Site Preparation

ESRM 323

Chpt. 8

Smith, et al.

Site Preparation

- Successful regeneration often depends on accessory measures to reduce competition from unharvested vegetation, prepare the seedbed, remove / dispose of excess harvest residuals (slash),

- the objective is to prescribe and create environmental conditions conducive to the establishment and growth of the desired species

Site Preparation

- Most treatments are applied during the period of new forest establishment
- Some are started well in advance of harvest cutting
- Occasionally they are applied throughout the rotation

Site Preparation

- Disposal of logging slash
- Treatment of the forest floor and competing vegetation
- Site Improvement

1. Disposal of slash

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- relation with forest fires: most slash disposal is done to reduce fire hazard

  A sudden input of some volume of fuel;

  Environment conditions

- effects of slash on reproduction (shade and mechanical)

  heavy shade and mechanical effect

  thin, loose layers of slash – protection

  it is better to have thin layer slash for true firs, spruces, and hemlock regen.

1. Disposal of slash

- management of slash and litter
  - decisions depend on forest floor & soil conditions
- burning effects
  - nutrients – N compounds volatilize
  - most minerals returned to the soil
- effects of removing organic materials
  - nutrients will slowly come back
  - most of nutrients are concentrated in the leaves, twigs, rootlets, bark and litter layer
  - timber harvesting is much less depletive

Slash disposal methods

- broadcast burning – slash in clearcut areas is burned where it lies within prepared firelines
  - precludes reliance on advance regeneration, and eliminates much undesirable vegetation
- spot burning – limits burning to concentrations of slashy patches: may conserve desirable seed in non-burned areas
- piling and burning – often associated with partial or patch cutting

Slash disposal methods

- lopping and scattering – fire hazard can be reduced simply by lopping tops so severed branches lie closer to ground
- chipping and yarding – the unmerchantable material is extracted from the forest, chipped, and sold for pulp - expensive

2. Forest floor & Vegetation treatment

- Seedbed preparation → treatment of forest floor (layer of unincorporated OM and plants in stages of decomposition)
- Competing vegetation → residual trees, woody shrubs, herbaceous plants, ferns, grasses, and even advance regeneration of undesired species
- Key point: know the kind of vegetation that will develop after any kind of treatment and conduct the chosen treatments in light of this knowledge

Prescribed burning

Prescribed burning

- Controlled fires that are set to burn through naturally occurring fuels on the forest floor, usually under existing stands
- Purposes and effects: prep. of seedbeds, control of competing vegetation, removal of unincorporated O.M., improvement of wildlife and grazing habitats, fuel reduction, etc.
- Potential damage: depends on the size of standing trees and the extent to which stems and crowns are heated, types of fuel & sources, intensity of the fire (heat can girdle trees)

Prescribed burning

- Application
  - Most useful in forest types where natural fires are common
    - Ponderosa pine type
    - Longleaf pine type
- Schedule
  - Gently blowing wind
- Season
  - Winter often best, avoid internal tree temps exceeding 55 C
  - Lethal to regeneration, hardwood saplings will resprout

Mechanical treatments

- Reduction of undesirable vegetation: uprooting, chopping or plowing (disk plows, rolling brush choppers)
- Redistribution of dead vegetation: windrows, scarification, piling
- Reshaping: plowing or scraping to create low ridges (wet areas) or shallow trenches (dry)

Mechanical treatments

- Bedding: mounding up of “beds” to increase the volume of soil sufficiently well supplied with oxygen and water.
- Loosening compacted soil: plowing to reduce the compaction produced by the hooves of animals or the weight of heavy machines. Reduction of hardpans
- Terracing: construct contour terraces or plow out furrows to collect water and uproot or bury vegetation.
- Limitations → horizontal movement of OM and topsoil should be avoided or limited to the minimum. Costly !!!

Herbicide treatments

- Broadcasting or localized spraying (mechanized or manual)
- Removal of competing vegetation has no effect on forest floor conditions
- Costs of products and application can make this operation very expensive
  - Pre-emergents
  - Topical
  - Systemic
  - Pest specific

Flooding

- Water is guided by channels and dikes to seasonally inundate a site to kill off weed growth
- Later, sites are drained and prepared.

3. Site Improvement

- Fertilization
- Drainage
- Irrigation
- Protection

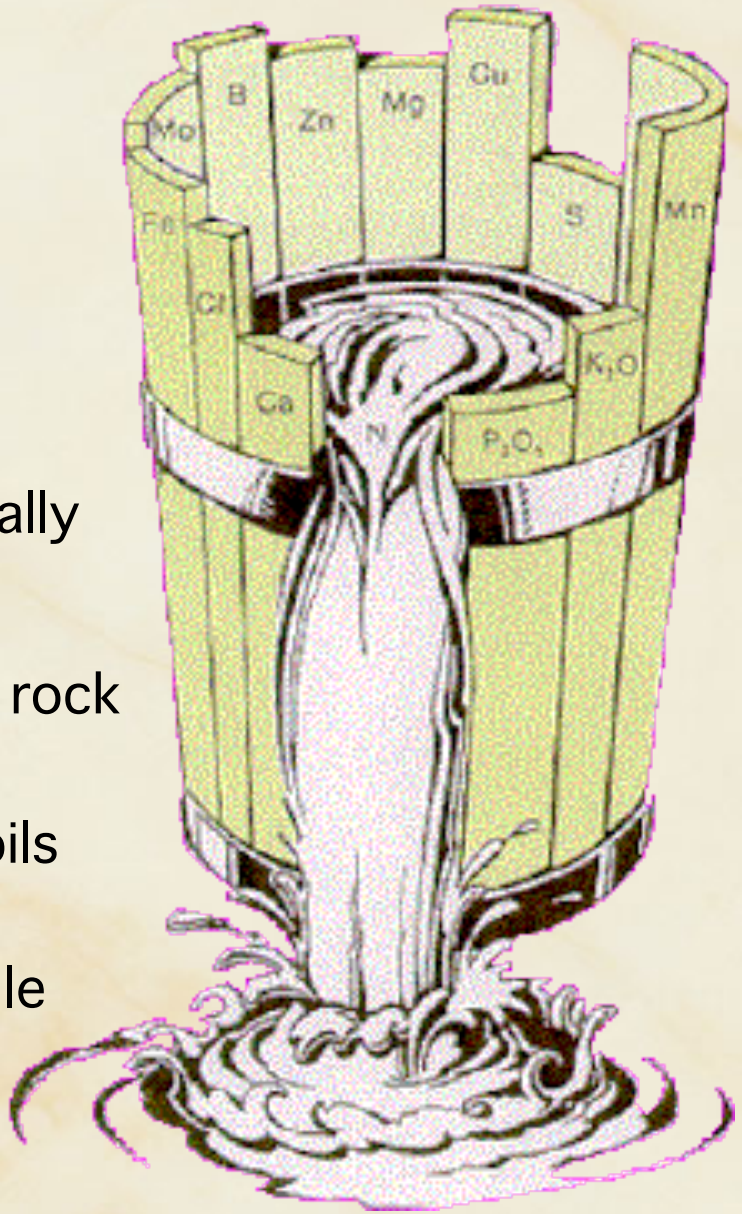
Fertilization

- Most common deficiencies are

Nitrogen (N), generally very mobile in soil

Phosphorous (P), rock weathering and particulate deposition, poorly drained soils

Potassium (K), single application gives long term benefit



Fertilization

- Plant nutrient deficiencies most often due to naturally low site fertility, but can be driven by improper past management
- N fertilization (urea and biosolids) depends on the site and presence of sufficient H_20 and P
- Can be added at time of planting or regeneration

Drainage & Irrigation

- Drainage
  - Primary and secondary ditches
- Irrigation
  - Particularly where rainfall is low but the soils are fertile
  - Except for nurseries, seed-orchards or trees with specific purposes, little is done in forestry
  - Important: avoid salinization !

Drainage & Irrigation

Protection

- Sites should be protected from erosion (disturbances that prevent vegetation establishment and soil stabilization) or improper land use

- Contouring: constructing physical or vegetative obstructions that are arranged parallel to the contour of the slope or disturbance-prone edge to stabilize earth movement and soil erosion

Summary Points

- Site Preparation is designed for:
  - Slash disposal
    - Burning or mechanical
  - Treating forest floor & competing veg.
    - Prescribed burning, chemical, or mechanical
  - Site improvement
    - Fertilization, drainage, irrigation, erosion control
- Achieve goals while protecting the site