

Regenerative Rights-of-Way: Local Harvests and Enhancements in Our Community Commons

by Brad Lancaster



www.HarvestingRainwater.com

www.DesertHarvesters.org

Tucson, Arizona and the Santa Cruz river

1904



2007



Maintaining the path destructing rivers and futures

The CAP canal (and its pumps) is the single largest consumer of electricity, and the single largest emitter of carbon in the state of Arizona (at the coal-burning plant generating the power it consumes)



Photograph: Pete McBride on the parched Colorado River delta, by Jonathan Waterman

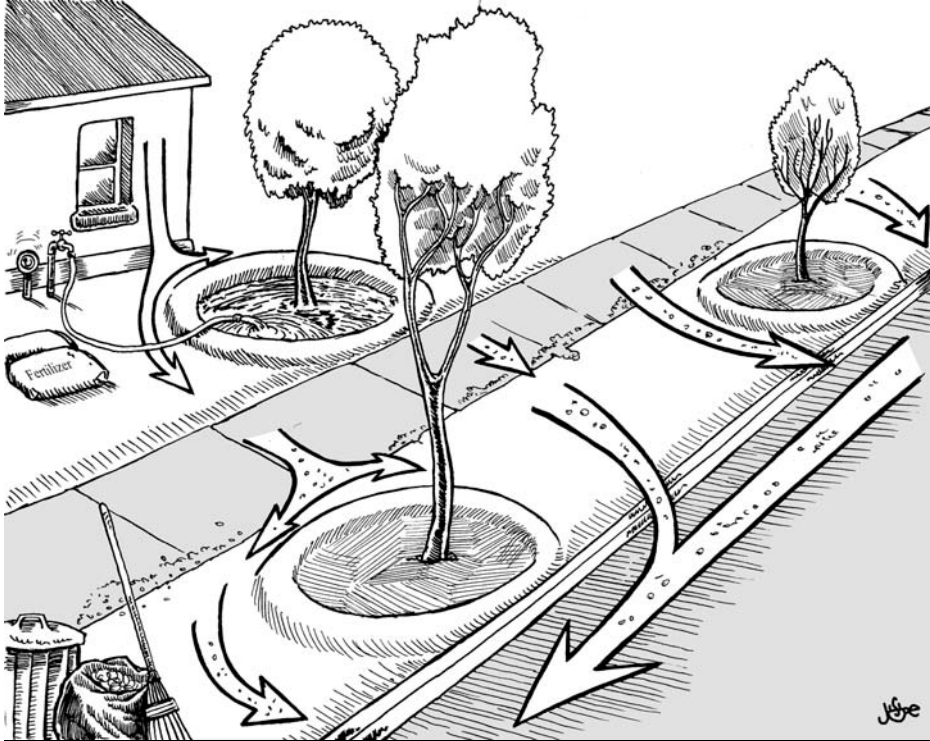


1996 Dunbar/
Spring Annual
Neighborhood
tree planting
began

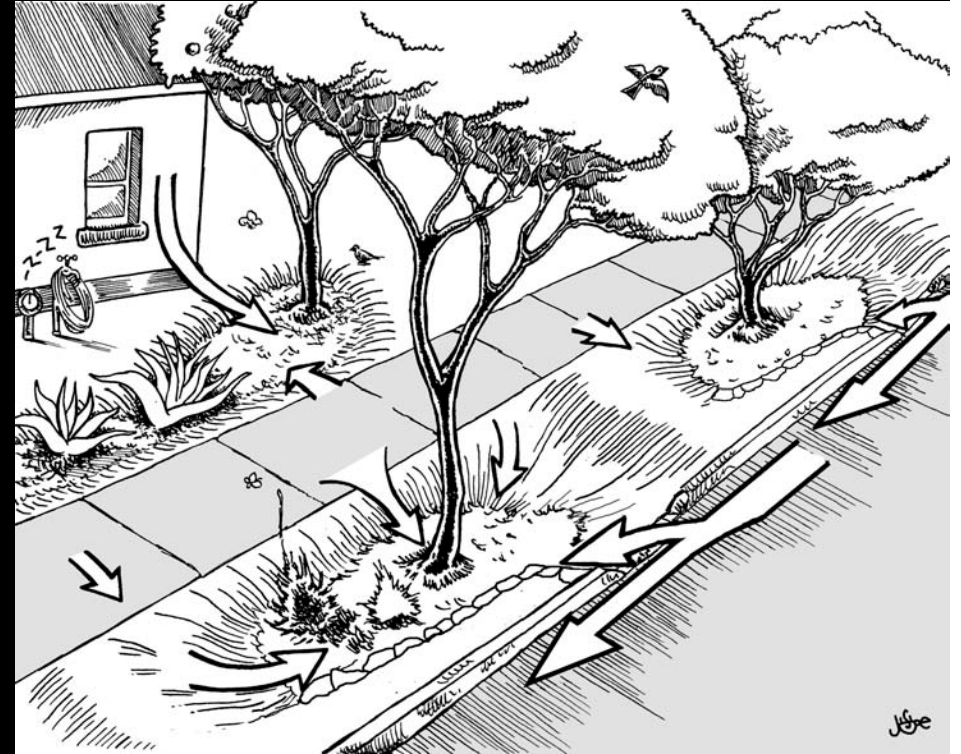
Trees planted in basins
to capture rainfall and
runoff from the adjoining
path



Path to Scarcity



Path to Abundance



- Turns resources into wastes
- Relies on the costly and imported
- Consumes more than it produces
- Disintegrated Drains

- Turns “wastes” into resources
- Relies on the free and local
- Produces more than it consumes
- Integrated Harvests

We selected native, multi-use, low-water-use, shade trees for maximum potentials

TUCSON CLEAN & BEAUTIFUL INC.
NATIVE SHADE TREE APPLICATION
 PLANTING NATIVE TREES ENHANCES OUR COMMUNITY AND SONORAN DESERT ECOSYSTEM

Thanks to a grant from TUCSON ELECTRIC POWER COMPANY, TEP customers may be eligible to receive 1 or 2 five gallon sized trees (3 - 6 ft. tall) for only \$6.00 per tree including delivery (PAYABLE TO TREES FOR 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. Subsidies are limited.

To qualify, each resident

A) Agree to plant trees within 15' of the house on the WEST, EAST, or NORTH sides to shade it from the rising and setting sun during the summer months, but retain access to direct winter sun/heat on the south side in the 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 Company harmless from all liability associated with the trees or tree planting.

Name: _____ Phone: _____ (H) _____ (O)
 Address: _____ Zip Code _____

Indicate Your Native Tree Choice(s) (Total of 2 trees per household - all trees below are low water users):

- Velvet Mesquite (fast/moderate growth rate to 20' tall & wide, semi-winter deciduous, yellow flowers)
- Desert Ironwood (moderate growth rate to 20' tall and wide, evergreen, plant in warm microclimate, purple flowers)
- Blue Palo Verde (fast/moderate growth rate to 20' tall and wide, blue green leaves and bark, yellow flowers)
- Foothills Palo Verde (moderate growth rate to 20' tall and wide, yellow-green leaves and bark, yellow flowers)
- Desert Willow (fast growth rate to 20' tall and wide, winter deciduous, no thorns, purple/white flowers)
- Cat Claw Acacia (moderate growth rate to 20' tall and wide, winter deciduous, grey bark, yellow flowers)
- White Thorn Acacia (moderate growth rate to 15' tall and wide, winter deciduous, red bark, yellow flowers)

 (Signature of Resident) (Date)

YOU MUST COMPLETE THIS SKETCH TO QUALIFY:

\$6.00 per tree
handling fee
payable to
Trees for Tucson

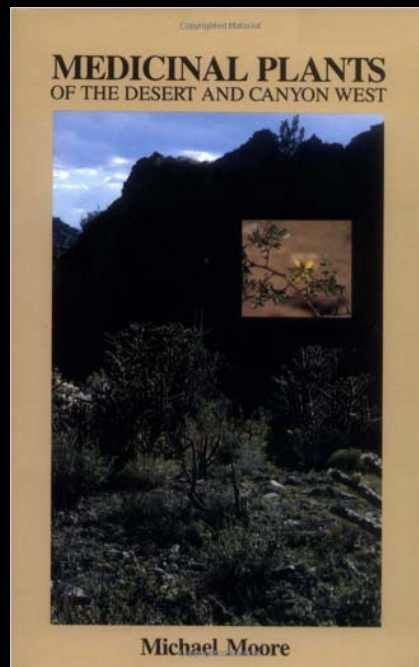
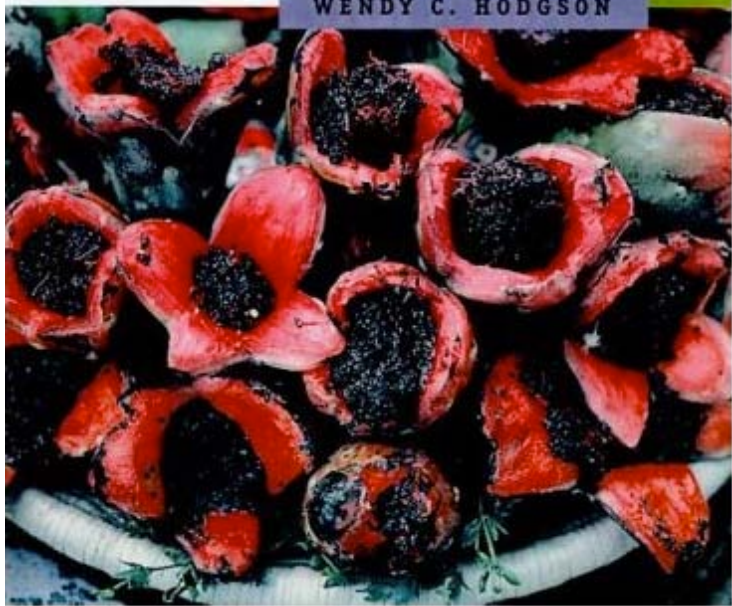
← 15' →

IMPORTANT:
Mark with an 'X' where you will plant trees in the Planting Zone.

NOTE: Before you plant, call Blue Stake 1-800-782-5348 to mark all underground utilities for free. Plant trees at least 10 ft. from sewer lines, 5 ft. from water lines, and 3 ft. from all other utilities. Do not plant under any overhead utility lines. Do not plant in the public right of way without a permit and Blue Stake clearance. Plant trees at least 26 ft. from one another.

Send Applications To: TREES FOR TUCSON P.O. Box 27210 Tucson, AZ 85726-7210 791-3109
 Trees for Tucson is a program of Tucson Clean & Beautiful

ARE YOU INTERESTED IN OTHER TREES FOR TUCSON PROGRAMS?
 Tree Care Workshop (free) Tucson and Southern Arizona Tree Tour - Fall/Spring (includes lunch and transportation)



VELVET MESQUITE
(Prosopis velutina)

SCREWBEAN MESQUITE
(Prosopis pubescens)

DESERT IRONWOOD
(Olneya tesota)

CANYON HACKBERRY
(Celtis reticulata)

FOOTHILLS PALO VERDE
(Cercidium microphyllum)

BLUE PALO VERDE
(Cercidium floridum)

DESERT WILLOW
(Chilopsis linearis)

CAT CLAW ACACIA
(Acacia greggii)

WHITE THORN ACACIA
(Acacia constricta)

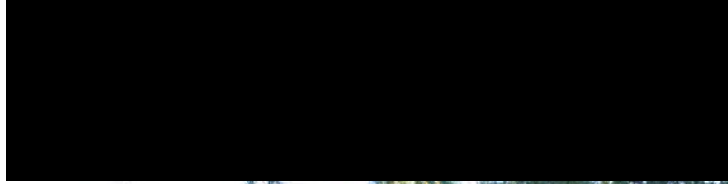


Native plants attract more beneficial native wildlife

Native velvet mesquites do not blow over or get their branches broken like South American varieties and hybrids do

Native velvet mesquite pods typically taste best







San Xavier
Cooperative Farm
harvests and sells mesquite
flour





4th annual
Cascabel
Hermitage
Association

mesquite milling
& pancake &
waffle breakfast

Cascabel, Arizona
2002



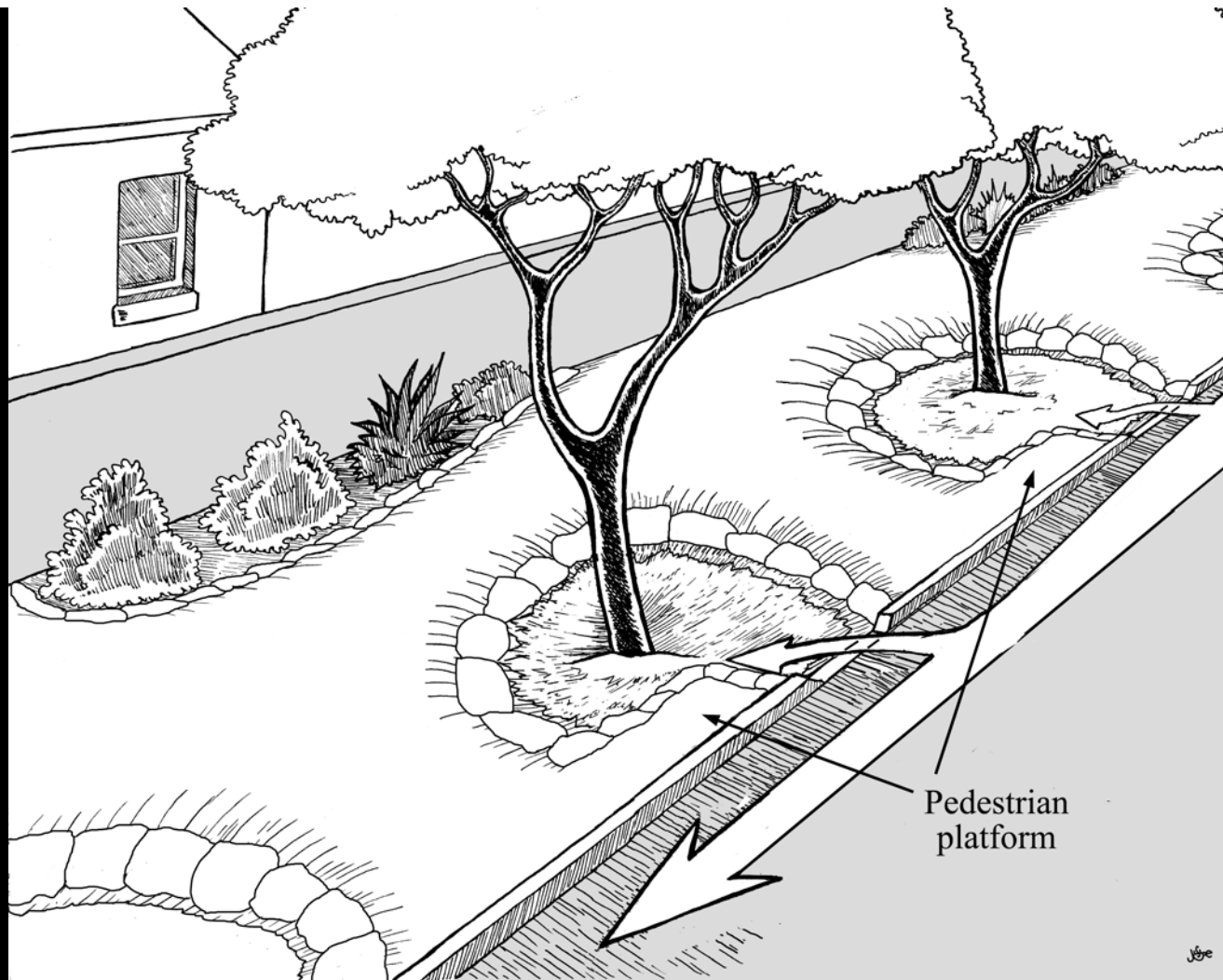
1st annual Dunbar/Spring
Mesquite Fiesta, 2003
3 griddles and 3 pancake flippers





The idea germinates to harvest stormwater as well as rainwater to turn a flooding liability into an irrigation asset





In Tucson, AZ (receiving less than 12 inches of annual rainfall)

One mile of an average residential street drains over
ONE MILLION GALLONS of rainfall per year.

That's enough water to sustainably irrigate 400 native food trees per mile,
or one tree every 25 feet on both sides of the street - irrigated by the street.

2004 - 2005 curb cuts and street runoff harvesting began





^ 1994

2006

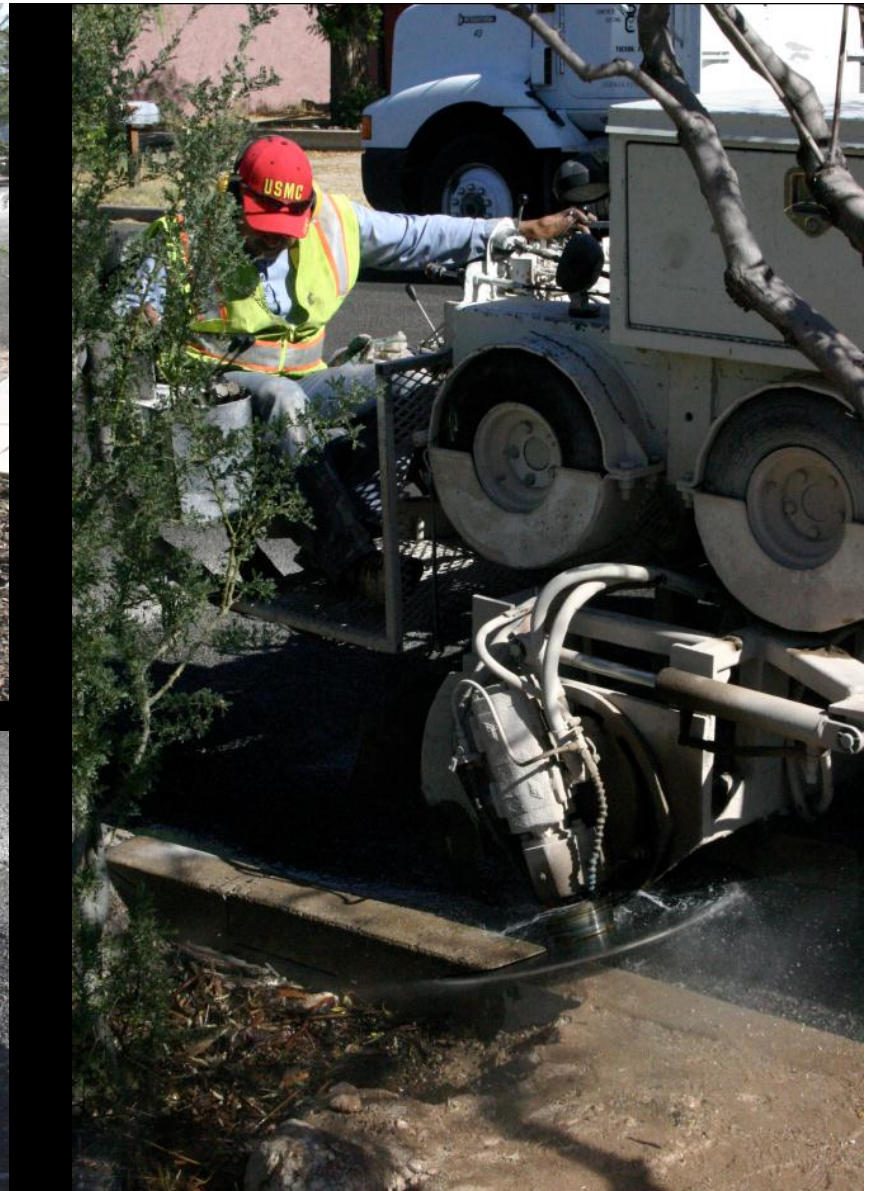
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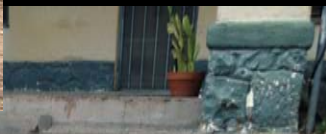
BEFORE

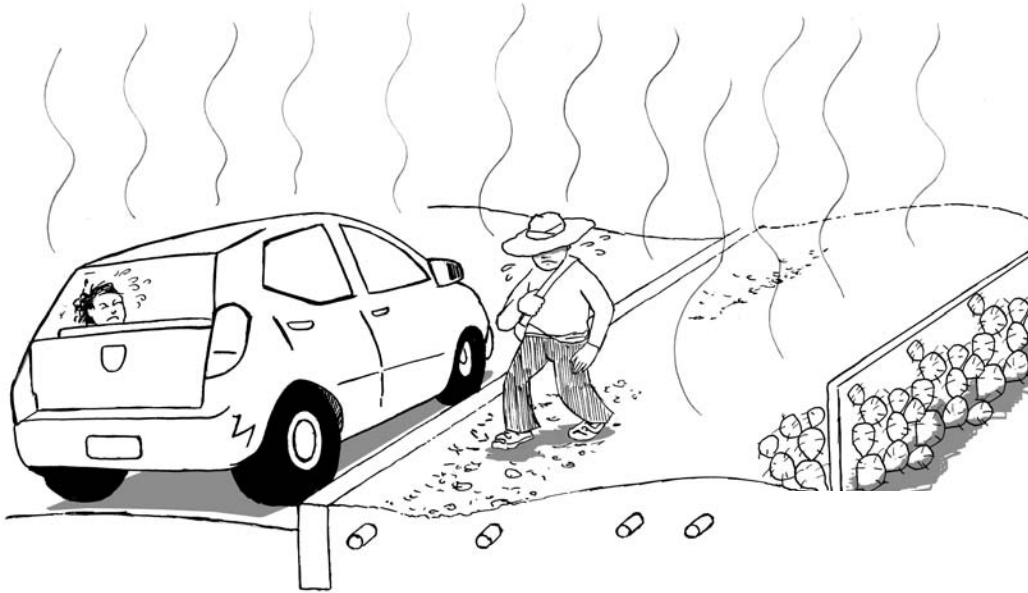
This photo was taken in 1994, prior to the 1996 planting of rain and trees in the public right-of-way adjoining the property at 813 N 9th Avenue. The asphalt driveway had just been removed. All of the current vegetation has been irrigated solely with passively harvested rainwater and street runoff. All prunings and leaf-drop are reused as mulch in the basins beneath the plants. More information is available at HarvestingRainwater.com and DesertHarvesters.org.



Curb cuts legalized in 2007
\$45 permit

Curb core hole
4-inch (100-mm) diameter





Public right-of-ways
must not be limited to
private utility
right-of-ways





Chipped and Mulchy

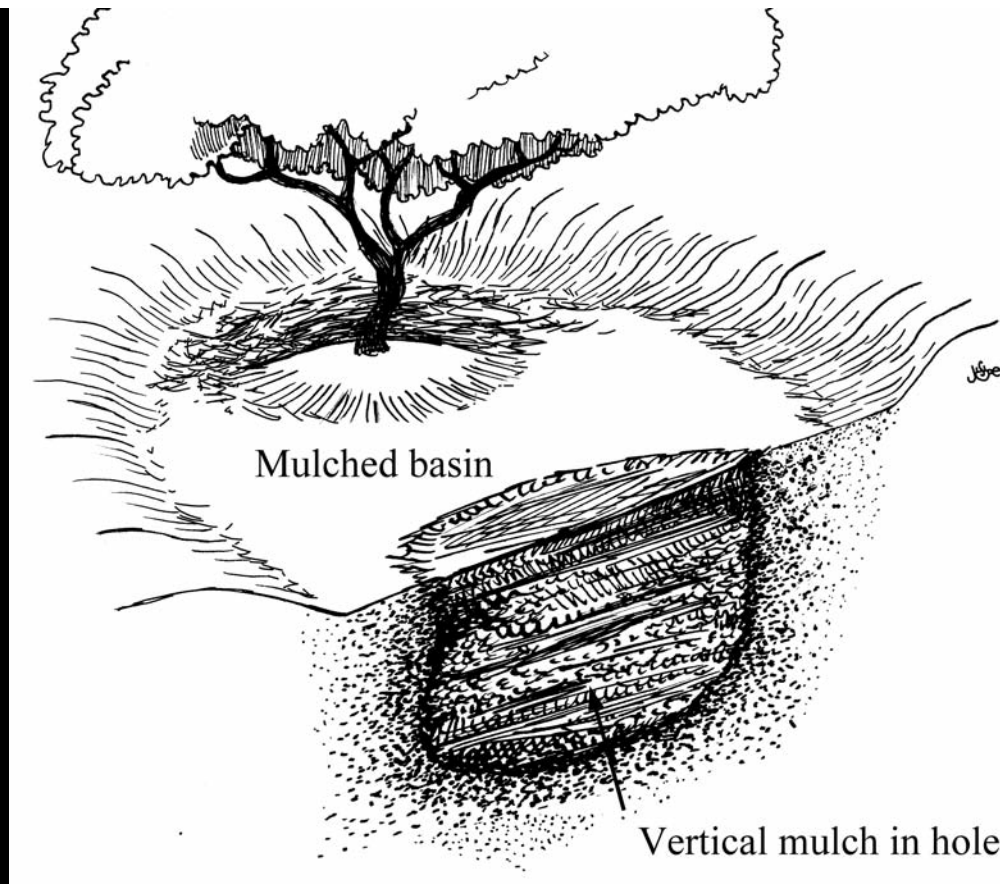




Prunings from tree used as mulch to fertilize tree and increase soil moisture

12 to 14% of the city's solid waste stream is yard trimmings

Brush and Bulky transformed into Chipped and Mulchy



Trees with associated water-harvesting basins grow to be 33% larger than trees without such basins.

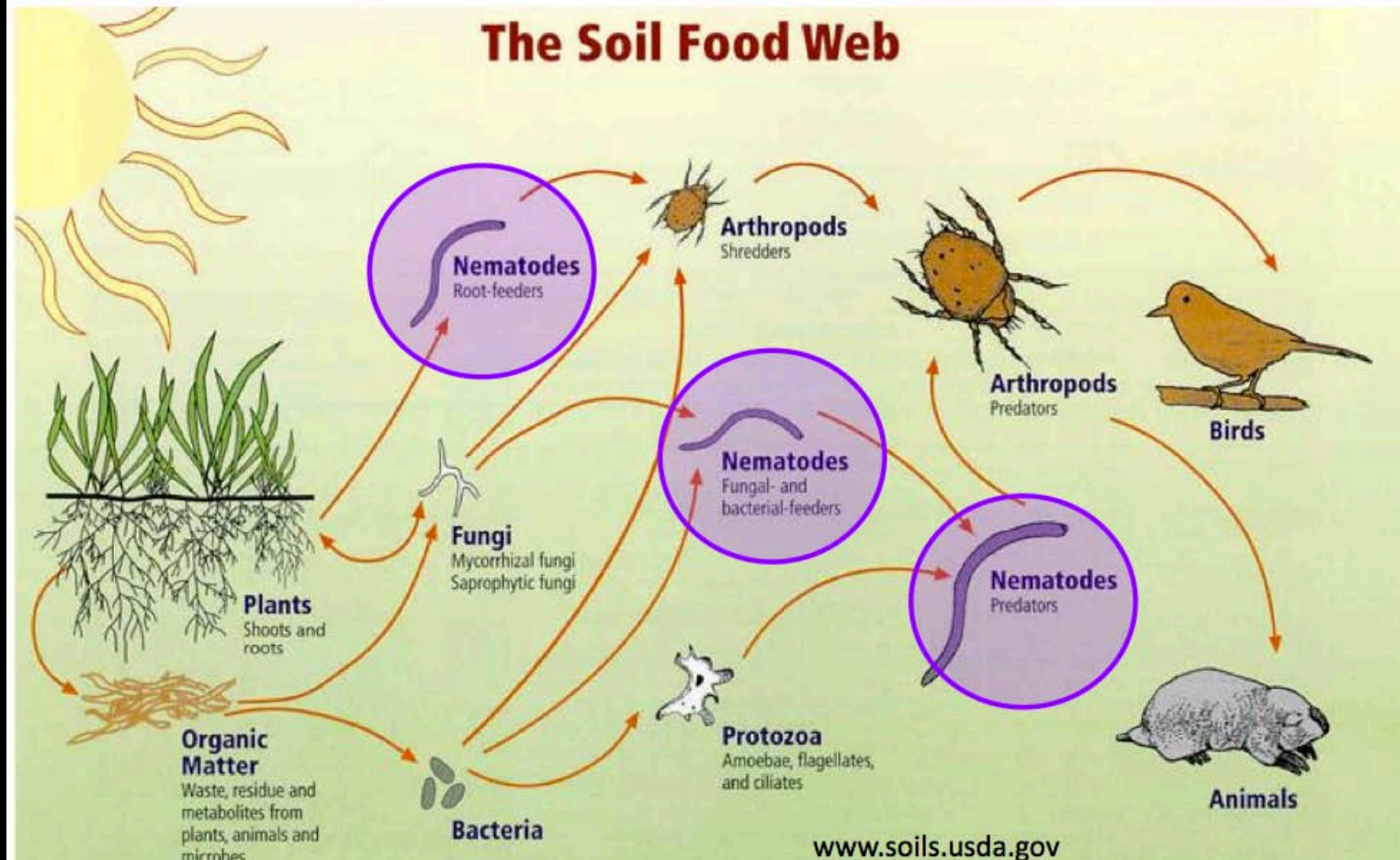
Basin trees sequester 1,754 kg/tree of carbon

Non-basin trees sequester 678 kg/tree of carbon

REFERENCE: Soil's Role in Processing Pollutants for Air and Water: Case Studies of Green Infrastructure and Carbon Sequestration by Mitch Pavao Zuckerman
webinar on 01/24/2013 <http://www.watershedmg.org/soil-stewards>

Deeper, vertically-mulched basins are harvesting much more water than shallower trees and supporting even more growth

Indicators of soil health – Soil food webs drive nutrient cycles

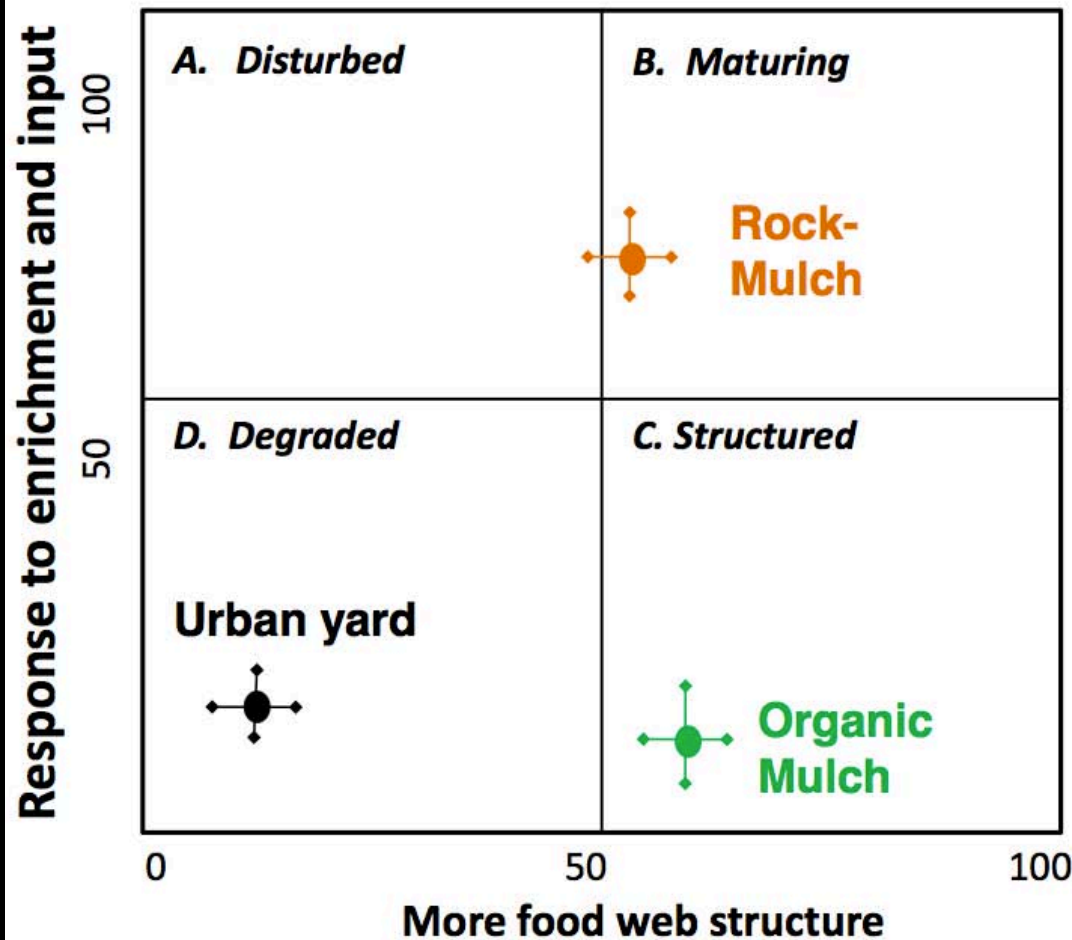


Mitchell Pavao-Zuckerman

Biosphere 2 & School of Natural Resources and Environment

University of Arizona mzuckerman@arizona.edu

Mulched Rain Gardens have more structured soil food webs



Basins bring more omnivores

Organic mulch:

- 5x increase in F:B ratio
- 6x increase in predators

Mitchell Pavao-Zuckerman

Biosphere 2 & School of Natural Resources and Environment

University of Arizona mzuckerman@arizona.edu



Dunbar/Spring neighborhood intersection repair, 2006





© Ron Niebrugge / WildNatureImages.com

Walk Score
86

Very Walkable Agree Disagree
Most errands can be accomplished on foot.

Near 813 North 9th Avenue
Tucson, AZ [Barrio Anita](#)

Slideshow

- Restaurants & Bars**
The Tasteful Kitchen and Thor .14 mi
- Coffee**
El Charro Café .43 mi
- Groceries**
Smiley's Ultimate Hookah .12 mi
- Outdoor Places**
De Anza Park .27 mi
- Schools**
Dan Hinton Accommodation S .25 mi
- Car & Bike Shares**
Hertz On Demand: Tyndall Av .90 mi



More places: Art & Community, Shopping, Entertainment, Health, Errands, Problem Spots

Public Transit
Tucson, AZ .73 mi

Bike Score
97 **Biker's Paradise**
Flat as a pancake, excellent lanes

[United States](#) > [Arizona](#) > [Tucson](#) > [Barrio Anita](#)

[Use Old Version of Walk Score](#)

Our
Walk Score
from [www.
WalkScore.
com](http://www.WalkScore.com)



Gila Monster bench by Hiro Tashima
next to neighborhood book nook

The neighborhood now annually harvests over 660,000 gallons (2 acre feet) of stormwater in the public right-of-way within 10 water-harvesting traffic circles, 33 chicanes, and 85 street-side basins fed by 50 curb cuts and 35 cores

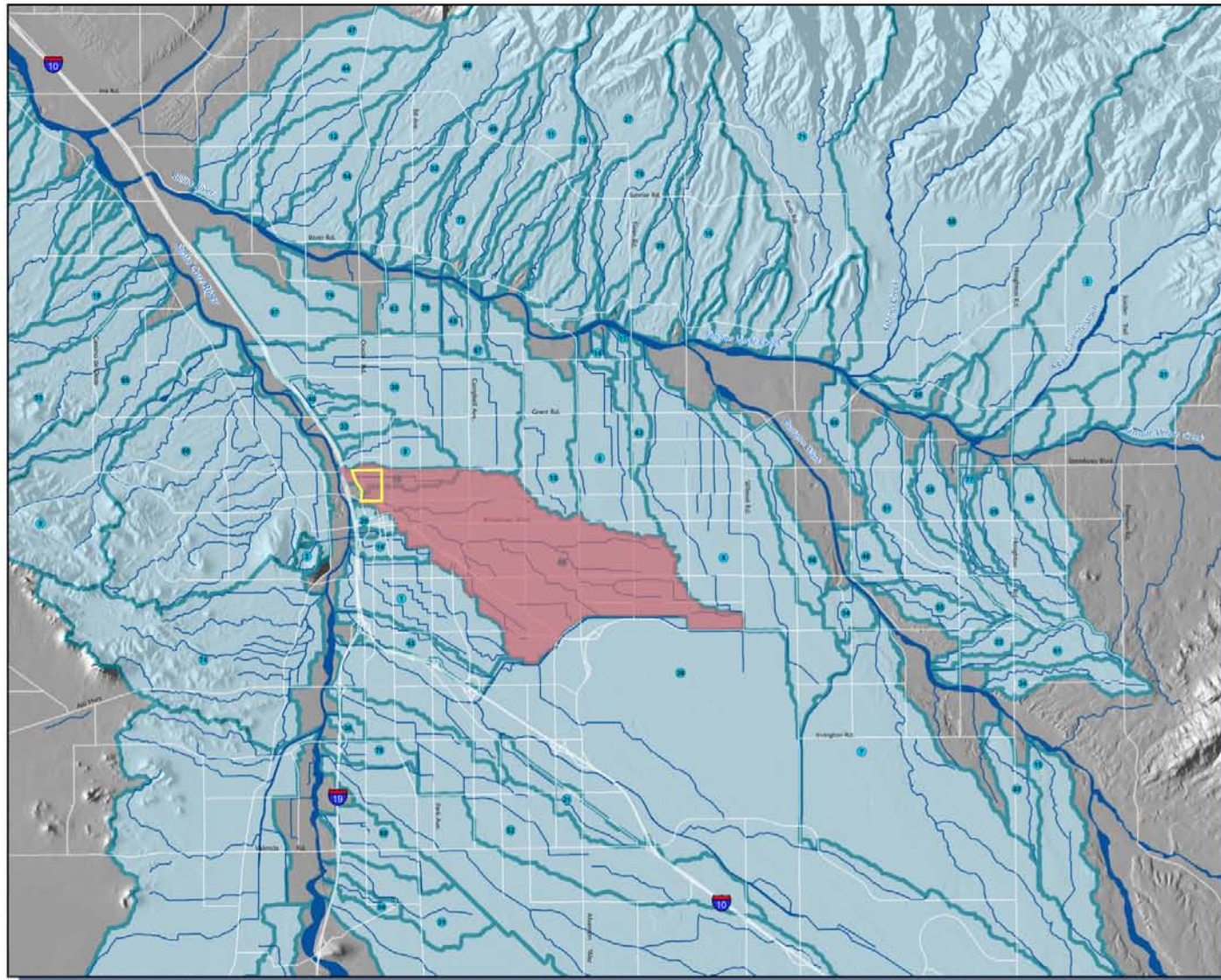
But we could, and need to, increase that harvest by at least 20 times



Before ^

After >

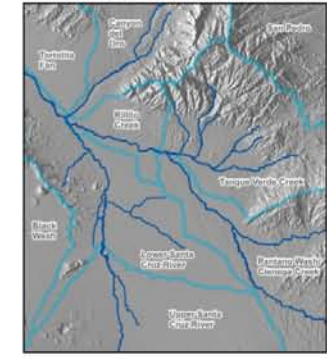
The Dunbar/Spring Neighborhood Washes & Their Watersheds*



*shaded red on map & in list
Named Tucson Basin Watersheds

- | | | |
|---------------------------|----------------------------------|----------------------------------|
| 1. 18th Street Wash | 27. Finger Rock Wash | 53. Roger Wash |
| 2. A Mtn Detention | 28. First Avenue Wash | 54. Roller Coaster Wash |
| 3. Agua Caliente | 29. Fischer Cacho Wash | 55. Rolling Hills Wash |
| 4. Airport Wash | 30. Flowing Wash Wash | 56. Rowe Hill Wash |
| 5. Alamo Wash | 31. Fortyniners Wash | 57. Rutheaff Wash |
| 6. Alvernon Wash | 32. French Village Wash | 58. Salino Creek |
| 7. Atterbury Wash | 33. Grant Road Wash | 59. Santa Clara Wash |
| 8. Bronx Wash | 34. Guillermo Wash | 60. Silvercreek Wash |
| 9. Camino de Oeste Wash | 35. Hidden Hills Wash | 61. Spanish Trail Wash |
| 10. Camino Real Wash | 36. Hughes Wash | 62. Stone Avenue Wash |
| 11. Campbell Wash | 37. Idle Hour Wash | 63. Swan Road Wash |
| 12. Casas Adobes Wash | 38. Irvington (Michigan) Wash | 64. Sweetwater Wash |
| 13. Christmas Wash | 39. Julian Wash | 65. Train End Wash |
| 14. Christopher City Wash | 40. Krueger Wash | 66. Tucson Arroyo |
| 15. Cívano Wash | 41. Los Reales Diversion Channel | 67. Tucson General Wash |
| 16. Cuyamoc Wash | 42. Margarita Ranch Wash | 68. Utdall Park Wash |
| 17. Creekside Wash | 43. Mission View Wash | 69. Valencia Wash |
| 18. Cushing Street Wash | 44. Naniñi Wash | 70. Valley View Wash |
| 19. Dal Cerros Wash | 45. North Mountain Ave. Wash | 71. Ventana Canyon Wash |
| 20. Downtown Watershed | 46. Owens Park Wash | 72. Villa Entrada Wash |
| 21. Earp Wash | 47. Pegler Wash | 73. WSCR Diversion Channel |
| 22. Eastview Wash | 48. Pima Wash | 74. West Branch Santa Cruz River |
| 23. El Vado Wash | 49. Race Track Wash | 75. West University Wash |
| 24. Escalante Wash | 50. Reyes Wash | 76. Wetmore Wash |
| 25. Este Wash | 51. Robo Wash | 77. Wightstown Wash |
| 26. Fahrigger Wash | 52. Rooce Wash | 78. Wyoming Wash |

Pima County Watersheds



Arizona Watersheds



TerraSystems Southwest and the Watershed Management Group, Inc. would like to thank Pima County Department of Transportation Geographic Information Services Division and the City of Tucson Department of Transportation for graciously providing the datasets displayed on this map. The Hydrologic Unit Code (HUC) data, aggregated to subregions, was provided by the USDA-NRCS National Cartography and Geospatial Center. All data is accepted as-is, with all known and unknown inaccuracies and/or errors, and without warranty of any kind.



Map Date: March 23, 2009

Major Streets

Named Washes

Major Watersheds



West University Boulevard to around 11th Ave is the ridgeline boundary between the two watersheds within our neighborhood.

These watersheds reach beyond our neighborhood (outlined above in yellow), inviting us to do the same.

Economic Engine:
neighborhood harvesters
can make \$25 per hour
harvesting, milling, and
then selling mesquite pods
grown in their own
neighborhoods







8th annual Desert Harvesters
Mesquite Fiesta 2010
Three hammermills milling pods,
community pod sorting, and taste tests
photos by Ruben Ruiz



2011 Desert Harvesters Mesquite Fiesta Bake Sale





Native and wild foods and medicinals vendors

Monsoon Kitchen, Mesquiteria,
Desert Tortoise Botanicals,
Native Seeds/SEARCH,
Bean Tree Farms,
Desert Survivors Nursery





Solar cooking demonstrations,
native food-bearing Christmas trees,
Arizona Native Plant Society,
Wildlife whose habitat we are reestablishing

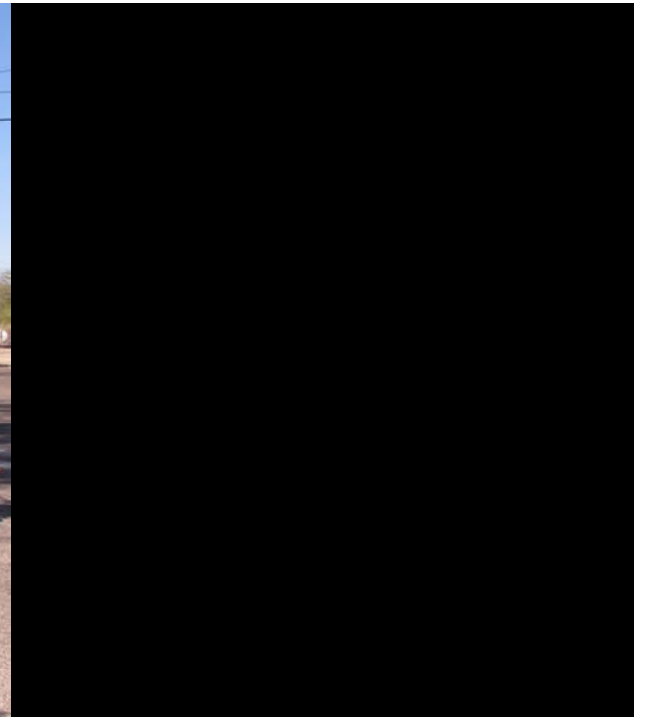




Non-profits and community efforts helping enhance our community's water, food, health, and cultural resilience

Living Streets Alliance, Watershed Management Group, BASA, Tasty Community Stories

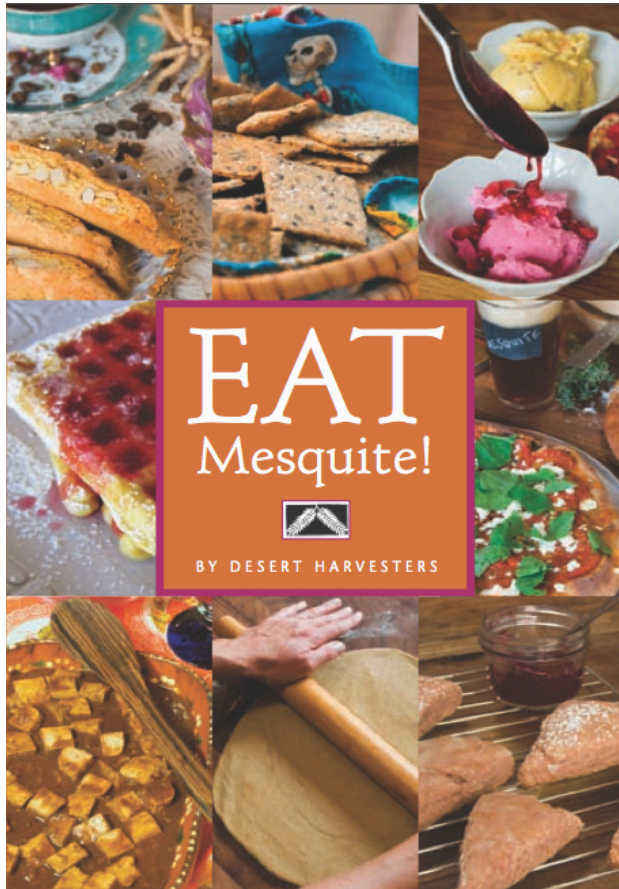




Lost Sonoran Sucker fish and water-harvesting Horned Lizard sculpture by Joseph Lupiani in a water-harvesting traffic-calming chicane



DesertHarvesters.org
and
HarvestingRainwater.com



Rainwater Harvesting
for Drylands
and Beyond!

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Guiding Principles
to Welcome Rain into Your
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Foreword by Gary Paul Nabhan

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Foreword by Andy Lipkis

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