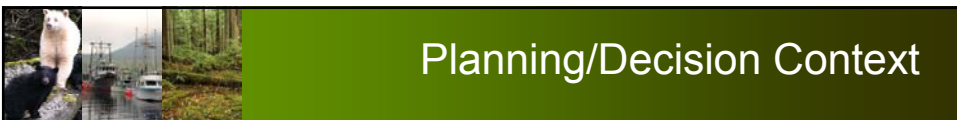




## Example: Variable Retention

### Maintaining stand structure and biodiversity

Bill Beese, Forest Ecologist  
Western Forest Products



## Planning/Decision Context

- Company “A” manages a TFL on the BC Coast with CSA Certification
- The SFM Plan includes the **overall goal**: conserve biological diversity on the tenure
- An overall strategy is developed with 3 components:
  - representation of ecosystems in reserves
  - maintain stand structural attributes
  - maintain viable populations of species
- An adaptive management approach is chosen, including research and monitoring
- AM results will be used to adjust practices



## Objectives and Indicators

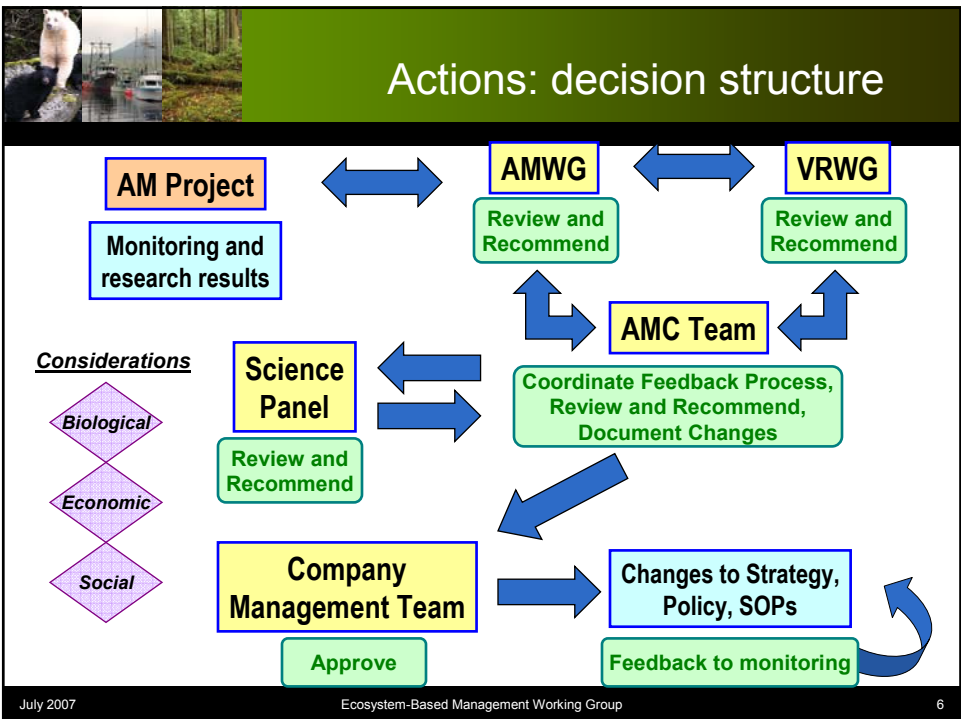
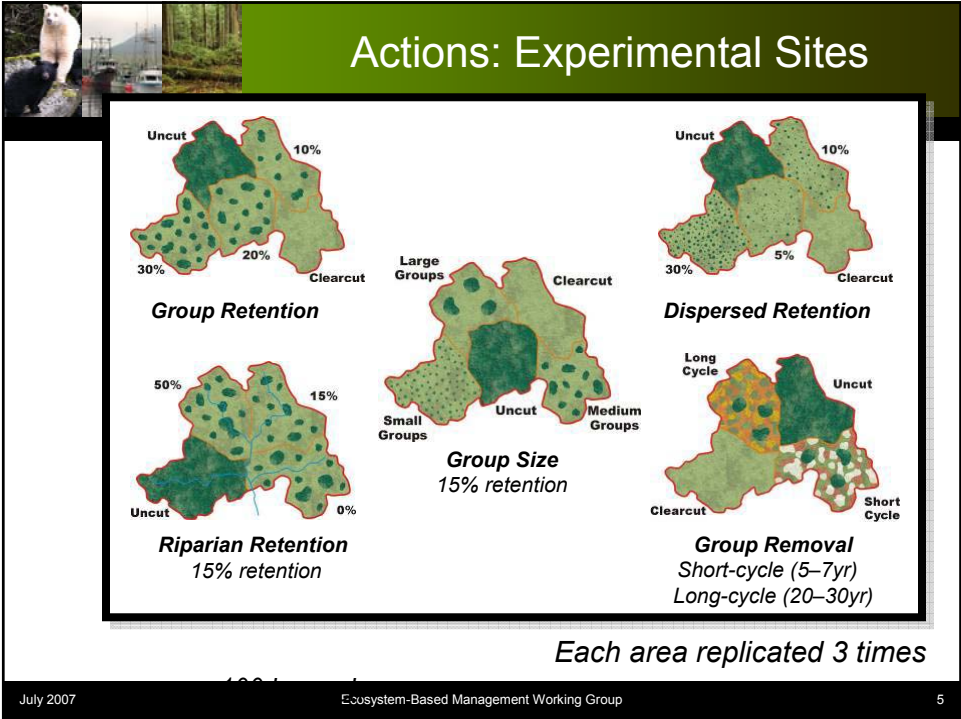
### Example: Maintain stand structural attributes

- **Objective:** maintain a legacy of structural attributes from the previous stand to enhance stand-level biodiversity
- **Indicators:**
  - Amount/type of attributes retained (% of stand, snags, CWD...)
  - Losses to windthrow over time
  - Safety, cost and feasibility of logging
  - Impacts on species (e.g., birds, beetles)



## Actions

- Guidelines are established for implementing variable retention using the 'retention system'
- For group retention, a minimum group size of 0.25 ha is chosen, and...
- 10% to 20% minimum cutblock retention
- Other guidelines are set for spatial distribution and type of attributes to retain (e.g., riparian)
- Experimental areas are set up to compare different approaches to retention (group, dispersed, % retained, group size)



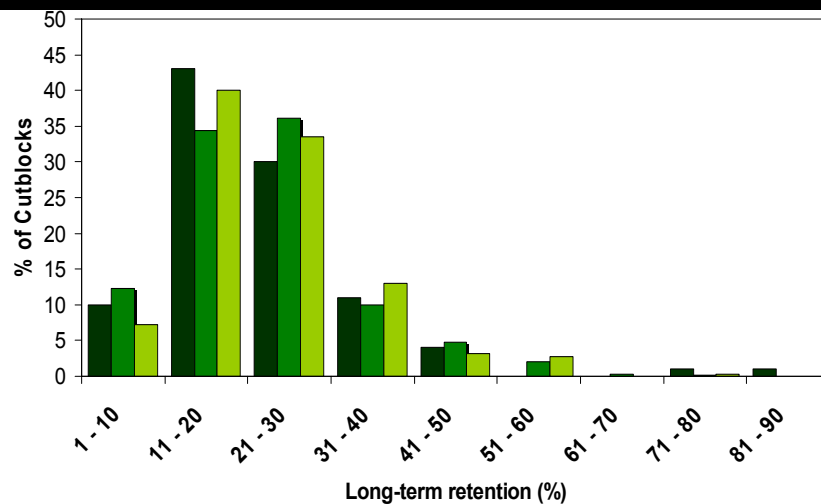


## Model

- Impacts of different practices are modeled to make predictions:
  - Species groups and habitat supply
  - Growth impacts on regeneration of different tree species
- Other models are used as an aid in planning (e.g., windthrow risk)



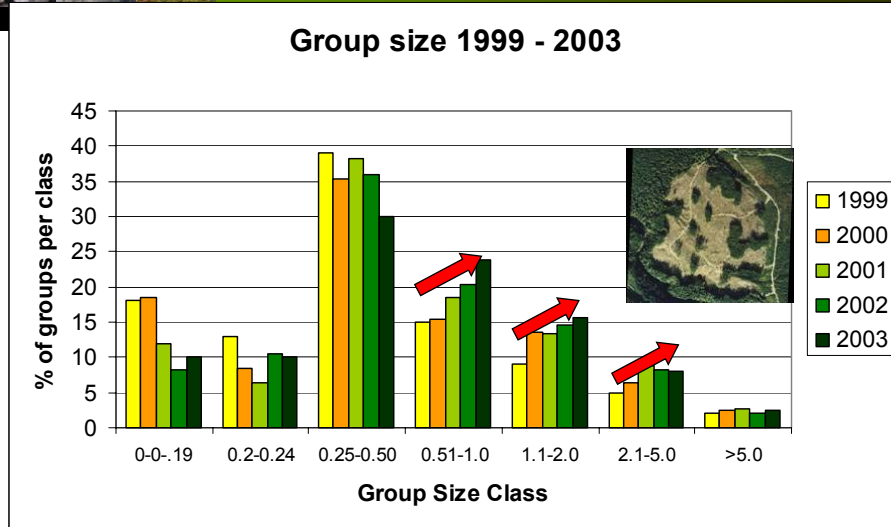
## Implement: % retention





## Implement: group size

Group size 1999 - 2003



Group size increased over the 5-year phase-in.



## Implement: stand attributes

- Average group size: 0.9 - 1.1 ha
- Groups with snags: 63 - 80%
- Groups with deciduous: 7 - 16%
- Groups on riparian: 21 - 43%
- Groups on rock outcrops: 14 - 16%
- Groups on scrubby trees: 6 - 16%

**Total Groups sampled: 1591**

2000: 489

2001: 426

2002: 302

2003: 374



## Monitor

- **Implementation monitoring** quantified the range of group sizes and % actually done
- **Effectiveness monitoring** quantified the habitat attributes in retained groups and impacts on windthrow, tree growth and wildlife species



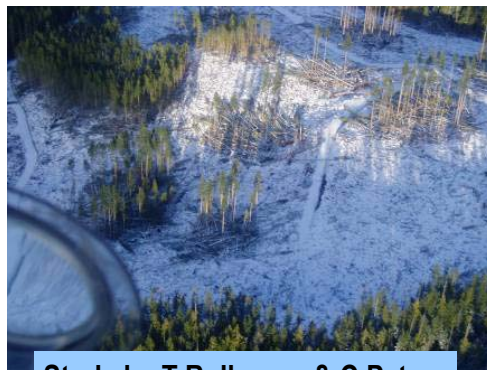
## Monitoring: windthrow

- 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


## Monitoring: birds




**Brown Creeper**



**Chestnut-backed Chickadee**



**Pacific-slope Flycatcher**



**Varied Thrush**



**Study by Mike Preston, SFU**

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## Monitoring: beetles

- Patches used by “forest specialist” carabid beetles 3-years post-harvest at all sites.
- More forest beetles in larger patches than smaller patches.

**Study by Dr. Isobel Pearsall**

July 2007 Ecosystem-Based Management Working Group 14



## Monitoring: summary

- Small groups had few large snags
- Small groups were more vulnerable to windthrow
- Large groups maintained more forest species
- Logging costs for cable yarding were lower for fewer large groups than more small groups



## Assess and Adjust

- Feedback monitoring results into a decision making framework to inform decisions about VR practices

Objectives	Large Group	Small Group	Dispersed
Old forest species	+++	++	+
Large snags	++	+	-
Windthrow	-	--	---
Cost	-	--	---





# Assess and Adjust

