

Clearcutting

- Defined as removal of all or most of vegetation from the site. Used in 2 ways
- To denote a logging technique --- *commercial clearcut* ----
- To denote a regeneration method --- *complete or silvicultural clearcut*

Clearcutting

- Leads to Even-Aged Stands
- Seedlings and site experience the entire range of environmental conditions during growth of stand --- from complete exposure in early life to stand closure later in life

Clearcutting

Variations in Method

- Artificial Regen --- No modifications needed
- Natural Regen --- greater knowledge of species characteristics, i.e., seeding habits

Clearcutting

With Artificial Regen (planting)

- No restrictions on size or geometry of cut
- Knowledge --- species to plant, adapting species to site, site prep method, plantation spacing --- we have control over these and do not need to depend on the whims of nature to do natural seeding

Clearcutting

Natural Regeneration

- Success depends on (1) distribution of good seed supply, (2) seedbed conditions favorable for germination and growth and (3) development of advance regeneration before the harvest

Clearcutting

Sources of Seed (Natural Regen)

1. One removal
 - a. Seed from forest floor
 - b. Seed from harvest trees (seed in place or seedling in place)
 - c. From adjacent trees

Clearcutting

Sources of Seed (Natural Regen)

1. Several removals
 - a. Clearcut in alternate strips
 - b. Clearcut in progressive strips
 - c. Clearcut in patches

Clearcutting

Factors

1. With seed, limits way you can do site prep or brush control
2. Seed are extremely variable --- viability, seedbed conditions, size and geometry of cut

Clearcutting

Advantages

- Concentration of operations
- Less risk/chance of losing valuable material left as seed source
- Need for timber marking eliminated
- Area regulation

Clearcutting

Advantages (with planting or Artificial Regen)

- No delay in obtaining regeneration (no time lag in growth)
- Control over stand density and arrangement
- Opportunity to use genetically superior material
- Avoid danger to which young seed and young seedlings are exposed
- Fewer restrictions on harvesting technique (seed source), and methods for site prep.

Clearcutting

Disadvantages

- High visual impact
- Higher cost
- Long time period to get another income
- Generally requires site prep and increases chance of damage to the site

Clearcutting

Characteristics of Species Suitable for Clearcutting Method

- Normally intolerant species
- Those that proliferate after a catastrophe (fire)
- Light-seeded
- Occupy an early or intermediate stage of succession
- Naturally occur in pure stands

Clearcutting

Use of Clearcutting

- Southern Pine
- Douglas-Fir
- Other Conifers
- Hardwoods

Clearcutting

Summary

Clearcutting is acceptable for most species, either using natural or artificial means with adequate seedbed conditions through site preparation

Clearcutting

Criticisms

- Resembles cut out and get out
- Not used wisely ---- clearcuts are too large
- Even-aged mgmt --- supposedly bad effects on wildlife. Is that true?

Clearcutting

1. Water Yield and Quantity
 - ET water loss
 - Sediment pollution
 - BMPs
2. Wildlife
 - Size considerations
 - Look at entire forest, not stand level

Clearcutting

2. Wildlife (continued)
 - Manage for diversity of stand size and age classes
 - Even-aged Mgmt works well
 - Optimum browse with early succession
 - Aesthetics --- border strips & SMZs
 - Monocultures

Silvicultural Systems

Only 3 systems

1. Even-Aged
2. Two-Aged
3. Uneven-aged

Silvicultural System vs Regeneration Method

- Silvicultural System ---- Management Arrangement
- Regeneration Method ---- Conditions under which a new stand is established

Methods of Regeneration within the Silvicultural System

- | | |
|------------|--------------------------|
| Even-age | a. Clearcut |
| | b. Seed tree |
| | c. Shelterwood |
| Two-Age | Leaving Reserve trees |
| Uneven-Age | a. Group Selection |
| | b. Single-Tree Selection |

Even-Aged vs Uneven-aged

Differences

- Height Differences --- crown classes
- Diameter Differences ---- curves
- Competition ---- ages

Even vs Uneven-age

Diameter Distribution Curves

- Even-aged STAND
- Balanced uneven-aged STAND
- Balanced even-aged FOREST

Even vs Uneven-Age

Geometry or Size of Cut

Amount of Sunlight received ↓

1. Clearcut
2. Seed Tree
3. Shelterwood
4. Selection

Choice of Method to Use

- Desires of the owner
- Natural or biological considerations
 - a. Requirements of Reproduction
 - b. Site Limitations
 - c. Wildlife habitat
 - d. Initial conditions of the stand
 - e. Intermediate operations ---- use of fire, etc
- Economics

With few exceptions the biological or ecological requirements of most species are such that they can be managed under any of the methods of regeneration.

Thus, considerations such as economics, management practices, and social considerations may dictate the method chosen.

Seed Tree

- **Form** --- Leads to Even-aged stands
- **Appearance** --- trees of seed bearing age are left scattered at fairly uniform spacing over the harvest areas





Seed Tree

- **Relation to Other Methods** --- between CC & SW --- leave too many trees resembles SW, not enough CC
- **Restrictions** --- few --- no restrictions in size or geometry of cut because seed source is left on the site and you do not have to depend on seed from adjacent stands

Seed Tree

Factors

- Good Phenotypes
- Seed bearing, upper canopy trees
- Windfirmness
- History of seed or cone production

Seed Tree

Seed Development

(gymnosperms --- 2-year process)

- Fall – flower primordia form
- Spring – flowers formed, pollination occurs
- Summer – pollen germinates, pollen tube grows, some growth of cones
- Spring – fertilization occurs
- Summer – cones grow and seed mature
- Fall – seed dispersal

Seed Tree

Number & Distribution of Seed Trees

- Uniform distribution
- 2 to 10 per acre *depending on* species seeding ability & degree of seedbed prep
- *When would you leave more or less seed trees?*

Seed Tree

Cultural Operations with Seed Tree

- Fire (southern pine)
- Herbicides if you have an excessive brush problem
- Mechanical --- mineral soil --- disk can damage seed trees

Seed Tree

Removal of Seed Trees

- Adequate Regeneration
- Inadequate Stocking ---- Site Prep Again
- Excessive Stocking
- Inaccessible or rough terrain ---- may leave seed trees

Seed Tree

Modifications of Seed Tree Method

- Group Seed Tree
- Reserve Seed Tree

Seed Tree

Advantages and Disadvantages

- Many of same advantages as clearcut
- Not restricted to size & shape of harvest
- Phenotypic selections
- More restricted in choice of site prep methods
- Risk of losing valuable large trees
- Detrimental effects of seed trees on seedling growth
- Chance of regeneration failure

Seed Tree

Use in Different Forest Types

- Southern Pine --- seedbed prep
- Doug-fir --- windfirmness, same for many western conifers
- Poor method with serotinous cone species
- OK for ponderosa pine --- moisture limiting
- Hardwoods --- not needed --- seed in place (poplar) or sprouting
