Have you ever experienced a true *living* oasis?

What was it like for you?

What did it enable?

Did you have a role in it?
Oasis

Photo credit: John Hoffman, www.nps.gov
The Ancient Oasis
4,000 Years of Agriculture and Irrigation in Tucson

Hohokam farmers, circa A.D. 1000

Tucson’s fields, circa 1915

Jonathan Mabry
Tucson Historic Preservation Office
Mirage
Mirage Infrastructure

We ignore, deplete, or pollute our local waters — then import ever more distant water

The largest consumer of electricity (and single source producer of carbon) in Arizona is the pumping of water
A choice between mirage or oasis

Tucson, Arizona

<table>
<thead>
<tr>
<th>RAINFALL INCOME</th>
<th>231 GPCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>874 lpcd</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>UTILITY-WATER USE</th>
<th>112 GPCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>424 lpcd</td>
<td></td>
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</tbody>
</table>

WATERGY

% MUNICIPAL ENERGY CONSUMPTION USED TO MOVE & TREAT WATER 14

44%

For references and calculations see:
One-Page Place Assessment page at HarvestingRainwater.com
Drain / Dying mirage

Net / Sponge / Living Oasis
In 1996 the Dunbar/Spring neighborhood was neither an oasis nor a mirage.

Then the planting of a living oasis was initiated, aiming to maximize the positive impact and grow potential.
Plant Community
Plant Multi-Use Trees

Native Shade Tree Application

Thanks to a grant from TUCSON ELECTRIC POWER COMPANY, TEPCO customers may be eligible to receive 1 to 2 live gallon shade trees (3 – 5 ft tall) for only $6.00 per tree including delivery (PAYABLE TO TUCSON – ATTACH CHECK). If you agree to plant them to shade your house, large shade trees can reduce cooling bills, especially if they shade windows or air conditioning units. Applications are limited.

To qualify, each resident:

A) Agree to plant trees within 15’ of the house on the west, east, or north side to shade it from the rising and setting sun during the summer months, but retain access to direct winter sunshine on the south side in winter months. Planting location will be checked when trees are delivered. Planting and maintenance instructions are provided with trees.

B) Agree to hold Trees for Tucson and Tucson Electric Power harmless from all liability associated with the trees or tree planting.

Name: ____________________________ Phone: ______________ Zip Code: __________

Address: ____________________________

[Check one type of tree (2 trees per house) – all trees are the same four varieties:]

- Desert Willow (adapted growth rate to 20’ tall and wide, white flowers, no fruit
- Desert Ironwood (adapted growth rate to 20’ tall and wide, green flowers and bark, yellow flowers)
- Desert Willow (adapted growth rate to 20’ tall and wide, white flowers, no fruit, purple flowers)
- Velvet Mesquite (adapted growth rate to 20’ tall and wide, green flowers and bark, yellow flowers)

[Signature of Resident] (Date) (Print)

Planting: Mark an “X” on the map in the general location you wish to plant each tree:

[Diagram of planting locations]

Medicinal Plants of the Desert and Canyons West

The Desert Smells Like Rain

A Naturalist's Papago Indian Country

The Tumbleweed Gourmet

Feasting with Paw-Paw Washington Tomatoes

Food Plants of the Sonoran Desert

Are you interested in other Trees for Tucson Programs?

Tucson and Southern Arizona Tree Tour - Fall flowers (fruits and transplants)
Maximize Habitat for Life

Non-native mirage  Native oasis
Street-side basin wolfberry harvest
Watchable wildlife activities generate $1.4 billion in economic activity per year to Arizona.

Native plants support native wildlife, because they have coevolved along with the region’s climate (and its cyclical droughts and floods).
Re-connect & Re-envision

4th annual Cascabel Hermitage Association, mesquite milling & pancake and waffle breakfast
Cascabel, Arizona, 2002

Photo credit: Sue Doerfler, Tucson Citizen
Interact – HARVEST
Celebrate and Demonstrate

1st annual Dunbar/Spring Mesquite Fiesta, 2003
3 griddles and 3 pancake flippers
Reciprocate & Regenerate

flooding liability turned into an irrigation asset
For every inch of rainfall…
• A 10-foot wide paved street will drain 27,800 gallons of rainfall per mile
• A 20-foot wide paved street will drain 55,700 gallons of rainfall per mile
• A 30-foot wide paved street will drain 83,500 gallons of rainfall per mile
2004 – 2005 curb cuts and street-runoff harvesting began
Curb cuts legalized in 2007
$50 permit
Green Streets Policy in Tucson, AZ
Minimum ½-inch rainfall to be harvested in roadway or adjoining right-of-way
https://www.tucsonaz.gov/files/transportation/Green_Streets_APG_Signed_by_Director.pdf

Commercial landscape policy
At least 50% of commercial landscape irrigation needs must be met by harvested on-site rainwater

www.WatershedMG.org
Plant the Right Plant in the Right Place as you Plant the Rain

Rain Garden Zones

*Bottom, Terrace, & Top*

For Multi-Use Rain Garden Plants Lists see:

- Rainwater Harvesting for Drylands and Beyond, Volume 1, 2nd Edition, appendix 4
<table>
<thead>
<tr>
<th>Species</th>
<th>Water Needs</th>
<th>Habitat</th>
<th>Rain Garden Zone</th>
<th>Size</th>
<th>Cold Tolerance</th>
<th>Elevation Range</th>
<th>Growth Rate</th>
<th>Type of Tree</th>
<th>Human Uses</th>
<th>Wildlife</th>
<th>Domestic Animals That Use Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desert ironwood (Olneya tesota)</td>
<td>LW (1)</td>
<td>terrace top</td>
<td>25 × 25' (7.6 × 7.6m)</td>
<td>sh 15' (-9°C)</td>
<td>2,500' (750m) and below</td>
<td>moderate</td>
<td>e</td>
<td>f, m, n.f, s, T</td>
<td>Birds, pollinators, large and small mammals</td>
<td>Chickens, goats</td>
<td></td>
</tr>
<tr>
<td>Velvet mesquite (Prosopis velutina)</td>
<td>LW (1)</td>
<td>terrace top</td>
<td>30 × 30' (9 × 9m)</td>
<td>h 5' (-15°C)</td>
<td>1,000–5,000' (300–1,500m)</td>
<td>fast</td>
<td>sD</td>
<td>f, fW, m, n.f, P, s, W</td>
<td>Birds, pollinators, large and small mammals</td>
<td>Chickens, goats, cattle, honey bees, dogs</td>
<td></td>
</tr>
<tr>
<td>Screwbean mesquite (Prosopis pubescens)</td>
<td>LW (2–3)</td>
<td>terrace bottom</td>
<td>20 × 20' (6 × 6m)</td>
<td>h 0' (-17°C)</td>
<td>4,000' (1,200m) and below</td>
<td>moderate</td>
<td>D</td>
<td>f, fW, m, s, W, WB</td>
<td>Birds, pollinators, large and small mammals</td>
<td>Chickens, goats, cattle, honey bees, dogs</td>
<td></td>
</tr>
<tr>
<td>Cat Claws a cacia (Senegasia greggii)</td>
<td>LW (1)</td>
<td>terrace top</td>
<td>20 × 20' (6 × 6m)</td>
<td>h 0' (-17°C)</td>
<td>Below 5,000' (1,500m)</td>
<td>moderate to fast</td>
<td>D</td>
<td>m, P, s, T, W</td>
<td>Birds, pollinators, large and small mammals</td>
<td>Cattle, honey bees</td>
<td></td>
</tr>
<tr>
<td>Whitethorn a cacia (Vachellia constricta)</td>
<td>LW (1)</td>
<td>terrace top</td>
<td>10–15 × 10–15' (4.5 × 4.5m)</td>
<td>h 5' (-17°C)</td>
<td>2,500–5,000' (750–1,500m)</td>
<td>moderate to fast</td>
<td>sD</td>
<td>f, G, m, s</td>
<td>Birds, pollinators, large and small mammals</td>
<td>Cattle</td>
<td></td>
</tr>
<tr>
<td>Desert Willow (Chilopsis linearis)</td>
<td>LW (2–3)</td>
<td>terrace bottom</td>
<td>25 × 25' (7.6 × 7.6m)</td>
<td>h −10' (-23°C)</td>
<td>1,500–5,000' (450–1,500m)</td>
<td>fast</td>
<td>D</td>
<td>f.w, m, s, W, WB</td>
<td>Birds and pollinators</td>
<td>Cattle, honey bees</td>
<td></td>
</tr>
<tr>
<td>Canyon hackberry (Celtis reticulata)</td>
<td>mW (2–3)</td>
<td>terrace bottom</td>
<td>up to 35 × 35' (10.5 × 10.6m)</td>
<td>h −20' (-28°C)</td>
<td>1,500–6,000' (450–1,800m)</td>
<td>moderate</td>
<td>D</td>
<td>f, s, W, WB</td>
<td>Birds, pollinators, large and small mammals</td>
<td>Chickens</td>
<td></td>
</tr>
<tr>
<td>Foothills Palo verde (Parkinsonia microphyllum)</td>
<td>LW (1)</td>
<td>terrace top</td>
<td>25 × 25' (7.6 × 7.6m)</td>
<td>h 15' (-9°C)</td>
<td>500–4,000' (150–1,200m)</td>
<td>slow to moderate</td>
<td>D</td>
<td>f, s, W</td>
<td>Birds, pollinators, large and small mammals, desert tortoise</td>
<td>Cattle, honey bees</td>
<td></td>
</tr>
<tr>
<td>Blue Palo verde (Parkinsonia floridum)</td>
<td>LW (2)</td>
<td>terrace bottom</td>
<td>30 × 30' (9 × 9m)</td>
<td>h 15' (-9°C)</td>
<td>500–4,000' (150–1,200m)</td>
<td>fast</td>
<td>D</td>
<td>f, s, W</td>
<td>Birds, pollinators, large and small mammals, desert tortoise</td>
<td>Sheep, honey bees</td>
<td></td>
</tr>
</tbody>
</table>

For Multi-Use Rain Garden Plants Lists, see:
• Rainwater Harvesting for Drylands and Beyond, Volume 1, 2nd Edition, appendix 4
• Plant Lists & Resources at www.HarvestingRainwater.com
Observe & Evolve

Key Elevation and Slope Relationships
see Street-Runoff Harvesting page at
www.HarvestingRainwater.com
for more

Speed
/         \\ Depth — Volume
Keep Your Best Planting Spaces Plantable
see Street-Runoff Harvesting page at www.HarvestingRainwater.com for more
Plant & Reinvest the Fertility

Mirage

Oasis
Grow Stewards
Chipped and Mulchy
Re-wilding. Re-enlivening.
Where we live, work, study, & play. Where we are.

U of A Architecture and Landscape Architecture Building, Tucson, AZ, CALA landscape tour [www.cala.arizona.edu](http://www.cala.arizona.edu)

**Mirage**

**Oasis**
Landscape to Educate

1996 2007 2013
Place-Based Fusion / Inclusion

EAT Mesquite!

By Desert Harvesters
2009 Community Recipe Tasting
photos by Brad Lancaster and Ian Fritz
2010
Desert Harvesters
Mesquite Fiesta
over 1,500 mesquite pancakes served
Photos by Ruben Ruiz
8th annual Desert Harvesters
Mesquite Fiesta 2010
Three hammermills milling pods,
community pod sorting, and taste tests
photos by Ruben Ruiz
GROWING ORGANIZATIONS MILLING MESQUITE
and/or organizing mesquite pancake fiestas and millings

Cascabel Hermitage Association Education Program, Cascabel, AZ 1998

Desert Harvesters, Tucson, AZ 2003

Kyle Young and Peter Ragan, Arivaca, AZ 2006

Prescott College, Prescott, AZ 2008

Tohono O’odham Community College, Sells, AZ 2008

Gila Pima Nation, Sacaton, AZ 2009

Baja Arizona Sustainable Agriculture, Bisbee, AZ 2010

San Xavier Farm Cooperative, Tucson, AZ

Tucson Community Food Bank Farm, Tucson, AZ 2015
2012 Bake Sale
Native and wild foods and medicinals vendors

Monsoon Kitchen, Mesquitery, Desert Tortoise Botanicals, Native Seeds/SEARCH, Bean Tree Farm, Desert Survivors Nursery
Solar cooking demonstrations,

native food-bearing Christmas trees, Arizona Native Plant Society,

Wildlife whose habitat we are reestablishing
Don’t Stop Evolving
What other problems can be turned into solutions?
Dunbar/Spring neighborhood surface area is:
43% impervious cover (rooftops and pavement) + 17.8% bare earth = 60.8% of the neighborhood
Currently just 12% is under tree canopy

2011 data from PAG & RFCD
Grow What the Community Can Do by Working Together

Before chicane ^

After chicane >
Cholla bud harvests from water-harvesting chicane
Public Art telling story of place

Lost Sonoran Sucker fish and water-harvesting Horned Lizard sculpture by Joseph Lupiani in a water-harvesting traffic-calming chicane
Before

Water-harvesting traffic circle forest

After
Strive to Make it Easier and Cheaper:
Plant seed in-situ with the rains
Diversify the Forest & the Harvest

Desert Ironwood
(Oleyna tesota)
Diversify & Convenientify the Daily Connection to Place

Photo credit: Celia Reeve & Exo Roast Co.
Reseed & Regenerate
a Culture

Book nook bicycle tour & neighborhood-harvested snack stand
Where do you want to live —in a mirage or a true oasis?

What will that choice enable in you, your community, and our shared watershed & world?

What will be your role in that choice?
DESSERT HARVESTERS’ MANIFESTO
on ethical wild-foods growing and harvesting

Nature is a system of abundance, cycles, and efficiency. We can mimic that.
Increase the fecundity of plants and their companions.
Leave and invest fallen pods, leaves, and cut-up prunings as fertile mulch for animals, soil life, and trees.
Say “thank you” for your harvest with generous actions.
Turn landscapes into lifescapes and lushscapes.
Give back, REINVEST.

We live in a land of precious water.
Use local, free, and gravity-fed water—rather than imported, costly, and mechanically pumped waters.
Therefore PLANT THE RAIN.
Capture rainwater by digging basins and other earthworks.
Catch rainwater runoff from roofs.
Divert public street run-off into public right-of-way rain gardens.
When you grow and harvest rain-irrigated desert food, you ENHANCE our local ecosystem.

HARVEST nearby.
Look for wild native-food sources in your backyard, rights-of-ways, and urban trails.
If they don’t exist there, PLANT them.
Leave desert abundance where it belongs—in the desert.
Re-wild the urban and suburban core.

Delight your tastebuds.
Be a culinary cupid. Introduce new flavors to one another.
Find new combinations of traditional, wild foods. INNOVATE. Prickly pear borscht, anyone? Mesquite muesli?
Practice place-based, place-appropriate, place-inspired fusion.

Be here now. CELEBRATE.
Give thanks to the ancestors.
Make offerings for the future.
Contribute to food, fertility, and water security, here, now, and for your children, their children, and their children.

Expand your COMMUNITY.
Meet your fellow desert dwellers. Those that have roots and flowers. Those that crawl and flutter.
Get to know other humans who harvest. There is so much to observe, so much to love.
Invite. Involve. Include.
DesertHarvesters.org

HarvestingRainwater.com
A watershed is “that area of land, a bounded hydrological system, within which all living things are inextricably linked by their common water course, and where, as humans settled, simple logic demanded that they become part of a community.”

Western United States delineated by their watershed boundaries as proposed by John Wesley Powell

A watershed is “that area of land, a bounded hydrological system, within which all living things are inextricably linked by their common water course, and where, as humans settled, simple logic demanded that they become part of a community.”
Watershed maps are natural community maps.
1994
Plant an imported tree, then import costly irrigation water & fertilizer

2015
Plant a multi-use native tree; and plant the free on-site rain, fertility, & community