Urban Desert Landscapes – Creating Climate Resilience One Tree at a Time!

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What Would Life Be Like Without Trees?

Herring Hall

Old Main
Outline

• Guiding principles relating to urban landscapes.
  • Ecosystem services plants provide.
• Role and challenges of trees in Arizona cities.
• 3 things you can do to for resilient urban landscapes.
  • Revised Desert Landscape site.
Plants are Foundational to Life on Earth

Primary Producers

Herbivores

1st Carnivores

2nd Carnivores

Decomposers

Primary Producers

Herbivores

1st Carnivores

2nd Carnivores

Decomposers
Trees are foundation species in terrestrial ecosystems. Foundation species: tree species that define and structure ecosystems through their influences on associated organisms and modulation of ecosystem processes. (Ellison et. al, 2005)

**Ecosystem:** an interdependent community of living and non-living things.

**Ecosystem Services:**
The goods and services produced natural processes as living and nonliving elements interact.
Ecosystem Services = Natural Capital

The value of the world’s natural capital ~ $33 Trillion/Year ~ 2x world’s combined GNP.

Urban Ecosystem Services = Green Infrastructure

Low cost, natural solutions for urban problems.

ie. water harvesting, green roofs, low impact development
Trees Benefit Cities

**Economic Prosperity**
- Increase property values
- Increase retail foot traffic
- Conserve energy
- Reduce utility demands
- Mitigate urban flooding
- Reduce repaving interval

**Quality of Life**
- Expand opportunities for recreation and community gathering
- Promote health
- Reduce crime
- Calm traffic
- Support urban wayfinding
- Preserve culture/heritage

**Environmental Health**
- Provide food
- Generate oxygen
- Capture CO₂/GHG
- Support wildlife
- Improve air quality
- Protect water quality
- Reduce soil erosion
- Combat drought.

Sustainability
Tree provide benefits with real value and excellent return on investment for humans and the planet in natural and built environments.

For every $1 invested in US urban trees, there is an average of $3.50 of (environmental and economic) goods and services provided to the municipality.
<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement</td>
<td>$28,217,339</td>
</tr>
<tr>
<td>Services</td>
<td>$272,997 / yr</td>
</tr>
<tr>
<td></td>
<td>$44.95/tree</td>
</tr>
<tr>
<td>Energy Savings</td>
<td>$55,065 / yr</td>
</tr>
<tr>
<td>CO₂ Sequestration</td>
<td>$29,180</td>
</tr>
<tr>
<td></td>
<td>3,890,698lbs of CO₂ stored</td>
</tr>
<tr>
<td></td>
<td>708,010lbs of CO₂ avoided</td>
</tr>
<tr>
<td>Stormwater</td>
<td>$13,766 municipal savings</td>
</tr>
<tr>
<td></td>
<td>2,867,671 G trapped and filtered</td>
</tr>
<tr>
<td>Air quality</td>
<td>$13,675</td>
</tr>
<tr>
<td></td>
<td>474 lbs of pollutants removed.</td>
</tr>
</tbody>
</table>
Arizona Needs Trees
Urbanization Concentrates Environmental Impacts

Urbanization, industrialization, population growth has led to loss of natural environments in urban areas. Lost too are the benefits of green spaces.

The Southwest is one of the most rapidly urbanizing regions in the United States.

80% of Arizona’s population lives in 1 of 3 major metropolitan areas.

American Forests and the USFS recommends 15-20% baseline target canopy cover for desert cities. The ideal is 26%

The average canopy cover in Tucson is ~8%

PAG – Planning and Green Infrastructure Prioritization Tool
https://gismaps.pagnet.org/PAG-GIMap/Map.aspx
Tucson Canopy Cover

Canopy disparity correlates with heat vulnerability
Conservation in Your Backyard!

- The largest use of potable water in Arizona is for landscaping.
- As much as 70 percent of residential water use is outdoors.
- Water use in all landscapes can be significantly reduced by using efficient and regionally-appropriate designs, plant selection, and irrigation practices.
Three Things YOU Can Do.

1. Plan thoughtfully.

2. Plant properly

3. Manage sustainably
Plan Thoughtfully

Design Gallery

Germinate ideas for your desert landscaping project with this handy plant gallery.

1. Trailing Indigo Bush
   Dalea greggii
   TYPE: GROUND COVER

2. Bougainvillea
   Bougainvillea species
   TYPE: VINE

3. Brittlebush
   Encelia farinosa
   TYPE: SHRUB

4. Engelmann's Prickly Pear
   Opuntia engelmannii
   TYPE: CACTUS

5. Century Plant
   Agave americana
   TYPE: ACCENT

6. Green Desert Spoon
   Dasylirion acutriche
   TYPE: ACCENT

7. Saguaro
   Carnegiea gigantea
   TYPE: CACTUS
Plan Thoughtfully

Daniel Harmon
B. S. Sustainable Plant Systems, Class of 2019

- Plant Selection Criteria
- Ecologically Sensitive Design
Plan Thoughtfully

- Search for plants.
- Filter results based on plant characteristics, site conditions or desired landscape function.
**Campus Arboretum Resources**

**Dichrostachys cinerea**

- **Common Name:** Sickle Bush
- **Family Name:** Fabaceae
- **Botanical Name:** Dichrostachys cinerea
- **Seed Source:** Tropical Africa
- **Genus:** Dichrostachys
- **Species:** cinerea

**Description:**
- **Height:** 6.5 ft
- **Drought Tolerant:** Yes
- **Soil:** Average
- **Flower:** Bright yellow
- **Fruit:** Pod

**Features:**
- Sickle-shaped leaves

**Cultural Notes:**
- Best suited for dry, well-drained soil
- Full sun

**Uses:**
- Ornamental plant
- Suitable for low-maintenance landscapes

**Notes:**
- This plant has adapted properties for use in arid regions.

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**Medicinal Plants Tour**

- Plants have been used for centuries to treat and remedy all sorts of ailments.
- On this tour, you will learn about the medicinal plants here on campus and their therapeutic properties for human health.

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**Contact:**

- For more information, please contact the Campus Arboretum at 555-555-5555.
PLANTS TO SPROUT IDEAS

Tried and true, virtually fool-proof plants and promising new experimental selections to consider.

- **NEW CULTIVAR - CIVANO NURSERY**: Libby Davison Ash, *Fraxinus griffii 'Libby Davison'*
- **PROVEN PERFORMER**: Wright's Acacia, *Senegalia Wrightii var. Wrightii*
- **PROVEN PERFORMER**: Ironwood, *Olea' tesota*
- **PROVEN PERFORMER**: Mulga, *Acacia aneura*
Plant Properly

Daniel Harmon
B. S. Sustainable Plant Systems, Class of 2019

Garden Basics

Get your landscape off to a healthy start. Learn when and how to plant trees and how to handle the most common challenges faced during the planting process.

1. Watering
2. Planting
3. Pruning

Planting

- Set bale on firmly packed soil to prevent settling.
- Gently pack backfill around the root ball.
- Keep mulch 1 to 2 inches (2.5 to 5 cm) back from trunk.
- Remove containers, wrappings, wires and ties.
- 2- to 4-inch (5- to 10-cm) layer of mulch.

Use two opposing flexible ties when making is necessary.
Ties should be placed on the lower half of the tree and allow trunk movement.
Manage Sustainably

John Pacheco
B. S. Sustainable Plant Systems, Class of 2020

- Irrigation
- Nutrition
- IPM
- Pruning
- Staking

Cora Ricoy
B. S. Sustainable Plant Systems, Class of 2019
Manage Sustainably

Horticulture Unlimited

QTSArizona.com
Manage Sustainably

AZ Plant Lady
Questions?

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https://arboretum.arizona.edu/
Key Points

- Trees play an essential role in our environmental, economic and social well-being.
- Older, mature trees provide the greatest benefits/ROI.
- We are not meeting standards for climate resilience.
- Urban deserts pose particular challenges for plants.
- Special care must be taken:
  - Select the right tree for the right place.
  - Learn and employ sustainable maintenance practices.
Plant and Care For Trees

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