

# Uneven-age Stand Management

a.k.a. Uneven-aged (Sized)  
Silviculture

Walt Wintturi- Watershed to Wildlife

# Define Terms

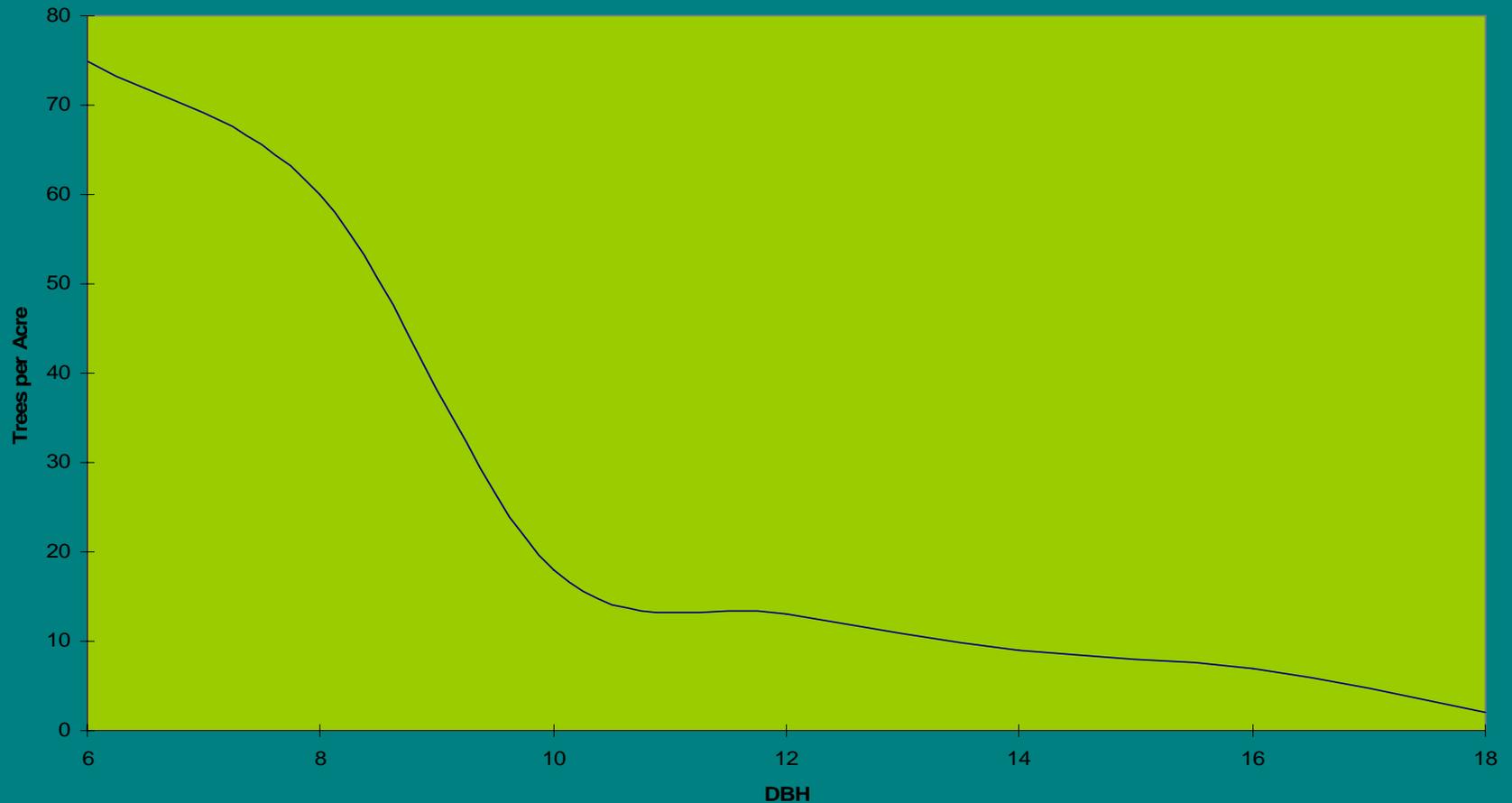
## Review Concepts

# Uneven-age Stand

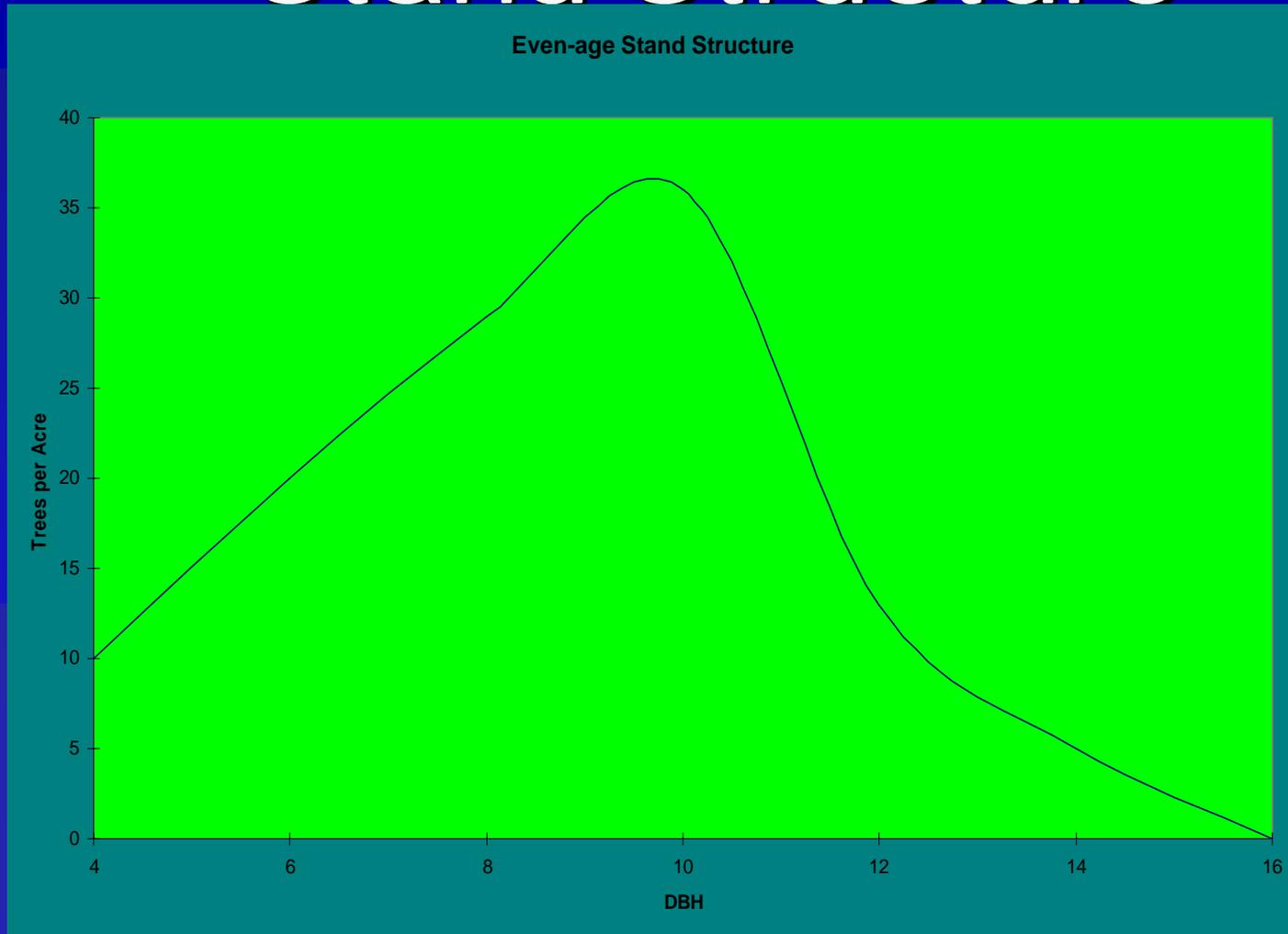
- At least three distinct age classes irregularly mixed in the same area.
- Well defined differences in total height and age, not just diameter.

# Uneven-age Stand Structure

Uneven-age Stand Structure



# Contrast to Even-age Stand Structure

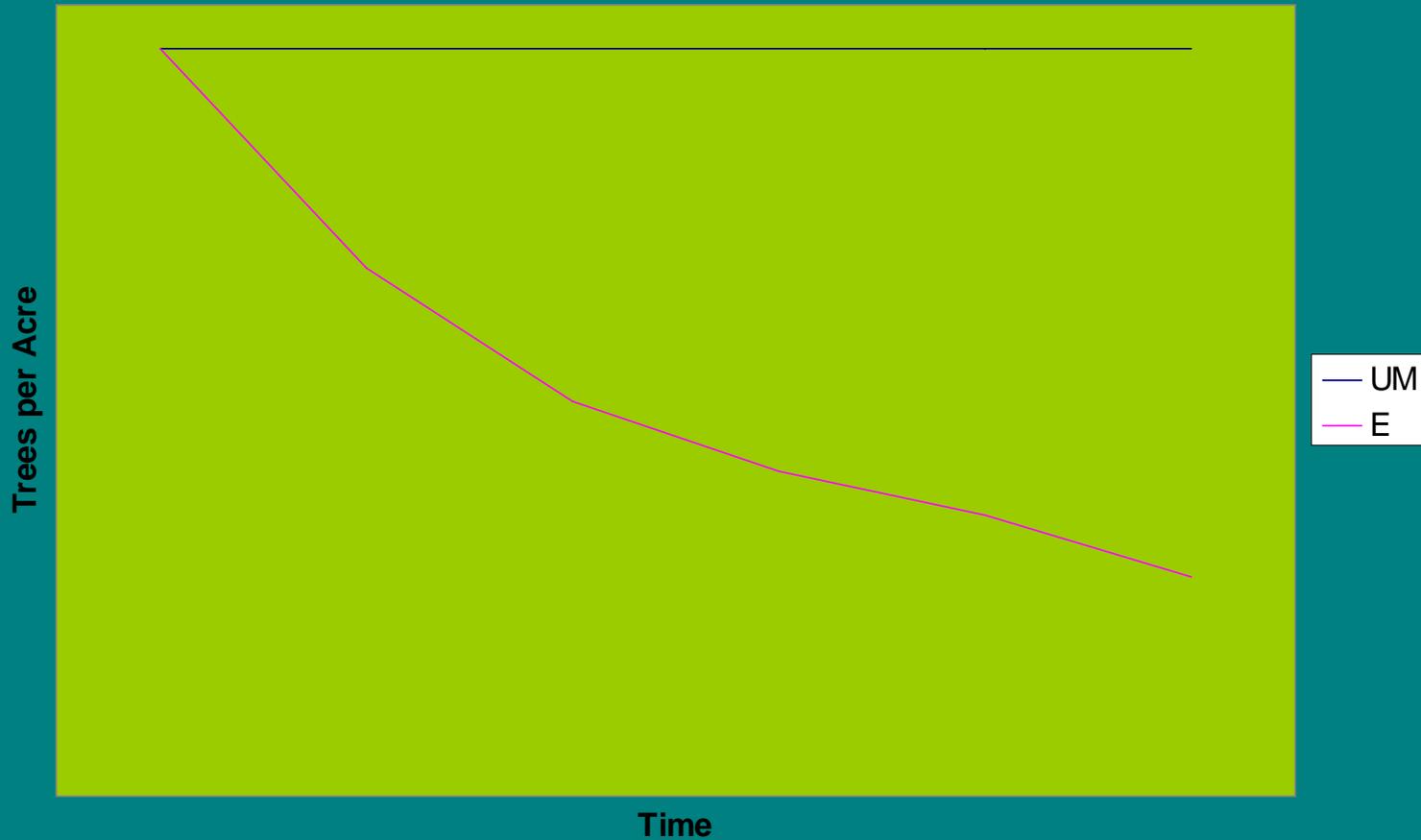


# Stand Height vs. Time



# Trees per Acre vs. Time

Trees per Acre vs. Time



- Does stand need to be uneven-age to manage it under the selection system?

# Place of Uneven-aged Stands.

- Four reasons for developing them.
  - 1) Stands were inherited. Cut too many young trees if stand is replaced by clearcutting.
  - 2) Management objective requires stand always has some large trees. Aesthetic considerations.
  - 3) Develop or maintain winter cover for wildlife.
  - 4) Habitat type is best suited for growing shade tolerant species, i.e. enriched, sugar-maple beech fine till, softwood wet or dry pan.

# Stand Size

- How large does an area have to be to be considered a stand?
- How small an area do you want to keep records for or a stand history for?
- Ten acres – anything less is an inclusion within a stand.

# Uneven-age Stand

- Small, irregular, even-aged groups.
- Groups intermixed, not clearly separated.
- Treated as uneven-aged from organizational standpoint.

# Selection System

- Term applied to silvicultural program aimed at developing or maintaining an uneven-aged stand.
  - Includes periodic harvesting.
- Well suited to shade tolerant species; sugar maple, beech, red spruce, balsam fir.

# Selection System - continued

- Mature trees are removed as individuals or small groups at relatively short intervals.
- Time between intervals depends on growth rates, stand condition, size (value) of desired harvest.

# Q factor

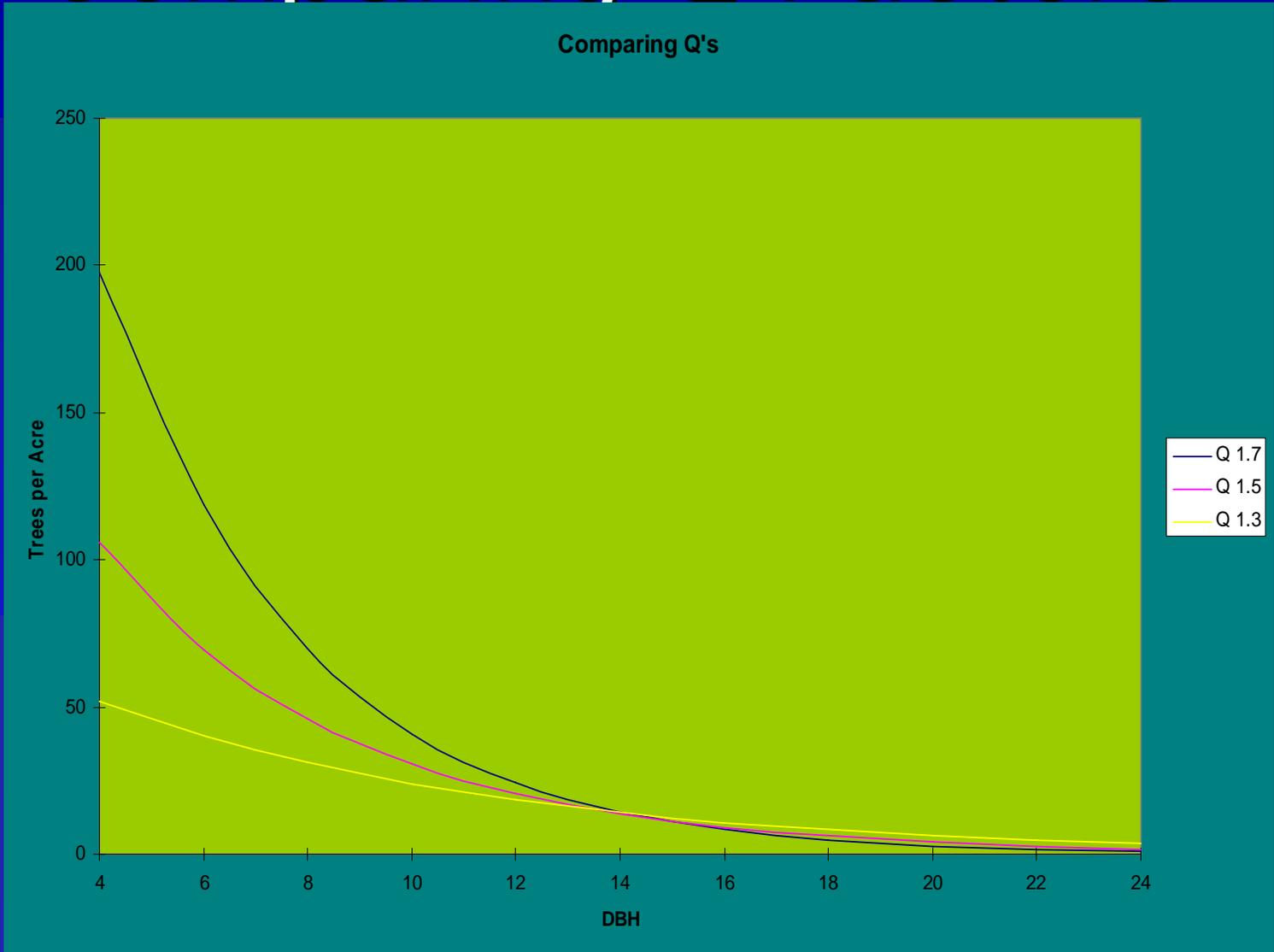
- A measure expressing stand structure.
- Diameter distribution **diminution quotient**
- ex. 12 trees/acre 10" class
- 9 trees/acre 12" class
- Q factor is  $12/9 = 1.3$

# Stand Q Calculation

■ DBH	Trees/Acre	Q
■ 4	110.1	
■ 6	56.6	1.9
■ 8	22.9	2.5
■ 10	12.0	1.9
■ 12	10.2	1.2
■ 14	5.1	2.0
■ 16	5.6	0.9
■ 18	4.0	1.4
■ 20	3.2	1.2
■ 22	1.9	1.7
■ 24	0.8	2.2
■ 26	1.0	0.8
■ 28	0.8	0.3
■ 28+	2.3	0.3
■	Total	18.3

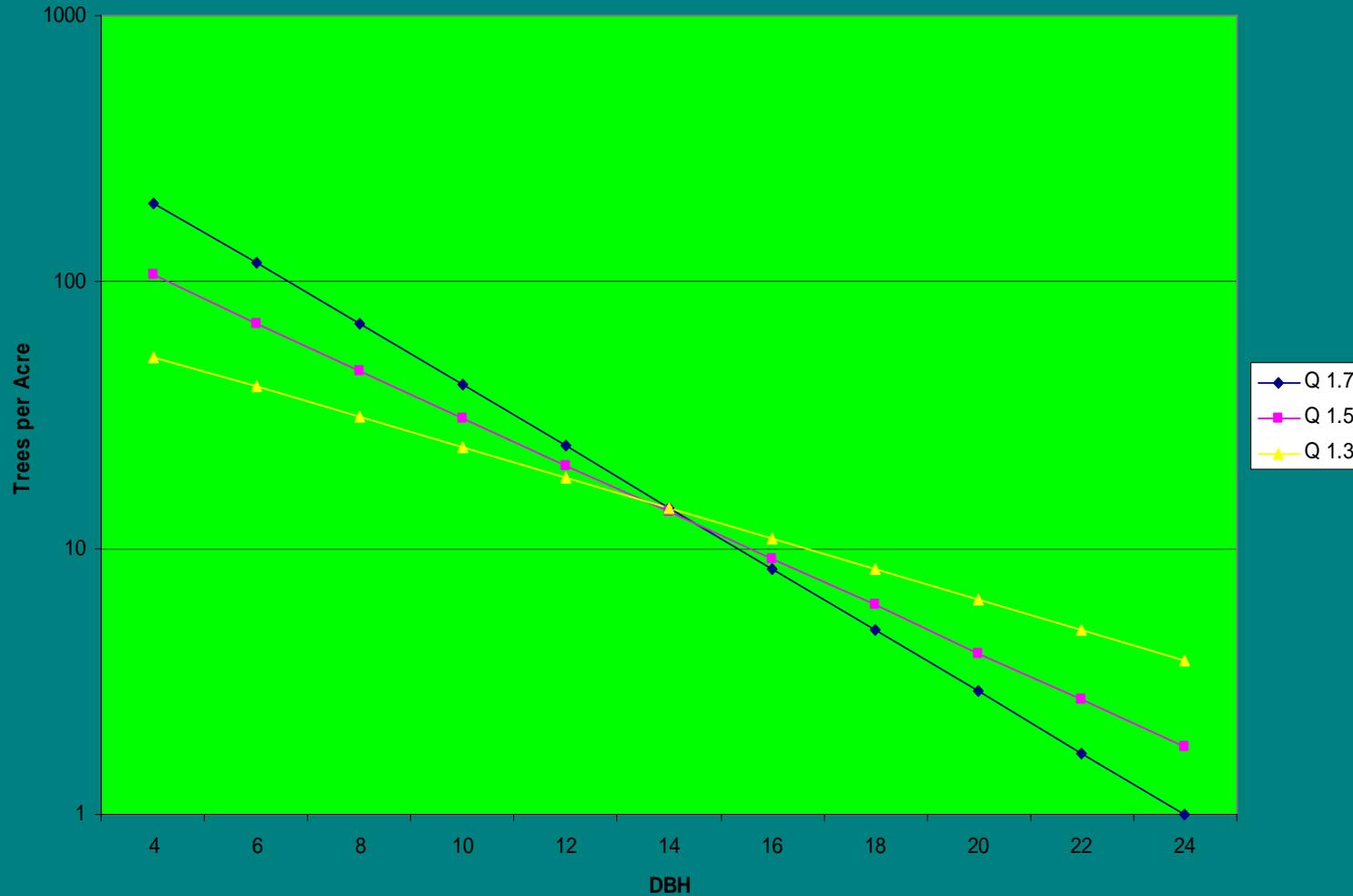
18.3/13 = Stand Q 1.4

# Comparing Q Factors



# Comparing Q Factors

Comparing Q's Log Scale



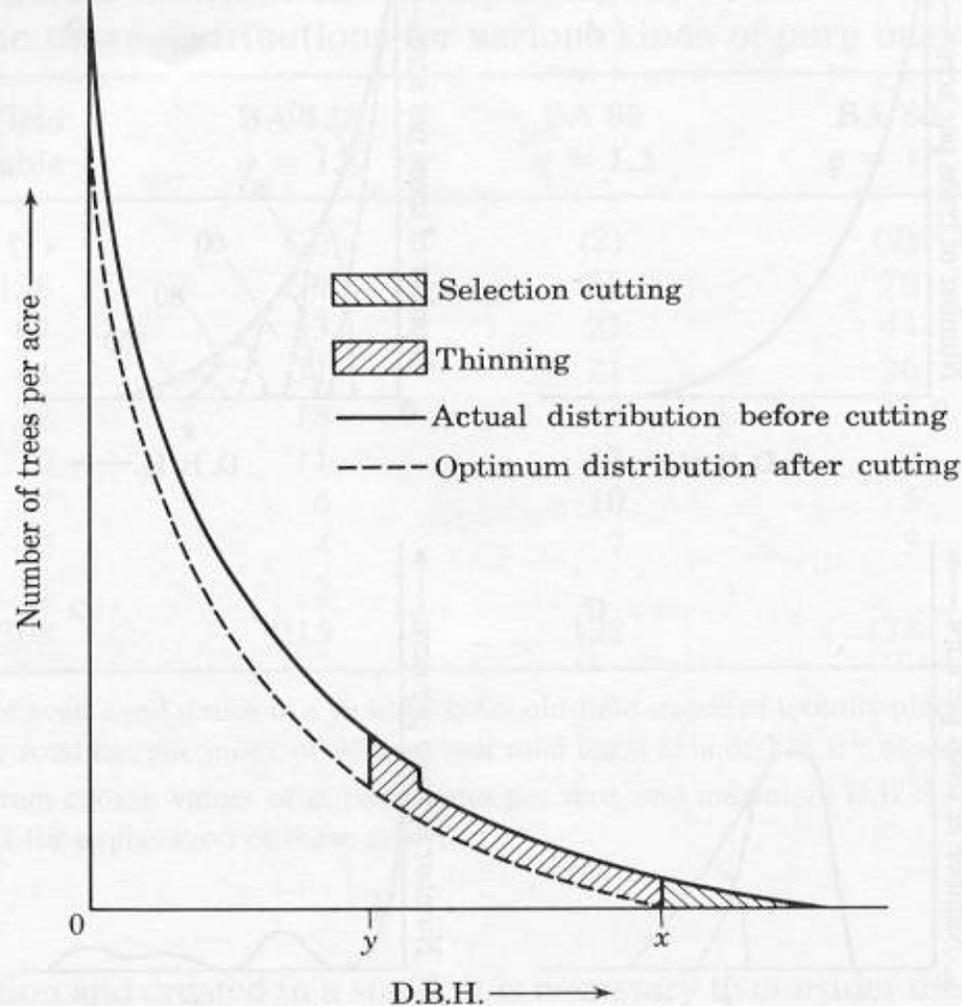
# Choosing a Structural Goal

- Existing stand Q.
- Rates of growth
- Stand basal area
- Size to which trees are to be grown.
- Species

# Choosing a Structural Goal

- Choose a Q the same or slightly lower than the existing Q.
- Q factor is mathematical, not biological.
- It is a guide. Be flexible.

- Must make inventory of the stand before marking it for cutting. Need to determine distribution of diameter classes by basal area. Cut is made on the basis of a comparison between actual distribution to what is assumed to be balanced.



**Figure 15.7** Diameter distribution of a balanced uneven-aged stand under intensive management, indicating the number of trees of different diameter classes theoretically removed in a single cutting. All trees larger than diameter  $x$ , which has been set as the index of rotation age, are removed. The trees of smaller diameter may also be reduced in number by thinning, provided that they are larger than the tree of lowest diameter ( $y$ ) which can be profitably utilized. Under extensive practice there would have been no cutting of trees less than diameter  $x$  and most of those represented above as being cut in thinnings would have been lost through natural suppression.

# Selection System

- Prescriptions used to regenerate uneven-age stands.
- Individual or single tree selection
  - Development of even-aged groups of trees in very small, scattered openings.
  - Species regenerated and perpetuated are very shade tolerant. Ex. Sugar maple & beech, spruce/fir, hemlock.
  - Openings need to be continually enlarged to perpetuate young tree growth.

# Selection System continued

- Group selection
- More feasible way of managing uneven-aged stands.
- Groups are 2X height of mature trees (75')  $2 \times 75' = 150'$
- Regeneration of some shade intolerant species. Paper birch, yellow birch, aspen.

# Selection System continued

- Improvement cut
  - Applied to pole timber stands.
  - Improve residual stand quality by removing unacceptable growing stock and lower quality overstory stems.

# Marking Priority

- 1) High risk trees
- 2) Undesirable growing stock
- 3) Trees greater than maximum diameter.
- 4) Slow growing trees.
- 5) Undesirable species.
- 6) Trees whose removal improves residual tree spacing.

# Summary

- Silviculture is local.
- Q factor selected and maximum tree size determined by site.
- Diameter distribution is determined by the biology (ecology) of the forest and purposes of management and not by mathematics.
- No reason to have a balanced stand, work with what you have.

# Summary continued

- With any approach to uneven-age management it is crucial to sustained yield to keep cutting openings in stands for recruitment of new regeneration.
- Selection system is complex requiring sophisticated prescriptions.
- Prescriptions take time, 3 to 4x more time.