

# Variable Retention

## Tailgate Training Posters



Developed by:



2003



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# Variable Retention (VR) Training

## How to use Tailgate Training Posters

This set of posters is a tool for explaining and discussing key implementation issues on VR for field crews. Posters can be used individually or as a package for both scheduled and informal field training.

The content is a summary of key points from “SPs for VR: Guidelines for Designing Variable Retention—Layout and Silvicultural Prescriptions”.

Posters should be kept handy (such as behind the seat of your truck) so that you can use them for “on the spot” field discussions. They beat writing in the dust!

You may also find the posters helpful for tours with students or public groups.

## Other training tools

- ❑ **Videos on “The Variable Retention Approach” Weyerhaeuser (2000):**
  - Introduction.** A general overview of VR and the Coast Forest Strategy (17 minutes)
  - Part 1.** Definitions, Ecological Rationale, Zoning, Economics, Highgrading, Regeneration and Pathogens, Windthrow (51 minutes)
  - Part 2.** Harvesting Considerations: Safety, Layout, Helicopters, Cable Yarding, Leave Tree Damage, Communication), Monitoring (47 minutes)Part 1 & 2 are also available on CD in a **Computer-Based Training** format.
- ❑ **Introduction to Silvicultural Systems: A Self-Study Workbook.** BC Ministry of Forests (1999).
- ❑ **Partial-Cutting Safety Handbook, BC Ministry of Forests and the Worker’s Compensation Board (1997)**
- ❑ **Binders from the original VR Field training sessions (1998/1999).** Copies of the “Participant’s Workbook” and “Reference Guide—Silvicultural Systems” are available in each Timberlands office.

## Acknowledgements

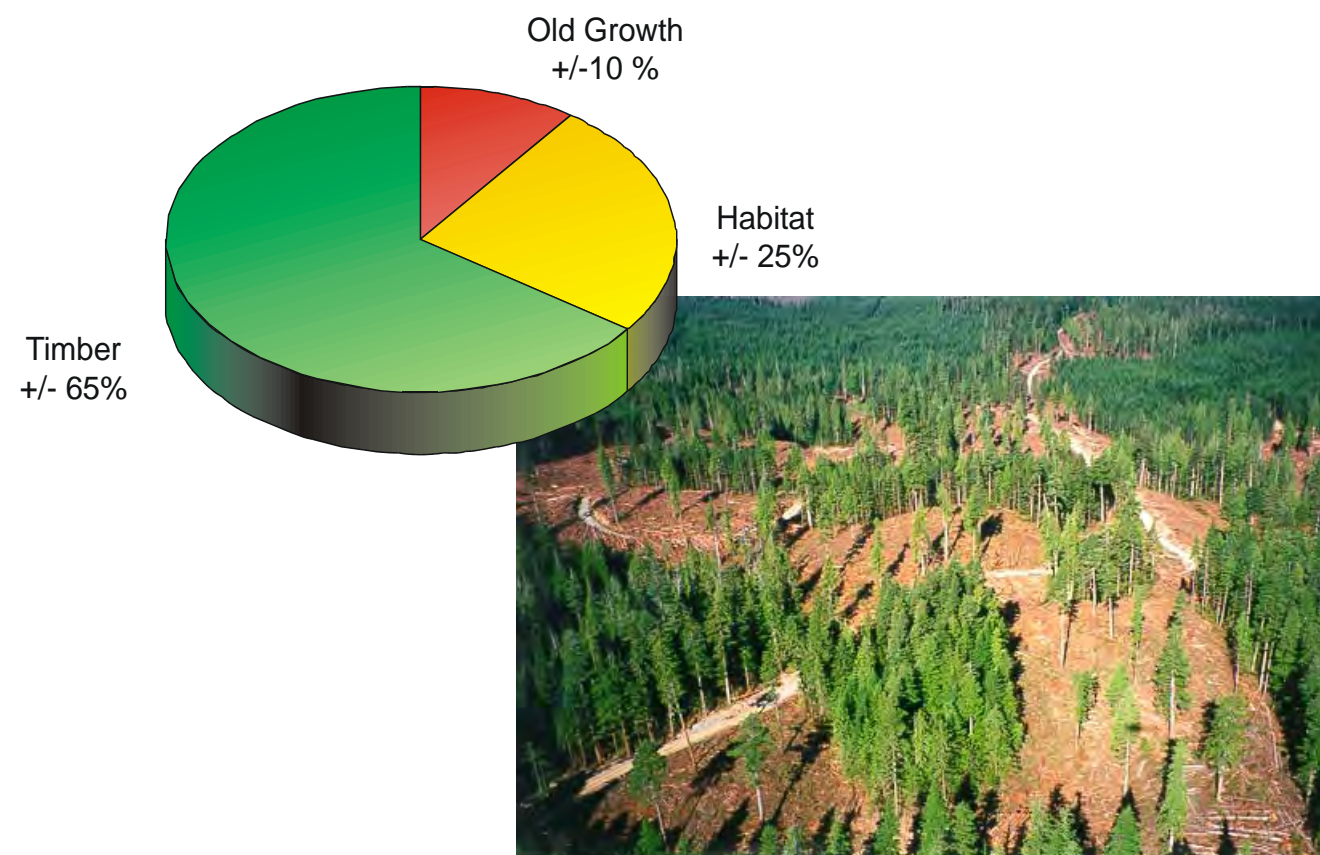
The Tailgate Training posters were developed and field tested by Bryce Bancroft and Ken Zielke, Symmetree Consulting Group Ltd. Edits were made by Bill Beese with input from the VR Working Group of Weyerhaeuser, BC Coastal Timberlands. Thanks to Paul Picard for use of some digital images; Stillwater Timberlands for heli-logging photos; Production Magic for the cable yarding diagram from the VR Training Videos; and John Przewczek for original diagrams modified for VR illustrations.



# Objectives – Why Variable Retention?

## Issues behind the BC Coast Forest Strategy (Forest Project):

- Landscape Simplification, Biodiversity
- Clearcuts and Public Perception
- Species Concerns



## Elements of the Coast Forest Strategy:

### Zones

- Old Growth conservation
- Key habitats
- “Don’t do the same thing everywhere”

### Variable Retention

- Legacies and Lifeboats
- Social License

### Adaptive Management



# Goals of VR

Weyerhaeuser's three goals for VR:

## 1. Leave a legacy of old forest values.

**Examples:** large and old trees, snags, multi-canopy structure, large woody debris, unique features

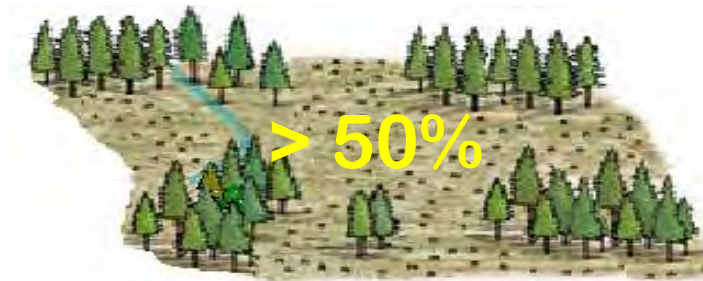
**TABLE shows minimums by zone.** Landscape reserves are rough averages for BC Coastal tenures.



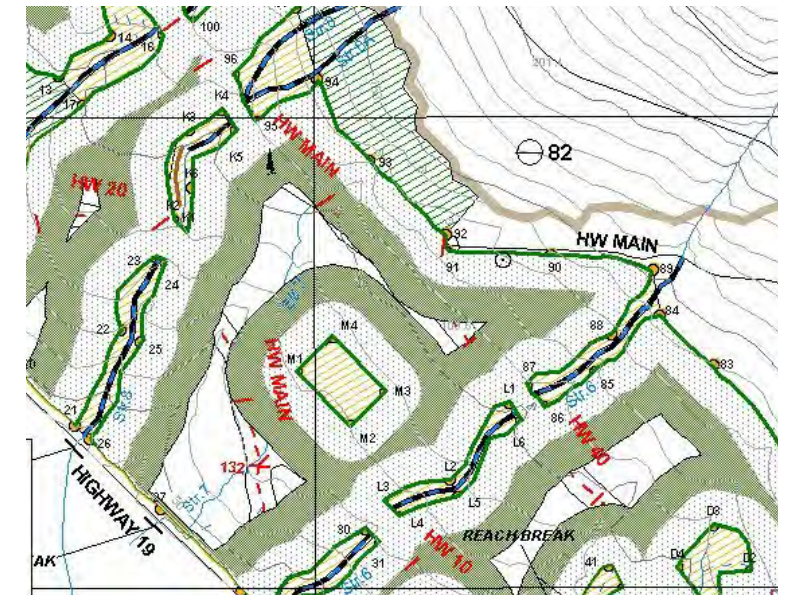
	Timber	Habitat	OG
Landscape area in reserves	28%	40%	70%
Retention by block	5% Dispersed, 10% Group	15%	20%

## 2. Maintain over 50% forest influence.

## 3. Practice good stewardship using the variable retention approach.



Within a tree length from an edge



➔ **Goal 3 includes: SAFETY, Forest Health, Windthrow, Visuals, Damage (soils, leave trees), Efficiency**



# Choosing what to leave

## ❑ Anchors – using the concept of Control Points

“Biological anchors”, some examples:

- Snag patches or large old trees
- Riparian areas
- Rock outcrops
- Unique ecosystems



## ❑ Spatial distribution of retention

Dispersed



Group



vs. Combinations

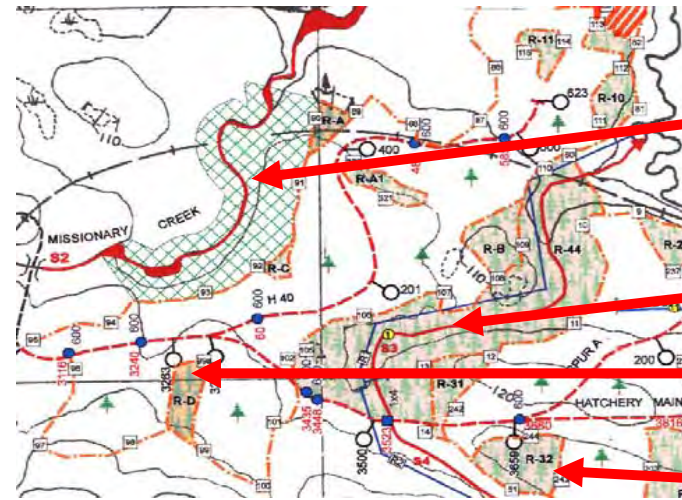


## Steps

1. Set Objectives
2. ID critical habitats or species at risk
3. Determine what you want to leave and why
4. Locate biological control points on map
5. Integrate with engineering control points
6. Determine final design (including visual aesthetics)



# Mapping and layout



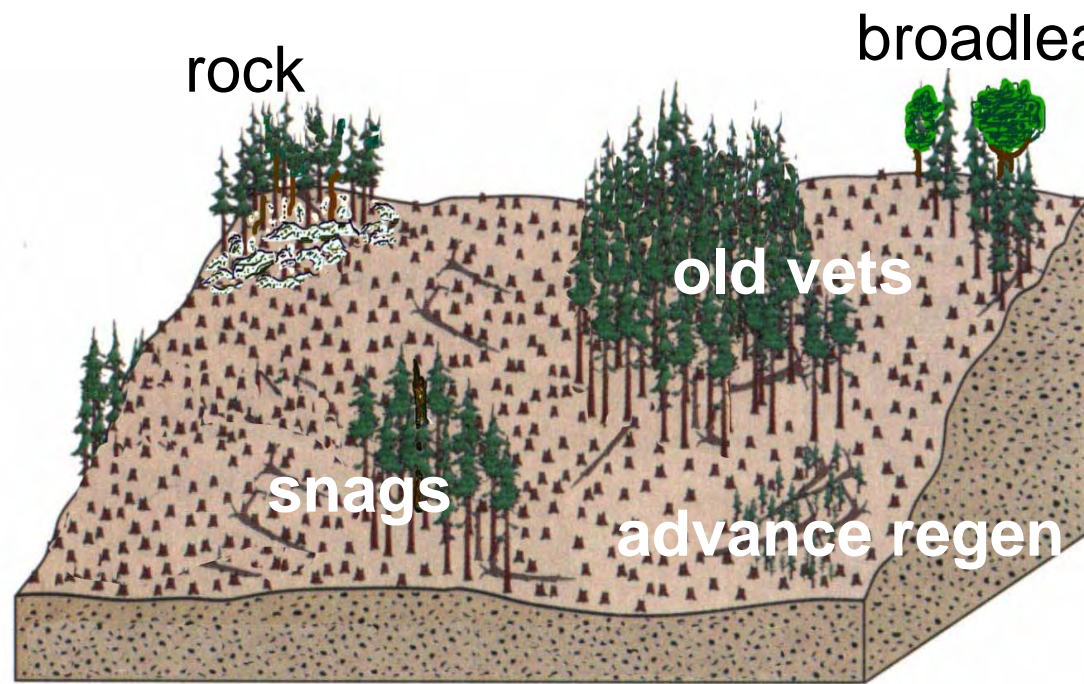
Riparian Reserve

Group of snags

Rock Outcrop

Wetland, Broadleaf Patch

USE THE CONTROL POINTS TO ANALYSE LAYOUT OPTIONS:



- Locate optimum landing areas
- Determine optimal yarding and forwarding patterns





# Focus most retention on groups

## Why groups? They provide:

- Adequate space to grow the new forest (less growth impact vs. dispersed)
- More habitat features than single trees
- Easier falling and yarding



### Clumps

(less than 0.25 ha)

*Useful for small openings  
or where a group is not feasible*



**Groups (0.25 ha +)**



# Visual objective – when is it too open?

## ❑ Guidance:

- Most retention is within the cutblock
- Retention is well distributed

As a general rule:

- Maximum ~4 tree lengths between groups
- Maximum ~2 tree lengths for dispersed retention

## ❑ “BCTV test” helps evaluate final layout design



## ❑ Exception: Large Patch VR

- Use for: windthrow, forest health or steep cable yarding
- Minimum of two 0.5 ha or one 1 ha patch for every 10 ha



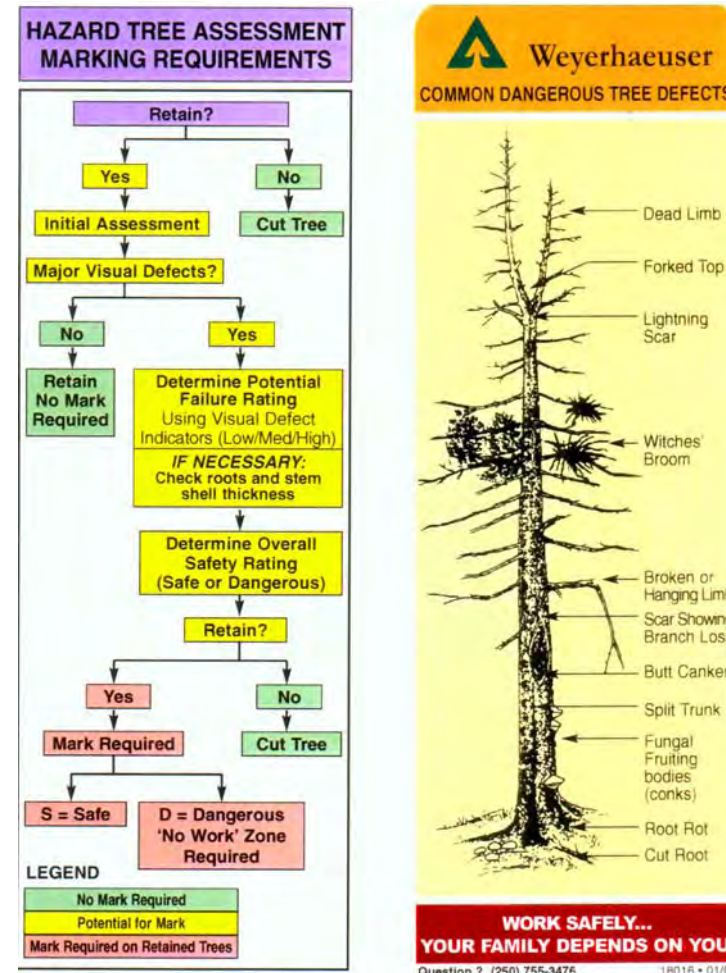
Large patch VR examples





# Danger Trees

- ❑ Are they being assessed?
- ❑ Options for danger trees:
  - Fall tree / eliminate risk
  - Create adequate no work zone
- ❑ Dangerous indicators but assessed as **SAFE**?
  - What procedure are you following for this?
  - Are you aware of company policies?
  - Why leave these trees?
- ❑ **General safety reminders:**
  - Ensure standing timber cannot fall on public roads and power lines
  - Create safe conditions for falling, yarding, loading, hauling and silviculture





# Windthrow Management - Hazard Assessment

## □ Assessment of Hazard

- Is the block exposed to problem winds?
- Are there limitations to rooting?
- Is the retention adapted to the wind?



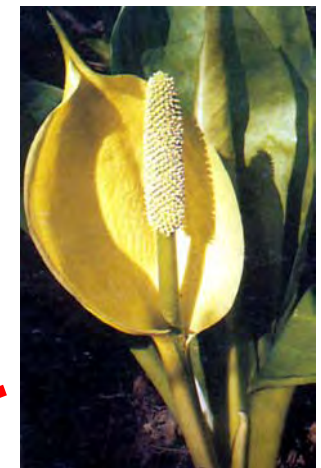
Look for trees adapted to wind exposure

## □ Use Windthrow Assessment Field Cards:

- **Site/Soil Hazard** (topography, rooting, drainage)
- **Edge Hazard** (windthrow history, species, stand density, tree height, crown size)
- **Edge + Site/Soil = Biophysical Hazard**
- **Wind Hazard** (existing windthrow, fetch length, Wind Exposure Index, Hazard Maps)
- **Biophysical + Wind = Windthrow Hazard**



Look for clues in plants



Edges and leave trees in well-drained deep soils



Minimize fetch between groups and between block edge and groups



# Windthrow Management - Risk Assessment

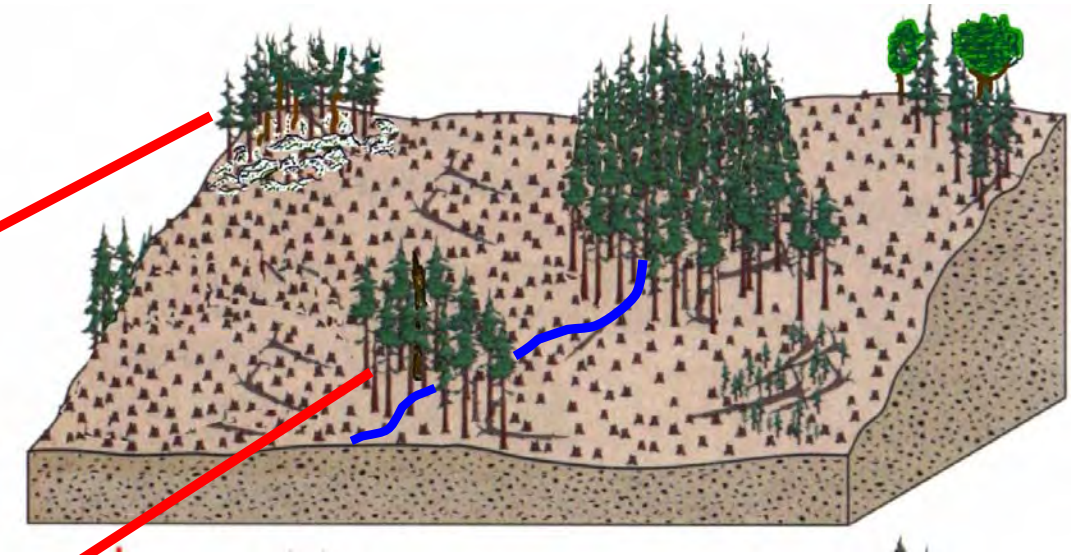
Assess windthrow risk and consequences of exposed edges, groups and dispersed retention



**MODERATE risk / LOW consequence?**



**HIGH risk / MODERATE consequence?**



## Choices:

- Change layout of groups and/or block boundaries; use large patches
- Plan for salvage
- Accept blowdown\*
- Edge treatment (pruning, topping)

\* **Remember:** Windthrow isn't all bad! It's been happening for centuries, and many species need dead trees on the ground for habitat.



# Windthrow Management - Treatments

## Crown Modifications

Use sparingly:

- Manual topping, pruning
- Heli-pruning



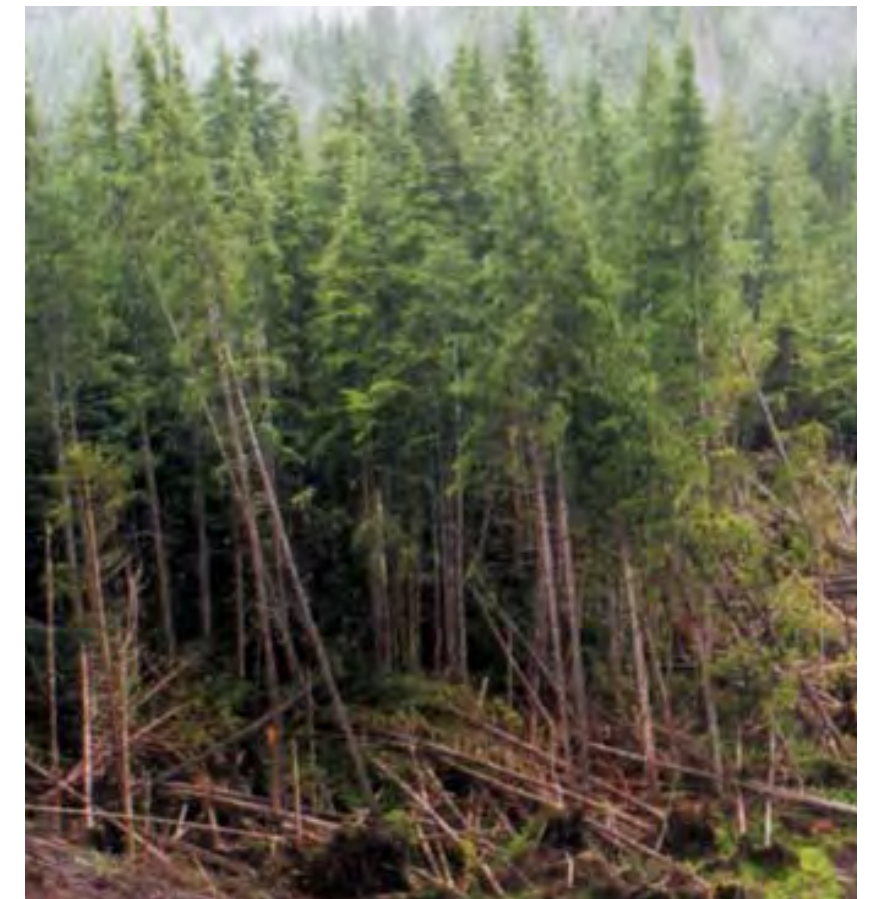
## Feathering

- Thinning within the first tree length (10% to 30% maximum)
- Keep most windfirm trees
- Don't feather in dense stands of slender trees—can make it worse!
- Avoid high risk, poorly rooted stands



## Salvage

- Anticipate prior to harvest
- Plan for it
- If SAFE and feasible:  
Try to keep windfirm trees  
& LEANERS





# High-grading

## Dangers of high-grading:

- Removes trees with the best **genes**
- Promotes **low quality or unhealthy** trees and species
- Undesirable trees **interfere with the growth** of desirable trees



## Can Lead to:

- Degraded stand quality and growth potential, or
- Uneconomical future harvesting
- = **Reduced future opportunities**

## To Avoid High-grading:

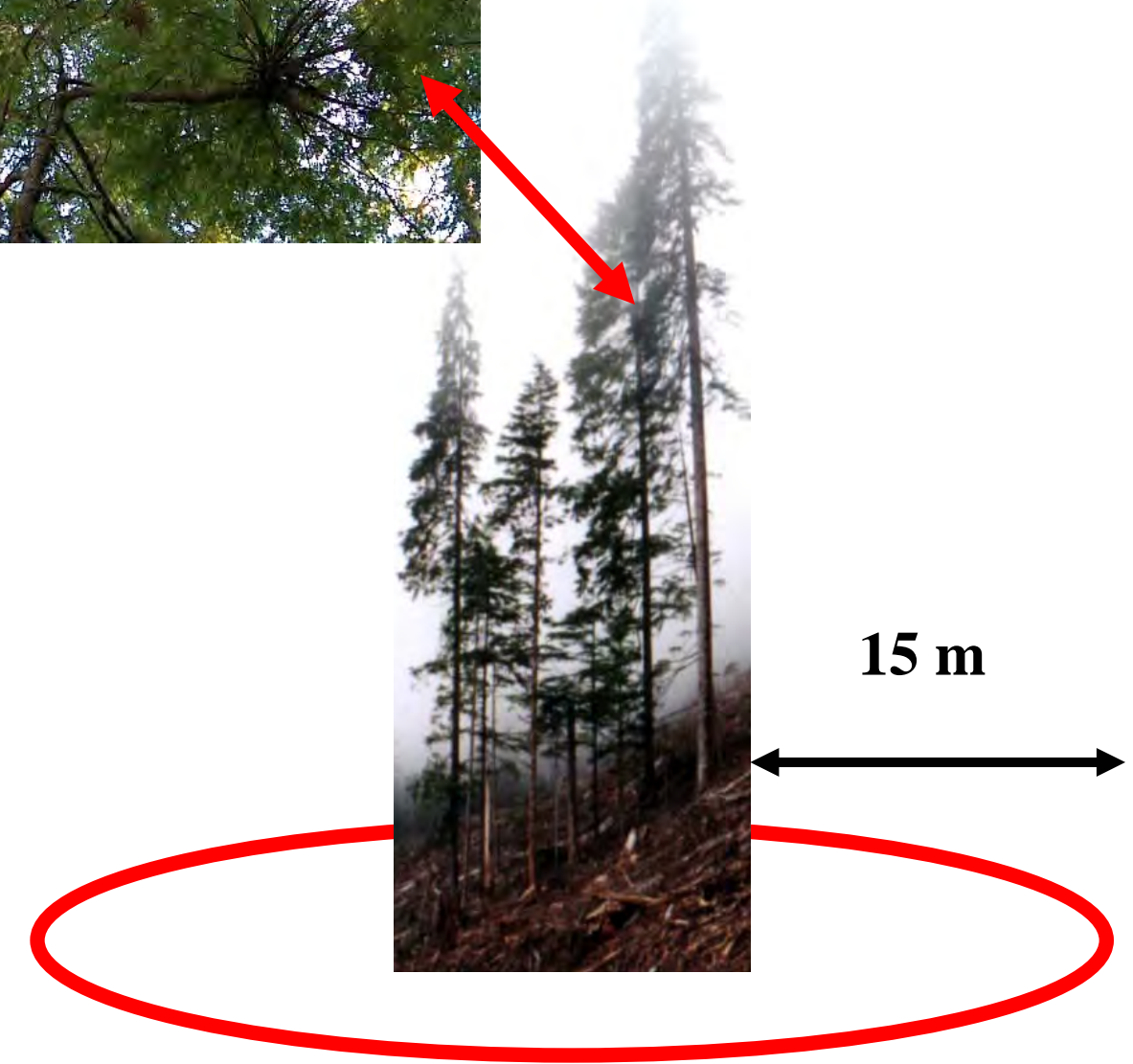
- Groups or individual trees are distributed to provide suitable growing space
- The prescription has a plan to deal with the spread of disease or pests from leave trees
- Where most trees are uncut, opportunities exist for future harvesting





# Hemlock Dwarf Mistletoe

- ❑ Impacts on hemlock: reduced vigour, growth and wood quality; stem swelling can lead to breakage
- ❑ Does not live on dead trees or branches
- ❑ Area of potential spread is generally about 15 m around infected trees



## Avoidance Strategies

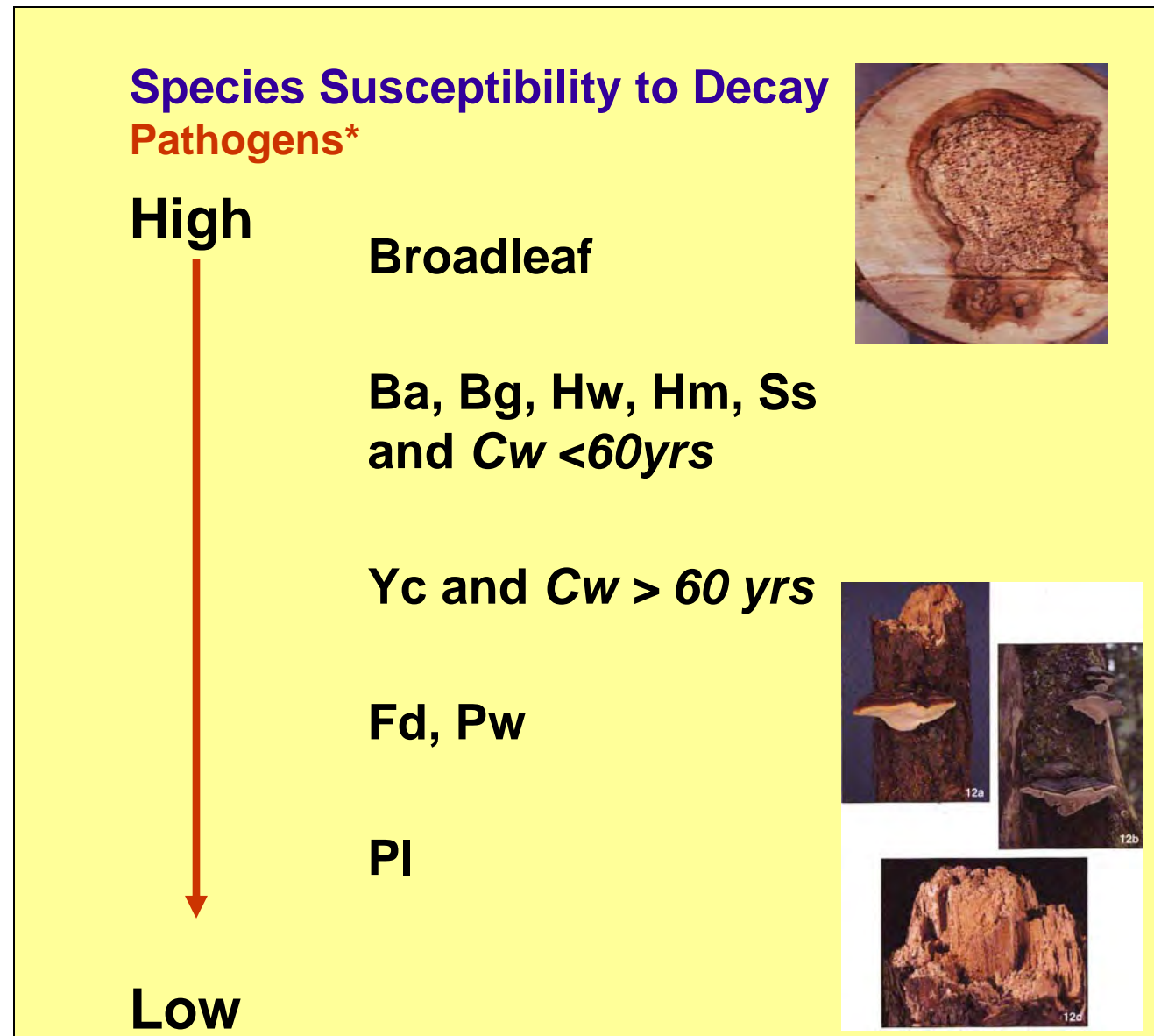
- ❑ **Leave other species if possible**
  - Dispersed – select alternatives to hemlock
  - Groups - remove hemlock component on edges
- ❑ **Assess hemlock leave trees and**
  - Plant other species in 15 m infection zone, or
  - Remove source trees



# Damage to leave trees – Assessment

## Damage significance: Size, location and depth of wound

- ❑ Large or wide wounds (bark removed)
  - high % of the stem girdled, or
  - area of scar >400 cm<sup>2</sup> (20 x 20 cm)
- ❑ Low to the ground
- ❑ Gouges into the sapwood
- ❑ Into a root within 1 m of the stem





# Damage to leave trees – Prevention

The longer stems are left on site

+

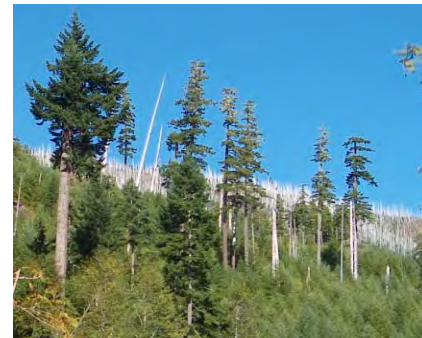
The more times exposed to harvesting entries =

The higher the likelihood of wounding resulting in decay

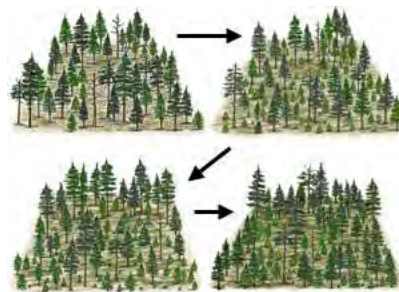


Is this too much damage?

2003



Clumps with one pass



Single tree selection

Risk  
Low



High  
Risk

## Guidance to reduce wounding

- Restrict operating season (in the spring the sap flows...this can be critical!)
- Gain cooperation of operators – they are the key!!
- Match equipment size with timber and site conditions
- Match inter-tree spacing with log length--wider spacing allows longer log lengths
- Designate 'rub' trees or use protection
- Use directional falling (herringbone)

\* From R. J. Nevill, 1997. A Review of Tree Wounding

For more information see [www.pfc.cfs.gc.ca](http://www.pfc.cfs.gc.ca)





# Ground-based Forwarding

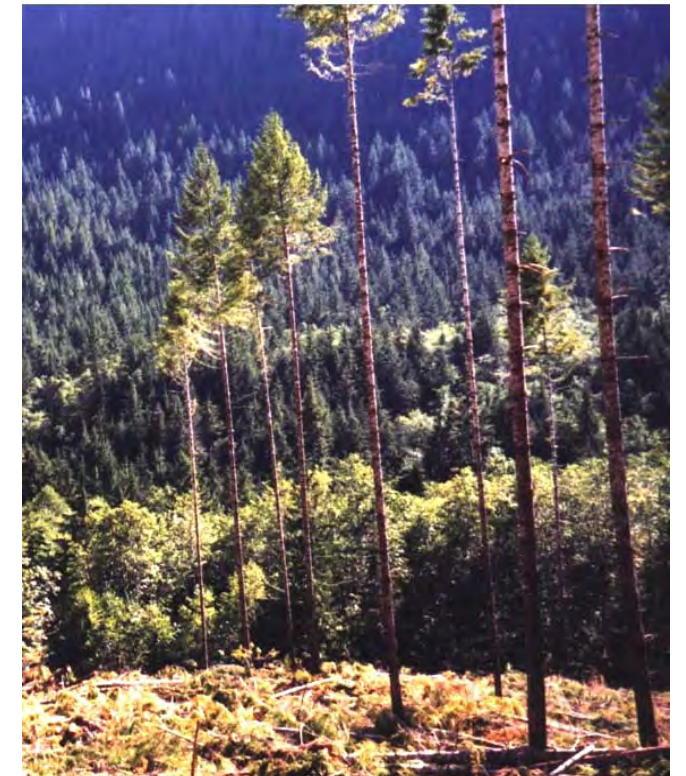
- ❑ **Efficient layout** – there are often lots of options
- ❑ **Avoid excessive amounts of dispersed trees**
  - Use clumps and large individuals where most effective for retention
- ❑ **Maintain at least two tree lengths between groups to aid falling**
- ❑ **Avoid creating pinch points**
  - Maintain room for the wood volume that will pass through the area
- ❑ **Minimize detrimental soil disturbance**





# Cable Yarding

- ❑ **Group retention is preferred**
- ❑ Place in logical areas for yarding
  - Poor deflection
  - Split lines
  - Allow yarder to angle behind
- ❑ Use “large patch VR” approach for difficult sites
- ❑ Leave extra dispersed retention in areas “too open”
  - Line up in direction of yarding
  - A small clump may do it
- ❑ Consider use of carriage to yard laterally behind mid-slope groups
- ❑ Avoid doing the same thing everywhere!
  - Different solutions for different sites

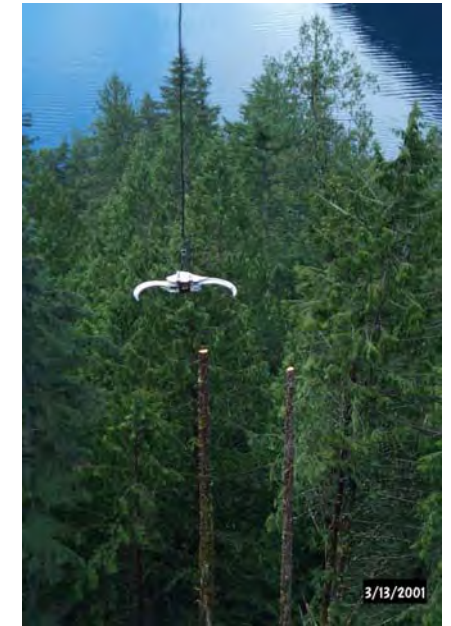




# Helicopter Yarding

## Conventional

- Many VR options are available, from group retention to group selection
- Arrange group or dispersed retention patterns to maintain efficient flight paths to the drop zone (e.g., triangular patches pointing upslope)
- Avoid situations where F&B is piled up against standing timber



## Standing Stem Harvesting

- For sites where conventional heli or other systems are not feasible (terrain, wildlife, riparian, VQO); or, for extracting high-value stems in advance of conventional falling/yarding
- First identify the critical resource values to be protected on constrained sites
- Must address high-grading, growth and regeneration issues in the prescription
- Remove groups of trees, creating larger canopy openings whenever possible
- **Consult the Weyerhaeuser SSH Guidelines**





# Multi-pass Harvesting

## PLAN AHEAD

### Objectives for multi-pass

- Visuals, green-up/adjacency constraints, markets
- Is two pass necessary? Can you achieve objectives with one pass?
- Three or more passes are required for Selection systems

### Think about future entries when planning the first entry

- Consider objectives after future entries (silviculture, wildlife, harvesting, visuals...)
- Consider falling and yarding issues and damage to young regeneration for all entries (discuss with logging foreman)
- Consider efficiencies and costs
- Have a paper plan on file for all entries
- Use a spatial model for complex blocks

