

Growth and Death  
in an Ancient  
Hawaiian  
Wet Forest

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**Proportion w/ Cavities**

1.0  
0.8  
0.6  
0.4  
0.2  
0.0

176

59

28

19

8

9

50

60

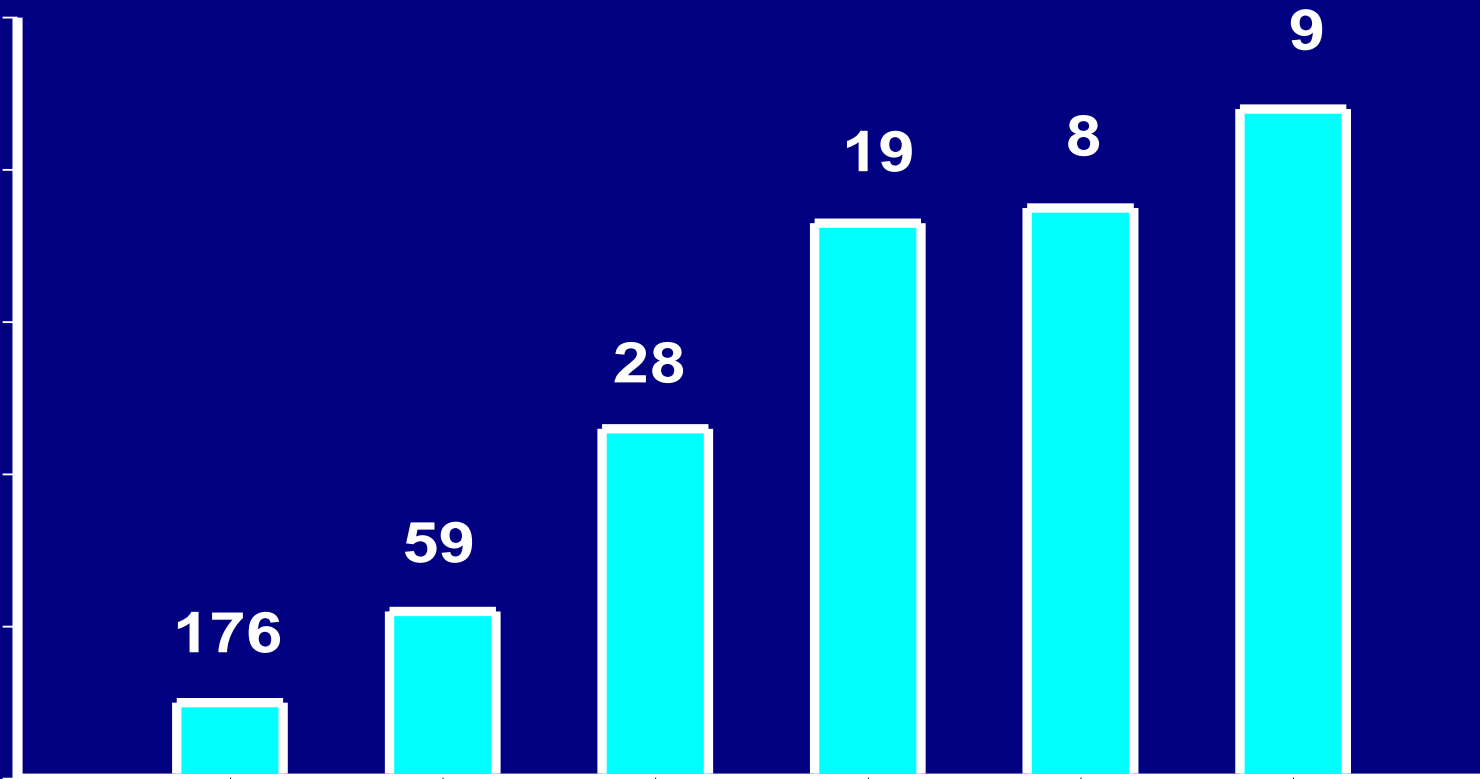
70

80

90

>100

**Size Class Ohia**





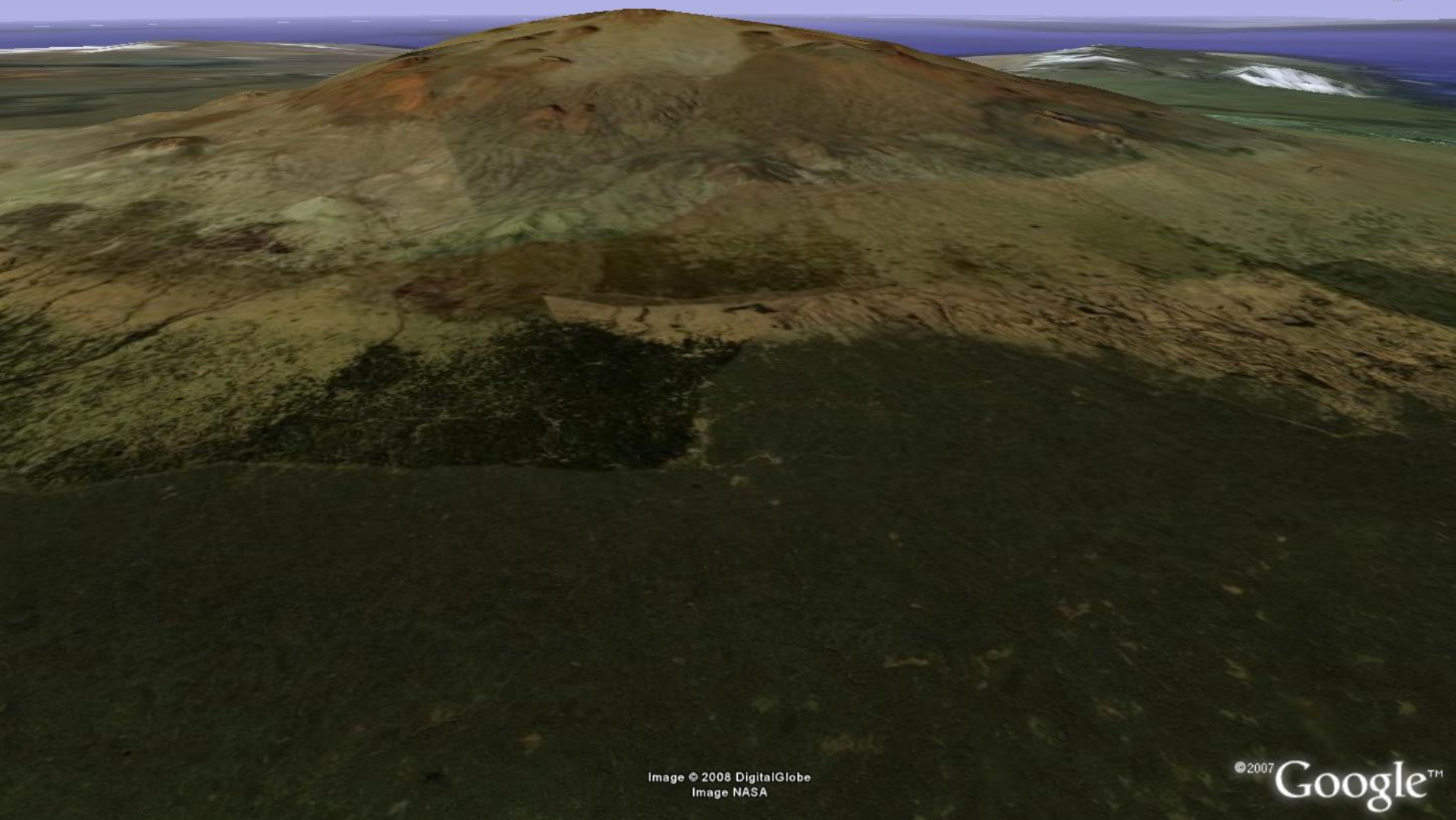


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Image NASA

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Pointer 19°47'25.97" N 155°19'17.46" W elev 6019 ft

Streaming ||||| 100%

Eye alt 16445 ft

1996-1997

- Established 2 study areas (1 km sq.)
- 100 plots per study area at 100m intervals  
(plot = 30m diameter)
- Mapped, tagged, and measured all trees >5cm dbh (>7000 trees total)



also classified each according to crown class...

S = suppressed

I = Intermediate

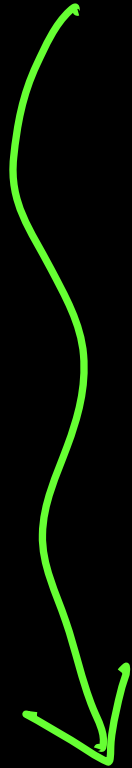
C = Co-dominant

D = Dominant





2004-2005

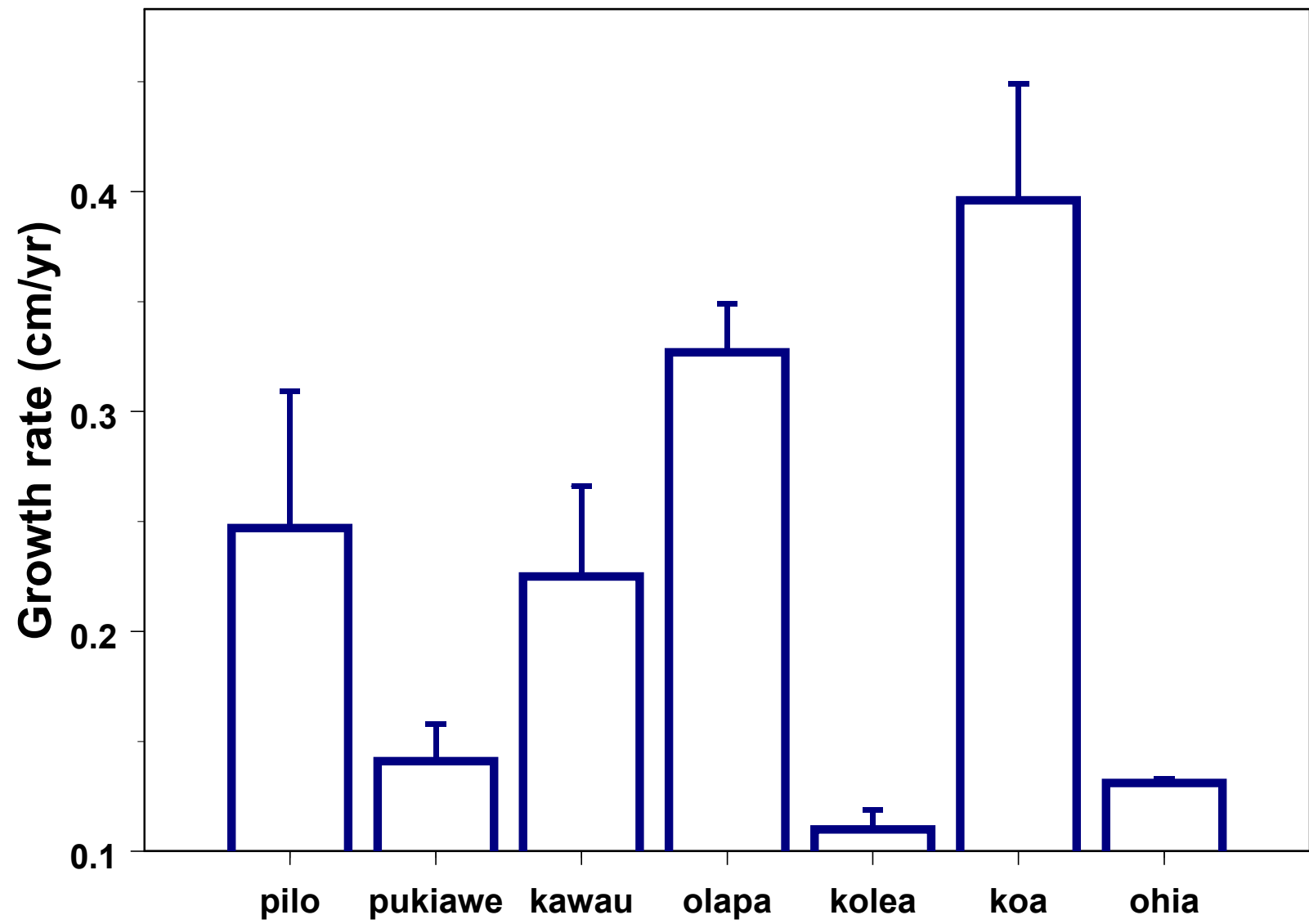


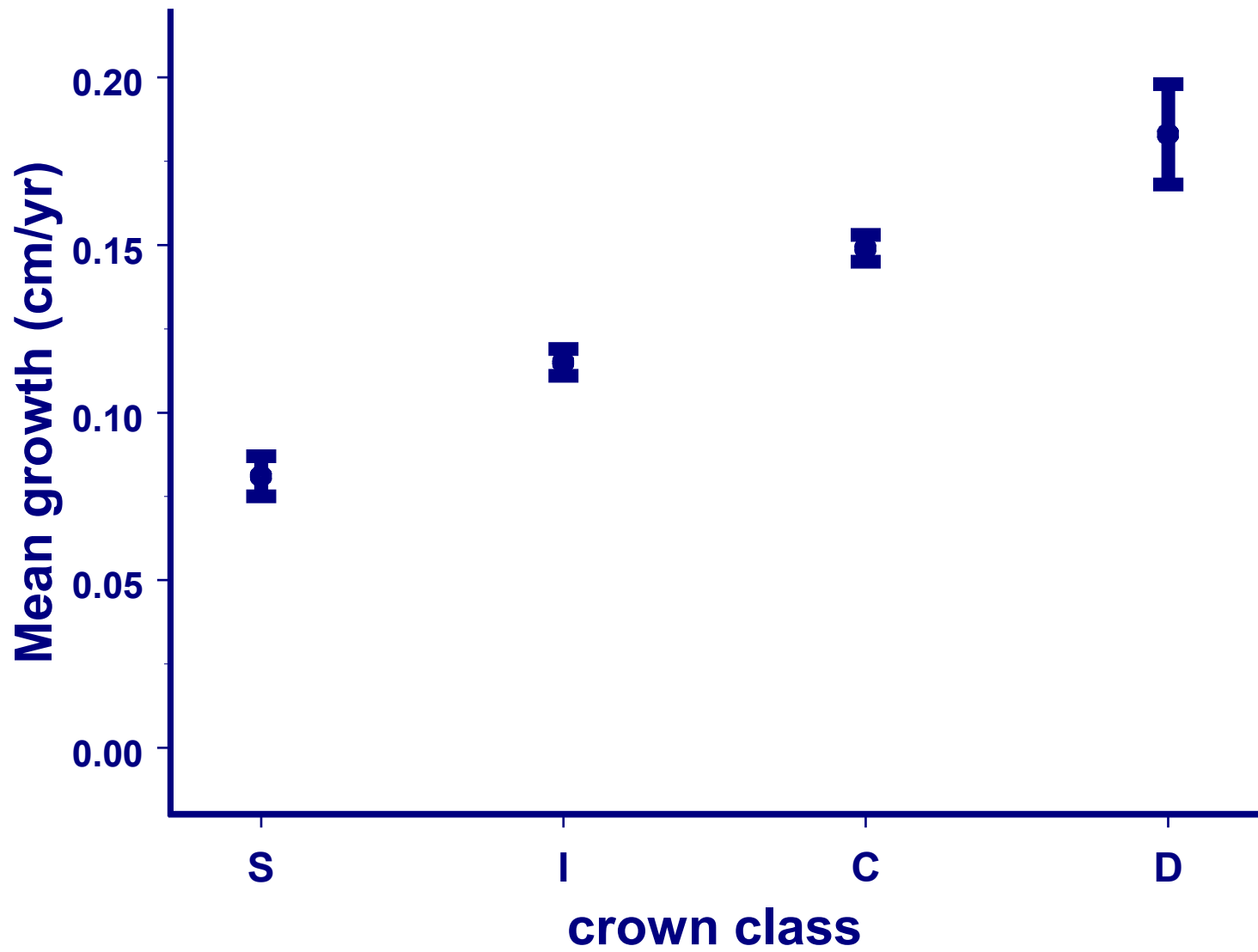
- Re-measured all trees

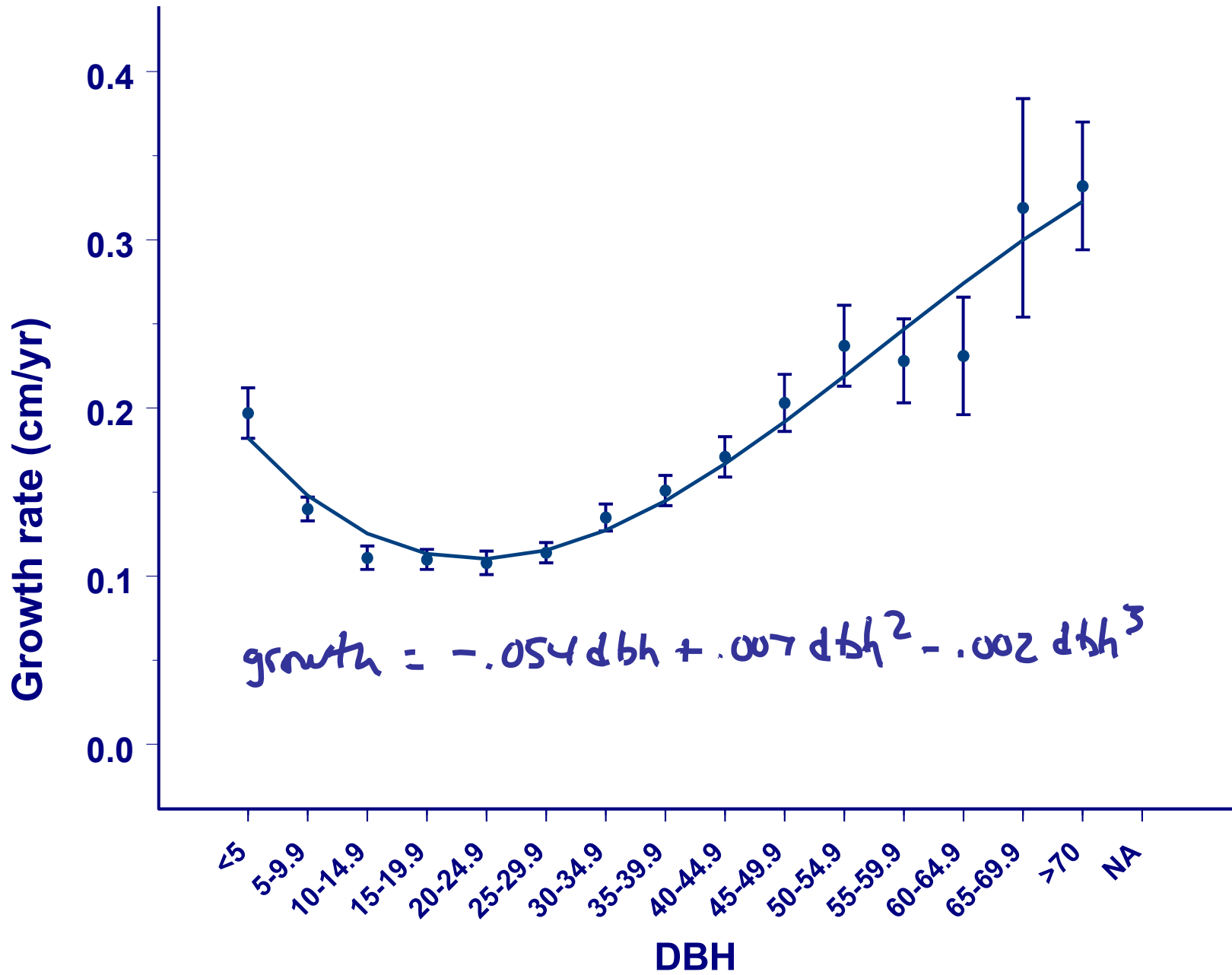
# Goals...

- Understand current forest dynamics
- Historical patterns
- Use above to make predictions re:  
future forest structure  
...and its continued suitability  
as rare bird habitat...

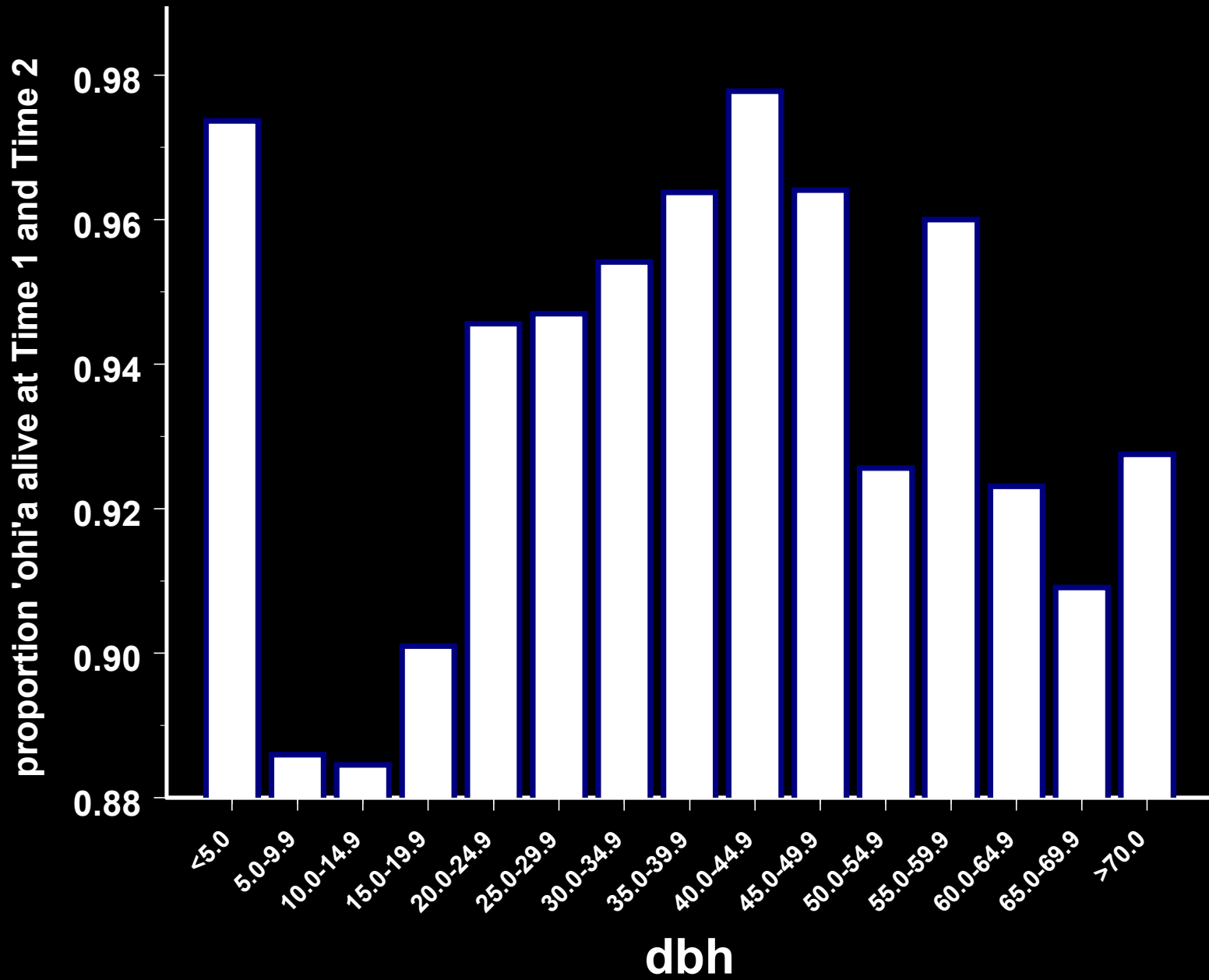
**Growth**



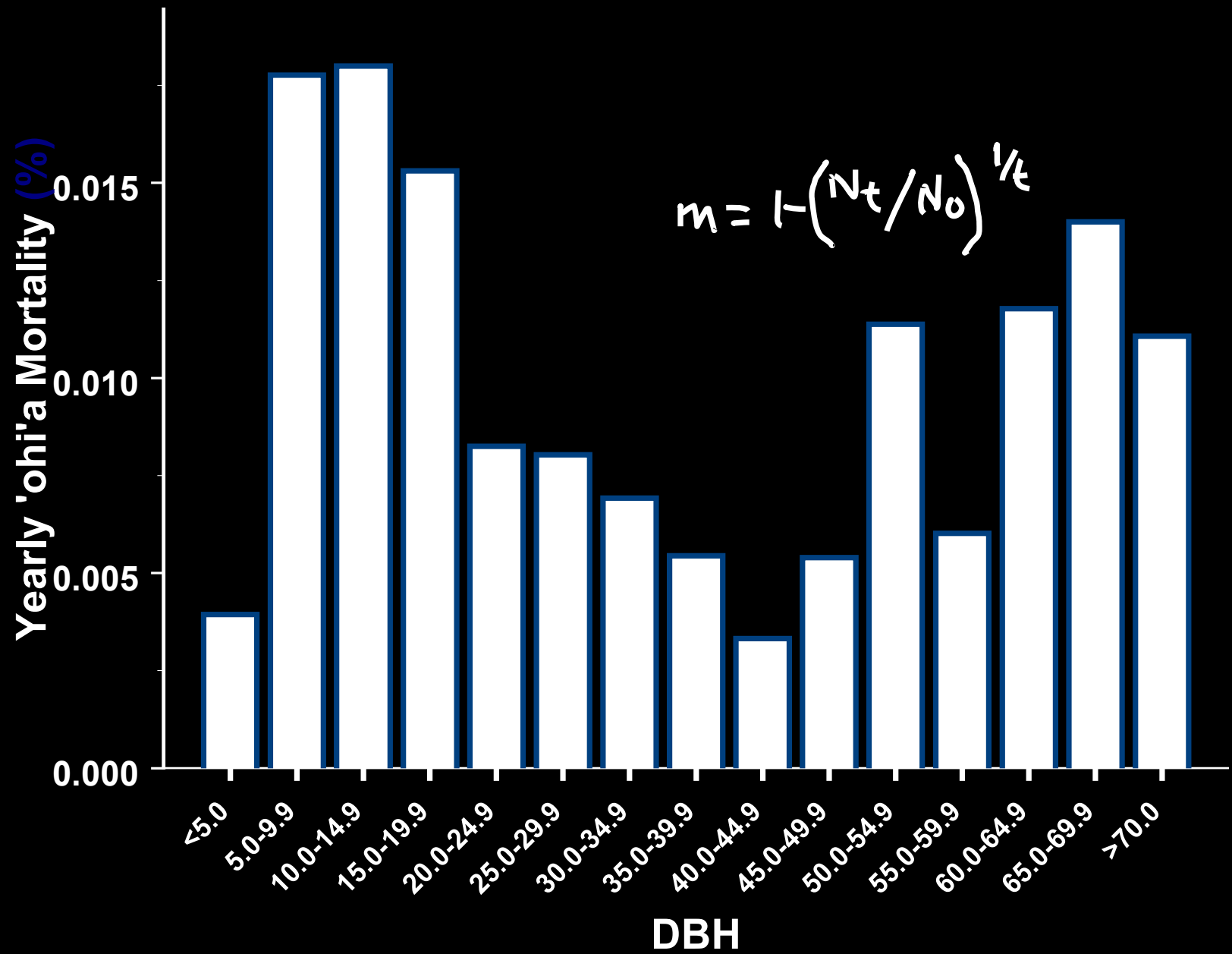




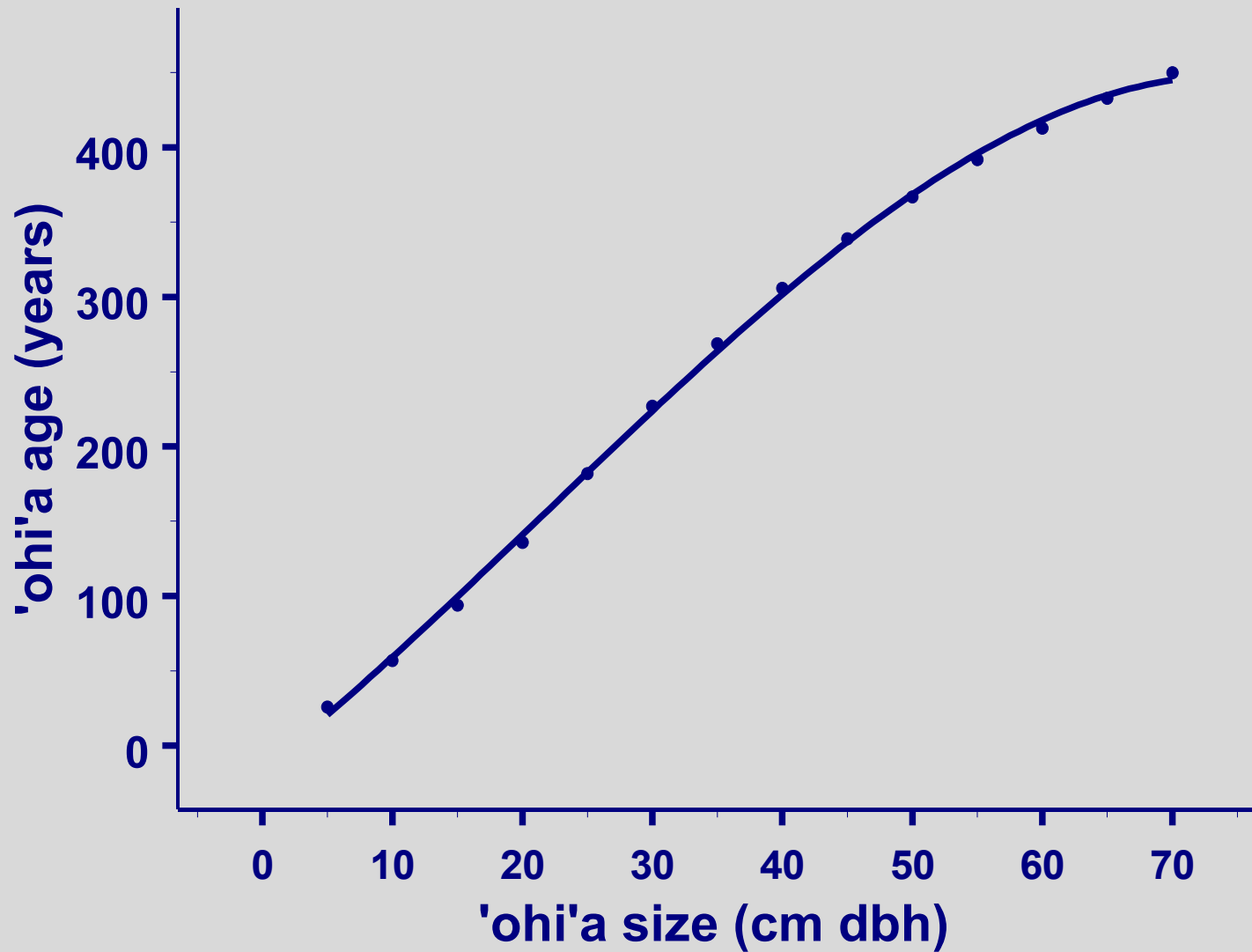
Death





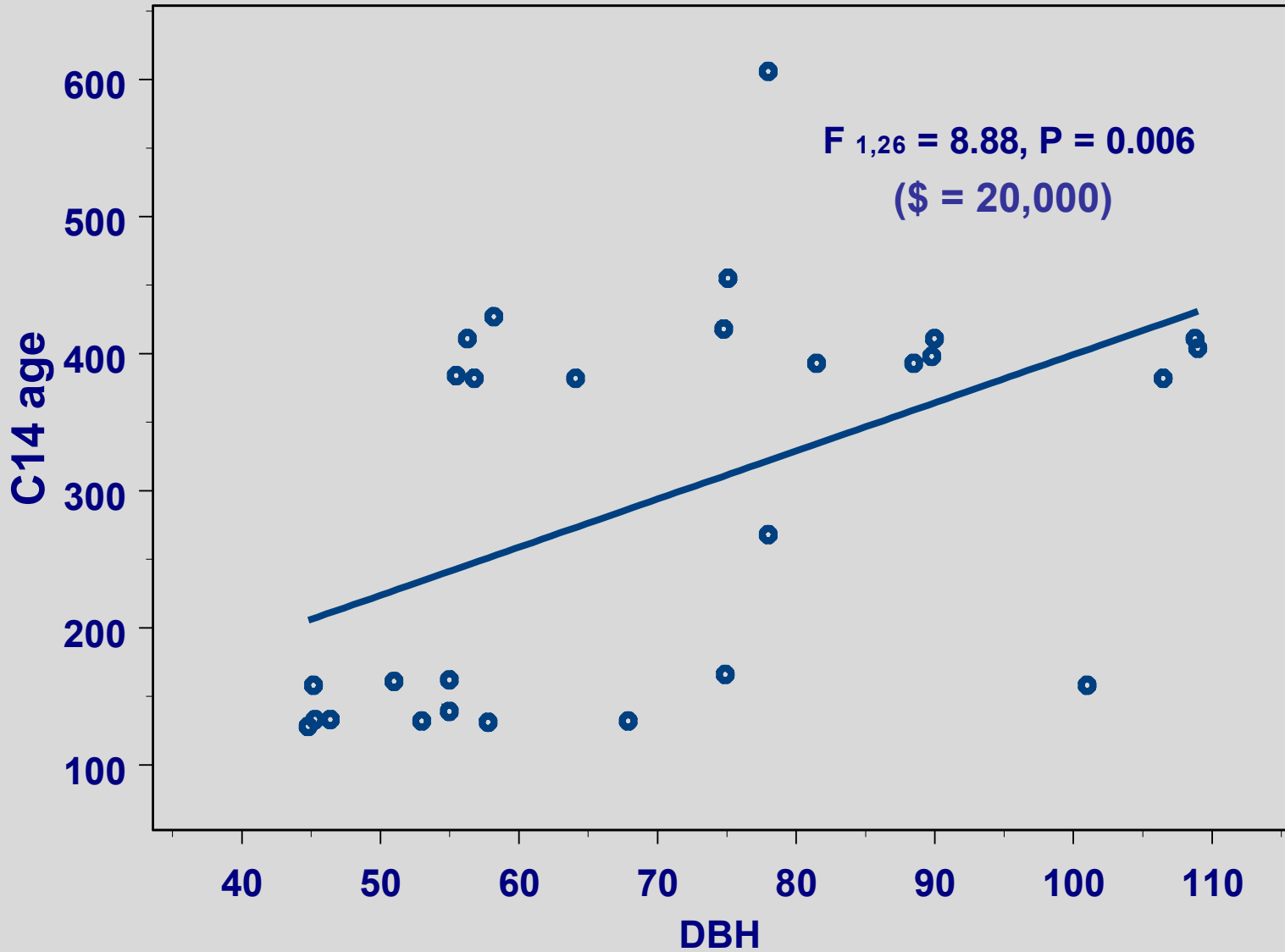


Age



- Radiocarbon dating of the largest trees to test growth model





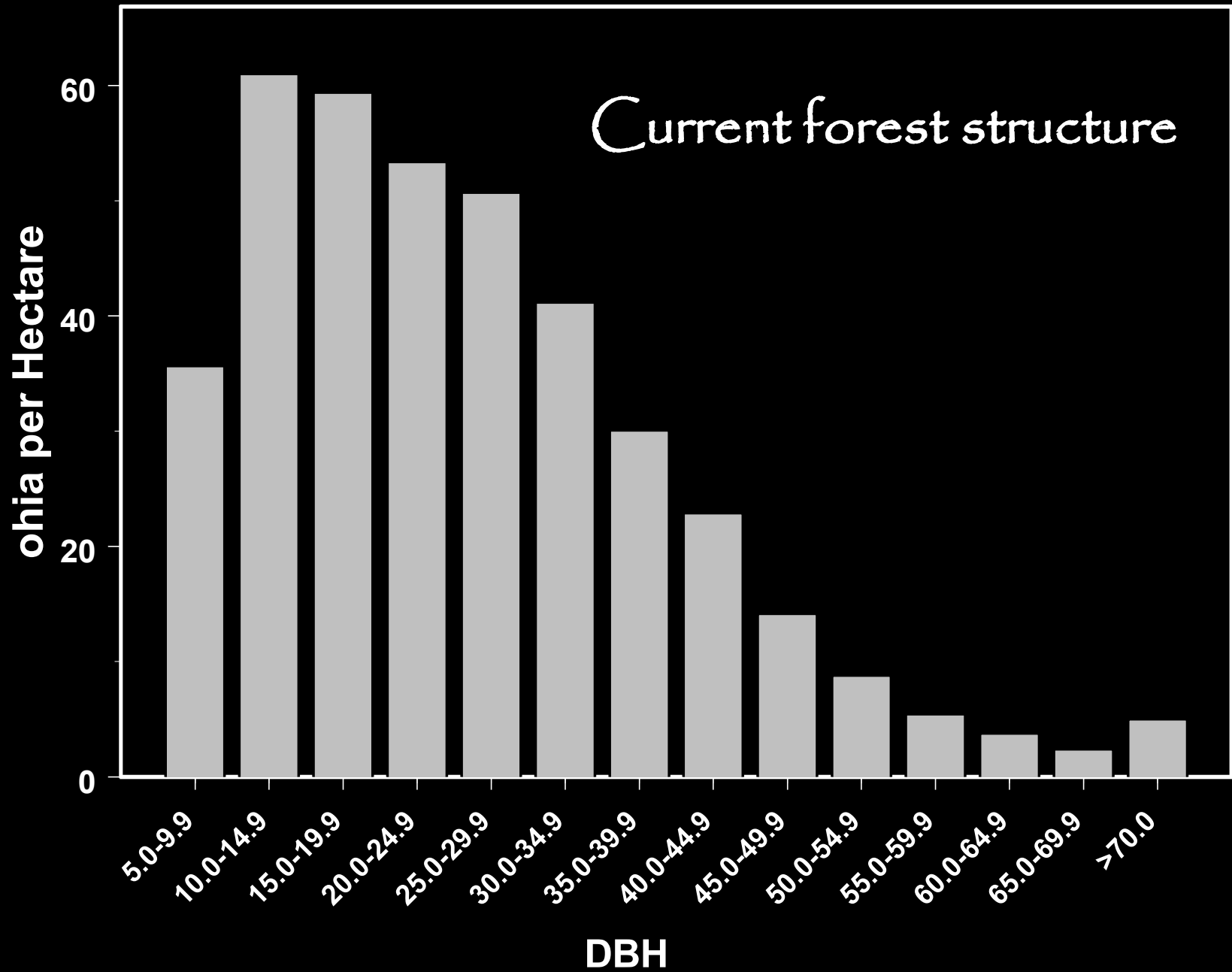
...With a *median* age for trees  
greater than 60cm DBH of 390  
years BP, Hakalau may be the  
oldest broadleaf forest in the  
Northern Hemisphere...

...and 'ohia the oldest  
broadleaf trees...

# Predictions





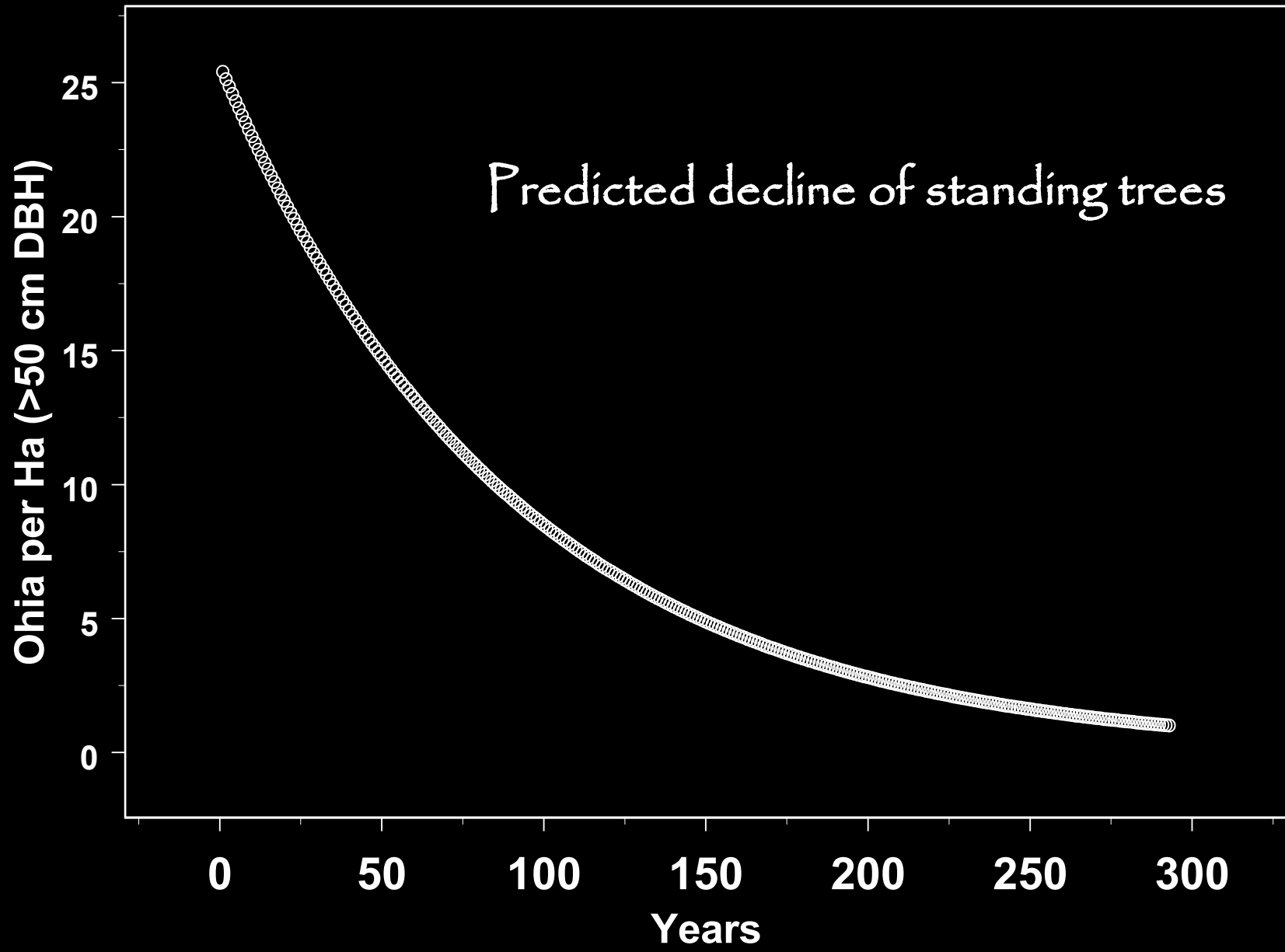


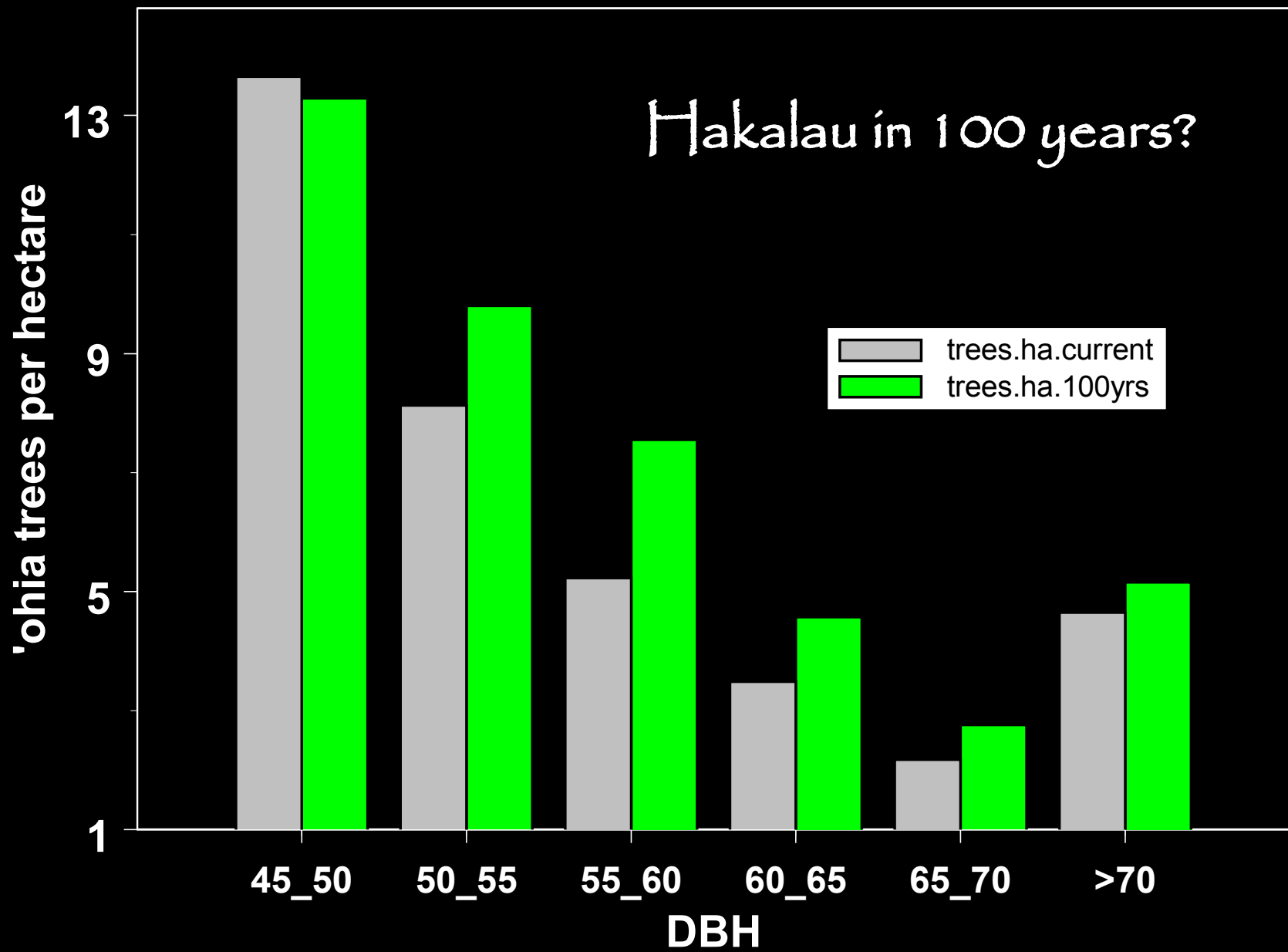
1.1 % of dhia  $> 50$  cm DBH die/yr

There are 25.41 trees/ha  $> 50$  cm DBH

So . . . .

trees/ha  $\times .989 =$  yearly decline  
etc etc





# Summary

- Growth models and radiocarbon dating agree on large 'ohia age

- Based on a 1.1% annual mortality rate of large trees, the old growth forest structure at Hakalau shouldn't change any time soon....

...But of course that all depends  
on the mortality rate staying  
constant...

# Many thanks to:

- Hakalau Forest NWR (Dick, Jack, Jim)
- US Forest Service
- Lenny Freed
- many helpers....