





**LID Basics and Beyond: Low Impact
Development Trends in the Southwest**

**The Urban Forest Resource:
a Critical Component of
Developing Sustainable
Infrastructure
and Healthy Living**

Benefits of Trees: Solution Multipliers

A low risk, high-yield investment for the community

- Water quality, storm runoff
- Air Quality, carbon sequestration
- Energy costs
- Property values
- Business
- Community safety and livability

Average ROI of \$2.23 in the Phoenix area

What is Urban Forest Sustainability in the Desert Southwest?

- A keystone for urban living
- A component of green infrastructure
- A process rather than a goal
- A myth?





What is the Urban Forest?

- The collection of trees growing with a city, town or suburb (large numbers of people and artificial surfaces).
- All vegetation, public and private.
- The human - forest interface.















Urban Heat Island

The replacement of natural land surfaces with materials that retain heat.

- Dealing effectively with the UHI requires a diverse set of solutions incorporating:
 - Cool and pervious pavements
 - Cool roofs
 - Urban forestry
- Adaptive and mitigation activities
- Good design and thoughtful planning







Green Infrastructure

- **INFRASTRUCTURE:** basic physical structures/features of a system/organization to support an economy or society.
- **GREEN INFRASTRUCTURE:** natural systems or engineered systems that mimic natural processes to enhance overall environmental quality and provide services.

These items appreciate through time whereas the gray infrastructure, sidewalks, streets, water and wastewater systems depreciate as soon as they are installed.



“Everywhere there is shade and plenty of it. The entire valley, from Mesa to Phoenix, is one solid mass of green ... and the entire distance ... can be driven under an almost unbroken arch of shade.” - 1905



Green Infrastructure

A large, leafy tree with green and yellow foliage is the central focus. To its right is a tall, silver street lamp with a white globe. In the background, a fountain with water spraying upwards is visible. The scene is set in a park-like area with a paved road in the foreground and a clear blue sky.

New ASLA report “Banking on Green” found GI to be proven and cost-effective at managing storm water runoff.

- Cost less
- Reduce energy expenses
- Reduce flooding and related damage/clean-up
- Improves public health



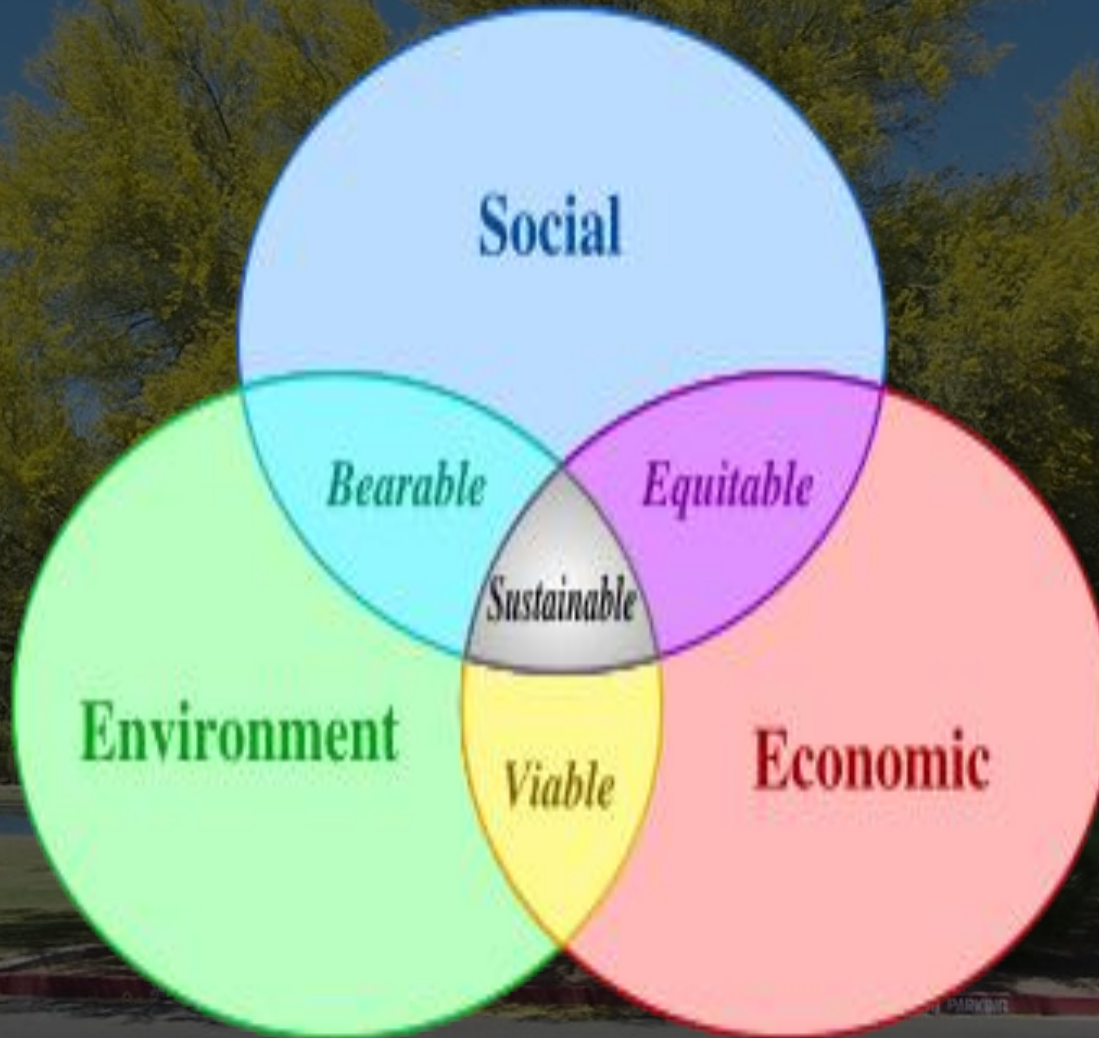


Green Infrastructure

A photograph of a park with a large tree, a fountain, and a street lamp. The tree is in the foreground, casting a shadow on the grass. The fountain is in the background, and the street lamp is on the right side of the image. The sky is blue and clear.

- Cooling effects of vegetation:
 - Evapotranspiration
 - Surface shading to reduce heat absorption
- Better planning and design:
 - Oasis - style plantings
- Protection of hardscape surfaces:
 - Positive correlation between tree shade and pavement performance

Sustainability Model



Urban Forest Sustainability

A large, leafy tree with green and yellow foliage stands in the center of the frame. To its right is a tall, silver street lamp with a white globe. In the background, a fountain sprays water into the air. The scene is set in an urban environment with a clear blue sky and a paved area in the foreground.

Four characteristics:

- Generates net benefits
- Provides services rather than goods
- Requires human intervention
- Majority is on private land

Urban Forest Sustainability Model

- Vegetative Resource
- Community Framework
- Resource Management

Urban Forest Sustainability Model

Vegetative Resource

- Canopy cover
 - Species mix
 - Age Distribution
 - Condition
- Native vegetation

Urban Forest Sustainability Model

Community Framework

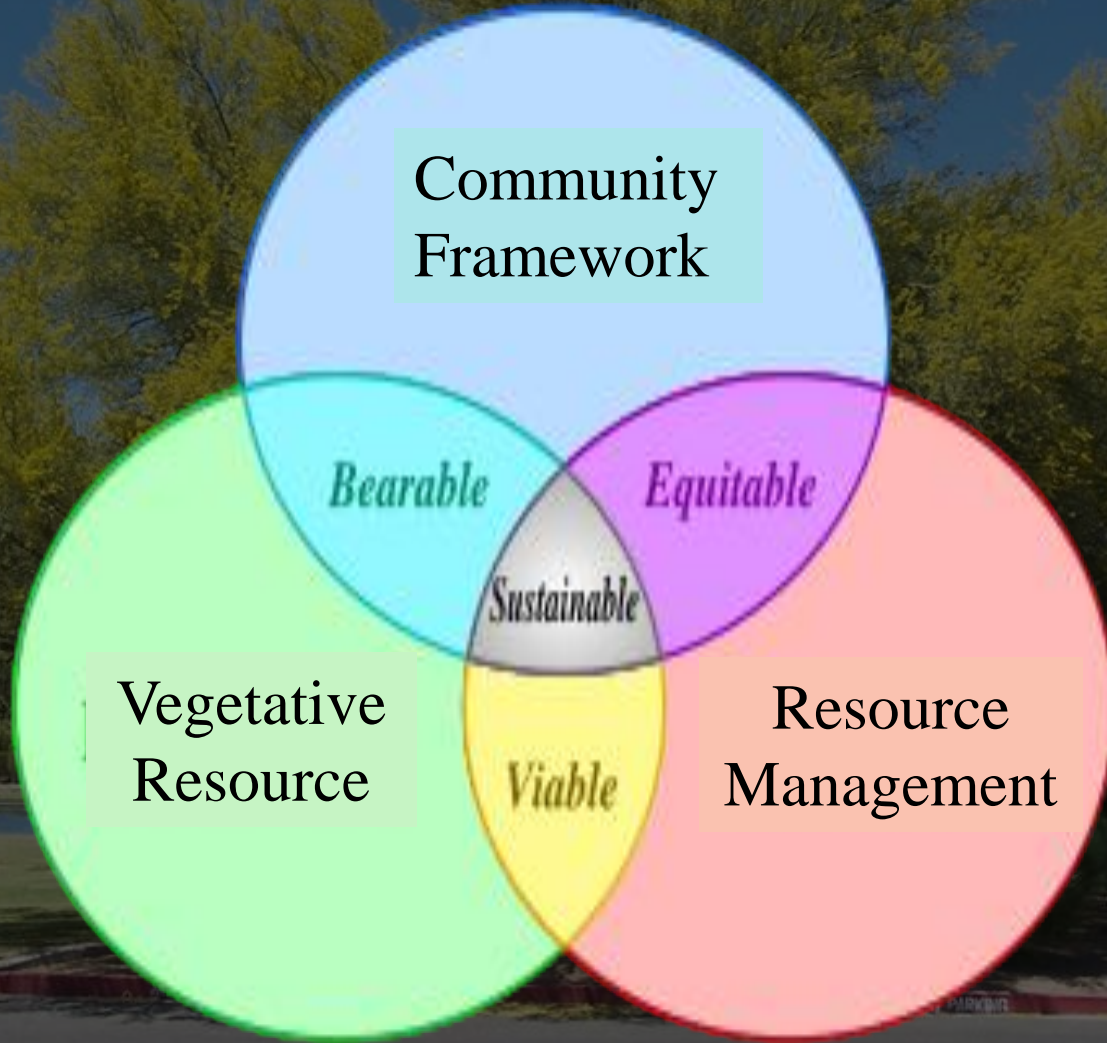
- Shared vision
- Education
- Partnerships

Urban Forest Sustainability Model

Resource Management

- Funding/Budget
- Staff
- Planning

Urban Forestry Sustainability Model



The Tree and Shade Master Plan

- <http://www.phoenix.gov/parks/shade.html>



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Right Tree Right Place



- Poor planting choices lead to problems and expense years after installation (maintenance/removal/replacement)
- Poorly pruned trees to “fit” the location
- Select for establishment and natural growth and development
- Design with mature plant development in mind
- Remember root development, not just branches



















Urban Forest Sustainability Model

Vegetative Resource

- Canopy cover
 - Species mix
 - Age Distribution
 - Condition

Tree Inventory

Top Ten Species in City of Phoenix

Vacant space	11.8%
<i>Prosopis velutina</i>	8.9%
<i>Parkinsonia florida</i>	7.0%
<i>Pinus halepensis</i>	5.9%
<i>Parkinsonia praecox</i>	5.3%
<i>Ulmus parvifolia</i>	4.3%
<i>Dalbergia sissoo</i>	4.3%
<i>Washingtonia filifera</i>	3.7%
<i>Fraxinus velutina</i>	3.1%
<i>Acacia stenophylla</i>	3.1%
<i>Washingtonia robusta</i>	2.8%

Tree Inventory

Top Ten Species in City of Phoenix

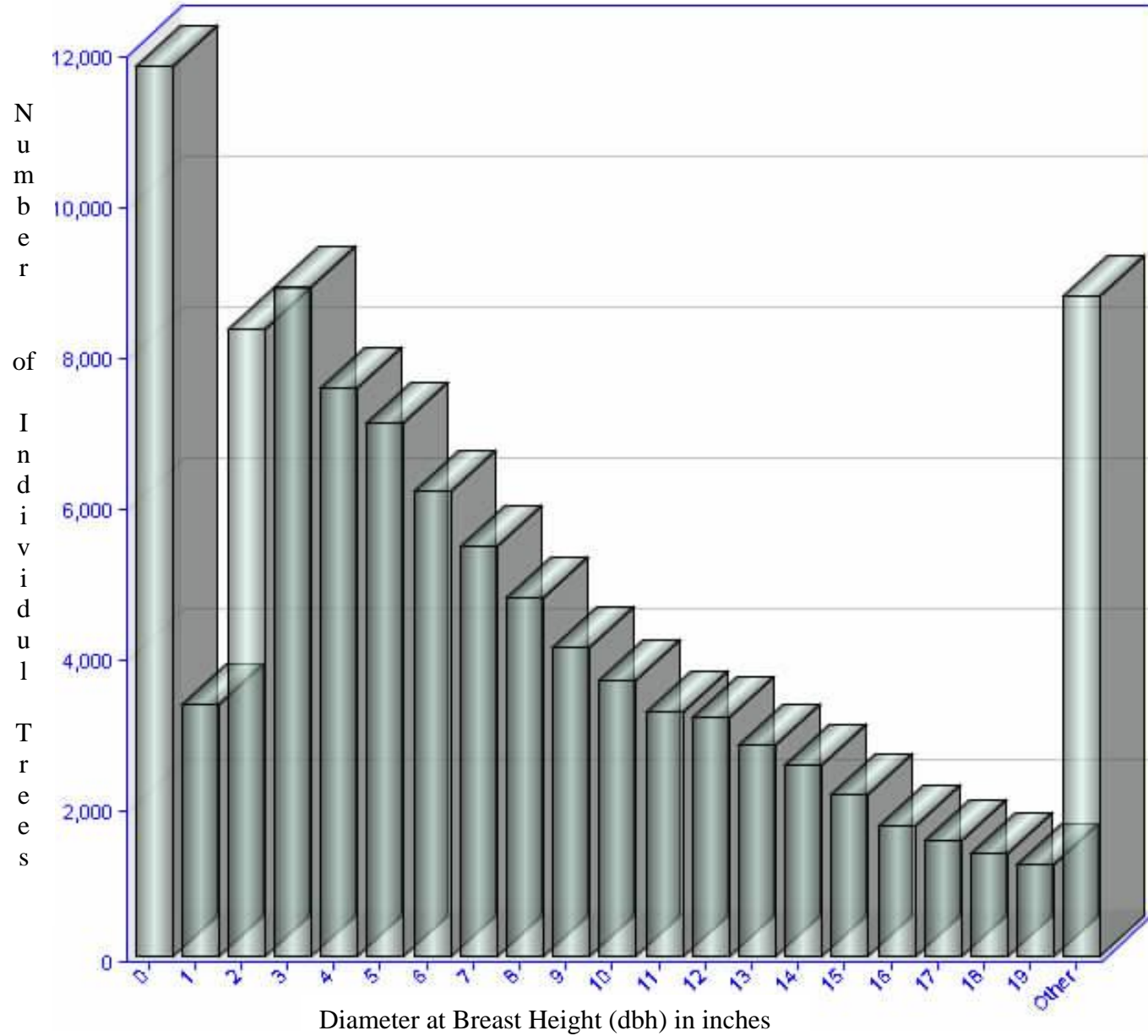
Parks

Pinus halepensis
Prosopis velutina
Vacant site
Ulmus parvifolia
Parkinsonia florida
Fraxinus velutina
Washingtonia filifera
Parkinsonia microphyllum
Olea europaea
Dalbergia sissoo

Traffic Arterials

Vacant site
Parkinsonia florida
Dalbergia sissoo
Prosopis velutina
Acacia stenophylla
Chilopsis linearis
Acacia aneura
Parkinsonia praecox
Ulmus parvifolia
Washingtonia robusta

Age Distribution of City of Phoenix Maintained Trees (105,000)



Tree Inventory

Overall Health Condition

Good 69.5%

Fair 28.8%

Poor .9%

Dead .8%



Phoenix Urban Forest

Top Five Species in Use Today ...

Prosopis spp. (thornless)

Quercus virginiana (Heritage and Cathedral)

Acacia spp. (*A. aneura*, *A. salicina*, *A. farnesiana*)

Parkinsonia spp. (museum, *P. florida*, *P. praecox*, *P. microphylla*)

Olneya tesota

Dalbergia sissoo

Valuation examples

Street Landscape medians:

- 10,600 trees, palms, tall cacti
- Appraised replacement value @ \$5.4 M

Encanto Park:

- 1760 trees and palms
- Appraised replacement value @ \$6.1 M
- Annual benefit value @ \$75.7 K

Trees in street landscape and parks:

- 71,750 trees
- \$9.4 M annual benefit to the community.

Tree City USA



Tree City USA Designation

Four Standards:

- A Tree Board or Department overseeing forest activities.
- A Tree Care Ordinance.
- A Community Forestry program with an annual budget of at least \$2/capita.
- An Arbor Day Observation and Proclamation.

Tree City USA Designation



Benefits:

- Establishes a framework for action
- Educational activities
- Public awareness
- Community pride
- Fosters partnerships
- Financial assistance



Phoenix	\$3.69
Tucson	\$5.28
Mesa	\$2.26
Glendale	\$2.06
Scottsdale	\$3.93
Gilbert	\$8.56
Peoria	\$2.46
Lake Havasu City	\$6.86
Casa Grande	\$19.81
Prescott Valley	\$3.07
Albuquerque	\$4.89
Las Vegas	\$2.74

Per Capita
expenditure Tree
City USA data for
2011 from the
National Arbor
Day Foundation

Arizona Chamber of Commerce Council

Arizona Public Service

Arizona Landscape Contractors Association

ASU/GIOS Sustainable Cities Network

Audubon Society

Hands-On Greater Phoenix

International Society of Arboriculture Western Chapter

Neighborhood Associations

Phoenix Clean and Beautiful

Salt River Project

US Forest Service, Urban and Community Forestry

Valley Forward

Valley Permaculture Alliance

Waterhed Management Company

And numerous other companies





<http://www.phoenix.gov/parks/shade.html>

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