

A satellite image of Earth showing a large hurricane system over the Gulf of Mexico. The Florida peninsula is visible in the lower half of the frame, and the surrounding ocean is dark blue. The hurricane's eye and spiral cloud bands are clearly visible.

Urban Forest Hurricane Recovery Program

<http://treesandhurricanes.ifas.ufl.edu>

Developing a preventive pruning program in your community:

Young trees



Dr. Ed Gilman and Traci Jo Partin

Pruning can reduce damage

A recent study at UF showed that pruning reduces the angle of trunk bend when trees are exposed to high winds.



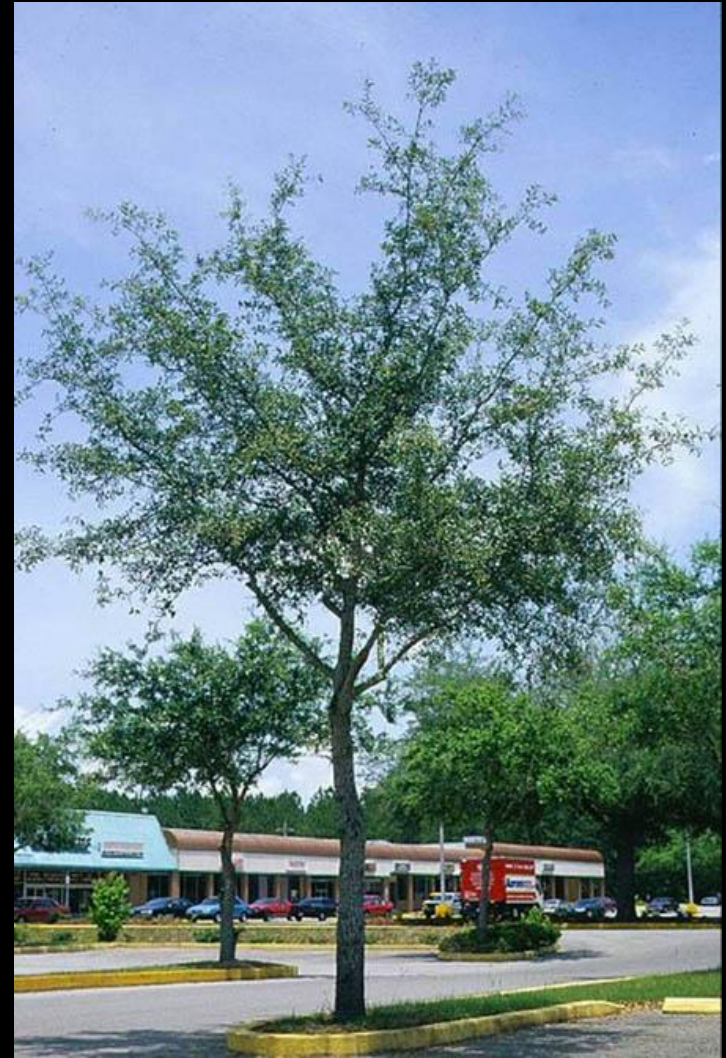
Not pruned



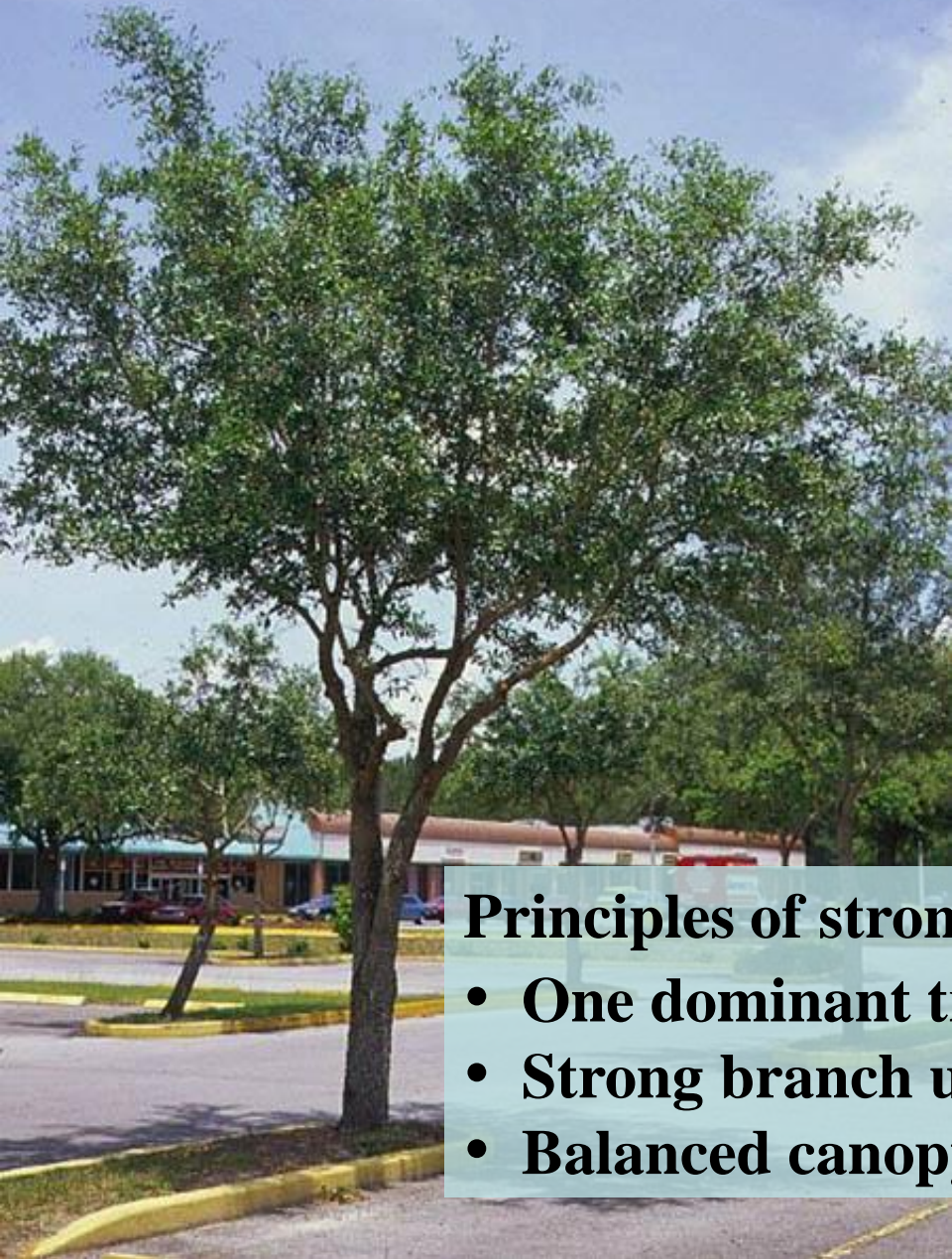
Reduction pruning

Preventive Pruning: **young trees**

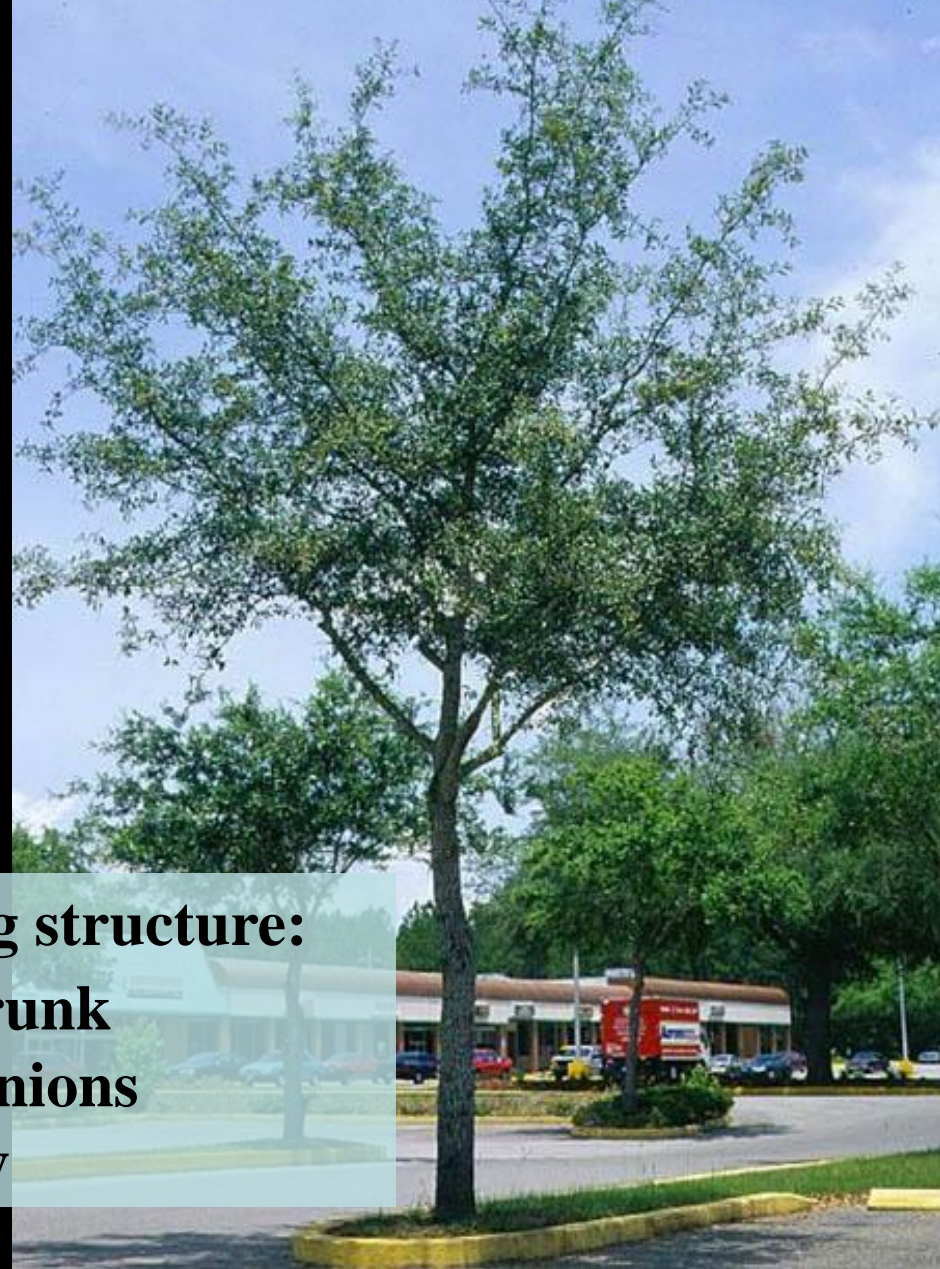
- Set objectives
- Determine pruning cycle and dose
- Execute pruning plan
 - make good cuts
 - prioritize trees with structural issues
 - temporary vs. permanent branch management



Poor form



Good form



Principles of strong structure:

- One dominant trunk
- Strong branch unions
- Balanced canopy

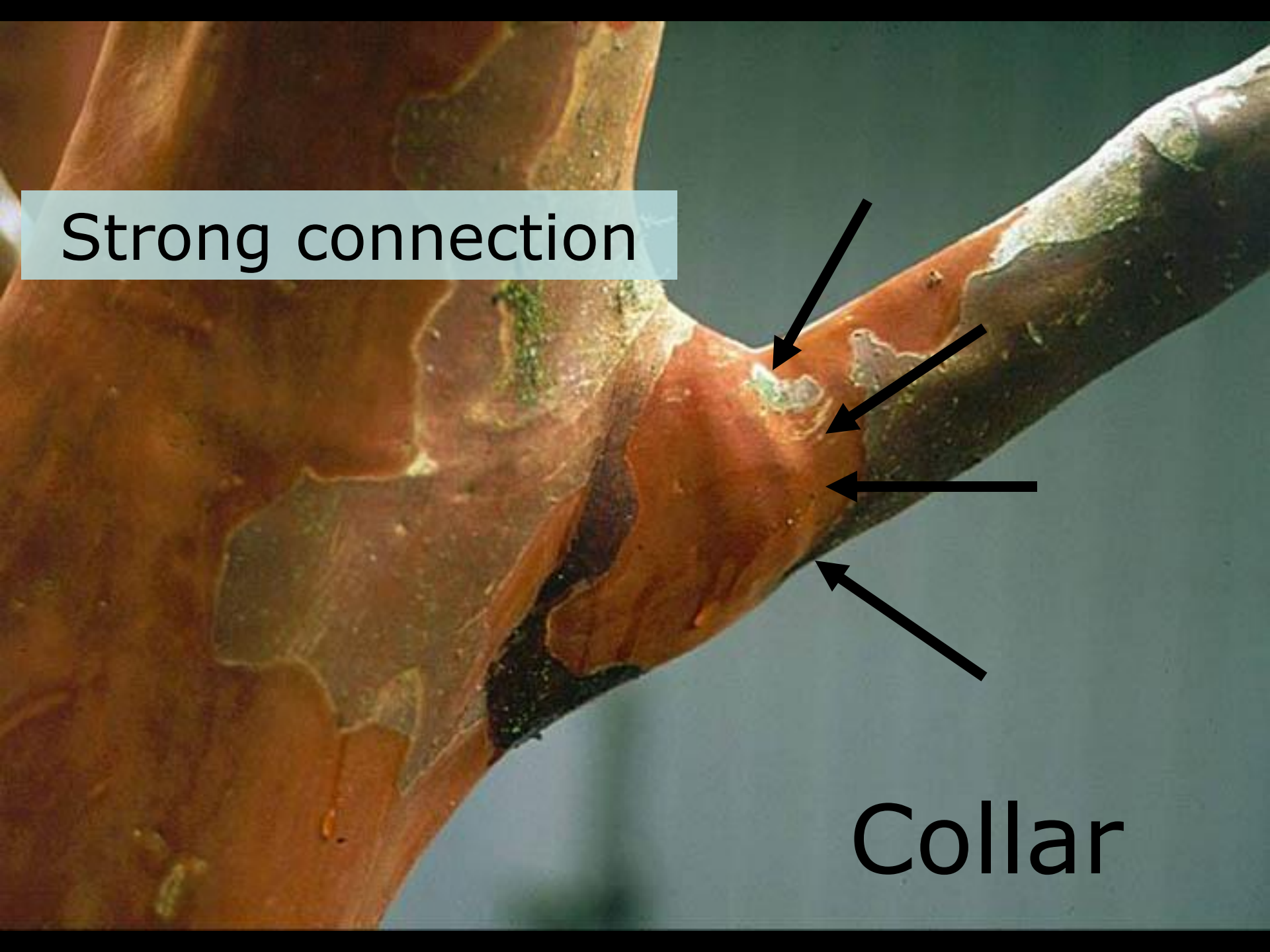
Objective: Reduce structural issues that cause tree failure

- **Codominant stems:**
stems of equal size originating from the same point on the tree
- **Included bark:**
bark pinched between two stems, indicating a weak union
- **Unbalanced canopy:**
one side much heavier, or most weight at the tips of branches
- **Large low branches:**



Strong connection

Collar



**Weak structure:
codominant stems and
bark inclusions**



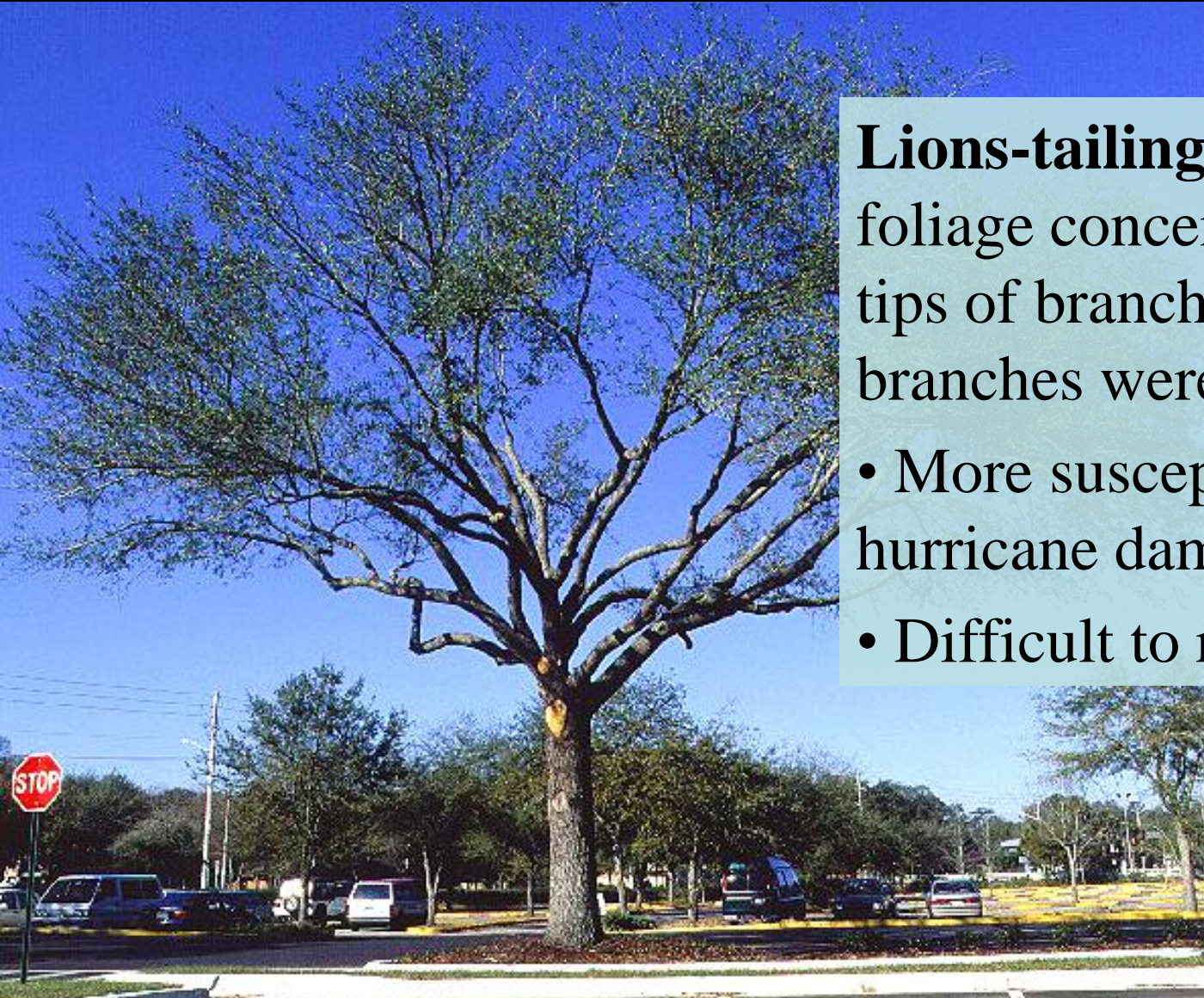
Codominant stems often cause branch failure in storms



Failure due to bark inclusion



Unbalanced canopy



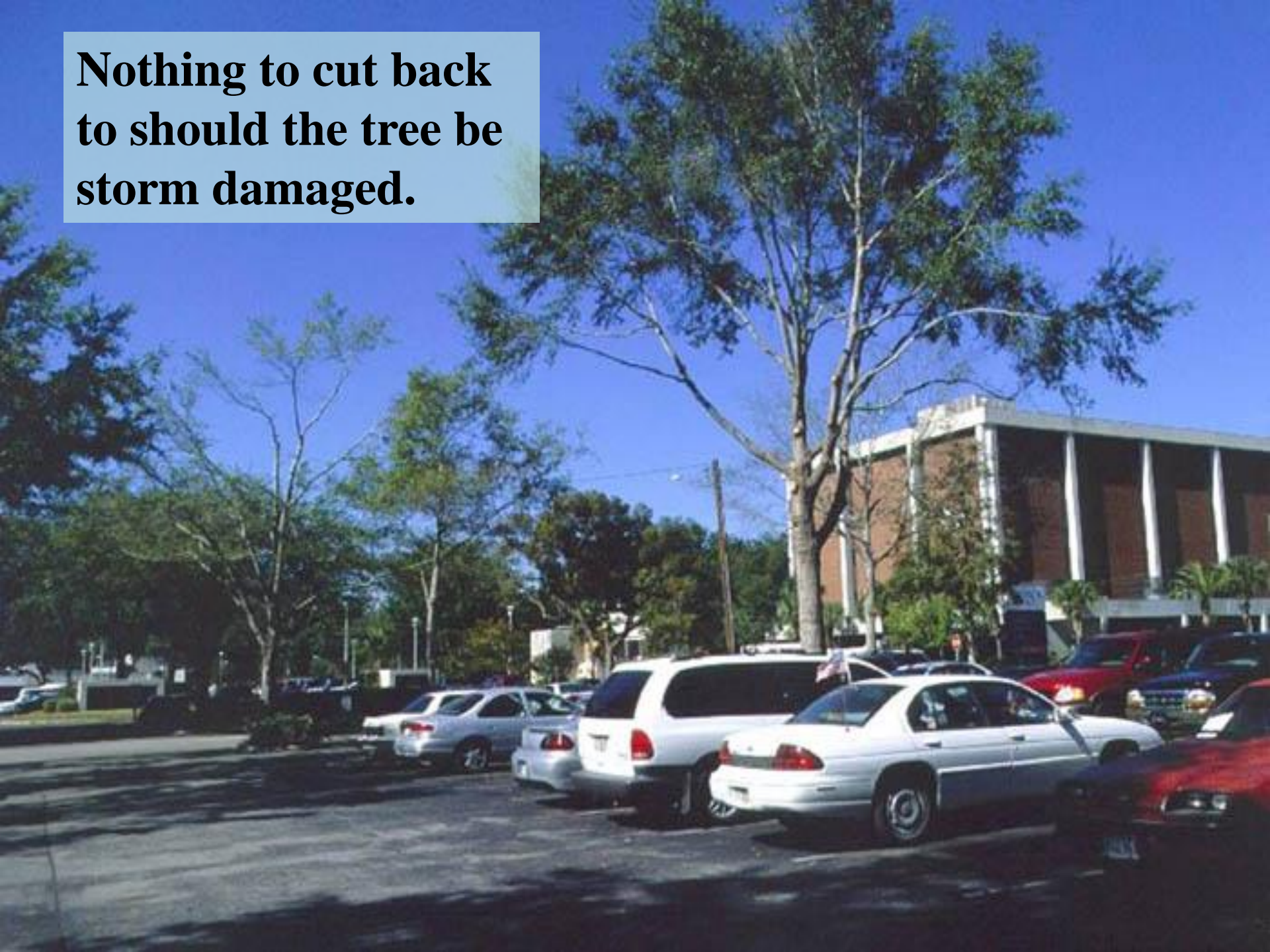
Lions-tailing: trees with foliage concentrated at the tips of branches because inner branches were removed.

- More susceptible to hurricane damage
- Difficult to restore

Lions-tailed trees failed



**Nothing to cut back
to should the tree be
storm damaged.**





Notice the large limbs located close to the ground – these will eventually have to be removed for clearance.

Big cuts can result in decay and cracks.





Low and big cuts
can be avoided
with early pruning.



Objective: Prune to promote strong structure

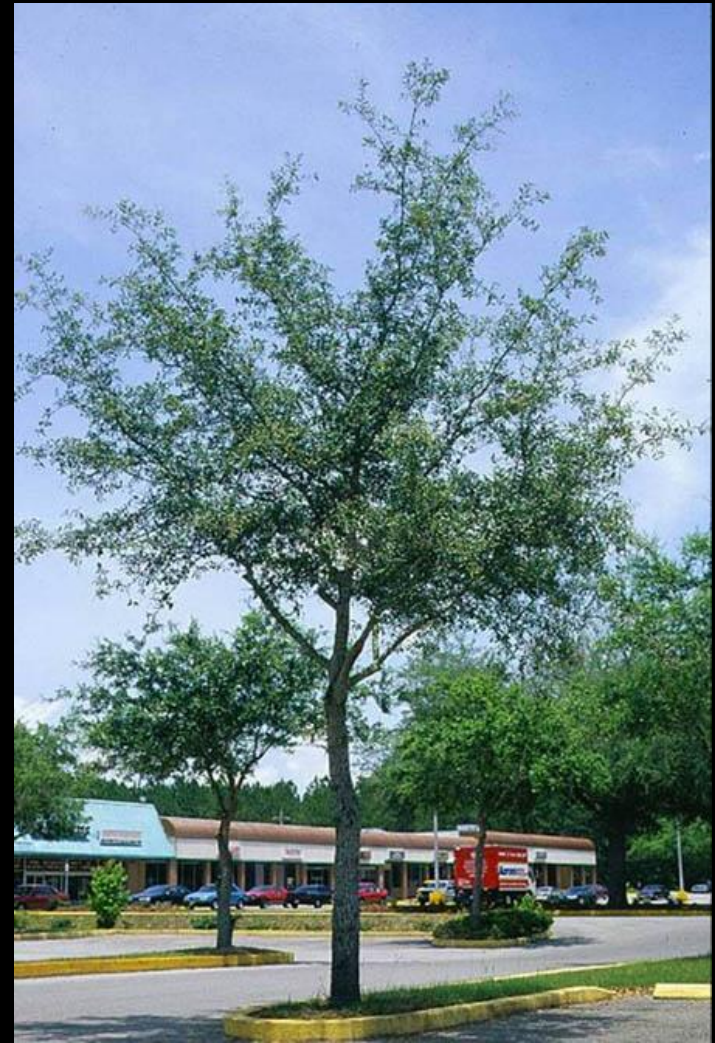
Trees require about 25 years of training to develop strong structure.

Structural Pruning Strategies:

1. Develop or maintain a dominant leader
2. Identify lowest branch in the permanent canopy
3. Prevent branches below the permanent canopy from growing too large
4. Space main branches along dominant trunk
5. Keep all branches less than $\frac{1}{2}$ the trunk diameter
6. Suppress growth on branches with included bark

Preventive Pruning: **young trees**

- Set objectives
- **Determine pruning cycle and dose**
- Execute pruning plan
 - make good cuts
 - prioritize trees with structural issues
 - temporary vs. permanent branch management



Pruning cycle: the interval or time between each pruning event

- Depends on quality of nursery stock, growth rate, climate, and species.
- Should be shorter in warmer climates where trees grow faster.
- A longer pruning cycle can lead to larger cuts having to be made to correct structural issues.

Determine a pruning cycle

Pruning cycle:

- more than 3-5 years = higher pruning dose
- every 1-2 years = smaller pruning dose

Suggested program:

- At planting
- Year two or three
- Year five or six
- Year ten
- Year fifteen

Pruning dose: the amount of live tissue removed at one pruning

- Depends on customer expectations, the size of the stems, and the pruning cycle.

Low pruning dose (< than 20%)	Higher pruning dose (> than 20%)
Mature or recently planted trees	Young, established trees
Cooler climates with short growing season	Warm climates where trees have longer growing season
Decay prone species	Good compartmentalizers

Appropriate Pruning Dose for Specific Applications

Large Pruning Dose

Small Pruning Dose

Municipality

Residences, commercial properties

Long pruning cycle

Short pruning cycle

Aesthetics of less concern

Aesthetics are a concern

Effects on the Tree from Applying Pruning Doses

Large Pruning Dose

Small Pruning Dose

Larger pruning wounds

Smaller pruning wounds

Larger void in canopy

Smaller void in canopy

Greatly encourages growth in unpruned portions of tree

Encourages some growth in unpruned portions of the tree

Impact of pruning dose on co-dominant stem growth



Impact of pruning dose on co-dominant stem growth

Foliage removed for 75% dose







Maximum critical diameter: the largest diameter pruning cut you are willing to make on a certain species

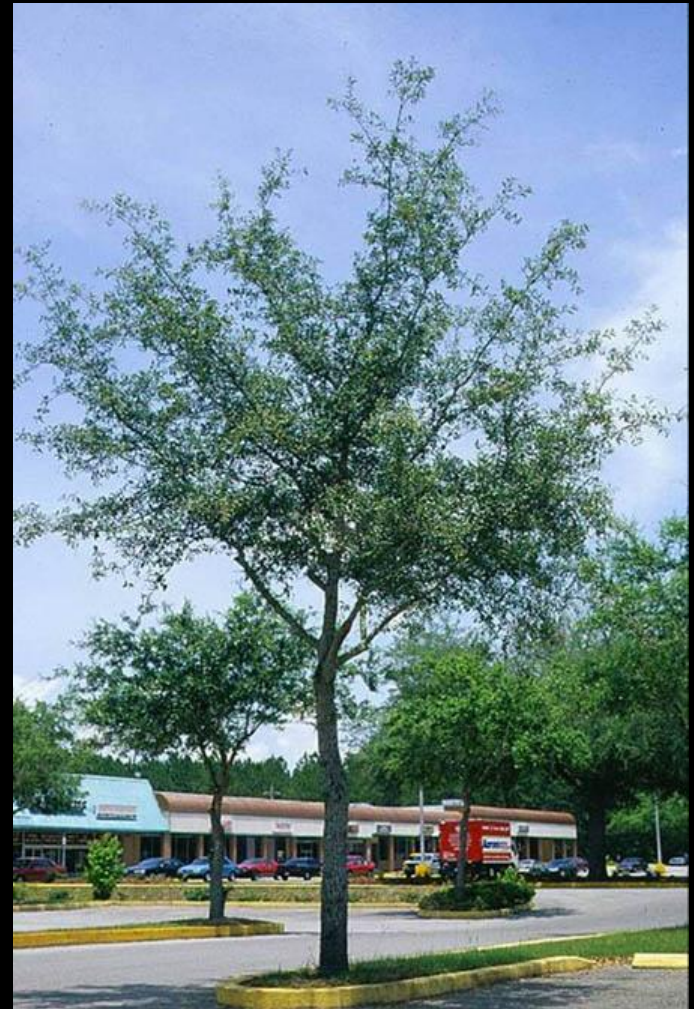
- This limit should be set for both removal and reduction cuts.
- Should be smaller for decay-prone species.
- Is controlled by the pruning cycle

Branch size: - proportion relative to trunk
- actual diameter of stem

Branch size	Consequences of Removal	Recommended Action
Less than 1/2 trunk diameter	Few consequences	Remove if needed
1/3 to 1/2 trunk diameter	Some trunk defects could result	Consider shortening instead
More than 1/2 trunk diameter	Defects likely	Shorten instead of removing
Large enough to have heartwood	Defects likely	Shorten instead of removing

Preventive Pruning: **young trees**

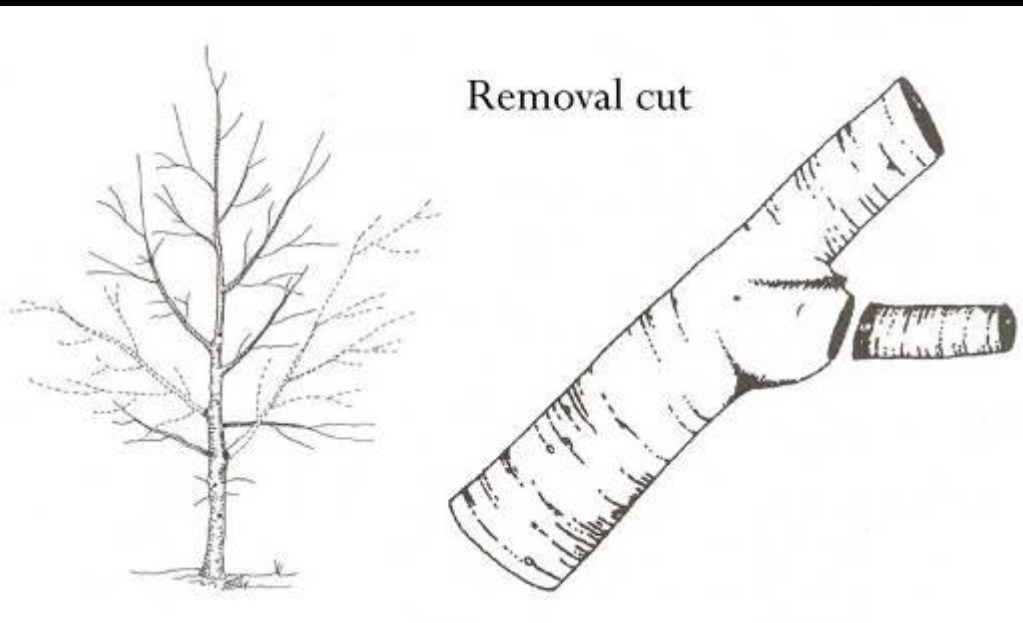
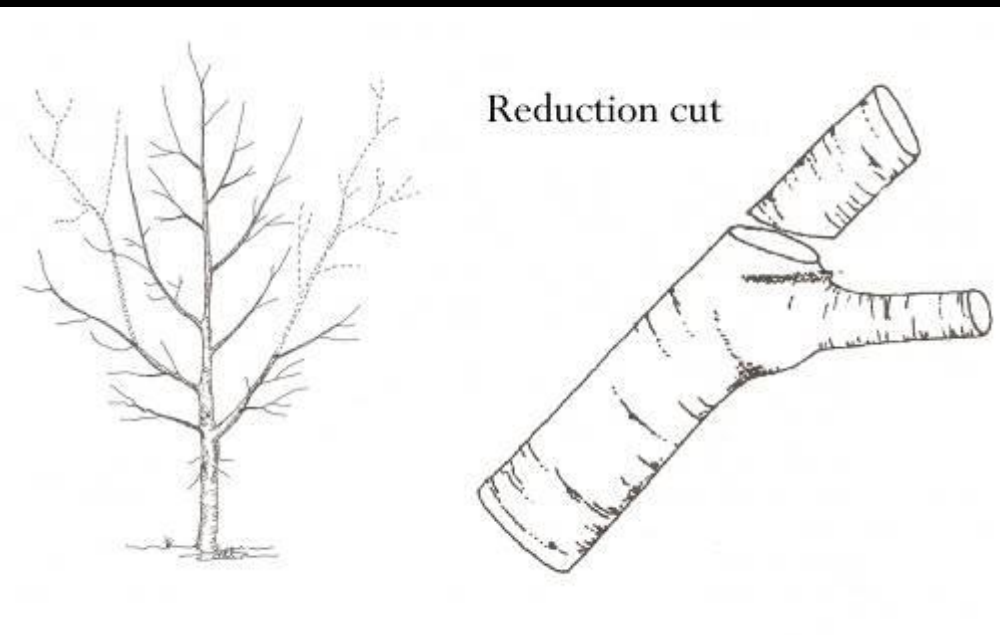
- Set objectives
- Determine pruning cycle and dose
- **Execute pruning plan**
 - make good cuts
 - prioritize trees with structural issues
 - temporary vs. permanent branch management



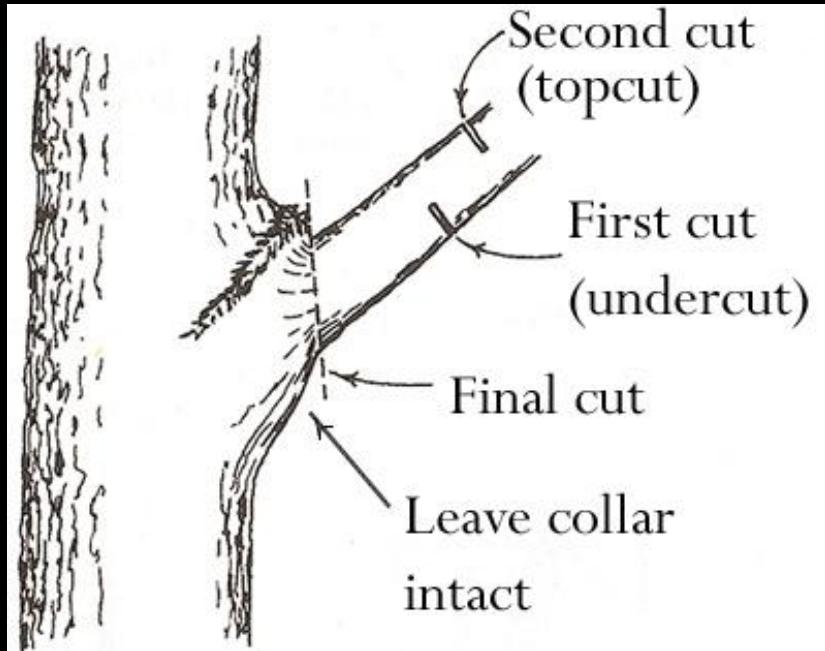
Types of pruning cuts:

Reduction cut shortens the length of a stem by pruning back to a smaller limb.

Removal cut prunes a branch back to the trunk or parent branch.



Make good pruning cuts



Step 1

Make an undercut about 12 inches from the trunk.

Step 2

Make a topcut farther out on the limb.

Step 3

Remove the stub with final cut, being careful not to cut flush against the trunk. Leave the collar intact.





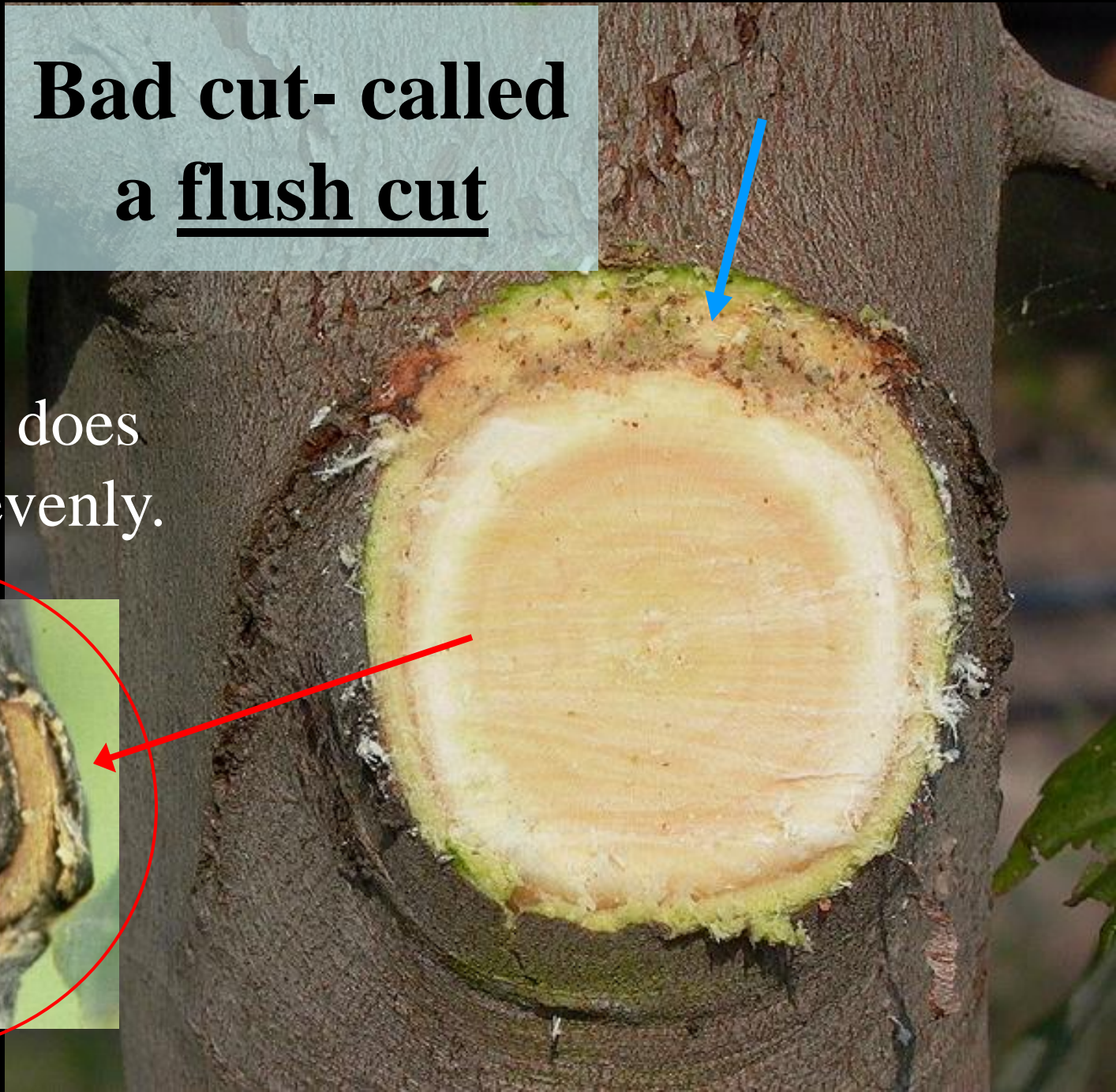
Branch bark ridge

Collar

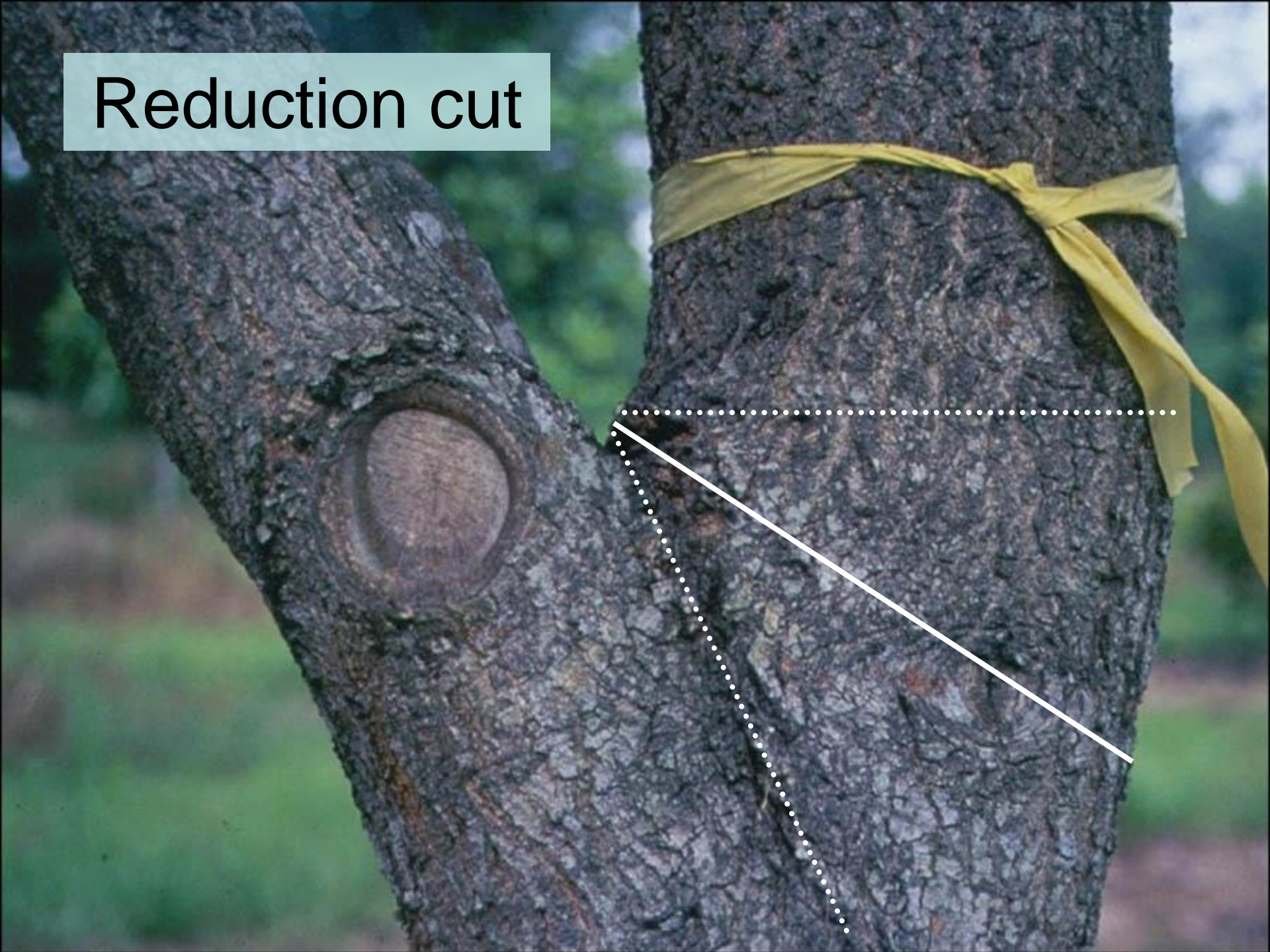
Collar: swollen area at the base of the branch where it joins the trunk. The tissue is rich in energy reserves and chemicals that hinder the spread of decay. Good pruning cuts avoid cutting into the collar.

**Bad cut- called
a flush cut**

Wound wood does
not develop evenly.



Reduction cut



Pruning strategies

- Execution
 - Prioritize which trees to prune
 - Decide location of lowest permanent limb
temporary branch management vs. permanent branch management



Prioritize:
**Structural pruning not
as important on these**

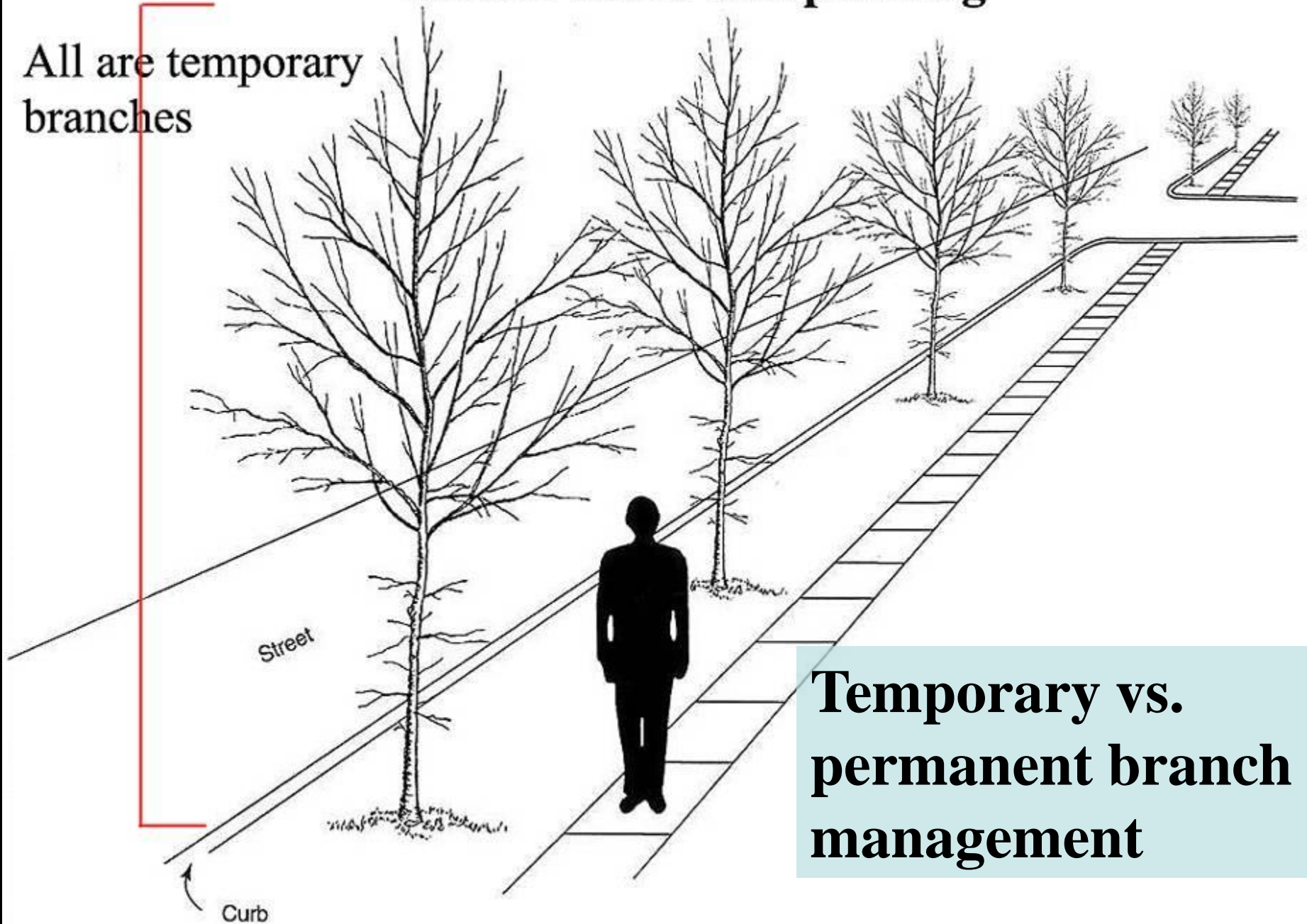


Temporary vs. permanent branch management

Keep in mind that all branches will eventually be removed on trees less than 4'' caliper

Recent street tree planting

All are temporary branches



**Temporary vs.
permanent branch
management**

Pruning Plan: **First 5 years**

Most branches are temporary.

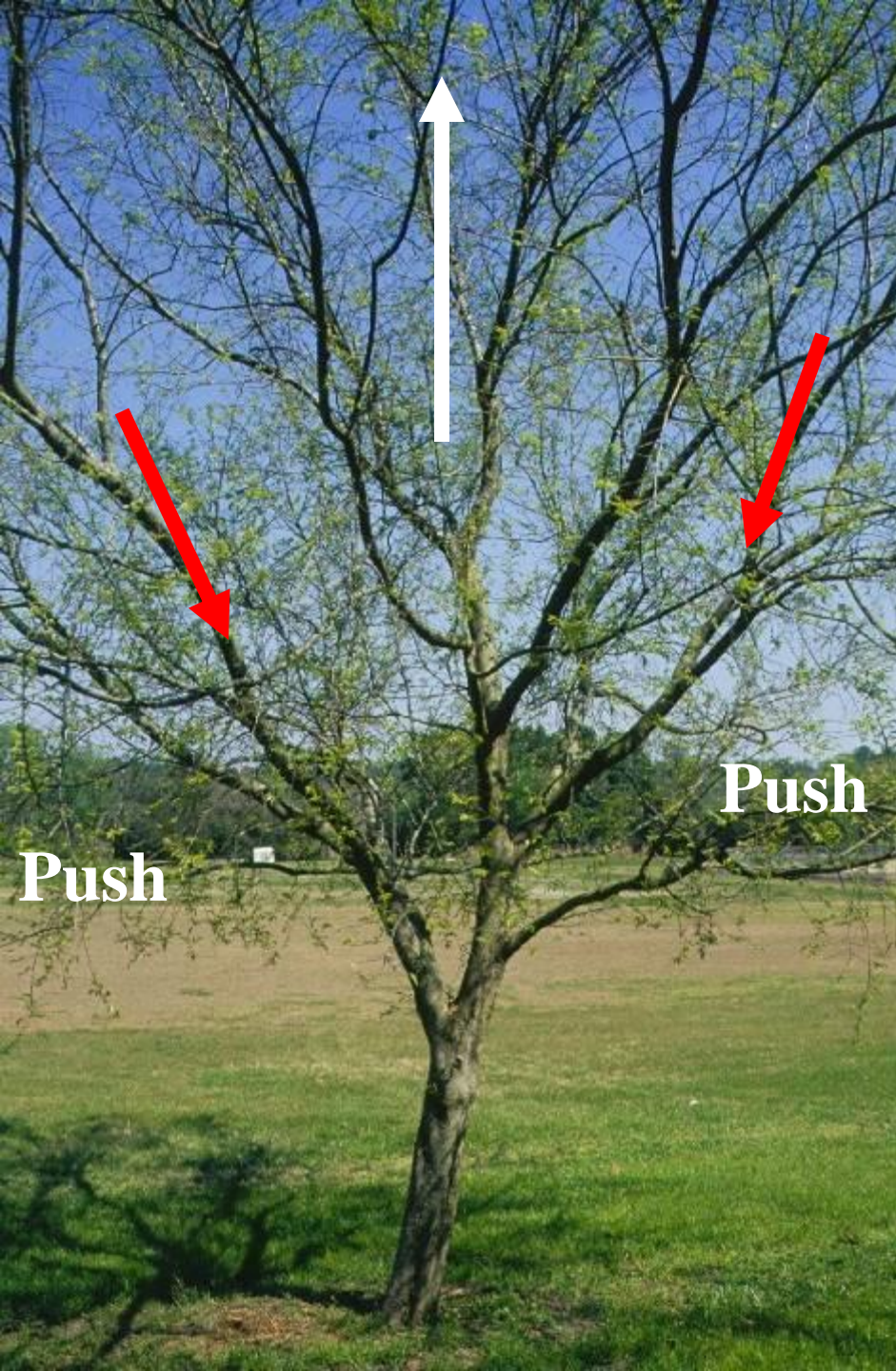
Do not remove more than 35% of live foliage at a pruning visit.

Reduce all branches greater than $\frac{1}{2}$ trunk diameter.

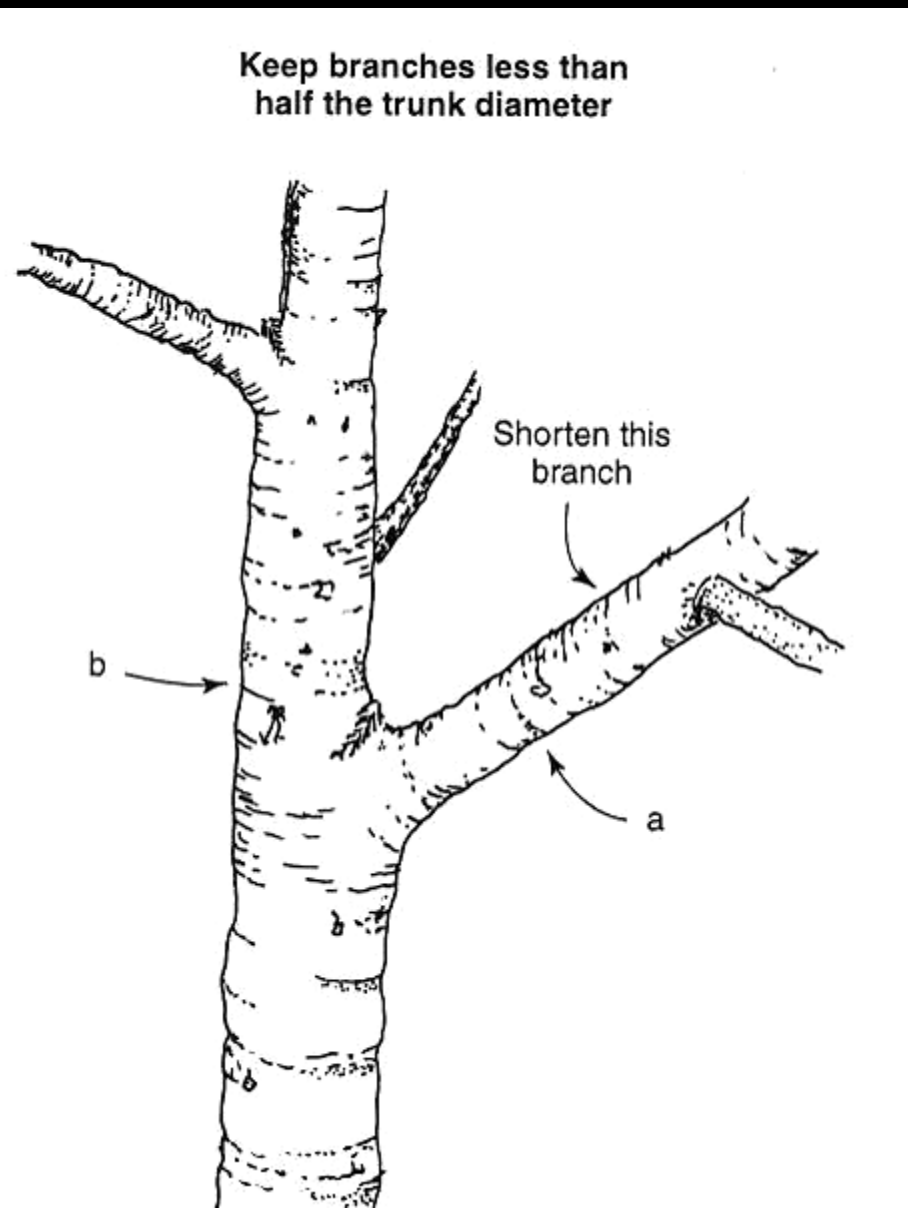
Reduce and/or remove all branches or stems competing with the one selected to be the leader.

Reduce and/or remove large, low vigorous branches.

Remove broken, cracked or severely damaged branches.



Reduce growth rate of low aggressive branches



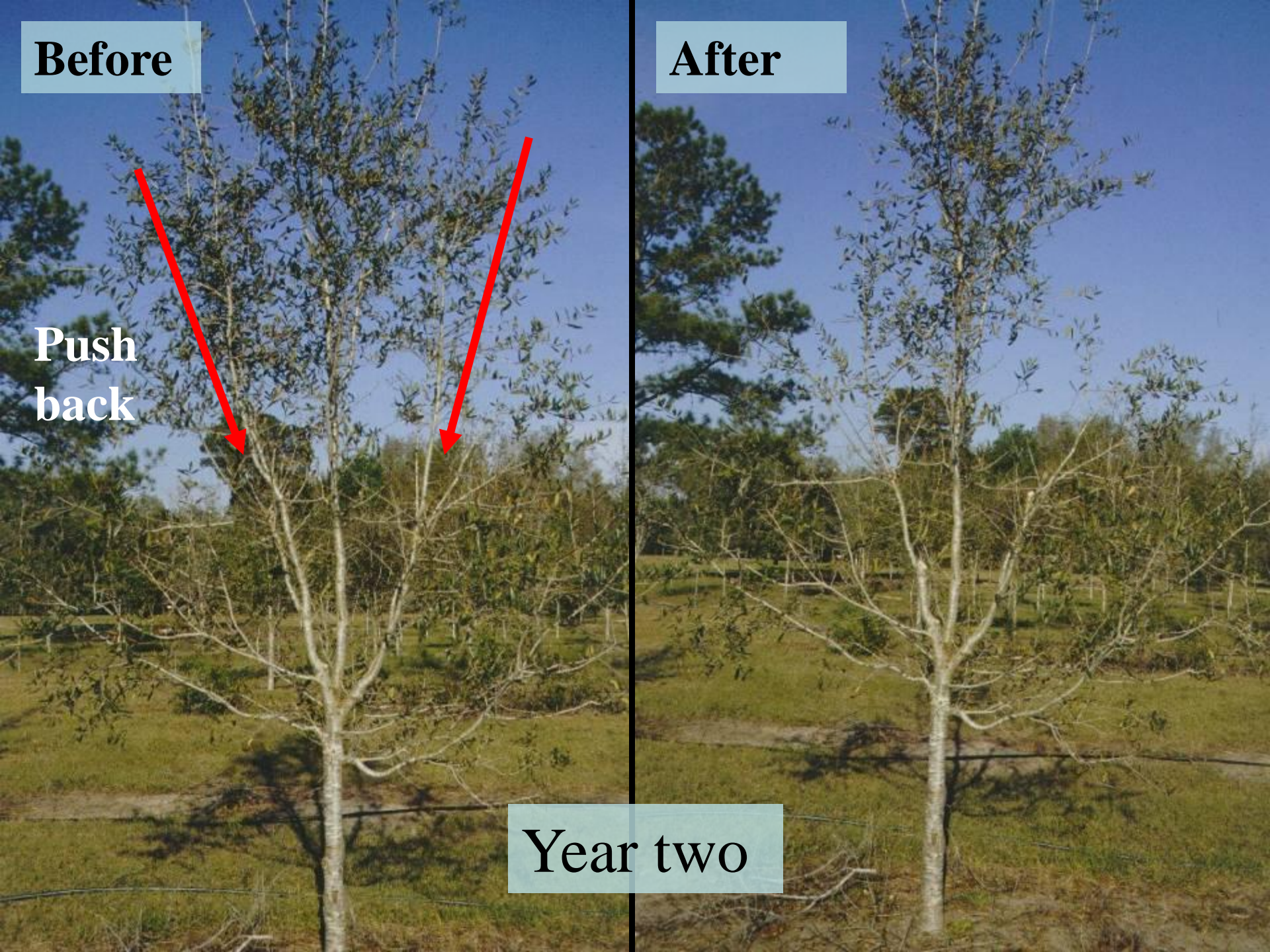
Before

After

**Push
back**



Year two



Before



Structural pruning is a three step process:

1. Identify the stem that will make the best leader.
2. Identify which stems are competing with this leader.
3. Decide where to shorten these competing stems.

Before



After



Pruning Plan: 5 – 20 years

Do not remove more than 25-35% of live foliage.

Reduce all branches greater than ½ trunk diameter.

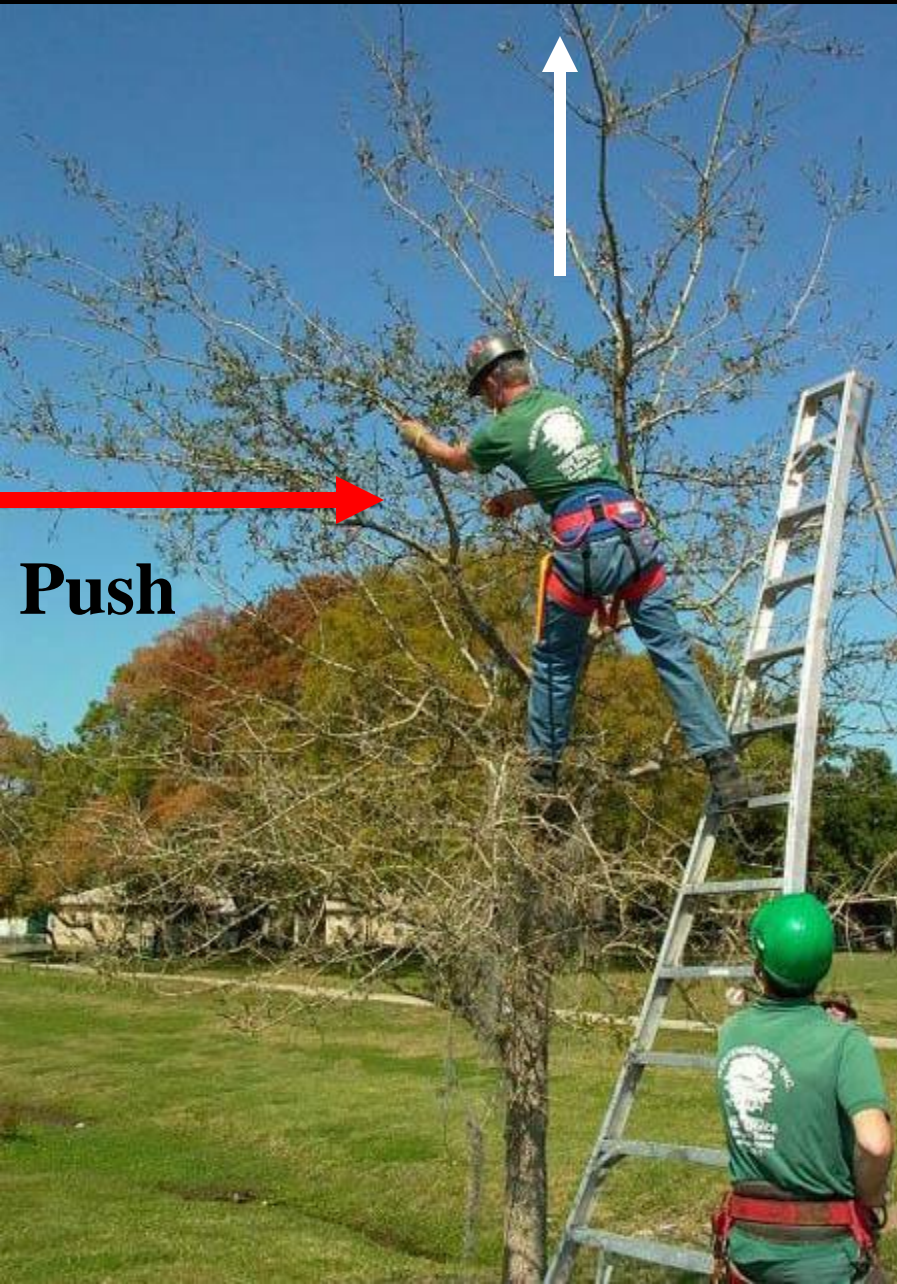
Identify lowest scaffold limbs of the permanent canopy and *reduce* all aggressive lower branches.

Reduce branches with included bark.

Reduce or remove competing leaders (if there are more than 3 competing leaders, this can be done in stages).

Reduce branches within 18'' of largest limbs.

Before



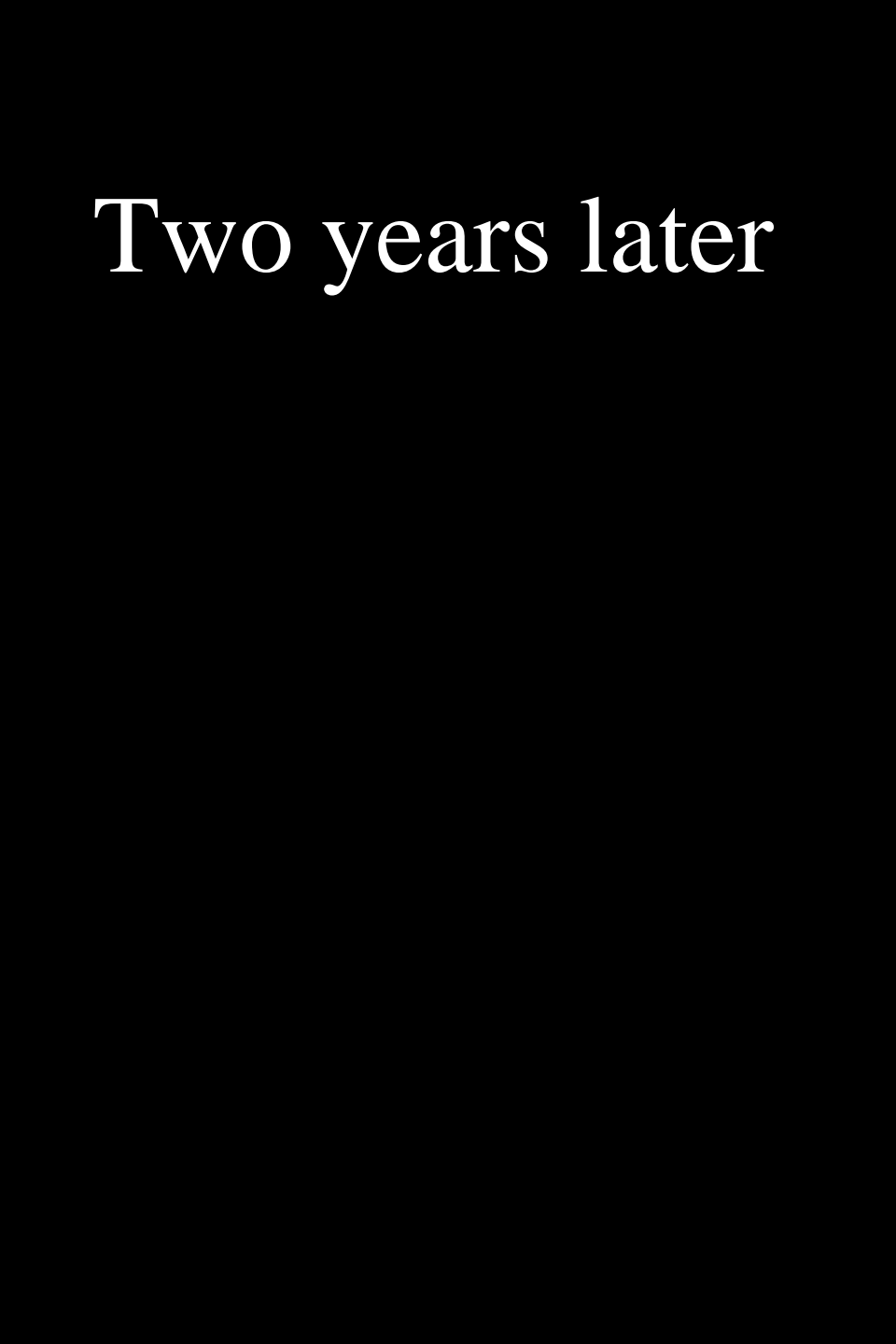
After



Before



Two years later



Before



After



Dominant leader
structure after two
pruning visits



Before pruning



After pruning



**Transforming a bush
into a tree**

Two years later



Pruning Plan: 20 – 30 years

Identify 5 to 10 permanent scaffold limbs and *reduce* branches within 18-36'' to avoid clustered branches.

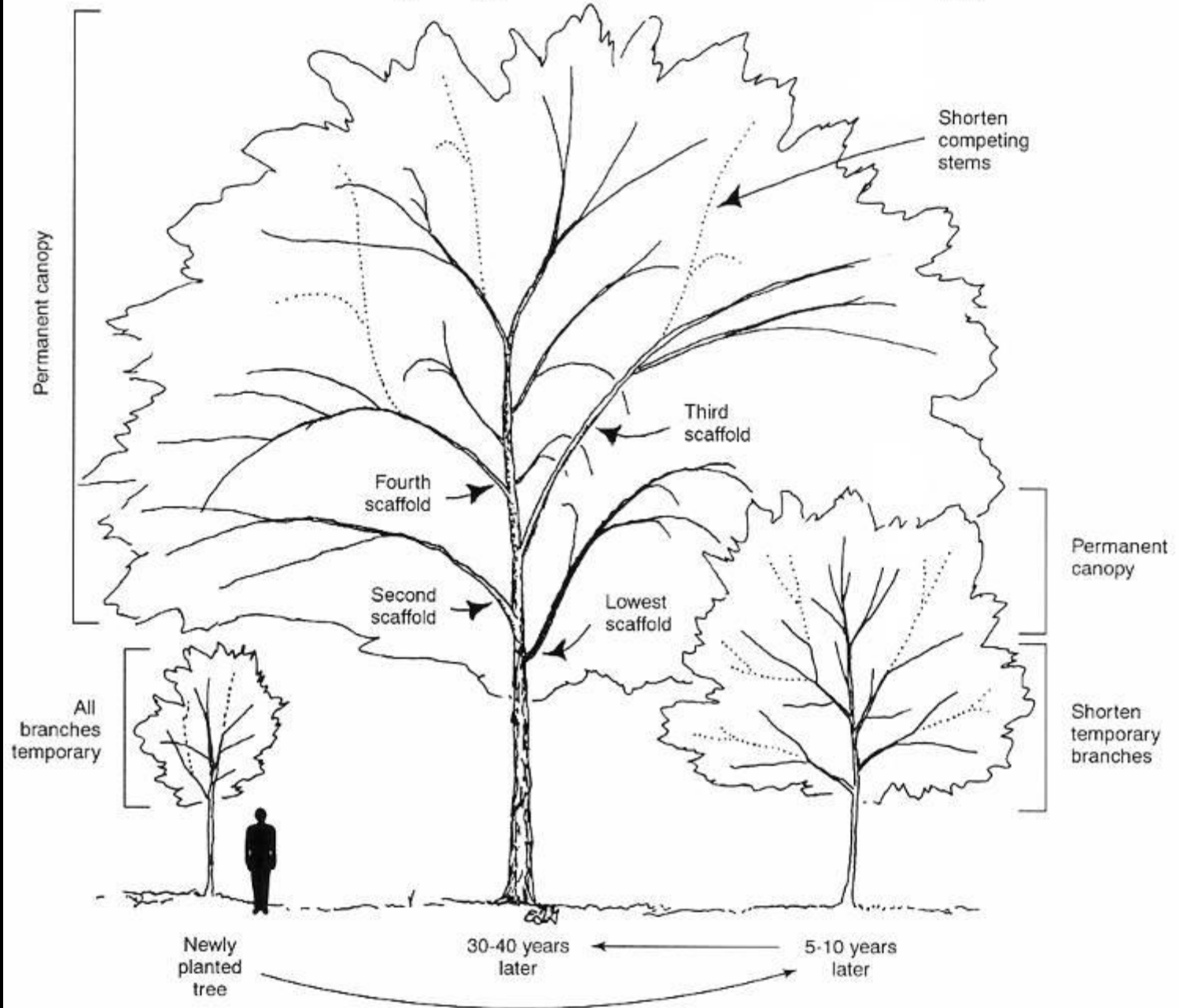
Space permanent scaffold limbs to reduce wind resistance.

Remove many or all of the branches below the first permanent limb.

Reduce branches with included bark.

Reduce and/or remove competing leaders.

Developing the permanent canopy





Reduce growth on
branches below permanent
canopy



2 years later



After

before



after



Here is a tree that was damaged in a storm. As a result, many stems are growing upright



Remove two upright, interior stems



Before



**After removing right
codominant stem**



**Before -
year 8**



After



Debris

**One year after
pruning**



After



**One year after
pruning**



18 months after pruning



With dedication to a management plan, your community can become a model for others

