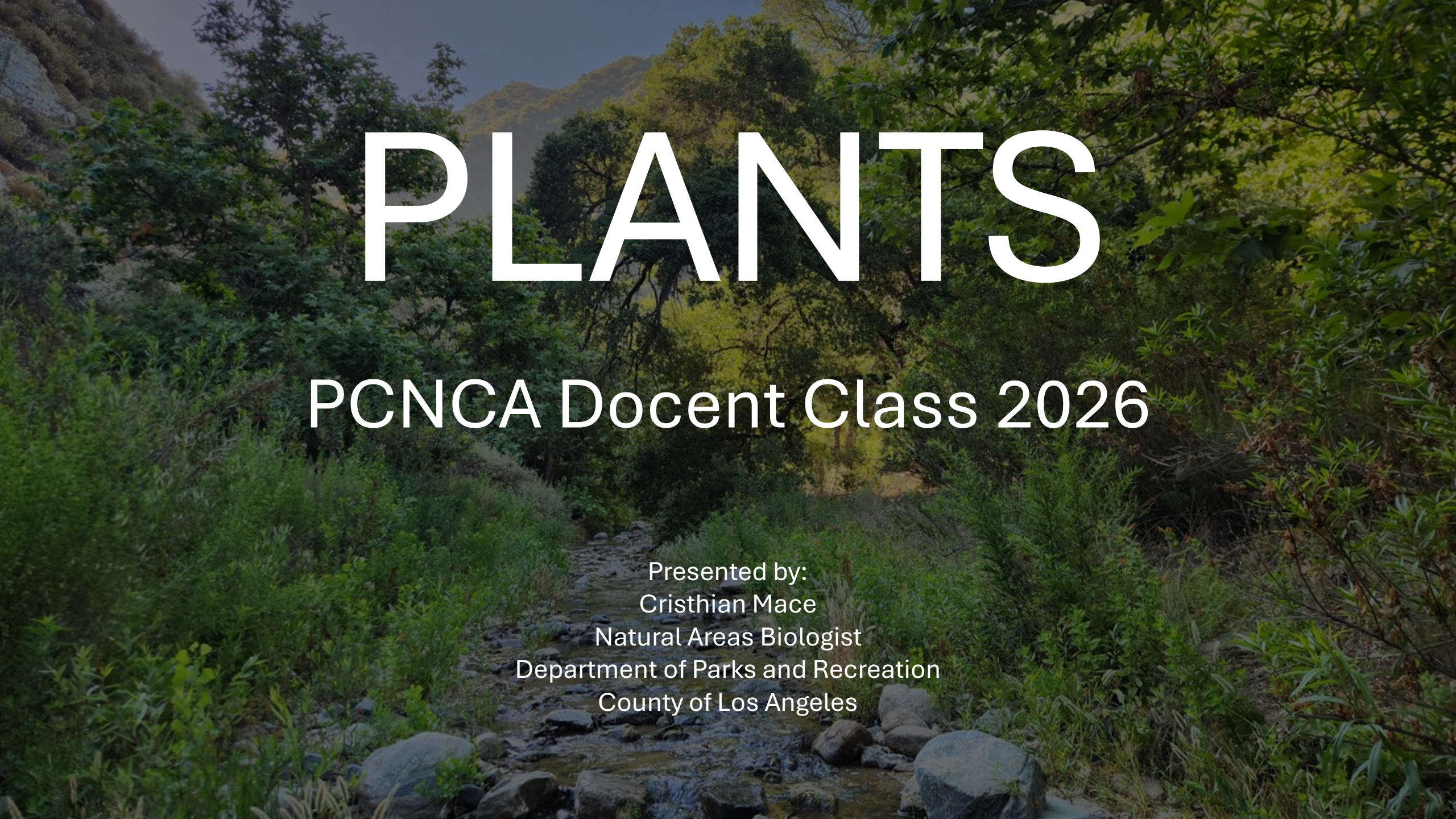


# PLANTS

## PCNCA Docent Class 2026

Presented by:
Cristhian Mace
Natural Areas Biologist
Department of Parks and Recreation
County of Los Angeles

# Allow me to introduce myself…

- Natural Areas Biologist (the first!)
- Over ten years of biological consulting in Southern California
- CSULB graduate. Go Beach!
- My objectives:
  - Collect and analyze baseline data of our natural resources in the Natural Areas
  - Create a Natural Resource Management Plan for each of the County's Natural Areas that align with its values
  - Create and participate in opportunities for community engagement

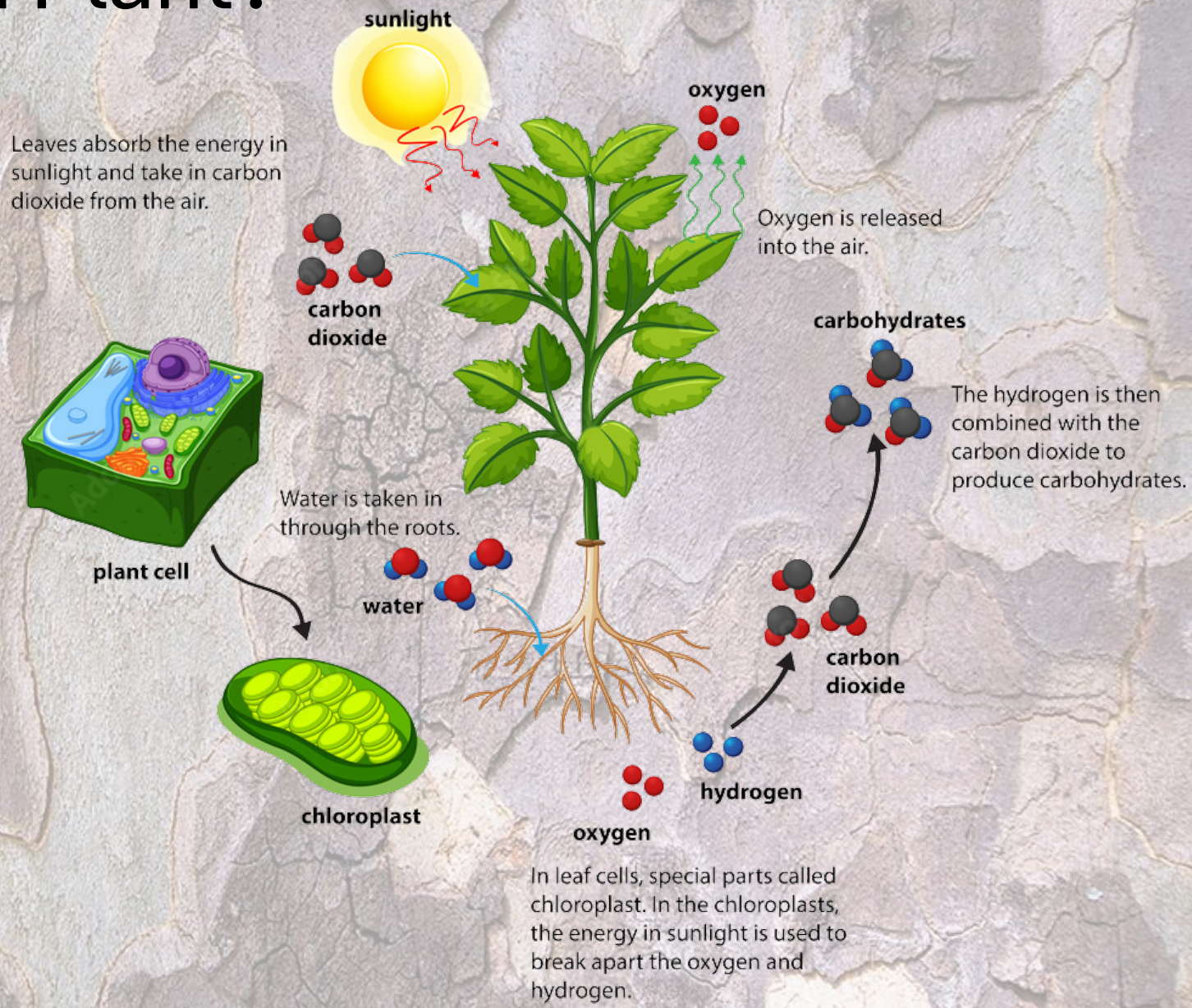
# Class Objectives

- Identify the most common local plant species for you to focus on
- Give you an overview of concepts that you can talk about when leading a walk
- Provide you with tools that allow you to learn more through self-study and in the field

# Introduction: What is a Plant?

Plants are living organisms in the kingdom *Plantae* that:

- Produce their own food through photosynthesis using chlorophyll and sunlight
- Have rigid cell walls made of cellulose, which provide structure and support
- Contain vascular tissue (xylem and phloem) that transport water, nutrients, and sugars throughout the plant
- Are anchored by roots that absorb water and nutrients from the soil
- Reproduce by seeds or spores; some species also reproduce clonally



# Plant Diversity: Four Major Plant Lineages

Rock moss (*Grimmia* sp.)

Coffee Fern (*Pellaea andromedifolia*)

Big-cone Douglas fir (*Pseudotsuga macrocarpa*)

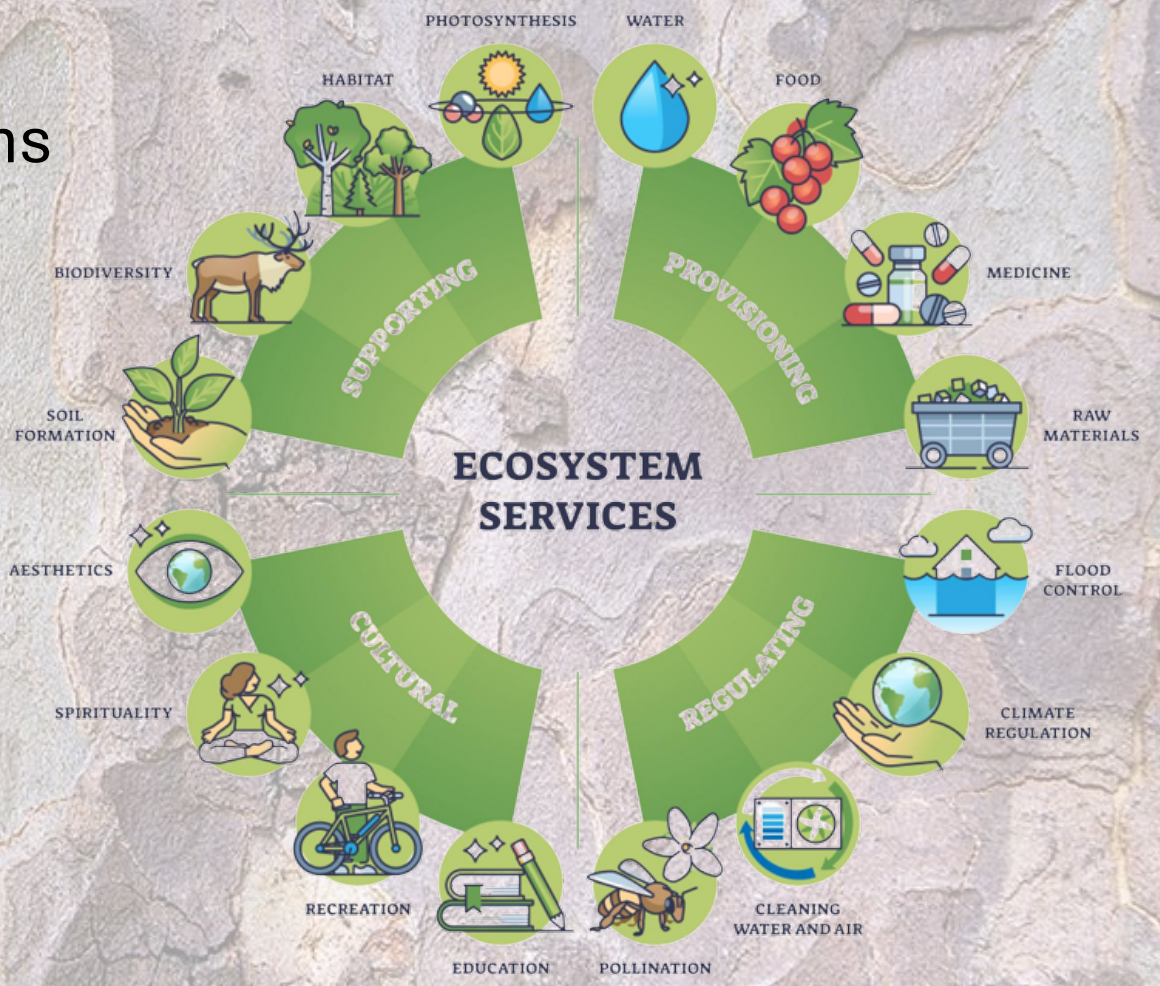
Catalina mariposa lily (*Calochortus catalinae*)

Plant biodiversity is organized into four major groups: bryophytes (mosses), ferns, gymnosperms (cone-bearing plants), and angiosperms (flowering plants)

# Why are Plants Important?

Plants are the foundation of ecosystems

- Primary production
  - Plants convert sunlight into energy, forming the base of all food webs
- Atmospheric regulation
  - Through photosynthesis, plants release oxygen and absorb carbon dioxide
- Carbon storage
  - Plants store carbon in their roots, stems, and leaves, helping regulate climate



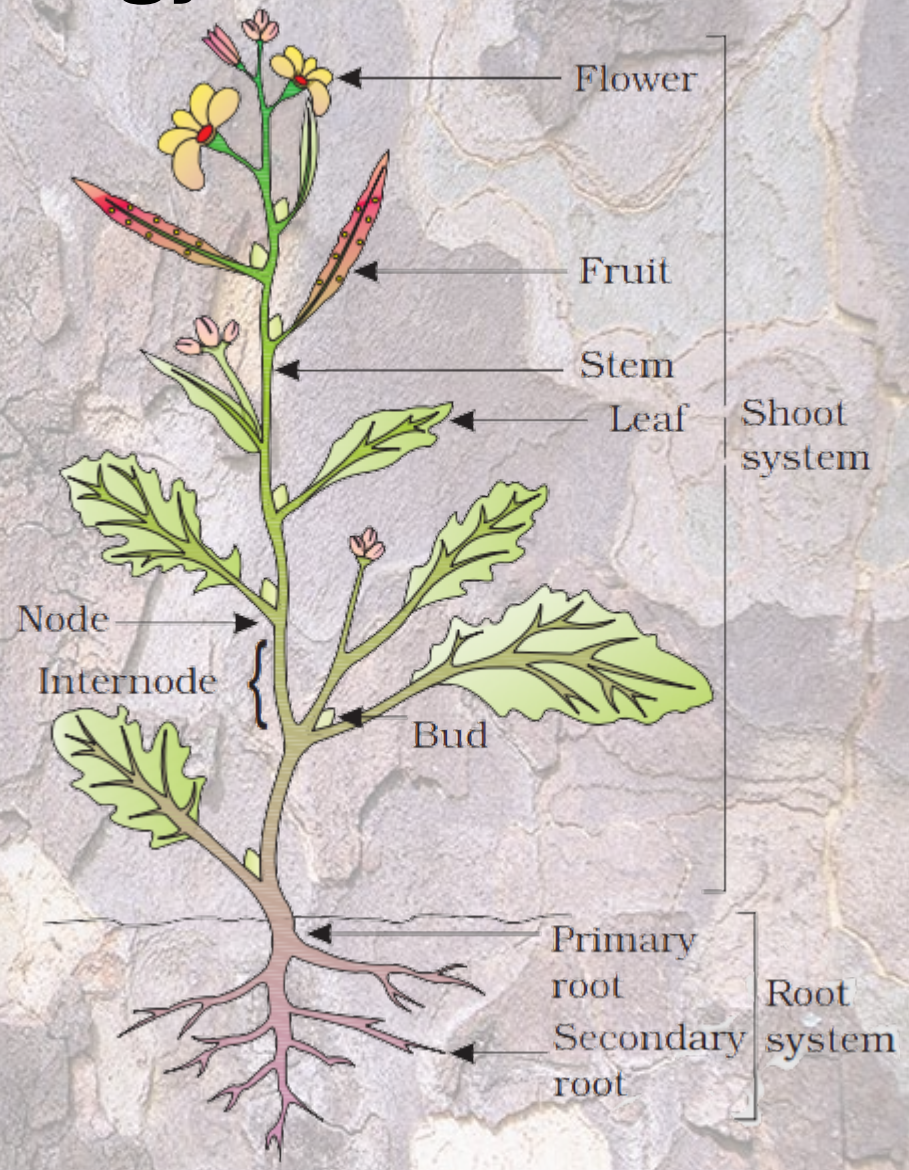
# Why are Plants Important at Placerita Canyon?

- Water regulation
  - Roots absorb and slow water, reducing runoff and supporting local hydrology
- Soil stability
  - Plant roots anchor soil, limiting erosion on slopes and in washes
- Habitat creation
  - Native plants provide food, shelter, and nesting sites for wildlife
- Microclimate moderation
  - Shade and vegetation cover reduce heat and create cooler, more stable conditions

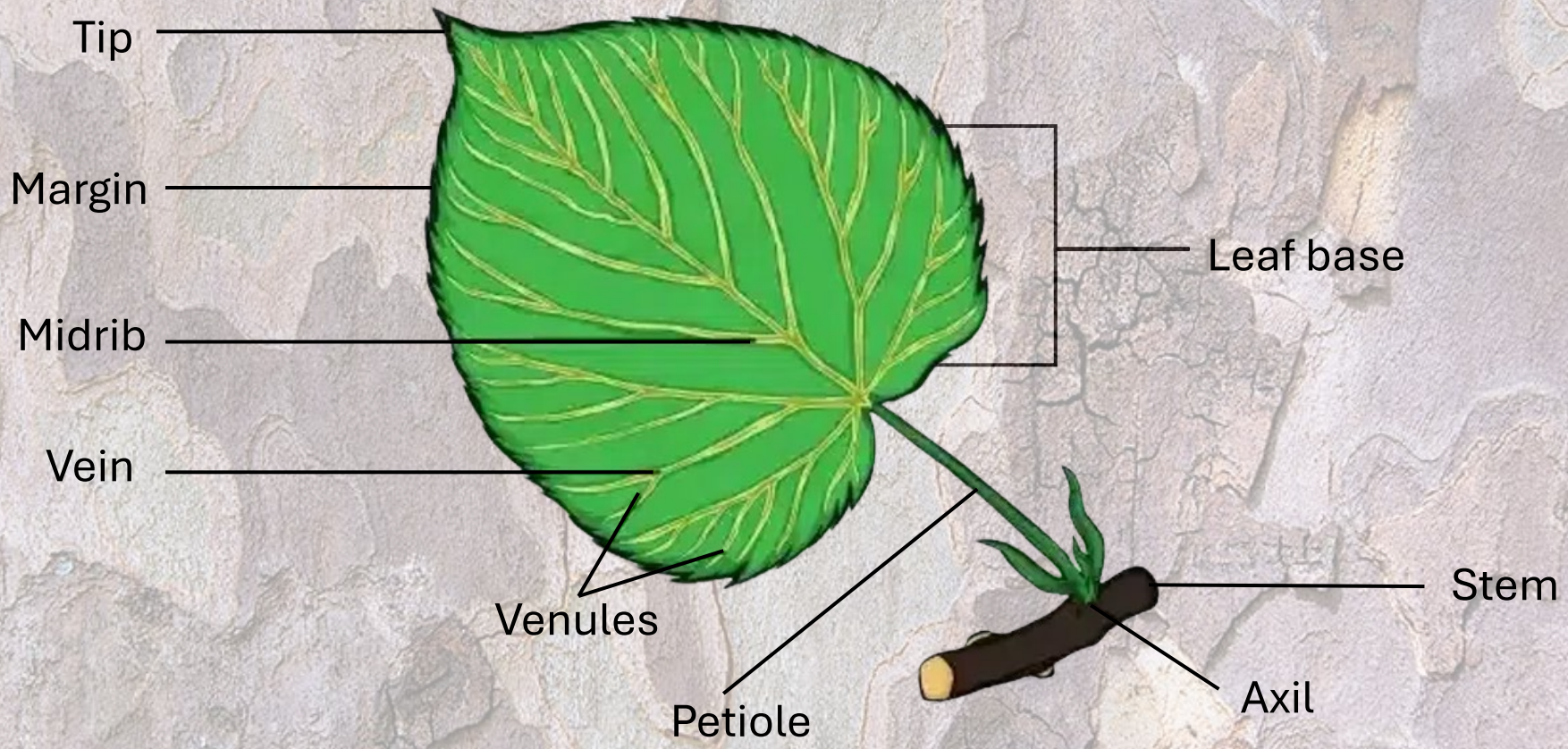
# Plant Structure

# Plant Structure: General Morphology

- Roots: Absorb water and nutrients; anchor the plant
- Stems: Provide structural support; transport water, nutrients, and food
- Leaves: Perform photosynthesis; absorb sunlight; release oxygen and moisture
- Reproductive Structures: Plants reproduce using different methods:
  - Flowers - Found in angiosperms (flowering plants); produce seeds within fruits
  - Cones - Found in gymnosperms (non-flowering plants); protect seeds without fruit
  - Spores - Produced by non-seed plants like ferns and mosses
- Together, these structures reflect adaptations to environment, disturbance, and life history

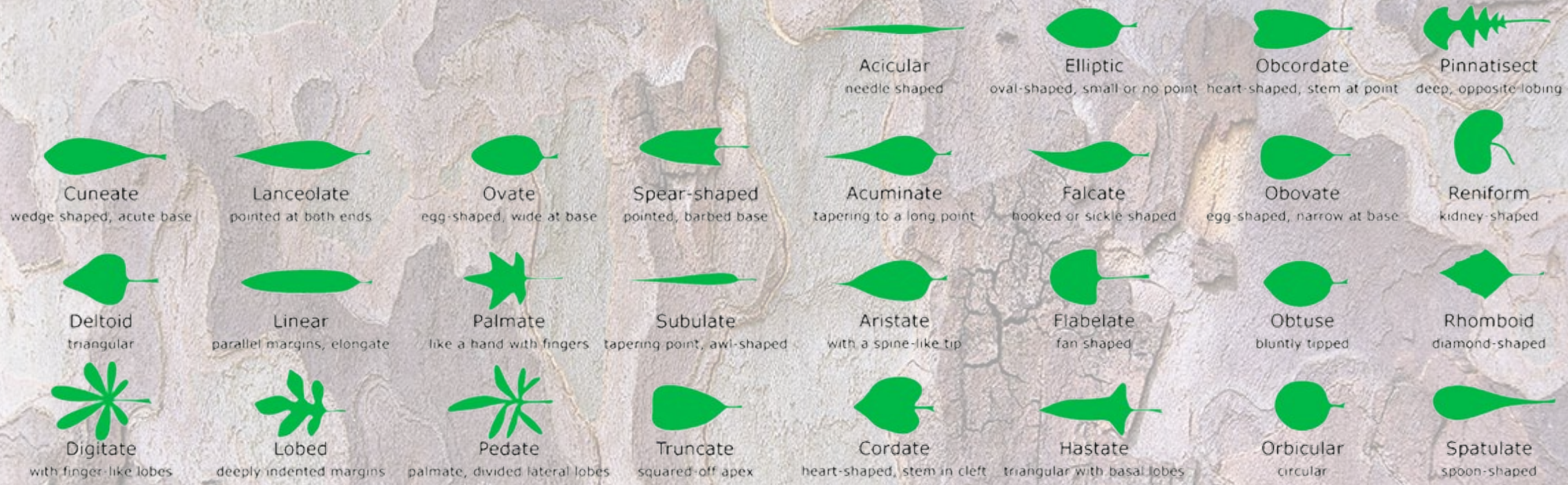


# Plant Structure: Leaf Morphology



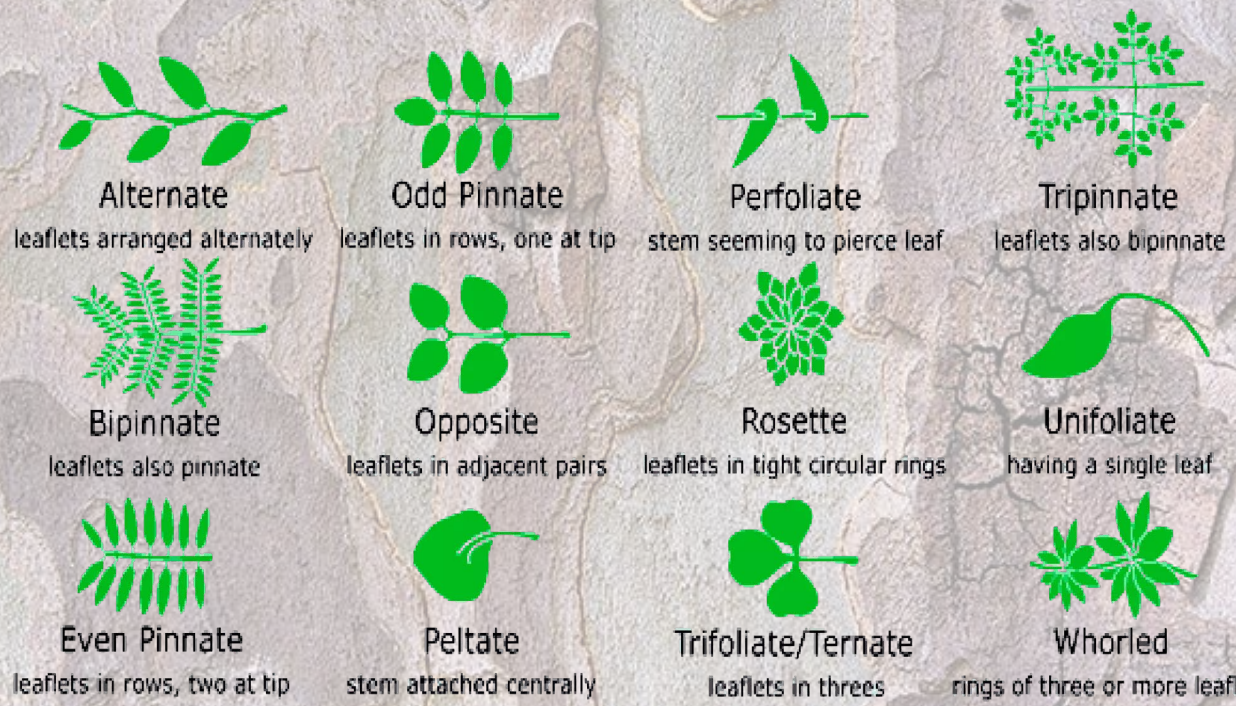

Leaves are built to capture sunlight and move water and sugars through their veins

# Plant Structure: Leaf Shape




- Reflects how plants adapt to light, water, and heat
- One of the most common traits used to identify plants in the field

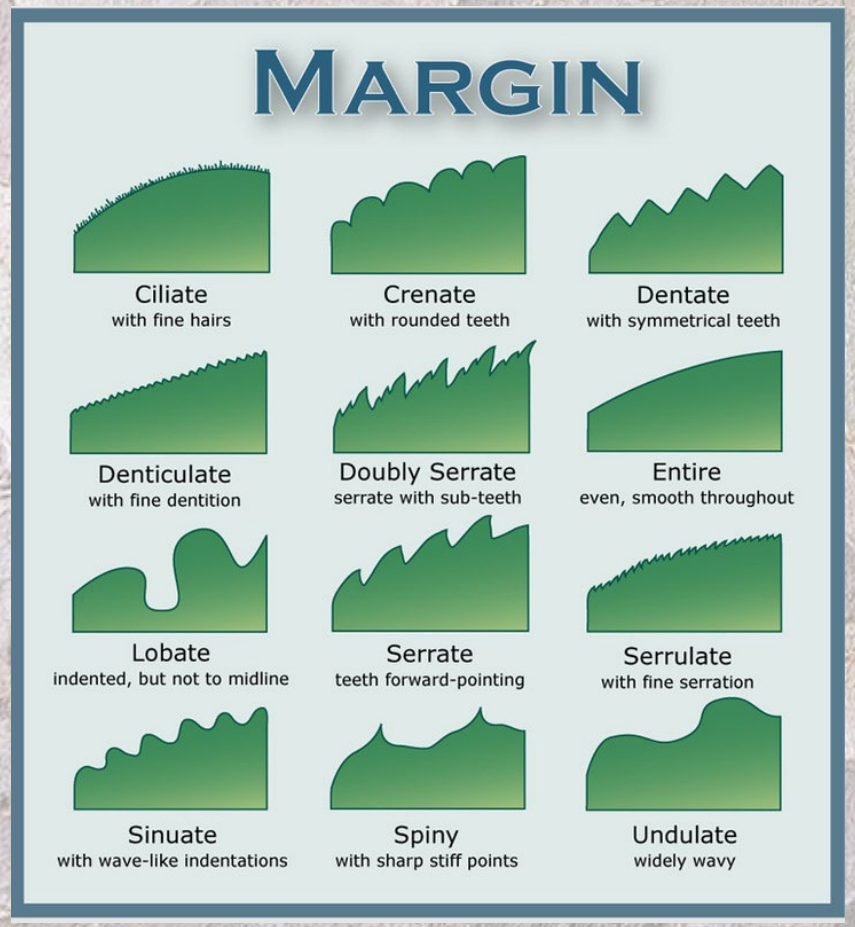
# Plant Structure: Leaf Arrangement




Leaf arrangement describes how leaves are attached along a stem and is a key trait for plant identification

# Plant Structure: Leaf Margins

Leaf margins describe the edge of a leaf and are another key feature used in plant identification




Serrate (e.g., Toyon)

Entire (e.g., Laurel sumac)

Spiny (e.g., Coast live oak)

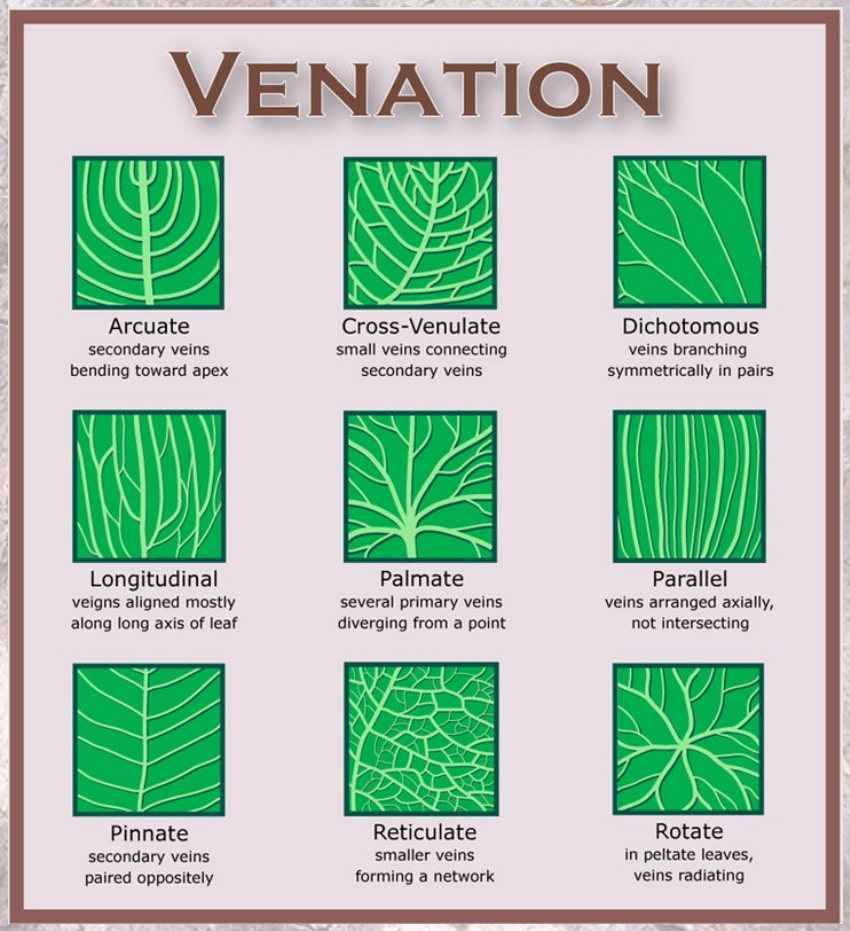
# Plant Structure: Leaf Venation

Leaf venation reflects how plants move water and nutrients, and often hints at plant family and evolutionary history

Parallel (e.g., Rush)

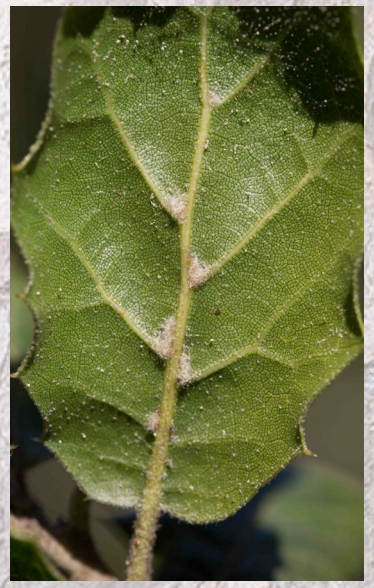
Palmate (e.g., Sycamore)

Pinnate Reticulate (e.g., Coast live oak)



# Plant Structure: Leaf Surface

Leaf surface texture describes the physical feel and appearance of a leaf, shaped by hairs, waxes, glands, and tissue structure



Rugose: Deeply wrinkled or textured (e.g., Coast live oak)

Scabrous: Rough and sandpaper-like due to stiff hairs or texture (e.g., telegraph weed

Pubescent: Covered in fine, soft hairs (e.g., Mugwort, underside)

Glaucous: Waxy or powdery coating, often bluish-gray, giving a shiny appearance (e.g., Prickly pear cactus)

Glabrous: Smooth and hairless (e.g., Toyon)

Tomentose: Densely woolly, with matted hairs (e.g., CA buckwheat, underside)

Villous: Long, soft, shaggy hairs (e.g., California cudweed)

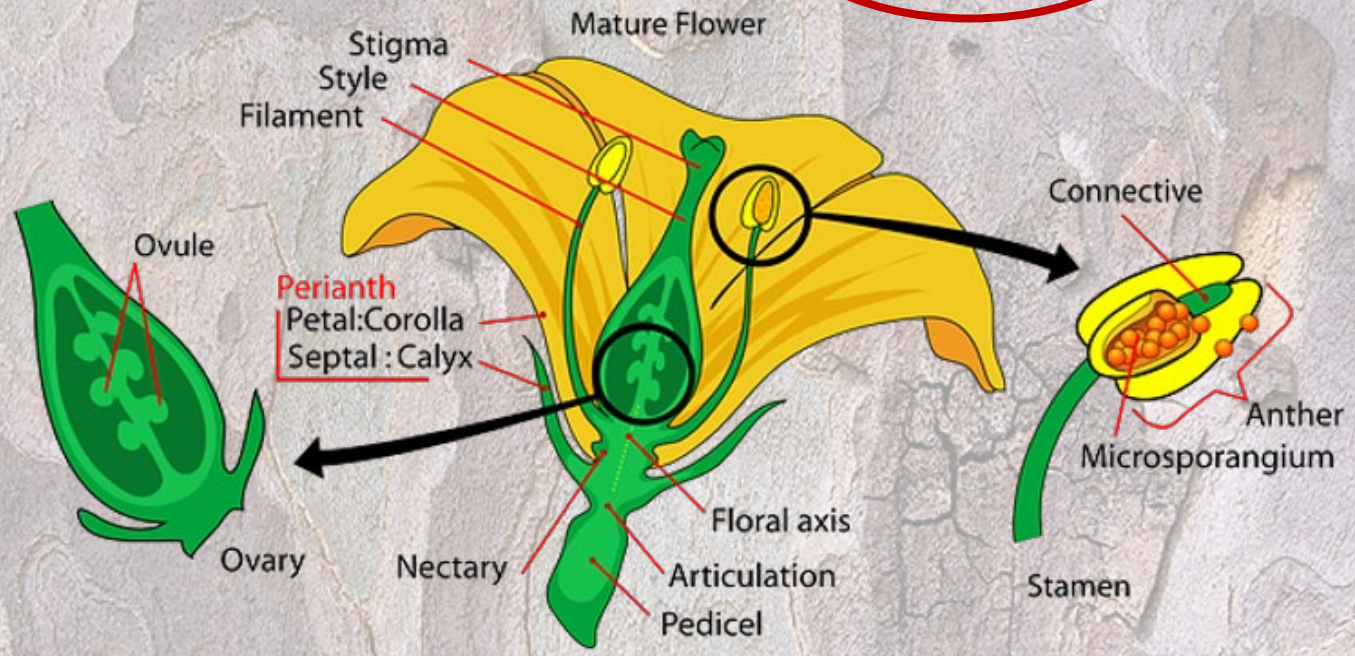
Glandular: Sticky or resinous, with glands that may secrete aromatic substances (e.g., Yerba santa)

Bullate: blistered or puckered, with raised areas between veins (e.g., black sage)

# Reproductive Structures

- Reproductive structures are the parts of a plant that produce, protect, and disperse the next generation
- Plants reproduce using flowers, cones, or spores, depending on their evolutionary group

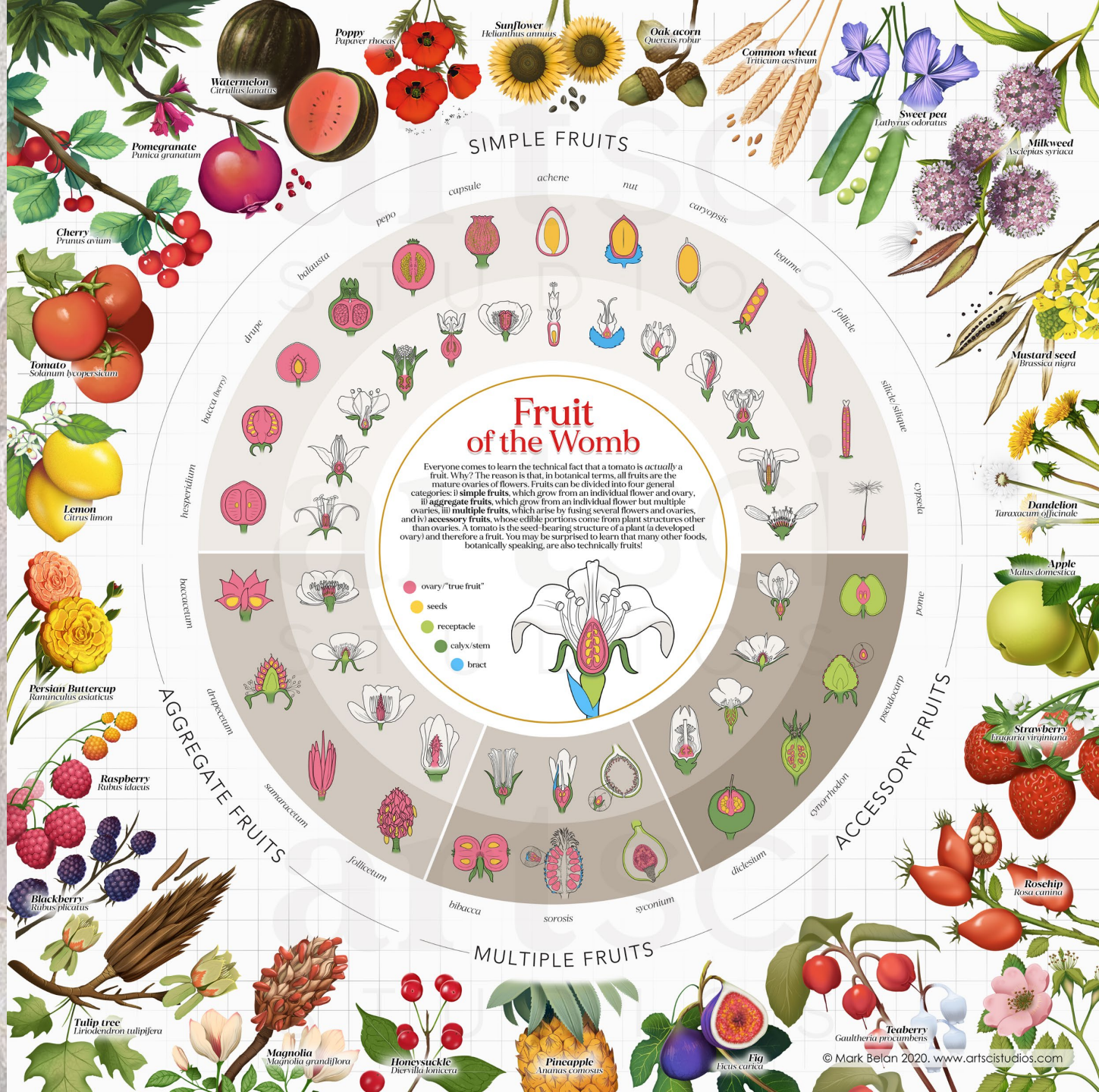
# Reproductive Structures: Flowers & Fruits




- Contain reproductive parts: stamens (male) and pistils (female).
- Attract pollinators using color, scent, or nectar.
- Pollinated flowers develop into fruits
- Types vary widely, influencing how plants reproduce and interact with pollinators.

# Reproductive Structures: Flowers & Fruits

- Develop from the ovary of a flower and protect seeds
- Aid in seed dispersal by wind, water, or animals
- Types vary widely (fleshy, dry, winged), influencing how seeds spread



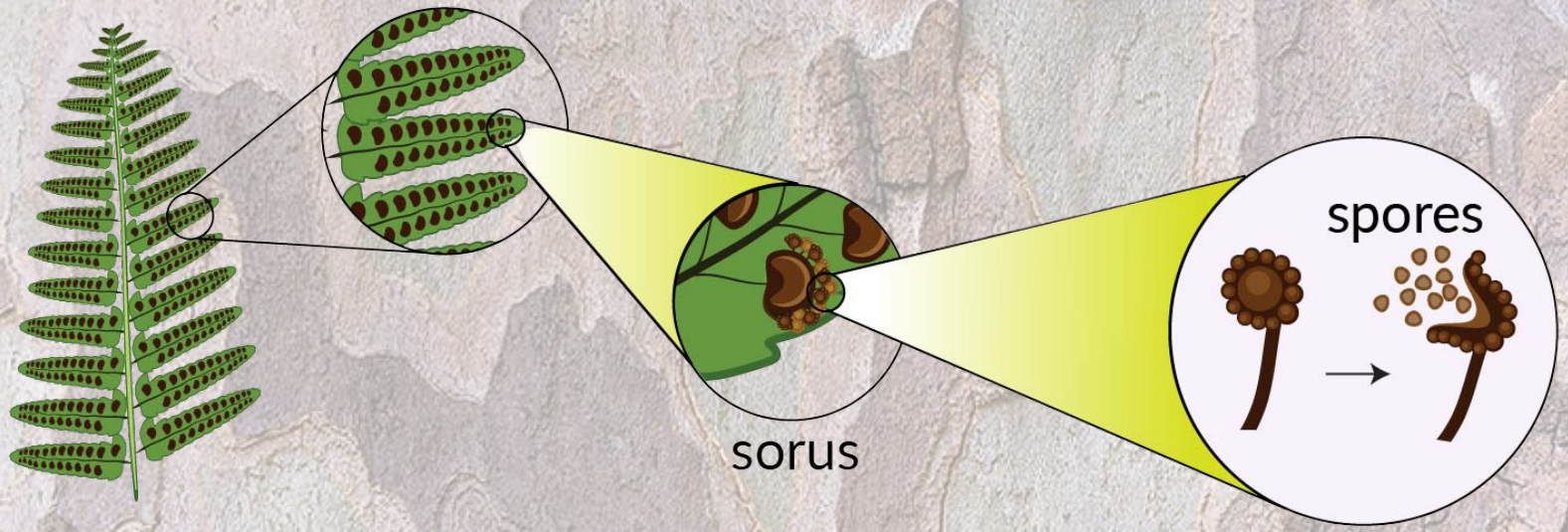

# Reproductive Structures: Cones

- Found in gymnosperms (e.g., pines, firs, cypresses)
- Male Cones: Produce pollen for fertilization
- Female Cones: Contain ovules that develop into seeds after fertilization
- Cones protect seeds and aid in dispersal via wind or wildlife

Placerita Canyon Spotlight

Bigcone Douglas Fir

# Reproductive Structures: Spores




- Found in non-seed plants like ferns, mosses, and liverworts.
- Produced in structures called sporangia
- Lightweight and dispersed by wind, water, or animals.
- Reproduction depends on moist environments for fertilization.

# How We Name Plants

Plant Families: Groups of plants that share key traits, often based on flowers, fruits, and leaf structure

## Mint Family (Lamiaceae)


Black sage


White sage

## Sunflower Family (Asteraceae)


Bush Sunflower



CA aster


CA mugwort

## Beech Family (Fagaceae)


Coast live oak


Canyon live oak


Scrub oak

# Common Names vs. Scientific Names

## Common Names

- Easy to remember
- Often regional or informal
- One name can refer to many different
- Example: Black Sage

## Scientific Names

- Universal and standardized
- Two parts: Genus + species
  - Genus = group of closely related plants
  - Species = a specific plant within that group
- Used worldwide
- Example:

*Salvia mellifera*

*Salvia* → the sages

*mellifera* → “honey-bearing”

*mellifera* → California black sage

# What Do Plants Need to Thrive?

- Soil:
  - Supplies essential nutrients (nitrogen, phosphorus, potassium)
  - Soil texture affects drainage, aeration, and root growth
  - Coast Live Oak thrives in well-draining soils
- Water:
  - Required for photosynthesis and nutrient transport
  - Water needs vary by habitat
    - Drought-tolerant plants use little
    - Riparian plants require consistent moisture
  - Western Sycamore depends on riparian water sources

- Favorable Germination Conditions:
  - Seeds respond to environmental cues
    - Moisture
    - Temperature
    - Fire or smoke
  - Chamise seeds germinate after exposure to heat or ash from fires

- Sunlight:
  - Drives photosynthesis (energy production)
  - Plants are adapted to different light levels
    - Full sun (many chaparral shrubs)
    - Partial shade (understory species)
  - White Sage thrives in full sun and hot, dry conditions

- Air:
  - Carbon dioxide fuels photosynthesis
  - Oxygen supports plant respiration
  - Open airflow benefits many woody shrubs
  - Toyon does well in open, well-ventilated settings

# Life Cycles & Growth Strategies

Plants use different life strategies to survive fire, drought, and disturbance

Coulter’s matilija poppy, Eaton Canyon Natural Area, March 1, 2025, 3 months after Eaton Fire

# Plant Life Cycles

## Perennials

- Live for many years
- Regrow from established roots
- Invest in long-term survival
- Example: Sugar bush (*Rhus ovata*)

## Annuals

- Complete their life cycle in one season
- Focus energy on rapid growth and seed production
- Often dominate after disturbance
- Example: California Poppy (*Eschscholzia californica*)

# Plant Life Cycles: What About Biennials?

- Two-year life cycle
  - Year 1: leaf and root growth
  - Year 2: flowering and seed production
- Biennials balance quick colonization with delayed reproduction
- Example: Common Mullein

# Plant Adaptations to Southern California

# What Is a Plant Adaptation?

- Traits that help plants survive and reproduce
- Shaped by climate, soils, fire, and disturbance
- Passed down over generations

# Adaptations to SoCal: Water Use

- Seasonal Drought Tolerance
  - Deep roots access groundwater
  - Reduced water loss during dry summers
  - Example: Coast live oak
- Water Storage
  - Succulents store water in leaves or stems
  - Example: Prickly Pear Cactus
- Water Efficiency
  - Waxy or thick leaves reduce transpiration
  - Example: Chaparral shrubs like Toyon

# Adaptations to SoCal: Leaves

- Small or Waxy Leaves
  - Less surface area = less water loss
  - Thick cuticles protect against heat.
  - Example: Chamise
- Leaf Shedding (Drought Deciduous)
  - Drop leaves during extreme drought
  - Regrow when moisture returns
  - Example: California Buckwheat
- Leaf Orientation & Texture
  - Hairy or angled leaves reflect sunlight
  - Reduce evaporation
  - Example: Yerba santa

# Adaptations to Disturbance

- Why Disturbance Matters
  - Fire, floods, wind, and landslides shape SoCal landscapes
  - Many native plants depend on disturbance

# Fire Adaptations

Fire-Responsive Traits

- Rapid resprouting from roots
- Fire-activated seeds
- Thick bark or protected buds
- Examples
  - Chamise — resprouts quickly
  - Ceanothus — seeds triggered by heat or ash


Chamise


Ceanothus

# Flooding, Wind & Landslides

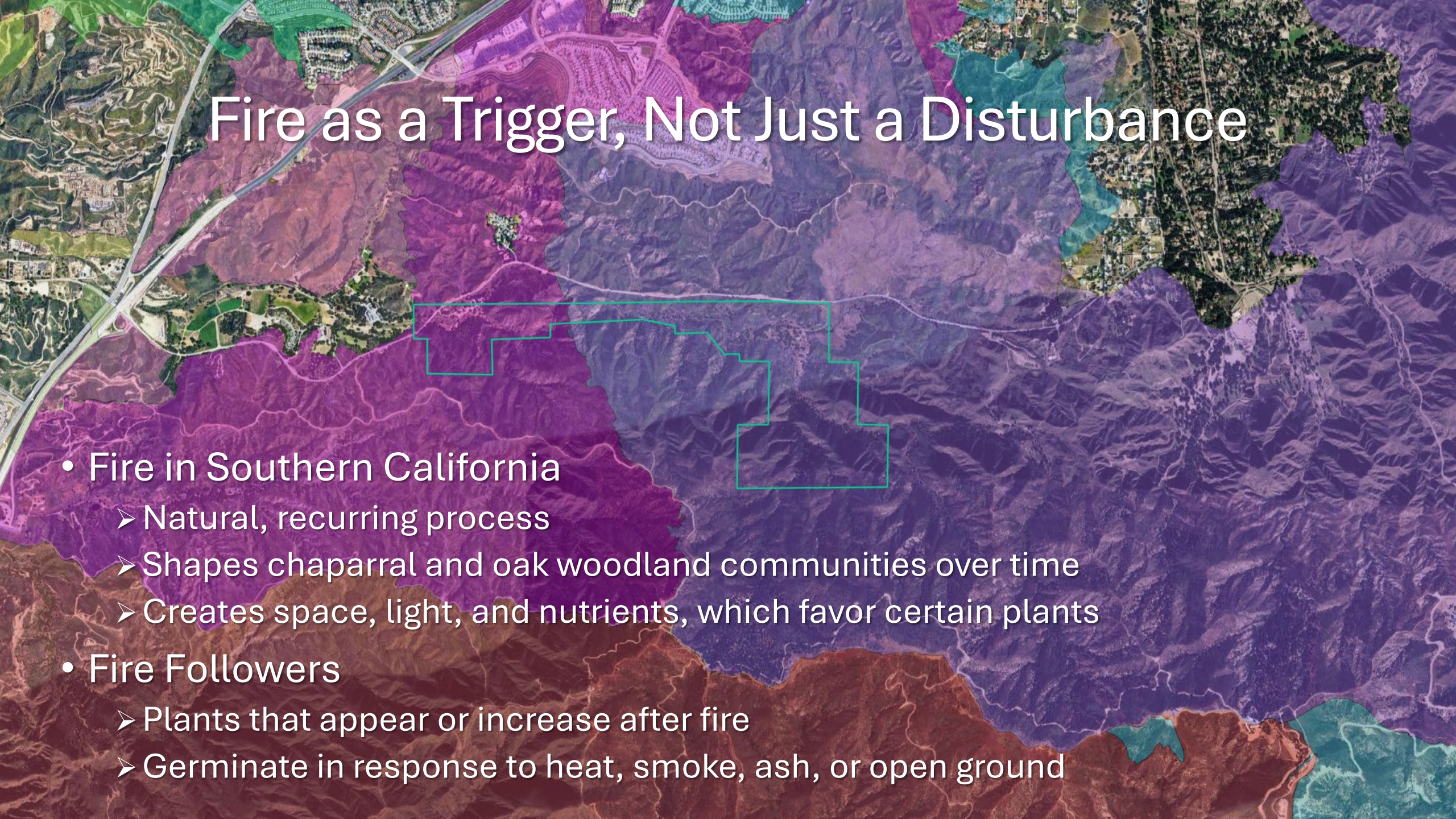
Flooding

- Flexible stems
- Rapid regrowth after burial
- Example: Mulefat

Wind & Slope Instability

- Deep or fibrous root systems
- Low growth forms reduce wind damage
- Example: California Sagebrush

# Fire as a Trigger, Not Just a Disturbance



- Fire in Southern California
  - Natural, recurring process
  - Shapes chaparral and oak woodland communities over time
  - Creates space, light, and nutrients, which favor certain plants
- Fire Followers
  - Plants that appear or increase after fire
  - Germinate in response to heat, smoke, ash, or open ground

# Why Fire Followers Are Often Annuals

- Post-Fire Growth Strategies
  - Rapid germination
  - Fast growth
  - High seed production
  - Short life cycle
- Examples
  - Phacelia
  - Chia
  - Whispering Bells

*Annuals are built for opportunity*

# Native vs. Non-Native Plants

# What Do “Native” and “Non-Native” Mean?

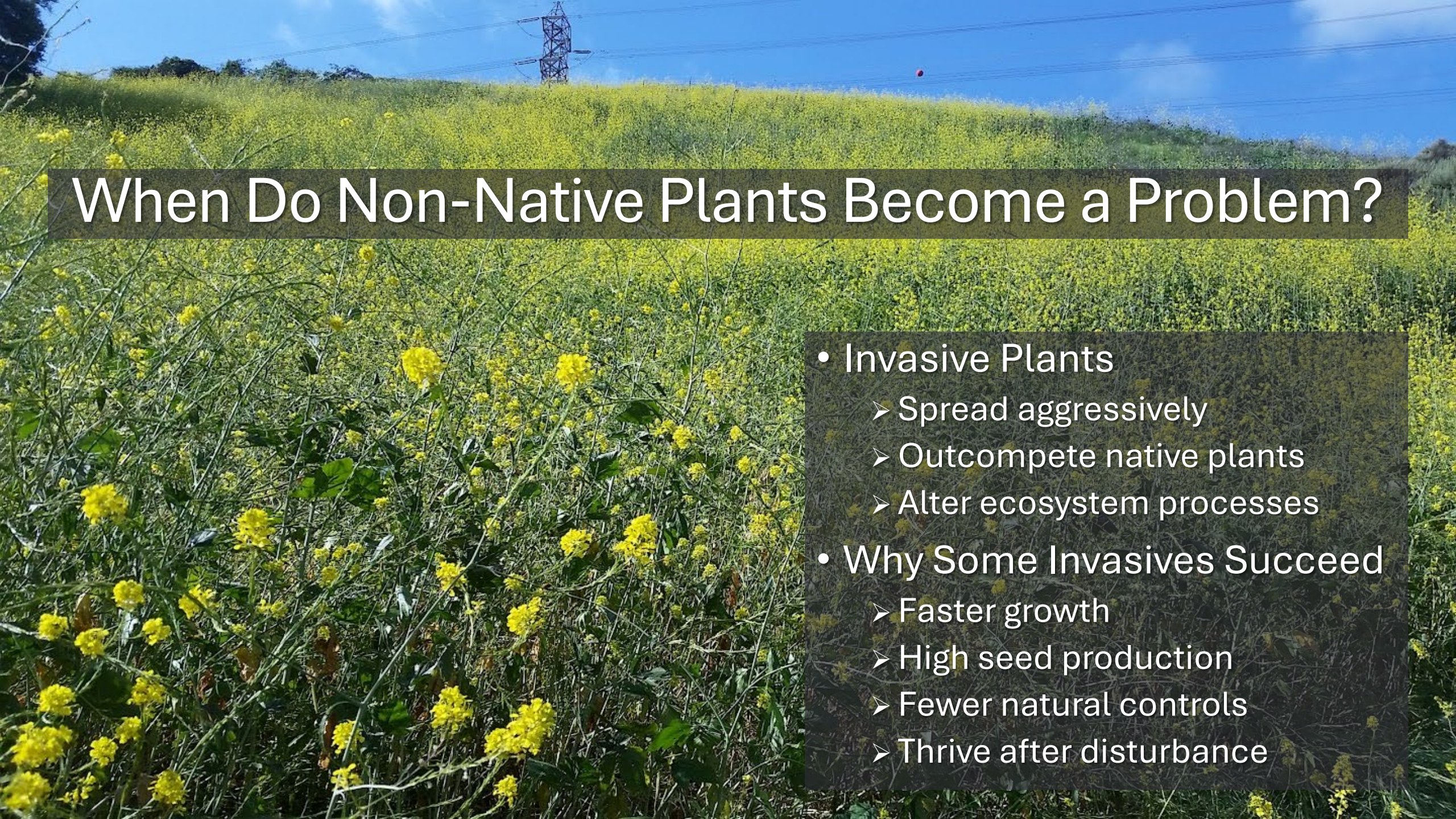
## Native Plants

- Occurred here before European settlement
- Evolved with local climate, soils, fire, and wildlife

## Non-Native Plants

- Introduced intentionally or accidentally
- From other regions or continents

Not all non-native plants are invasive

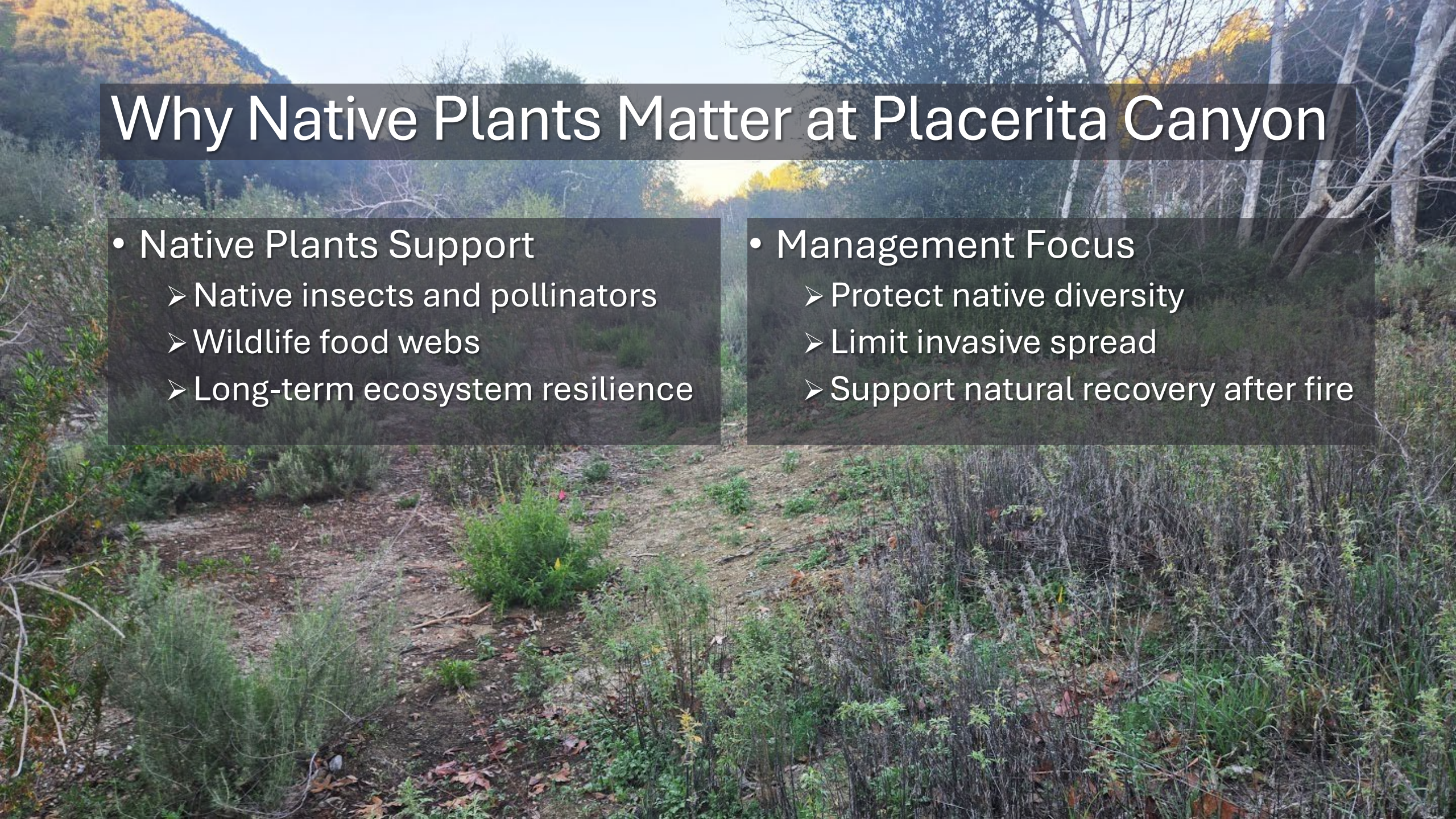


# When Do Non-Native Plants Become a Problem?

- Invasive Plants
  - Spread aggressively
  - Outcompete native plants
  - Alter ecosystem processes
- Why Some Invasives Succeed
  - Faster growth
  - High seed production
  - Fewer natural controls
  - Thrive after disturbance

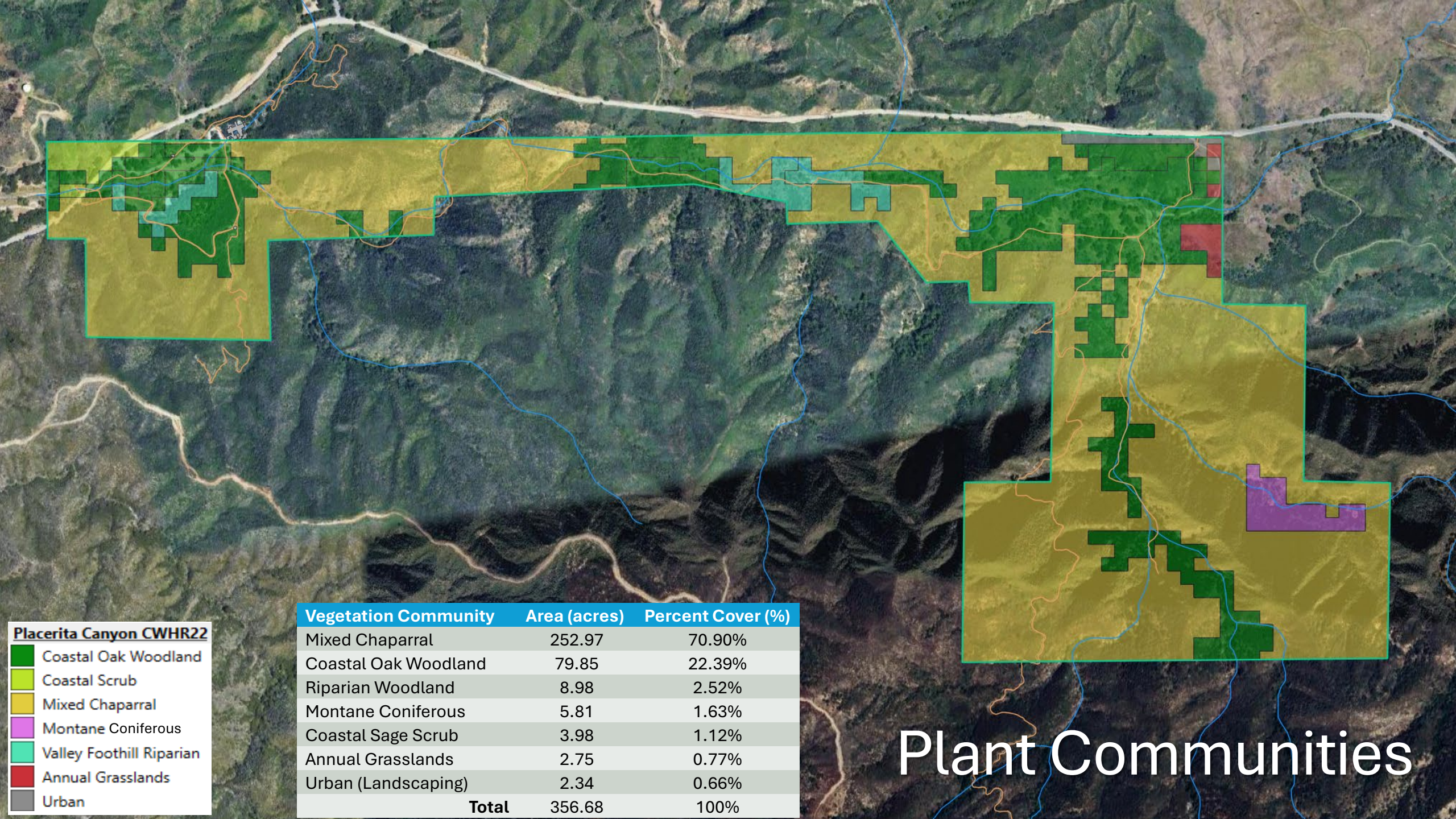
# Fire, Disturbance & Invasive Advantage

- After Fire or Heavy Disturbance
  - Many native plants are adapted to recover after fire and drought
  - Some non-natives exploit open space faster
  - Example: brome grasses
- Common Patterns
  - Dense stands
  - Reduced native diversity
  - Alter fire behavior
  - Example: shortpod mustard



# Why Native Plants Matter at Placerita Canyon

- Native Plants Support
  - Native insects and pollinators
  - Wildlife food webs
  - Long-term ecosystem resilience
- Management Focus
  - Protect native diversity
  - Limit invasive spread
  - Support natural recovery after fire




| Vegetation Community | Area (acres) | Percent Cover (%) |
|---|---|---|
| Mixed Chaparral | 252.97 | 70.90% |
| Coastal Oak Woodland | 79.85 | 22.39% |
| Riparian Woodland | 8.98 | 2.52% |
| Montane Coniferous | 5.81 | 1.63% |
| Coastal Sage Scrub | 3.98 | 1.12% |
| Annual Grasslands | 2.75 | 0.77% |
| Urban (Landscaping) | 2.34 | 0.66% |
| **Total** | 356.68 | 100% |

# Plant Communities

# Plant Communities in Placerita Canyon

- What Are Plant Communities?
  - Groups of plants that occur together under similar conditions
  - Shaped by climate, soils, water, and disturbance
  - Support wildlife, fungi, and microorganisms as part of a shared system
- Key Plant Communities in Placerita Canyon
  - Coastal Oak Woodland
  - Chaparral
  - Riparian Woodland
  - Montane Coniferous
  - Coastal Sage Scrub
  - Annual Grasslands

# Coastal Oak Woodland

- Characteristics
  - Dominated by Coast Live Oak with a shaded understory
  - Provides critical food, shelter, and nesting habitat for wildlife
  - Occurs on cooler slopes and canyon bottoms
- Common Species
  - Coast Live Oak (*Quercus agrifolia*)
  - Golden Currant (*Ribes aureum*)
  - Poison Oak (*Toxicodendron diversilobum*)
- Why it matters
  - Oak woodlands support some of the highest biodiversity in the canyon

# Riparian Woodland

- Characteristics
  - Found along streams and seasonal water sources
  - Plants adapted to periodic flooding and saturated soils
  - Supports both aquatic and terrestrial wildlife
- Common Species:
  - Western Sycamore (*Platanus racemosa*)
  - Willows (*Salix spp.*)
  - Mulefat (*Baccharis salicifolia*)
- Key signal
  - Water availability, not elevation, defines this community

# Chaparral

- Characteristics
  - Dense, evergreen shrubs
  - Dominate dry slopes and ridges
  - Adapted to drought, heat, and fire
  - Many species resprout or germinate after fire
- Common Species
  - Hoaryleaf Ceanothus(*Ceanothus crassifolius*)
  - Sugar Bush (*Rhus ovata*)
  - California Scrub Oak (*Quercus berberidifolia*)
- Key take away
  - Chaparral is built to burn and return

# Bigcone Douglas-fir (Relict Stand)

- Characteristics
  - Large, long-lived conifer with massive cones
  - Typically found at higher elevations and cooler north-facing slopes
  - At Placerita, occurs as a small, isolated stand
- Current Condition:
  - Footprint reduced following the 2016 Sand Fire
  - Surviving trees represent a remnant of a formerly larger stand
  - Recovery limited by drought, fire frequency, and climate stress
- Ecological Significance
  - Represents Placerita's biological and climatic diversity
  - Provides unique structure and habitat uncommon in the canyon
  - Sensitive to future fire and changing climate conditions
- Key takeaway
  - This stand reflects both Placerita Canyon's ecological history and the lasting effects of wildfire


Bigcone Douglas-fir (Relict Stand)

# Annual Grasslands (Non-Native Dominated)

- Characteristics
  - Dominated by fast-growing annual grasses and forbs introduced from Europe and the Mediterranean
  - Green briefly in winter and spring, dry out by early summer
  - Common in areas with historic disturbance such as grazing or grading
- Common Species:
  - Ripgut Brome (*Bromus diandrus*)
  - Wild Oat (*Avena* spp.)
  - Shortpod Mustard (*Hirschfeldia incana*)
- Key takeaway
  - These grasslands reflect past land use and ongoing disturbance

# Wildflowers at Placerita Canyon

- What You'll Notice
  - Most visible late winter thru late spring, following rain
  - Many are annuals that respond quickly to open ground and disturbance
  - Appear across multiple plant communities, especially grasslands and open slopes
- Common Examples
  - California Poppy
  - Phacelia
  - Lupine
  - Goldfields
- Why They Matter
  - Provide seasonal resources for pollinators
  - Reflect rainfall patterns and recent disturbance
  - Offer a snapshot of the canyon's seasonal change

# Spotlight: Narrowleaf Milkweed

(*Asclepias fascicularis*)

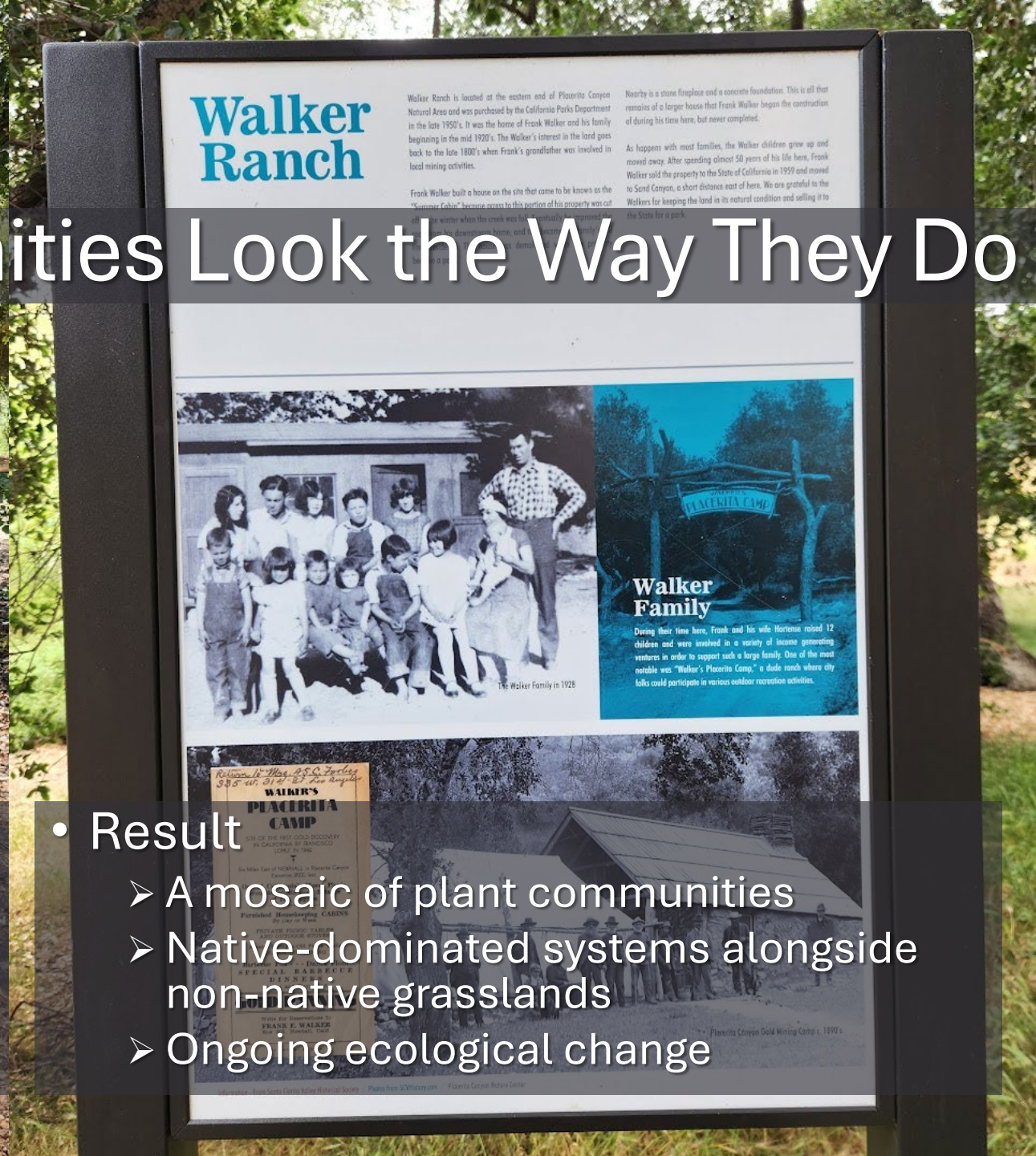
- Why This Plant Matters
  - Host plant for Monarch butterfly caterpillars
  - Provides nectar for a variety of pollinators
  - Native perennial adapted to SoCal conditions
- Ecological Role
  - Supports a specific plant–insect relationship
  - Demonstrates how native plants anchor local food webs
  - Often found in open, sunny areas and disturbed soils
- Key Takeaway
  - Native plants support wildlife in ways non-native plants often cannot


Placerita Canyon Today: A Living Landscape

# Why These Plant Communities Look the Way They Do

- Key Influences
  - Mediterranean climate (cool wet winters, hot dry summers)
  - Fire and other disturbances
  - Past land use and ongoing pressures

- Result
  - A mosaic of plant communities
  - Native-dominated systems alongside non-native grasslands
  - Ongoing ecological change



# What Visitors Might Notice on Trail

As you explore Placerita Canyon, you may notice:

- Changes in vegetation with slope, shade, and water
- Areas recovering from past fires
- Seasonal shifts (green in spring, dry in summer)
- Mixes of native and non-native plants

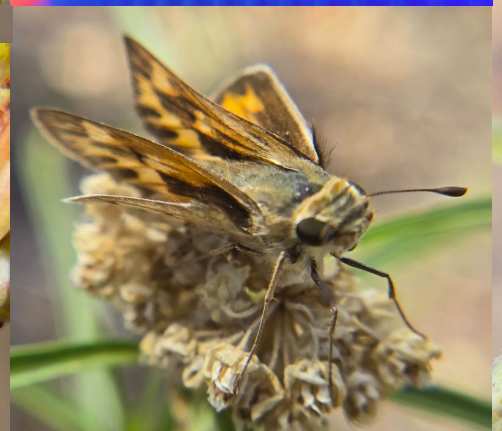
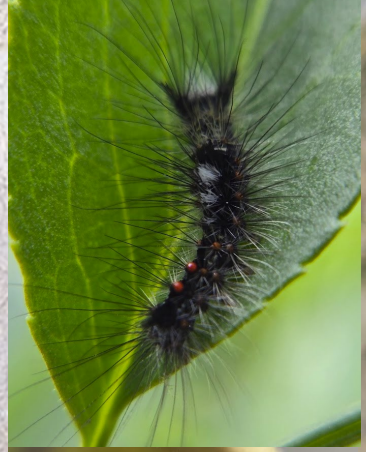
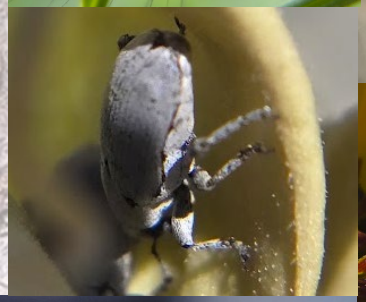
# Plants at Placerita Canyon: Why They Matter

- Helps guide conservation and restoration
- Supports wildlife and pollinators
- Informs how we respond to fire and disturbance





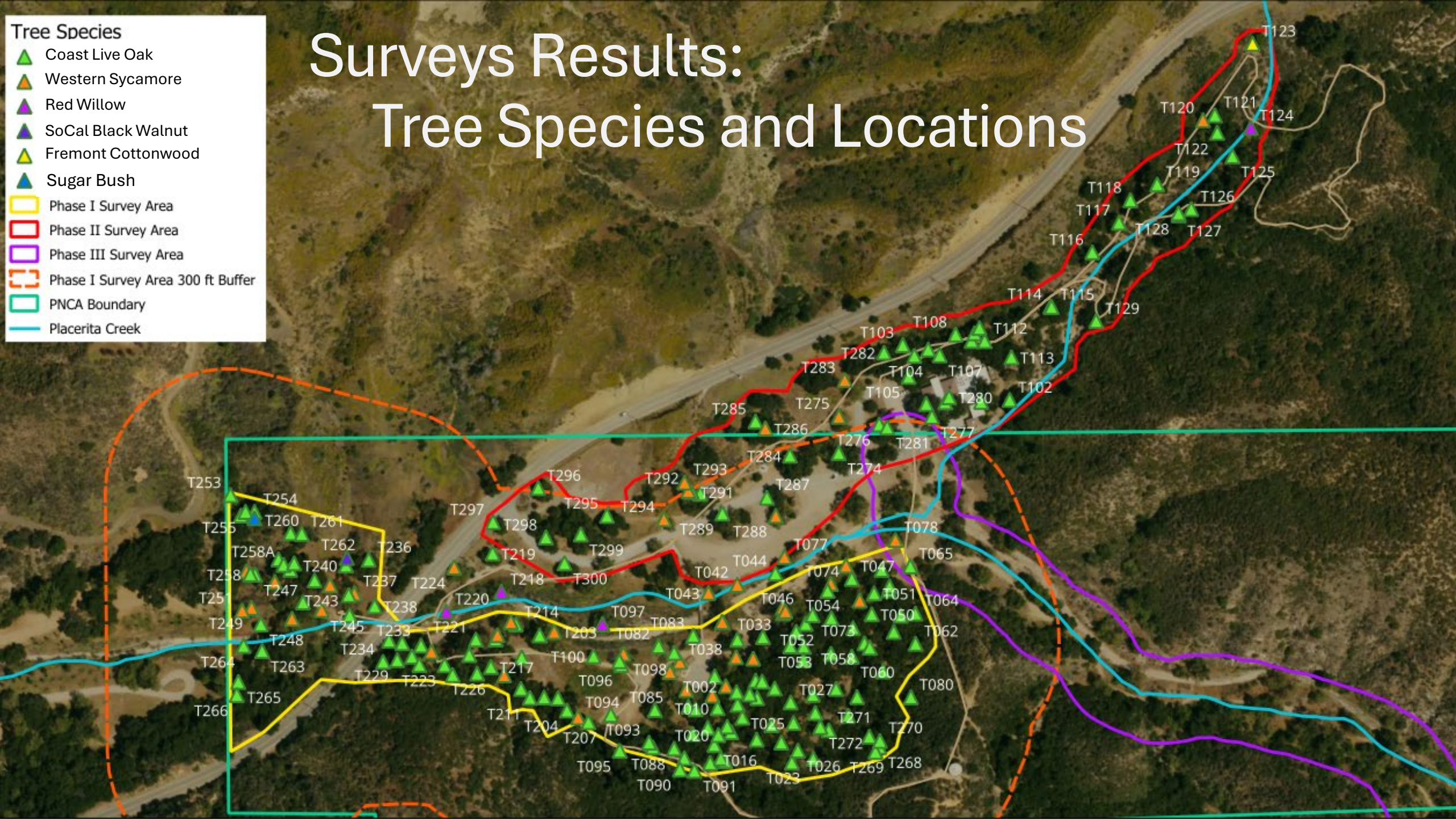


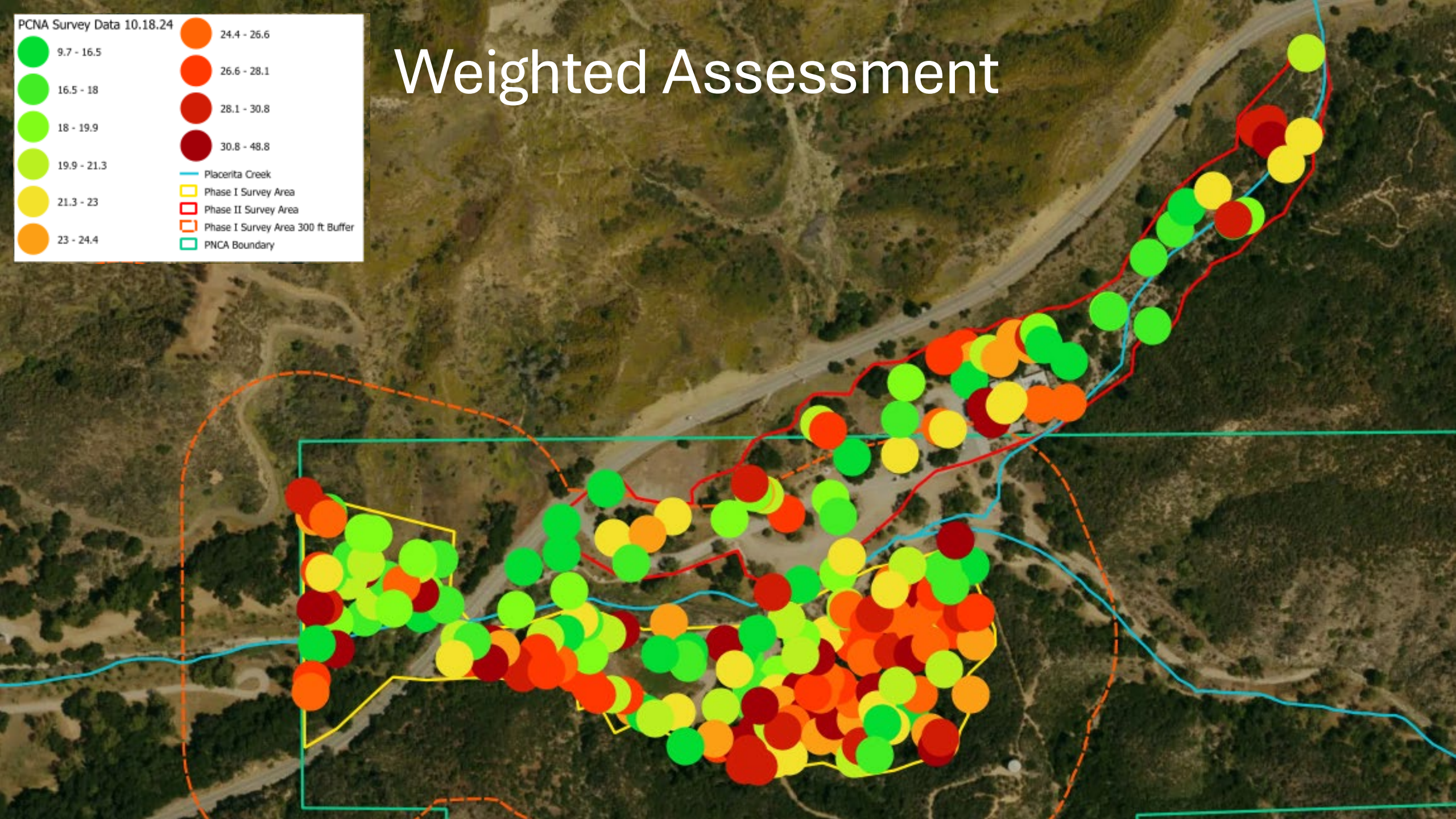

# Caring for Trees at Placerita Canyon

- Why We Monitor Tree Health
  - Trees are long-lived and slow to recover from stress
  - Drought, fire, pests, and soil conditions affect tree stability and survival
- What We're Doing
  - Conducting tree health and condition surveys
  - Documenting stress, damage, and recovery
  - Using data to guide long-term management and safety decisions
- Key Takeaway
  - Monitoring tree health helps protect both the ecosystem and visitors

# Surveys Results:
# Tree Species and Locations



# Weighted Assessment



# Goldspotted Oak Borer at Placerita Canyon

- What Is GSOB?
  - An invasive beetle that attacks oak trees
  - Causes canopy thinning, branch dieback, and eventual mortality
- Why It Matters
  - Oaks are a keystone species in Placerita Canyon
  - GSOB adds stress to trees already impacted by drought and fire
- Our Approach
  - Monitoring oak health and beetle activity
  - Coordinating with forestry and pest management specialists
  - Using data-driven, site-specific management strategies
- Key Takeaway
  - Early detection and monitoring are critical for protecting oak woodlands

University *of* California Corporative Extension

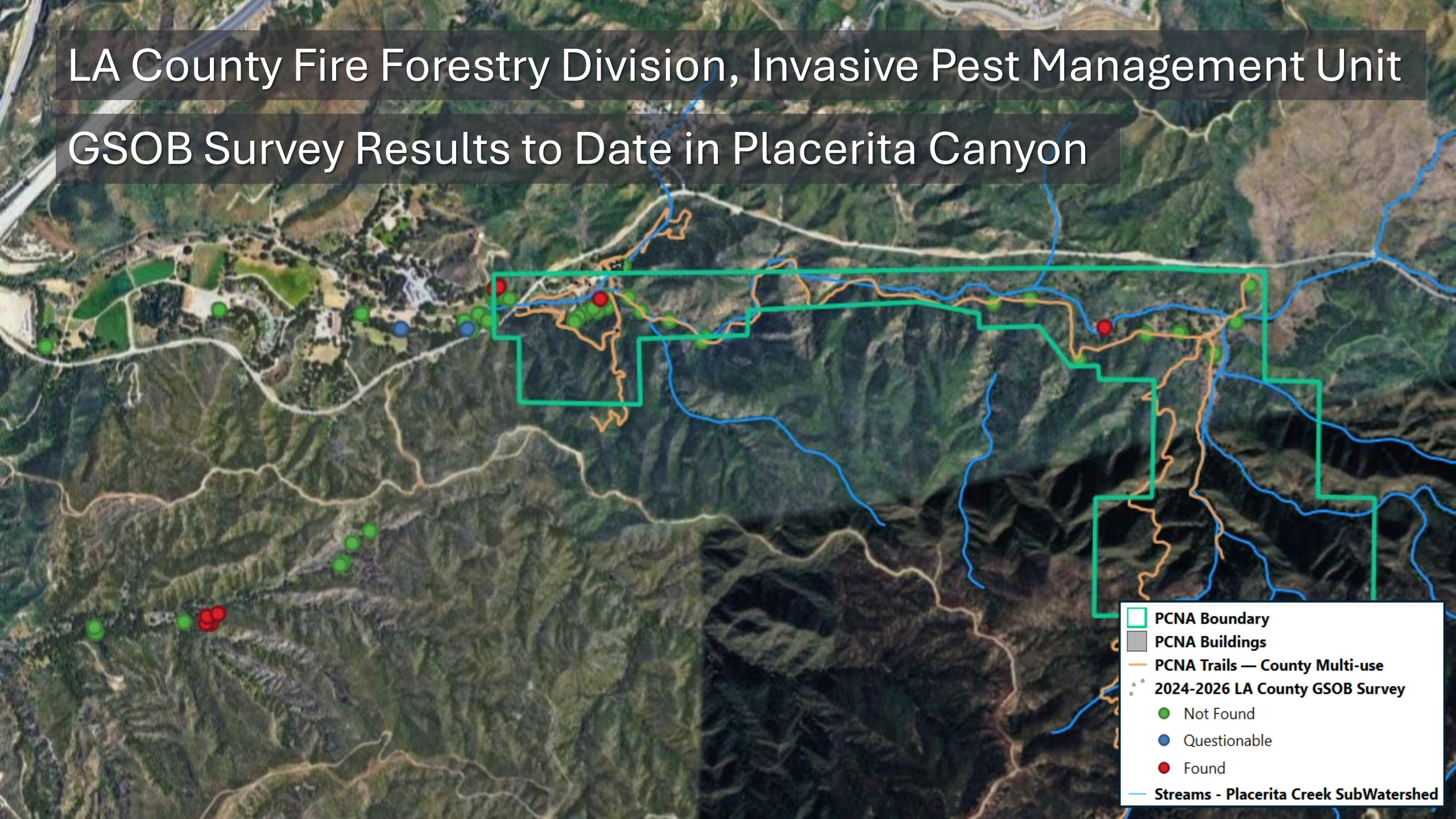
Goldspotted Oak Borer

GSOB.org

UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

# LA County Fire Forestry Division, Invasive Pest Management Unit

## GSOB Survey Results to Date in Placerita Canyon



# Why All This Matters for Docents

- Build Confidence
  - Understand how Placerita's plant communities function
  - Recognize how native plants support wildlife and ecosystem health
- Enhance Visitor Experiences
  - Use plant stories to connect visitors to place
  - Help visitors notice seasonal and ecological change
- Support Conservation Awareness
  - Explain why native plants matter and how invasives alter ecosystems
  - Encourage simple stewardship actions, like staying on trails
- Practical Skills
  - Confidently identify key native plants and their roles
  - Lead engaging, informed tours rooted in local ecology


Next Step: Heading Outside!

# Let’s Wrap It Up

- Any questions?
- Interested in volunteering or learning more?
- Email me anytime, CMace@parks.lacounty.gov