RAHMA EDIBLE FOREST GARDEN

10 YEAR ENVIRONMENTAL BENEFITS ASSESSMENT

PRELIMINARY ESTIMATES BEFORE COMPLETE TREE INVENTORY

3100 S SALINA ST, SYRACUSE, NY
ALCHEMICAL NURSERY

"The Alchemical Nursery Project is a non-profit organization committed to promoting the development of sustainable, regenerative urban lifestyles and landscapes. By providing the resources, dialogue space, and networks needed for those interested in the movement for sustainable cities, we are furthering our goal to contribute to the growth of the urban ecovillage movement locally, nationally, and globally."

ABOUT THIS STUDY

METHODS

Environmental modeling programs i-Tree Hydro, i-Tree MyTree and i-Tree Design were used along with data available online to assess some of Rahma Forest Garden's ecosystem services.

i-Tree Tools are a suite of free scientific computer programs from the US Forest Service and various partners, simulating the physical processes and relationships that connect tree and forest...

Structure -> Function -> Benefits -> Value

SCENARIOS

To put current benefits in context, comparisons are made with other relevant land cover scenarios. For this preliminary study, 2 alternatives were assessed:

- No Trees scenario: remove all current tree cover and replace it with the land cover that was under its canopy, either grass or impervious cover.

- Parking Expansion scenario: same as No Trees scenario, plus parking lot expands to fill in garden area.

AUTHOR & ORGANIZATION

Rahma Forest Garden is a collaborative effort by Rahma Health Clinic, Alchemical Nursery, and numerous volunteers of various species.

This analysis & report was prepared by Robbie Coville of Alchemical Nursery in July 2019. Contact at info@alchemicalnursery.org

For a full report with more details, please visit
www.AlchemicalNursery.org

LAND COVER

(A)

(B)

(C)

Land Cover Types

- ⊞ Herbaceous
- 🟥 Impervious
- 🟩 Tree Canopy
- 🟫 Pervious
- ▨ Shrub Cover
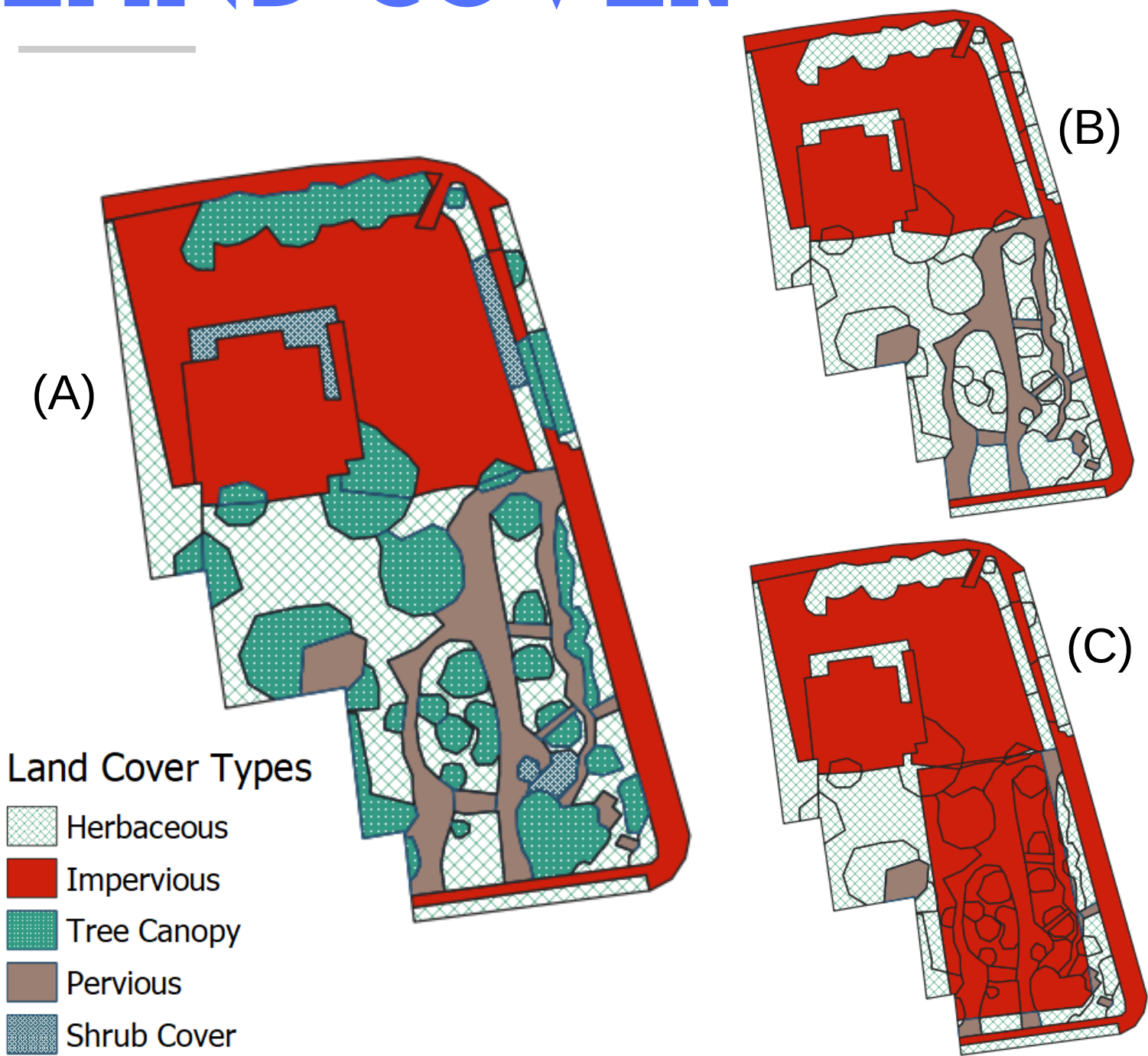
Land Cover Scenarios	(A) Current Conditions 10 Year Forest Garden	(B) No Trees	(C) No Trees + Parking Lot Expansion
Herbaceous (grass, gardens)	24%	47%	23%
Impervious (building, parking)	39%	41%	74%
Bare Soil (wood, compost)	11%	11%	3%
Shrub Cover	3%	0%	0%
Tree Cover over Pervious Surfaces	21%	0%	0%
Tree Cover over Impervious Surfaces	2%	0%	0%
Total Tree Canopy	23%	0%	0%
Total Land Cover	100%	100%	100%

STORMWATER BENEFITS

Water Quantity (million cubic meters)	Total Flow	Base Flow	Pervious Runoff	Impervious Runoff
Current Condition	25.33	2.13	18.67	4.53
No Trees	25.81	2.13	19.12	4.55
Parking Expansion	34.49	0.95	11.62	21.93

% Change	Total Flow	Base Flow	Pervious Runoff	Impervious Runoff
No Trees	2%	0%	2%	1%
Parking Expansion	36%	-56%	-38%	384%

Stormwater Impacts of Rahma's Landscape as Compared with 2 Land Cover Scenarios

MULBERRY BENEFITS

INDIVIDUAL TREE HIGHLIGHT

One year of accounting for a few of the environmental benefits scientists already quantify

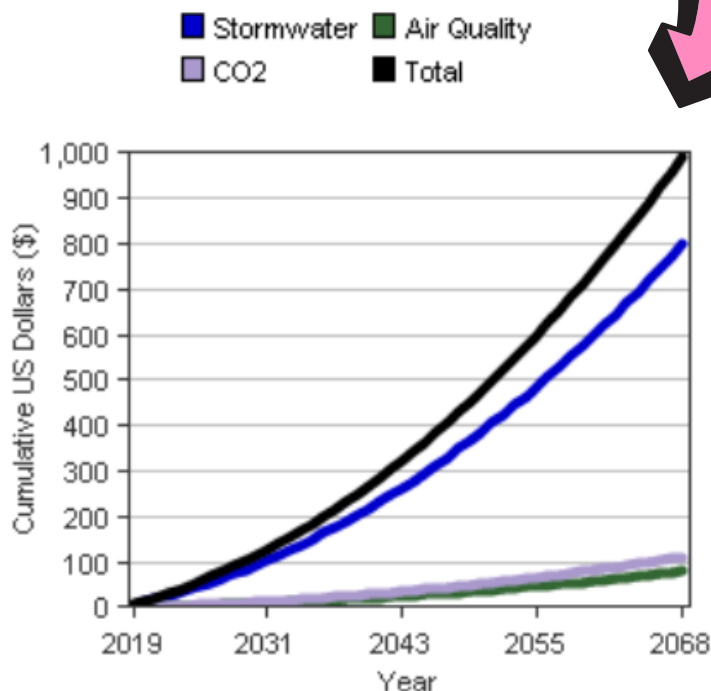A few benefits projected out over 50 years of likely growth using i-Tree Design

Legend: Stormwater · Air Quality · CO2 · Total

Figure 1. Tree benefit forecast for 50 years

MyTree Benefits

i-Tree

Tree 1: Mulberry, Red (Morus rubra)
Serving size: 7" dbh, Good condition

Total benefits for this year — **$6.81**

Carbon Dioxide (CO_2) Sequestered — $0.69

Annual CO_2 equivalent of carbon[1]	29.83 lbs

Storm Water runoff avoided — $1.18

Runoff avoided	131.92 gal.
Rainfall intercepted	691.23 gal.

Air Pollution removed each year — < $0.10

Carbon monoxide	0.13 oz
Ozone	4.04 oz
Nitrogen dioxide	< 0.10 oz
Sulfur dioxide	0.16 oz
Particulate matter < 2.5 microns	0.22 oz

Energy Usage each year[2] — $4.12

Electricity savings (A/C)	4.75 kWh
Fuel savings (Natural Gas, Oil)	0.21 MMBtu

Avoided Energy Emissions — $0.77

Carbon dioxide	32.54 lbs
Carbon monoxide	0.27 oz
Nitrogen dioxide	< 0.10 oz
Sulfur dioxide	0.67 oz
Particulate matter < 2.5 microns	< 0.10 oz

Carbon Dioxide (CO_2) Stored to date[3] — $5.70

Lifetime CO_2 equivalent of carbon[3]	244.97 lbs

Benefits are estimated based on USDA Forest Service research and are meant for guidance only: www.itreetools.org

[1]Large trees: sequestration is overtaken by CO_2 loss with decay/maintenance.

[2]Positive energy values indicate savings or reduced emissions. Negative energy values indicate increased usage or emissions.

[3]Not an annual amount or value.

www.itreetools.org
i-Tree MyTree v1.5
powered by the i-Tree Eco engine

TAKEAWAYS

1. Ten years of forest gardening has resulted in approximately 25% tree canopy on the Rahma Clinic's property – half the total un-paved area!

2. Trees provide some stormwater benefits as opposed to lawn, but the major factor in stormwater is impervious cover. Minimizing impervious surfaces and avoiding continuous paved areas – e.g. by punctuating pavement with trees and green infrastructure – can mitigate urban stormwater issues.

3. Tree benefits get better with time, much better! Big tree provide many times more benefits than small trees.

4. i-Tree Tools only estimates a small set of environmental 'regulating' benefits, like cleaning air and infiltrating water. **There are many other benefits trees provide, some yet to be quantified and some maybe never to be quantified!**

Wildlife Habitat

Temperature Regulation

"Forest Bathing"

Culture

Soil Health

Fiber

Air

Food!

Medicines

Fuel

Water

Pollination

Beauty

Community

SUPPORTING THAT WHICH SUPPORTS YOU

Trees are giving. Some of what they give we can quantify with the latest science of today and more tomorrow. Some of what they give we can touch and taste, smell and hear, feel and share. Much of what they give is more valuable when we make the effort to enjoy it. And much of what they give can be enhanced and propagated! We give thanks for the abundance trees support.

Get involved with a local forest gardening group to start enjoying more of what trees have to offer, and learn to work with trees in mutual benefit!

If you appreciate this document, please support Alchemical Nursery's efforts by volunteering or donating. Visit www.AlchemicalNursery.org