# Water and energy efficient tree choices !

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# Trees are adapted to their native environment.

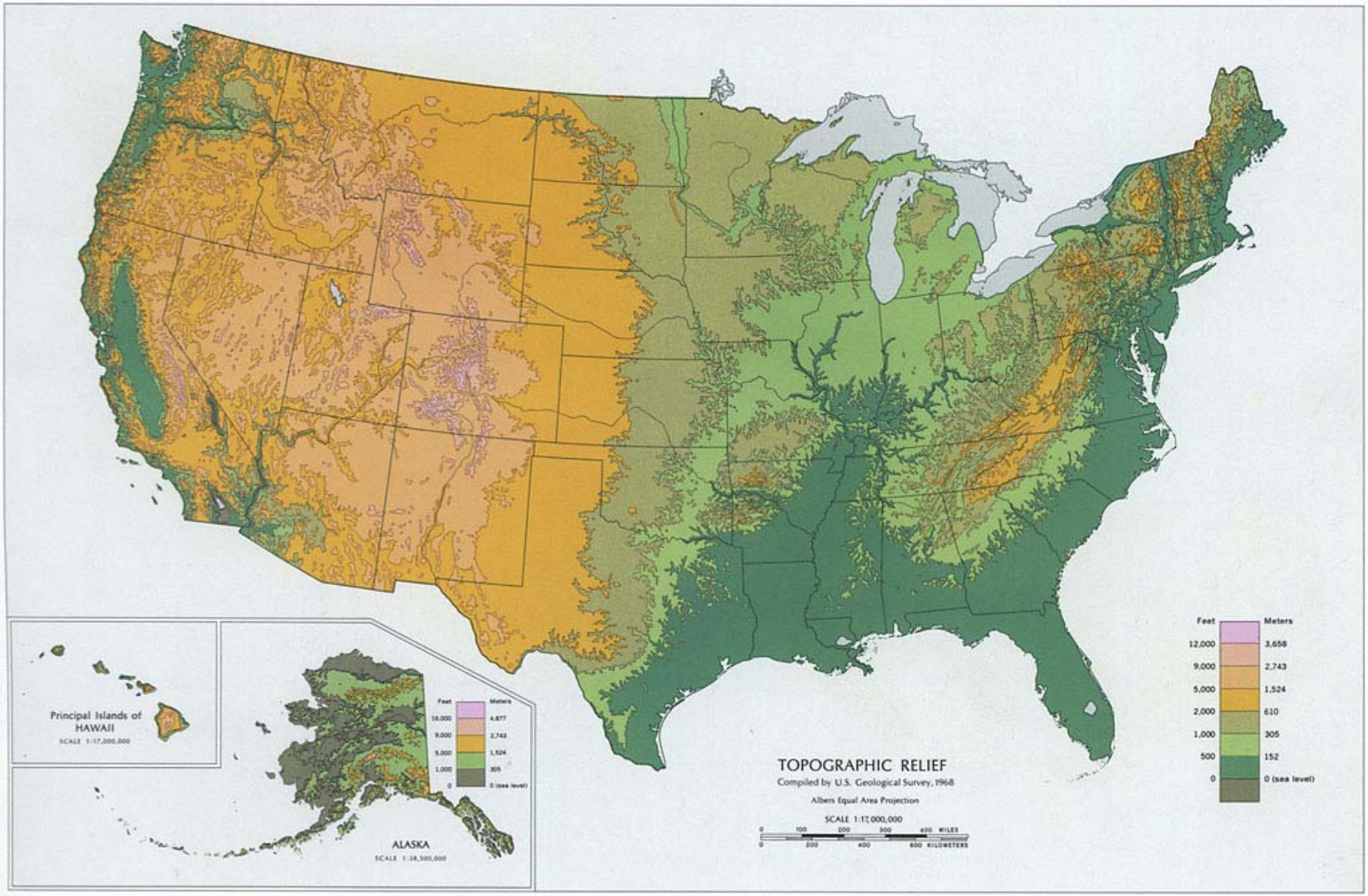
Semi-arid short grass prairie is our dominant indigenous plant community.

In the mountains plant communities change over short distances with changes in elevation, precipitation rates and aspect.

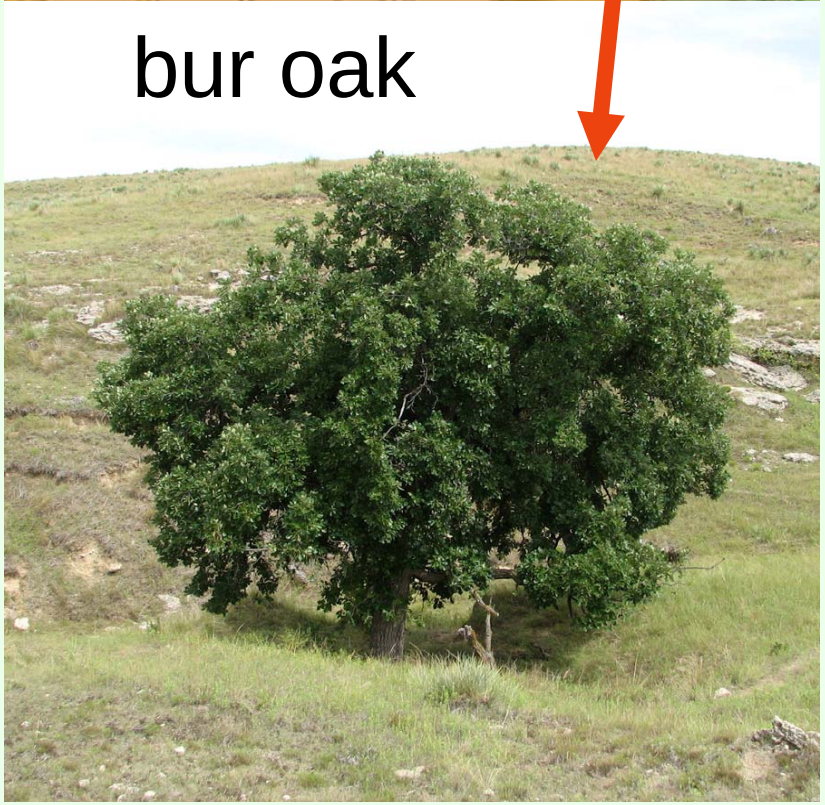
| | Average annual precipitation |
|---|---|
| Fort Collins | 15.20” |
| Monument | 19.41” |
| Estes Park | 17.94” |
| Wolf Creek Pass | 29.84” |
| Manhattan Kansas | 31.92” |

Source: Climate and Man 1941 Yearbook in Agriculture

# Choosing trees adapted to our area



bur oak



hackberry

# Low water use trees

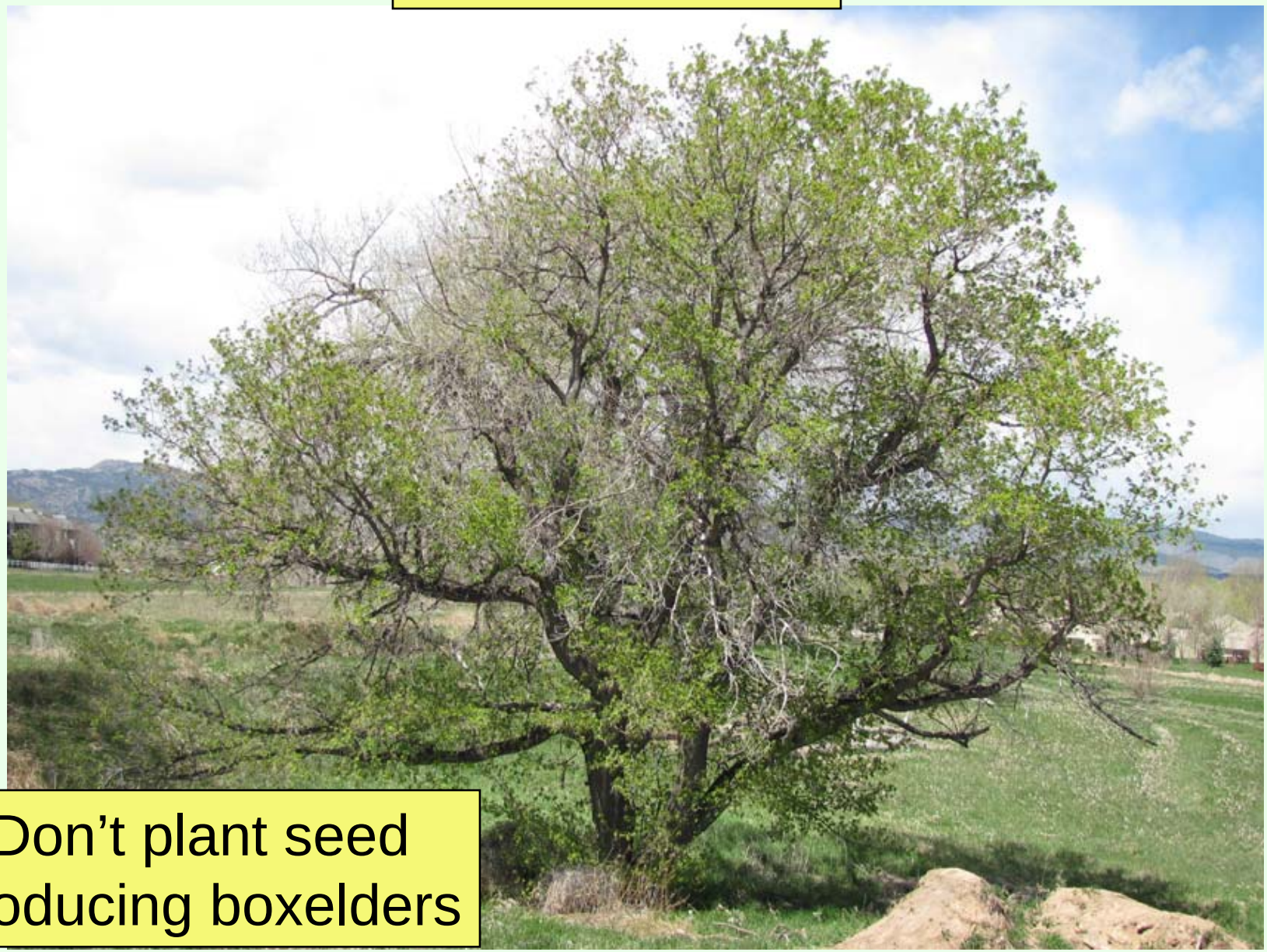
When irrigation is strategically applied the following species can be grown with less than 10 inches of supplemental irrigation per season.


canyon maple

canyon maple

Sensation
boxelder

# boxelder

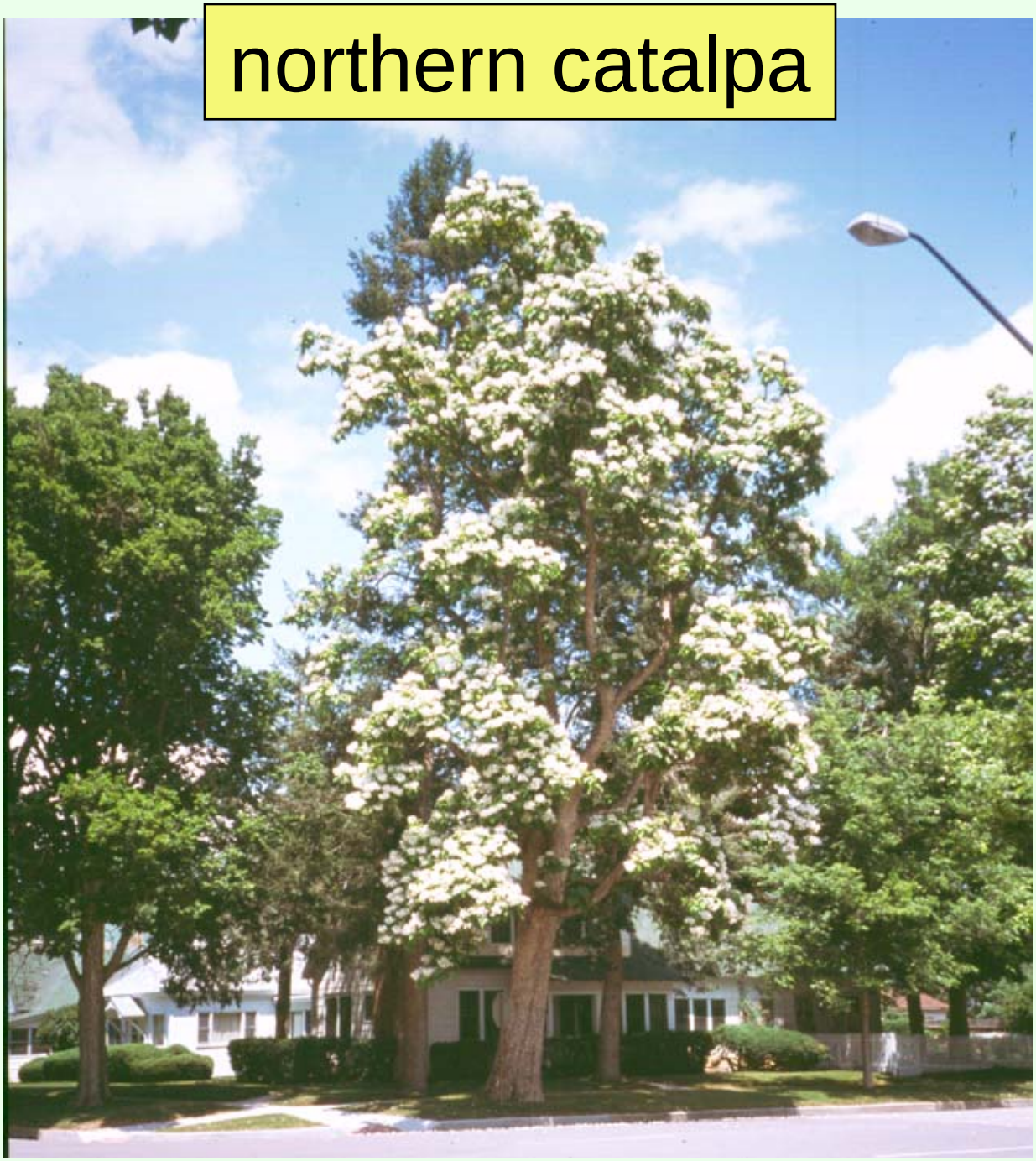


Don’t plant seed producing boxelders

# boxelder

Don’t plant seed producing boxelders

# northern catalpa



# northern catalpa

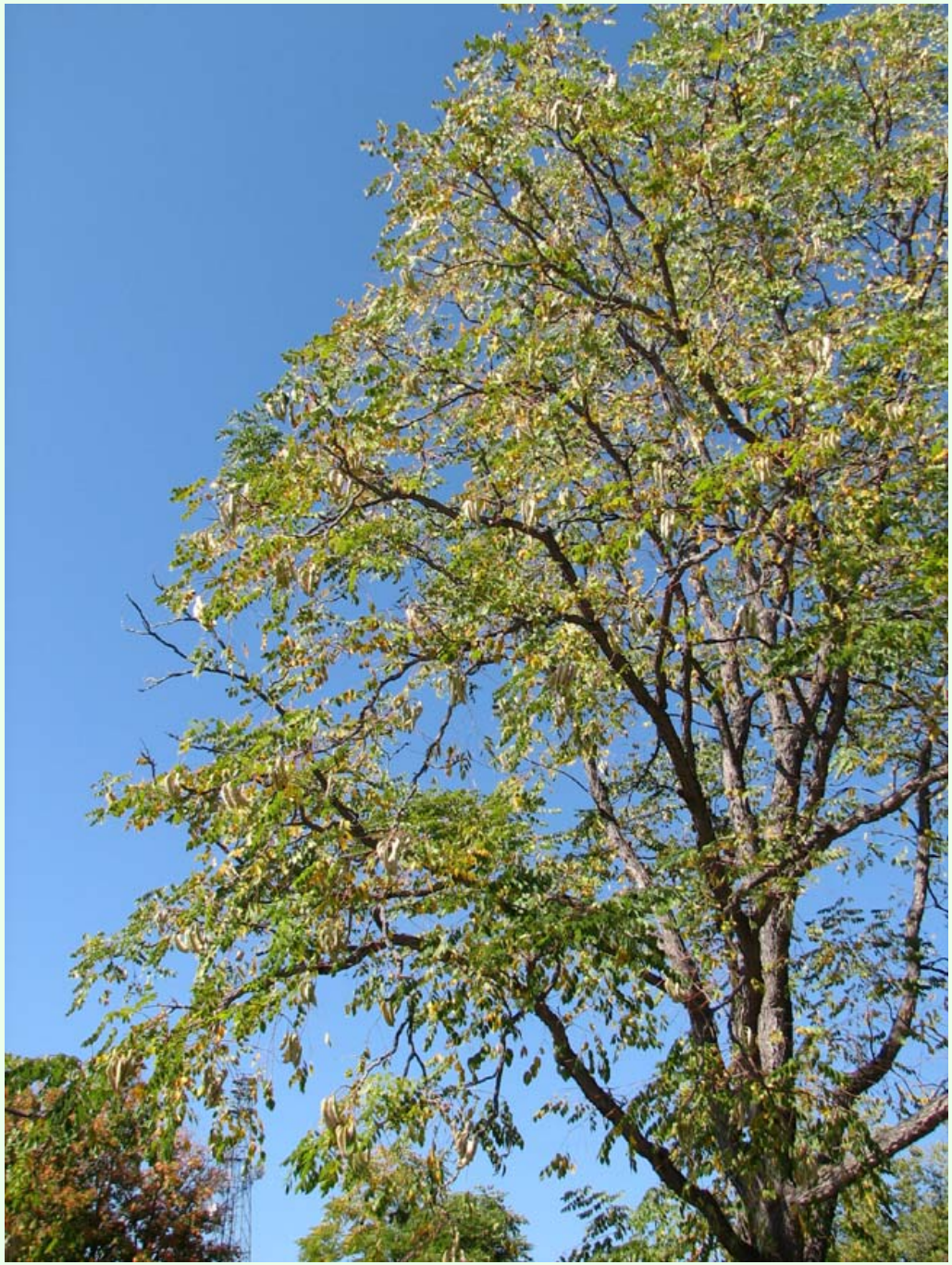
# Russian hawthorn

# Russian hawthorn

# honeylocust

honeylocust

# Kentucky coffeetree



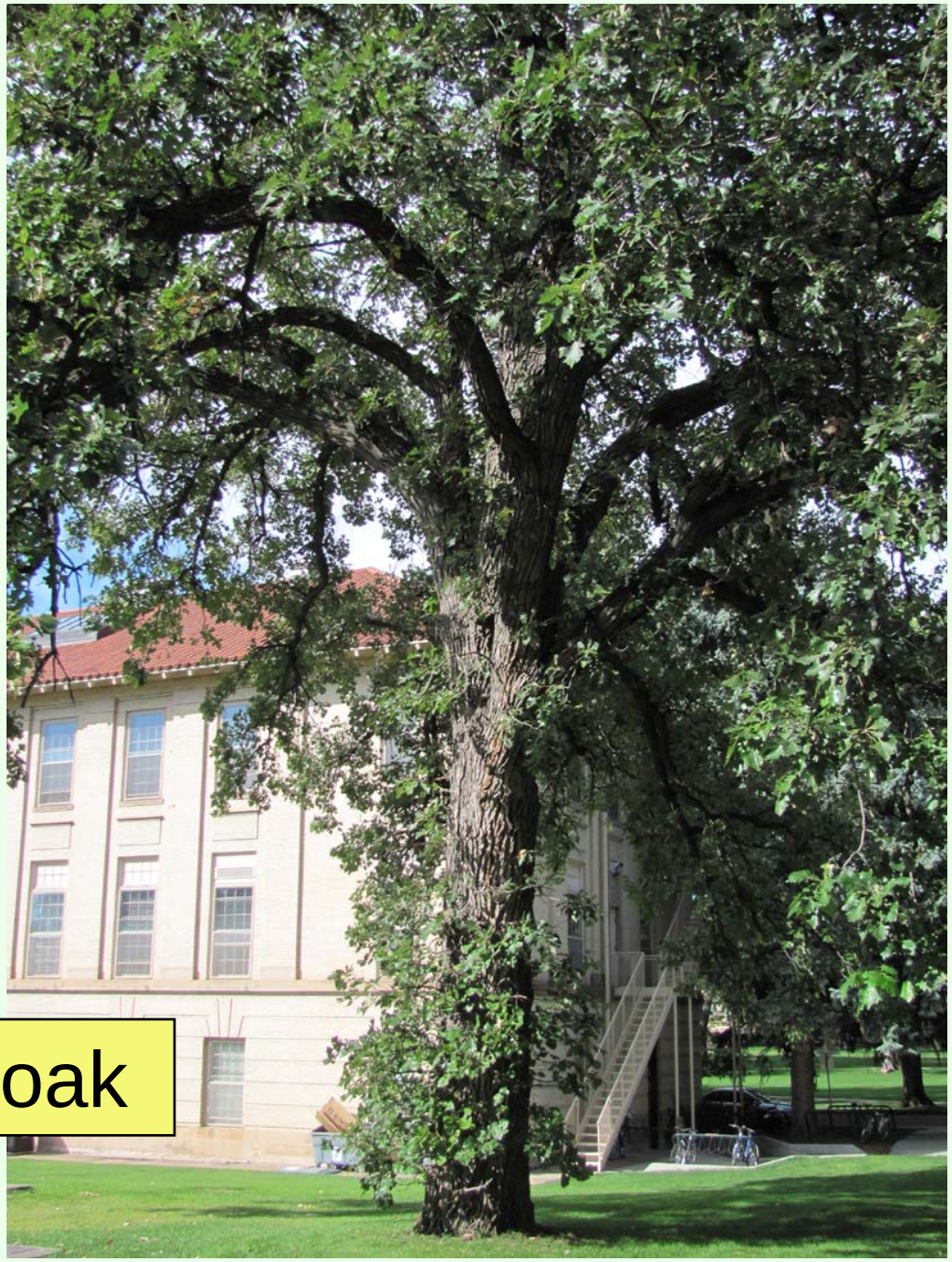
Kentucky coffeetree

# Kentucky coffeetree

# American plum

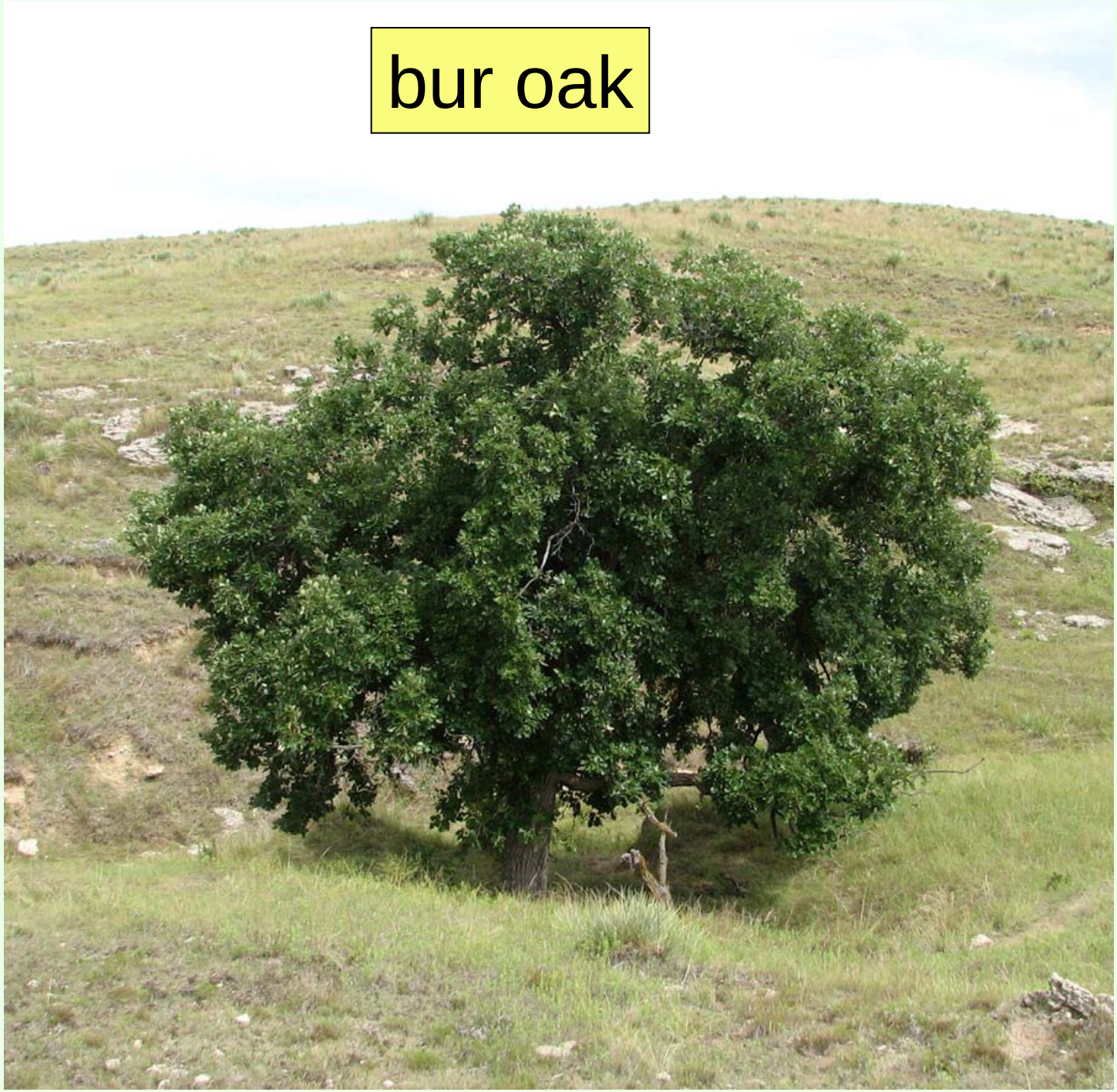
American plum

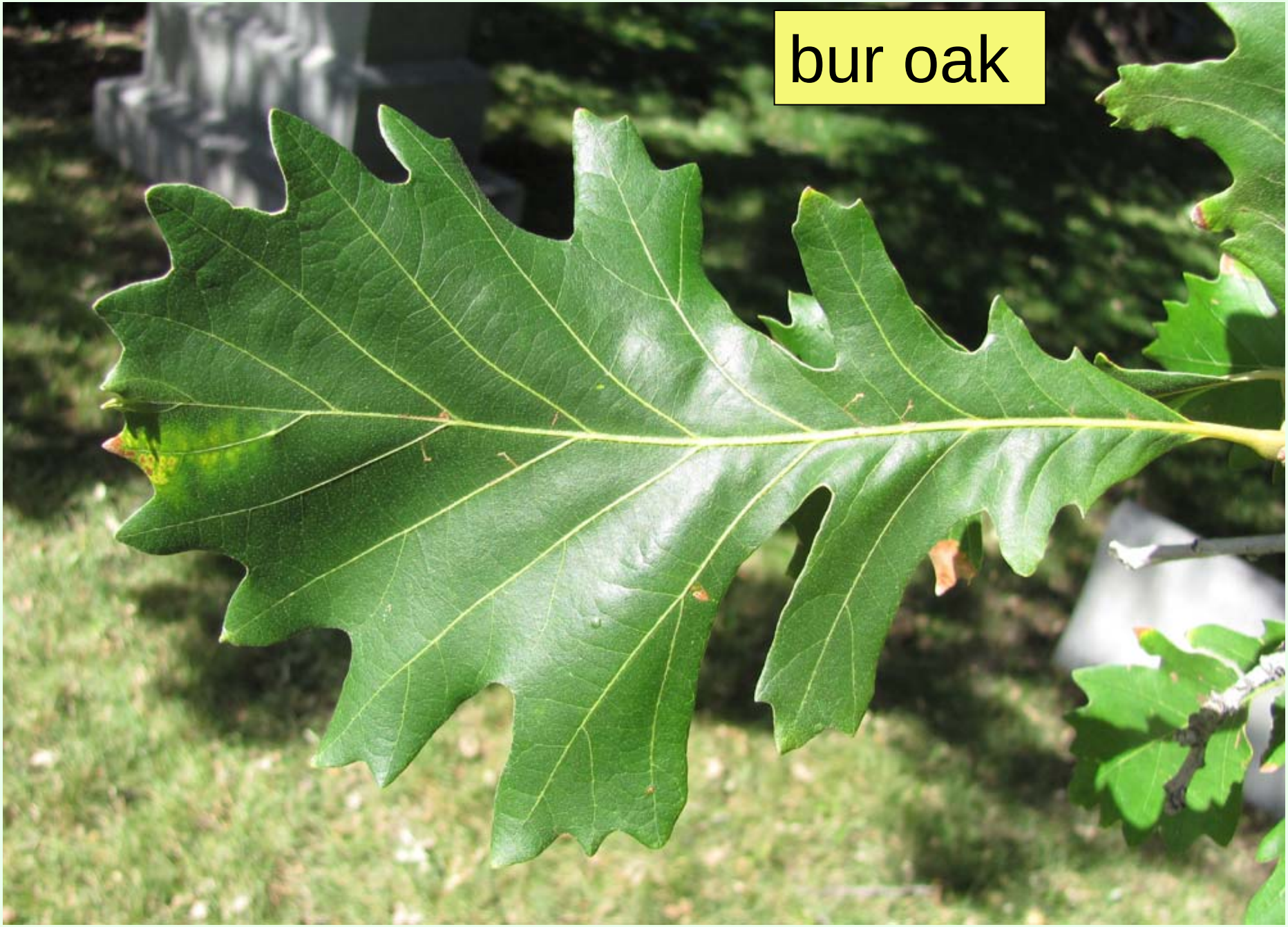

bur oak



bur oak

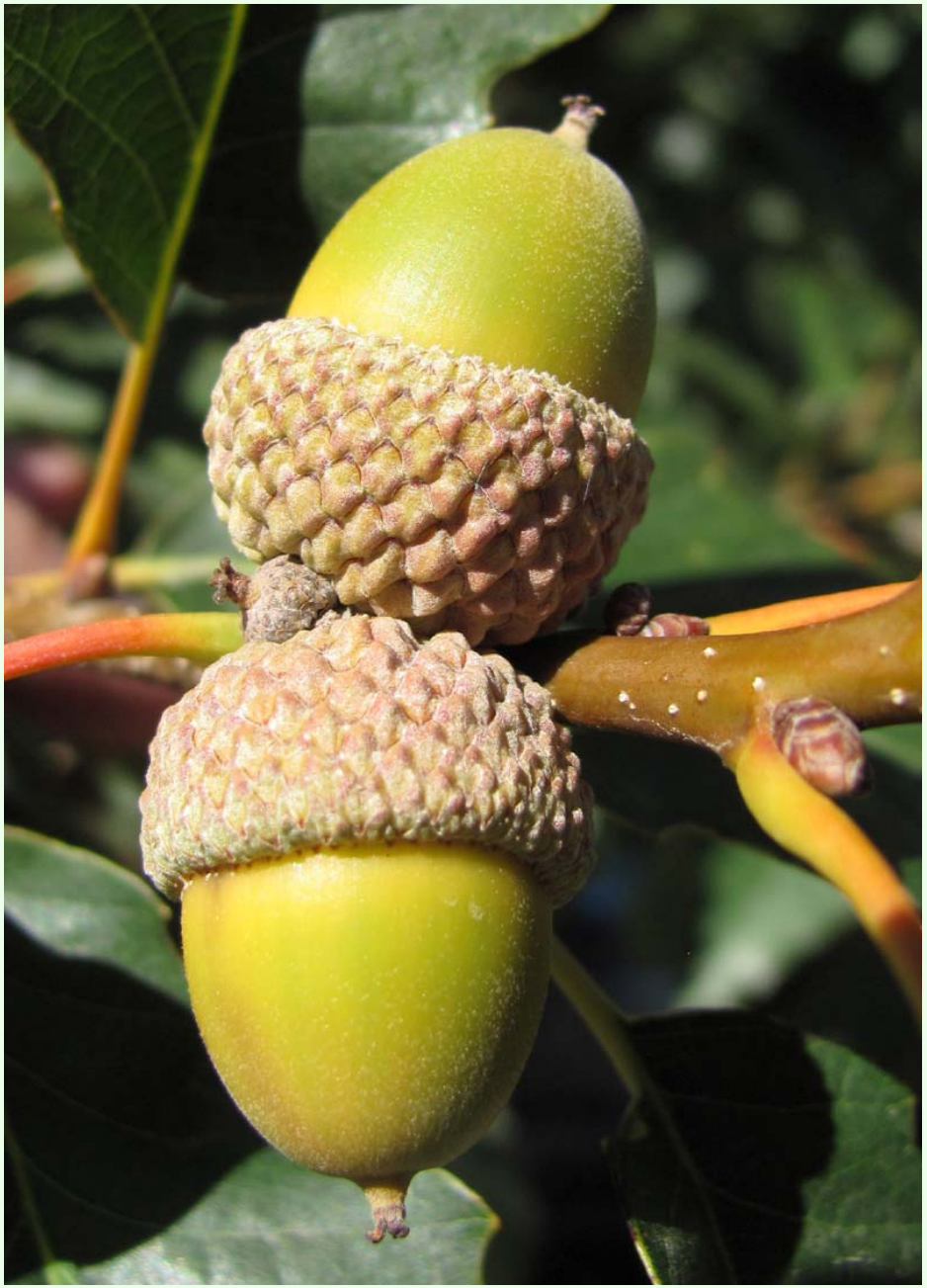
# bur oak




bur oak

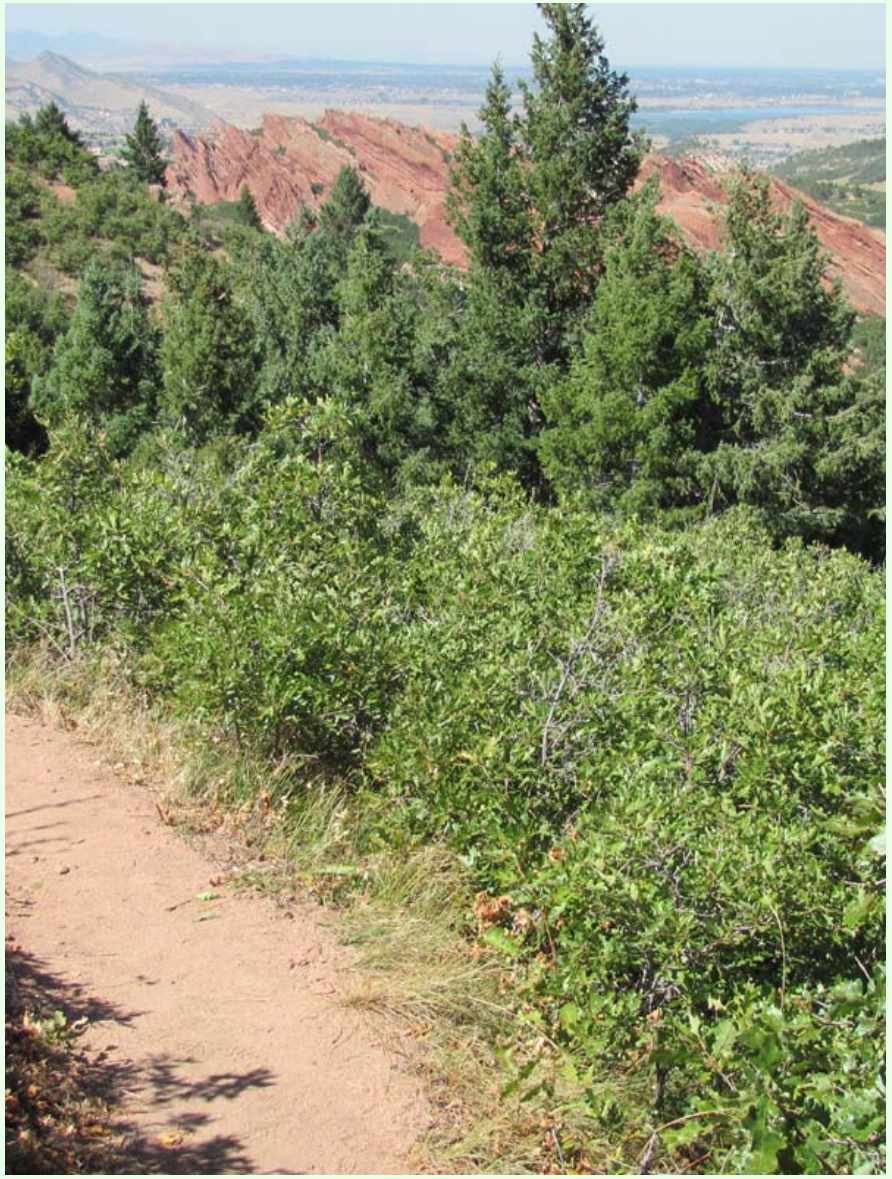
chinquapin oak


chinquapin oak

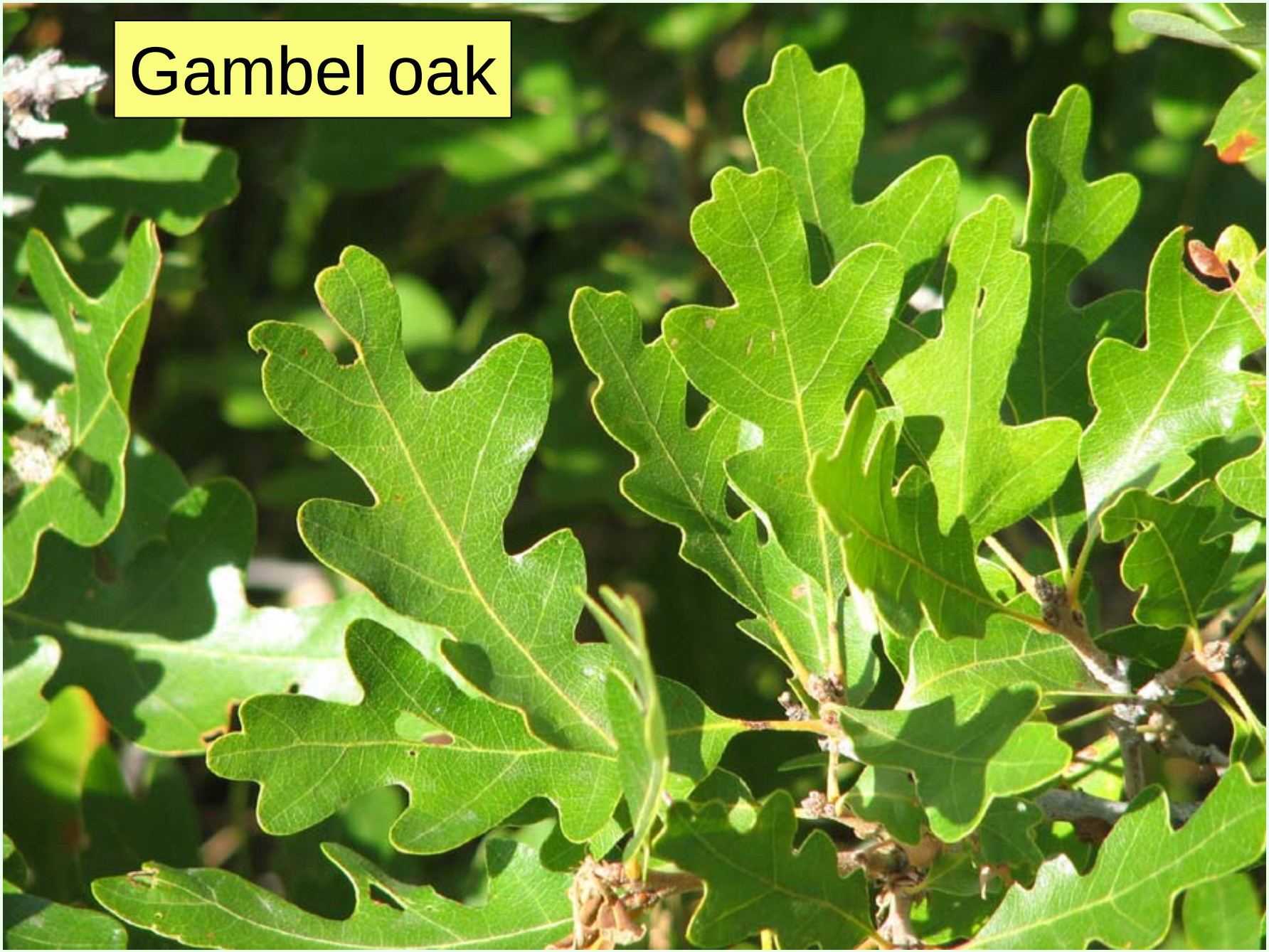


chinquapin oak

# Gambel oak




Gambel oak


Gambel oak

one-seed juniper

Utah juniper

Utah Juniper

one-seed Juniper

# Rocky Mountain juniper


Rocky Mountain juniper

# bristlecone pine

# bristlecone pine

# pinyon pine

pinyon pine

limber pine

# limber pine

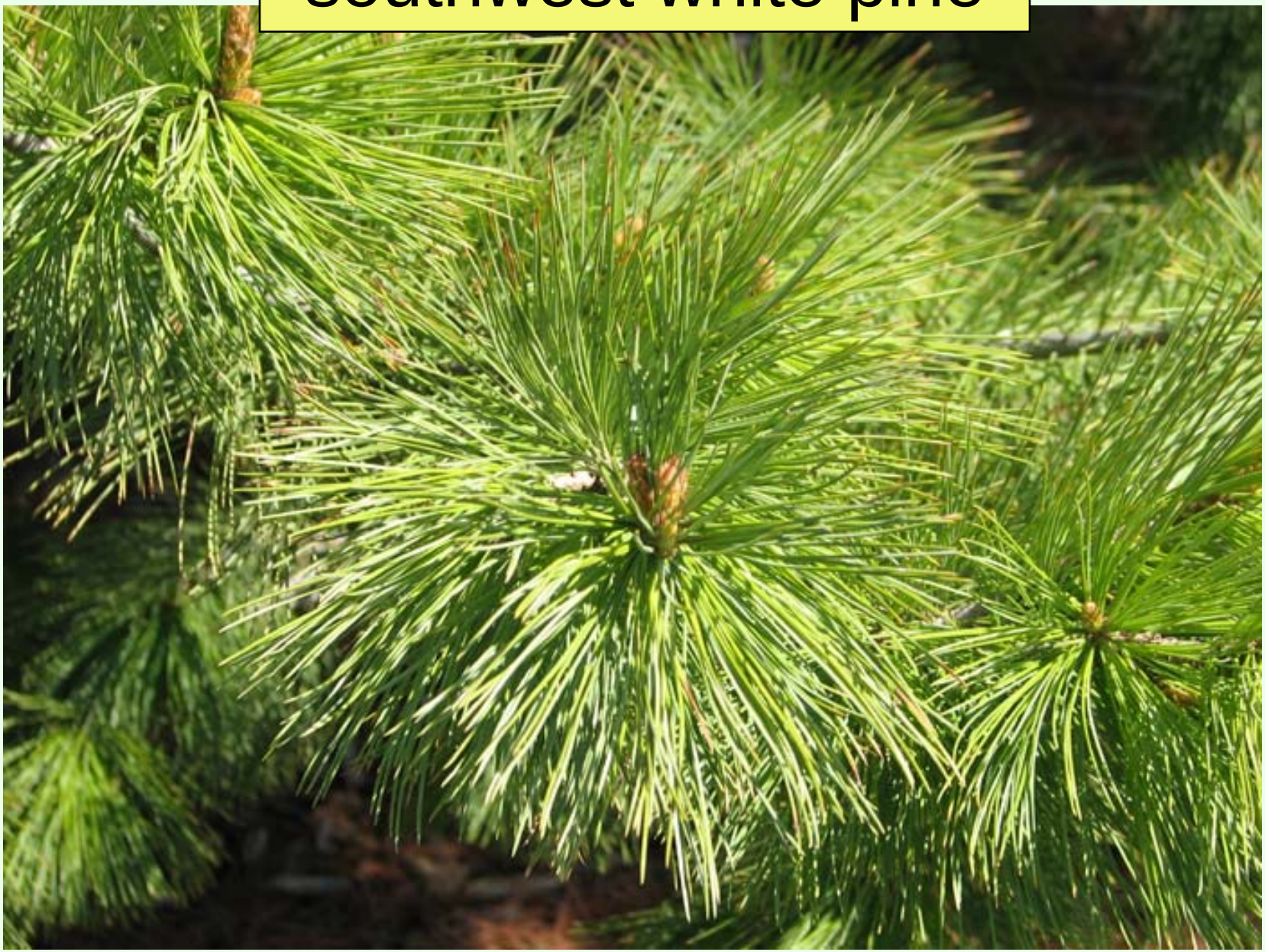
# ponderosa pine

# ponderosa pine

ponderosa pine

# southwest white pine

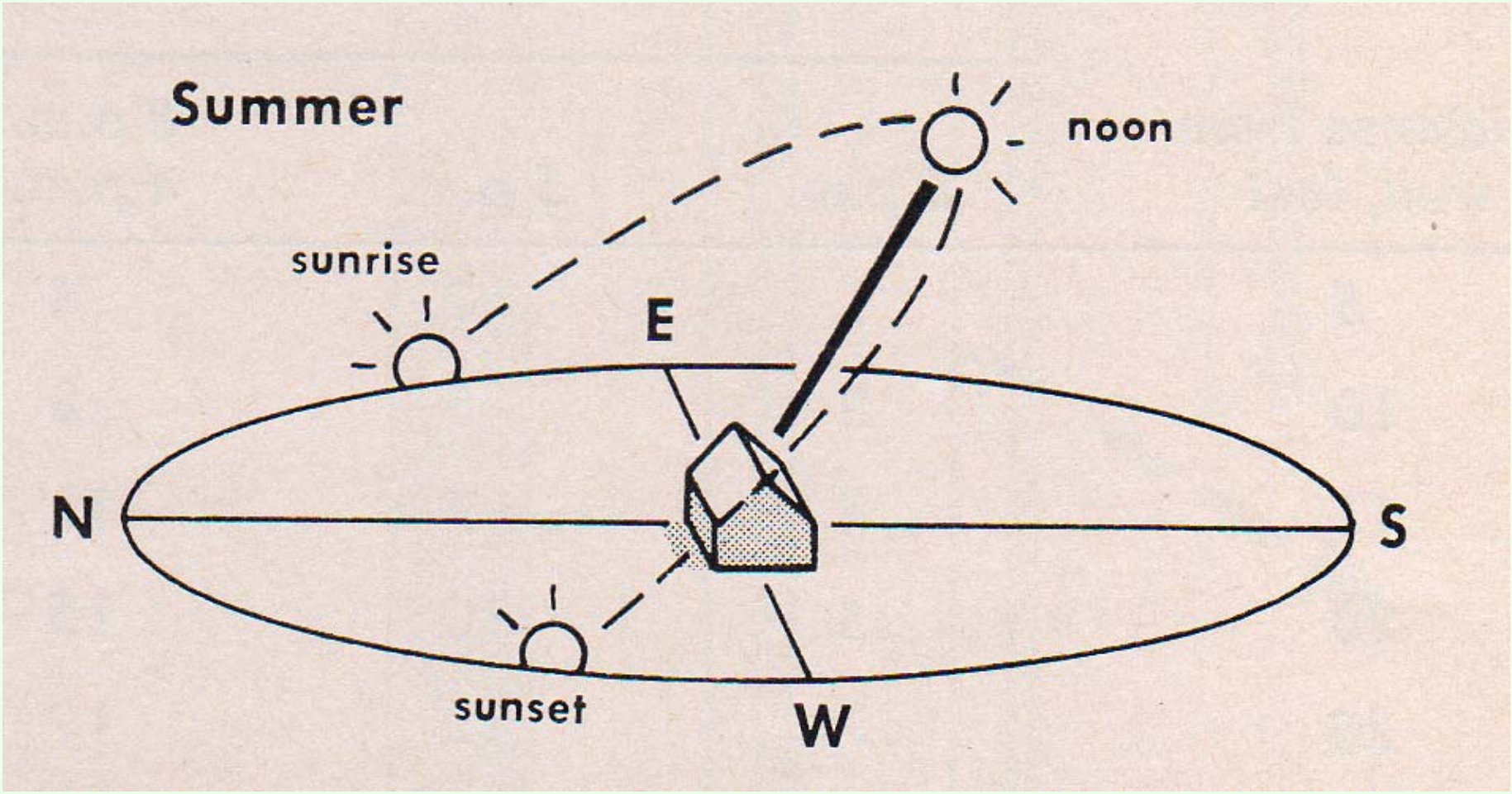
# southwest white pine



# Maximizing energy savings from shading
# Where should trees be planted?

**West** is best

# Summer sun primarily radiates the east and west walls.




Designing and Energy-Efficient Home Landscape, Circular 1178 by William R. Nelson
University of Illinois at Urbana-Champaign, August 1980

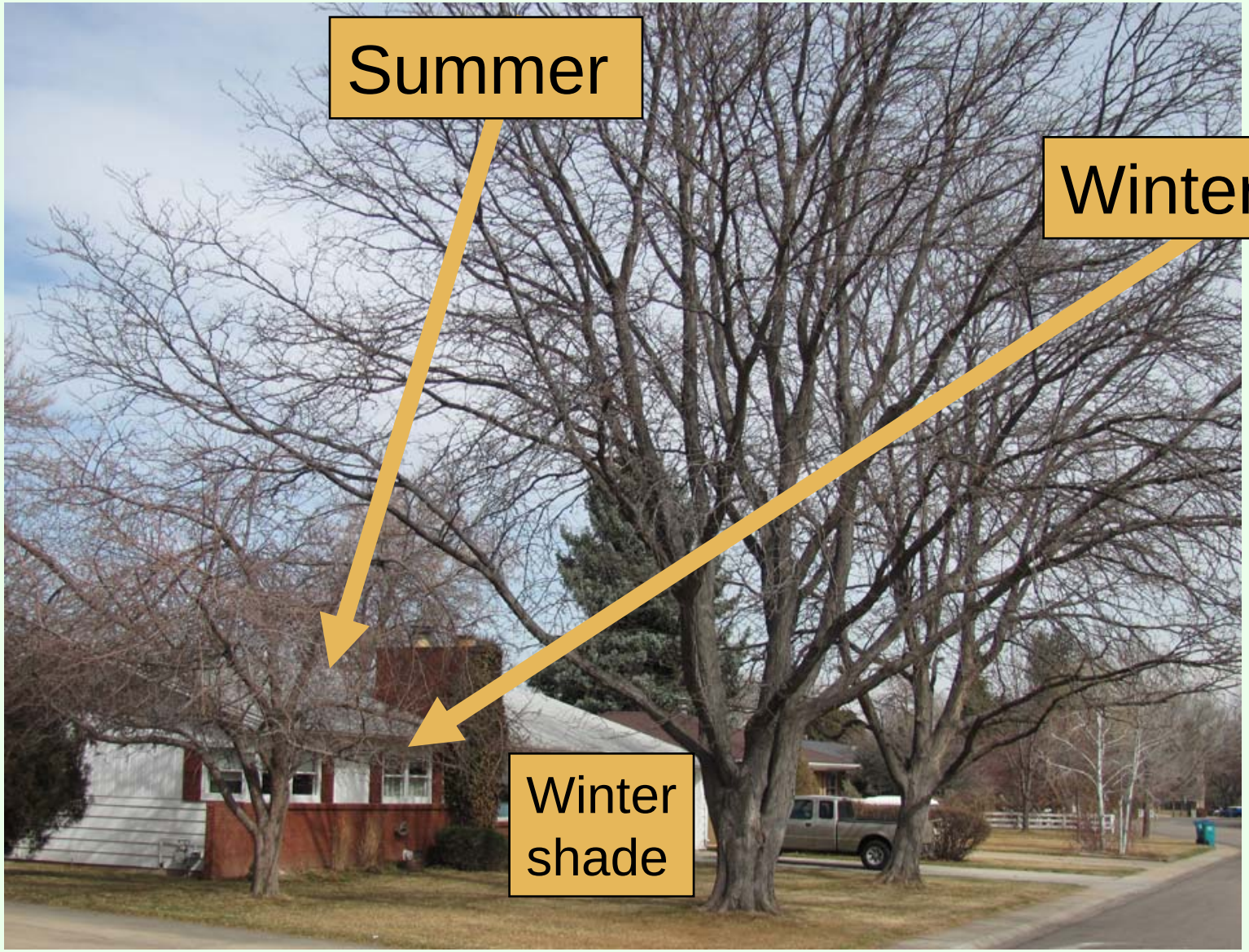
Electricity use can be high during the afternoon when temperatures are warmest and incoming sunshine is greatest.

Position trees to shade as much of the roof and walls from west sun in summer as possible.

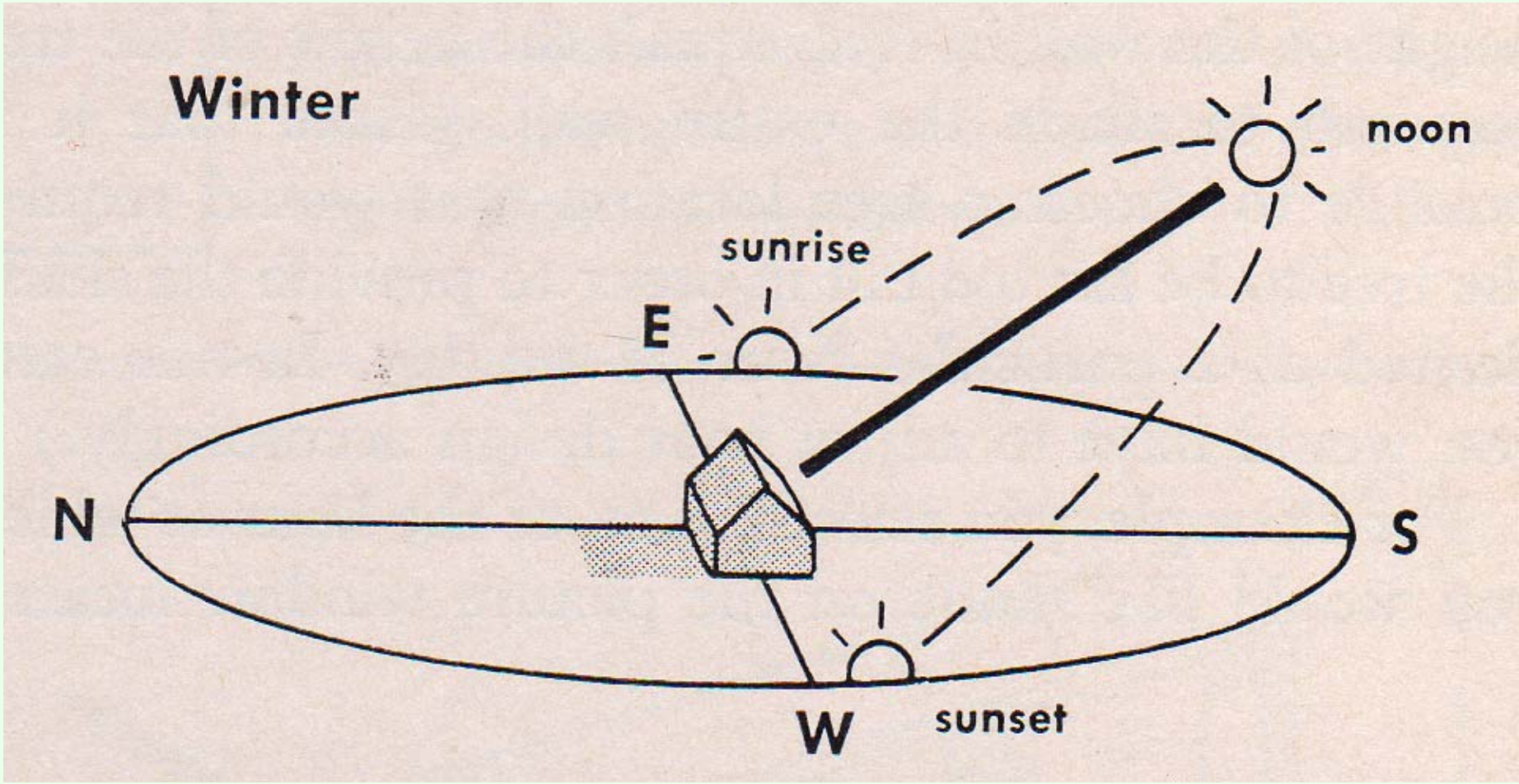
# East is second best

Trees planted on the east side of homes can shade windows and the roof in the morning hours.

# Trees located to shade south walls can block winter sunshine and increase winter heating costs



# The low-angle winter sun primarily radiates the south wall.

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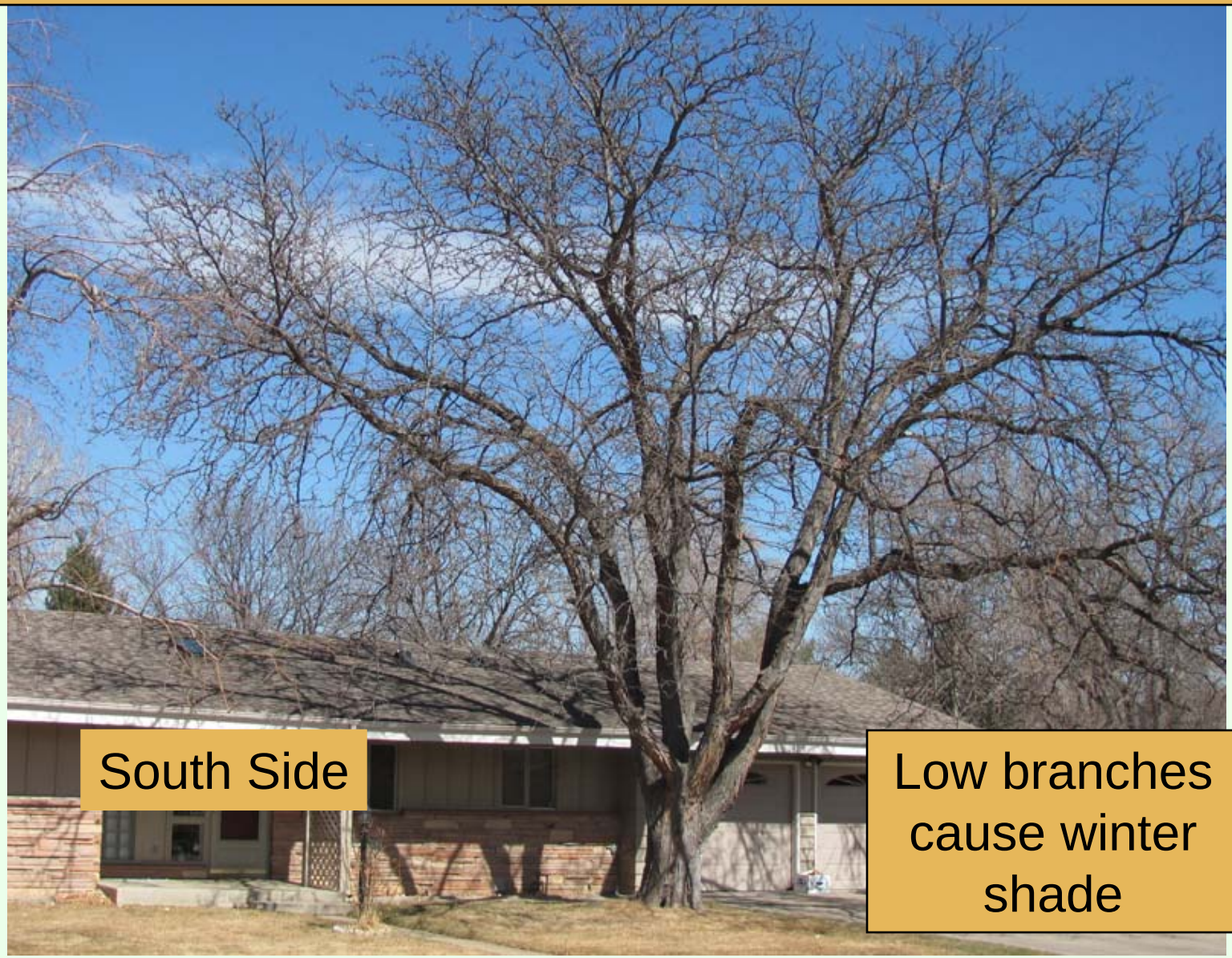
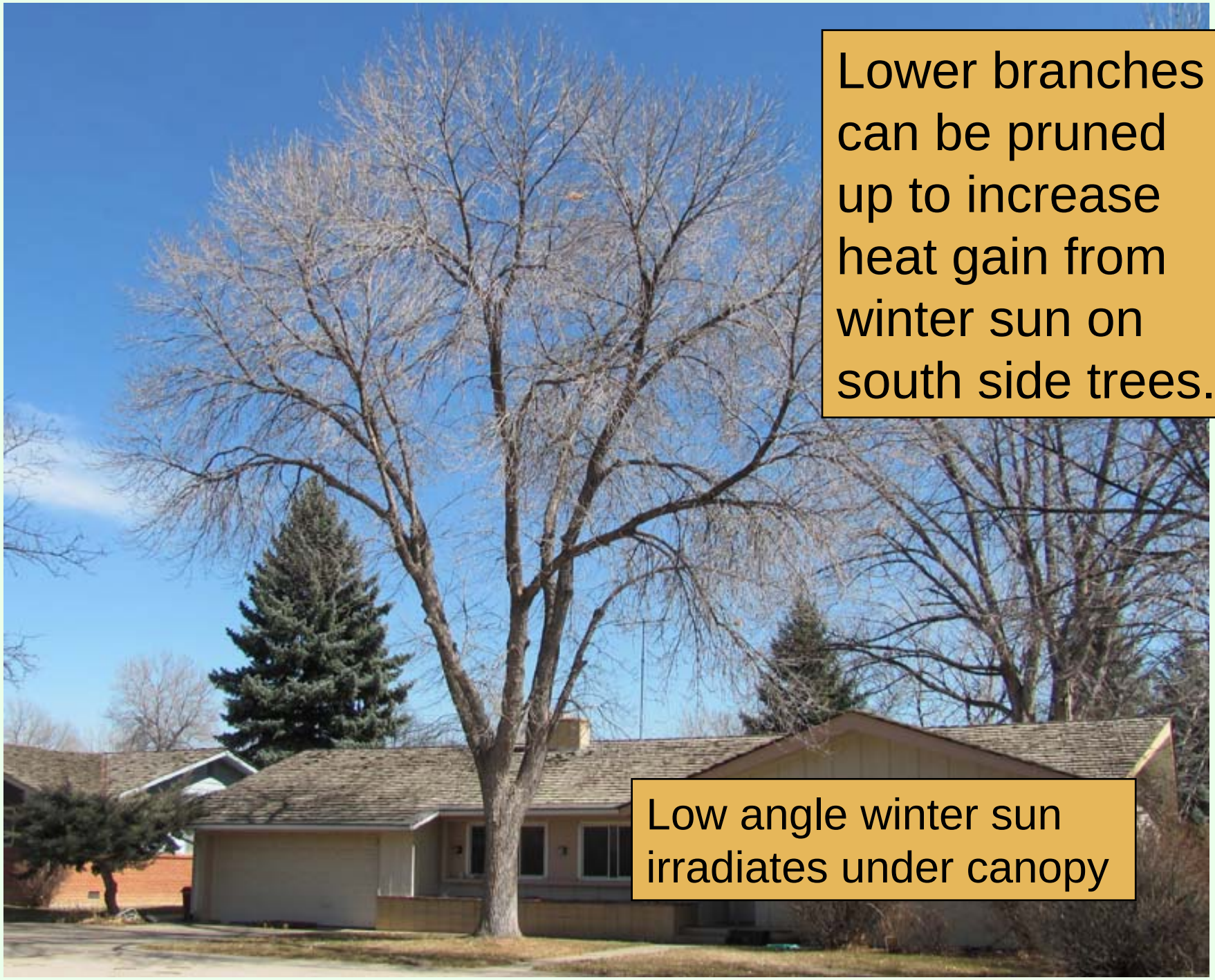
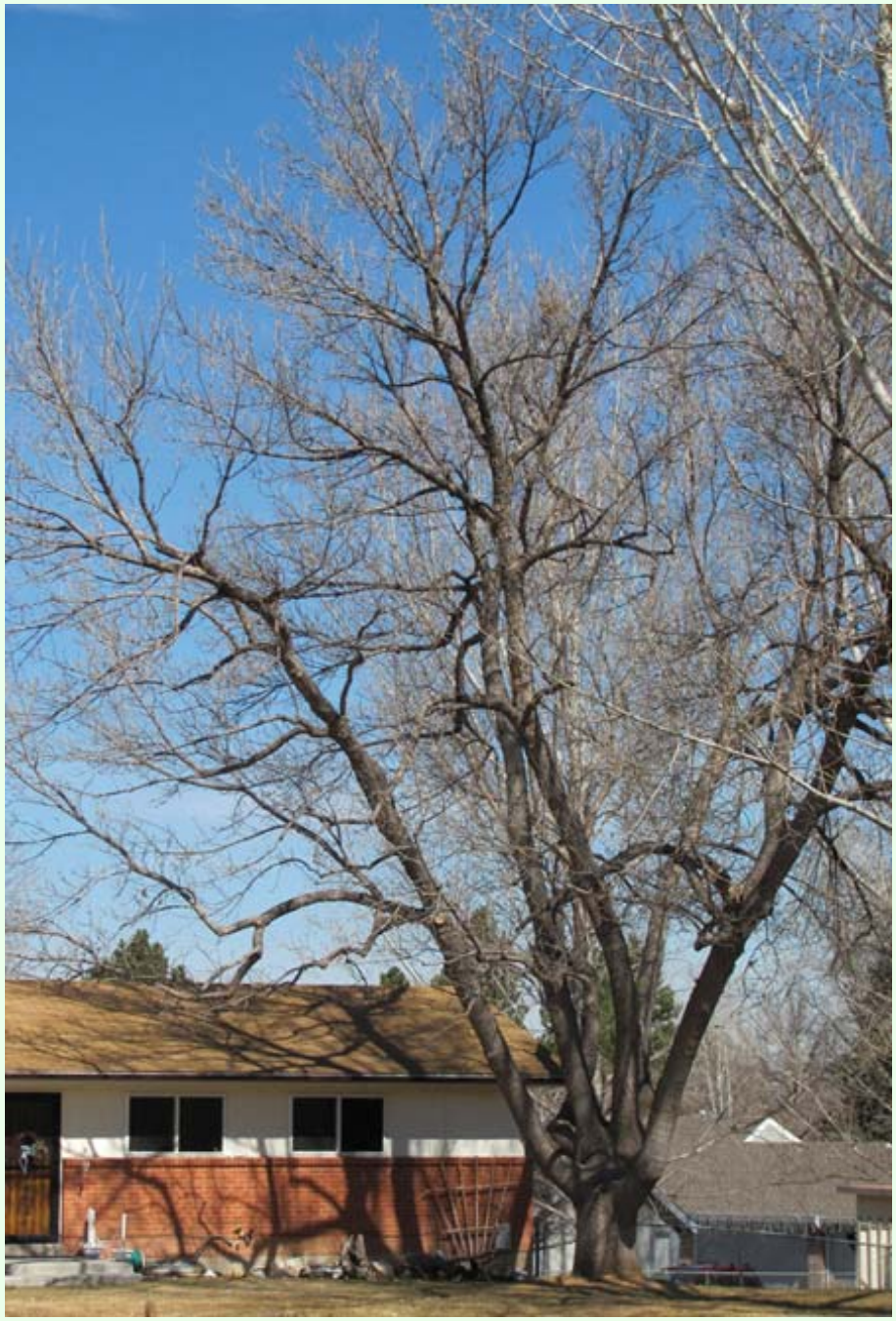
To maximize summer shade and minimize winter shade locate trees about 10-20 feet from the home




Lower branches can be pruned up to increase heat gain from winter sun on south side trees.
Low angle winter sun irradiates under canopy

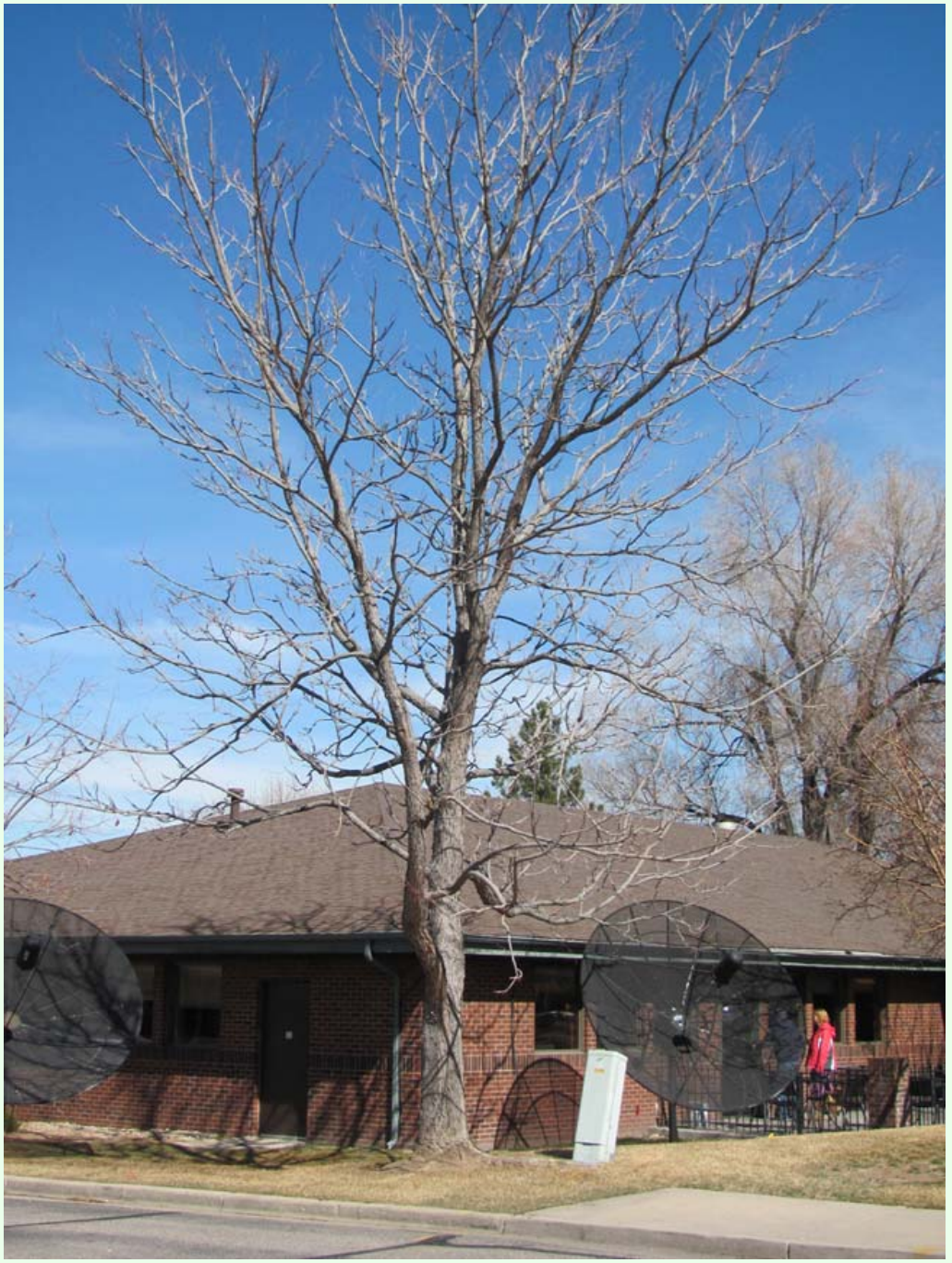
Use solar friendly trees to the south because the bare branches of these deciduous trees allow most sun-light to strike the building.



Some solar unfriendly deciduous trees can reduce sunlight striking the south side of a building by 50%.

# Solar Friendly Trees

- ash
- maple
- catalpa
- Kentucky coffeetree



# Pruning can improve solar performance

Often with taller homes trees need to be at least 15-20 feet from the house to reduce conflicts

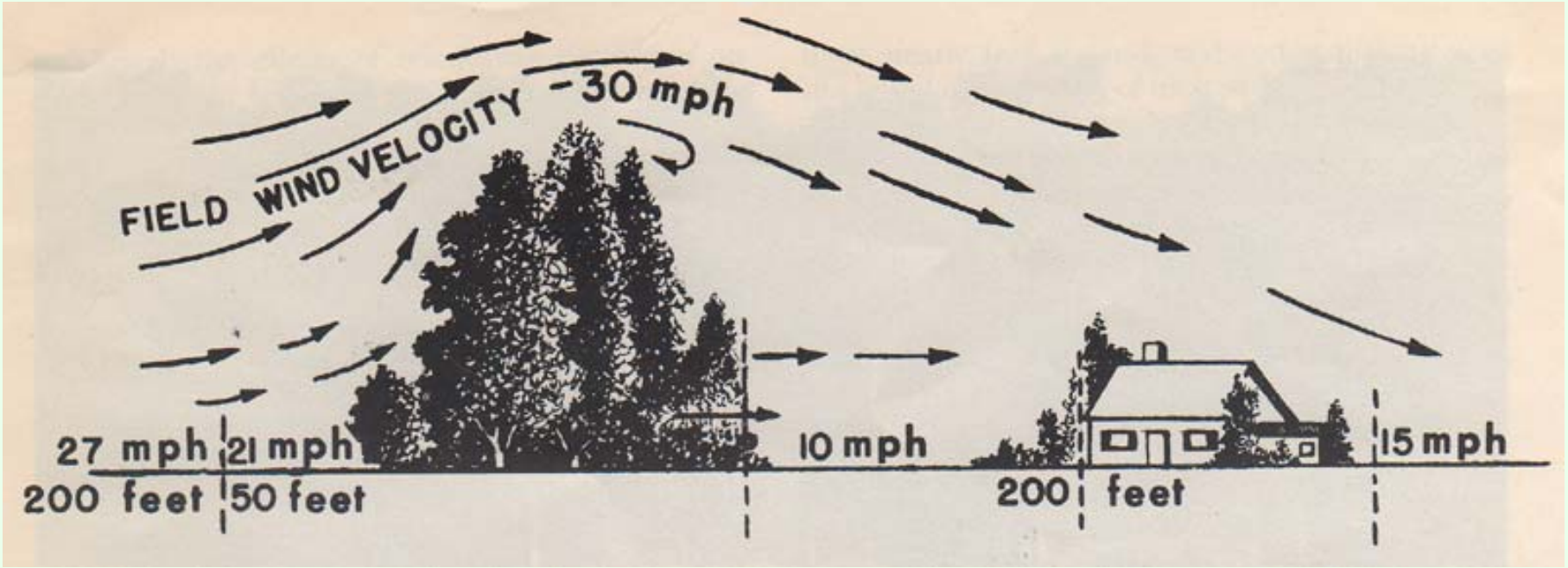
Evergreen trees can provide some benefit on east and west exposures, but are of much less value on the south side of homes.

Trees located to shade parked cars reduce vapors from fuel and oil.

# Planting trees to reduce wind speed

The Farmstead Windbreak – Colorado State Forest Service 1980

# Leeward wind speed is reduced




Windbreaks for Conservation
U.S. Department of Agriculture Soil Conservation Service
Agriculture Information Bulletin 339 October 1969


Leeward distance of wind protection is proportional to height of barrier
Wind velocity is 40% of open at 4 H

Solid screen of juniper planted in 1976

# Multiple rows of trees and shrubs can be planted to increase density and provide habitat

# Living snow fence

# Selecting trees to plant near solar panels


serviceberry

# thornless cockspur hawthorn

Coralburst crabapple

# Japanese tree lilac

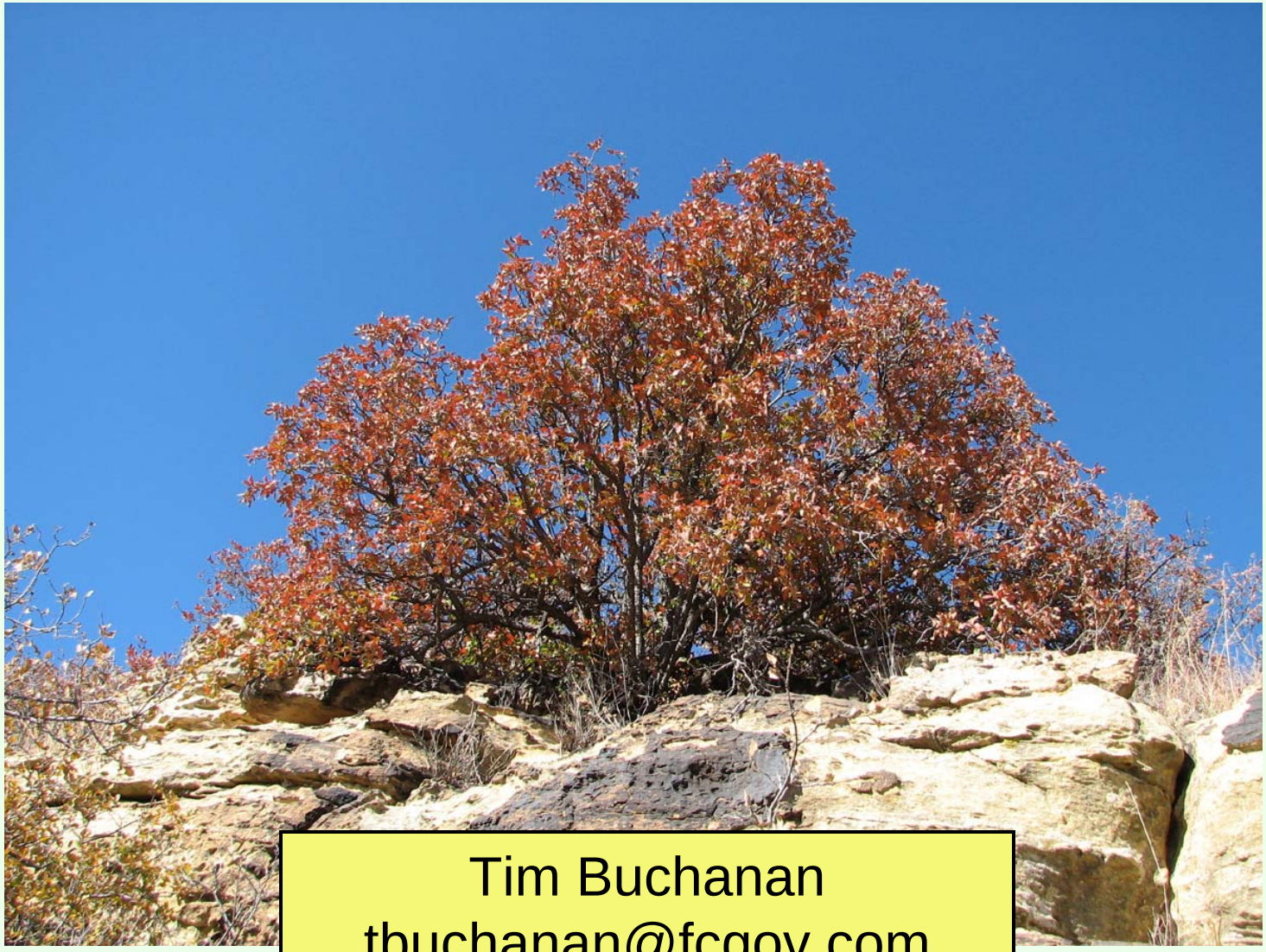
Volunteers are needed to take donated oaks!

shrub live oak

shrub live oak


shrub live
oak

# Questions ?



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