

Hardwood Propagation

- **Hardwood propagation is defined as a cutting taken from a mature woody stem for the purpose of propagation**
- **For both types of cuttings- Poles & Branched**
- **Hardwood cuttings are made from branches, stems, or trunks**
- **Applies to willows, cottonwood, dogwood, and a few other species**
- **In dry areas, don't use whips (current year's growth) - Use 2-7 year old wood**

TYPES OF PLANTING STOCK

Dormant unrooted branched cuttings

- **Cut from the same source as pole planting material**
- **Main difference is that the tops and side branches are left on the cuttings**
- **Normally used for bulk, long lasting wood, and sprouting**
- **Multiple stems per foot**



TYPES OF PLANTING STOCK

Dormant unrooted cuttings for pole plantings

- **Reach to lowest watertable**
- **Can withstand high streamflow velocities**
- **Smaller planting hole**
- **Can take total inundation for long periods**
- **Can be planted in some competing vegetation**



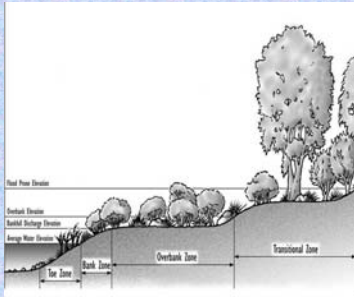
Dormant unrooted cuttings for pole plantings

- **Root Primordia or root buds**
- **Inexpensive**
- **Easy to harvest**
- **Easy to store**
- **Easy to plant**
- **Easy to replant**
- **Plant in large numbers - rapidly**



Hardwood Propagation

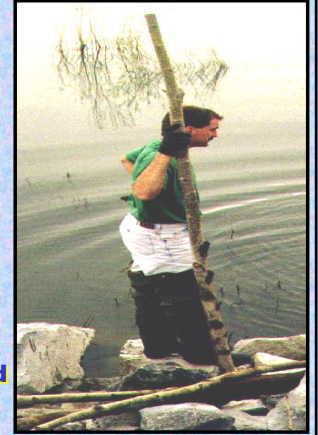
- Plant in Bank, Overbank, Transitional Zones
- Can plant deeply with minimum sized hole
- Plant where watertable may be deep
 - * Must reach the lowest watertable of the year



Planting Recommendations For Pole Cuttings

• Cutting Length

- * Reach the lowest watertable
- * Extend above competing vegetation shade
- * Extend below the competing vegetation root mass
- * 2/3 cutting in the ground



Poplar cutting

Poplars after 3 growing seasons

Planting Recommendations For Pole Cuttings

• Cutting Diameter

- * Larger is better
- * 2-7 years old (Depends on area and Species)
- * Don't use whips (except in high precipitation areas)
- * Species Dependent



Planting Recommendations For Pole Cuttings

•Cutting Treatment for pole planting

- *Cut off apical bud
- *Cut off all side branches
- *Seal cutting top



Planting Recommendations For Pole Cuttings

- *Soak in water to swell the root primordia for a minimum of 24 hours, 5-7 days is better.
- *Roots will emerge after about 14 days or longer depending upon species
- *Soak the entire cutting



Planting Recommendations For Pole Cuttings

- * Stored is good (store dry)
- * Plant as soon as harvested (dormant cuttings)
- * Green cuttings 50% survival (as long as they are processed like a dormant cutting.)



Be careful when soaking the cuttings

Planting Recommendations For Pole Cuttings

• Planting Depth

- *Lowest watertable of the year
- *Soil Texture
- *Soil Layers - perched water
- *Good soil to stem contact
- *2/3 of cutting in ground
- *1 to 2 buds above ground (unless shade problems)



Planting Recommendations For Pole Cuttings

• Planting Methods

- * Accessibility
- * Washout Problems
- * Good soil to stem contact
- * Depth to lowest watertable
- * Soil Texture
- * Layers - Compaction, clay, calcic
- * Rock - Large gravel, cobbles, boulders

The Stinger



TYPES OF PLANTING STOCK

- Plugs, Conetainers, Deep pot, Bareroot, Potted, Balled and Burlap
- Plant where adequate moisture is available - natural or irrigated
- Little or no competing vegetation - chemical or scalp
- Plant in areas with short period of inundation or flooding
- Can't take high streamflow velocities



Plugs, Conetainers, Deep pot, Bareroot, Potted, Balled and Burlap

- **Soils test**
 - Establish fertility of soil
 - Needed supplements
 - Water holding capacity
- **If irrigation is needed (soils information is crucial)**
 - Drip irrigation system
 - Moveable and reusable
 - Up-gradable as plants grow
 - For portability, use Gas pump or solar pump
 - Avoid sprinkler system
 - Weeds
 - Water concentrated at roots

Plugs, Conetainers, Deep pot, Bareroot, Potted, Balled and Burlap

- **Irrigation Water Management (soils information is crucial)**
 - Early on: High frequency, Low duration
 - As plants start to grow: Lower frequency, higher duration
 - As plants extend root system: Low frequency, long duration
- **Weed control**
 - Have a plan
 - Identify the weeds
 - Identify person who will do the work
 - Budget money
 - Schedule work



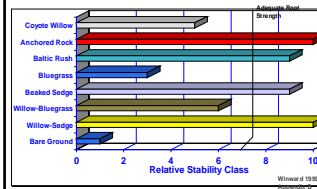
Suggestions for better establishment success

- Bottom 6-8 inches of pole cutting should be in the lowest watertable of the year
- Most expensive part of planting a pole cutting is digging the hole
 - Put multiple stems in the same hole to increase changes that at least one will survive and root.
- If the vegetation cover is 50% or greater sedges and rushes, do not plant pole cuttings
 - Too much competition
 - Too wet for tender new roots
- Part of the pole cutting should be in aerobic soil above the saturated zone.
- Soak the cuttings in water before planting
- Muddy the cuttings in to eliminate air pockets and get better soil to stem contact

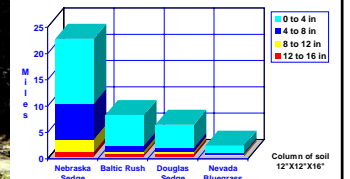
Planting Herbaceous Wetland Plants

- **Plant plugs versus seeding**
 - Seeds need water, heat, and light
 - Development of structures to breath in anaerobic conditions
- **Buy the largest plugs you can afford**
- **Plant in the right hydrologic zone for each species**
- **Spacing should be about 18 inches between plugs**
 - Will fill in between plugs in one growing season
 - If you don't have enough plants, plant in copses or patches and skip areas in between

Channel Stability Rating (Vegetation)



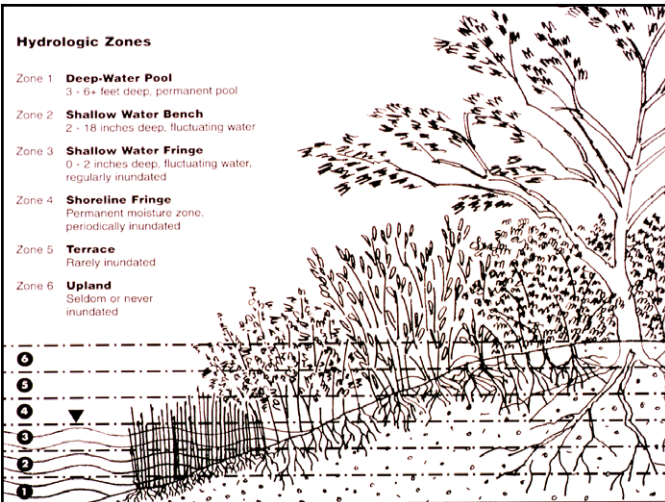
Root Length



Column of soil 12" X 12" X 16"
Manning, M.E., et al., 1989

Hydrologic Zones

- Zone 1 **Deep-Water Pool**
3 - 6+ feet deep, permanent pool
- Zone 2 **Shallow Water Bench**
2 - 18 inches deep, fluctuating water
- Zone 3 **Shallow Water Fringe**
0 - 2 inches deep, fluctuating water, regularly inundated
- Zone 4 **Shoreline Fringe**
Permanent moisture zone, periodically inundated
- Zone 5 **Terrace**
Rarely inundated
- Zone 6 **Upland**
Seldom or never inundated



**22 cu. in.
Plug of
Nebraska
Sedge**