A Greener Hawaiʻi: Carbon Sequestration Potential of Urban Forests

Prepared by: Katia Chikasuye, Maggie Enzweiler, Ryan Lea Thomas, Melissa Ryerson & Dylan Vandenberg

Prepared for: State of Hawaiʻi, Greenhouse Gas Sequestration Task Force

Urban Forests in Hawaiʻi

Urban Forests ⟶ All vegetative cover in a geographically defined urban area, including public and private lands (trees and green spaces)

Primarily focused on tree preservation and planting

Urbanized areas >50,000 people: 3 in the State of Hawaiʻi

1. Urban Honolulu
2. Kailua-Kaneʻohe (Honolulu County)
3. Kahului (Maui County)

Hawaiʻi State Data Center, DBEDT, 2013

Kaulunani Grant Program

Citizen Forester Program

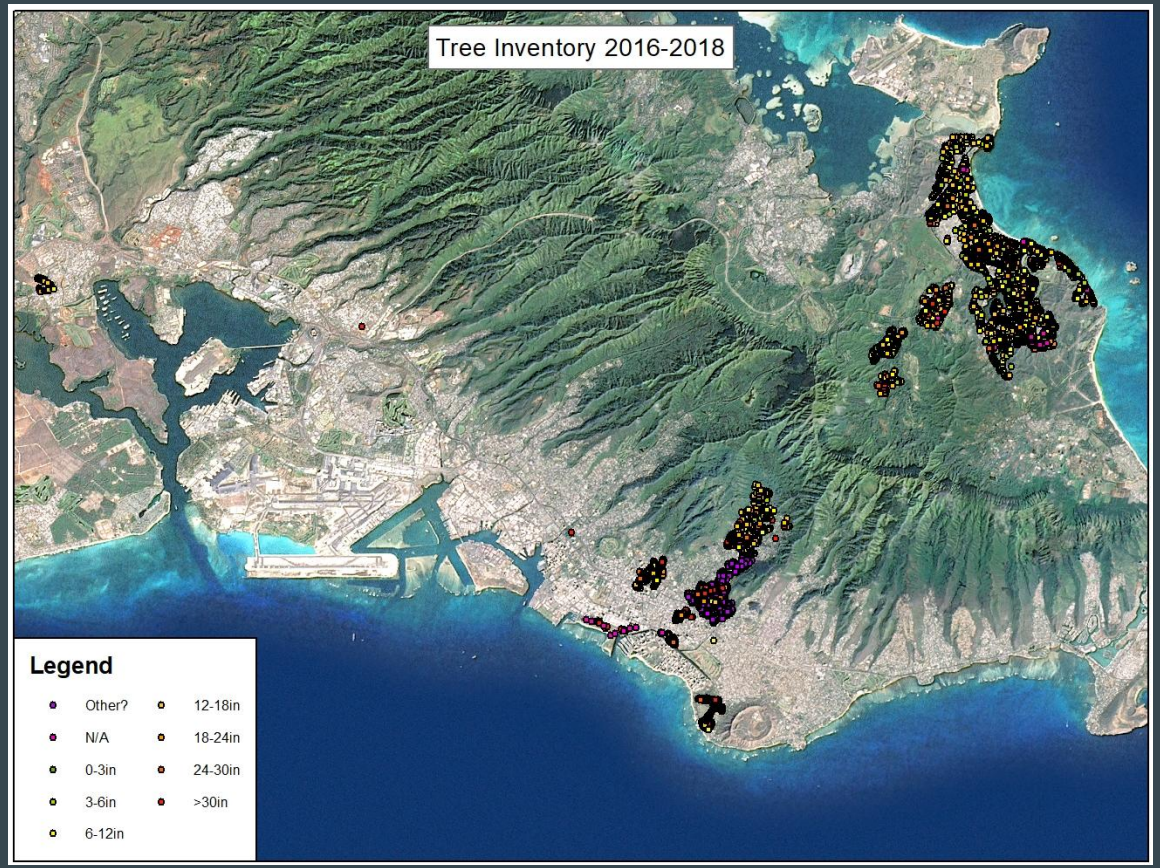
Current Local Policies & Programs

- Exceptional Tree Program
  - Recognition, protection, tax breaks
- Trees for Honolulu's Future
  - 35% canopy cover by 2035
  - Plant 100,000 trees by 2025
- Community Recreational Gardening
  - Access to urban garden space
- Tree Acquisition Program
  - Tree rights transferred to the state
  - Aid in maintenance and removal

Tree for Honolulu's Future Initiative

Exceptional Tree Program

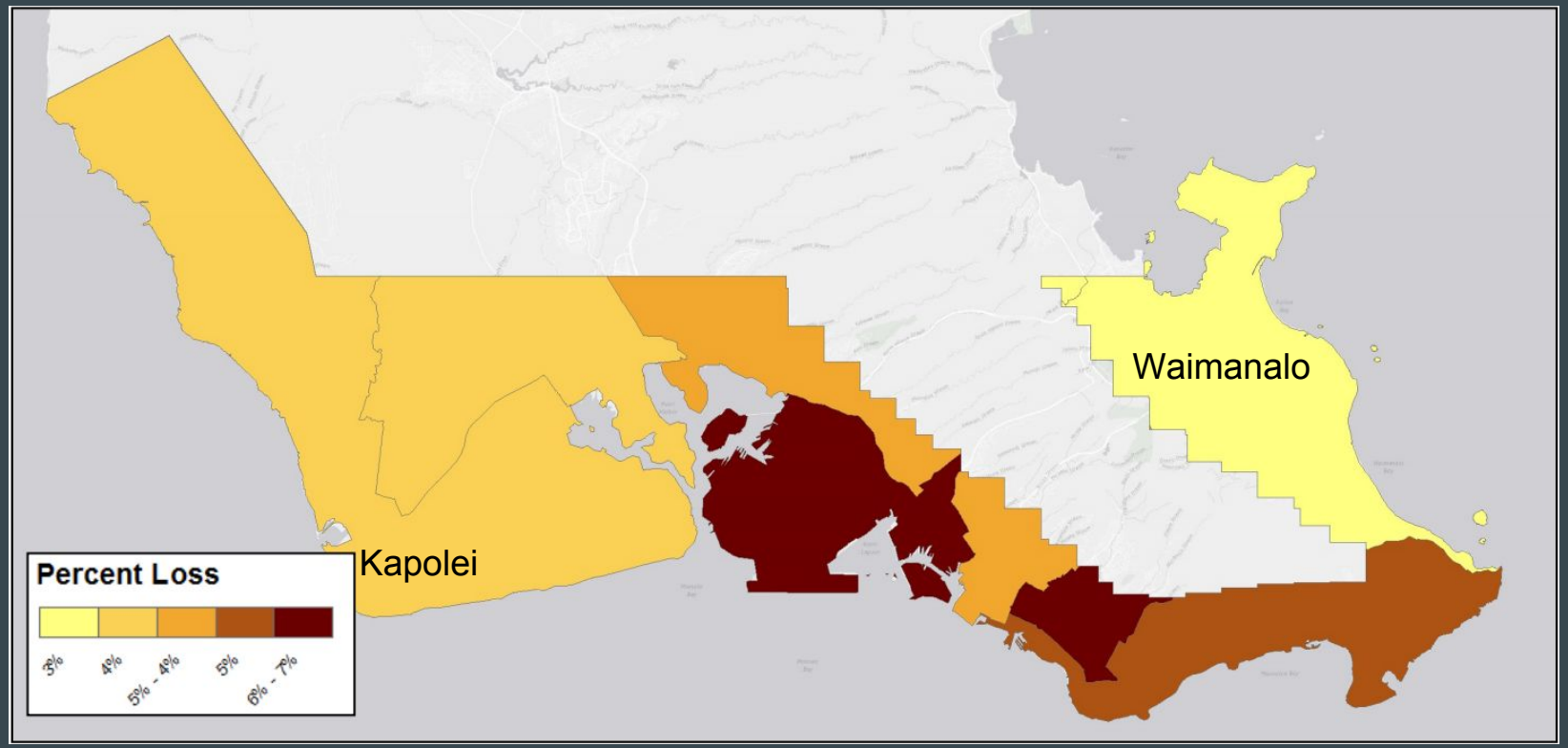
O‘ahu’s Tree Inventory Map



- Citizen science
- Ongoing tree health surveys

Division of Forestry, Citizen Forester Program

Tree Canopy Loss between 2010-2013 (Honolulu Districts)



O‘ahu Urban Tree Canopy Assessment (State & Federal Partnership)

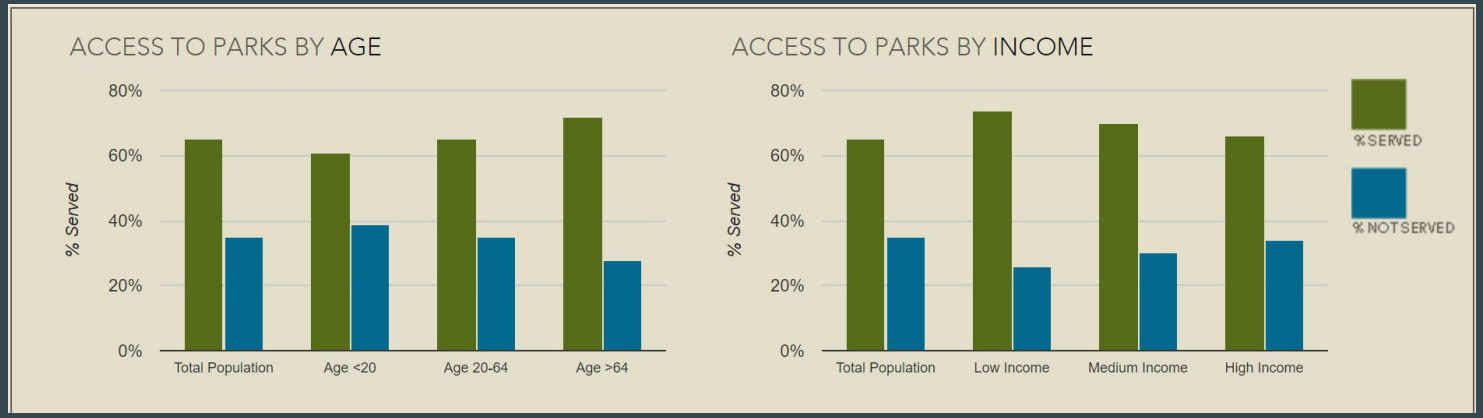
Urban Forests as a Public Good

Market Failures

- Positive externalities: co-benefits
- Information asymmetry
- Endogenous preferences: palms, non-native species

Government Failures

- Bureaucratic under-supply
- Limited regulation: private lands



Honolulu ParkScore 2018, The Trust for Public Land

Policy Goals

1. Increase carbon sequestration from vegetative cover
2. Equitable access and proximity to urban forests
3. Political feasibility for support and implementation
4. Economic efficiency

Mixed Methods

- Interviews
  - Shannon Rivera
    Division of Urban Forestry
  - Matt Gonser
    Office of Climate Change, Sustainability, & Resiliency
  - Myles Ritchie
    The Outdoor Circle & Exceptional Trees
  - Wai Lee & Corey Bassett
    Smart Trees Pacific
- Literature Review
  - History of sector
  - Current policies
  - Funding availability
- iTree Online Calculator & Citizen Forester Program Data

Impact Categories

GOALS	IMPACT CATEGORIES
1. GHG Sequestration	Increased Urban Canopy Cover Area
	Increased Green Space Area
2. Equity	Measurable Co-Benefits
3. Political Feasibility	Stakeholder Support and Engagement
4. Efficiency	Sequestration Potential Per Cost

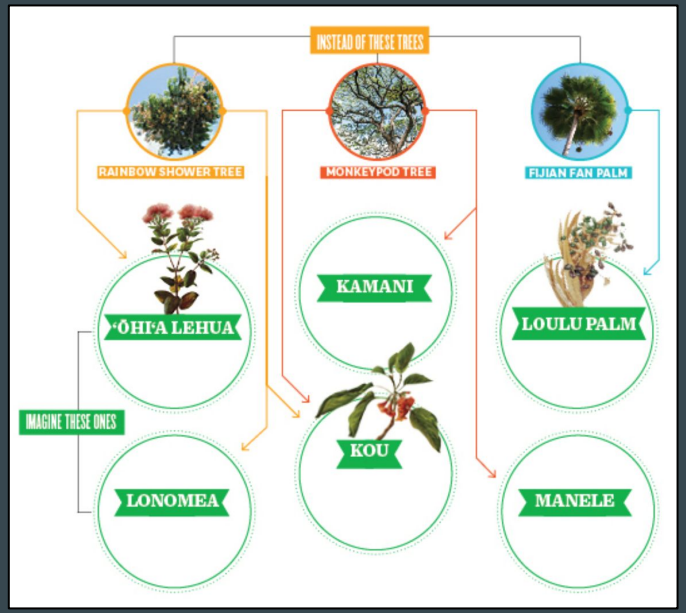
Policy Alternatives

1. Status Quo
2. Tree Removal Permits
3. Crediting Systems
4. Incentive Programs
5. Current Program & Policy Expansions

Forested rain garden, Smart Trees Pacific

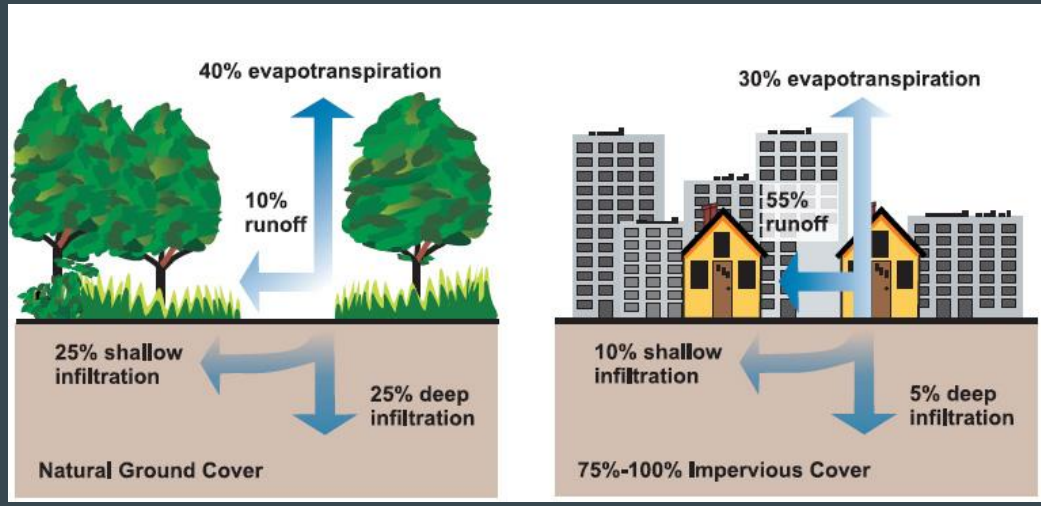
Tree Removal Permits

- Limit reduction in canopy cover
- Horticulture Services Branch, Division of Urban Forestry
  - Assessment & approval by certified arborist
  - Removal prioritization
    - Sick, dying, health/safety concerns
    - Invasive species
    - Non-native species



Crediting Systems

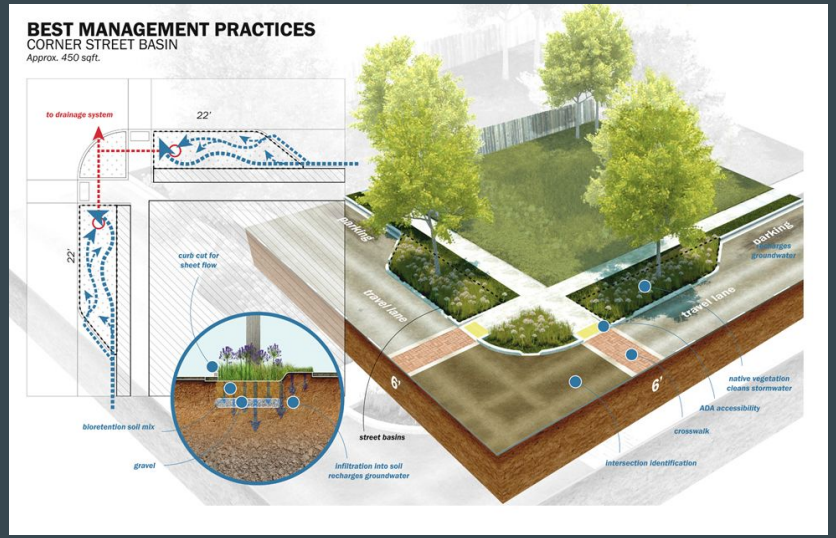
- Stormwater Management
  - Nutrient & Sediment Runoff
- Impervious Surface Reduction
- Carbon Sequestration
- Energy Consumption Reduction



U.S. Environmental Protection Agency, Washington, D.C. "Protecting Water Quality from Urban Runoff." Document No. EPA 841-F-03-003

Incentive Programs

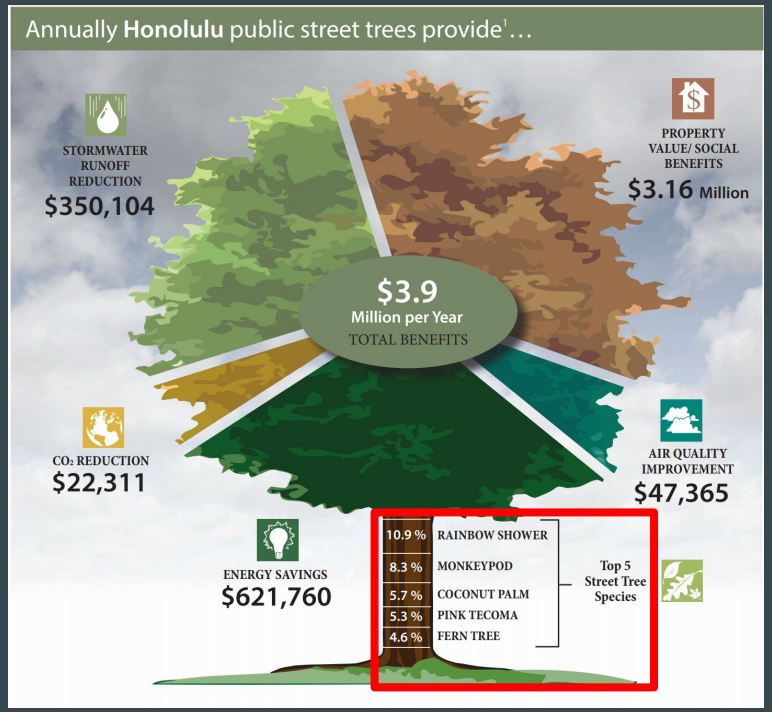
- Development Incentives
  - Green Infrastructure
  - Non-structural solutions
- Stormwater Fee Implementation & Discounts
- Grants
- Rebates - private landowners



Dana Brown & Associates, Pontilly Stormwater HMGP

Current Policy & Program Expansions

- Oʻahu Urban Tree Canopy Assessments
  - Annual surveys
  - Use results to prioritize tree-planting efforts
  - Species & location
- Citizen Forester Program
  - Complete inventory
  - iTree calculator adjustments
- Exceptional Trees
  - More tax breaks & other incentives
  - Change standards to include more trees



DLNR, Benefit of Honoluluʻs Street Trees, 2013

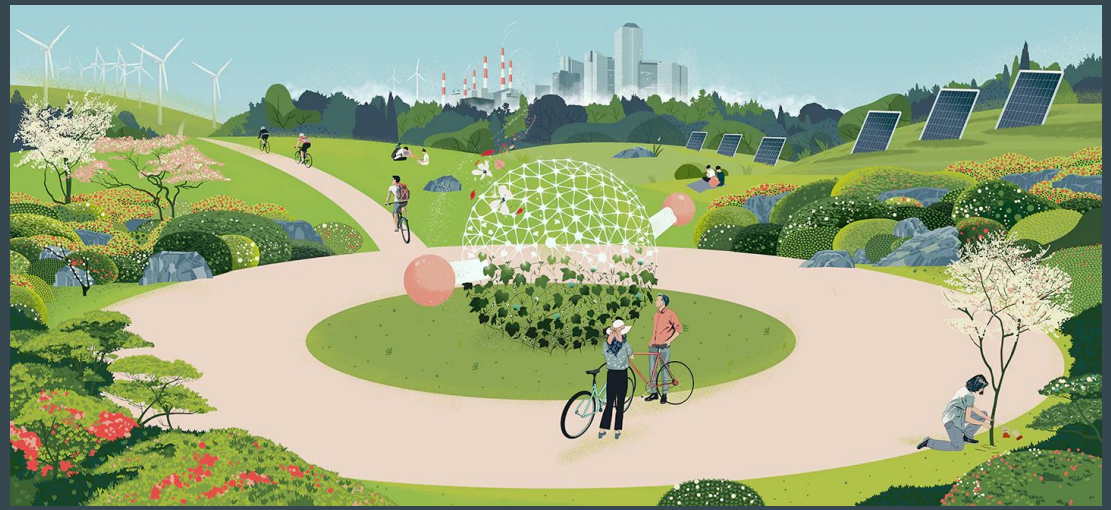
Analysis, Assessment & Recommendation

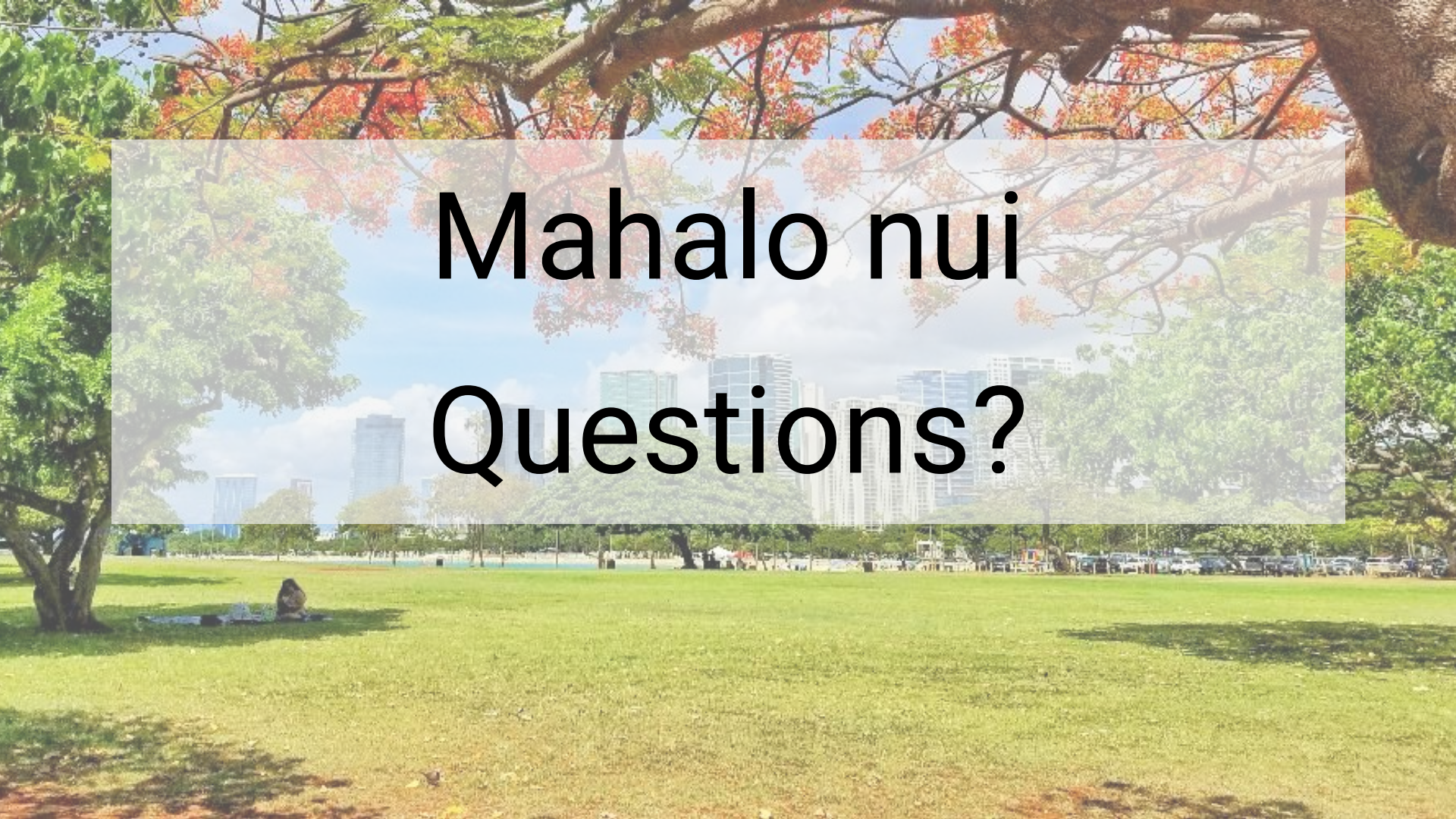
GOALS	IMPACT CATEGORIES	POLICY ALTERNATIVES					
		Status Quo	Tree Permitting	Urban Tree Credits	Stormwater Fee Discount	Tree Rebate	Policy Expansions
1. GHG Sequestration	Increased Urban Canopy Cover [Low-High]	Low	Low	Med-High	Medium	Med-High	High
	Increased Green Space [Low-High]	Low	Low	Med-High	Med-High	Medium	Medium
2. Equity	Sociocultural Benefits [Low-High]	Low	Low-Med	Med-High	Low-Med	Med-High	Medium
3. Feasibility	Stakeholder support [Low-High]	High	Low	Med-High	Low	Med-High	High
4. Efficiency	Sequestration Potential Per Cost [Low-High]	Low-Med	High	Medium	Medium	Medium	Medium

Low	1
Low/Medium	2
Medium	3
Medium/High	4
High	5
Expansion	24
Urban Tree Credits	23
Tree Rebate	22
Stormwater Fee Discount	18
Tree Permits	11
Status Quo	11

Next Steps

- iTree Calculator HI-specific adjustments
- Completion of Oʻahu's tree inventory ⟶ Citizen Forestry Program
- Annual canopy cover assessments
- Neighborhood education and outreach programs





Mahalo nui

Questions?