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 Hawai‘i, Greenhouse Gas Sequestration Task Force
Urban Forests in Hawai‘i

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 Hawai‘i

1. Urban Honolulu
2. Kailua-Kane‘ohe (Honolulu County)
3. Kahului (Maui County)

Hawai‘i State Data Center, DBEDT, 2013
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
O‘ahu’s Tree Inventory Map

- Citizen science
- Ongoing tree health surveys

Legend:
- Other?
- N/A
- 0-3in
- 3-6in
- 6-12in
- 12-18in
- 18-24in
- 24-30in
- >30in
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

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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

<table>
<thead>
<tr>
<th>GOALS</th>
<th>IMPACT CATEGORIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. GHG Sequestration</td>
<td>Increased Urban Canopy Cover Area</td>
</tr>
<tr>
<td></td>
<td>Increased Green Space Area</td>
</tr>
<tr>
<td>2. Equity</td>
<td>Measurable Co-Benefits</td>
</tr>
<tr>
<td>3. Political Feasibility</td>
<td>Stakeholder Support and Engagement</td>
</tr>
<tr>
<td>4. Efficiency</td>
<td>Sequestration Potential Per Cost</td>
</tr>
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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
Current Policy & Program Expansions

- O‘ahu 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 Honolulu’s Street Trees, 2013
## Analysis, Assessment & Recommendation

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<th>POLICY ALTERNATIVES</th>
<th>Status Quo</th>
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<th>Urban Tree Credits</th>
<th>Stormwater Fee Discount</th>
<th>Tree Rebate</th>
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<tbody>
<tr>
<td>1. GHG Sequestration</td>
<td>Increased Urban Canopy Cover [Low-High]</td>
<td>Low</td>
<td>Low</td>
<td>Med-High</td>
<td>Medium</td>
<td>Med-High</td>
<td>High</td>
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<td>Increased Green Space [Low-High]</td>
<td>Low</td>
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<td>Med-High</td>
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### Expansion
- 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 O‘ahu’s tree inventory → Citizen Forestry Program
- Annual canopy cover assessments
- Neighborhood education and outreach programs
Mahalo nui
Questions?