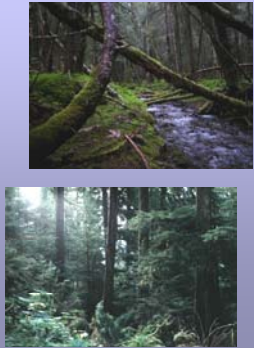


Alternatives to Clearcutting in the Old-Growth Temperate Rainforest of Southeast Alaska

Dr. Michael McClellan & Dr. Paul Hennon
USDA Forest Service
Pacific Northwest Research Station
Juneau, Alaska, USA

Native Forest Conditions


- Temperate old-growth rainforest with a high-frequency, low-intensity disturbance regime.
- Over 80% of the productive forest is old-growth; most of the native forest remains protected.
- *Tsuga heterophylla* dominates (83% by number). *Picea sitchensis*, *Thuja plicata*, *Chamaecyparis nootkatensis*, *Tsuga mertensiana* are common associates.



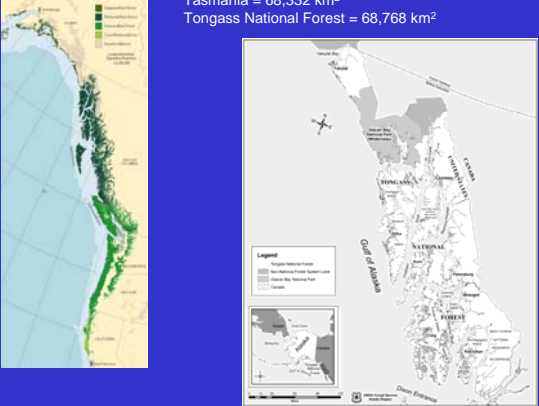

Ecological & Social Context Study Design Selected Results

Native Forest Conditions

- Fires are rare and limited in extent (there is NO dry season).
- Wind, heart rot, insects, snow damage are common mortality agents—mostly affecting a few trees.
- Stands are 62% all-aged, 20% three-aged.
- The oldest trees are often 600-800 years-old.



Tasmania = 68,332 km²
Tongass National Forest = 68,768 km²



Old-growth features have been defined.

- Large old trees, often with decay or damage
- Multiple canopy layers
- Standing snags
- Down woody debris
- Diverse and abundant herb layer



(Capp *et al.* 1992)

Aboriginal use of the forest was limited and low intensity.



Two world wars increased demand for Sitka spruce.



Ship building and iron smelting increased demand for timber during the Russian colonial period.



The 1950s brought increased emphasis on large-scale clearcutting.

Early 20th century logging was usually selective and limited to shorelines and valley bottoms.



Clearcutting has created over 263,250 ha of young stands in southeast Alaska.



Clearcutting has been controversial for many reasons.

- Reduced visual quality & effects on tourism
- Simplified forest structure & loss of function
- Degraded fish and wildlife habitat
- Reduced slope stability
- Loss of understory vegetation

The lack of understory may persist as long as 120 years.

After 15-25 years, the canopy closes, blocking light to the understory plants.

The loss of understory severely limits forage available to deer.

“beckoning antechamber of hell,” or young-growth forest?

This is a problem, because deer in southeast Alaska are essential for sport and subsistence hunting...

...prey for carnivores such as brown and black bears...



We are testing two approaches for maintaining desired old-growth features.

1. Accelerate development of those features in young, even-aged stands.
2. Protect and retain features with variable-retention harvesting.





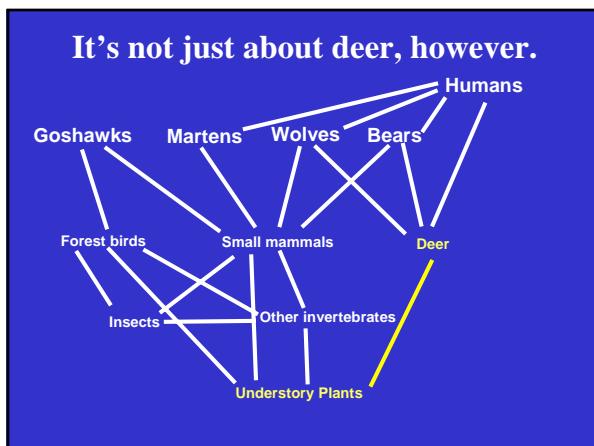

... and for wolves.



Managers have concerns with partial cutting.

- Dwarf mistletoe
- Tree injury and wood decay
- Increased logging costs
- Shift to more-tolerant species
- Windthrow

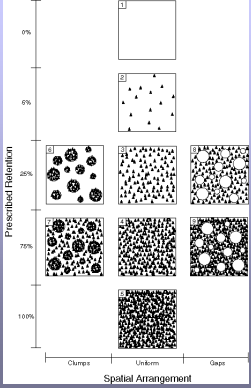



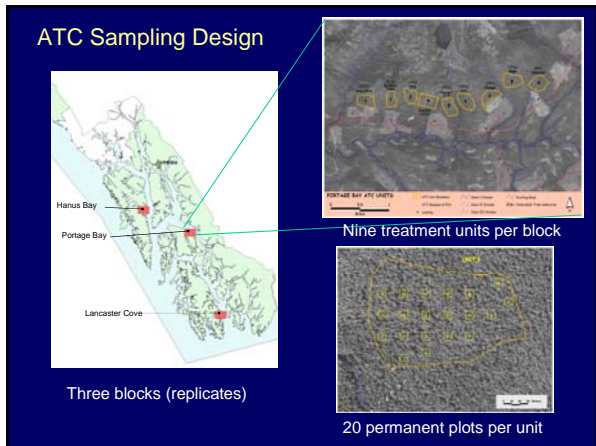
Experimental Design

Cutting Intensity: basal area retained (0 to 100%)

Spatial Arrangement: clumps, gaps, or uniform

Patch size: 0.1, 0.2, 0.7 ha





Understory Biomass and Forage

BA Retained	Pattern	Deer-days/ha		Biomass dry kg/ha
		Doe only	Doe + fawn	
100%	Control	328	50	2054
25%	ITS/uniform	763	182	3077
25%	ITS/gaps	1169	296	4958
25%	clumps	1157	232	5093
75%	ITS/uniform	267	82	2505
75%	gaps	631	384	2516
75%	ITS/clumps	283	65	2106
0%	Clearcut	1294	279	5700

Research Findings

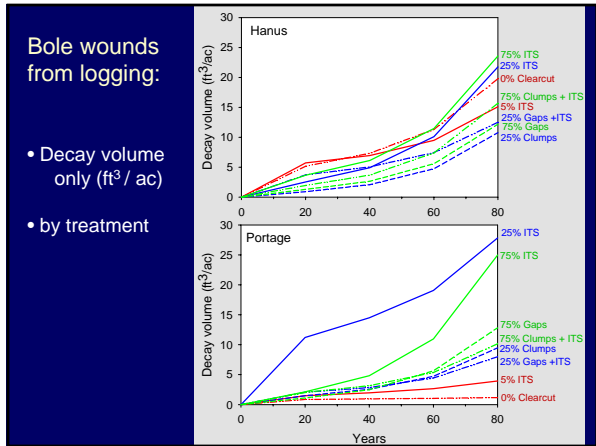
- All blocks were sold as standard timber sales— incentives were not required.
- All treatments were operationally feasible, even the 75% uniform retention.
- Yarding costs:
 - Lowest BA retention: US\$305-317/mbf
 - Highest BA retention: US\$331-353/mbf
- Christian and Brackley (2007) concluded that the value of the timber did not justify added costs of helicopter yarding.

Clearcut

0.3%

Portage 9

0.1%



5% Retention

5.4%

Portage 2

0.8%

