

## A Decade of Variable Retention in Coastal BC

What have we learned?



W.J. (Bill) Beese, Forest Ecologist



Be prepared

*"Give me six hours to chop down a  
tree and I will spend the first  
four sharpening the axe."*

**The best thing about the future  
is that it comes one day at a time.**

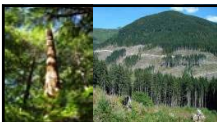


**Abraham Lincoln (1809 – 1865)**



## VR “Top 10” Lessons

- **How much and what pattern:** landscape context, natural disturbance, riparian
- **Effectiveness for biodiversity:** lifeboating species, structure, windthrow
- **Growth impacts:** group vs dispersed
- **People factors:** safety, costs, public acceptance



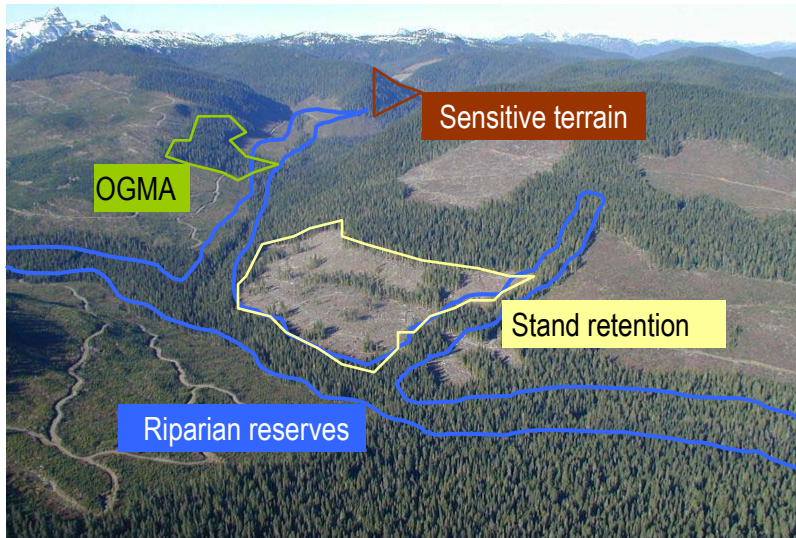
## How much and what pattern?

1. The landscape context determines how much stand-level retention is necessary to meet biodiversity conservation goals.





## Landscape- and stand-level reserves



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5



## How much and what pattern?

1. The landscape context determines how much retention is necessary to meet biodiversity conservation goals.
2. It is not practical (or necessary?) to precisely mimic or emulate natural disturbance patterns.

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6



# Natural disturbances



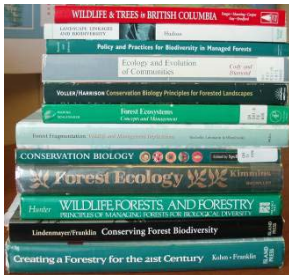
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# Natural disturbance: mimic?



**A guide, not a goal.**

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## A variety of approaches



Group retention - 13%



Mixed retention - 19%



Group selection



Mixed retention - 16%



Two-pass retention - 53%



Standing stem harvesting



## How much and what pattern?

1. The landscape context determines how much retention is necessary to meet biodiversity conservation goals.
2. It is not practical or necessary to precisely mimic or emulate natural disturbance patterns.
3. Riparian networks are a governing factor for retention patterns.



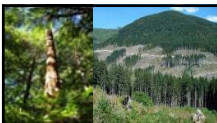
## Streams and wetlands



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11



## Effectiveness for biodiversity

4. Monitoring shows that retention can achieve a “lifeboating” function for some species, with a positive correlation between patch size and species survival.
  - Amount of retention generally more important than pattern
  - Review of 214 studies: aggregates better for most species
  - No negative responses to retention for species abundance

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12



# Monitoring: birds

Study by Mike Preston, SFU

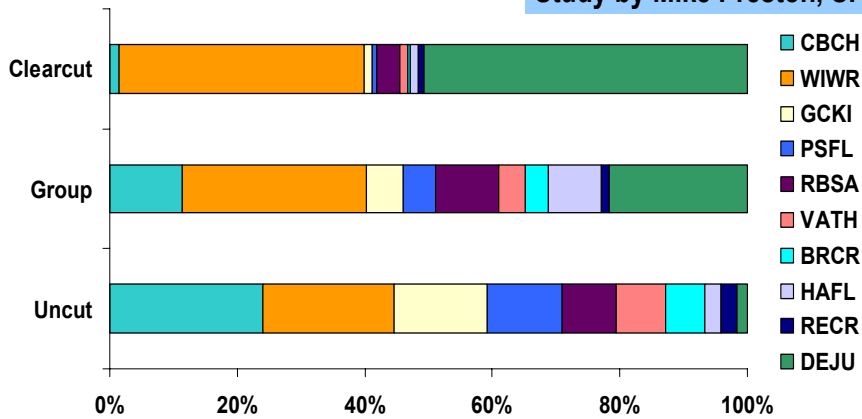
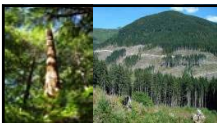


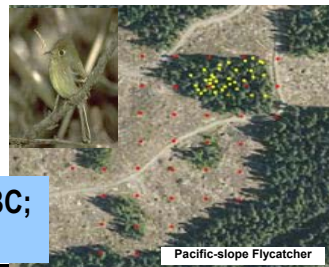
Figure 4. Percent frequency of occurrence in each treatment of the 10 most common species detected in uncut stands. Species codes and full names are given in Appendix 1.

**Group retention maintains more similar distribution of common species from uncut stands than a clearcut**



# Monitoring: birds

- Group retention beneficial
- Positive correlation to % retention
- Group size important for some
- Less than 15 - 20% retention, benefits decline significantly
- Some sensitive species decline below 35 – 40% retention
- 30% removal: little impact



Studies by M. Preston, SFU; A. Chan-McLeod, UBC; and D. Huggard & F. Bunnell, UBC



## Evaluating less mobile species



- Positive correlation between post-harvest abundance and size of retained groups; more important for drier sites
- Gastropods impacts: six negative, two positive, two mixed
- Small snails more diverse than slugs

Studies by I. Pearsall, K. Ovaska and L. Sopuck



## Ectomycorrhizal fungi



- Abundance of EM fungi decreased with distance from forest edges
- For dispersed retention, EM diversity increased with tree density and was greater near retained trees

Study by Dr. T. Trofymow and R. Outerbridge



## MASS study – 15 year understory



- Species richness and diversity greater in all treatments at 15yrs than pre-harvest
- Edge effects minor
- Species associated with old forest recovering; bryophytes, maintained in patches and SW
- Vaccinium => pre-harvest at 10 – 15 years post-harvest

Studies by Beese and Sandford



## Effectiveness for biodiversity

4. Monitoring shows that retention can achieve a “lifeboating” function for some species, with a positive correlation between patch size and species survival.
5. Wind damage is a challenge for dispersing retention, making CC with reserves the most viable for some sites & landscapes



## Monitoring: windthrow

- Database: 3700+ plots, 125 cutblocks, 264km of blk edge, 153ha of groups <1ha

**Cutblock edges:**  
11 to 21% (15 avg.)

**Edges of Large Patches:**  
11 to 38% (22 avg.)

**Small Groups:**  
9 to 55% (37 avg.)



Study by T.Rollerson & C.Peters



## Windthrow Damage – NW VanIsle





# WFP Zoning Guidelines

	ZONE		
	Enhanced	General	Special
<b>Use of the retention system</b>	30% - 60%	40% - 70%	90%
<b>Minimum Long-term retention in each cutblock</b>	10% - 15%	15% - 20%	20%
<b>Primary silvicultural systems</b>	Retention, CC+reserves	Retention, CC+reserves Shelterwood	Retention, Selection



# Effectiveness for biodiversity

4. Monitoring shows that retention can achieve a “lifeboating” function for some species, with a positive correlation between patch size and species survival.
5. Wind damage is a challenge for dispersing retention, making CC with reserves the most viable for some sites & landscapes
6. Retention has potential long-term benefits for enhancing structural diversity of forests.



## Structural diversity



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## Growth impacts

7. Growth impacts on regeneration increase with greater dispersion of single trees or small groups.



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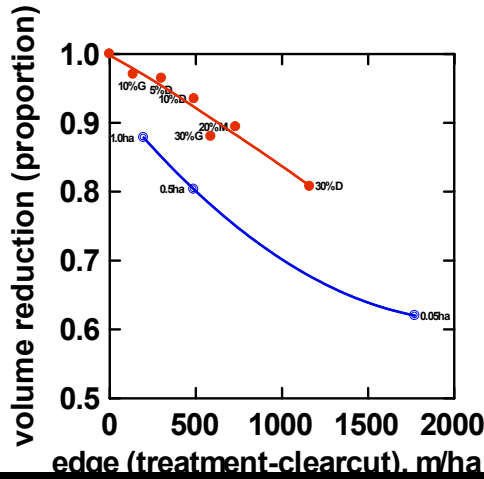
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# Growth and yield modeling

## Fir Yield Compared to Clearcut



### Impact of Retention

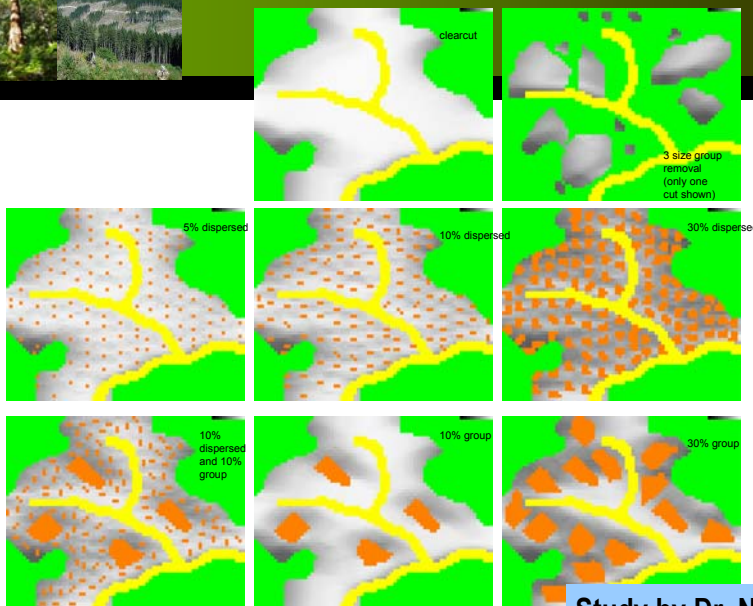
#### TYPE

- group/dispersed
- group removal

Study by Dr. Nick Smith



## FORGE model



Study by Dr. Nick Smith



## MASS study – 15 year planted trees



- Shelterwood reduced growth compared to CC, GT, PC
- Planted Hw best growth in PC
- Edge effects short distance
- Growth “check” at 10+ years not alleviated with retention
- *Vaccinium* a significant competitor

Studies by Mitchell, Koppenaar, Bown, Goodmanson



## People factors

8. Retention can be done safely across a wide range of forest types & terrain using a variety of logging and silvicultural systems.

- **Company safety performance improved during phase-in of variable retention**
- **Over 50,000 ha of the retention system since 1998 by our company**
- **43% of all Crown land harvesting 2004-2007 on BC coast used the retention system**



## People factors

8. Retention can be done safely across a wide range of forest types & terrain using a variety of logging and silvicultural systems.
9. Costs are a significant challenge in today's marketplace.



## Cost in today's markets

"Currently out of balance."

**Captain Obvious**





## People factors

8. Retention can be done safely across a wide range of forest types & terrain using a variety of logging and silvicultural systems.
9. Costs are a significant challenge in today's marketplace.
10. Public visual preferences conflict with ecological goals and operational needs.



## Public acceptance



- For a given retention level, people prefer dispersed retention over group retention
- Retention <15% is generally perceived only slightly better than clearcutting



# Meeting the challenge of SFM



- If we don't contribute our share of global wood products, we transfer the impacts elsewhere
- We can and must demonstrate SFM here; If we can't with all our advantages, who can?

Based on Shifley 2006



# Questions?

## With thanks to:

Glen Dunsworth, Jeff Sandford,  
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