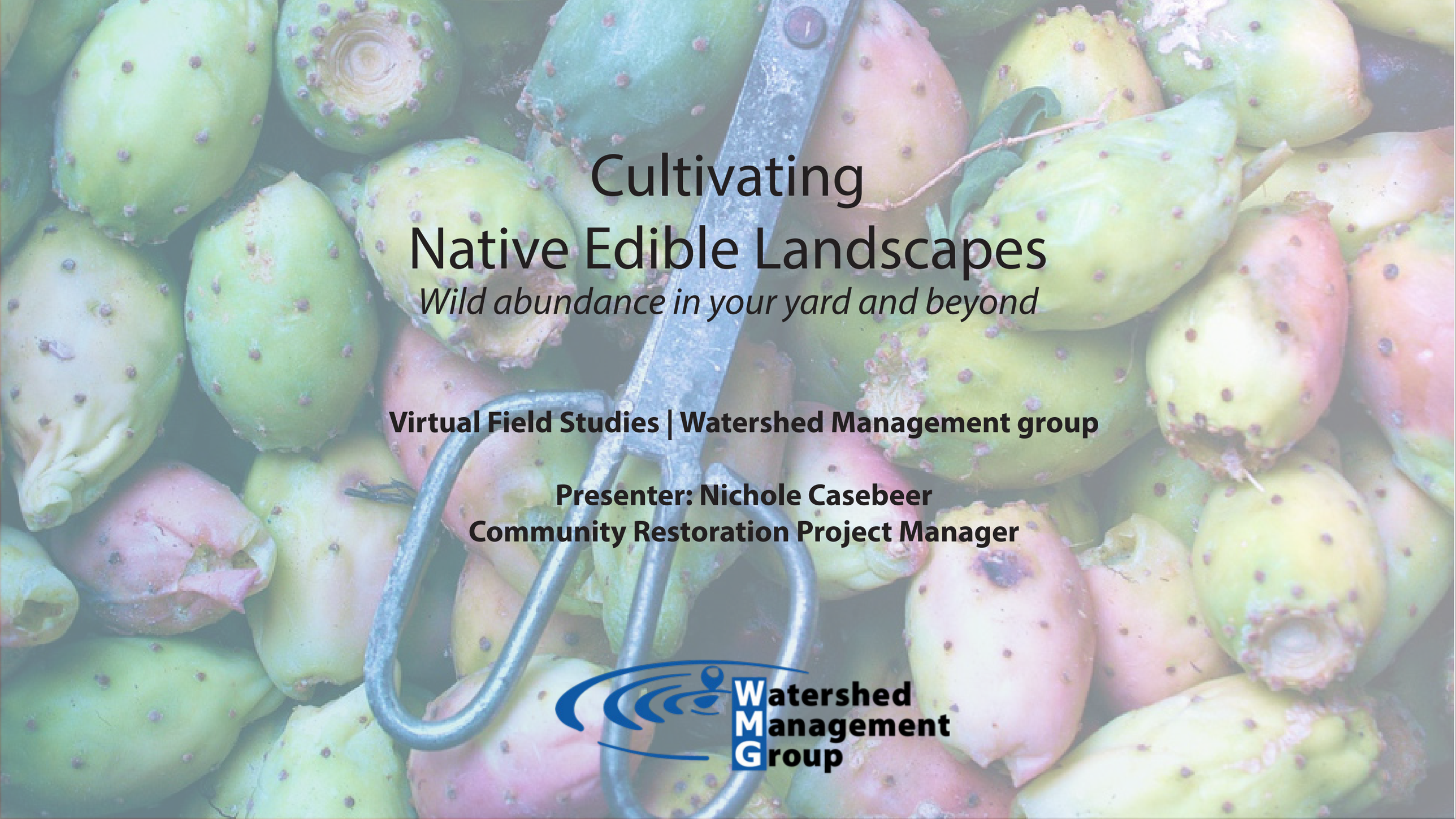


Cultivating Native Edible Landscapes

Wild abundance in your yard and beyond

Virtual Field Studies | Watershed Management group

Presenter: Nichole Casebeer
Community Restoration Project Manager

Watershed Management Group

Food for thought |

How food abundant do you think the desert is?

In Case You Missed - Fall Field Studies and Online Resources

watershedmg.org/learn/resource-library

Resource Library

Filter by resource category

☐ Cisterns ☐ Composting Toilet ☐ Ecosanitation ☐ Erosion Control ☐ Green Infrastructure ☐ Greywater ☐ Maps ☐ Plants ☐ Rain Garden

☐ Soils ☐ Stream Restoration ☐ Tippy Tap

Reset Filter

(Document) Presentation: How to Maintain and Prolong the Life of Your Rain Tank

(Document) Pump Based Irrigation Presentation

(Document) Example Plant Lists and Water Requirement Calculations for Tucson, Arizona plus a Sonoran Desert Foods Harvest Calendar

(Document) Landscape Watering by the Numbers

(Document) Gravity-based Tank Irrigation Presentation

(Document) Virtual Field Studies Rain Garden Care Presentation

(Document) Monsoon Weeding Guide

(Document) Care of Desert Adapted Plants

(Document) AMWUA Xeriscape Guide Watering Schedule

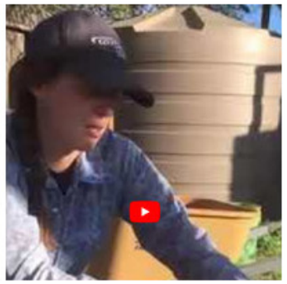
Steward In Place

watershedmg.org/advocacy/steward-in-place

Steward in Place Videos

As part of Steward In Place we are creating a whole new series of how-to, fun, and educational videos to inspire your backyard projects. New videos will b
regularly!

Steward In Place: The Tippy Tap

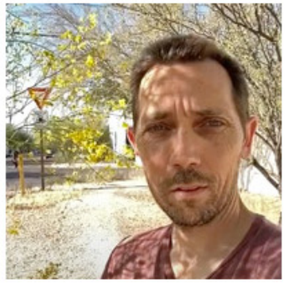


Steward In Place: How to Create Garden Soil from Sheet Mulching

Steward In Place: Trevor on Arundo Donax

Steward In Place: Trevor on Buffelgrass

Steward In Place: Trevor on the Stinknet Plant



Steward In Place: Pruning right-of-way trees in your neighborhood

Steward In Place: Composting Toilet Maintenance

Steward In Place: A Look At Large-Scale Green Infrastructure with Joaquin

Virtual and In Person Services

https://watershedmg.org/services/home/virtual-specialist-consultation

Ask a Water Harvesting Specialist - Virtual Appointment

Schedule a call with a Specialist!



Make the most of your time at home and dive into some water harvesting projects! Speak with our staff to answer questions about active water harvesting systems (tanks, irrigation systems and greywater systems) as well as passive systems (raingardens, native and edible landscapes and wildlife habitats). We want to help you set up new water harvesting systems or trouble shoot existing systems. The appointment will be done by phone or Google Hangouts.

Cost & Scheduling:

$30 for 30 minutes or $60 for one hour. Fill out the webform below, choose 30 or 60 minutes, pay online, and then we'll email or call you to schedule your appointment.

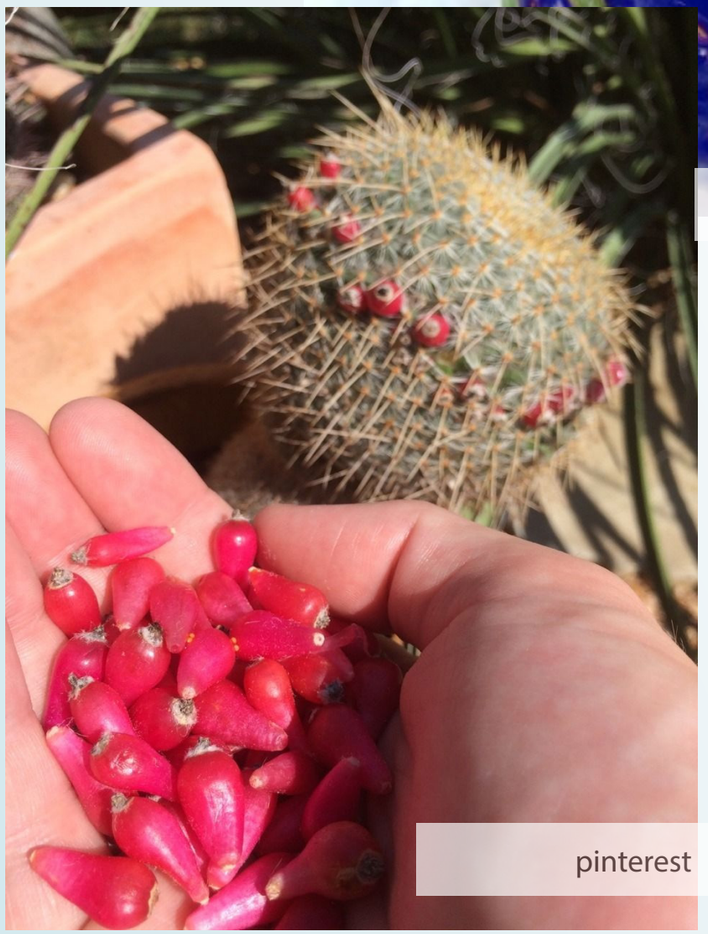


Class Overview

- **Introduction to Native Edible Landscapes**
  - » Types of edible landscapes
  - » Defining native, wild, and edible
  - » Value and culture of desert food plants

- **Designing Native Edible Landscape**
  - » Planning Considerations
  - » Species!
  - » Maintaining your edible landscape

life changing products.com



pinterest

Framework

Landscape Ecology Lens

- **Scale**
  - » How zoomed in are we?
- **Space / Relationships**
  - » Relationships between species, including humans
  - » Patterns, organization, connectivity, fragmentation
- **Time**
  - » Changes, disturbance, cycles

https://www.nationalgeographic.com/culture/onward/2014/04/16/when-gardening-is-graffiti/

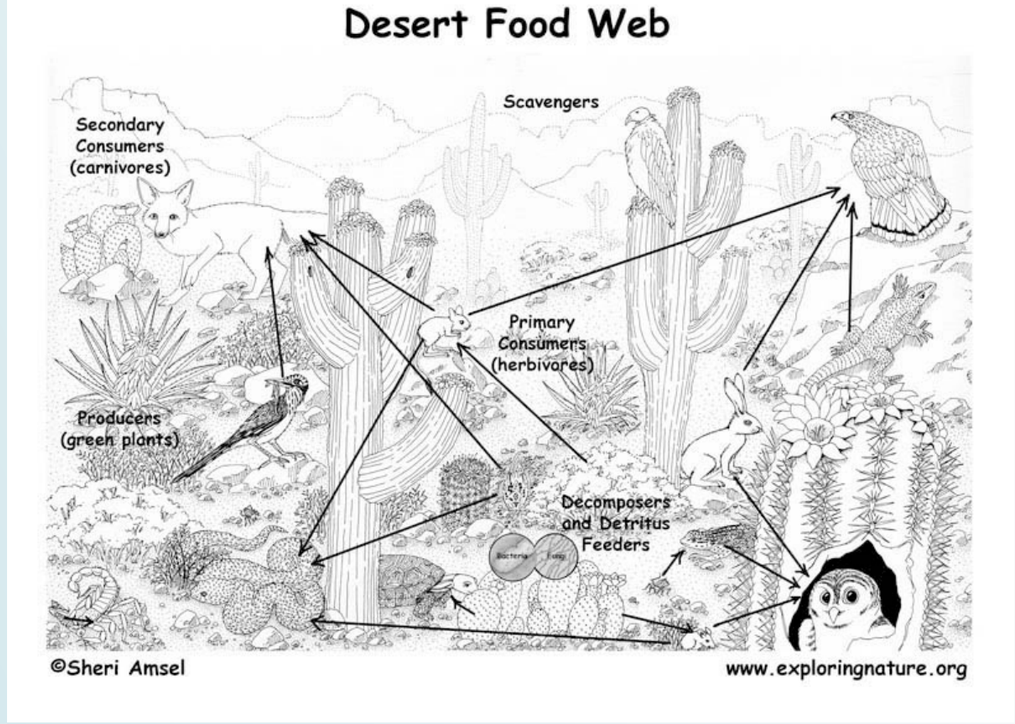
Framework

Cultural Ecology Lens

- **Value Frameworks**
  - » How do we value food and food production?
  - » What does that mean for our human and natural communities?
- **Perception**
  - » How do humans shape their environment as an expression of these underlying values?

Daily Star


High Country News

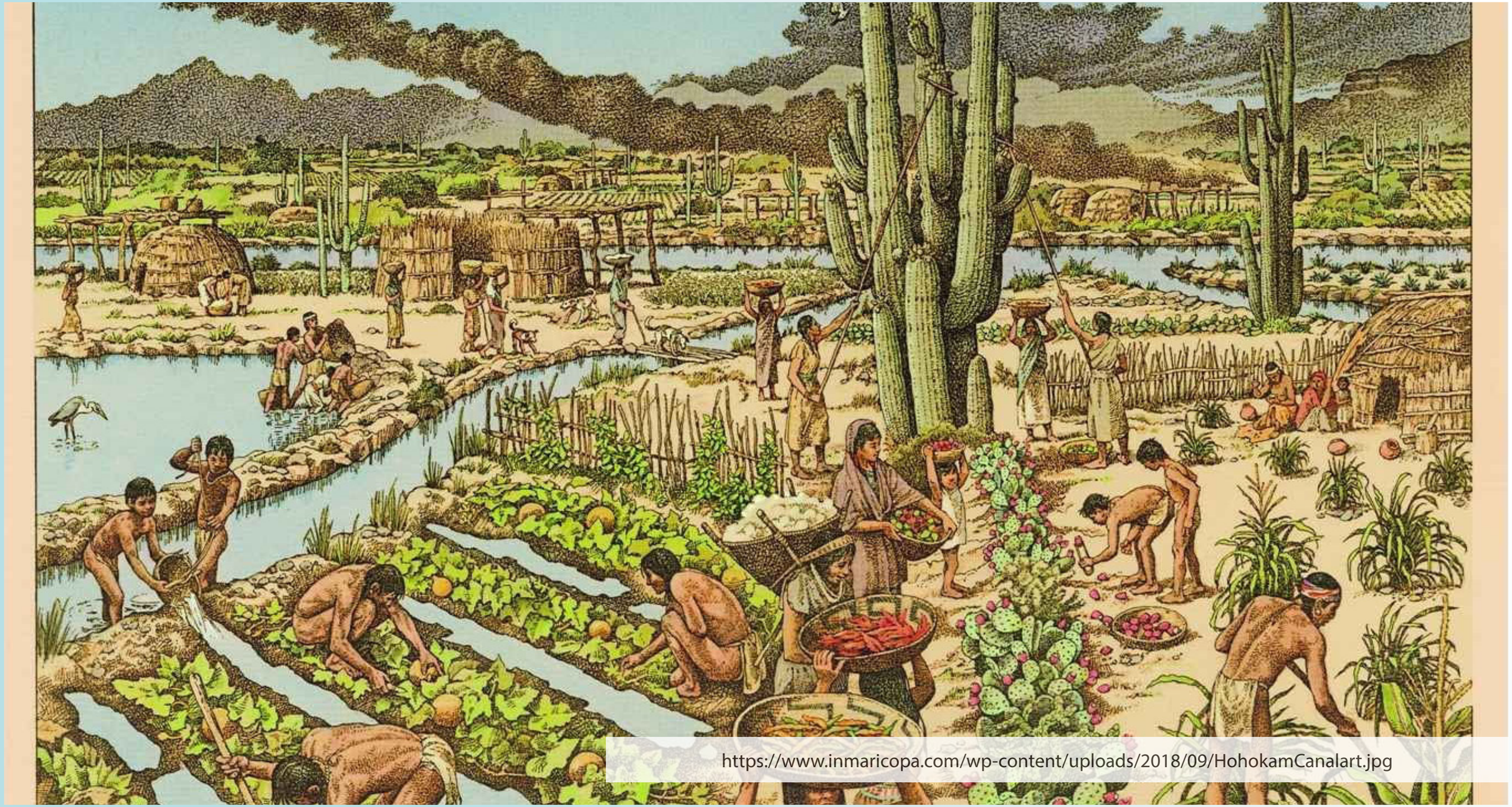


Types of Edible Landscapes

Precolonial, Indigenous

- **Scale**
  - » Mixed at a variety of sizes
- **Relationships**
  - » Species rich, natives and domesticated species, all drought tolerant
  - » Distributed throughout and incorporated with natural adjacent landscape
- **Time**
  - » Mix of annuals and perennials
  - » Tied to seasonal water availability. Only surface flows were utilized

https://s3.amazonaws.com/ah-cms.hideawayreport.com/images/map-pueblo-grande-museum.jpg



https://www.inmaricopa.com/wp-content/uploads/2018/09/HohokamCanalart.jpg

Types of Edible Landscapes

Veggie garden

- **Scale**
  - » Lot | Backyard gardens
  - » Neighborhood | Community Gardens, Mission Gardens
- **Relationships**
  - » Species rich, low structural diversity, exotics and domesticated species
  - » Typically removed / isolated from the adjacent landscape, think fences, microclimate, walls, etc.
- **Time**
  - » Largely annuals, one-time use species
  - » Mini, ephemeral ecosystem that we artificially recreate each year

https://i.ytimg.com/vi/PUHy5TQAveA/maxresdefault.jpg

https://www.tucsonaz.gov/files/parks/docs/capital/SP_Revised_Master_Plan_9_24_13.pdf

Types of Edible Landscapes

Permaculture , Edible-izing, Rewilding Movements

- **Permaculture**
  - » Systems thinking, mimic natural systems

- **Edible-izing**
  - » Guerrilla gardening
  - » Food Not Lawns
  - » Agroforestry, Agrovoltaics

- **Rewilding**
  - » Circling back to native wild species, focus on biodiversity

http://www.truenature.org/permaculture-design.htm

https://blog.ted.com/a-visit-to-ron-finleys-la-garden-plus-5-more-ted-talks-about-growing-your-own-food/

Any Questions?

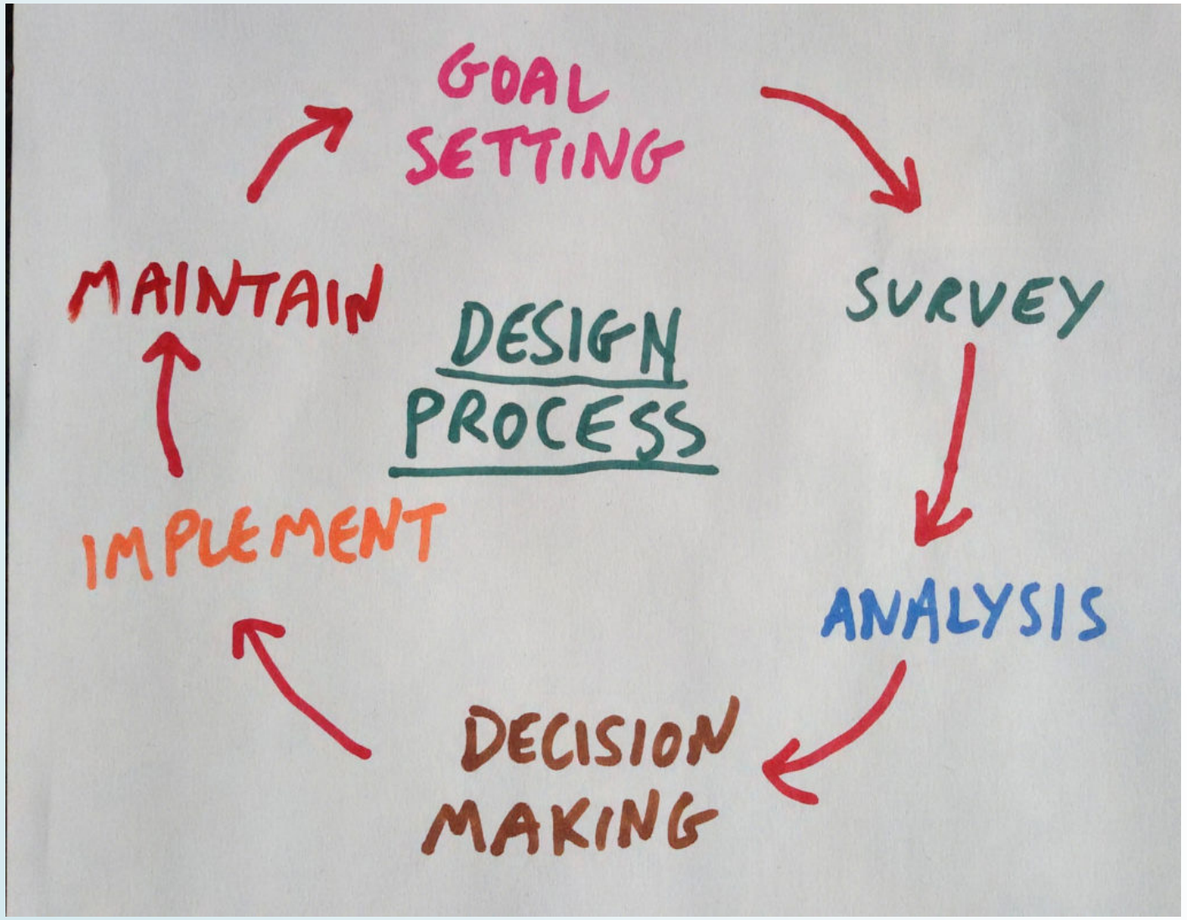
Food for thought |

Are you currently growing / utilizing native edibles in your backyard?

Designing a Wild/*Native* Edible Landscapes

Overview

- **Process**
  - » **Define what native means to our area**
  - » **Define what edible means to us**
  - » **Define our goals**
  - » **Choose appropriate approach for our goals / area, consider best practices**
  - » **Site Planning & Assessment Considerations**
  - » **Species Selection**
  - » **Maintenance Considerations**



https://spiralseed.co.uk/permaculture-design-process/

Designing a *Native* Edible Landscapes

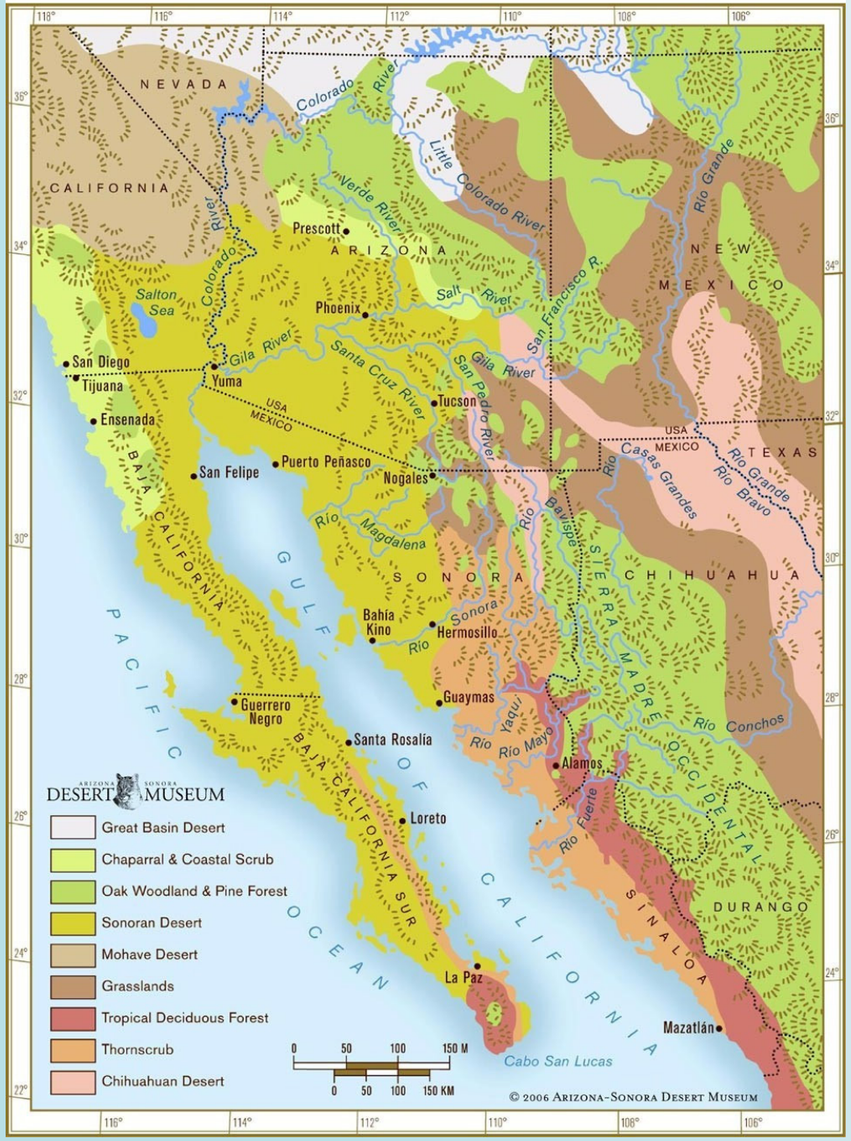
Defining Native

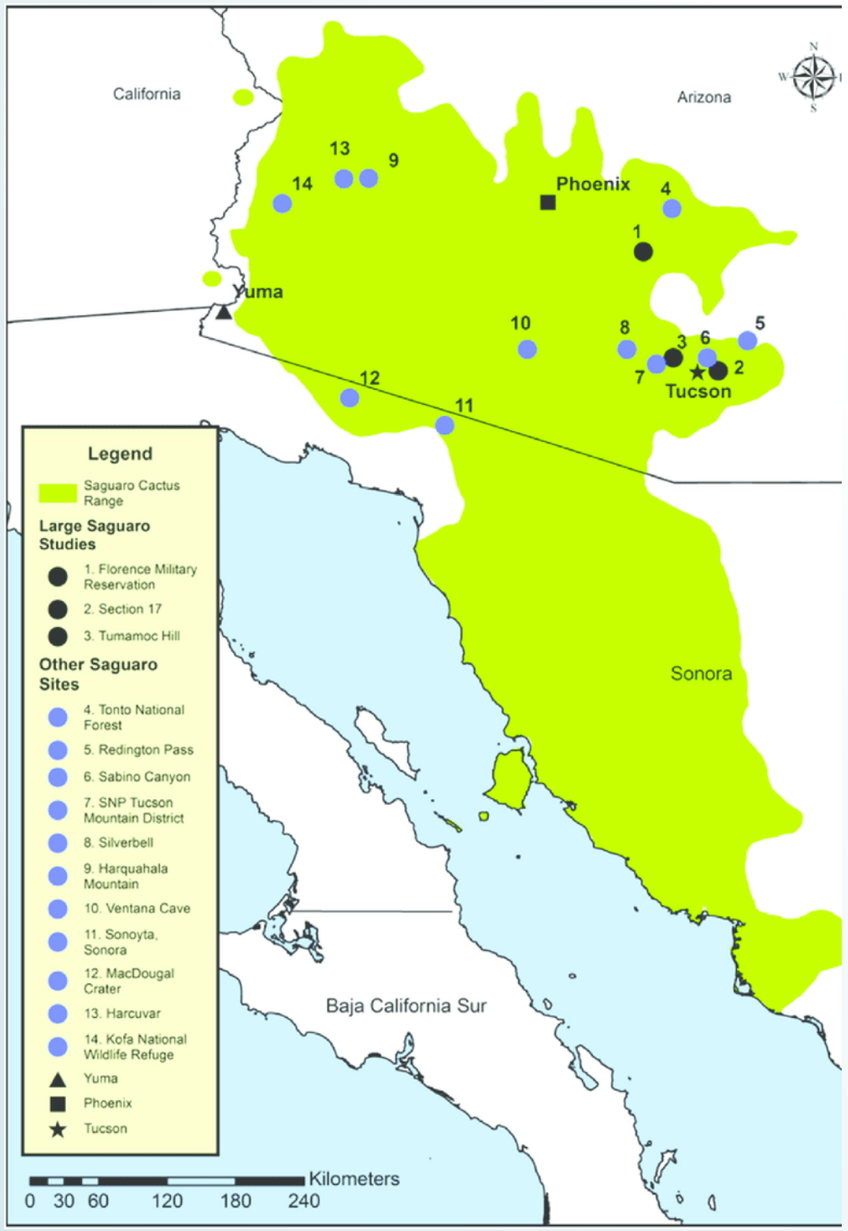
- **Native**
  - » A plant that is a ***part of the balance*** of nature that has developed over hundreds or thousands of years in a particular region or ecosystem.
  - » Should always be used with a ***geographic qualifier.***
  - » i.e. Native to the Sonoran Desert is very different than native to Arizona.

goodfreephotos.com

Sonoran Desert Region

The Sonoran Desert Region consists of the Sonoran Desert itself plus the surrounding biological communities, including the Sea of Cortez (Gulf of California) and its islands





wwww.sonorandesertmuseum.org

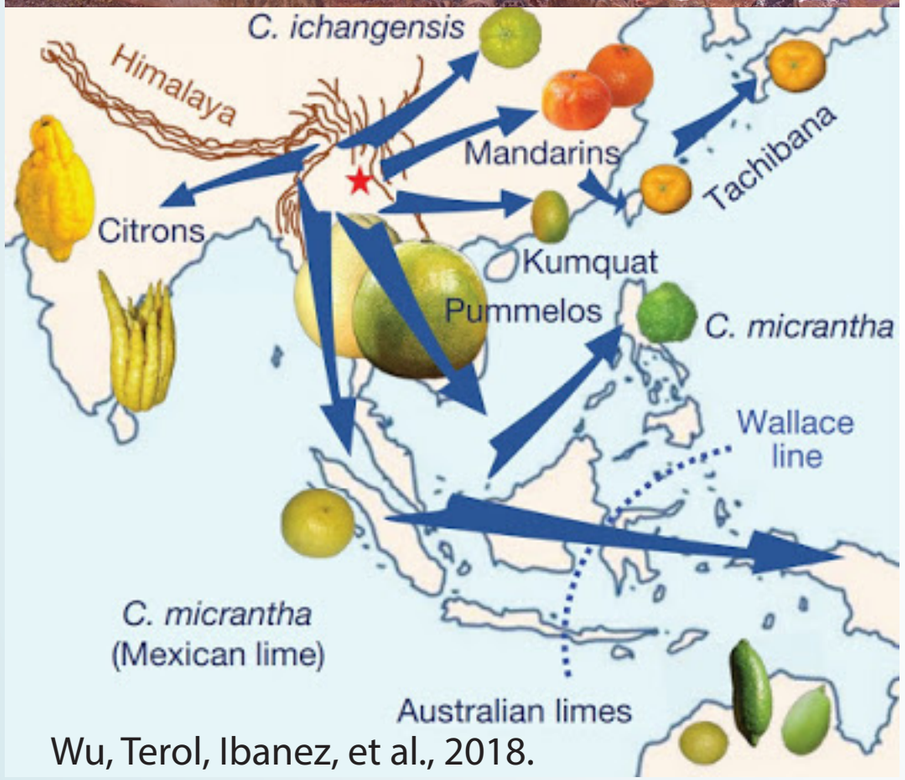
Native Edible Landscapes

Defining What is Not Native

- **Exotic Species**
  - » A plant not native to the continent on which it is now found. (Plants from Europe are exotic in North America)

- **Introduced Species**
  - » Outside this native range, a species may be introduced ***by human activity***, either intentionally or unintentionally


University of Arizona



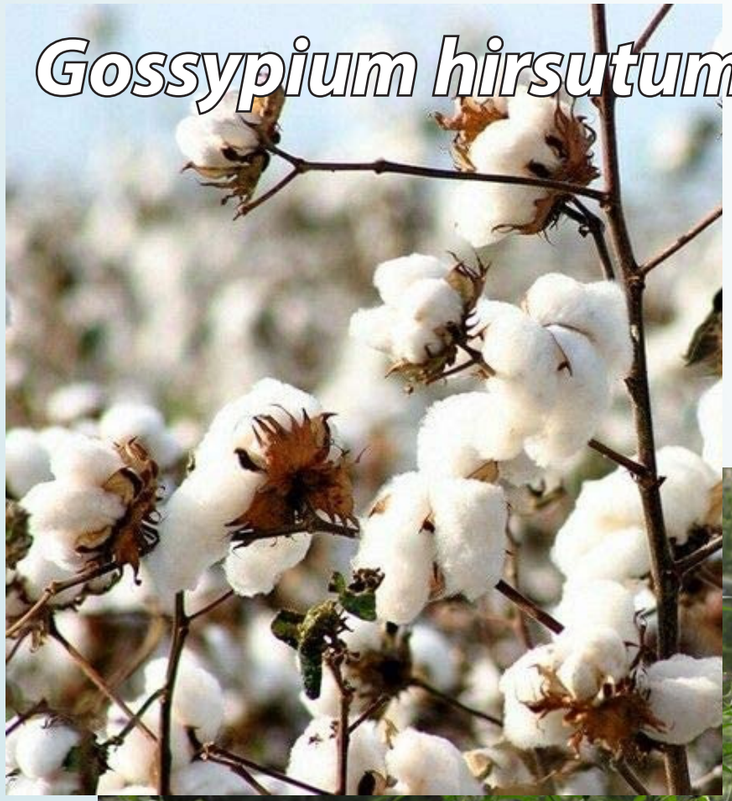
Wu, Terol, Ibanez, et al., 2018.

Wild Native Edible Landscapes

Defining Wild

- **Wild**
  - » A plant that does not need human help to reproduce and maintain itself over time in an area where it is native

- **Domesticated Species**
  - » The process whereby wild plants have evolved into crop plants through artificial selection.



Gossypium hirsutum x G. barbadense

Gossypium thurberi

Native Seed Search
SEInet / USDA

Wild Native Edible Landscapes

Defining Wild

- **Naturalized Species**
  - » A non-native plant that does not need human help to reproduce
- **Weed**
  - » A non-native plant or native plant that is not valued in the place it is growing.

Reddit

Native Edible Landscapes

Defining Edible

- **Safety First**
  - » Always ensure a proper ID on a plant you plan to consume. Toxicity health risk
  - »
- **New Flavor Frontier**
  - » Be ready to explore a new flavor palette.
  - » Edible may simple mean palatable

Slattery, SW Foraging

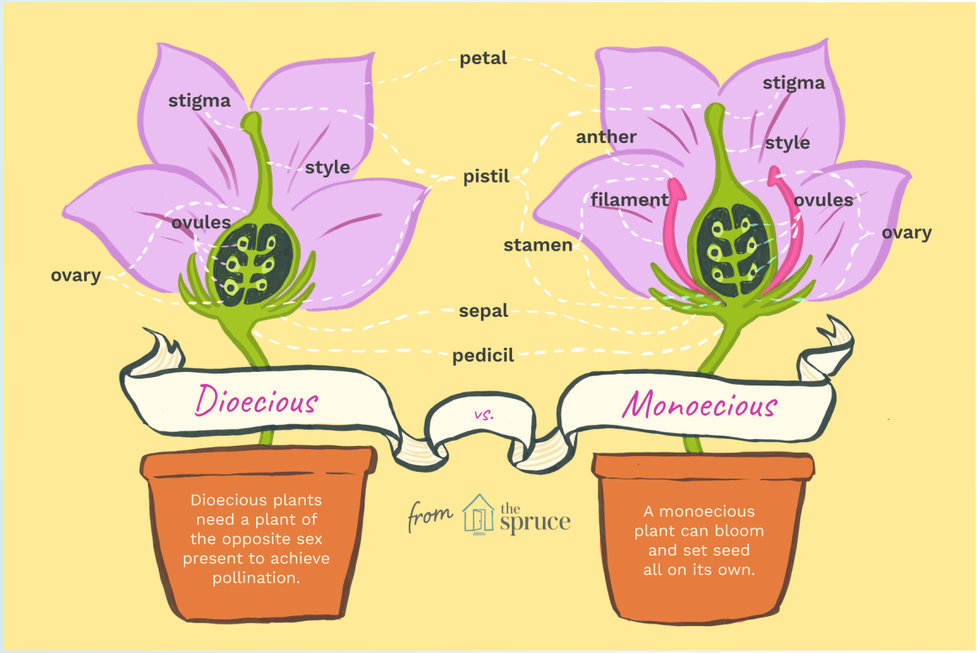
https://savorthesouthwest.blog/category/sonoran-native/

Native Edible Landscapes

Productivity and edible-ness

- **Avoid sterile "native" cultivars & hybrids**
  - » Native trees are often cultivated to produce less or fewer fruits, or to have sterile flowers
  - » Male trees are preferentially bred over female trees to avoid seed pod "litter"
- **Know your plants gender**
  - » Some desert plants are dioecious, meaning there are male and female plants
  - » In some cases you may need to have a mating pair

www.asiascientist.com



» **Parkinsonia Desert Museum**

» **Chitalpa hybrid**

https://www.laspilitas.com/nature-of-california/plants/195--chilopsis-linearis

Native Edible Landscapes

Defining how much is edible

- **Abundance & Expectations**
  - » 3 to 70 years for species to reach fruit bearing age

- **Edible Means Getting Eaten**
  - » Are you able to harvest your bounty?

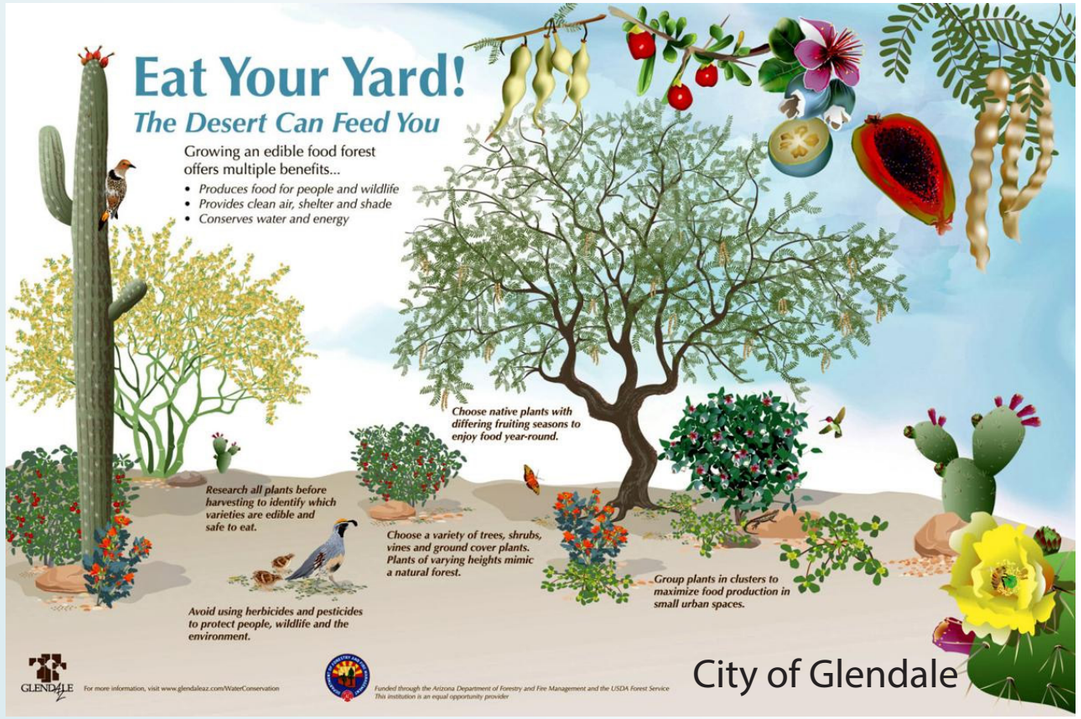
Desert Harvesters

Designing a Native Edible Landscape

Defining your goals

- **What do you value?**
  - » Why do you want to produce native food?
  - » Do you have goals for food production, personal meaning, habitat creation, or biodiversity targets?

- **What is your perception?**
  - » Stay open minded
  - » Be willing to challenge your existing landscape "aesthetic" preferences

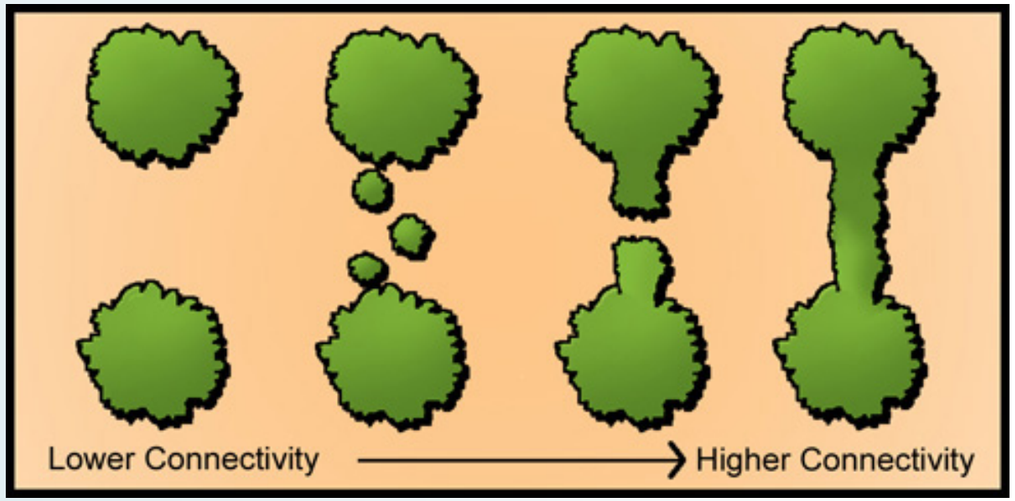


City of Glendale


Travel Blog

Designing a Native Edible Landscape

Finding Appropriate Solutions



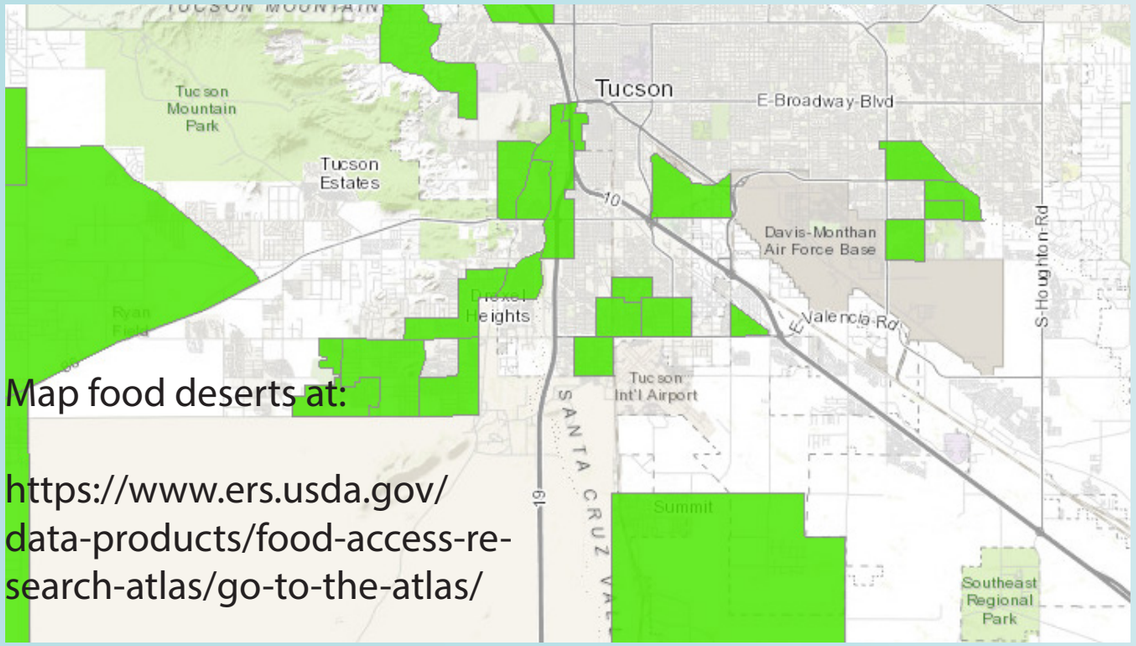
- **Ecological Considerations**
  - » Native edibles are ecologically valuable species
  - » You may invite local native guests who value them as well, creating opportunity for conflict
  - » Water conservation
  - » Habitat conservation and connectivity

Designing a Native Edible Landscape

Finding Appropriate Solutions

Socio-Cultural Considerations

- Reinforce a sense of place and community
- Local knowledge and identity
- Community resilience and equity



Map food deserts at:

https://www.ers.usda.gov/data-products/food-access-research-atlas/go-to-the-atlas/

Researchgate

Wheat Design Group

Any Questions?

Food for thought |

What goals do you identify with?

SW Native Edible Landscapes

Best Practices

1. **Incorporate with sustainable landscape practices**
   - » Plant the water, Principles of Rainwater Harvesting
   - » Regenerate & cycle rather than use/ sink resources

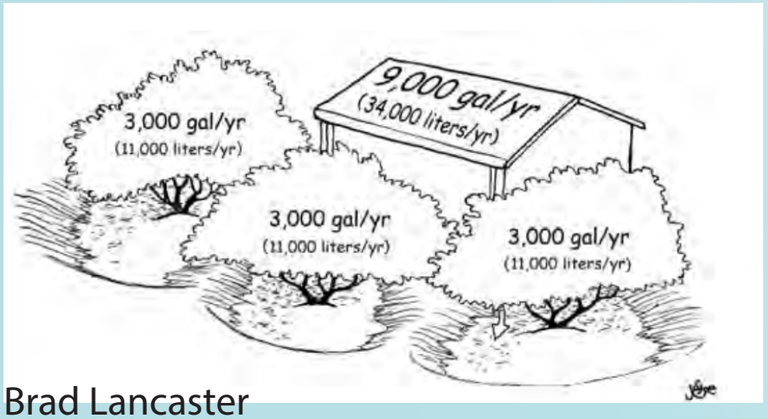
2. Select and locate plants appropriately

3. Nurture and harvest responsibly

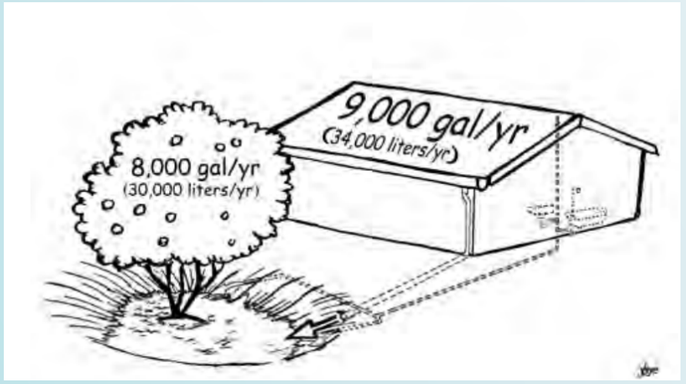
SW Native Edible Landscapes

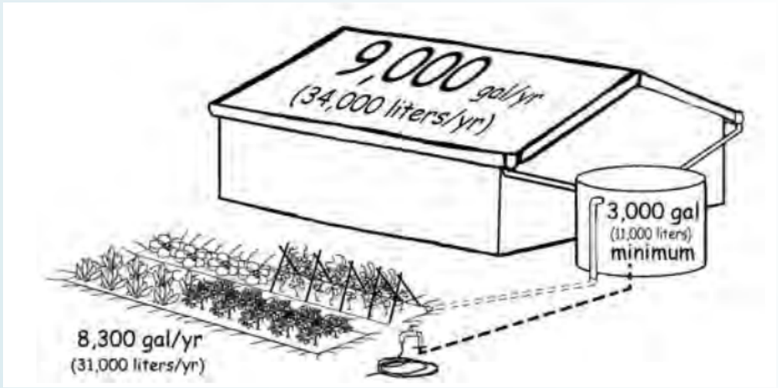
Site Considerations

- **Water Sources & Budget**
  - » Native desert species have adapted to survive on available rainfall in their habitat.
  - » Mimic natural "irrigation" and habitat of species
  - » Passive systems and greywater



Brad Lancaster





www.watershedmg.org/water-budget-calculator

SW Native Edible Landscapes

Site Considerations

- **Seasons**
  - » Winter (cold, wet)
  - » Spring (warm, wet)
  - » Summer (hot dry)
  - » Monsoon (hot , wet)
  - » Fall (hot, dry)

- **Selecting Species for Year Round Bounty**
  - » Make a food calendar for your species
  - » Is there a seasonal balance?

» **Seasonal Aesthetics**

SW Native Edible Landscapes

Best Practices

1. Incorporate sustainable landscape practices

2. **Select and locate plants appropriately**
   - » Right plant, right place
   - » Maximize food by supporting natural function and growth

3. Nurture and harvest responsibly

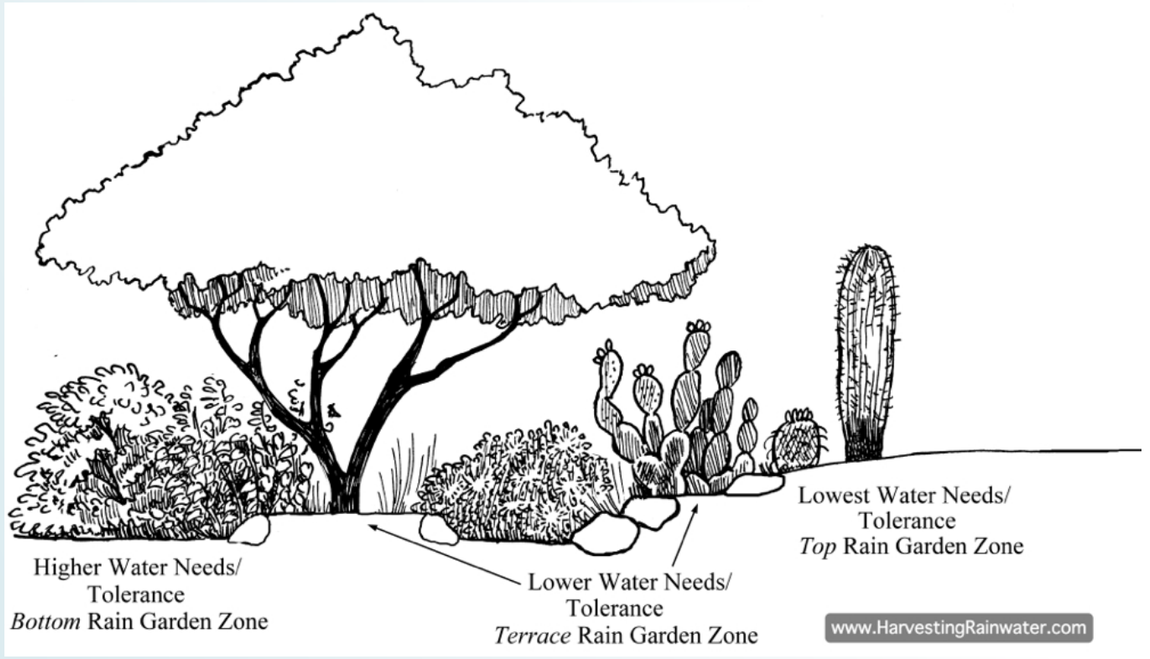
Nevada Water Authority

Syn-Turf.com

SW Native Edible Landscapes

Site Considerations

- **Hydrozones & Ecotones**
  - » Plant species with similar water tolerances together
  - » Observe where they occur in the wild



Box A4.2. Native Multi-Use Trees for the Tucson, Arizona Area

Species	Water Needs	Rain Garden Zone	Size	Cold Tolerance	Elevation Range	Growth Rate	Type of Tree	Human Uses	Wildlife	Domestic Animals That Use plant
Desert ironwood (*Olneya tesota*)	LW (1)	terrace top	25 × 25' (7.6 × 7.6m)	sh 15°f (-9°C)	2,500' (750m) and below	moderate	e	f, m, nf, s, T	Birds, pollinators, large and small mammals	Chickens, goats
velvet mesquite (*Propsopis velutina*)	LW (1)	terrace bottom	30 × 30' (9 × 9m)	h 5°f (-15°C)	1,000–5,000' (300-1,500m)	fast	sD	f, fW, m, nf, P, s, W	Birds, pollinators, large and small mammals	Chickens, goats, cattle, honey bees, dogs
screwbean mesquite (*Prosopis pubescens*)	LW (2–3)	terrace bottom	20 × 20' (6 × 6m)	h 0°f (-17°C)	4,000' (1,200m) and below	moderate	D	f, fW, m, s, W, WB	Birds, pollinators, large and small mammals	Chickens, goats, cattle, honey bees, dogs


Google
Agua Caliente Park
Tanque Verde


Moon Travel

SW Native Edible Landscapes

Site Considerations

- **Visibility & Access**
  - » Strive to place food bearing plants in areas you regularly inhabit
  - » Don't put native babies in the corner!

Brad Lancaster

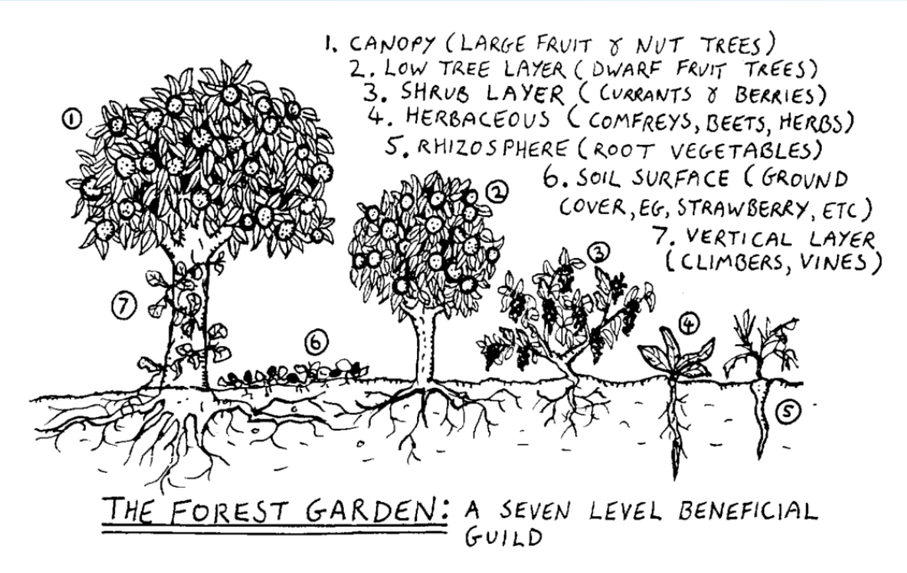
https://permaculturevisions.com/getting-permaculture-zone/


Staff
Area

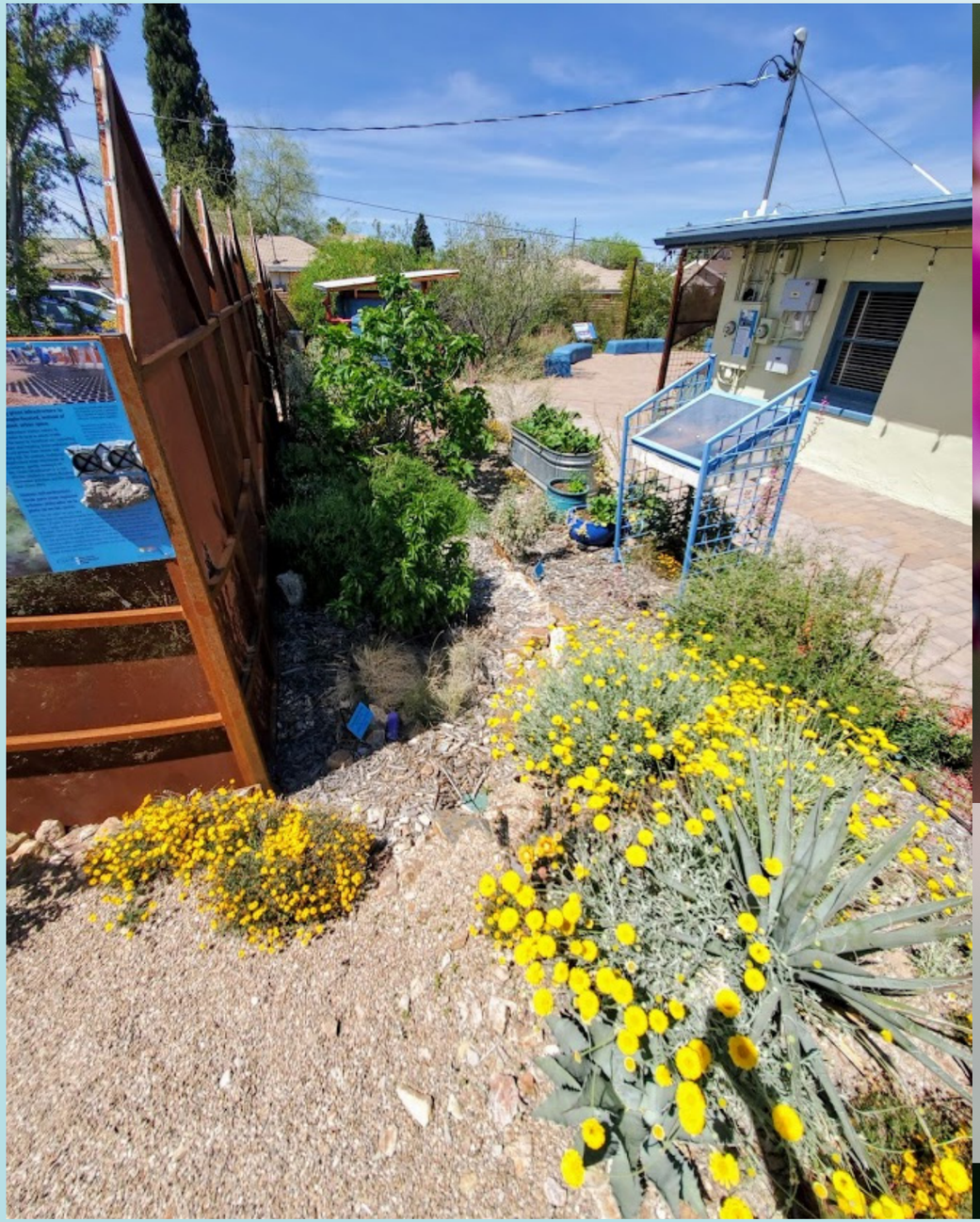
SW Native Edible Landscapes

Site Considerations

- **Grouping & Diversity**
  - » Plants naturally grow in beneficial guilds
  - » Diversity (structural & species)
  - » Support your pollinators



https://www.aquaponicsandearth.org/2013/11/how-to-start-permacult



» **Flowering plants and shrubs, such as chuparosa and penstemon, attract and support pollinators**

» **Landscape framing & function**

University of Arizona

» **Landscape framing & aesthetic**

SW Native Edible Landscapes

Site Considerations

- **Microclimate & Niches**
  - » Utilize "nurse plants" and "islands of fertility"
  - » As the system grows, the microclimate will change

- windbreak
- accumulation of organic matter
- increase soil nutrients
- funnels and retains moisture

SW Native Edible Landscapes

Species Selection

www.sedonateablends.com

- **Native Edible Species**
  - » Prioritize water conscious sonoran desert natives that will thrive in urban environments

- **Resources**
  - » Southwest Environmental Information Network (SEINet)
  - » U.S. Department of Agriculture Plants Database (NRCS)
  - » www.fireflyforest.com
  - » Arizona Flora by Kearny and Peebles
  - » Natural History of the Sonoran Desert, AZ Sonoran Desert Museum
  - » Wild Foods of the Sonoran Desert by Kevin Dahl

SW Native Edible Landscapes

Species Selection

- **Wild Edible Species**
  - » Naturalized and invasive species
  - » Weeds are edible, wild and abundant in and around urban areas
  - » Native does not mean it will thrive in urban landscapes

- **Foraging Resources**
  - » Southwest Desert Foraging by John Slattery
  - » Southwest Medicinal Plants by John Slaterry
  - » Sonoran Desert Food Plants by Charles Kane

SEInet, Pointleaf Manzanita (Little Apple)

Savor the Southwest Blog, Bracken Fern

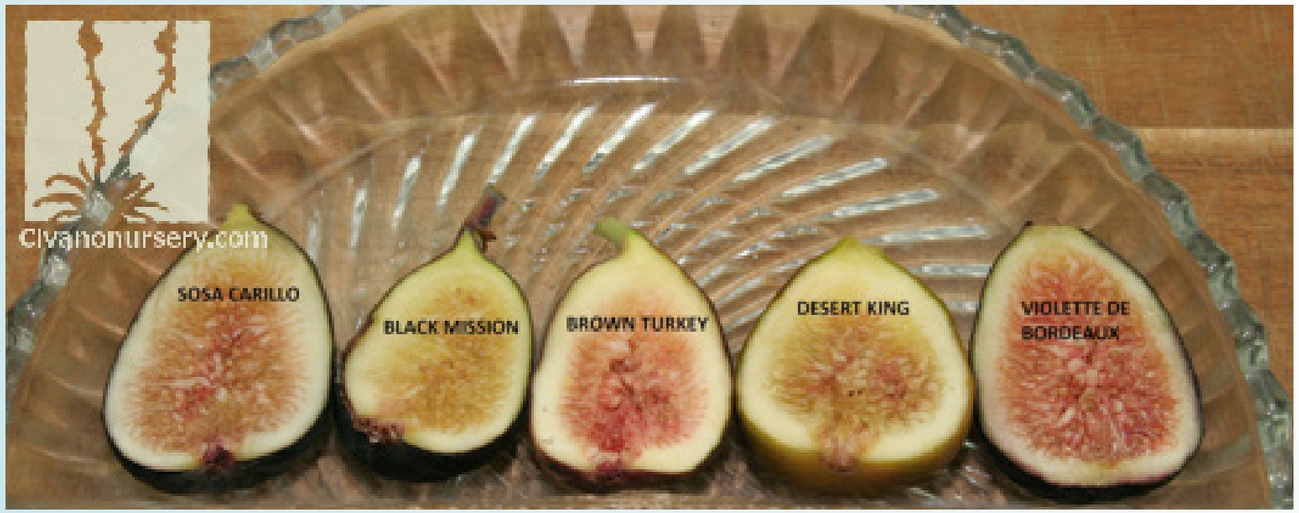
SW Native Edible Landscapes

Species Selection

- **Domesticated / Introduced Edible Species**
  - » "Heritage" desert crops introduced by missionaries or cultivated by indigenous peoples
  - » Please note local does not mean native
  - » Many of these are exotics and moderate to high water use plants

Savor the Southwest Blog, I'itoi (Elder Brother) Onion

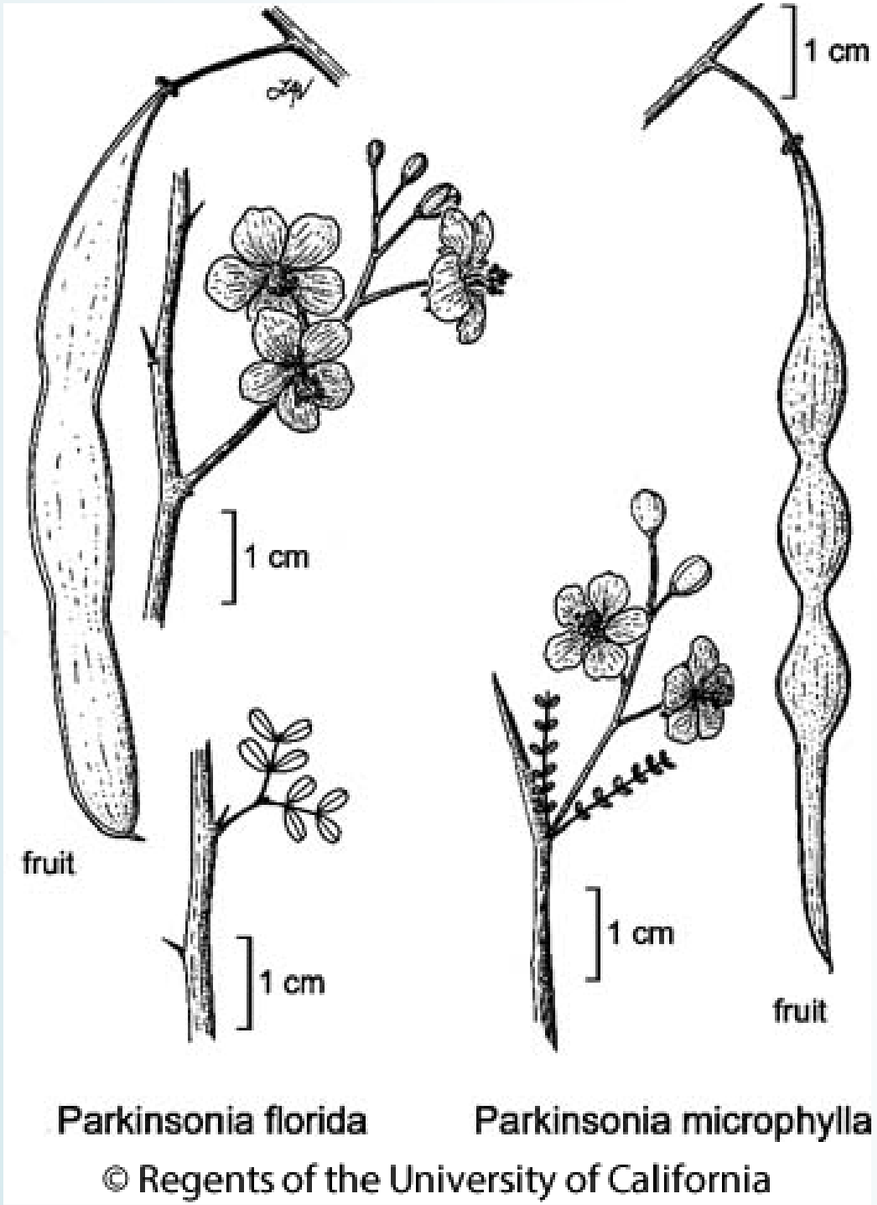
- **Resources**
  - » Mission Gardens
  - » Native Seed Search
  - » Desert Gardening by George Brookbank



SW Native Edible Landscapes

Species Selection

- **What's in a name**
  - » Value of using scientific or latin binomial nomenclature
  - » Palo Verde
  - » Only the Blue and Foothills are Arizona Natives



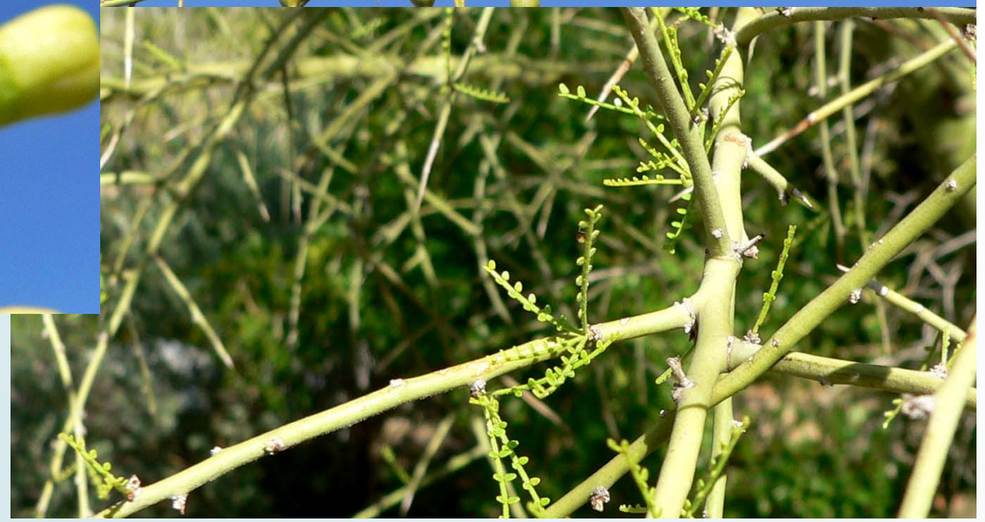
Any Questions?

Trees Please

Foothills Palo Verde - Wild Native

Parkinsonia microphylla

- **Biotic Community**
  - » Uplands
- **Edible Parts**
  - » Edible Flowers
  - » Edible Seed Pods (like snap peas)
- **Seasonality / Harvest**
  - » Spring, Summer



Native Seed Search

SEInet / USDA

Desert Ironwood - Wild Native

Olneya tesota

- **Biotic Community**
  - » Uplands
- **Edible Parts**
  - » Edible Flowers
  - » Edible Seed Pods (like snap peas)
- **Seasonality / Harvest**
  - » Spring, Summer

Native Seed Search

SEInet / USDA

Velvet Mesquite - Wild Native

Prosopis velutina

- **Biotic Community**
  - » Uplands, Riparian, Lowlands
- **Edible Parts**
  - » Edible Flowers
  - » Edible Seed Pods
- **Seasonality / Harvest**
  - » Fall / Summer
  - » Fully ripened dried pods during dry periods before rain, dampened ripe pods can harbor fungus that produces aflatoxins

Native Seed Search

SEInet / USDA

Jojoba - Wild Native

Simmondsia chinensis

- **Biotic Community**
  - » Riparian, upland, lowland
- **Edible Parts**
  - » Edible Fruits (aka nuts)
  - » Better roasted
- **Seasonality / Harvest**
  - » Spring, Early Summer

Native Seed Search

SEInet / USDA

Desert Lavender - Wild Native

Hyptis emoryi

- **Biotic Community**
  - » Riparian, upland, lowland
- **Edible Parts**
  - » Leaves and flowers
- **Seasonality / Harvest**
  - » Spring, Summer

Native Seed Search
SEInet / USDA

Wolfberry - Wild Native

Lycium sp.

Native Seed Search

SEInet / USDA

- **Biotic Community**
  - » Riparian, upland, lowland
- **Edible Parts**
  - » Flowers, berries
- **Seasonality / Harvest**
  - » Spring, Summer

Scrumptious Succulents

Staghorn Cholla - Wild Native

Cylindropuntia versicolor

- **Biotic Community**
  - » Lowland
- **Edible Parts**
  - » Fruit, Flower buds
- **Seasonality / Harvest**
  - » Spring

Native Seed Search

SEInet / USDA

Desert Prickly Pear - Wild Native

Opuntia phaeacantha

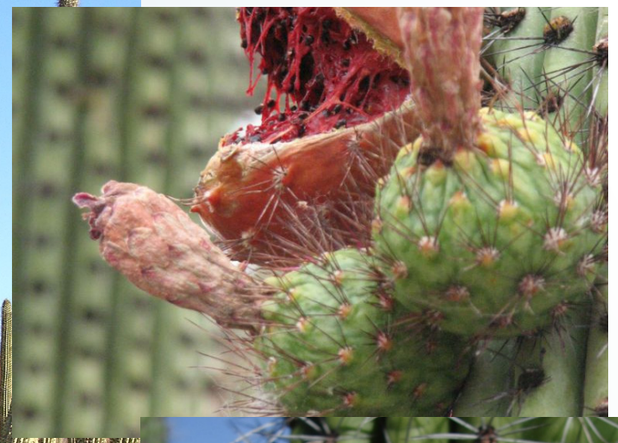
- **Biotic Community**
  - » Lowland
- **Edible Parts**
  - » Pads (new growth)
  - » Fruit
- **Seasonality / Harvest**
  - » Spring (pads) and Summer/Fall (fruit)

Native Seed Search
SEInet / USDA

Organ Pipe - Wild Native

Stenocereus thurberi

- **Biotic Community**
  - » Lowland
- **Edible Parts**
  - » Seeds, Fruit
- **Seasonality / Harvest**
  - » Late summer



Native Seed Search

SEInet / USDA

Pass the Annuals

Desert Rhubarb - Wild Native

Rumex hymenosepalus

- **Biotic Community**
  - » Lowland, riparian, disturbed areas
- **Edible Parts**
  - » Seeds, Stem and leaves
- **Seasonality / Harvest**
  - » Spring, Late summer - post rain

Native Seed Search
SEInet / USDA

Devil's Claw - Wild Native

Proboscidea parviflora

- **Biotic Community**
  - » Lowland, riparian, disturbed areas
- **Edible Parts**
  - » Immature fruit
- **Seasonality / Harvest**
  - » Post rain, mid-summer

Native Seed Search

SEInet / USDA

Careless weed - Wild Native

Amaranthus palmeri

- **Biotic Community**
  - » Lowland, riparian, disturbed areas
- **Edible Parts**
  - » Seeds, young leaves
- **Seasonality / Harvest**
  - » Winter and Spring

Fireflyforest

Street Food

London Rocket - Naturalized Invasive

Sisymbrium irio

- **Biotic Community**
  - » Lowland, riparian, disturbed areas
- **Edible Parts**
  - » Flowers, seeds, young leaves
- **Seasonality / Harvest**
  - » Winter and Spring

Native Seed Search
SEInet / USDA

Desert Tortoise Botanicals

Viney Victuals

Arizona Grape - Wild Native

Vitis arizonica

- **Biotic Community**
  - » Lowland, riparian, disturbed areas
- **Edible Parts**
  - » Flowers, seeds, young leaves
- **Seasonality / Harvest**
  - » Winter and Spring

Firefly Forest

UofA

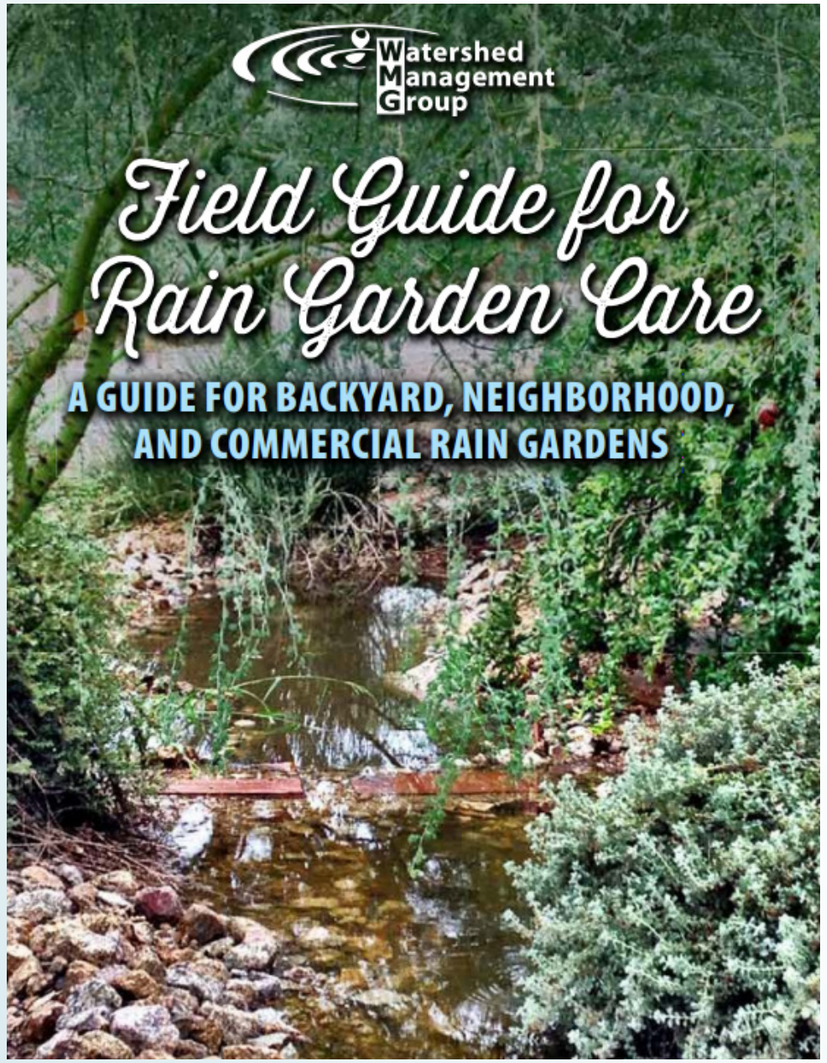
SW Native Edible Landscapes

Best Practices

1. Incorporate sustainable landscape practices

2. Select and place plants appropriately

3. **Nurture and harvest responsibly**
   - » Utilize nurturing, resourceful maintenance practices
   - » Learn how, when, and how much to harvest for you and your plant friend's health



https://watershedmg.org/document/guide-rain-garden-care

Chop N Drop

Madeline Ryder

Conventional Landscaping

Say NO to Mow, Blow, & Go!

Grass is a water hog and is maintained with loud mowers and chemical fertilizers.

Leaf blowers are a public nuisance—they cause air and noise pollution. And they blow vital organic material off the landscape!

Chemical weed killer is sprayed frequently on public landscapes (often seen as blue/green coloring). These chemicals are harmful to our soil, water, and wildlife.

Say YES To Hoe, Flow, & Grow!

Hand tools are the best way to remove weeds. You can be selective about what weeds you pull, and there is no noise or chemical pollution!

Plan your landscape to let the water flow through your yard and soak into the soil.

Let your plants grow and prune minimally. You'll be pleased with the results—healthier plants, unique shapes, and better wildlife habitat.

SW Native Edible Landscapes

Best Practices

- **Seeds / Seedbanks**
  - » Never pick ‘em all
  - » Unless they’re invasive

USDA

Flickr

SW Native Edible Landscapes

Best Practices

- **Endangered and Protected Species**
  - » Never harvest illegally
- **Resources**
  - » Sonoran Desert Conservation Plan
  - » UA Cooperative Extension
  - » USDA - Check Protected Status
  - » https://plants.usda.gov/java/threat?state-list=states&stateSelect=US04

Arizona Native Plant Law:
What You Need to Know

Kim McReynolds, Area Extension Agent, Natural Resources, University of Arizona Cooperative Extension, Cochise, Graham and Greenlee Counties

(A) Desert willow (*Chilopsis linearis*) is a salvage assessed protected plant. (B) San Francisco Peaks groundsel (*Senecio franciscanus*) is a highly safeguarded protected plant. (C) Honey mesquite (*Prosopis glandulosa*) is in both salvage assessed and harvest restricted. (D) Soaptree yucca (*Yucca elata*) is one of the many salvage restricted protected plants.

Arizona is home to a wide diversity of native plants. There are around 3,350 species of flowering plants and ferns known to be growing without cultivation in the state. Some species are scattered widely throughout the state, while others occur only locally and are adapted to particular conditions within a certain habitat zone.

What a lot of people don't realize is that many of Arizona's native plants are protected by law. These protected plants may not be removed from any lands, whether private or public, without the permission of the land owner and a permit from the Arizona Department of Agriculture. While land owners do have the right to remove native plants on their land, there is a process that must be followed. Protected species notification must be given to the Arizona Department of Agriculture and a permit must be issued prior to

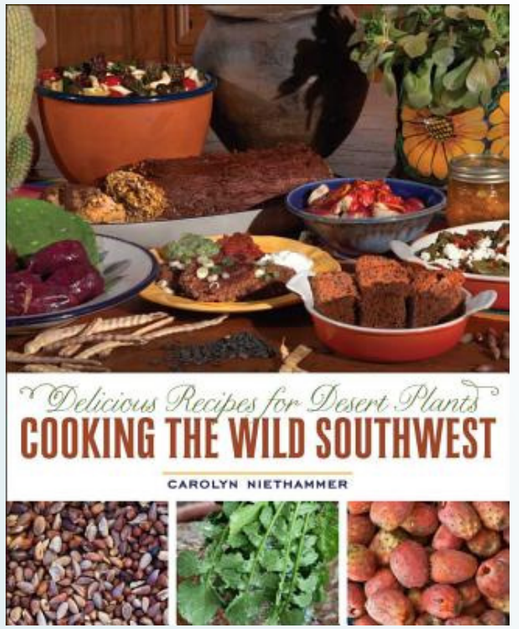
of the species that are in this category are saguaro, Arizona willow, and some of the agaves and cacti.

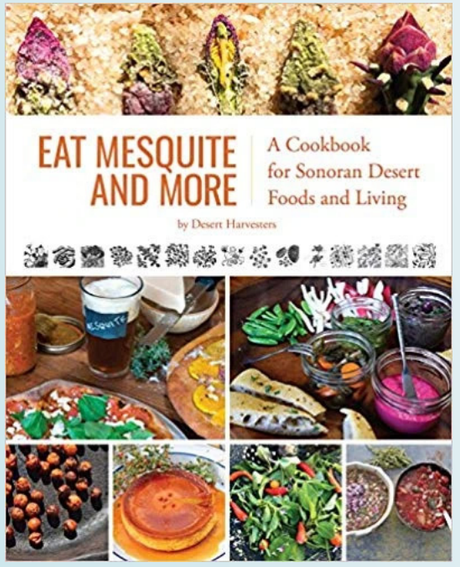
2. Salvage Restricted – This large group of plants are subject to damage and vandalism. This is a large list of species with 44 plant families represented, the largest being numerous species of cacti.
3. Salvage Assessed – This much smaller group of plants have enough value if salvaged to support the cost of salvaging. This list includes the desert willow, palo verde, ironwood, smoke tree and several mesquite species.
4. Harvest Restricted – Also a smaller group, these plants are protected due to the fact that they are subject to excessive harvesting because of

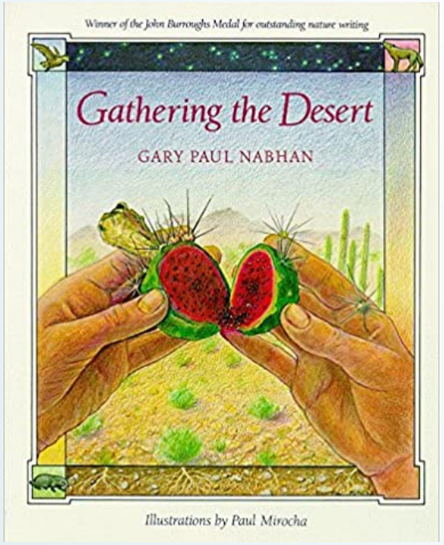
SW Native Edible Landscapes

Recipe and Cooking Resources

- Eat Mesquite and More, Desert Harvesters)
- Desert Harvesters Website
- Cooking the Wild Southwest: Delicious Recipes for Desert Plants, Carolyn Niethammer
- Gary Nabhan books and website








Prickly Pear Season is Now!

Steps to Process

- **Scope a spot**
  - » Never harvest illegally, make friends with neighbors
  - » Check their ripeness | Color, Fruit abscission

- **Harvest!**
  - » Beware of glochids - hands off methods are best
  - » Use tongs, sticks, and other tools

Steps to Process

- **Juicing - 3 easy methods**
  - » Freeze thaw | You just need a pillowcase, strainer, bucket and freezer
  - » Blend and strain | you'll need a blender and a 1/16 mesh strainer
  - » Cut and dry | Just a knife and a flat area in the sun

Have fun!
Any Questions?

Food for thought |

After taking this class, what are your next steps going to be?