Why Do We Manage Forest Vegetation ?

Bruce Kelpsas


PIERCE
CASE
9030B


THOMPSON CREEK
DOUG FIR 2+0
CHECK

Where we started from: 1950's -1960's

Phenoxy herbicides 2,4,5-T and 2,4-D registered and become established for nearly all forest brush control

Broadcast burning a common site preparation treatment

Brush competition is viewed as the primary reforestation problem

Early understanding of competitive effects of herbaceous vegetation

Atrazine registered 1959

From Newton, 1964

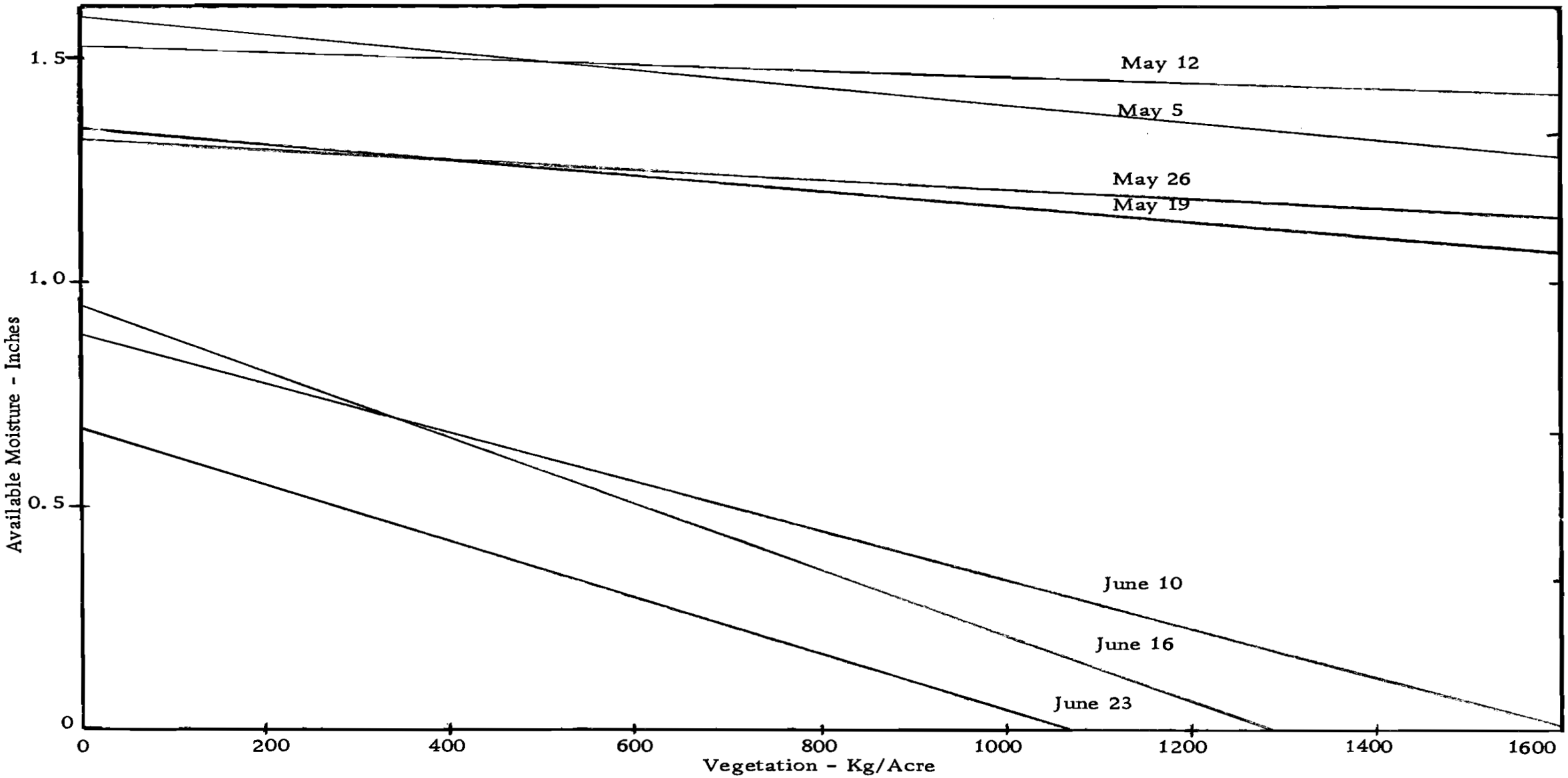


Figure 5. Available soil moisture, in inches, in the 3-12 inch zone of soil as the function of vegetation and date. 1092 observations.

1980 USFS Siuslaw Report:

Looked at 324 clearcuts from 1972, 73, 74

89 % Burned

34 % chemically site prepped (phenoxies) mostly due to salmonberry

50 % required release – Alder 80%, Salmonberry 20%

Free to grow age: 8-10 years

Where we started from: 1970's -1980's

Roundup (glyphosate) herbicide established on forest land use 1975-76

2,4,5-T suspended in NW forests 1979, Garlon registered 1980, Arsenal 1985

Forest vegetation competition trials spurred by 2,4,5-T loss

Velpar used in forestry 1977

Oust herbicide established for forest use 1988

Total vegetation impacts become investigated in trials and operationally

From Wagner, 1989

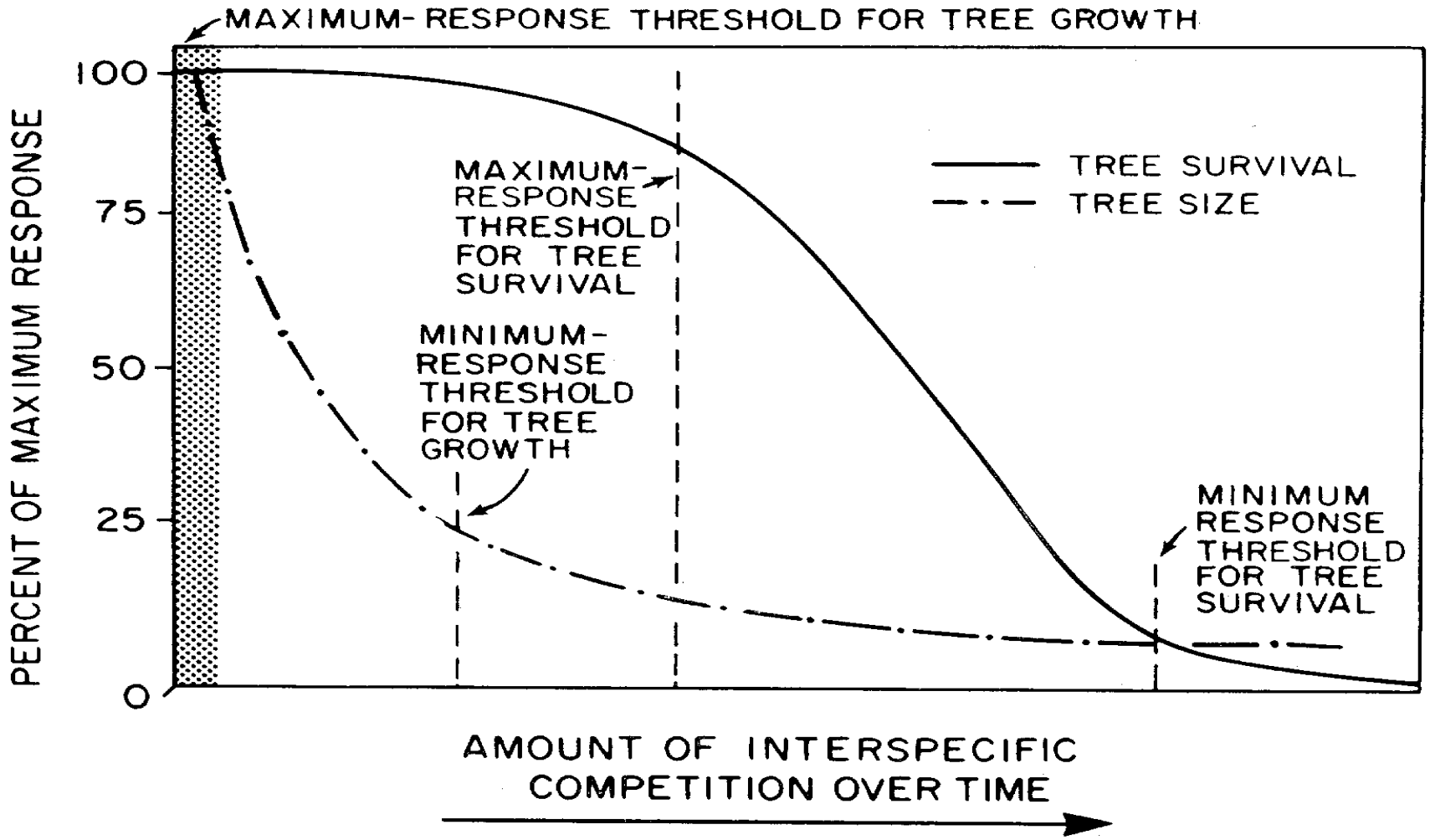
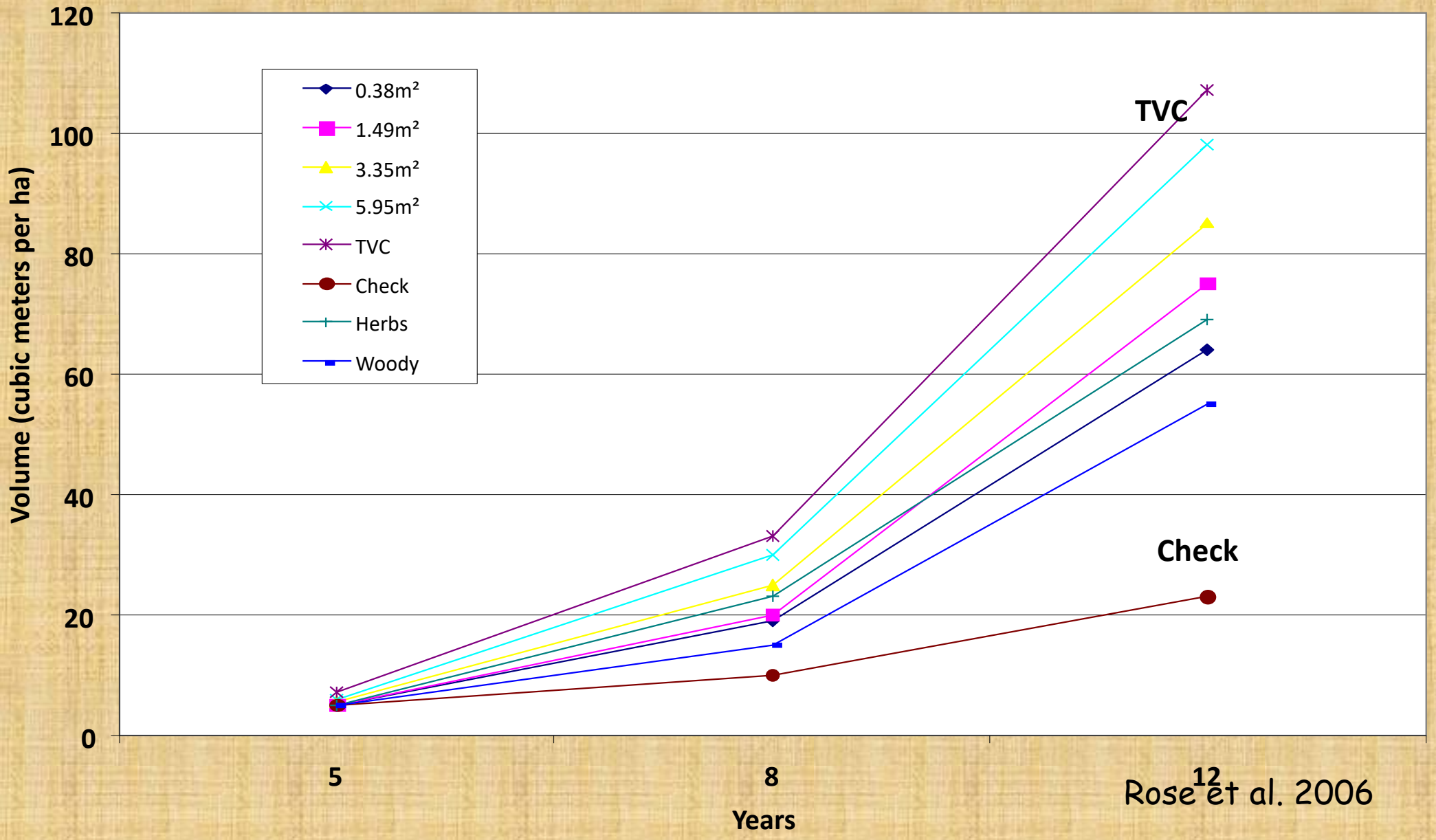


Fig. 3. Hypothetical relationship between interspecific competition, and tree survival and growth. The maximum- and minimum-response thresholds for tree survival and growth occur at different levels of interspecific competition. The maximum-response threshold for tree growth occurs in the shaded region under nearly vegetation-free conditions.

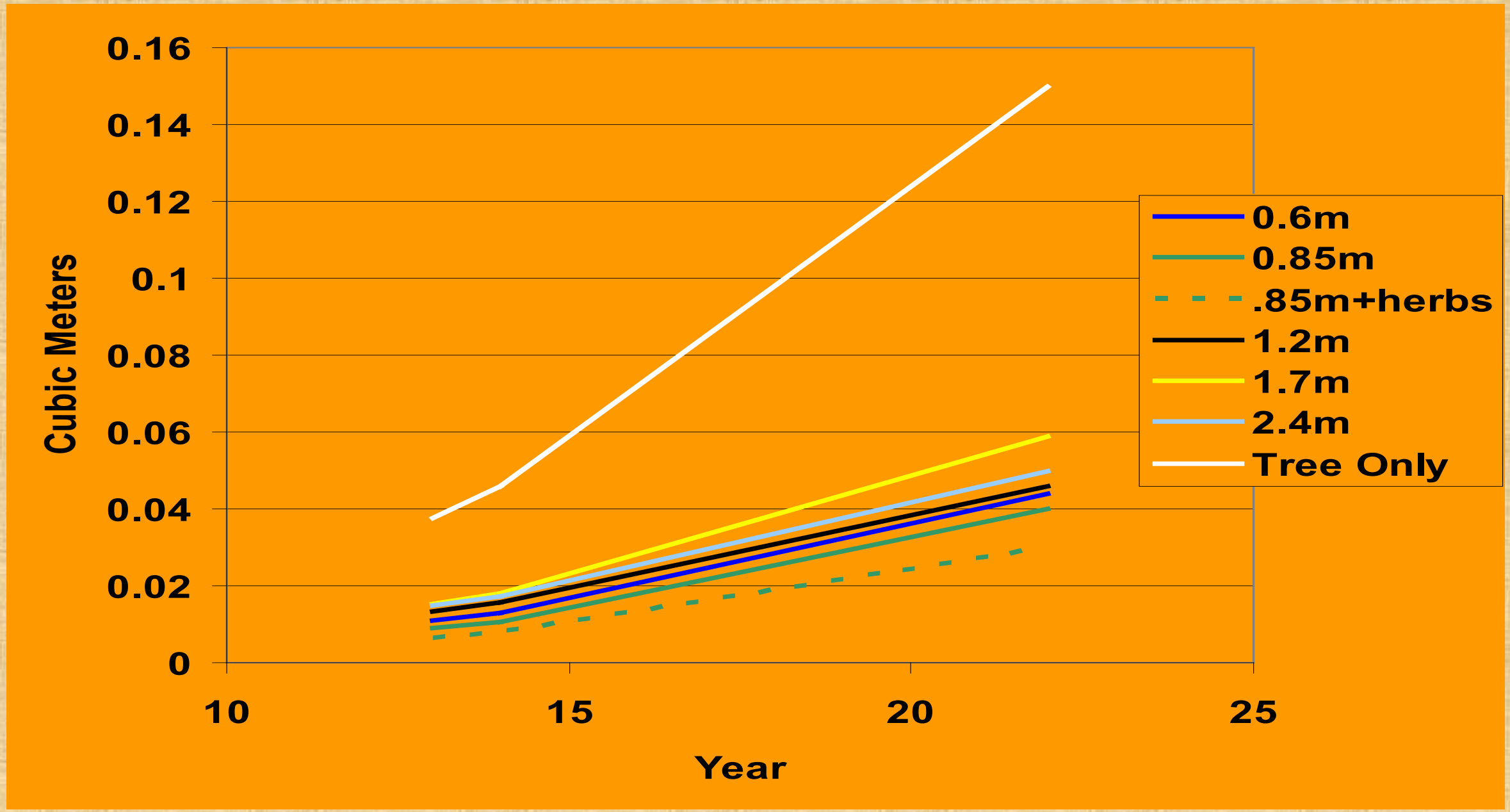
Douglas-fir Stem Volume VS Area of Control at 5,8 and 12 Years for Summit



Rose et al. 2006

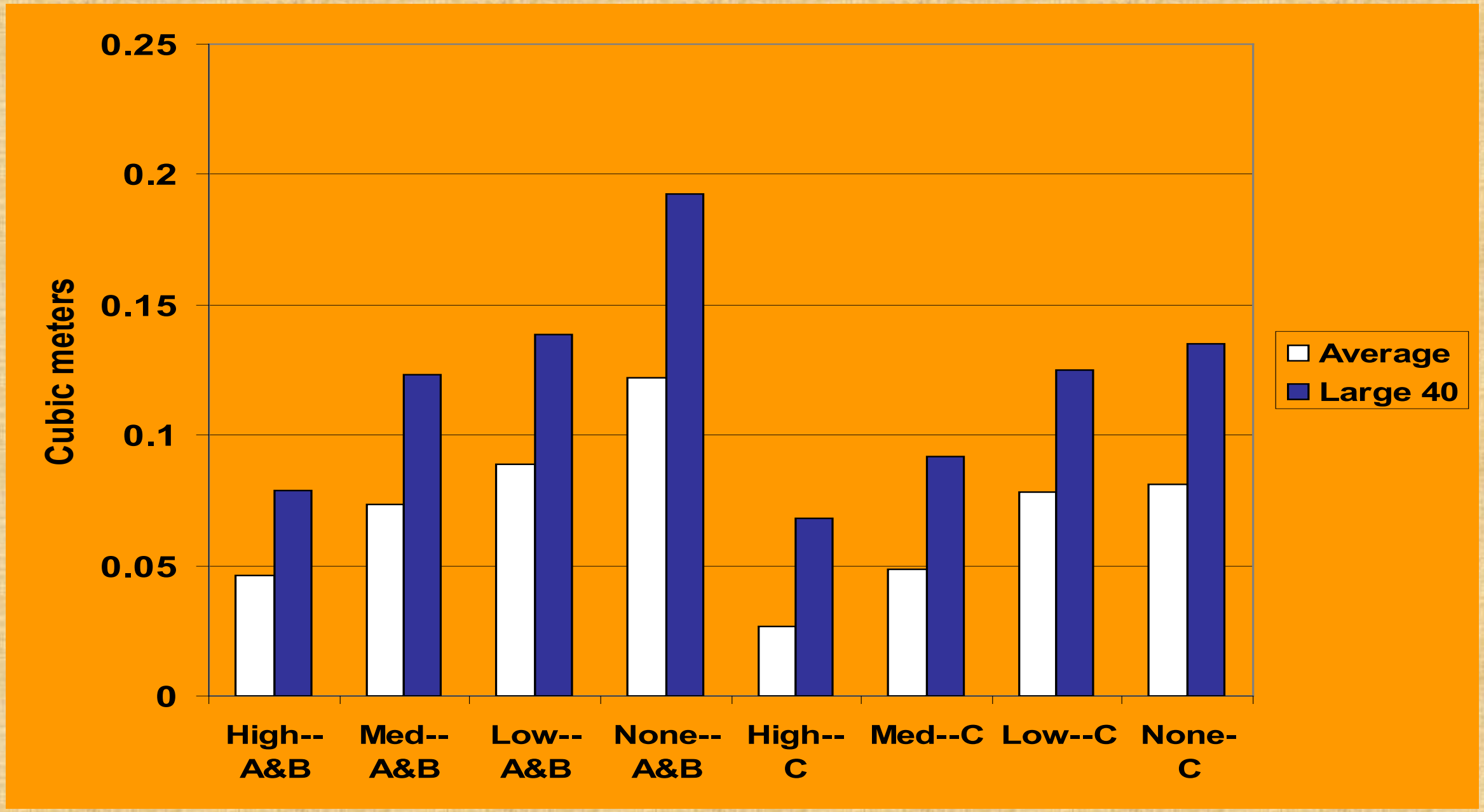
From Newton and Cole, 2008

Ponderosa Pine Stem Volume VS Manzanita Density



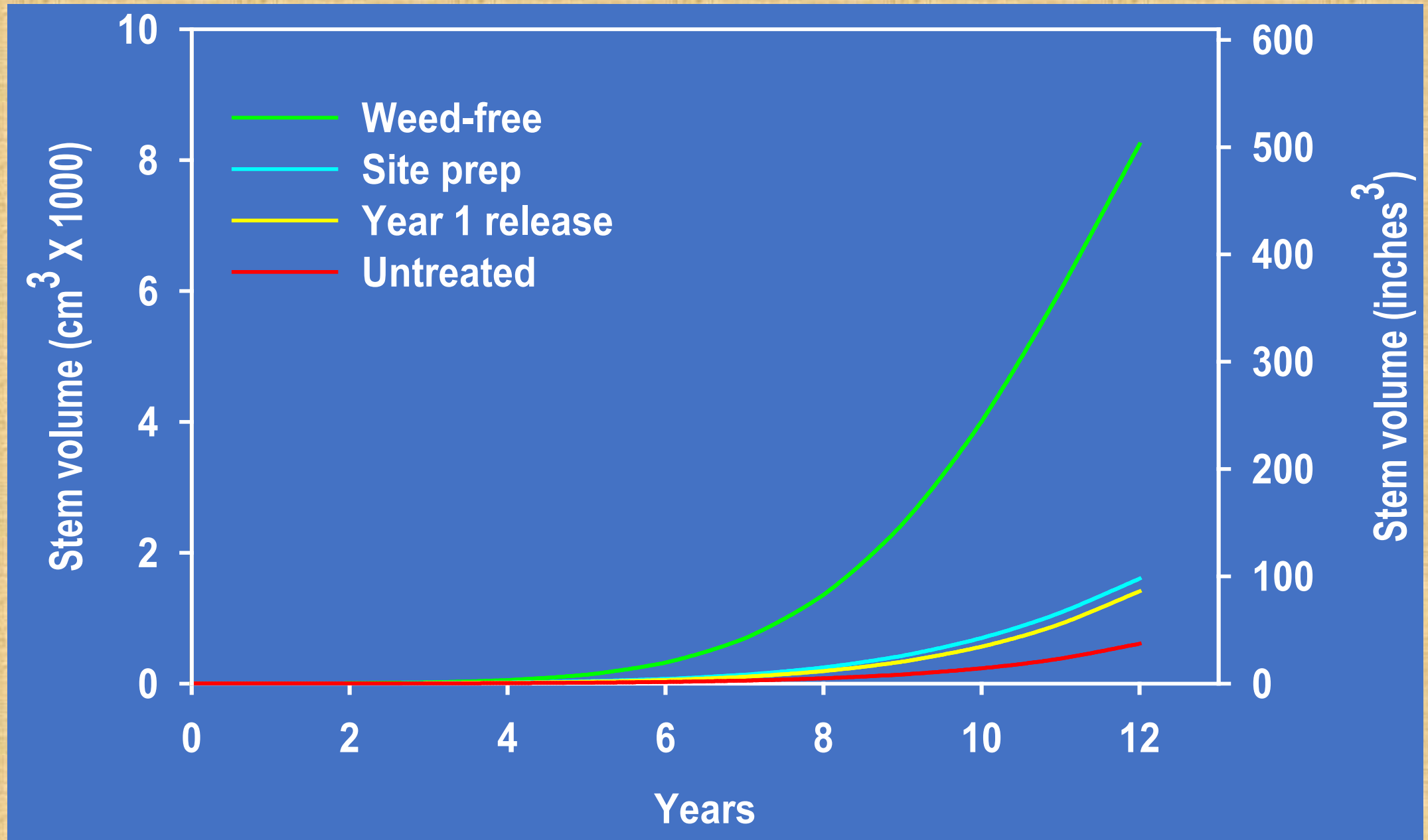
From Newton and Cole, 2008

D-Fir Stem Volume VS Madrone Clump Density Yr 23



From Youngblood, 2011

White Spruce Stem Volume VS Vegetation Treatment



Where we started from: 1990's – 2000's

Burning mostly eliminated for site preparation

Intensive woody and herbaceous control with tank mixes of herbicides like Transline in 1994

Alder invasion of new units nearly eliminated by soil residual herbicides

Herbicide resistance in woodland groundsel and others

Invasive plants increasingly become established on forest sites

From Chen, 2004

Native VS Non-native plants on reforestation sites

Recorded 175 herbaceous species on four sites in the Coast Range and Cascades

104 species were native; 71 species were non-native

40 % introduced including: woodland groundsel, bedstraw, Canada and bull thistle, mare's tail, Japanese cudweed, prickly lettuce, sow thistle, false brome, velvet grass, false dandelion, dandelion, Australian fireweed, foxglove, St johnswort, orchard grass, vetch and clovers

Where we are at and headed to: 2000's +

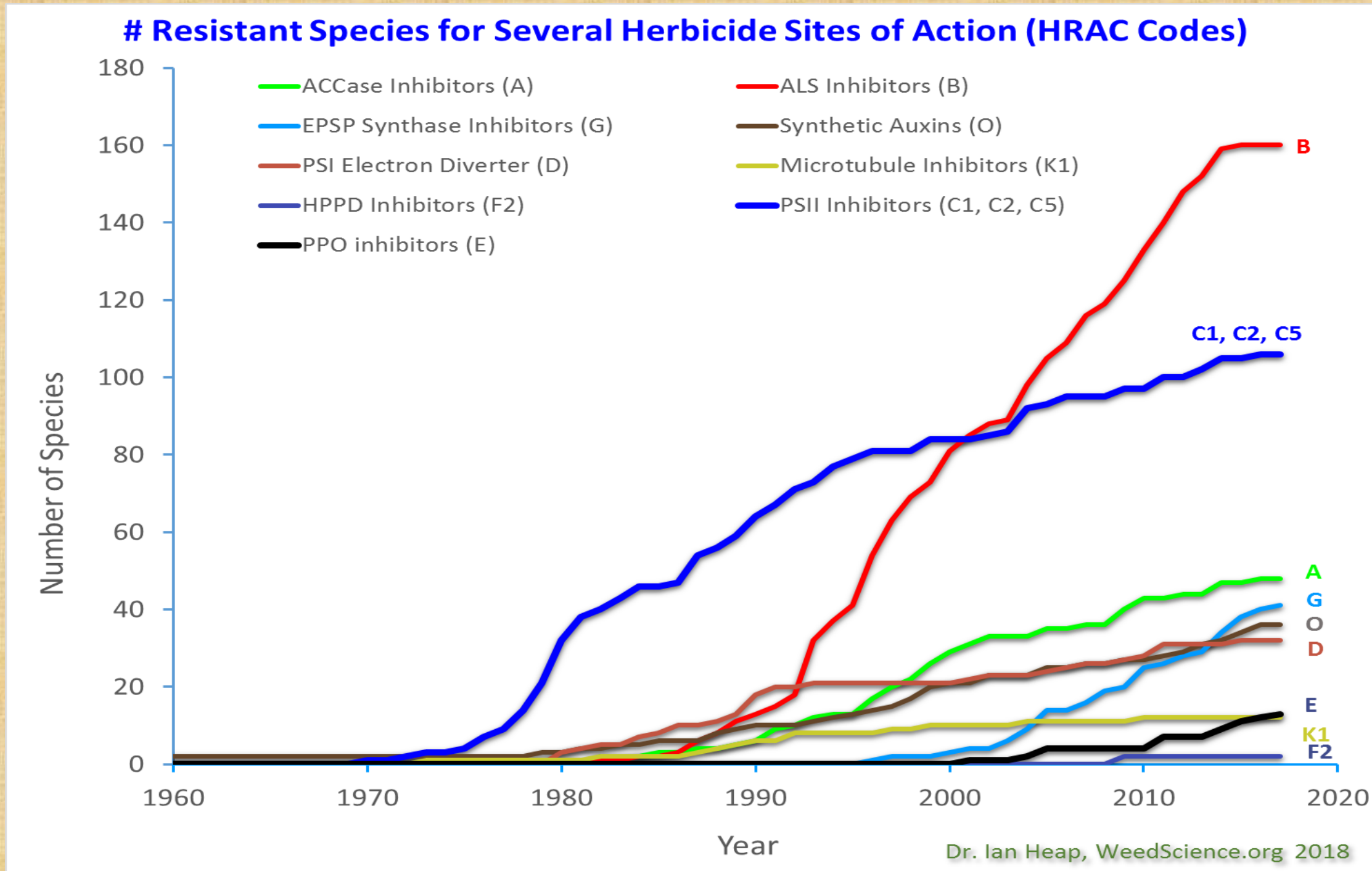
Herbicide tool kit provides near total control of many forest competitors with existing herbicides resulting in improved survival and growth

New chemistries like Cleantraxx and Esplanade F will be introduced

New invasive plants will surface and become established on forest sites

Additional herbicide resistance in competitive plants

Climate change will accentuate weed control, invasives and fire prevention


Resistant Species for Several Herbicide Sites of Action (HRAC Codes)
ACCase Inhibitors (A)
ALS Inhibitors (B)
EPSP Synthase Inhibitors (G)
Synthetic Auxins (O)
PSI Electron Diverter (D)
Microtubule Inhibitors (K1)
HPPD Inhibitors (F2)
PSII Inhibitors (C1, C2, C5)
PPO inhibitors (E)
Number of Species
0
20
40
60
80
100
120
140
160
180
1960
1970
1980
1990
2000
2010
2020
Year
B
C1, C2, C5
A
G
O
D
E
K1
F2
Dr. Ian Heap, WeedScience.org 2018

Fourth National Climate Assessment

Hotter and longer summers

More extreme weather events

Opportunities for invasive plants adapted to drier conditions

Accentuates the need for careful monitoring and diligent weed control for successful seedling survival and growth