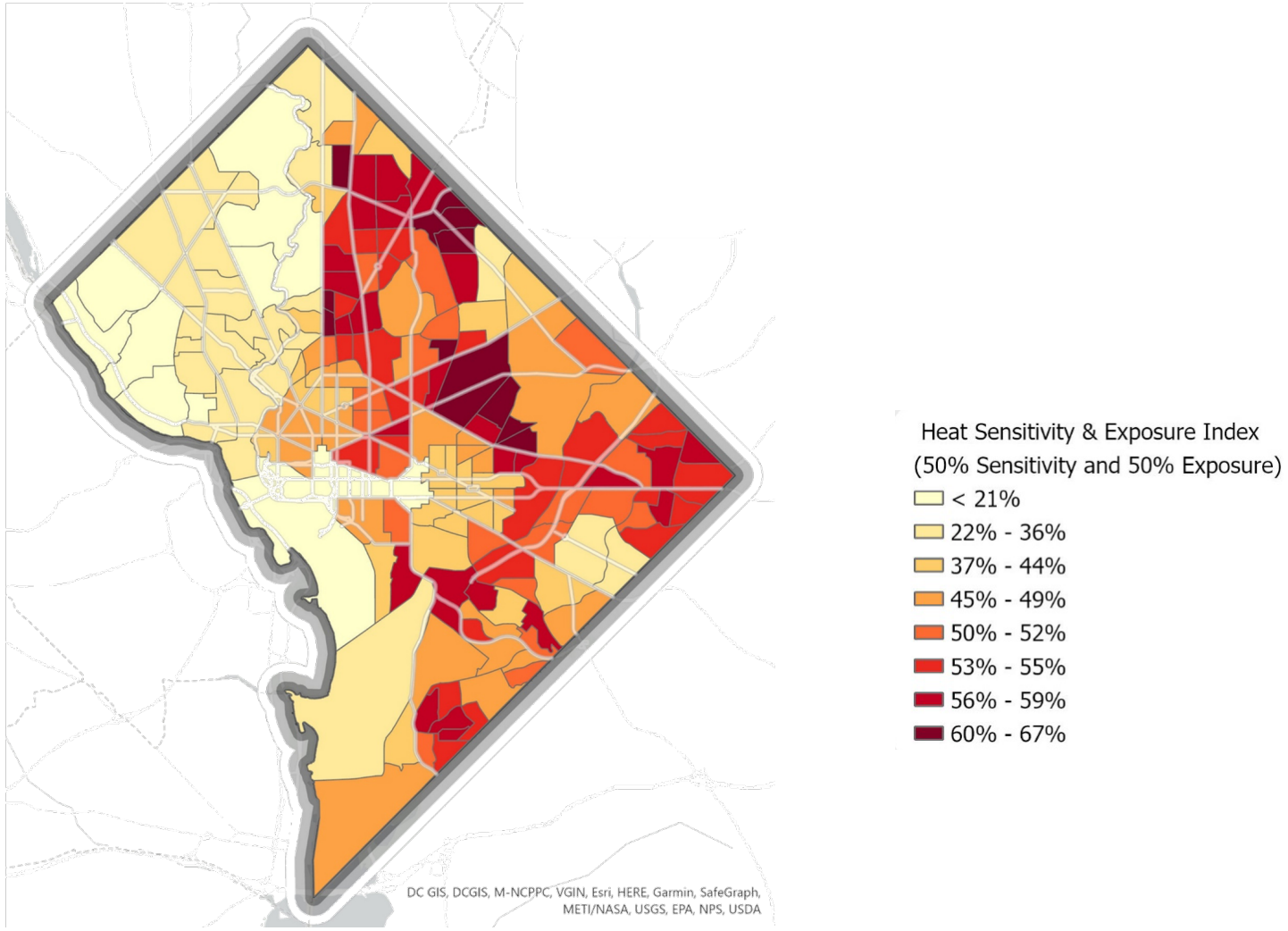
Evaluating progress

Planting trees where they are needed most



Shandas, V., Voelkel, J., Williams, J., Hoffman, J., 2019. Integrating Satellite and Ground Measurements for Predicting Locations of Extreme Urban Heat. Climate 7, 5.

Planting trees where they are needed most



Keep Cool DC 2022, District Department of Energy & Environment

Assessing climate vulnerability: what is at risk?

CLIMATE CHANGE VULNERABILITY OF URBAN TREES
WASHINGTON, D.C.


rjones0856/Flickr

This list was developed to aid Washington, D.C. community forestry practitioners in selecting trees to reduce climate change vulnerability of their urban forests. It is meant to be a complement to other tree selection resources. Other factors may also need to be considered, such as aesthetics, local site conditions, wildlife value, or nursery availability. It is also important to note that some species may have climate benefits but may not be suitable for planting for other reasons, such as having invasive potential or susceptibility to pests or pathogens.

Vulnerability: Trees can be vulnerable to a variety of climate-related stressors such as intense heat, drought, flooding, and changing pest and disease patterns. Climate vulnerability is a function of the impacts of climate change on a species and its adaptive capacity. Species with negative impacts on habitat suitability and low adaptive capacity will have high vulnerability and vice versa. The following factors were used to determine climate vulnerability:

Urban adaptability: Adaptability scores were generated for each species based on literature describing its tolerance to disturbances such as drought, flooding, pests, and disease, as well as its growth requirements such as shade tolerance, soil needs, and ease of nursery propagation. Scores were assigned to species using methods developed in an urban forest vulnerability assessment for Chicago for trees planted in developed sites. A positive score indicates that a species is tolerant to a wide range of disturbances and can be planted on a variety of sites. A negative score indicates a species is highly susceptible to disturbances and/or is limited to specific planting sites.

Hardiness and heat zone suitability: Tree species ranges were recorded from government, university, and arboretum websites. Species tolerance ranges were compared to current and projected heat and hardiness zones for Washington, D.C. using downscaled climate models under low emissions (RCP 4.5) and high emissions (RCP 8.5) scenarios for changes in greenhouse gases. Trees were considered to have suitable zone suitability if the species' tolerance was within the range of current and projected hardiness and heat zone through the end of the 21st century.

NOTE: This list was primarily created for species planted in developed sites, such as streets, yards, boulevards, and parks. If you are interested in projected changes in habitat suitability for native species in natural areas, see the Climate Change Tree Atlas at www.fs.fed.us/nrs/atlas/.

Current and projected USDA Hardiness Zones and AHS Heat Zones for Washington, D.C. Hardiness zone is determined by the average lowest temperature over a 30 year period. Heat zones are determined by the number of days above 86°F.

Time Period	Hardiness Zone Range		Heat Zone Range	
1980–2010	7		7	
	Low Emissions	High Emissions	Low Emissions	High Emissions
2010–2039	7	8	7 to 8	8
2040–2069	7 to 8	8	8	9
2070–2099	8	8 to 9	8	9 to 10

SOURCE: Adaptability scores were assigned using methods developed in an urban forest vulnerability assessment for Chicago by Brandt et al. 2017 (https://www.fs.fed.us/nrs/pubs/gtr/gtr_nrs168.pdf). Future heat and hardiness zone information were provided from: https://usfs.maps.arcgis.com/apps/MapSeries/index.html?appid=96088b1c086a4b39b3a75d0fd97a4c40.

www.forestadaptation.org

URBAN ADAPTABILITY:
- \+ **High:** *Species may perform better than modeled*
- • **Medium**
- – **Low:** *Species may perform worse than modeled*

ZONE SUITABILITY:
- ✓ **Suitable**
- ✕ **Not Suitable**

VULNERABILITY:
- ▼ **Low:** *Suitable zone, high adaptability*
- ● **Low-moderate:** *Suitable zone, medium adaptability*
- ⊖ **Moderate:** *Suitable zone, low adaptability or zone not suitable, high adaptability*
- ○ **Moderate- high:** *Zone not suitable, medium adaptability*
- △ **High:** *Zone not suitable, low adaptability*

*Invasive species

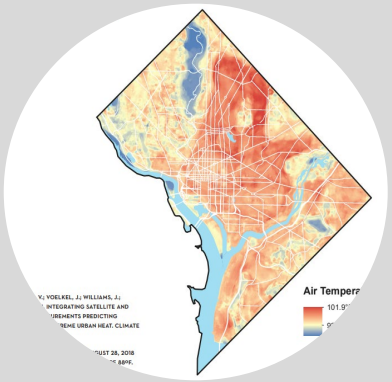
COMMON NAME	ADAPT	LOW EMISSIONS ZONE SUIT	LOW EMISSIONS VULN	HIGH EMISSIONS ZONE SUIT	HIGH EMISSIONS VULN
Alleghany serviceberry	+	✓	▼	✕	⊖
American linden, Basswood	•	✓	●	✕	○
American sweetgum, fruitless	+	✓	▼	✓	▼
American beech	•	✓	●	✓	●
American elm	•	✓	●	✓	●
American sycamore	•	✓	●	✓	●
Amur corktree*	+	✕	⊖	✕	⊖
Amur maackia	+	✕	⊖	✕	⊖
Amur maple*	•	✕	○	✕	○
Bald cypress	+	✓	▼	✓	▼
Bipinnate goldenrain tree	+	✓	▼	✓	▼
Black alder	•	✕	○	✕	○
Black locust	•	✓	●	✕	○
Black oak	•	✓	●	✕	○
Black tupelo, Black gum	+	✓	▼	✓	▼
Black walnut	–	✓	⊖	✓	⊖
Blackjack oak	–	✓	⊖	✓	⊖
Boxelder	•	✓	●	✕	○
Bur oak	•	✓	●	✕	○
Callery pear*	•	✓	●	✕	○
Carolina silverbell	•	✕	○	✕	○
Chestnut oak	+	✓	▼	✕	⊖
Chinese fringetree	+	✓	▼	✓	▼
Chinese magnolia	+	✕	⊖	✕	⊖
Chinese pistachio	•	✓	●	✓	●
Chokecherry	•	✕	○	✕	○
Common hackberry	+	✓	▼	✓	▼
Common horsechestnut	•	✓	●	✕	○
Crapemyrtle	+	✓	▼	✓	▼
Dawn redwood	•	✓	●	✕	○
Downy serviceberry	+	✓	▼	✓	▼
Eastern hemlock	–	✕	△	✕	△
Eastern redbud	•	✓	●	✕	○
Eastern redcedar	+	✓	▼	✓	▼
Eastern serviceberry	•	✕	○	✕	○
Eastern white pine	–	✕	△	✕	△
English oak	•	✓	●	✕	○
European hornbeam	+	✓	▼	✕	⊖
European mountain ash	+	✕	⊖	✕	⊖
Flowering dogwood	•	✓	●	✓	●
Ginkgo	+	✓	▼	✕	⊖
Goldenrain tree*	+	✓	▼	✓	▼
Green ash	•	✓	●	✓	●
Hardy rubbertree	+	✕	⊖	✕	⊖
Hedge maple	+	✓	▼	✕	⊖

COMMON NAME	ADAPT	LOW EMISSIONS ZONE SUIT	LOW EMISSIONS VULN	HIGH EMISSIONS ZONE SUIT	HIGH EMISSIONS VULN
Honeylocust*	•	✓	●	✕	○
Ironwood	+	✓	▼	✓	▼
Japanese flowering cherry	–	✕	△	✕	△
Japanese pagoda tree	•	✓	●	✕	○
Japanese tree lilac	+	✕	⊖	✕	⊖
Japanese zelkova	+	✓	▼	✕	⊖
Jefferson elm	+	✓	▼	✓	▼
Katsura tree	–	✓	⊖	✕	△
Kentucky coffeetree	+	✓	▼	✕	⊖
Kousa dogwood	+	✓	▼	✕	⊖
Lacebark elm	+	✓	▼	✓	▼
Littleleaf linden	+	✕	⊖	✕	⊖
London planetree	•	✓	●	✕	○
Musclewood	+	✓	▼	✓	▼
New Harmony elm	+	✓	▼	✓	▼
Northern red oak	+	✓	▼	✕	⊖
Northern white cedar, Arborvitae	•	✕	○	✕	○
Norway maple*	+	✕	⊖	✕	⊖
Norway spruce	•	✕	○	✕	○
Nutall oak	+	✓	▼	✓	▼
Okame cherry	+	✓	▼	✕	⊖
Osage-orange	+	✓	▼	✓	▼
Overcup oak	•	✓	●	✕	○
Paperbark maple	–	✓	⊖	✕	△
Persian parrotia	+	✓	▼	✕	⊖
Pin oak	•	✕	○	✕	○
Post oak	–	✓	⊖	✓	⊖
Princess tree*	+	✓	▼	✕	⊖
Princeton elm	+	✓	▼	✓	▼
Red buckeye	•	✓	●	✓	●
Red horsechesnut	•	✓	●	✕	○
Red maple	•	✓	●	✓	●
River birch	•	✓	●	✓	●
Sawtooth oak*	+	✓	▼	✕	⊖
Scarlet oak	+	✓	▼	✓	▼
Shingle oak	+	✓	▼	✕	⊖
Shumard oak	+	✓	▼	✓	▼
Siberian elm*	•	✓	●	✓	●
Silver linden	•	✕	○	✕	○
Silver maple	•	✓	●	✕	○
Smoothleaf elm	+	✓	▼	✓	▼
Sour cherry	•	✓	●	✕	○
Sourwood	+	✓	▼	✓	▼
Southern live oak	+	✓	▼	✓	▼
Southern magnolia	+	✓	▼	✓	▼

NIACS
Northern Institute of Applied Climate Science

Climate change and urban forest management in the District

2019

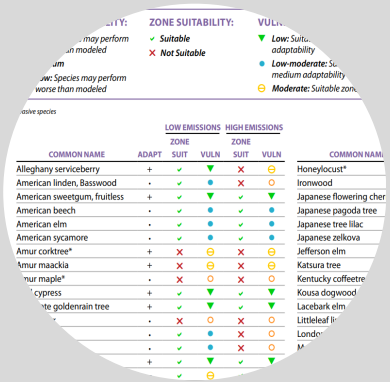


Urban heat mapping

2020

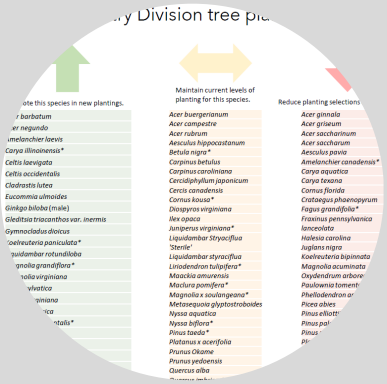
Assessing climate vulnerability and adaptation planning

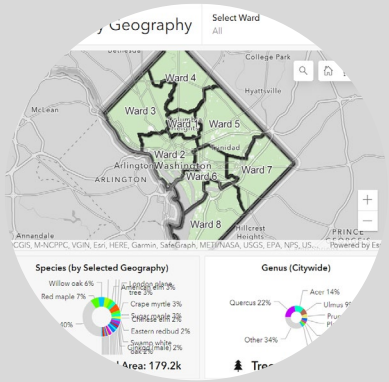
2021



Prioritizing tree species

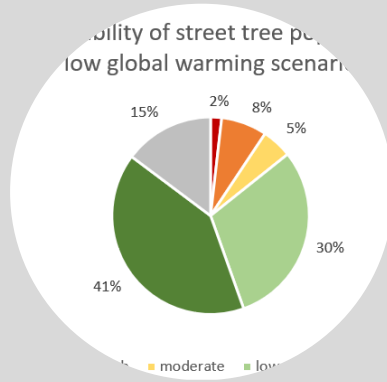
2022





Decision support tool: implementation

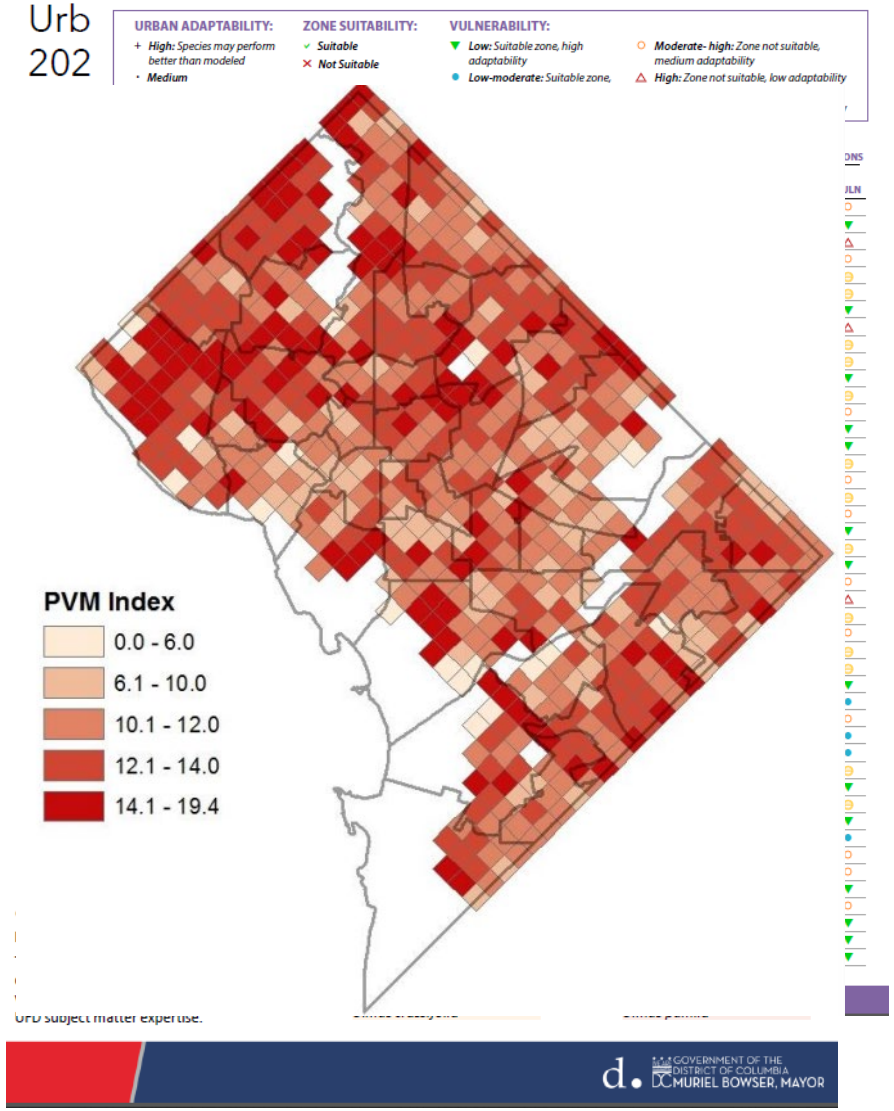
2023



Evaluating progress

Prioritizing tree species selections

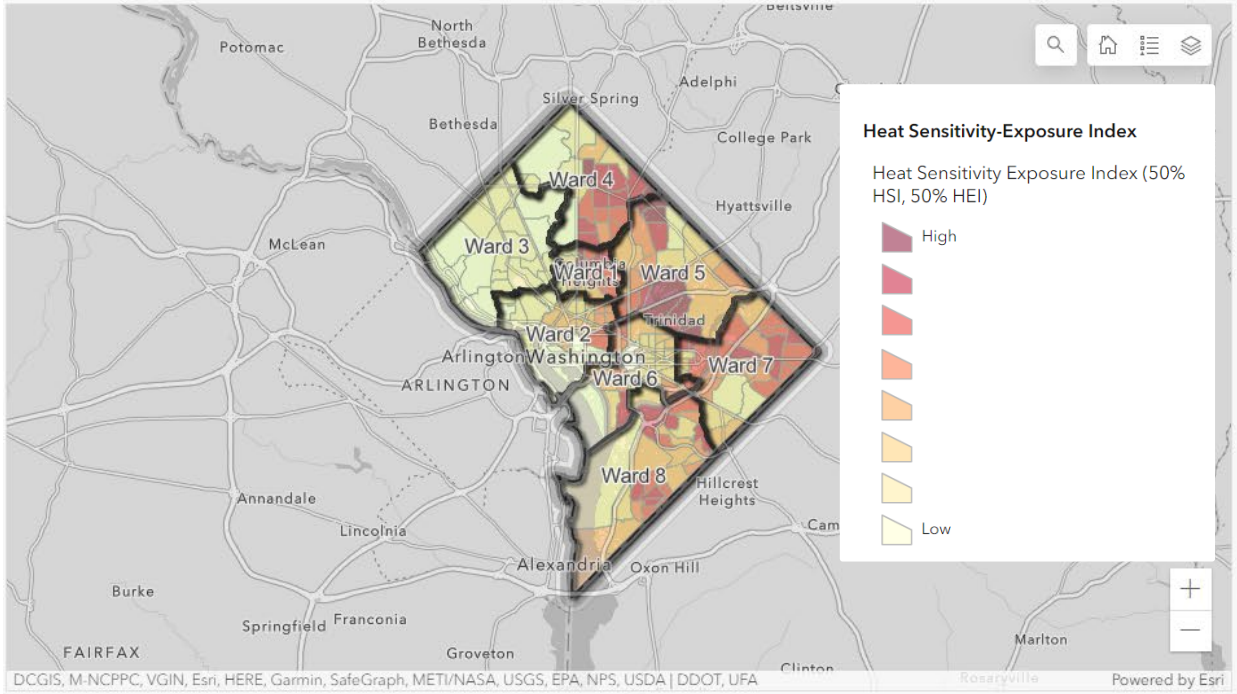
- Available data and resources
  - Tree atlas and NIACS climate vulnerability
  - Pest vulnerability matrix
  - Subject matter expertise
  - Tree mortality study data
- Urban foresters ranked tree species
- Prioritized tree list for planting



Decision support tool

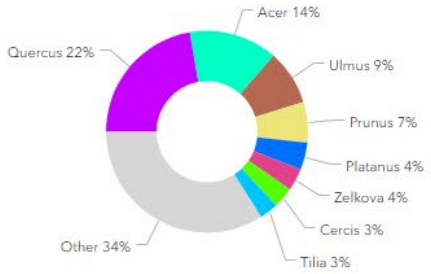
d. Trees by Geography

Select Ward	ANC	SMD	Arborist
All	All	All	All



Ward 1

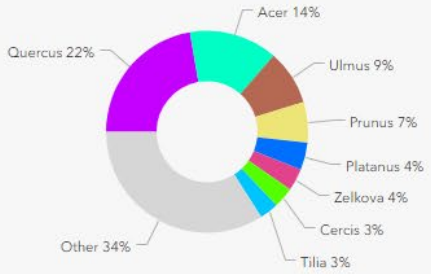
Genus (by Ward)



179.2k

SMD: 1A01

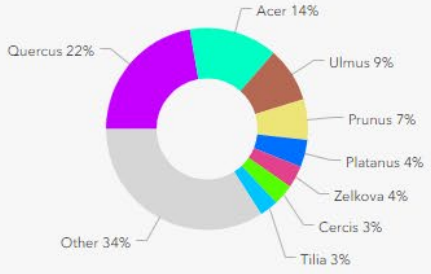
Genus (by SMD)



179.2k

ANC: 1A

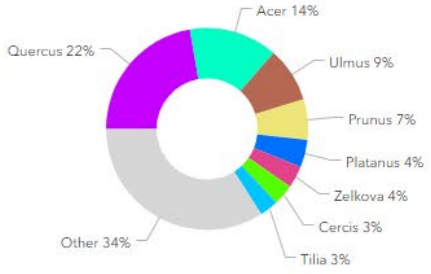
Genus (by ANC)



179.2k

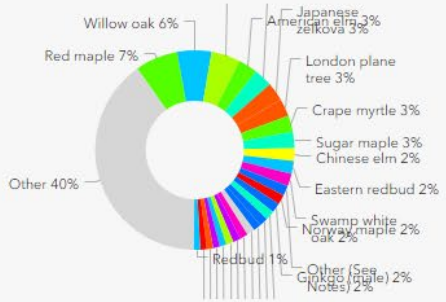
Alexander Grieve

Genus (by Arborist)



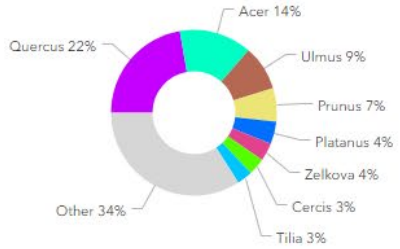
179.2k

Species (by Selected Geography)



Trees by Selected Area: 179.2k

Genus (Citywide)



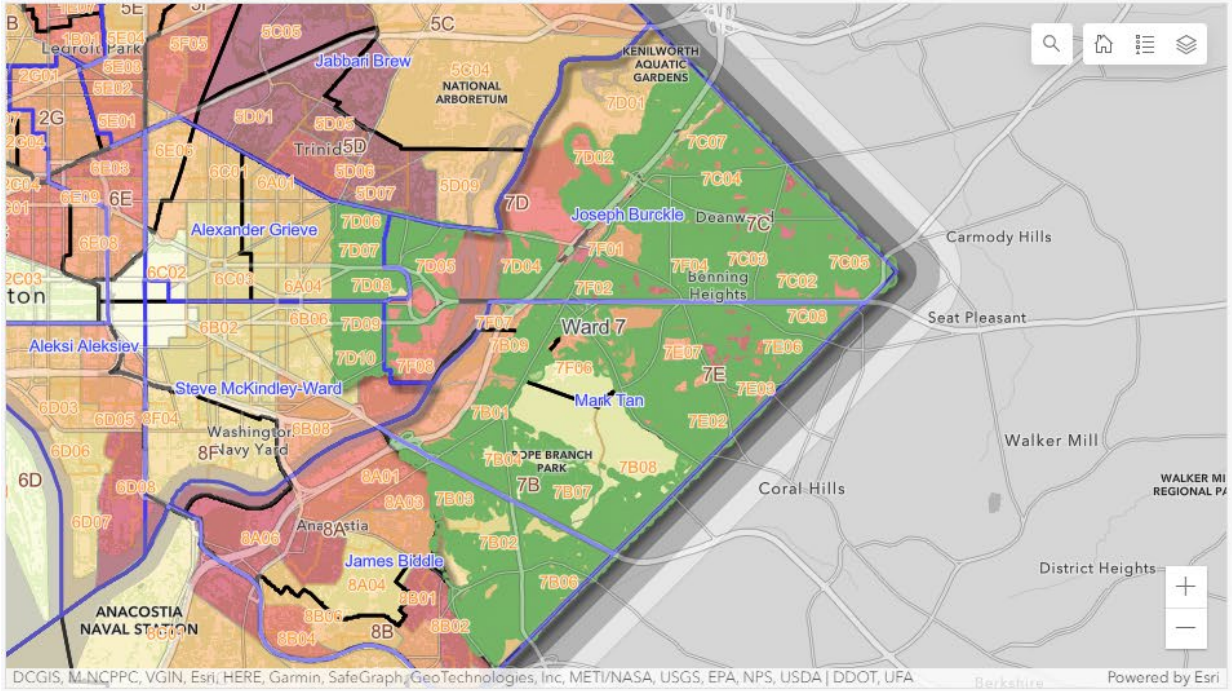
Trees in DC: 179.2k

By Geography | Distribution | Benefits | Planting Priorities | Vulnerabilities

Decision support tool

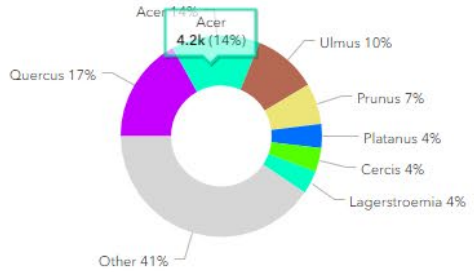
d. Trees by Geography

Select Ward	ANC	SMD	Arborist
7	All	All	All



Ward 7

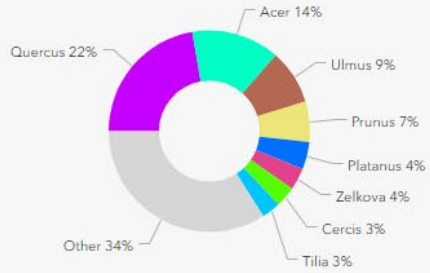
Genus (by Ward)



29.3k

SMD: 1A01

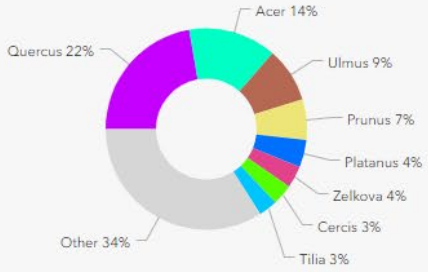
Genus (by SMD)



179.2k

ANC: 1A

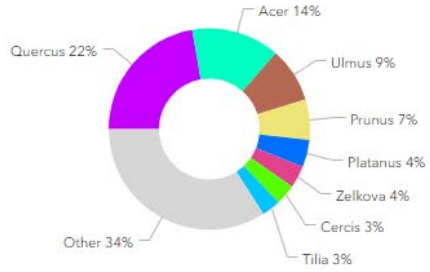
Genus (by ANC)



179.2k

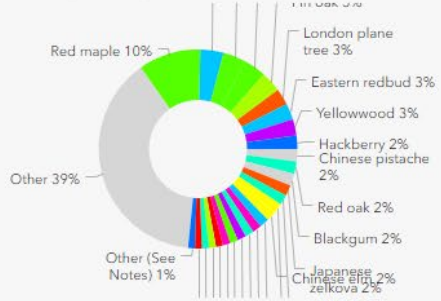
Alexander Grieve

Genus (by Arborist)



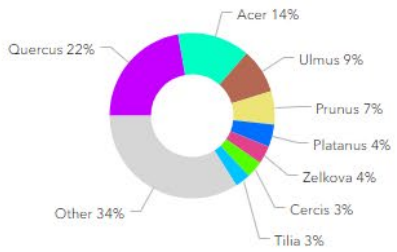
179.2k

Species (by Selected Geography)



Trees by Selected Area: 29.3k

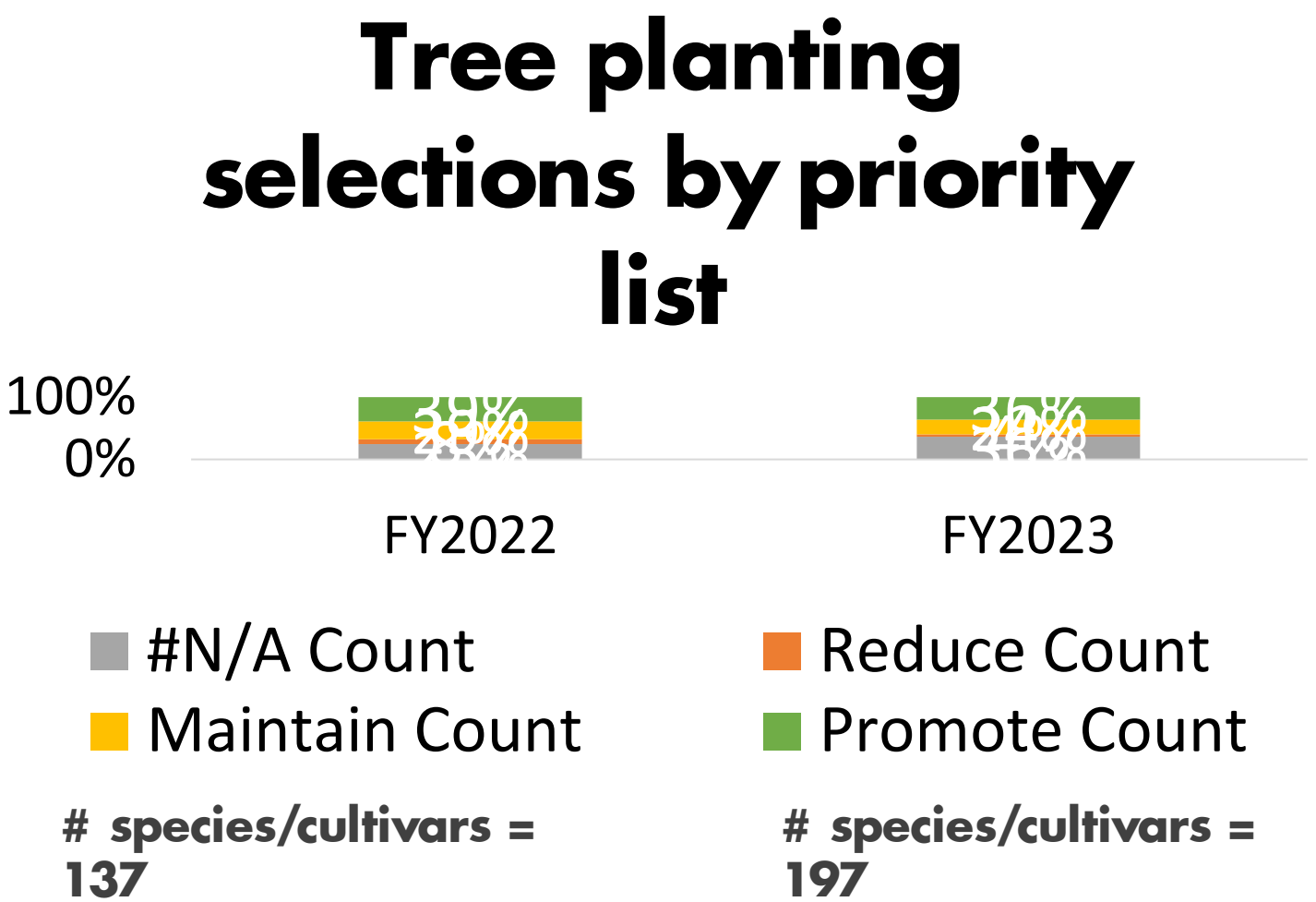
Genus (Citywide)



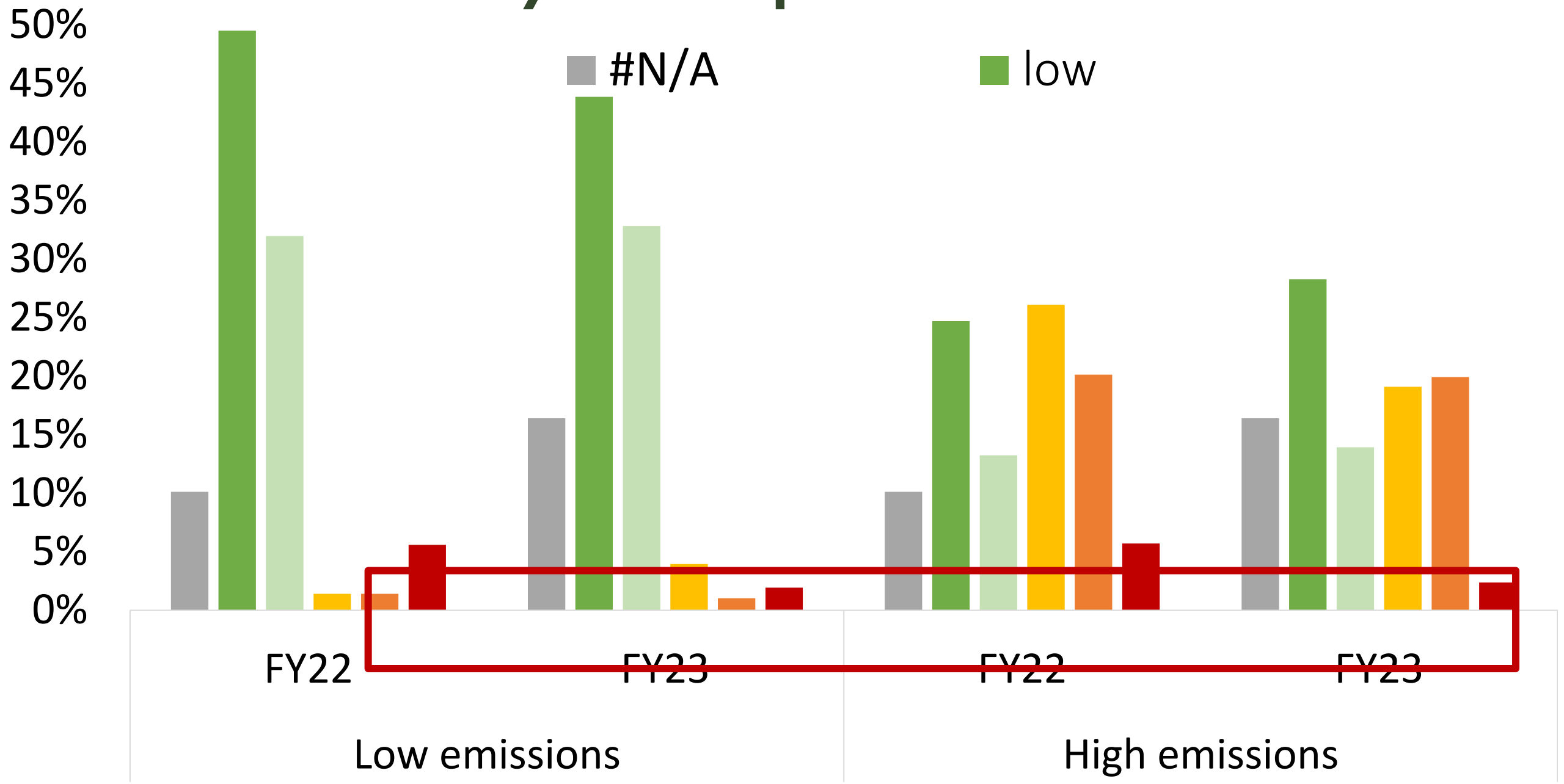
Trees in DC: 179.2k

By Geography | Distribution | Benefits | Planting Priorities | Vulnerabilities

Adoption of tree species priority list

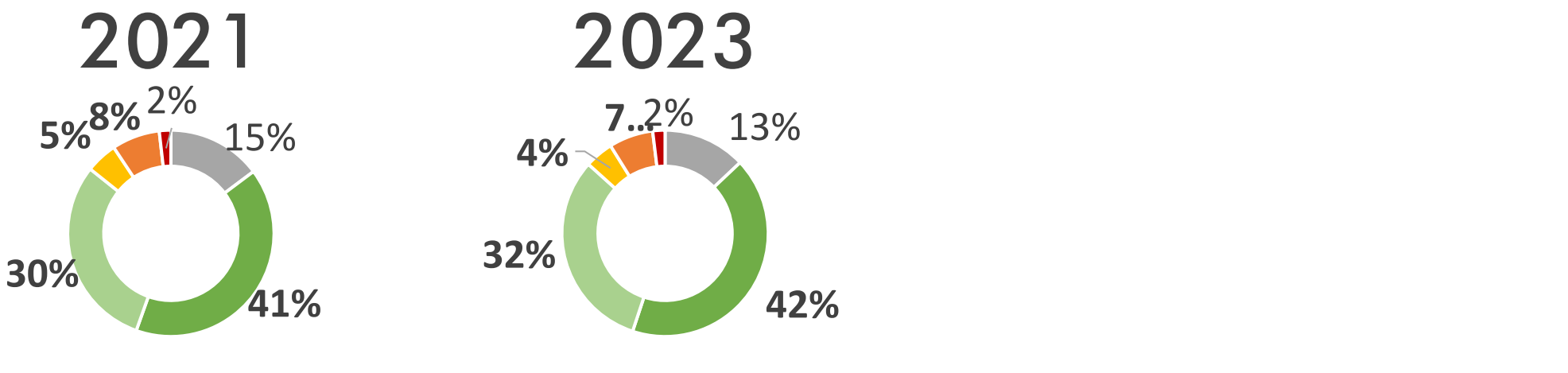


Climate vulnerability of tree species selections

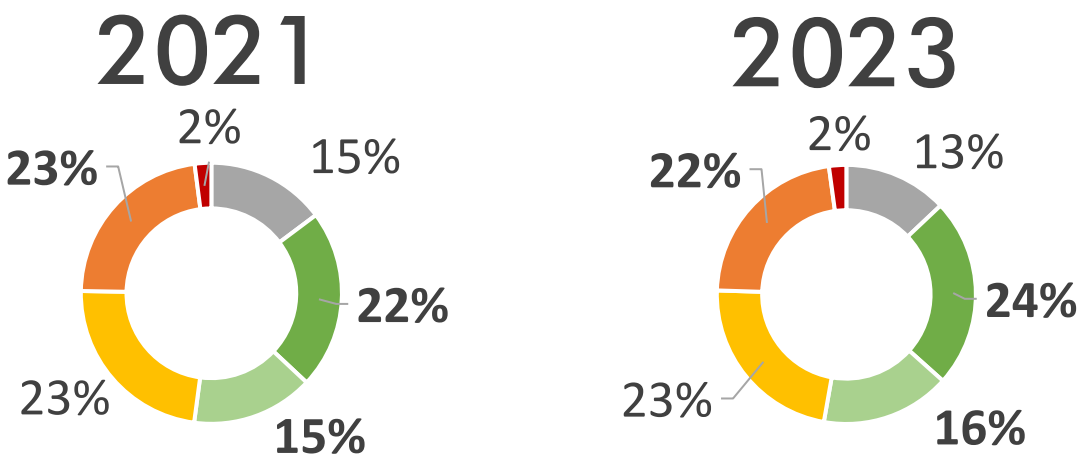


Climate vulnerability of street tree population

Low emissions scenario



High emissions scenario



Next steps

- Annual evaluation of planting selections
- Integrate climate vulnerability into public tree inventory (Open Data DC)
- Apply climate vulnerability to Urban Forest Inventory and Analysis data
- https://climatereadyforests.dc.gov/

Thank you

Kasey M Yturralde, PhD

Urban and Community Forestry
US Forest Service
kasey.yturralde@usda.gov

District Department of Transportation
Urban Forestry Division

https://trees.dc.gov/

Food and Agriculture Organization of the United Nations

2nd World Forum on Urban Forests

2023

World Forum on Urban Forests

2nd World Forum on Urban Forests

Washington DC, 2023

Planning, designing and managing the urban forest to strengthen its resilience to external shocks.

Kampala Urban Tree Audit and Forestry Plan

Presented by

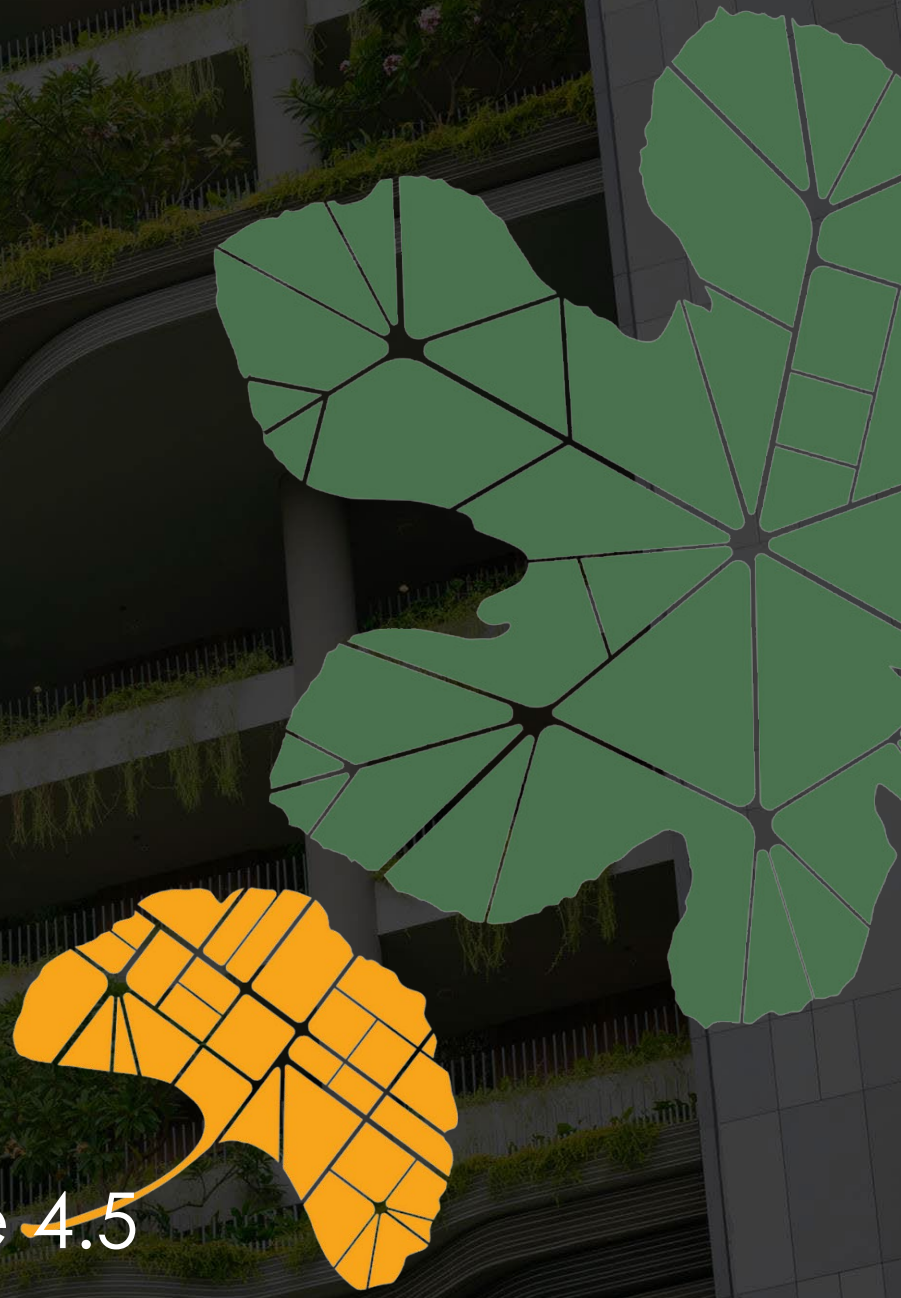
Padde Daniel

Kampala Capital City Authority, Uganda

18th October, 2023

Kampala – Capital City of Uganda

- Total area of 189 sq. Km(4,668.3 Ha)
- Regarded the Garden city of Africa (KPDP, 2012)
- Contributes 60% of the national GDP (KCCA, 2014)
- Area size – 189 Km Sq.
- PopIn: Resident: 1.65million & day time 4.5 million (UBOS, 2014)



Kampala URBAN FOREST

- A system of trees growing on public, private and institutional land within the city and its suburb limits. urban forest is a valuable natural resources that has a number of benefits that enhance the overall environment quality of places where people live and work

As a vital, living component of the city. Their interaction with other necessities such as buildings adversely impacts their normal life expectancy

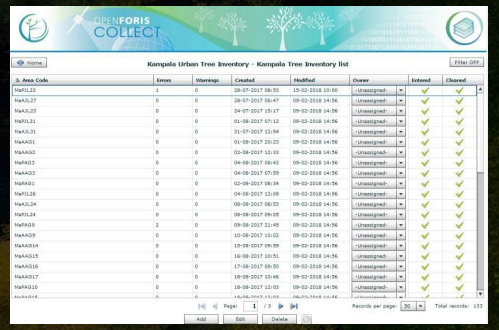
Limited by planting spaces, compacted poor soils, reflected heat and inadequate water, etc.

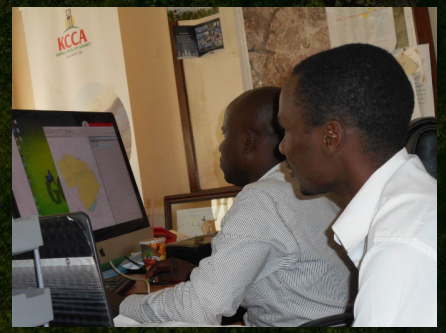
As a result, urban trees must be treated to a sound, rigorous, and purposeful management regime in order to perform successfully in their surrounding. Provide significant community benefits while remaining reasonably safe for surrounding homes and individuals

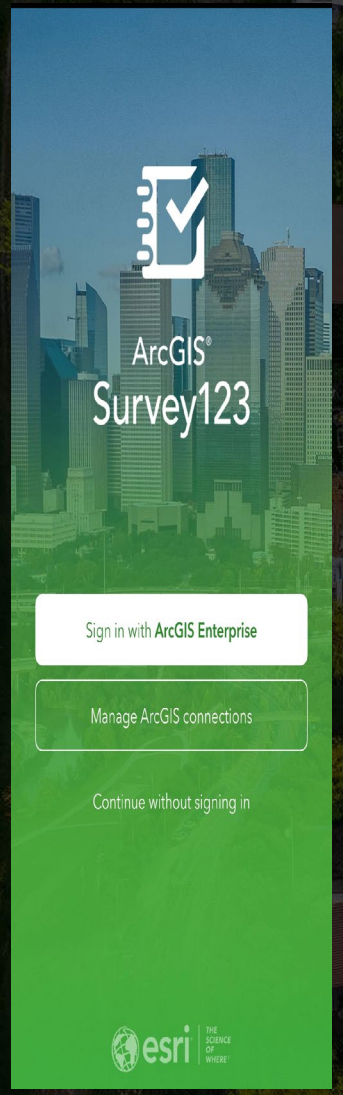
Benefits of the Urban Forest

- Air quality, Biodiversity conservation, Flood mitigation, Social cohesion, nutrition supplement, UHI effect reduction

Kampala Tree Audit : Know the trees to manage





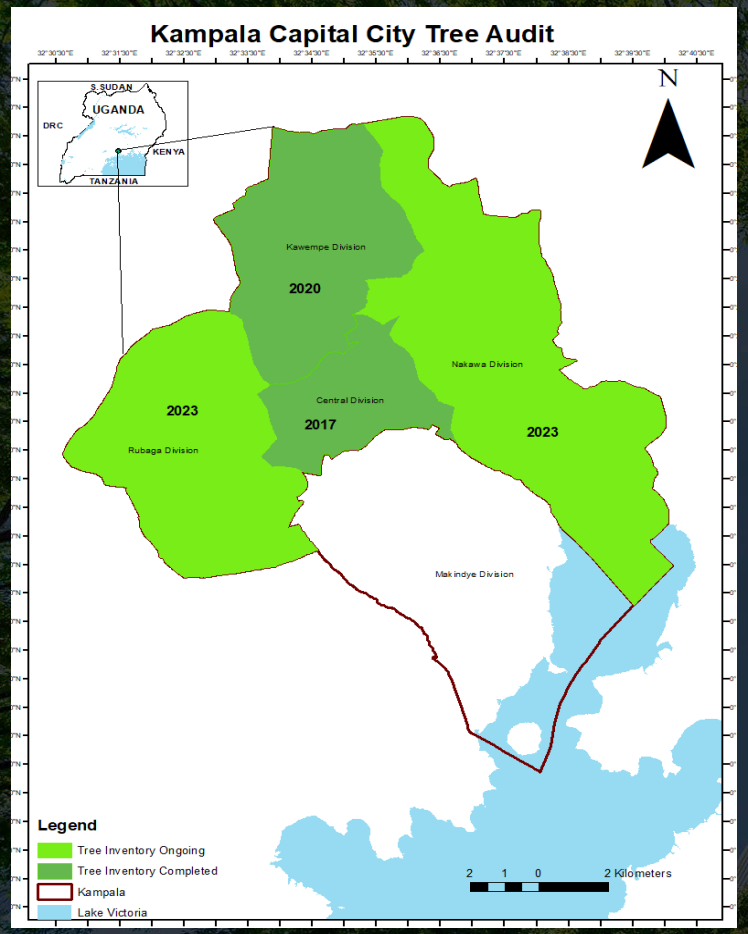


Tree inventory

- Objectives

1. Develop tree data base for the city
2. Assessment for tree health
3. Estimate the carbon stock and sequestration potential
4. Develop an urban forestry plan

Kampala Tree Audit



- Pilot in 2016/17 in Central, expanded to Kawempe in 2020/21 and Nakawa and Rubaga in 2023

105,671 trees Audited to date

- Estimated av. canopy cover of **15%**
- A tree density of 13 trees/acre
- 80% Exotic and 20% Native

Kampala Tree Audit

- Over 328 species, 13 being Nationally & internationally protected
- 43 fruit tree species, *Persea americana* is the most abundant fruit tree with 31.4%
- 125 ornamental species, Palms are the most abundant, with *Roystonea regia* at 10.67%

Kampala Forestry Plan 2019 -2039

- **Vision: B**y 2039, Kampala's Urban Forest will be abundant, diverse, healthy, self reliant and cared for by all and will contribute to the safetyof our community and creation of a lush green attractive and livable city in the region.

Goal

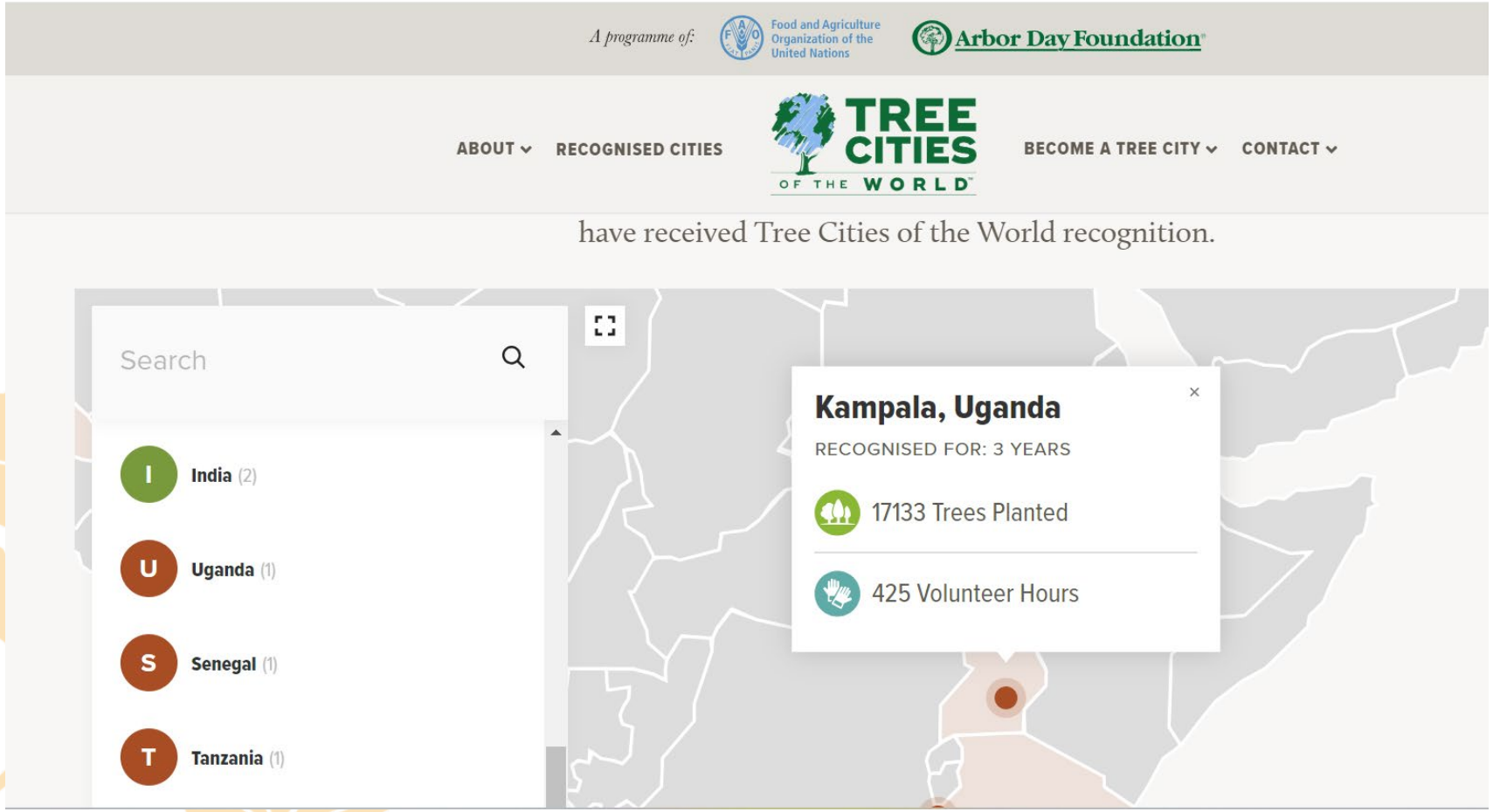
Enhance and Maintain

Conserve & protect urban tree canopy cover

Objectives

1. Increase the tree density of the Urban forest
2. Develop an Urban Forestry framework
3. Increase the diversity of native species
4. Increase awareness of the urban forest mgt

Tree Cities of the World Recognition- FAO, 2022



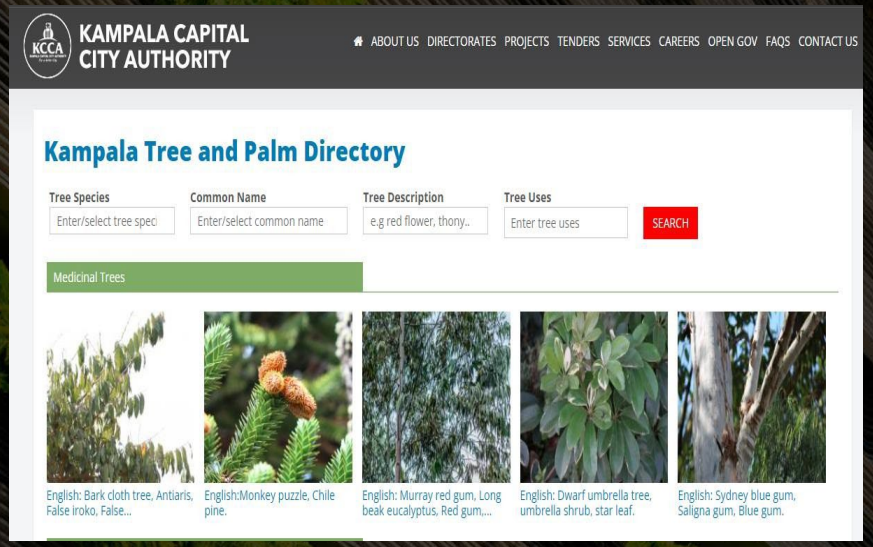
- Recognized for 3 years running on urban forest mgt standards
- 2020 – only city in Africa to attain recognition

- Establish Responsibility
- Set the Rules
- Know What You Have
- Allocate the Resources
- Celebrate Achievements

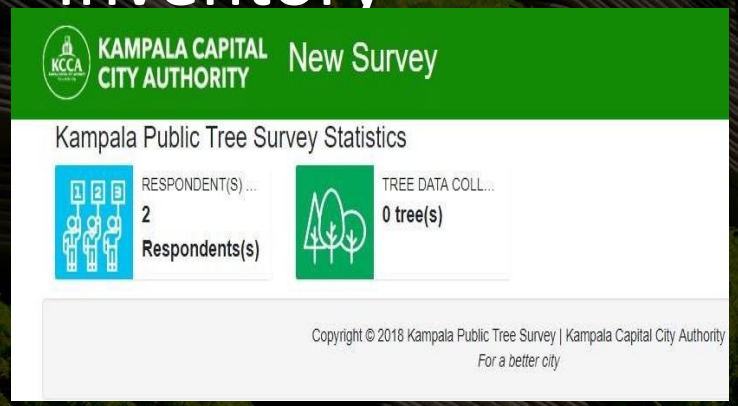
https://treecitiesoftheworld.org/directory.cfm

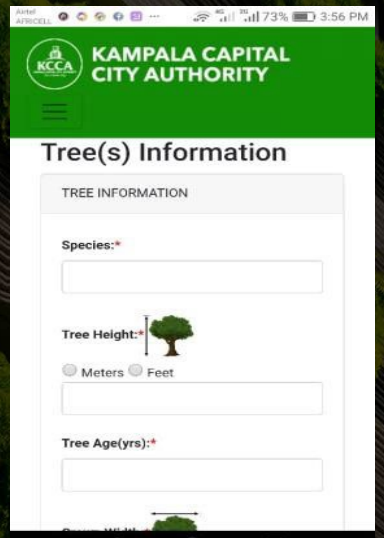
Importance of the Urban Tree Audit

- Kampala Tree & Palm Directory



- Public Tree Inventory





- Green Infrastructure ordinance
- Tree Valuation, A criteria to attach monetary value to our trees in the cit
- Carbon sequestration methodology, enable us estimate annual carbon sank

Other Projects being undertaken

Kampala Blue-Green Master Plan development

Kampala Biodiversity Survey (Fauna)

“With out data you are just another Person with an Opinion”

W. Edwards Deming- Data Scientist

Thank you

PADDE | Kampala Capital City Authority

Urban Forester

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2nd World Forum on Urban Forests

2023

World Forum on Urban Forests

2nd World Forum on Urban Forests

Washington DC, 2023

Role of popular participation in the management of protected areas in a context of intense formal and informal urbanization pressure

Presented by

Luiz Octavio de Lima Pedreira

Rio de Janeiro City has 1205 km2, and 50% of green coverage

The city has 67 Protected Areas – PA under city management, many of these areas overlap each other, occupying 26% of its total area. Of these, only 15 have Management Councils, and of these only 7 are active.

PA must have a Management Council - MC, whose function is to assist the head of the UC in its management and integrate it with the population and the actions carried out in its surroundings. The MC must have representation from public bodies, both from the environmental and related areas (scientific research, education, national defense, culture, tourism, landscape, architecture, archeology and indigenous peoples and agricultural settlements), and from civil society, such as the resident and surrounding population, traditional population, indigenous peoples, property owners within the PA, workers and the private sector operating in the region, scientific community and non-governmental organizations with proven performance in the region.

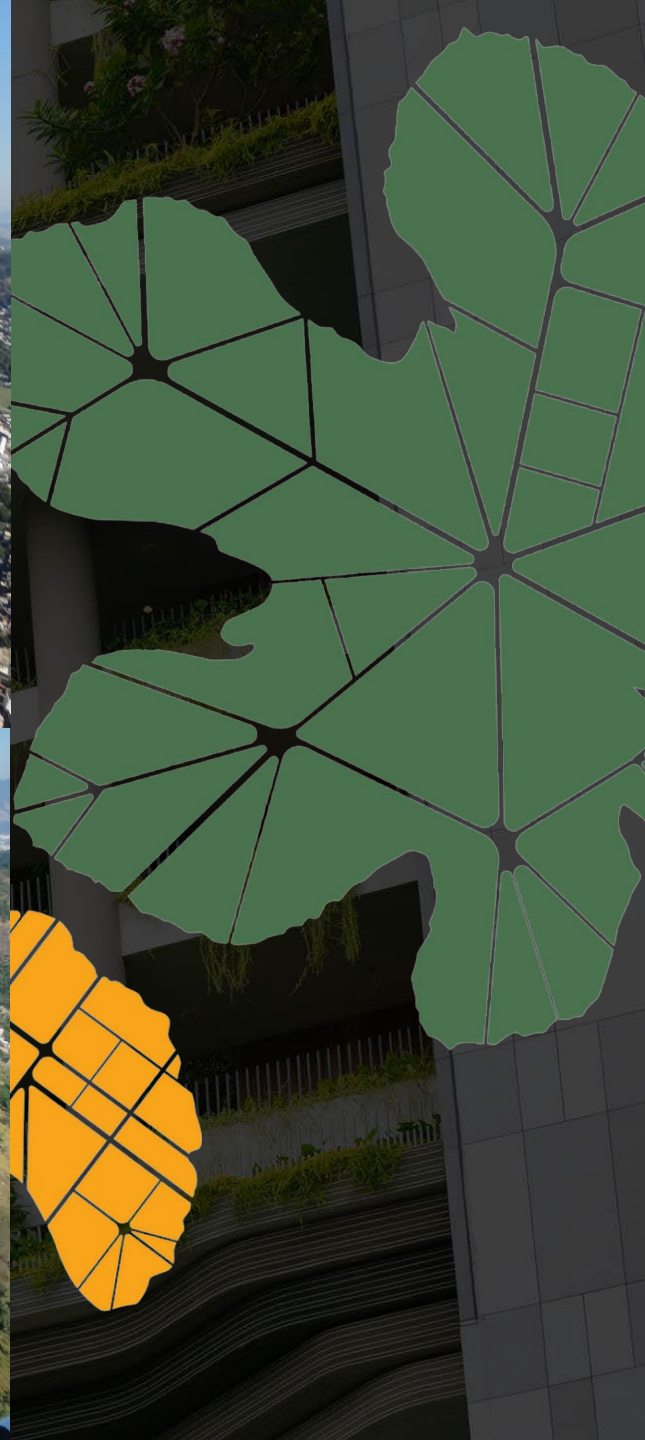
We analyzed aspects of the effectiveness of urban PA creation and management implementation, in a context of severe formal and informal urbanization pressure, and the role of citizenship governance on PA management.

Environmental Protection Areas – APA (acronym in Portuguese) are a kind of PA of sustainable use, covering public and private lands. Serra dos Pretos Forros APA was created in 2000, with 27,26 km^2, it has almost half of its area densely urbanized, with slumps and low-income neighborhoods, and vast areas covered by invasive exotic grasses, subject to annual anthropic fire, areas under forest restoration, and some areas covered with natural forests. Many of these areas are in a state of war between drug factions and paramilitary groups.


Tiroteios aterrorizam moradores da Praça Seca - 18/05/2018
RJ2
RJ2
19:25
Shooting at Praça Seca
Moradores estão desde o início da tarde no meio do fogo cruzado
00:46 / 01:25


200 m
APA Serra dos
Pretos Forros
250 m
400 m
200 m
300 m
250 m
Parque Nacional
da Tijuca
450 m





In August 2018, the City Hall was ordered by the court to implement the MC, with equal participation from civil society and public agencies, and to coordinate the process of elaboration of the area's Management Plan - MP. In November 2018, the City's Environmental Office appointed a manager to the area, with the mission to coordinate the creation of the MC and the elaboration of the MP.

One year after, the council was created, had approved its Internal Rules, and had held five meetings, and there was a group working in the elaboration of the MP, process that was interrupted some months later with the advent of the COVID19 pandemic. After changing the area's manager in September 2020, the hole process stopped, until February 2021, when a new manager was appointed, who reactivated the MC, which has been active since then, even though the process of elaboration of the MP for the area has not been resumed.

SERRA DOS PRETOS FORROS APA MC MEMBERS

Instituto Naturalis – NGO
ACALMA – NGO
AMA Freguesia - Residents' Association
FAM Rio - Residents' Association Federation
Água Mineral Santa Cruz – Company
SMAC - Rio de Janeiro Municipal Environmental Office
ICMBIO - National Biodiversity Institute
INEA - Environmental State Institute
SMU – Rio de Janeiro Municipal Urbanism Office
SMH – Rio de Janeiro Municipal Housing Office

More than twenty years after, the Sertão Carioca APA was created, but its goal to protect natural remnants of the natural environment is under risk. Despite the main objective of the area being the protection of the remnants of the herbaceous marsh, dominated by the herbaceous *taboa, Typha domingensis* Pers., the fish of the *Rivulidae* family and the swampy forests, dominated by the tree *caixeta Tabebuia cassinoides* (Lam.) DC., the proposed zoning for the area foresees the possibility of building, with the opening of drainage channels, landfill and elevation of the grade, in more than 70% of the area, which implies the suppression of this natural environment.

SERTÃO CARIOCA APA MC MEMBERS

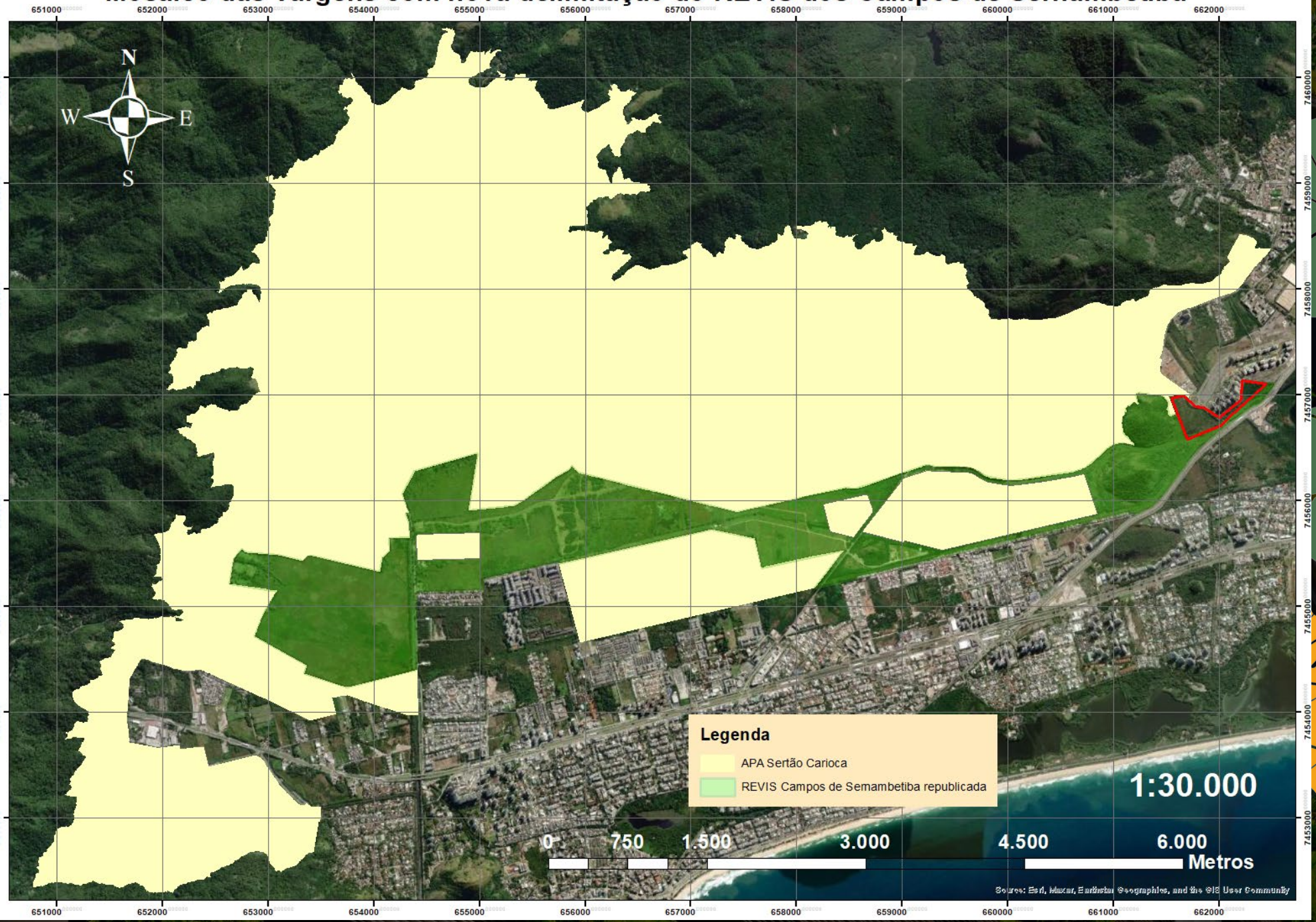
CBH-BG - Watershed Committee
IEDHMA – NGO
AMAVAG - Residents' Association
AMOR - Residents' Association
Ecomarapendi – NGO
Associação de Moradores da Santa Luzia - Residents' Association
Movimento Baía Viva - NGO
Alphaville Foundation
Rio de Janeiro Municipal Environmental Office
National Biodiversity Institute
Environmental State Institute
Rio de Janeiro Municipal Education Secretary
Rio de Janeiro Municipal Guard
UFF – Fluminense Federal University
UERJ – Rio de Janeiro State University
UFRJ – Rio de Janeiro Federal University

Taboa

Caixeta

Rivulidae

Mosaico das Vargens com nova delimitação do REVIS dos Campos de Sernambetiba



QUADRO DE ÁREAS

Sertão Carioca APA
Total Area: 3.247 hectares.

Área ZOC: 2.240 (69%)
Área ZVS: 1.007 (31%)

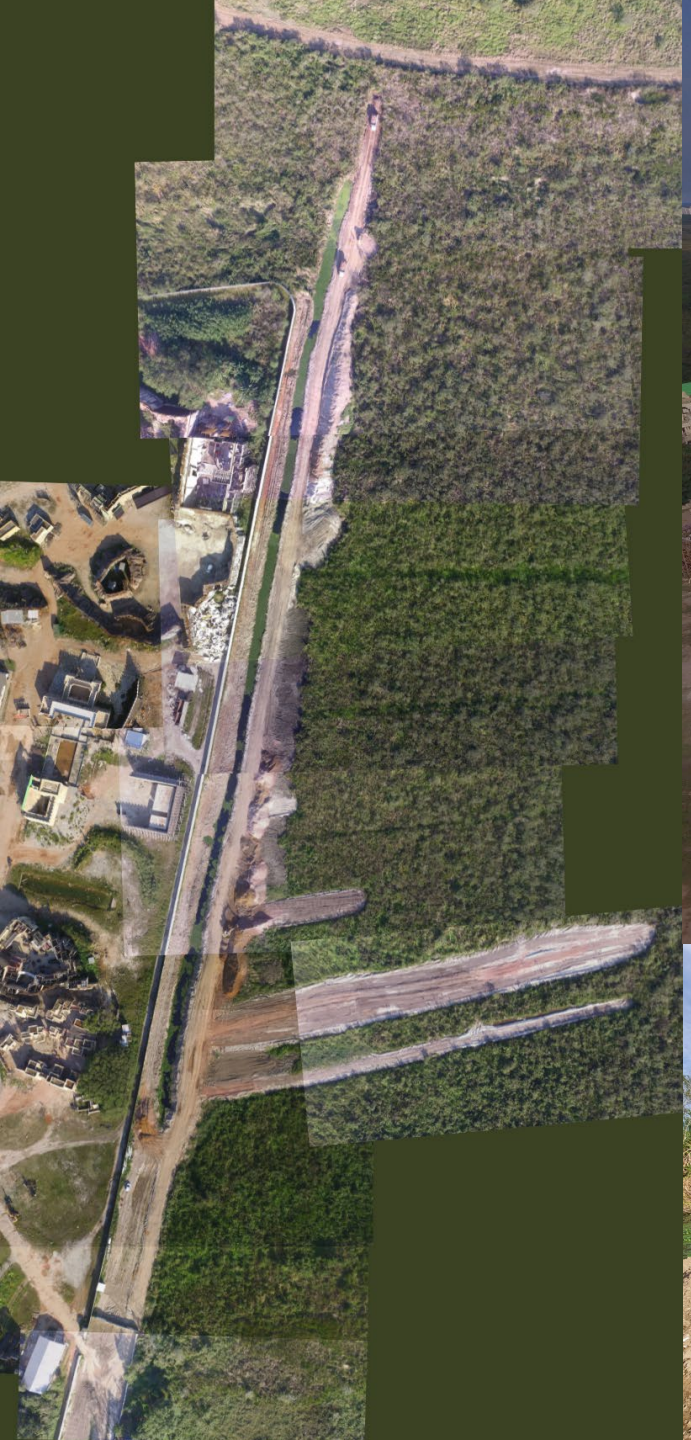
REVIS dos Campos de Sernambetiba
Total Area: 543 ha

Mosaico das Vargens
Total Area: 3.790 ha


8
7
1
A
2
6
C
3
B
4
5

With a strong development pression, of both formal and informal stakeholders, it seems that the reason to create this protected area will be impossible to realize. To avoid the suppression of the vegetation on these wetlands, and the flora and fauna that it supports, the civil society, organized in a MC, focus on the elaboration of the MP to revert the area zonation.




HYUNDAI

The Protected Areas Management Councils of these areas represent a civil society governance structure to ensure the implementation of the objectives foreseen when these areas were created, they represent the last hope to these natural remnants of the urban forests.

Thank you, Let's Make a Better World, One Tree at a Time

Luiz Pedreira

Rio de Janeiro City Environmental and Climate Office

ISA CA

lolprj@ gmail.com

Food and Agriculture Organization of the United Nations

Arbor Day Foundation

POLITECNICO MILANO 1863

CICEF

ISA

Smithsonian

2nd World Forum on Urban Forests

2023

World Forum on Urban Forests

2nd World Forum on Urban Forests

Washington DC, 2023

Holistic Biomass Management:

Integrating Workforce Development & Wood Utilization in Philadelphia

CAMBIUM CARBON

Presented by

Cambium Carbon

Ben Christensen, Co-Founder & CEO

Alicia Blake, Sr. Environmental Analyst

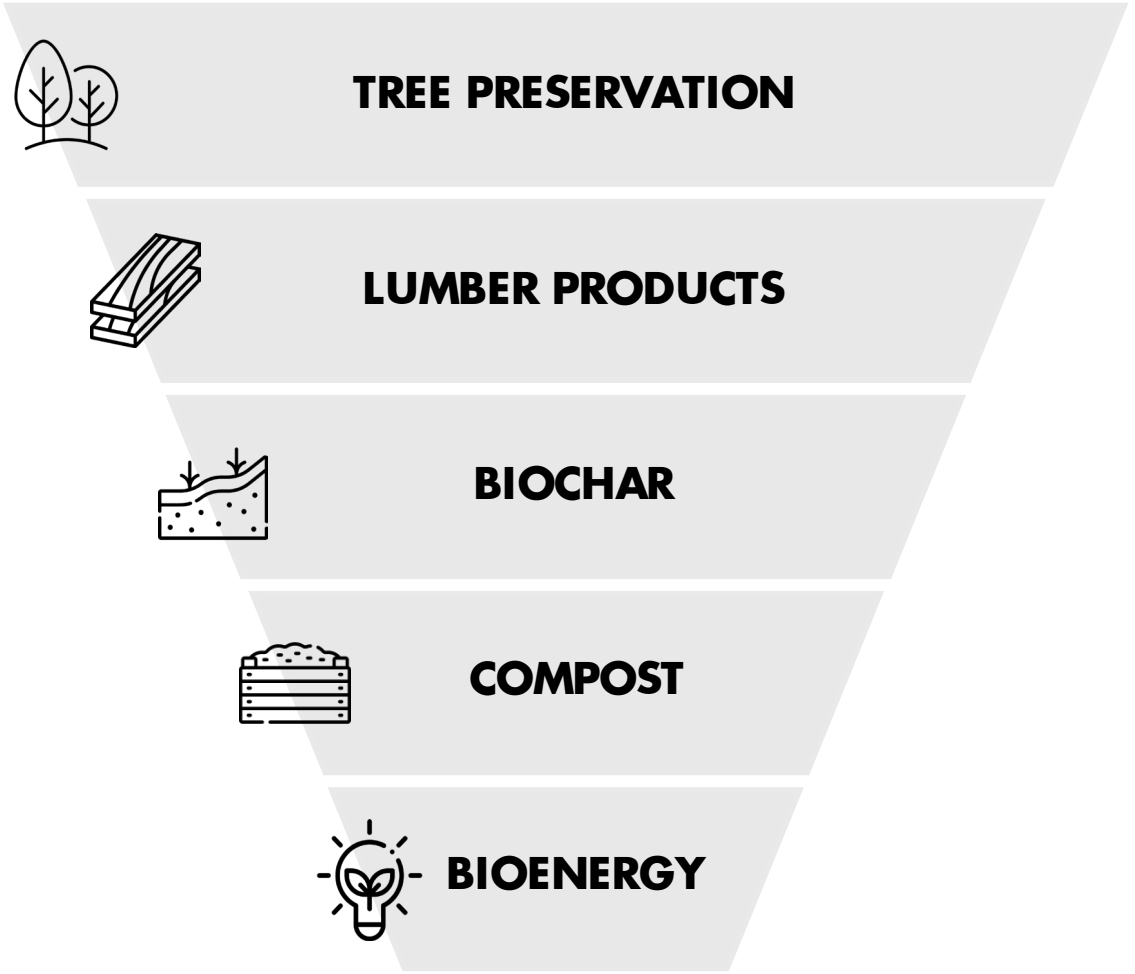
US urban forests generate **46 million tons** of wood waste annually

Effective utilization of that wood can reduce greenhouse gas emissions by **251 million MT** while providing economic & social co-benefits

Trees come down for a variety of reasons.

We believe there is a way to maximize impact after removal.

HIERARCHY OF WOODY BIOMASS UTILIZATION



CAMBIUM CARBON

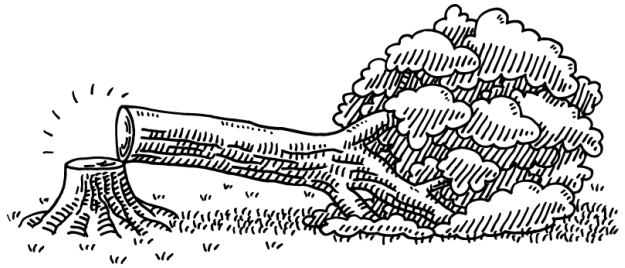
Cambium Carbon uses technology to build local, regenerative supply chains.

We enable our partners to save wood from landfill, creating beautiful products with social & environmental impact.

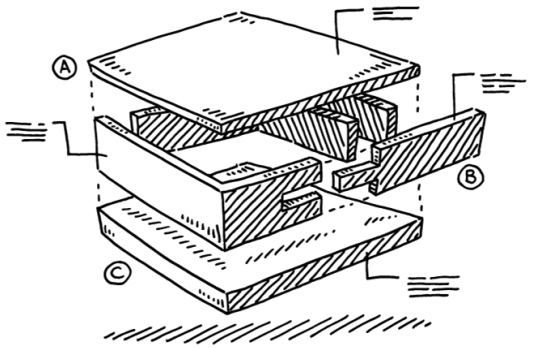
Our team works to help cities process urban forest wood waste into value- added goods.

The Vision:
Carbon Smart Wood Cities

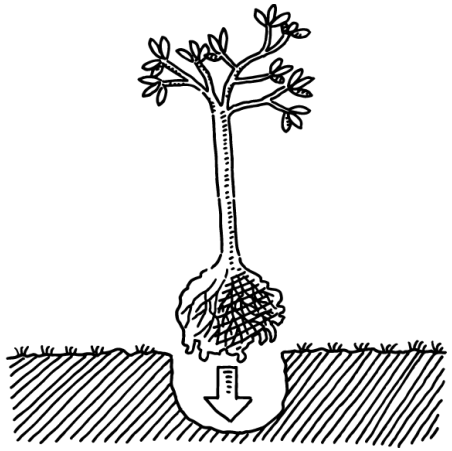
Trees require removal due to death, disaster, development, disease



Wood is up-cycled into value-added products



Profits support urban canopy regeneration



This model thrives when different partners are brought together.

WOOD GENERATORS

WOOD PROCESSORS

SECONDARY WOOD USERS

COMMUNITY GROUPS

Philadelphia Reforestation Hub

A first-of-its kind public-private-partnership model for lumber processing and job training.

CAMBIUM CARBON

FIND YOUR PATH PHILADELPHIA PARKS & RECREATION

POWER CORPS PHL

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

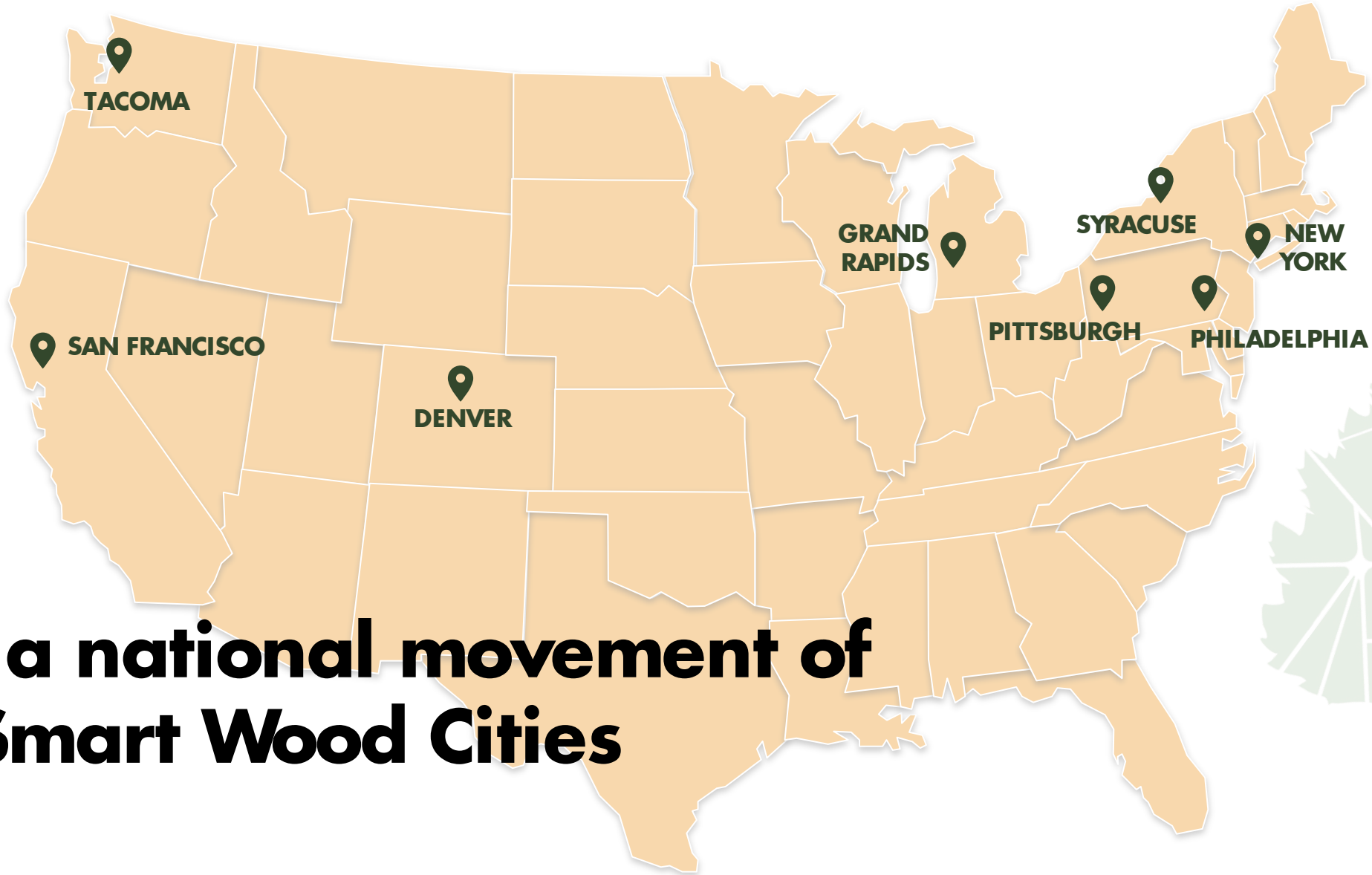
COST SAVINGS

WASTE DIVERSION

WORKFORCE DEVELOPMENT

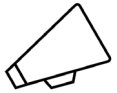

TREE
EQUITY


POWER CORPS PHL
POWER CORPS PHL
WOOD SHOP



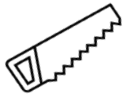
Building a national movement of Carbon Smart Wood Cities


How might you engage to maximize impact through woody biomass utilization?



City, Municipality, or Gov't Agency

Act as the voice, connector of parties, and policy advocate



Sawmill or Organics Recycling Center

Expertise to put woody biomass to its highest and best use

Designer, Architect, or Procurement

Key to utilizing the offtake and developing a market

Workforce Development Agency

Provides high-skilled jobs and tree canopy resiliency

Let's work together.

City, Municipality, or Gov't Agency

Program Assessment, Design, & Implementation

Sawmill or Organics Recycling Center

Technology platform to support scaling material

Designer, Architect, or Procurement

Connect to a hyper-local and green materials

Workforce Development Agency

Enhance your green infrastructure curriculum

Assessment & Design
6 to 12 months

Pilot
12 to 18 months

Implementation & Scaling Up
12 months +


POWER CORPS

Let us know how we can create value for you.

Thank you

Ben Christensen | ben@cambiumcarbon.com

Alicia Blake | alicia@cambiumcarbon.com

CAMBIUM
CARBON

2nd World Forum on Urban Forests

2023

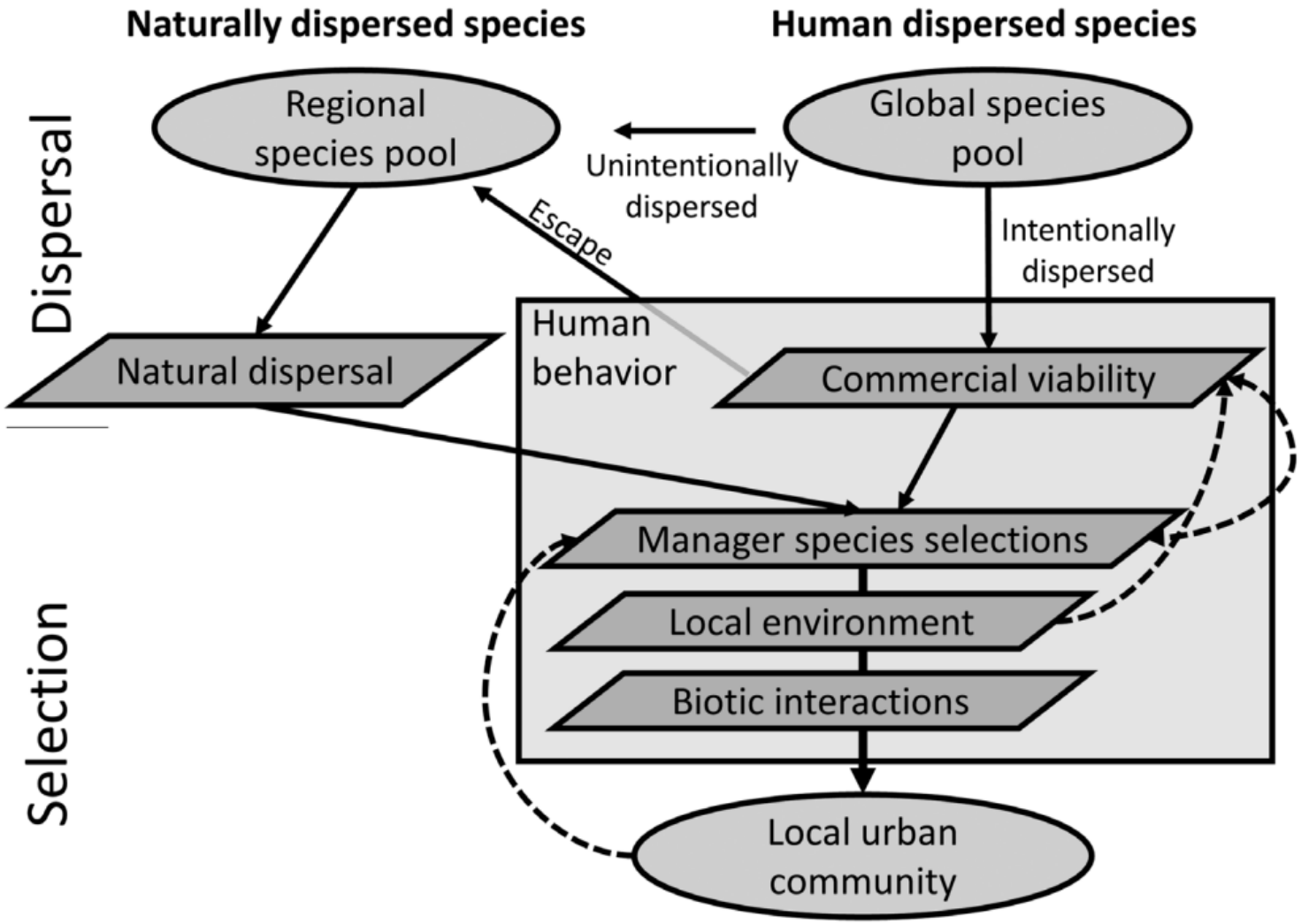
World Forum on Urban Forests

Selection in the City: understanding the roles of natural and domestic selection in shaping urban forests

Nancy F. Sonti, USDA Forest Service

Dexter Locke, Meghan Avolio, Karin Burghardt, Eva Perry, Beatriz Shobe, Morgan Grove

Natural, Artificial, and Domestic Selection



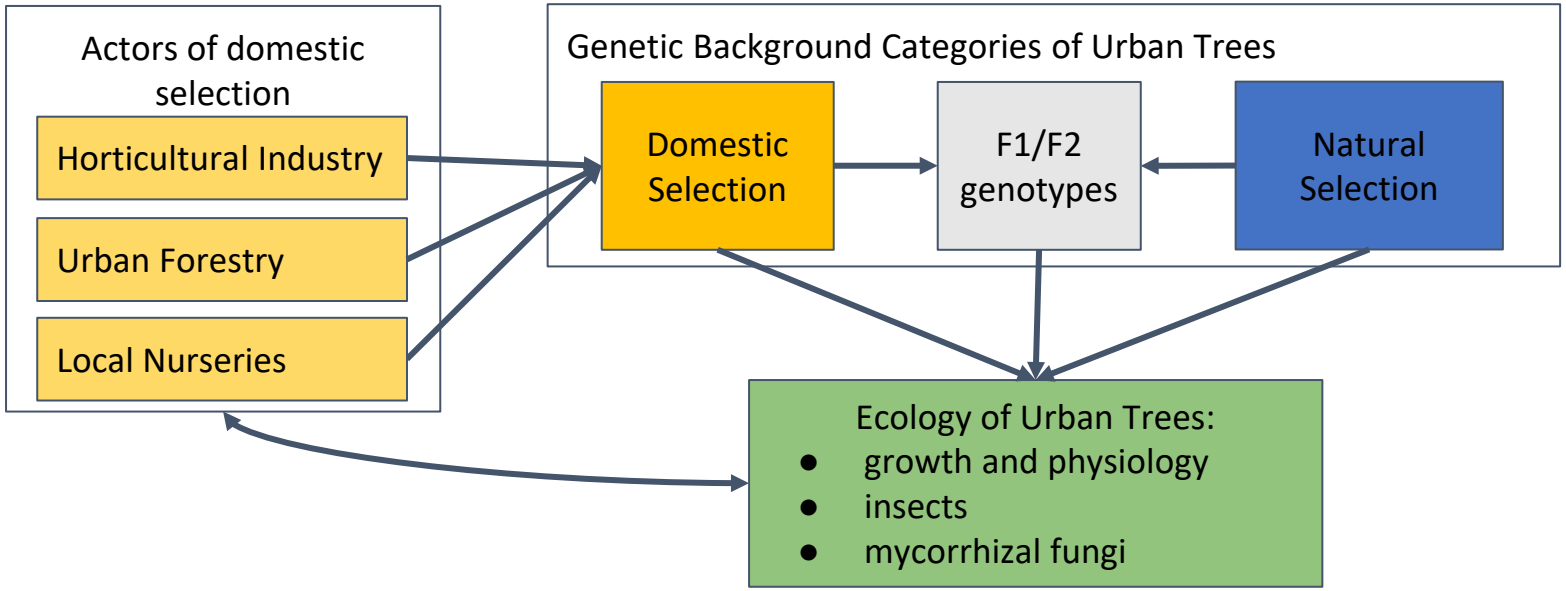
Avolio et al. 2021 *Oikos*

Objective: Study the influence of domestic selection on the genetic diversity of urban trees and potential consequences for ecosystem services

- Urban trees provide many important ecosystem services
- Many urban trees are planted and sourced from nurseries
- Artificial selection is the selection of desirable traits by the ***breeder***
- Domestic selection incorporates artificial selection and
  - Decisions about which trees to breed by ***nurseries and growers***
  - Decisions about which trees to plant by ***land managers and urban forestry practitioners***
- Planted cultivars can be clones of one another and have limited to no genetic variation among individuals

Selection in the City: Study Objectives

- Examine domestic selection and the process of selecting and disseminating cultivars from the horticultural industry to urban tree planting organizations.
- Determine whether genotypes and genetic material from domestic selection are migrating into surrounding forests.
- Investigate whether genotype identity (e.g. original cultivar, F1/F2 generations, or wild type) affects physiological traits and associated insect and mycorrhizal communities.



Selection in the City: Study Objectives

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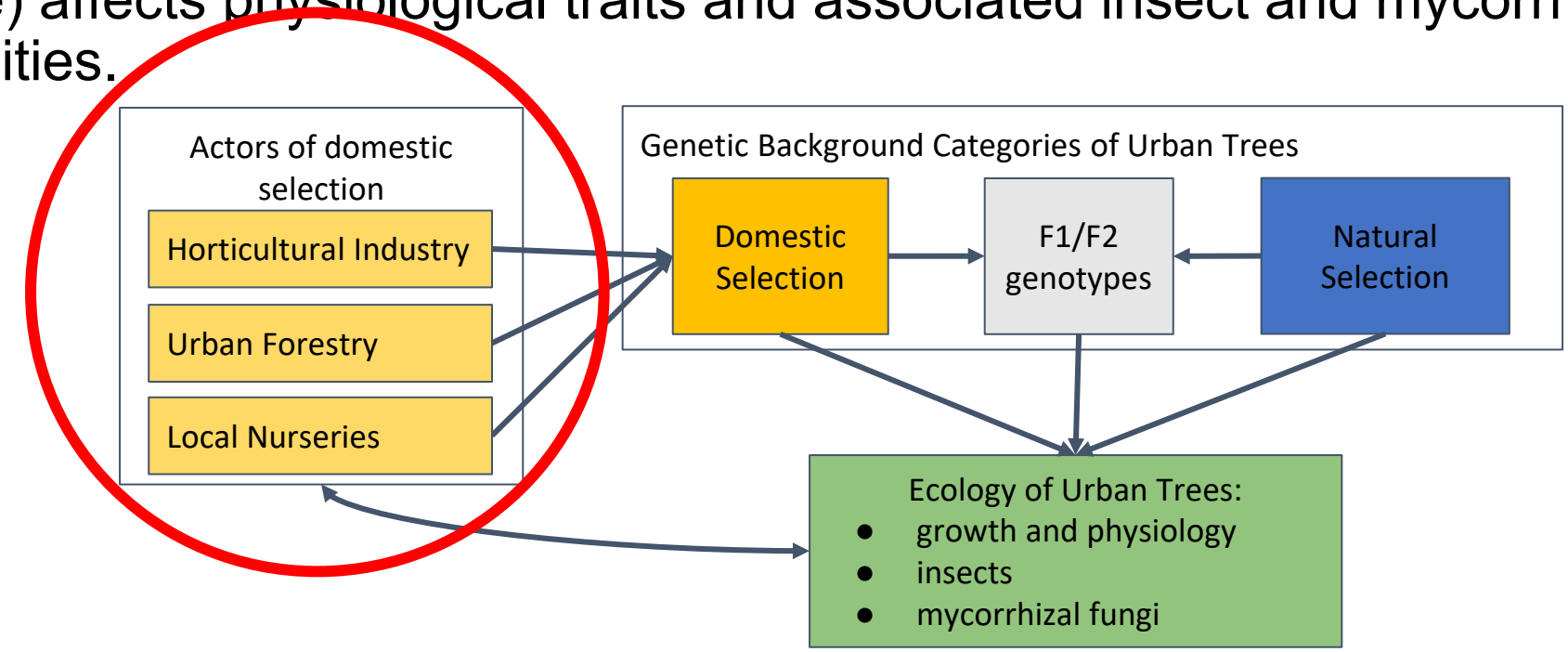


Supply Chain Analysis

- Conduct a supply chain analysis for Baltimore City using snowball sampling
- Aim to interview nurseries, breeders, and tree planting organizations to **understand motivations behind choosing species/cultivars to produce and plant**

Recent work from other regions of the US

Urban Forestry & Urban Greening 62 (2021) 127183

Contents lists available at ScienceDirect

Urban Forestry & Urban Greening

journal homepage: www.elsevier.com/locate/ufug

Relationships between consultant discipline and specified tree diversity: A case study of two Iowa (USA) communities

Grant L. Thompson [a,*], Audrey McCombs [b], Marcus D. Jansen [a]

[a] Department of Horticulture, Iowa State University, 2206 Osborn Drive, Ames, IA, 50011, United States
[b] Department of Statistics and Ecology and Evolutionary Biology Program, Iowa State University, 2438 Osborn Dr, Ames, IA, 50011, United States

SOCIETY & NATURAL RESOURCES
https://doi.org/10.1080/08941920.2023.2175285

Routledge
Taylor & Francis Group

Check for updates

Expanding Urban Tree Species Diversity in Florida (USA): Challenges and Opportunities for Practitioners

Deborah R. Hilbert[a], Andrew K. Koeser[a], Michael Andreu[b], Mysha Clarke[b], Gail Hansen[c], Lara A. Roman[d], and Mack Thetford[e]

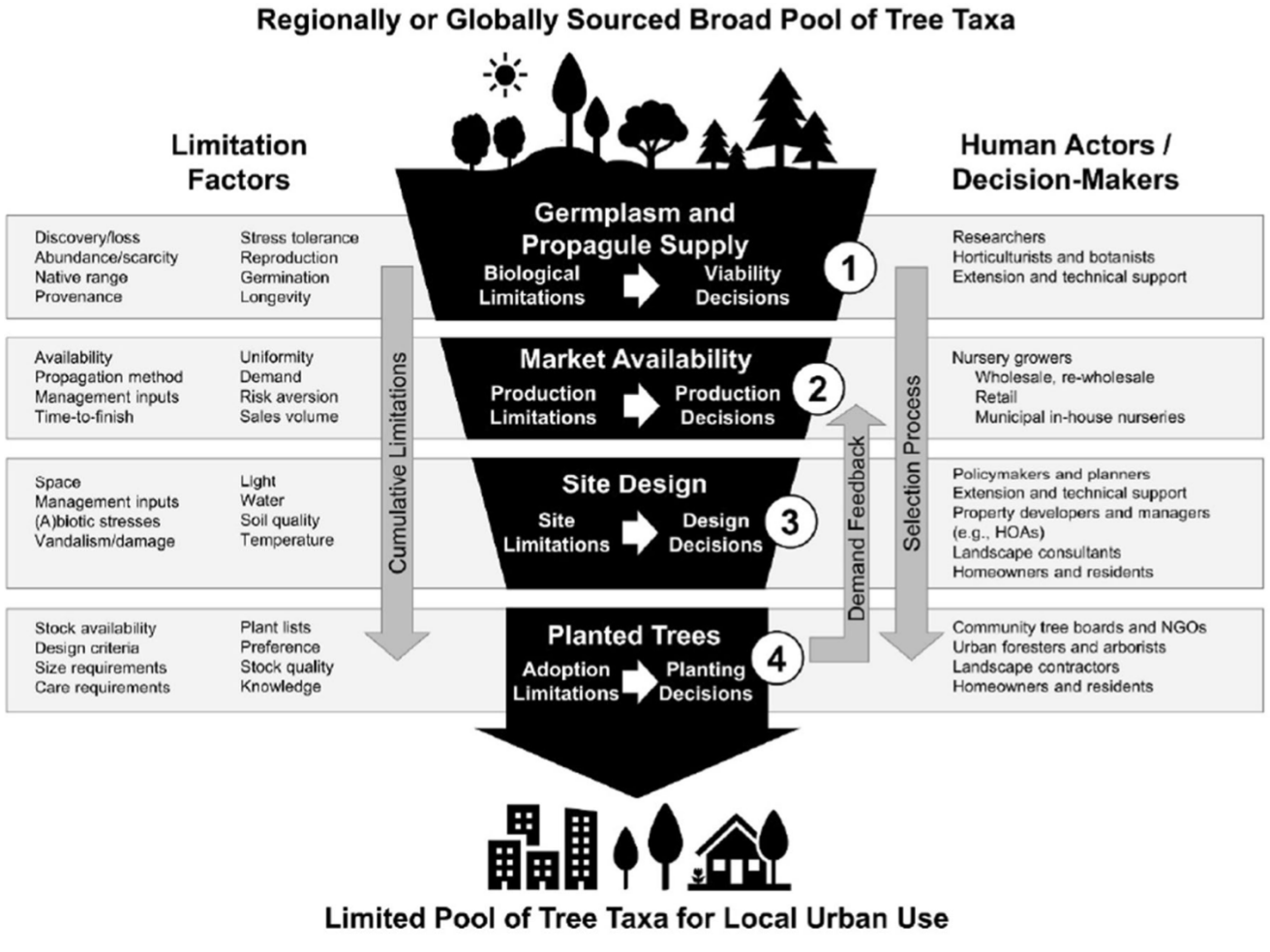
Ambio 2023, 52:1532–1542
https://doi.org/10.1007/s13280-023-01876-7

KUNGL. VETENSKAPS-AKADEMIEN
THE ROYAL SWEDISH ACADEMY OF SCIENCES

PERSPECTIVE

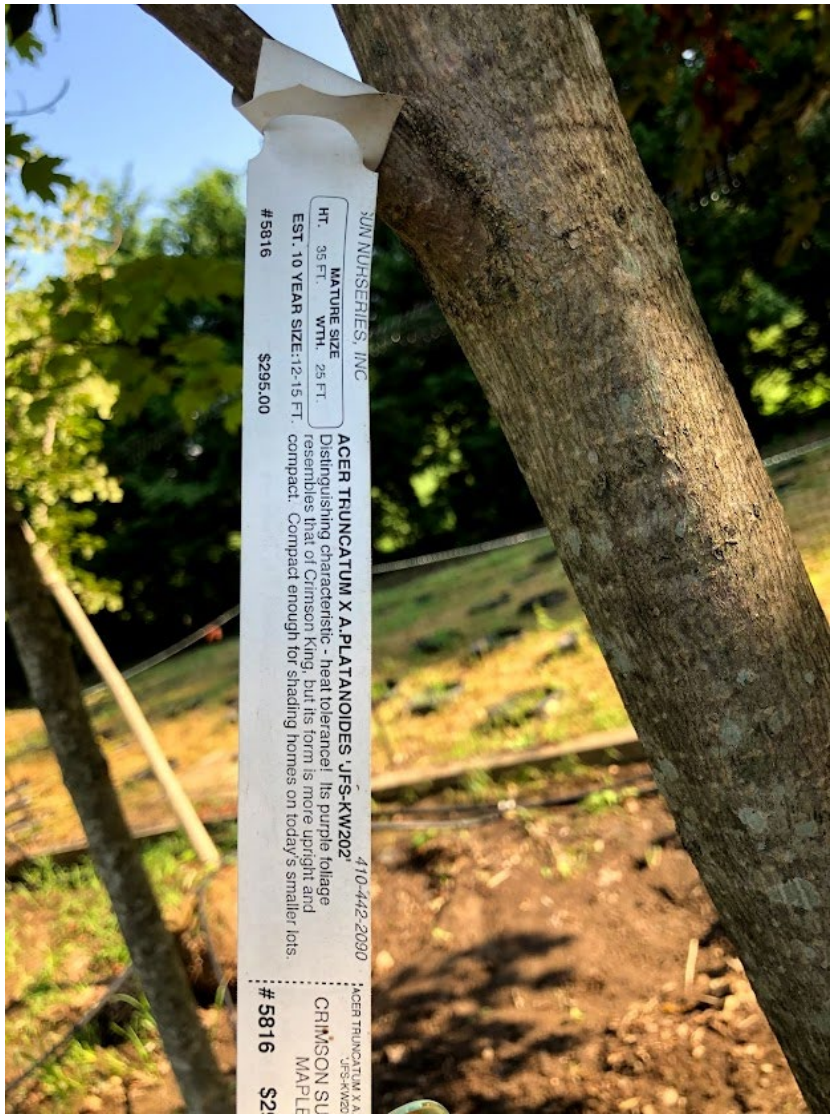
Conceptualizing the human drivers of low tree diversity in planted urban landscapes

Deborah R. Hilbert, Andrew K. Koeser, Michael G. Andreu, Gail Hansen, Lara A. Roman, Mack Thetford, Grant L. Thompson



Urban tree supply chain: who is involved?

- Breeders
- Propagators (whips/liners)
- Nurseries (differing clientele)
- Urban forestry practitioners
  - Direct planting activities
  - Shape policy (tree lists)
  - Tree giveaways
- Who are we missing?
  - Landscape architects
  - Contractors – tree planting
  - (Residential and other private landowners)



Urban tree supply chain: interviews

- Understand the decisions made along the supply chain to breed, grow, sell, and plant red and Norway maple trees in Baltimore City
- Explore broader considerations of tree diversity at genetic or species level
- How do these decisions impact genetic diversity of trees planted and growing in Baltimore?
- How have these decisions changed over time?

Urban tree supply chain: interviews

- How do you decide which species and cultivars to breed/grow/sell/plant?
- Which red and Norway maple cultivars are being bred/grown/sold/planted? Which traits are being selected for these species?
- What are the benefits/drawbacks of these two species and their cultivars?
- In addition to showy traits, do you consider tolerance to urban conditions? climate resilience? genetic diversity?
- What do customers want most when selecting trees? Why are they selecting red and Norway maple? (or why not?)
- Future plans for providing these species/cultivars?

Maryland Tree Solutions Now Act: 5 million trees by 2030

How has the recent Maryland state legislation changed the conversation around:

- nursery production?
- urban tree planting?
- climate resilience of cultivars?
- genetic diversity of planted tree populations?

Preliminary results

- Tree planting orgs and landscape architects rarely have quantitative goals for diversity, though most do strive to increase diversity in a qualitative sense
- Can be difficult to enforce goals/targets for diversity throughout the network of decisions
- Aesthetics and familiarity are drive many tree planting decisions rather than genetic diversity or climate adaptation
- People tend to grow and plant what they know

Preliminary results

- Norway maple rarely used (only by landscape architects in projects outside the city)
- Red maple is polarizing – overplanted in Baltimore but still a landscape architect favorite
- Straight species of red maples only used in “conservation” type projects, otherwise cultivars
- Logistical challenges to expanding production of some native species (e.g., *Carya spp*)
- Seed-grown trees may have slower or more variable growth rates than cultivars or are less predictable in other ways, leading to product/resource waste

Thank you

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Food and Agriculture Organization of the United Nations

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ISA International Society of Arboriculture

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2nd World Forum on Urban Forests

2023

World Forum on Urban Forests

2nd World Forum on Urban Forests

Washington DC, 2023

Building Resilient Cities
30 Years' of China's Urban Forest Development

Presented by

Prof. Wendy Y. Chen

The University of Hong Kong

Urban Forests in China

- In ancient Chinese cities: planting trees along rivers/streets, maintaining tree stands around houses
  - Food source
  - Feng-shui
  - Scenery

- Since 1992, urban forestry has been formally recognized as an academic discipline
  - An umbrella term that supersedes the traditional urban-rural distinction
  - Flexible, integrative, multidisciplinary problem-solving approaches
- Investment in urban forest has been increased
  - From 5.3 billion USD in 2005 to 36.2 billion USD in 2018

- Significant increase of urban forest coverage
  - 1980-2018: 1100 km^2 to 30471 km^2

- A shift of urban greening strategy
  - 1990s-2000s: beautifying urban and peri-urban landscape and enhancing recreational function
    - Green landscapes: “the face of the city”
  - 2000s-2010s: urban forests as a countermeasure to environmental stresses
    - Forest belts in peri-urban areas: sand storms

- **Since 2010s: urban forests as a visual manifestation of ecological civilization**
  - No resilient and healthy cities without urban forests
  - Constructing resilient cities for which ecological resilience and a synergistic provision of diverse ecosystem services have been emphasized

- Recreational function is enhanced: with low
  s
  - ape
  - cities
  - ces

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Urban forests' recreation and habitat potentials in China: A nationwide synthesis

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- Ecological functionality is declined in the majority of cities

	Recreation	Habitat
ln(Population)	-2.275**	-11.944**
	(1.227)	(6.088)
ln(Land size)	0.273	1.808
	(0.582)	(2.859)
ln(GDP/capita)	3.417***	-13.143**
	(1.180)	(5.260)
Ecozone	0.225	10.960***
	(0.585)	(3.619)
Constant	-30.885***	73.626**
	(10.042)	(43.265)
Hausman test/Wald $\chi 2$	23.38***	18.07***
R-squared	0.225	0.278

A solid knowledge base about the multi-faceted characteristics of urban forests and comprehensive criteria for evaluating resilient urban forests and resilient cities!

Thank you

Wendy Y. Chen

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Session 3.2: Do the right thing: Planning, designing and managing the urban forest to strengthen its resilience to external shocks

PP-23-3570

World Forum on Urban Forests