

Proper Pruning

For Tree Health and Defensible Space

NFP Training for Lone Peak Conservation Center, May 4, 2005

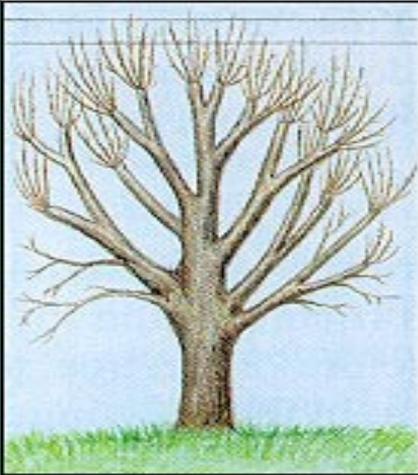
Maggie Shao, Community Forestry Program Coordinator



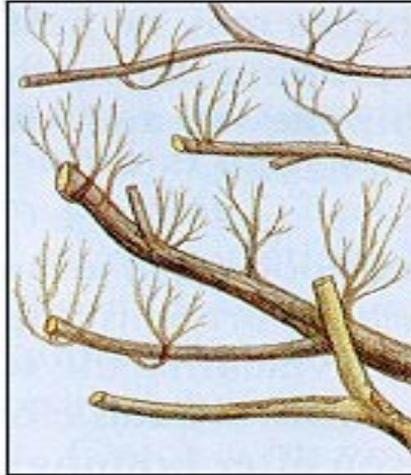
Reasons for Pruning

- **Safety** - involves removing branches that could fall and cause injury or property damage, trimming branches that interfere with lines of sight, removing branches that grow into utility lines, and *vertical separation distance for defensible space*
- **Health** - can best be used to encourage trees to develop a strong structure and reduce the likelihood of damage during severe weather. Removing broken or damaged limbs encourages wound closure
- **Aesthetics** – enhancing natural form and character

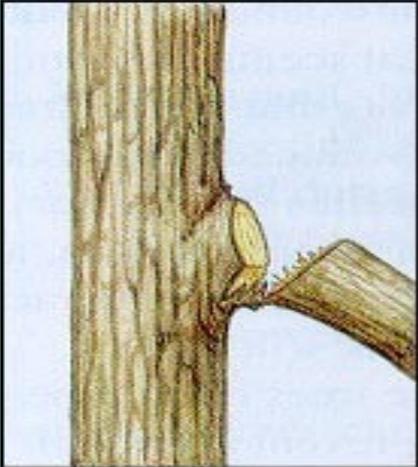
Practices that Harm Trees



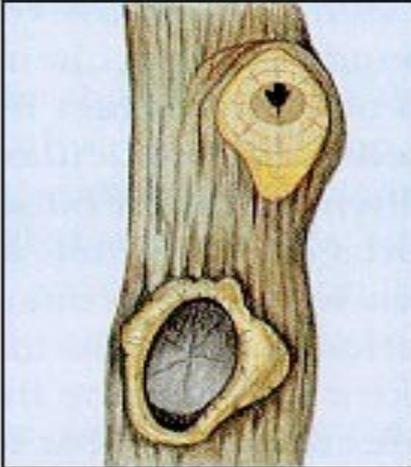
A. Topping



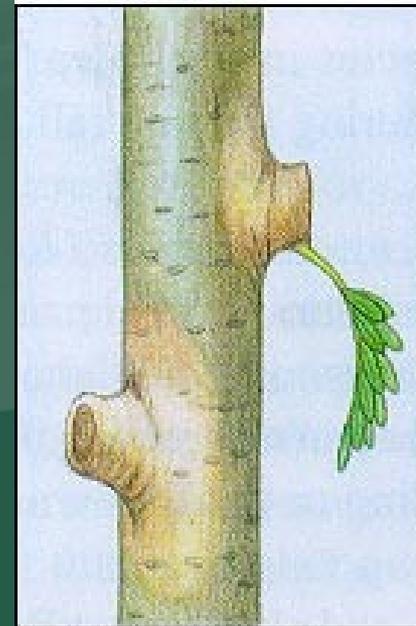
B. Tipping



C. Bark ripping



D. Flush cutting



E. Stub cutting

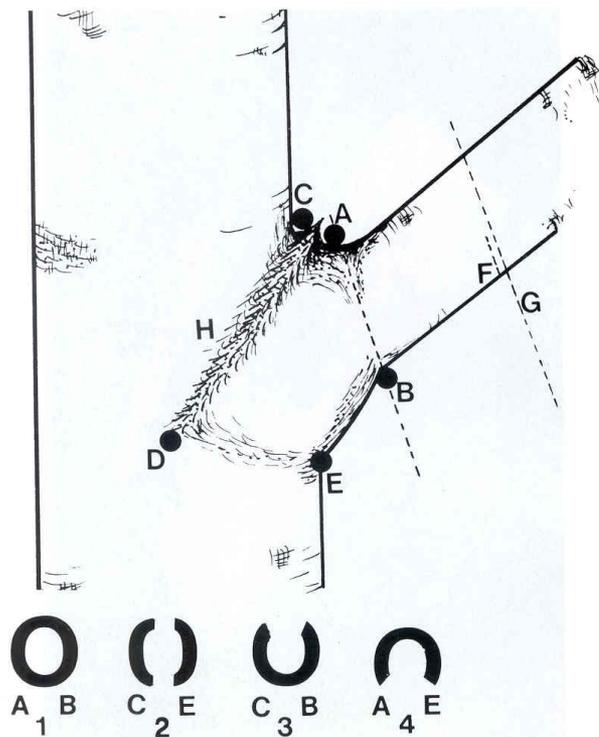
Good Pruning Practices

- Prune for **safety, health, then aesthetics**
- Never prune trees that are touching or near utility lines, call the utility company
- Avoid pruning trees that might increase susceptibility to certain pests or diseases
- When to prune – dead branches anytime, to limit growth during the summer, otherwise during the winter.

Good Pruning Practices

- All crewmembers should be wearing the appropriate safety gear: hard hats, eye protection, approved boots, hearing protection, chain saw chaps for groundwork
- Assess tree –
 - ✓ What species is it?
 - ✓ Which branches to cut, if removing limbs - too much foliage lost that will harm tree
 - ✓ Do no work with chainsaw above your reach

Natural Target Pruning



NATURAL TARGET PRUNING

Locate the branch bark ridge (H) and the branch collar (E to B).

Stub cut the branch (up F, down G).

Locate points A and B where the branch meets the branch collar.

Cut from A to B, or from B to A with care.

If position of B is uncertain, draw a line in your mind from A to E.

Angle EAD is approximately the same as angle EAB.

Point D is the beginning of the branch bark ridge (H).

A proper cut will result in woundwood pattern 1.

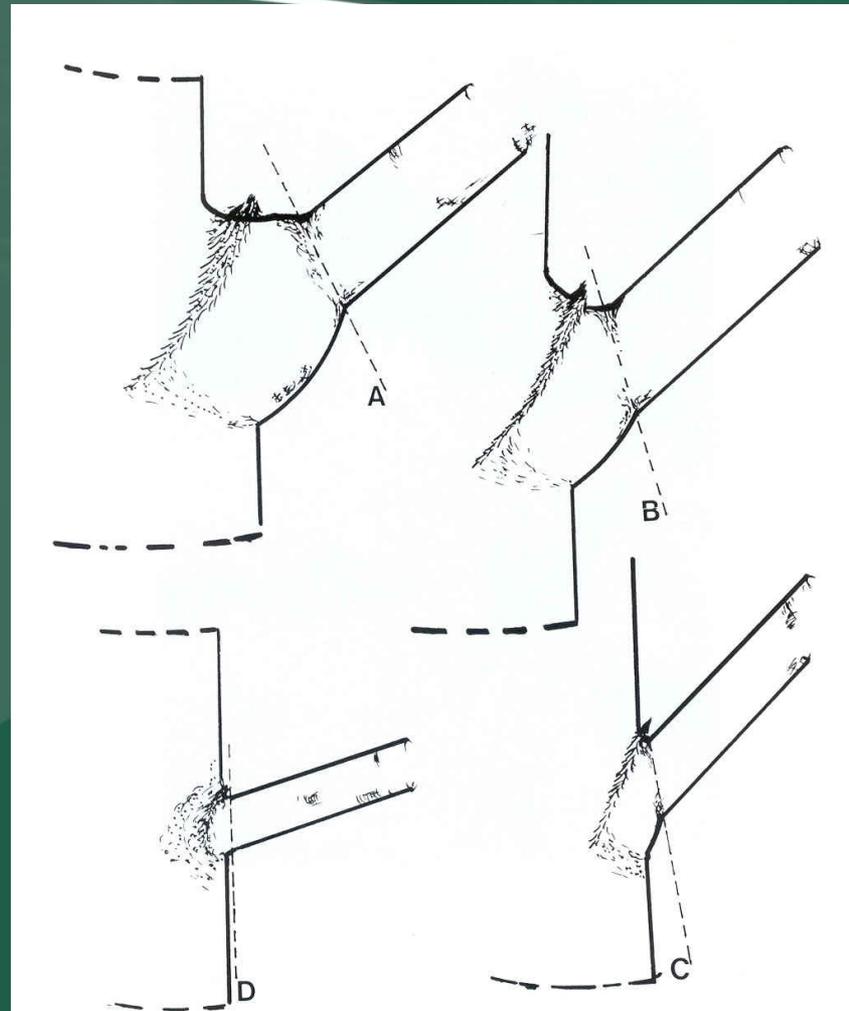
Improper cuts will result in patterns 2, 3, and 4.

Do not leave stubs.

Do not make flush cuts.

Do not paint the wounds.

Different Types of Branch Collars



BRANCH COLLARS AND ANGLES OF CUTS

Proper pruning of a living branch is a cut as close as possible to the branch collar. There is no set angle for a proper cut.

Cuts A, B, C, and D are proper cuts.

Branch Protection Zones

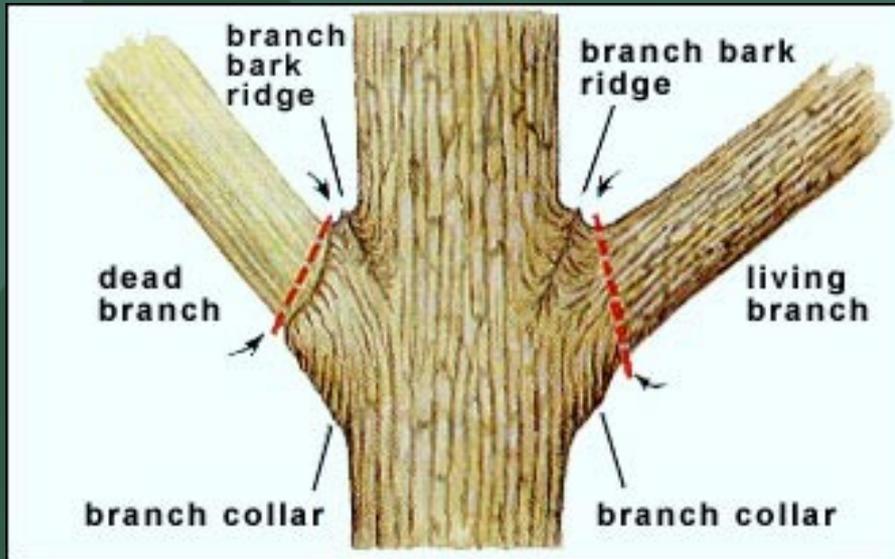


New Hampshire

PROTECTION ZONES

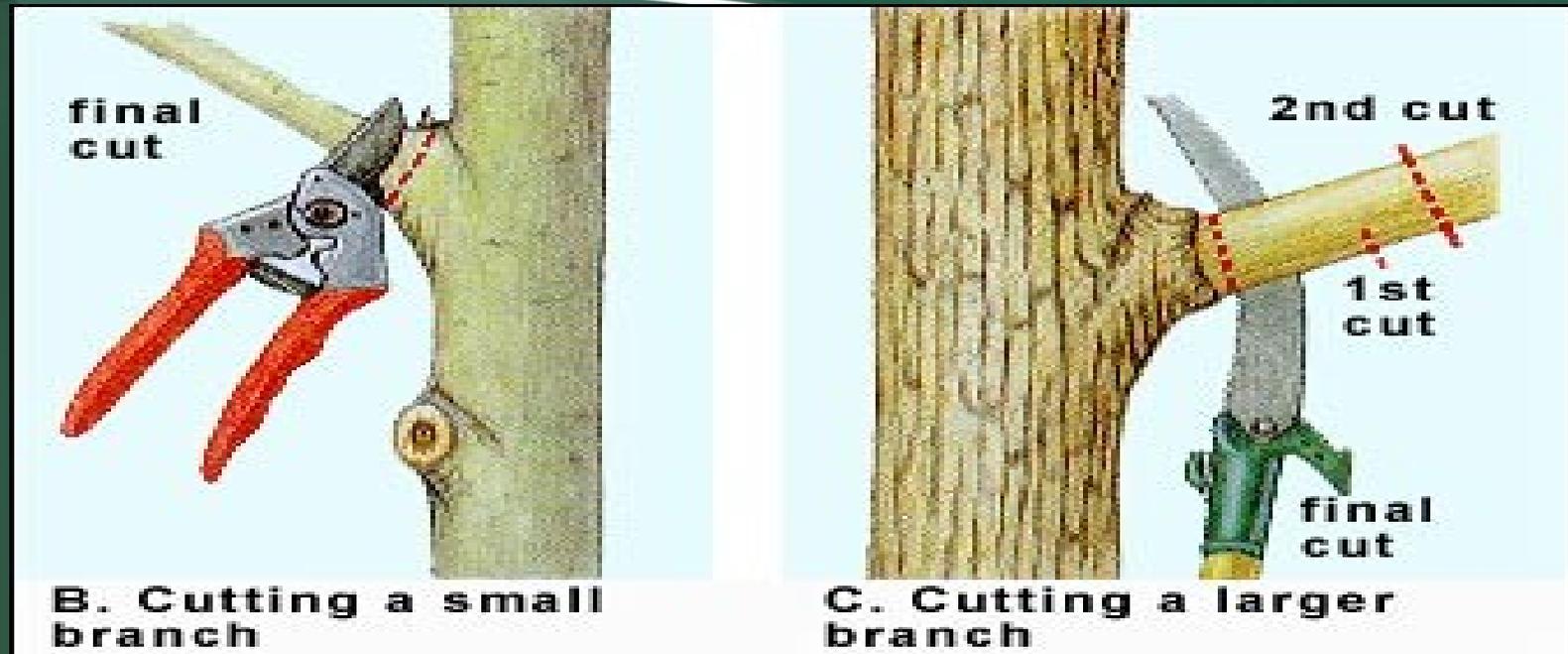
Protection zones form within the bases of branches. The zones are made up of chemicals that come from stored energy reserves—starch, oil—in living wood cells. The zones resist spread of organisms from the branch into the trunk. The chemicals are phenol-based in hardwoods and terpene-based in conifers.

Targeting the Cut



- Proper cut, smaller wound, easier for tree to heal
- Don't leave stubs – tree will expend energy to close off and heal the stub; or weak wood will sprout from stubs

Pruning Cuts



- Small branch – cut just above branch collar
- Larger branch – Take weight off the branch, to avoid bark ripping

Pruning Cuts

- Always use clean and sharp tools so you don't spread disease, for a clean cut and wound
- Do not need to dress or paint wound, tree can heal itself
- Do not leave stubs



*Courtesy of Dr. John Ball, South Dakota
Cooperative Extension*

What's wrong with this picture?



Shigo, Tree Pruning A Worldwide Guide

What's Wrong with this picture?



Pruning Cuts on Pine



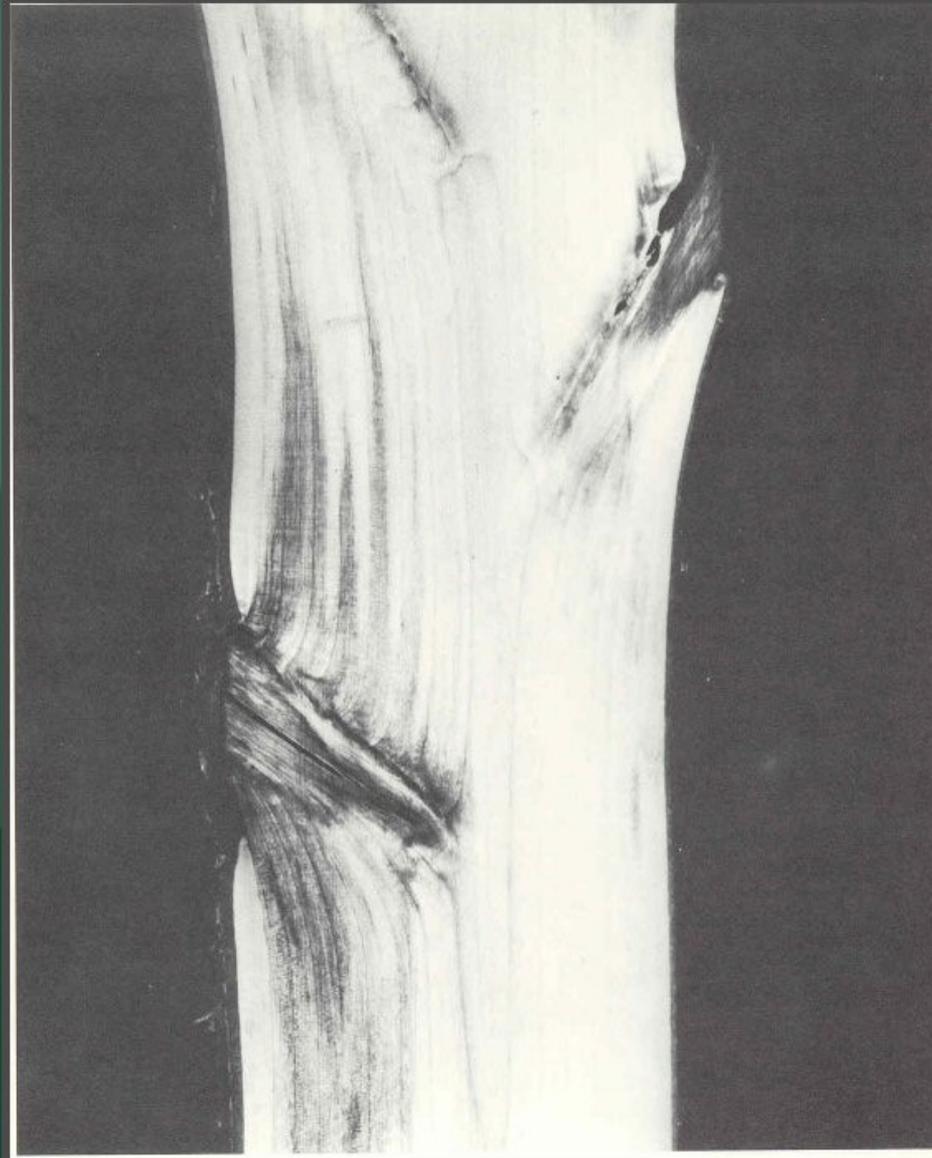
New Hampshire

COMPARISON OF PRUNING CUTS ON PINE

Dissected samples of red pine (left) and white pine (right) one year after each was pruned with an improper cut to the left and a proper cut to the right of each sample. The branch cores of conifers are impregnated with protective resin substances while the branches are alive.

Improper cuts expose trunk wood that has living cells and is not impregnated with protective substances.

A yellow birch pruned in January, 1981, and dissected in July, 1981. Upper branch properly pruned, lower branch improperly pruned (Alex Shigo).



Flush Cut Injury



Maine

WHY FLUSH CUTS INJURE TREES

Flush cuts are improper pruning cuts that remove the branch collar and the wood where the branch protection zone forms. Flush cuts expose the trunk wood to infections. The experimentally inflicted trunk wound at left is much larger in area than the flush cut at right. Flush cuts destroy a major tree defense system.

Proper Pruning – Healthy Wounds



Washington

INSIDE VIEW OF PROPER CUT

A proper cut after nine years in a deodar cedar. The colored central core was the diameter of the tree at the time of pruning. The wound closed and compartmentalized the pathogens and no rot or cracks developed. Natural target pruning is effective for large branches and small branches. (Michael Schnad)

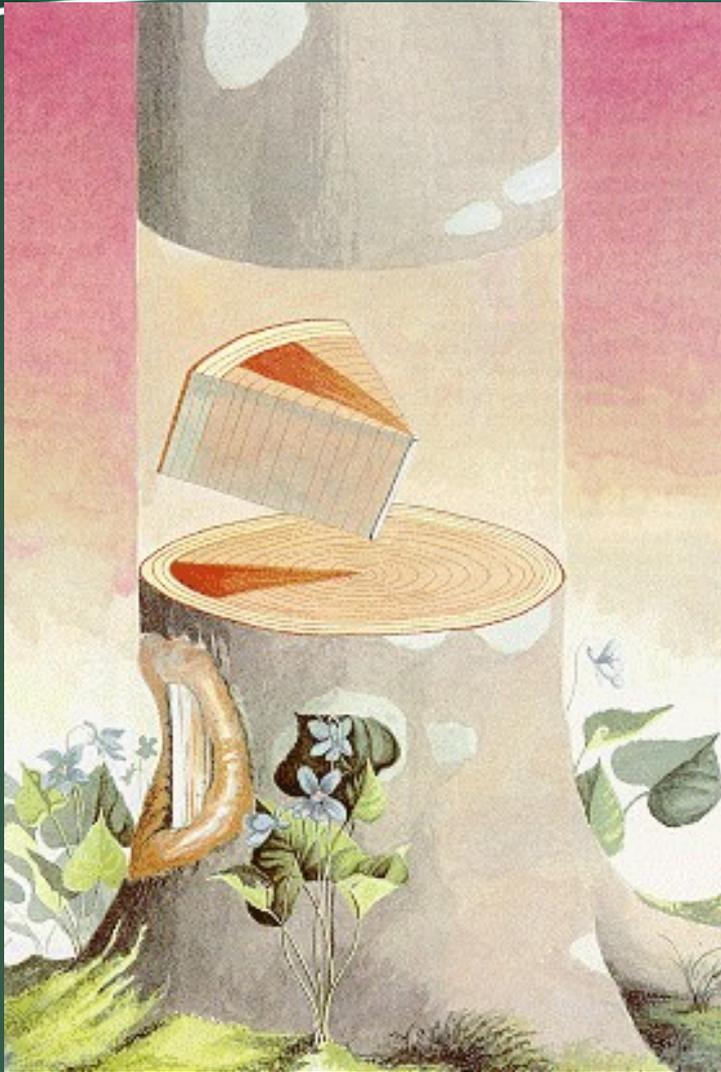
Proper Pruning – Healthy Tree



Improper – Poor Wound Healing



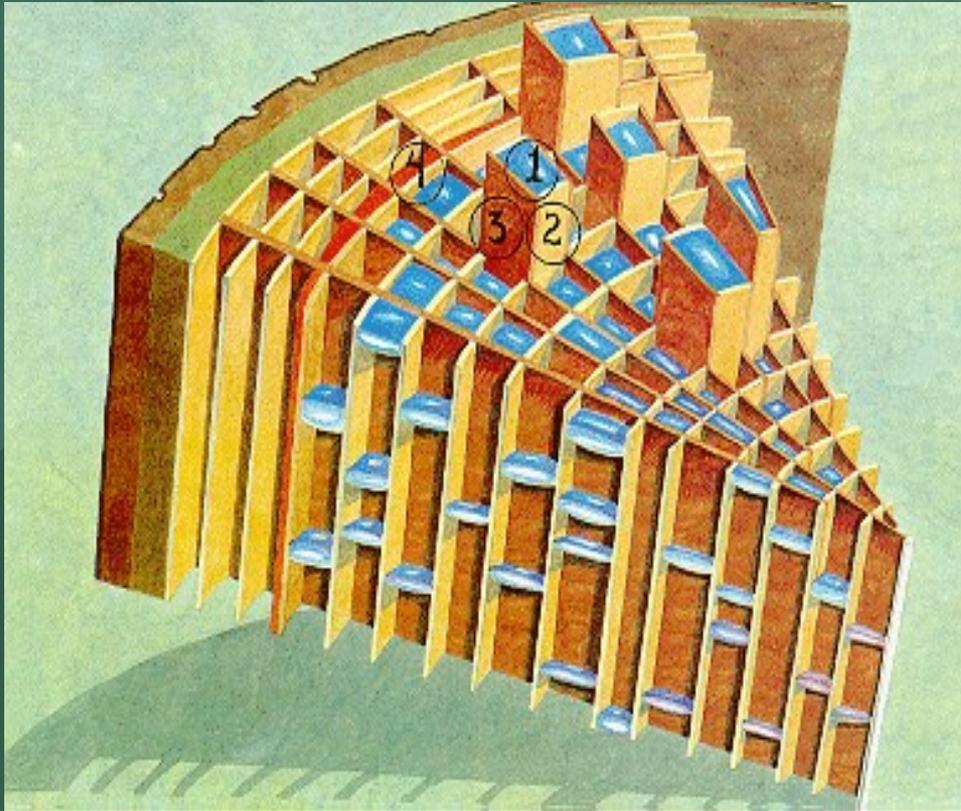
CODIT



- **CO**mpartmentalization of **D**ecay In **T**rees
Compartmentalization is a tree's defense system. Trees survive wounds and infection because they are highly compartmented plants that compartmentalize the injured and infected tissues

CODIT – 4 WALLS

Four “walls” or compartments



1. Vertical xylem plugging above and below wound prevents upward and downward decay
2. Annual rings of xylem - Prevents inward decay
3. Parenchyma cells make up radial wall – prevents lateral spread of decay
4. Cambium forms new protective wall – physical and chemical it is the strongest wall

Sugar maple – walls 2,3,4 effective



Tree Species and CODIT

- Species that are good compartmentalizers: *Oaks, sugar maple, walnut, American Elm, black locust*
- Species that are poor compartmentalizers: *Poplars (aspens & cottonwoods), hackberries, willows, box elder*

Firewise Guidelines

Did you

**T
I
P
6**



construction

Prune tree limbs so the lowest is between 6'-10' from the ground.



landscaping



Did you

**T
I
P
9**



construction

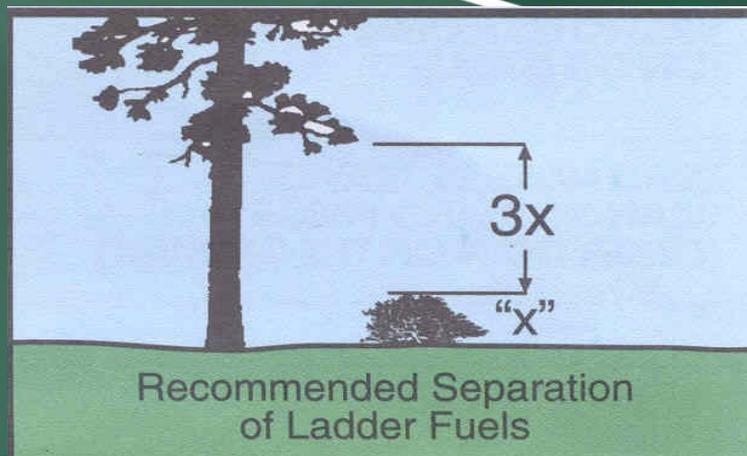
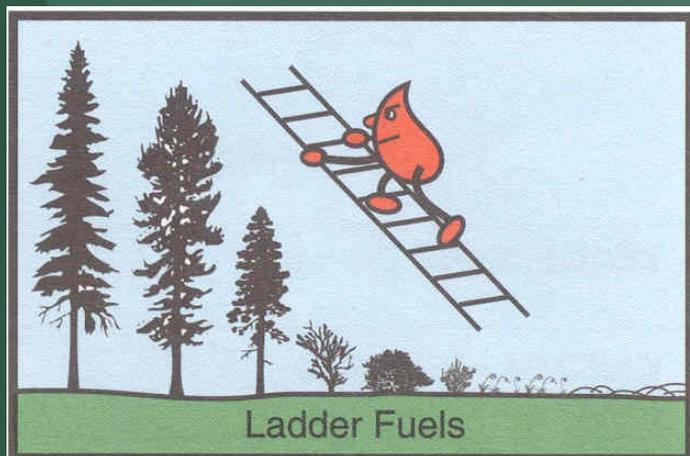
Remove dead or overhanging branches.



landscaping



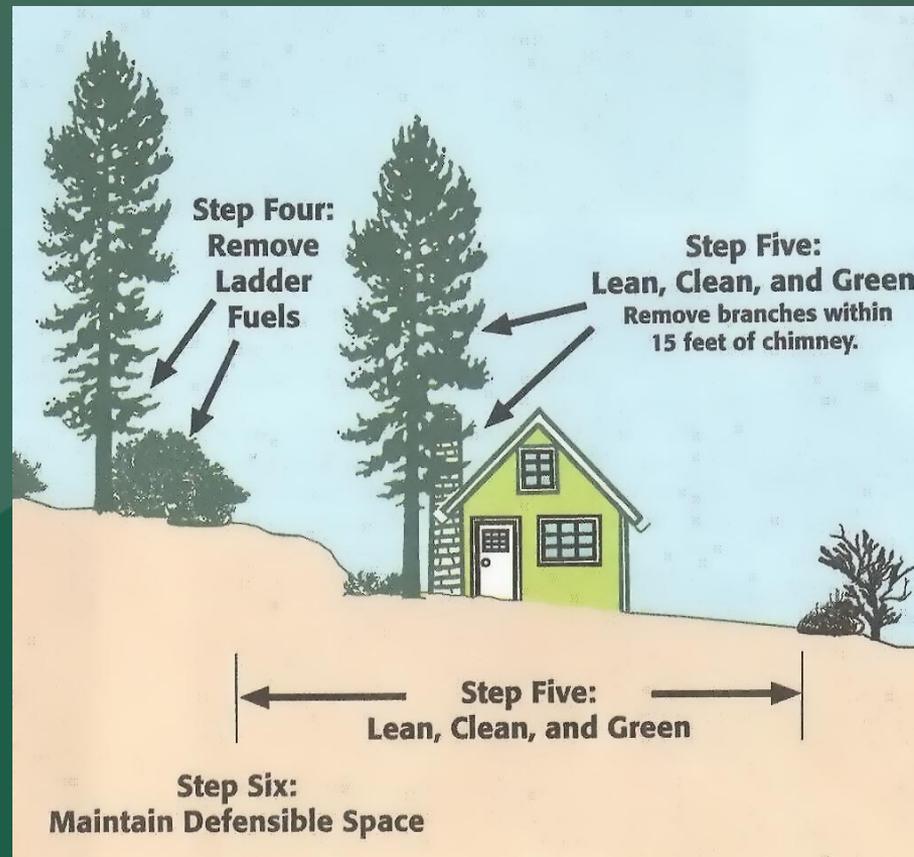
Ladder Fuels



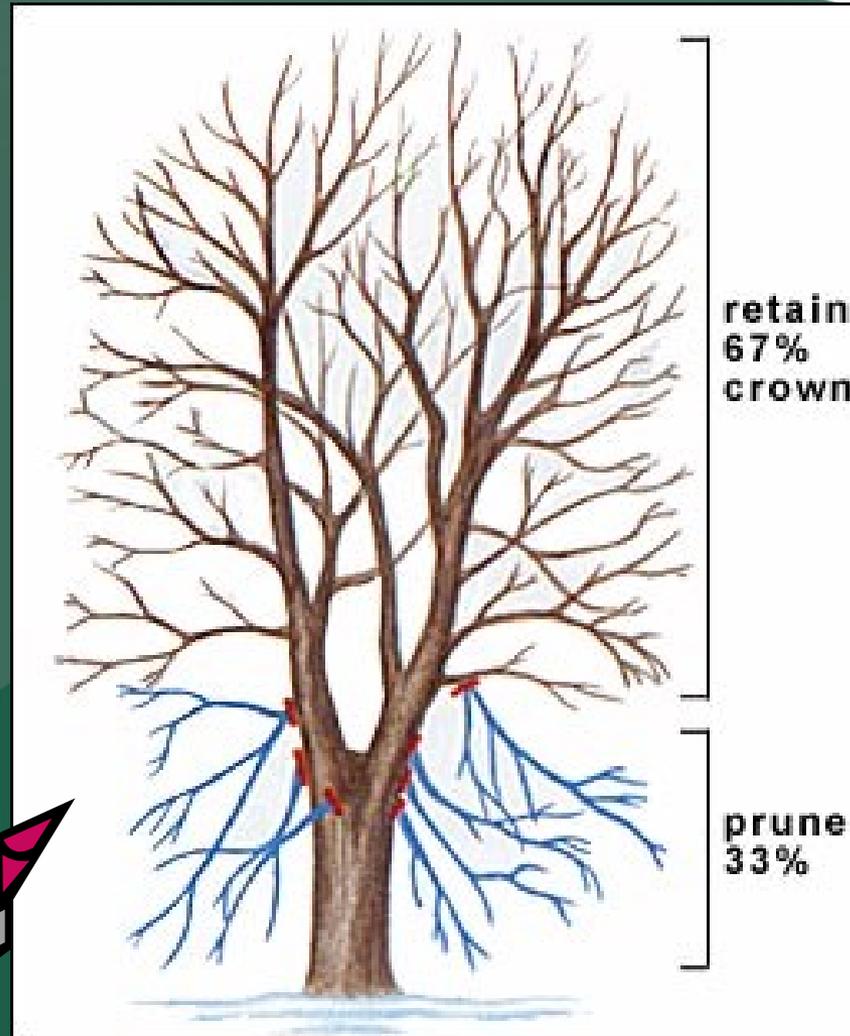
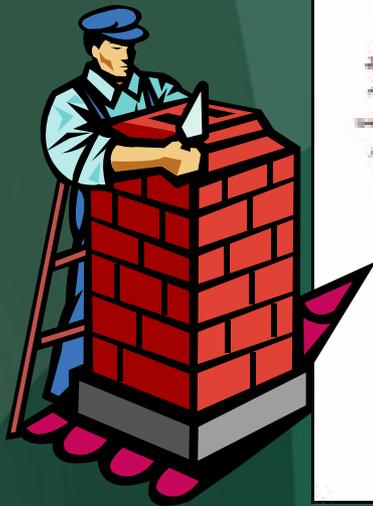
- Within the defensible space area, a vertical separation of 3X the height of the lower fuel layer is recommended (LIVING WITH FIRE Great Basin Fire Prevention)

Lean, Clean and Green Checklist

- Remove branches within 15 feet of chimney



Where would you prune if near a chimney?



Equipment

Extended Pole Pruner



Figure 2. Combination pole saw pruner

Pruning Shears



Scissor
Action



Anvil
Action

Lopping Shears



Scissor
Action



Figure 4. Pruning saws
(folding saw and bow saw)

Proper Pruning

- **Safety** – removing dead or overhanging branches or vertical clearance for defensible space
- **Health** -
 - ✓ Make clean and proper cuts above branch collar
 - ✓ Smaller wounds – easier for tree to heal
 - ✓ Do not take more than 1/3 of canopy
- **Aesthetics** – Good pruning can also (not always e.g. directional pruning for utility) be attractive

References

- **How to Prune Trees USDAFS NA-FR-01-95** (http://na.fs.fed.us/spfo/pubs/howtos/ht_prune/prun001.htm)
- **Tree Defects: A Photo Guide**, Alex L. Shigo, US Forest Service General Tech. Report NE-82; 1983; 167 pages (<http://www.chesco.com/~treeman/hardtoget/ntb168/index.html>)
- **Tree Pruning A worldwide Photo Guide**, Alex L. Shigo 1990
- **Tree Decay An Expanded Concept** USDAFS Information Bulletin 419, April 1979 (<http://www.na.fs.fed.us/spfo/pubs/misc/treedecay/cover.htm>)



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Any Questions?