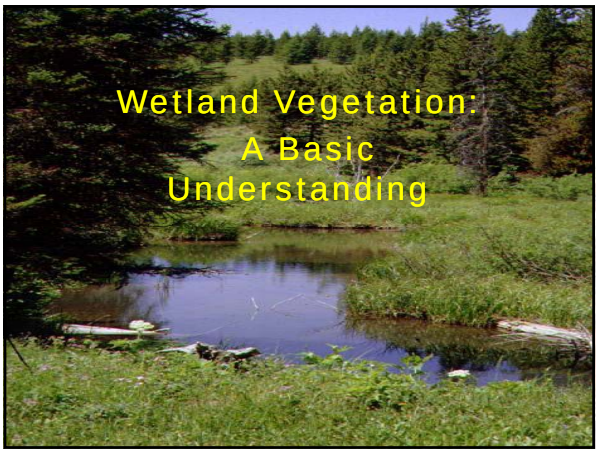
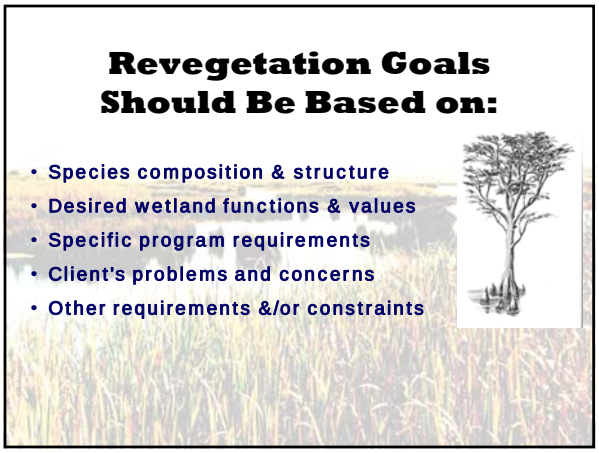

Wetland Vegetation:
A Basic
Understanding


Lesson Objectives
• Develop revegetation success criteria
• Determine whether Natural Regeneration is a viable alternative to planting using the Natural Regeneration vs. Planting keys
• Select the appropriate species for active revegetation of a wetland restoration site using the Species Selection Worksheet


Revegetation Goals
Should Be Based on:
• Species composition & structure
• Desired wetland functions & values
• Specific program requirements
• Client's problems and concerns
• Other requirements &/or constraints


Revegetation Success Criteria
•Desired species composition
•Desired density
•Time

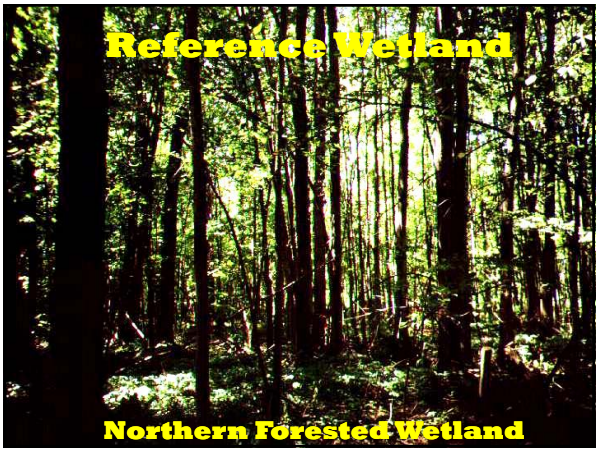

Forested Wetland Success Criteria
Minimal acceptable stand will be 200 trees and shrubs per acre by the end of the fifth growing season with at least 3 species of trees and 2 species of shrubs.


Emergent Wetland Success Criteria
Plants will fill interspace (18 inches) in one growing season for at least 3 species after planting.

Use Reference Wetlands to:

- Determine vegetative strata
- Determine species composition
- Determine dominant species
- Visualize the final target

(these all vary across regions)




Reference Wetland
Oregon Ash
Forested Wetland


Reference Wetland
Emergent Wetland


1ST: Survey & ID Vegetation
•
• Identify all species that occur in an appreciable amount.

2nd: Determine Strata

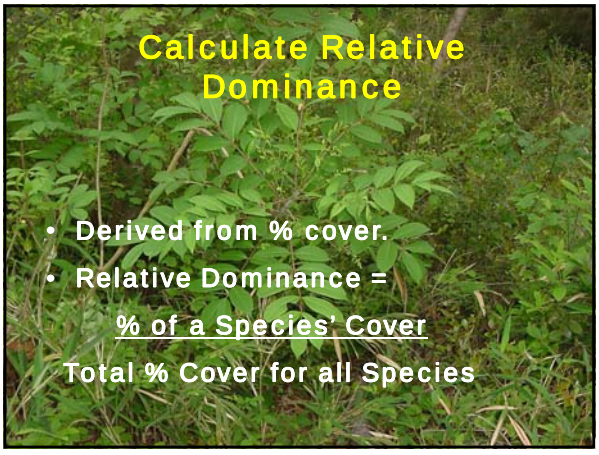
- Identify the strata & record data for each strata separately.
  - > 20' + > 5" DBH (canopy)
  - > 20' + < 5" DBH (understory/subcanopy)
  - > 3' + < 20' (shrub)
  - < 3' (herbs + woody)

3rd: Determine the Dominants

- Estimate Actual % Cover for each species in each strata
- Convert the Actual % Cover to Relative % Cover
- Determine the dominant vegetation in each strata using the "50/20 rule"

Actual % Cover (example)

Species	% Cover
Shining Willow	35
Red Willow	25
Boxelder	25
Fremont Cottonwood	15
Pussy Willow	10
Coyote Willow	10
Redosier Dogwood	5
Black Ash	5
Total	130



Relative Dominance Example

Species	% Cover	Relative Dominance
Shining Willow	35	27
Red Willow	25	19
Boxelder	25	19
Fremont Cottonwood	15	11
Pussy Willow	10	8
Coyote Willow	10	8
Redosier Dogwood	5	4
Black Ash	5	4
Total	130	100

50/20 Rule

Dominant species are those that, when ranked in decreasing order and cumulatively totaled:

- are greater or equal to 50% of the dominance measure,
- plus any additional species with a dominance measure of 20% or more.

Determine Dominant Species using the "50/20 Rule"

Species	% Cover	Relative Dominance	
Shining Willow	35	→ 27	*(27)*
Red Willow	25	→ 19	*(46)*
Boxelder	25	→ 19	*(65)*
Fremont Cottonwood	15	11	
Pussy Willow	10	8	
Coyote Willow	10	8	
Redosier Dogwood	5	4	
Black Ash	5	4	
Total	130	100	

(This same process should be done for each stratum)

REVEGETATION
Planting Vs. Natural

- ***Natural revegetation*** allows a site to revegetate through the natural succession process.
- ***Revegetation by planting*** allows a site to develop from a planted group of species.

(Planting includes augmenting natural revegetation with additional plantings.)

Can *Natural Regeneration* work on my site?

Now what do I look for?

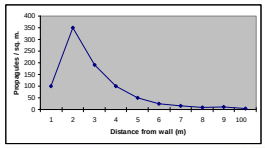
- Seed Banks - Must be present on site
- Seed Dispersal - Must be able to get to site

Warning: There may be bad seed mixed with the good!

Seed Banks

- Viable seed present in the sediment
- Best candidates for natural regenera
  - -Sites drained less than 20 years (*herbaceous wetlands*) or 5 years (*wooded wetlands*)
- Seed banks may contain undesirable or exotic species
  - -Could jeopardize successful revegetation.
  - -Examine composition of seed bank.
  - -Seed bank assay technique.

Seed Dispersal



- Rate of succession on abandoned fields
  - Related to distance from stands of natural vegetation.
  - As distance increased, seed dispersal declines logarithmically.
- Wind-blown tree stands = 200 ft from seed wall.
- Emergent marshes = 1/2 mile from restoration site

Natural Regeneration Vs Planting Key: Forested wetland types

1. Hydrology and soil condition marginally altered	Go to 2
1. Hydrology and soil condition significantly altered	Go to A
2. Propagules already exist on site	Go to 3
2. Propagules do not exist on site	Go to 5
3. Desirable species occur on site	Go to 4
3. Desirable species do not occur on site	Go to 5
4. Cover of plants is adequate to meet project objectives	Go to B
4. Cover of plants is inadequate to meet project objectives	Go to 5
5. Restoration site is adjacent to a surrounding seed wall	Go to 6
5. Restoration site is not adjacent to a surrounding seed wall	Go to A
6. Seed wall contains desirable species	Go to C
6. Seed wall does not contain desirable species	Go to A

A = Natural regeneration not recommended for site
B = Natural regeneration may be recommended for the entire site
C = Natural regeneration should be no greater than 200 ft. (75 meters) from the surrounding seed wall

How would you decide whether this site should be left to natural regeneration or whether planting is a viable alternative?

Natural Regeneration Vs. Planting Key: Emergent Marsh wetland types

1. Vegetation already exists on site	Go to 2
1. Vegetation does not exist on site	Go to 4
2. Desirable species occur on site	Go to 3
2. Desirable species do not occur on site	Go to 4
3. Species diversity and cover is adequate to meet project objectives	Go to A
3. Species diversity and cover is inadequate to meet project objectives	Go to 4
4. Site downstream, adjacent to, or near existing wetland	Go to 5
4. Site not downstream, adjacent to, or near existing wetland	Go to 6
5. Existing wetland contains desirable species	Go to C
5. Existing wetland does not contains desirable species	Go to 6
6. Wetland effectively drained for less than 20 years	Go to 7
6. Wetland effectively drained for more than 20 years	Go to B
7. Seed bank contains desirable species	Go to 8
7. Seed bank does not contains desirable species	Go to B
8. Density of seeds is adequate to meet project objectives	Go to A
8. Density of seeds is inadequate to meet project objectives	Go to B

A = Natural regeneration may be recommended for the site
B = Natural regeneration not recommended for the site
C = Limit natural regeneration to areas within 1/2 mile of emergent wetlands

Natural Regeneration Selected

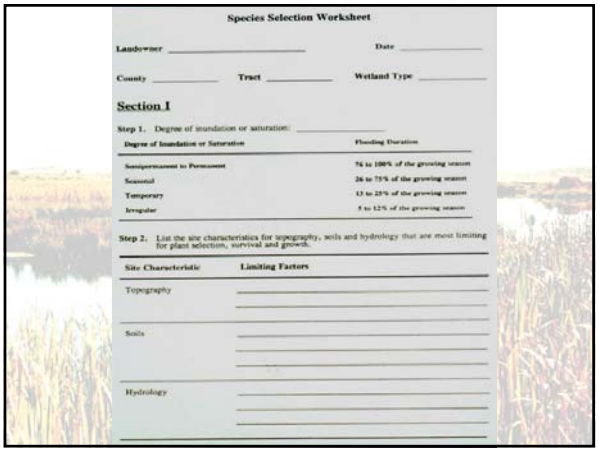
- Note seed dispersal times of the target species
- Sites should be disked prior to the dispersal season

Failures

- Overbank flooding did not occur
- Seed failure in the seed wall or seed bank
- Procedure may have to be repeated the next year

PLANTING REQUIRED

- Species Diversity?
- Species Selection?
- Species Selection Worksheets



Species Selection Worksheet

Landowner _____ **Date** _____

County _____ **Tract** _____ **Wetland Type** _____

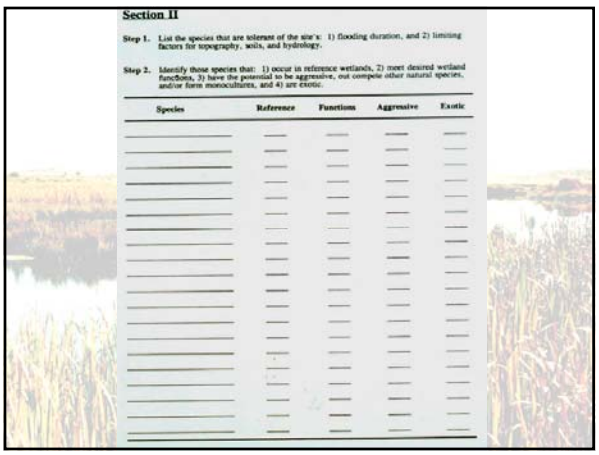
Section I

Step 1. Degree of inundation or saturation: _____

Degree of Inundation or Saturation	Flooding Duration
Semipermanent to Permanent	76 to 100% of the growing season
Seasonal	26 to 75% of the growing season
Temporary	13 to 25% of the growing season
Irregular	5 to 12% of the growing season

Step 2. List the site characteristics for topography, soils and hydrology that are most limiting for plant selection, survival and growth.

Site Characteristic	Limiting Factors
Topography	
Soils	
Hydrology	

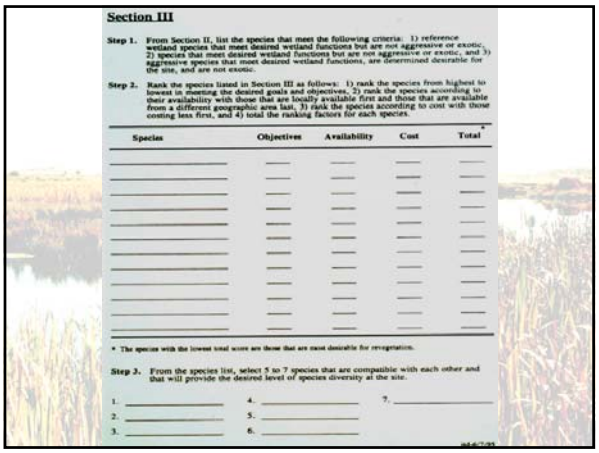


Section II

Step 1. List the species that are tolerant of the site's: 1) flooding duration, and 2) limiting factors for topography, soils, and hydrology.

Step 2. Identify those species that: 1) occur in reference wetlands, 2) meet desired wetland functions, 3) have the potential to be aggressive, out compete other natural species, and/or form monocultures, and 4) are exotic.

Species	Reference	Functions	Aggressive	Exotic



Section III

Step 1. From Section II, list the species that meet the following criteria: 1) reference wetland species that meet desired wetland functions but are not aggressive or exotic, 2) species that meet desired wetland functions but are not aggressive or exotic, and 3) aggressive species that meet desired wetland functions, are determined desirable for the site, and are not exotic.

Step 2. Rank the species listed in Section III as follows: 1) rank the species from highest to lowest in meeting the desired goals and objectives, 2) rank the species according to their availability with those that are locally available first and those that are available from a different geographic area last, 3) rank the species according to cost with those costing less first, and 4) total the ranking factors for each species.

Species	Objectives	Availability	Cost	Total*

* The species with the lowest total score are those that are most desirable for revegetation.

Step 3. From the species list, select 5 to 7 species that are compatible with each other and that will provide the desired level of species diversity at the site.

1. _____ 4. _____ 7. _____
2. _____ 5. _____
3. _____ 6. _____

Summary

- Succession drives the system
- Revegetation Success Criteria
- Natural Regeneration vs. Planting criteria
- Species Selection

(*Our job is not to recreate nature, but to identify what nature will do with a site and give a little push in that direction.*)