

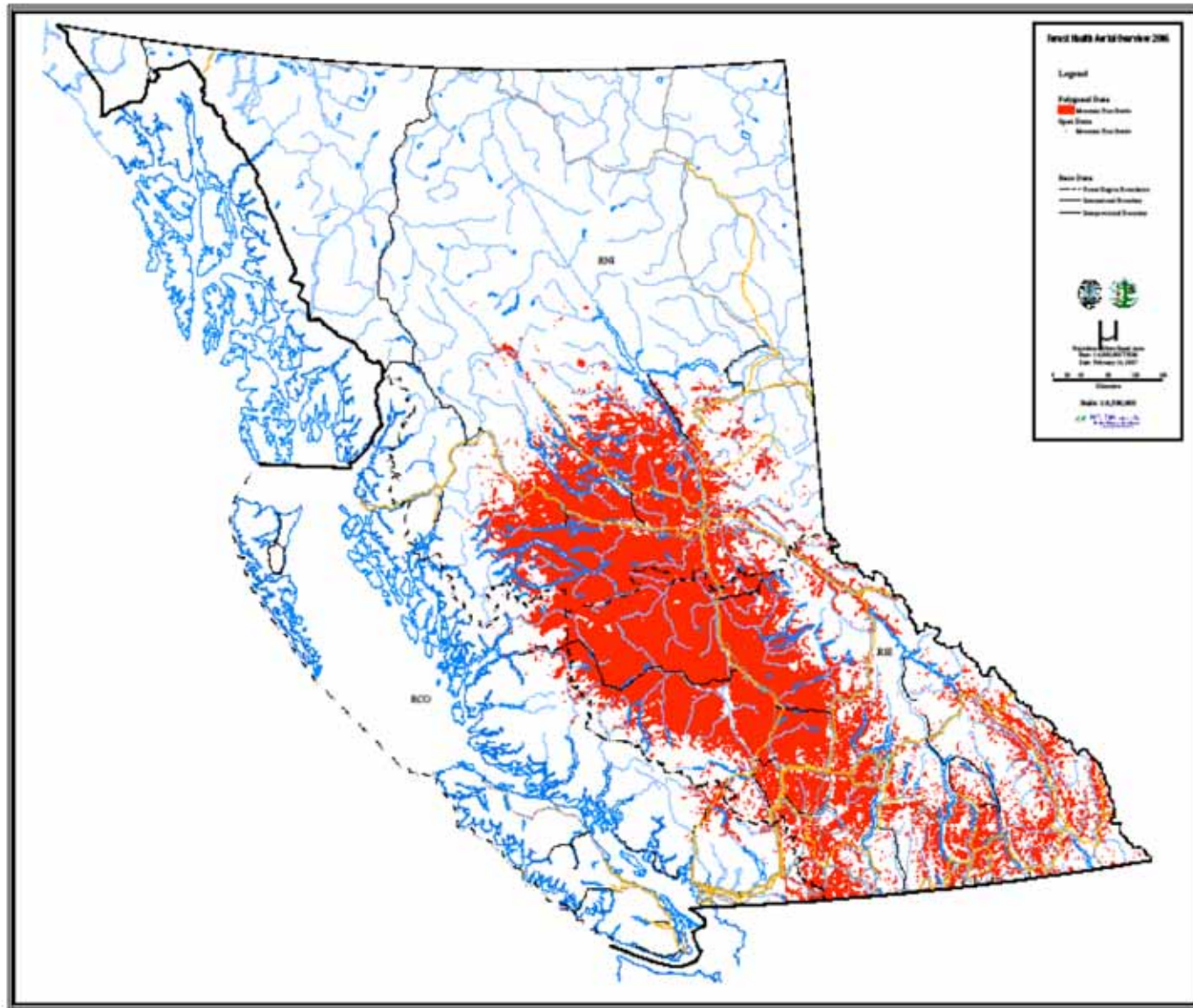
# Ecosystem Recovery Following MPB Attack: A Case of Shifting Values



Craig DeLong



# Massive outbreak of MPB impacting lodgepole pine (*Pinus contorta*) stands over most of central and southern BC





Wanted to examine changes to the ecosystem in response to MPB as a novel disturbance agent at this scale





50 Plots established in 2005 to determine effects of MPB on ecosystem/tree properties over time

- ☛ 10 mesic sites > 70% pine and >80 yrs old in each of 3 different climatic regions (biogeoclimatic subzones);
- ☛ 10 sites impacted by MPB then burned by wildfire;
- ☛ 10 sites on dry pine lichen sites



# Research examining

- tree fall down rates (timber value loss, fire risk);
- advanced regeneration release and natural regeneration establishment and growth (unmanaged stand yield - AAC effects, species composition prediction);
- changes in stand structure and habitat features (maintenance of biodiversity values);
- lichen survival and growth (maintenance of caribou forage value).



# Focus of this presentation

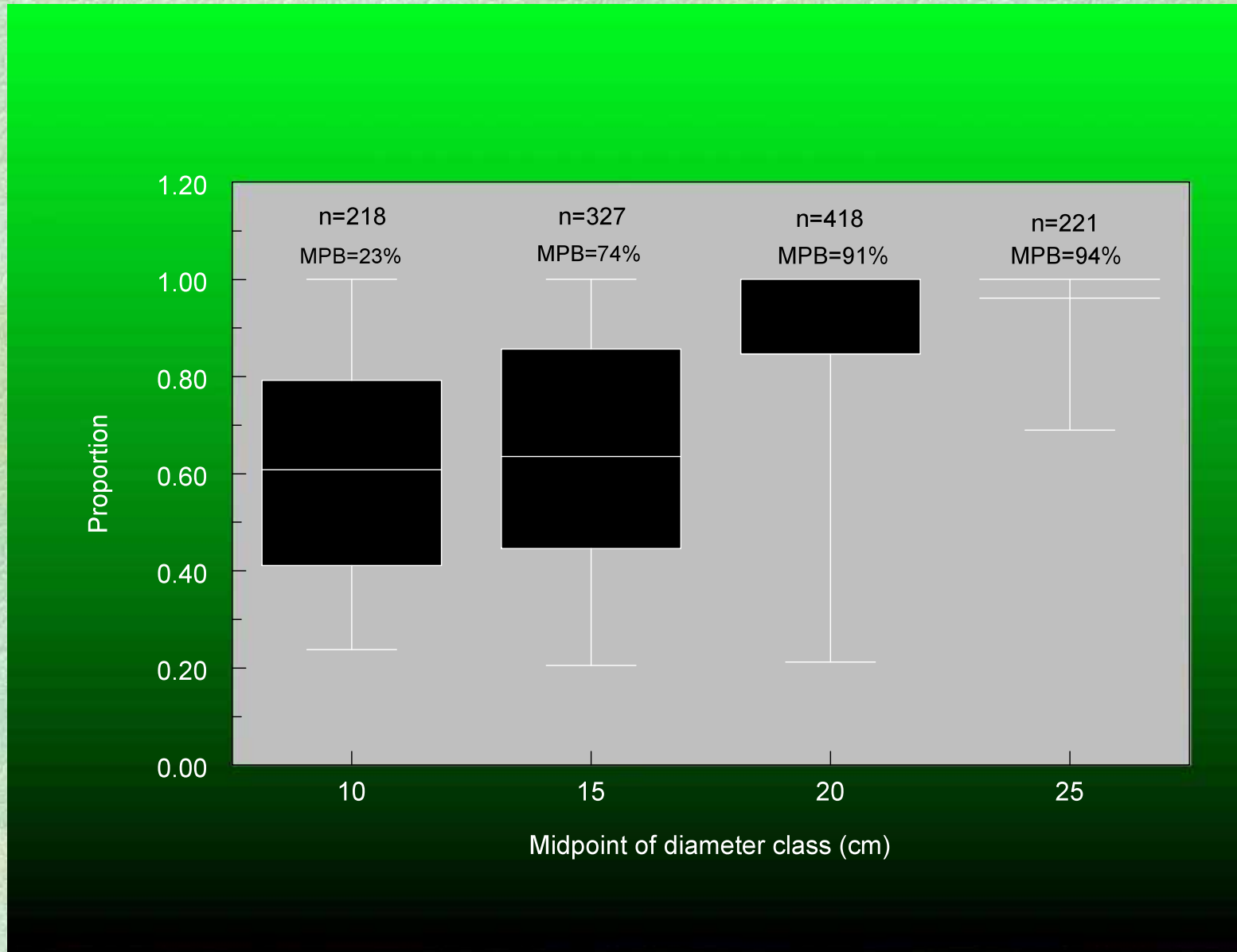
- ☛ Mesic (average moisture regime) unburned sites
- ☛ Changing timber and habitat values



# General View

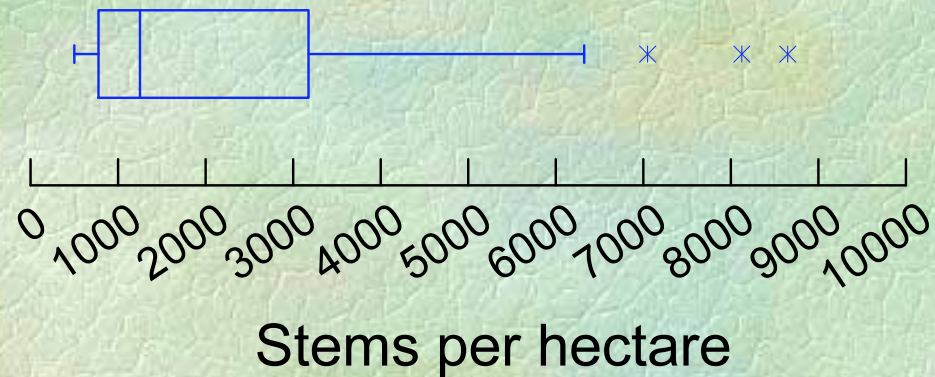
- ☛ Dead forest
- ☛ Focus on recovery of timber value
- ☛ More recent concerns over effects on water supply

# Very high mortality of larger stems





# Value of live understory



- 24 of 30 sites largest 500 sph pole size (> 7.5cm dbh), rest of sites sapling size (1.3m ht to 7.4cm dbh)











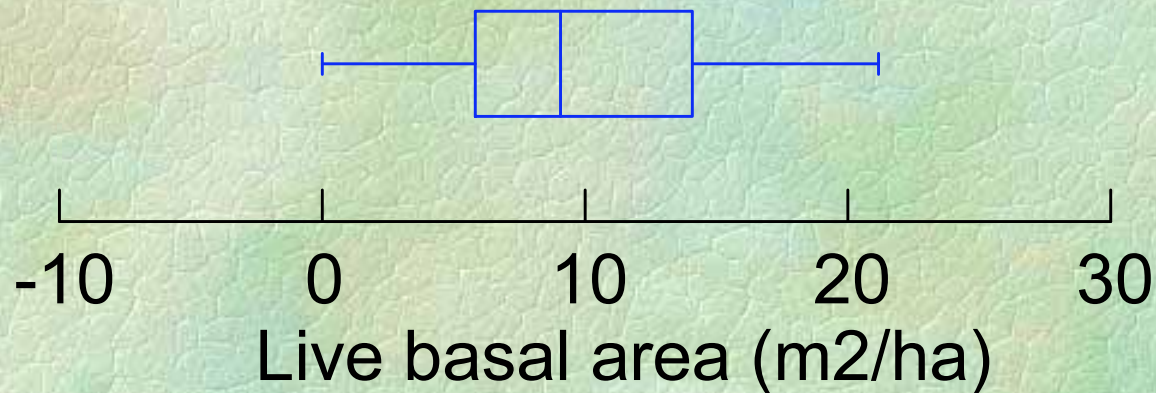
# Clearcut equivalency

- ☛ Examined median diameter of largest 500 sph and compared it to regeneration performance data from plantations established after clearcutting
- ☛ 10 of 30 equivalent to 25+ year old plantation, 14 ~15 – 20 year old plantation and 6 ~10 year old plantation



# Clearcut equivalency

- Basal area of 20, 30, 40 year old spruce plantation estimated to be 1 – 3 m<sup>2</sup>/ha, 7 – 14, 18 - 30 m<sup>2</sup>/ha respectively



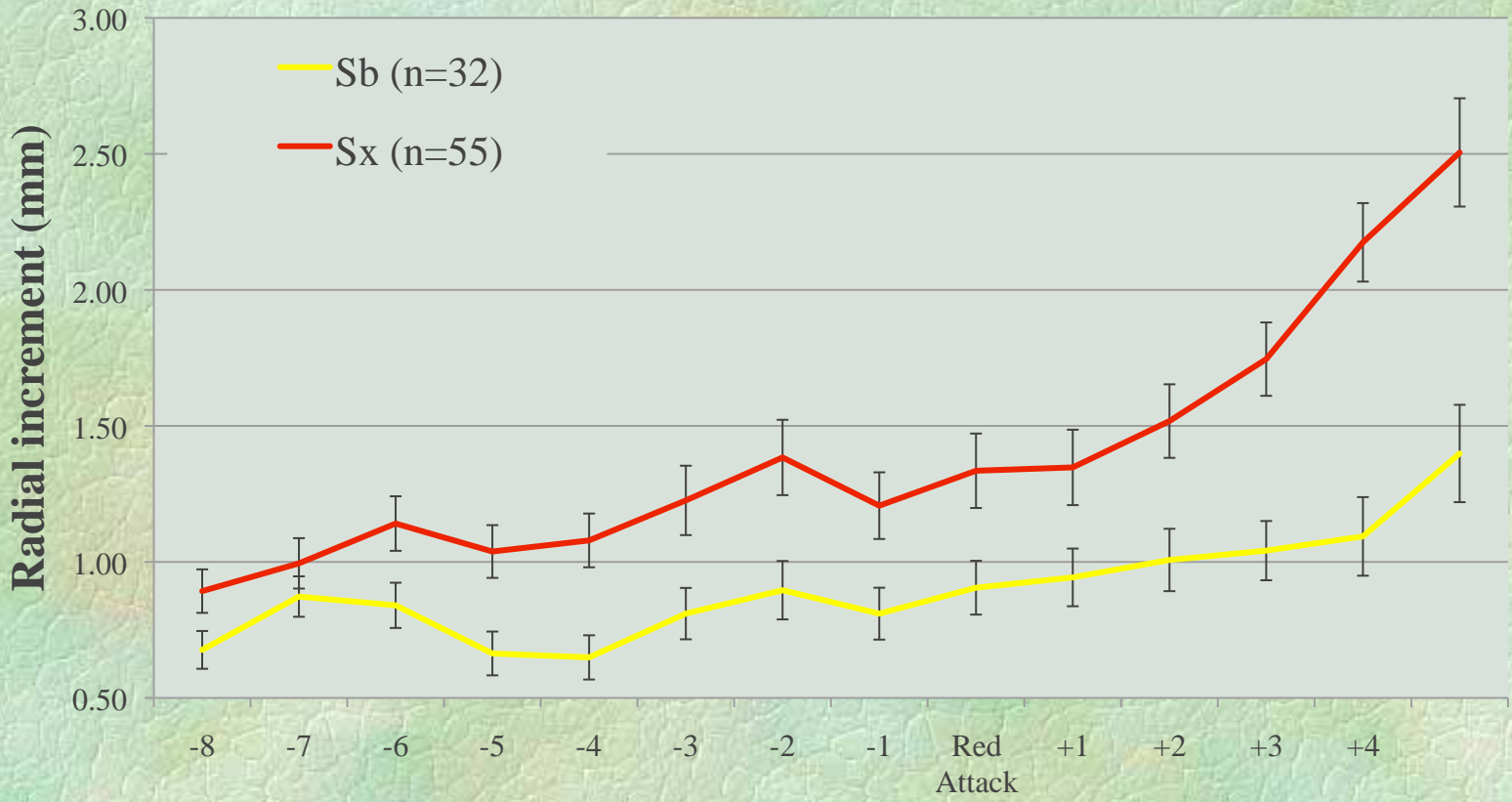


# Release response of understory

- Examined height and radial release response of poles, saplings and seedlings for hybrid white spruce (*Picea glauca* x *engelmannii*), black spruce (*Picea mariana*) and subalpine fir (*Abies lasiocarpa*)



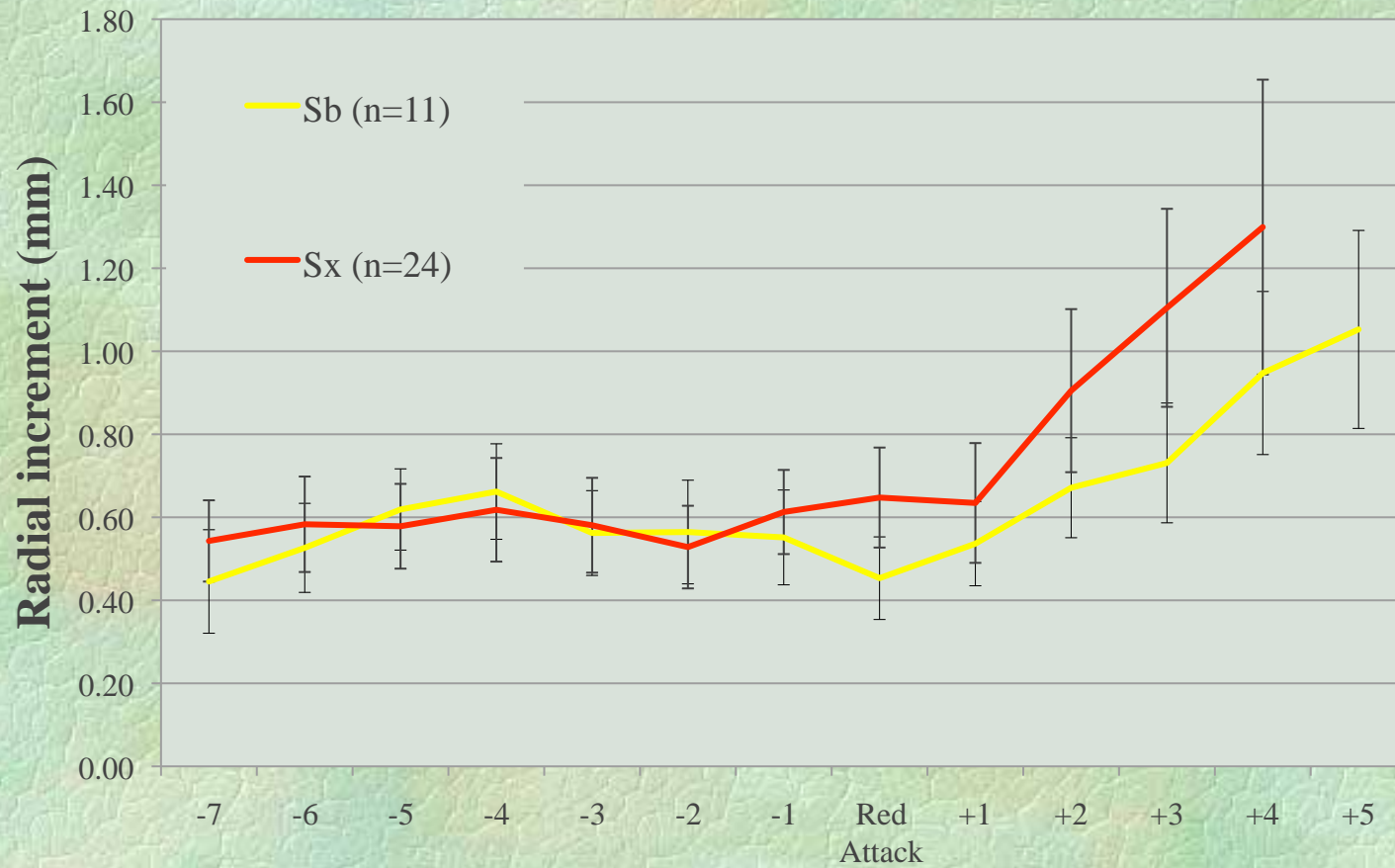
### Release of spruce poles (>7.5cm DBH)



Years since MPB attack



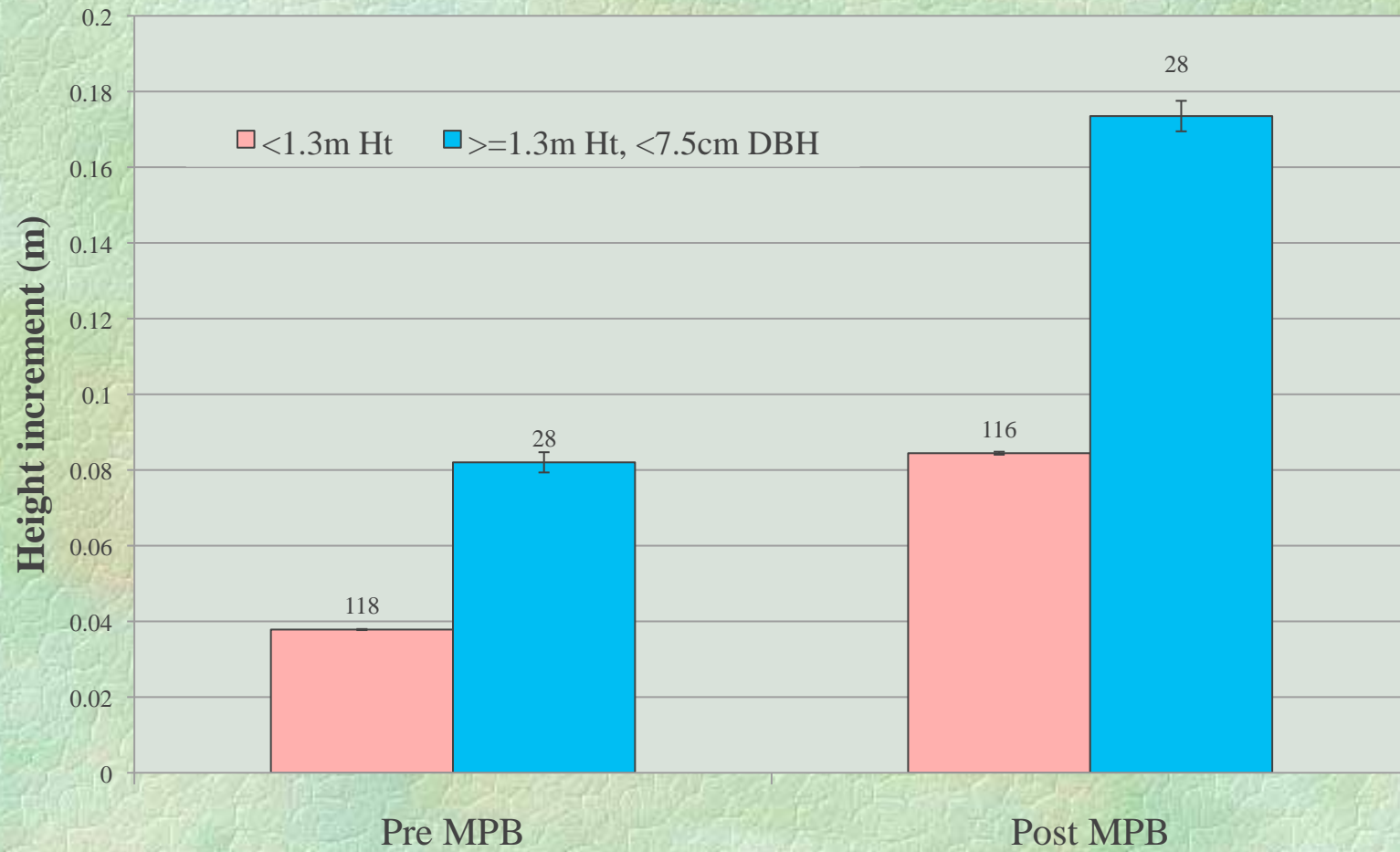
## Release of spruce saplings (> 1.3 ht < 7.5cm dbh)



Years since MPB attack

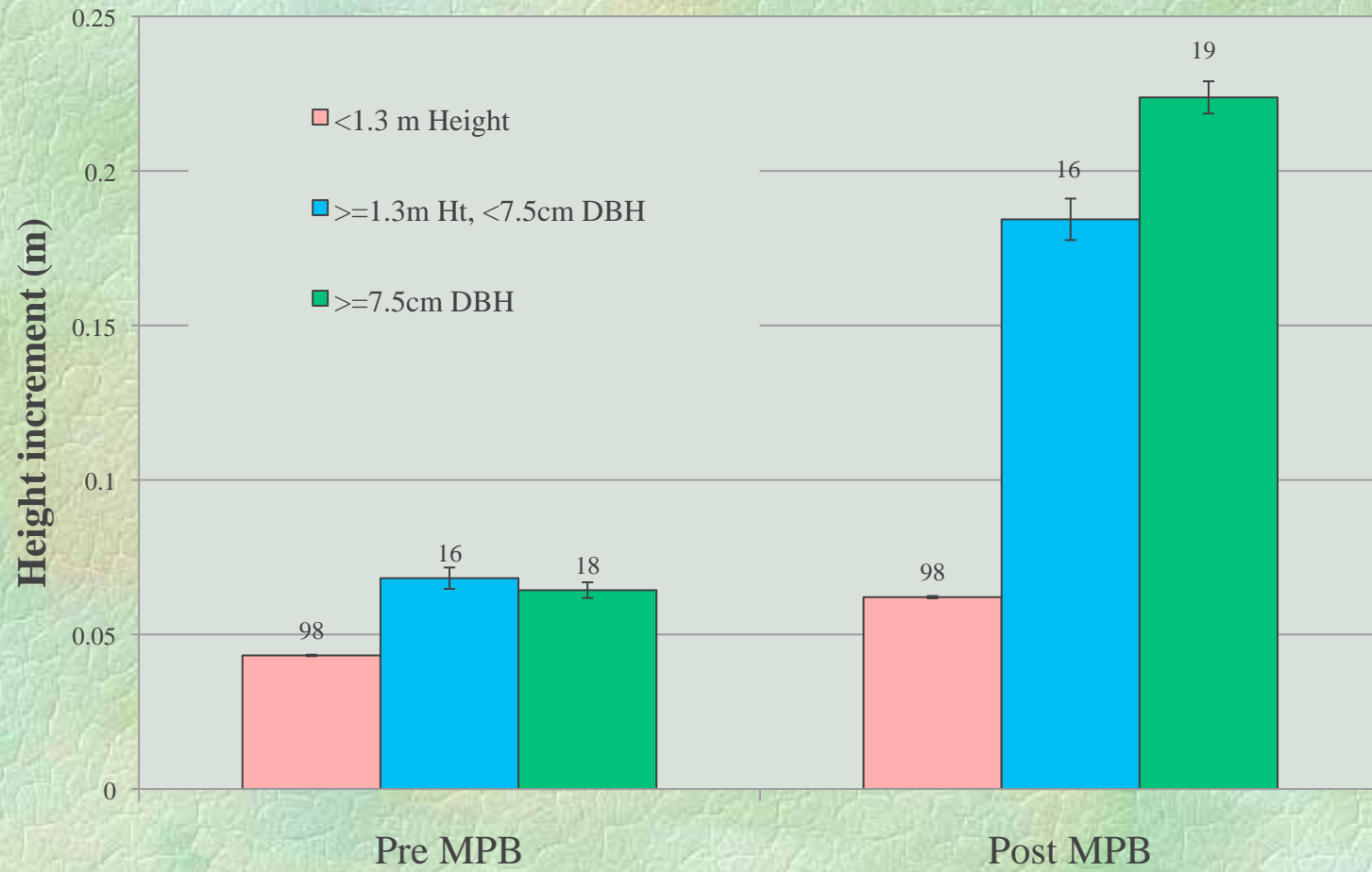


## Subalpine fir height response



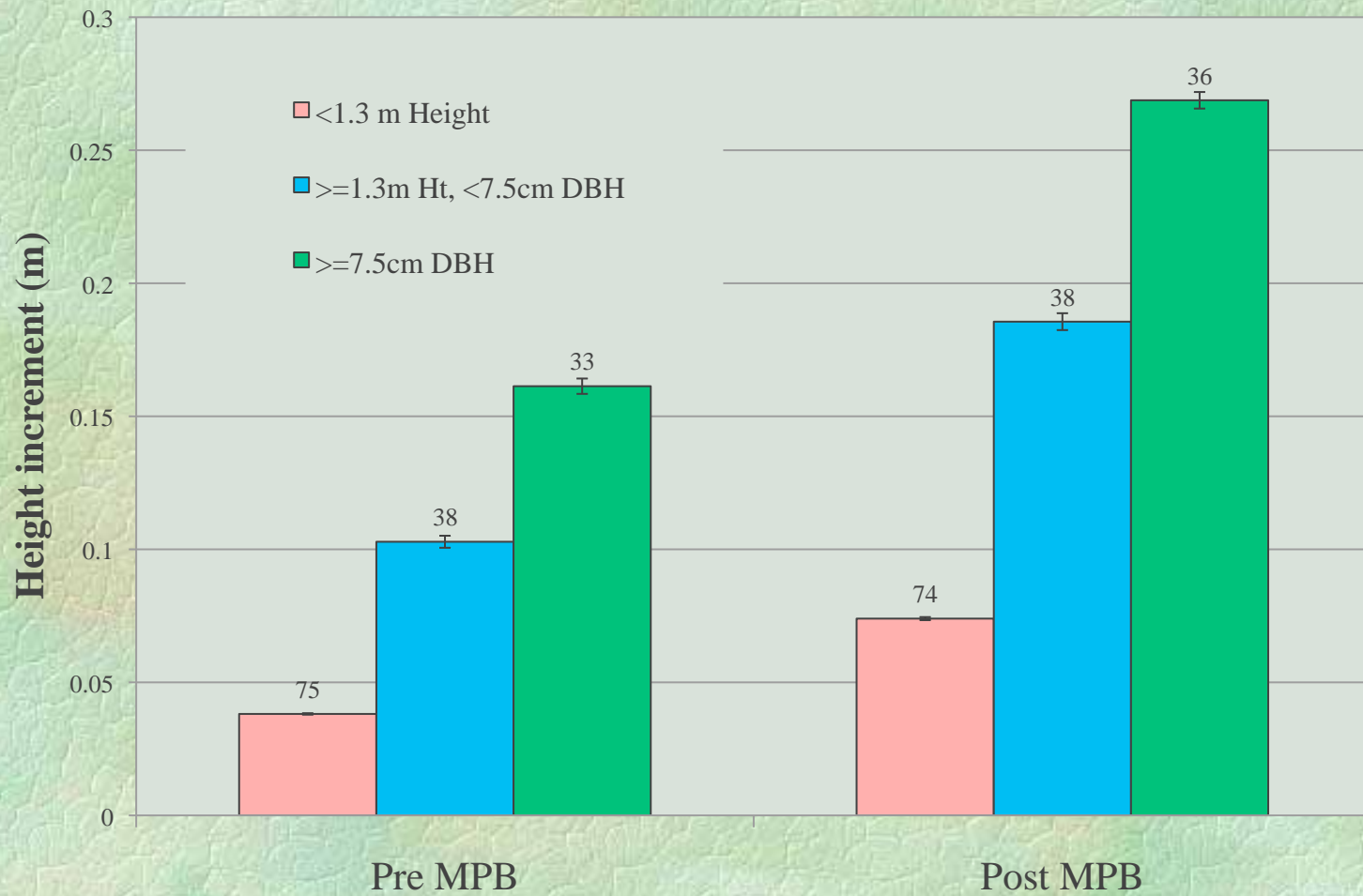


## Black spruce height response



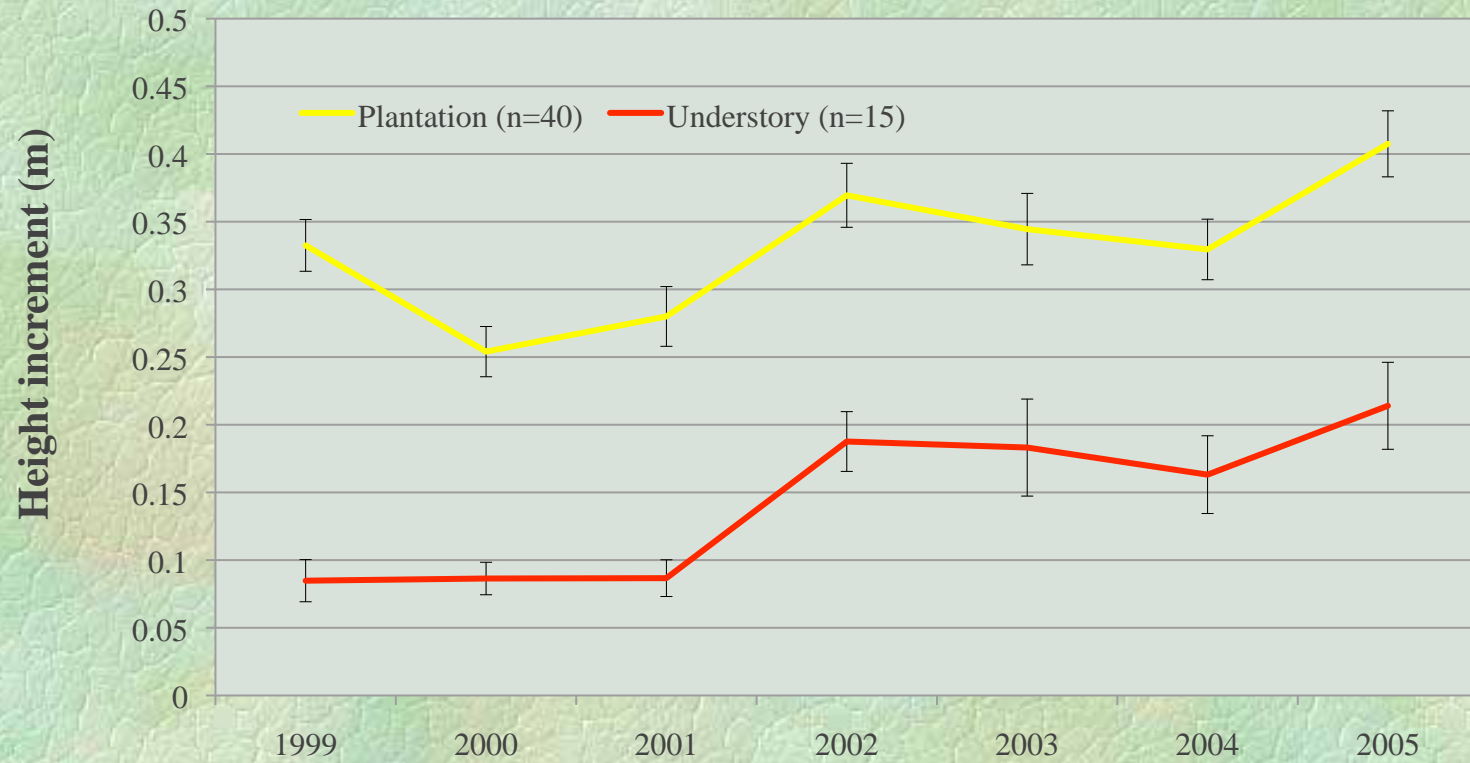


## Hybrid spruce height response





## Hybrid spruce annual height increments



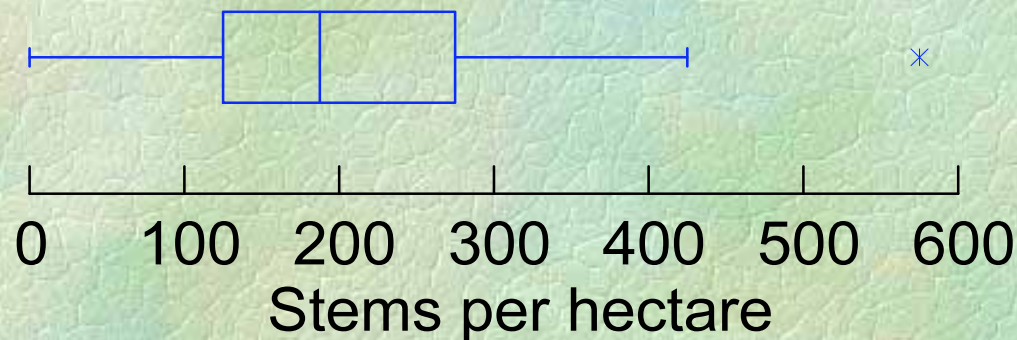






# Larger live trees

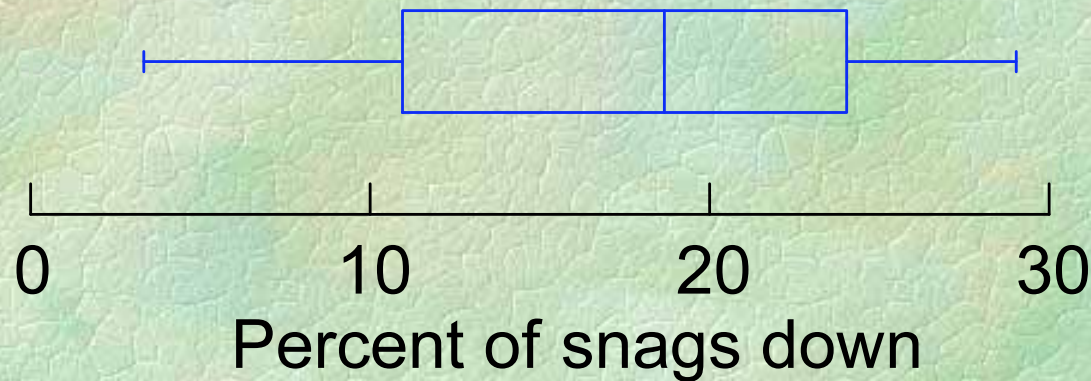
- lack of large live trees on the landscape due to level of clearcut salvage
- median of 190 sph live trees  $>15\text{cm dbh}$  from 30 plots





# Snag fall down

- Average of 20% of dead pine down over 5 years
- Liberal estimate that maximum of  $\frac{1}{2}$  of this would be utilized = loss of current timber value
- Fall down rate expected to increase due to prevalence of butt rot





# Increase in habitat values

## Concealed Spaces



## Elevated Runways

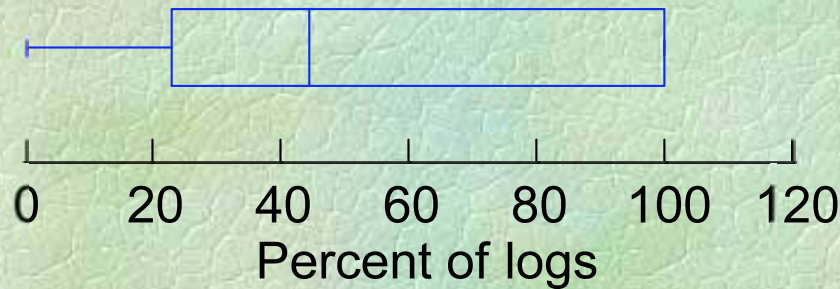




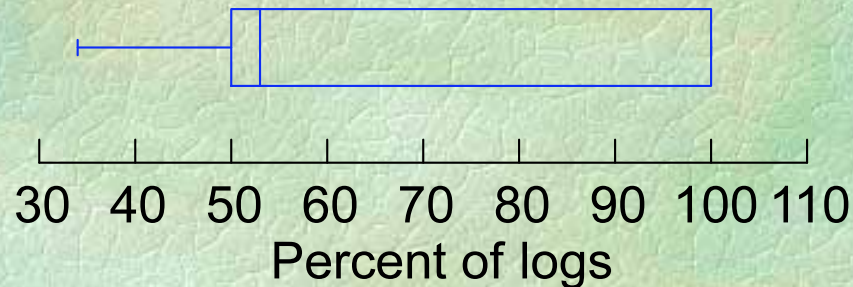
# Habitats formed by snag fall down

- Average of 50% forming concealed spaces and 60% forming elevated runways

Concealed spaces



Elevated runways





## Summary

- ☛ almost complete mortality of larger diameter PI leading to focus on salvage harvest to recover timber value;
- ☛ advanced regeneration is generally abundant and often equivalent to 20+ yr old clearcut and release is substantial and should help reduce mid-term timber supply problems;
- ☛ large live trees will be rare on landscape and generally over 100 sph of potential in unsalvaged stands;
- ☛ dead pine is falling to the ground reducing timber value while these same trees are increasing habitat value of the stand



## Management Implications

- ☛ focus needs to shift from focus on recovery of timber value to protection of future timber and habitat value;
- ☛ unmanaged stands must be assigned a high value even if they are not “old growth” forest since they contain habitat values (large trees, snags and CWD) that will be hard to replicate in managed stands
- ☛ how these stands respond to climate change compared to salvaged MPB stands will provide an interesting future comparison



# Acknowledgements



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