SouthWest Vegetation Management Association

11th Annual Conference

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Challenges of Native Seed Collection Posed by Invasive Species

Reclamation
Seed Industry is Relatively New

- Dust Bowl days of the 1950s
- Pioneering efforts of the Soil Conservation Service (today Natural Resource Conservation Service) and the Great Basin Experimental Station
- Surface Mining and Reclamation Act of 1977
- Federal Highway Act of 1987

Reclamation

Seed Industry is Relatively New (cont)

- Conservation Reserve Program of the 1980s and 1990s
- President Clinton edict in 1994 directing federal agencies "*when practical, the use of local native plant species will be used for land reclamation*"
- Use of native plant materials by U.S. Forest Service and Bureau of Land Management for fire reclamation and cheatgrass control and state DOT's for roadside reclamation

How Does the Seed Industry Meet the Growing Demand for Native Plant Materials?

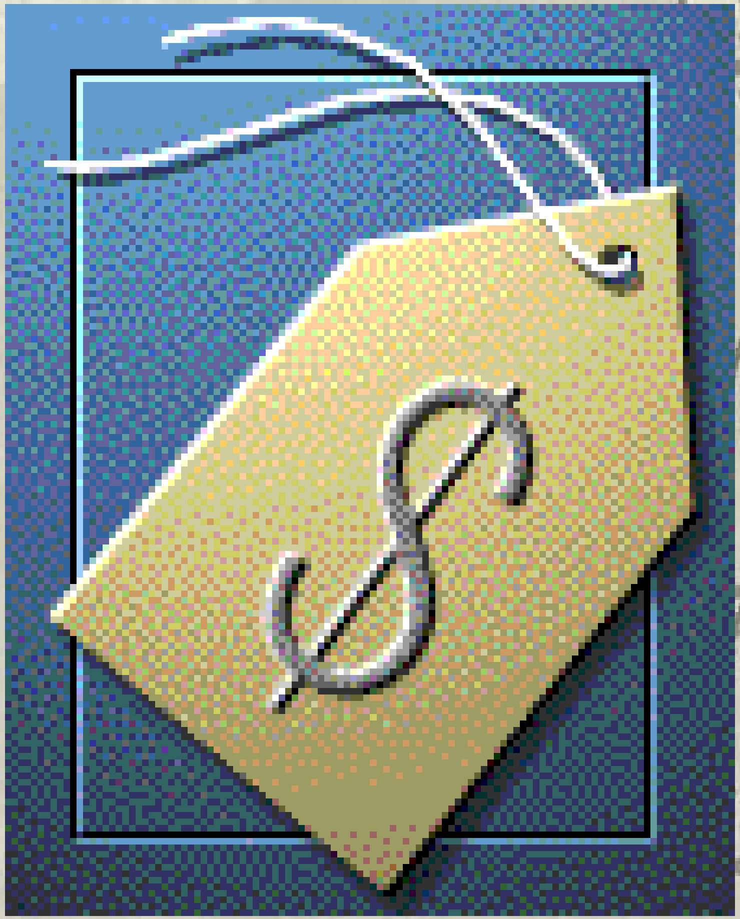
- Successful prediction of what the demand will be
- Looking at past history/ usage

Why Might the Seed Industry Not Have the Seed That Reclamation Managers Are Requesting (Availability)?

- Crop failure (weather, insect predation, disease)
- Unusual increase in demand
- Requests for materials the reclamation industry has not typically needed or wanted in the past

Cost of Native Seed Species

- Hand harvested seed from wild collections is the most expensive seed
- Field produced seed is less expensive



Generally, grass species are the easiest to acquire and accumulate and consequently less expensive than forb and shrub species. The exceptions are species such as needle and thread grass or inland salt which must be hand collected in the wild and can be quite expensive to process.

- Farm cultivated
- Machine harvested
- Much research resulting in many improved varieties with broad adaptations

Although many forbs or wildflowers are also field produced, they are typically more expensive because of difficulties associated with propagation, weed control and harvest. However, most are still hand collected from native stands.

Woody plants (shrubs and trees) are generally the most expensive because they must be hand collected from the wild.

Seed Collection

- Individuals must be familiar with species and plant communities
- Must be familiar with the phenology of the species you are collecting
- Must be a hard worker with a strong back

Challenges of Seed Collection

- Must find stands that are large enough to be worth harvesting
- Must obtain permission/permits to collect seed
- Must determine when to harvest the seed

- Must organize crews to harvest
- Must be aware of invasive/noxious species

Challenges of Seed Collection

- Once collected, seed must be dried
- Must be cognizant of weather patterns and events
- Transported to processing facilities for cleaning
- Once thoroughly cleaned, seed is sent to a certified seed testing laboratory to be tested for purity and germination

Approaches to Specifying Native Seed for Reclamation Projects

- Species from similar ecological areas regardless of geographic distance (allows greater flexibility in providing large quantities of seed at less cost)


WA
Arlington
Bromar
Whitmar
Bannock
Goldar
Bannock
Schwendimar
Hederma
Sherman
Secar
Nezpar
OR
Durar
Sodar
ID
Sand Hollow
Bannock
Summit
MT
Critana
Trailhead
Rimrock
Pryor
Rosanna
Primar
ND
Bison
Lodorm
Tomahawk
SD
Pierre
Forestburg
WY
Shoshone
Goshen
NE
Holt
Nebraska 28
Butte
Butte
Garden
Trailway
Pawnee
NV
UT
CA
CO
Fults
Arriba
Paloma
SanLuis
KS
Kaw
Barton
Aldous
Cimarron
OK
Cheyenne
Bend
Woodward
Texoka
El Reno
Blackwel
AZ
NM
El Vado
Redondo
Pastura
Viva
Bandera
Vaughn
Woodward
Elida
Niner
Salado
Lovington
Hachita
TX
Haskell
Alamo

Approaches to Specifying Native Seed for Reclamation Projects

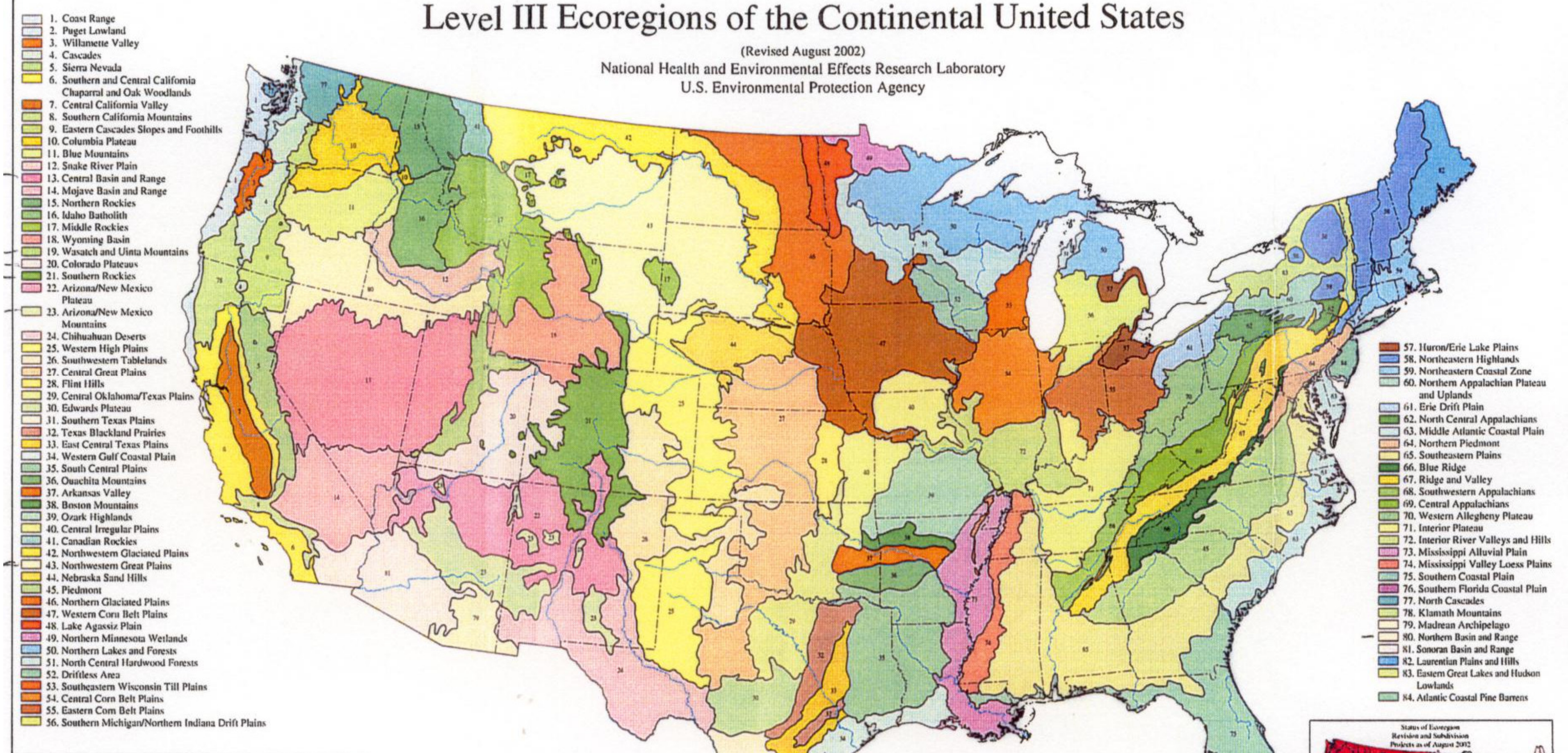
- Using species that originate from a narrow geographic proximity (restricts flexibility and less opportunity to provide sizable quantities of seed. More expensive and good planning needed).

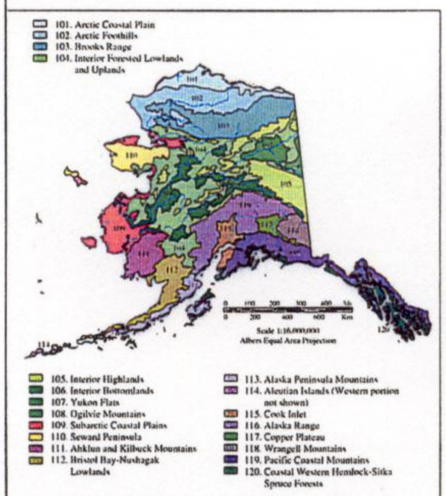
Level III Ecoregions of the Continental United States

(Revised August 2002)

National Health and Environmental Effects Research Laboratory

U.S. Environmental Protection Agency





The ecoregions shown here have been derived from Omernik (1987) and from refinements of Omernik's framework that have been made for other projects. These ongoing or recently completed projects, conducted in collaboration with the U.S. EPA regional offices, state resource management agencies, and with other federal agencies, involve refining ecoregions, defining subregions, and locating sets of reference sites. Designed to serve as a spatial framework for environmental resource management, ecoregions denote areas within which ecosystems (and the type, quality, and quantity of environmental resources) are generally similar. The most immediate needs are to develop regional biological criteria and water quality standards and to set management goals for nonpoint source pollution.

The approach used to compile this map is based on the premise that ecological regions can be identified through the analysis of the patterns and the composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity (Wiken 1986; Omernik 1987, 1995). These phenomena include geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level. Because of possible confusion with other meanings of terms for different levels of ecological regions, a Roman numeral classification scheme has been adopted for this effort. Level I is the coarsest level, dividing North America into 15 ecological regions, whereas at Level II the continent is subdivided into 52 classes (CEC 1997). Level III is the hierarchical level shown on this map. For portions of the United States (see map inset) the ecoregions have been further subdivided to Level IV. The applications of the ecoregions are explained in Gallant et al. (1989) and in reports and publications from the state and regional projects. For additional information, contact James M. Omernik, U.S. EPA National Health and Environmental Effects Laboratory (NHEERL), 200 SW 35th Street, Corvallis, OR 97333; phone: (541) 754-4458, email: omernik@mail.cor.epa.gov.

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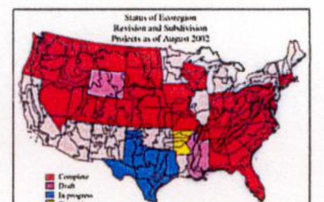
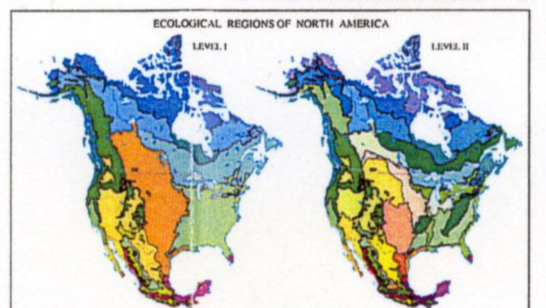




The names and identification numbers for level I and II ecological regions are given in CEC 1997.

Seeding Application Methods
Seed for Your Reclamation Project

- Aerial for large projects

Seeding Application Methods
Seed for Your Reclamation Project

- Aerial for large projects
- **Hydraulic**


5 18 '94

Seeding Application Methods
Seed for Your Reclamation Project

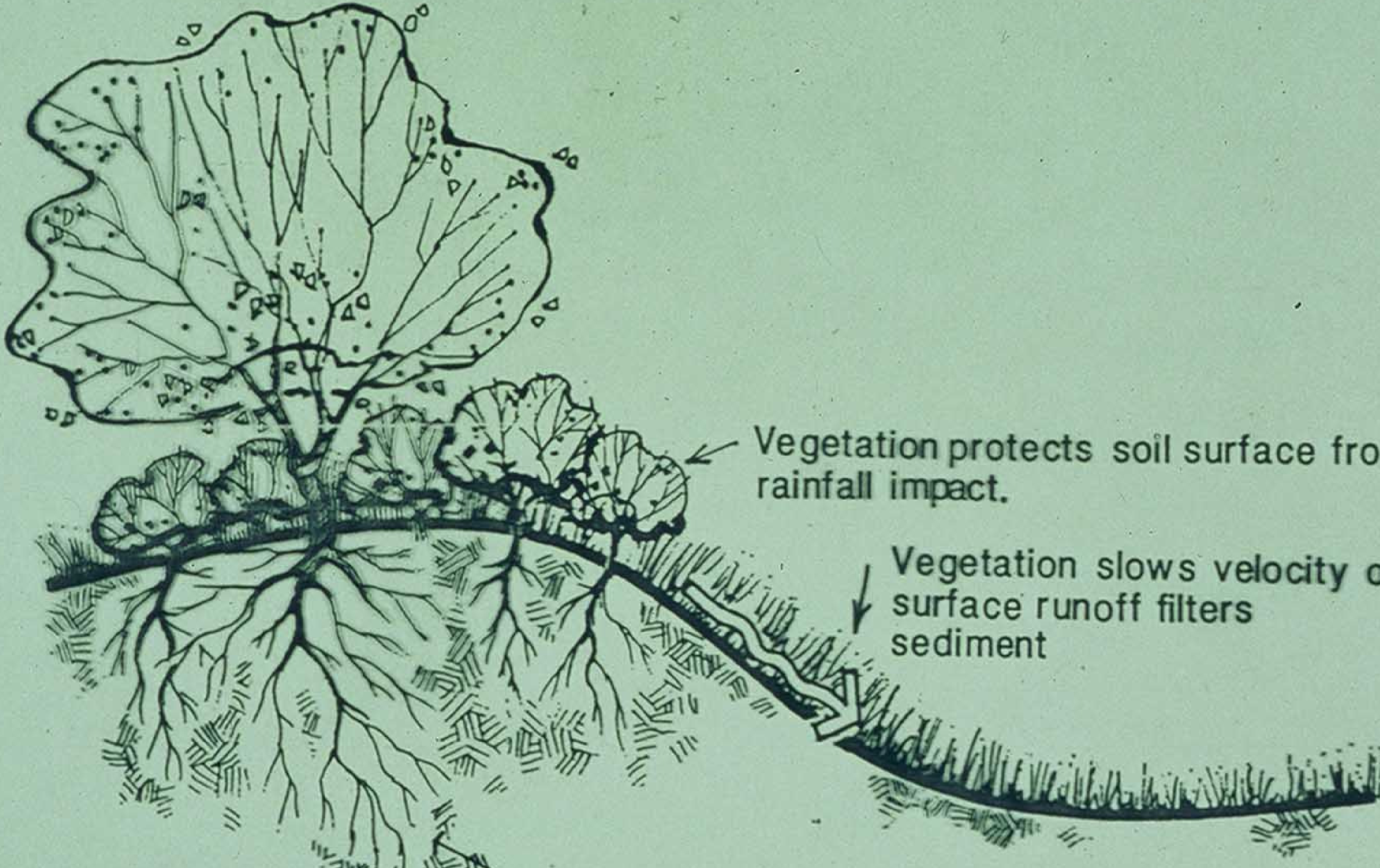
- Aerial for large projects
- Hydraulic
- **Drill**

Seeding Application Methods
Seed for Your Reclamation Project

- Aerial for large projects
- Hydraulic
- Drill
- **Hand broadcast for smaller projects**

The seed industry is in the business of providing you with products that you request whether Improved varieties or localized collections

Perennial plant material selection and grade re-establishment are key to the long term success of your project


Vegetation protects soil surface from rainfall impact.
Vegetation slows velocity of surface runoff filters sediment
Roots provide soil support increase infiltration and reduce soil moisture through transpiration.

Planting Plan

- ***Seed and transplants***
  - **Determine species**
  - **Determine species percentages**
  - **Determine rates**
  - **Determine application and burial method**

Determining Species

- Consider existing surrounding vegetation and potential cover crops
- Consider soil type
- Consider climate
  - Precipitation
  - Temperature extremes
- Consult literature sources
- Develop a wish list
- Discuss with local expertise
  - Local reclamation contractors
  - Local seed companies
  - County extension agents
- Develop a revised list
- Determine availability
- Produce the final list

Determining Species Percentages

- Determine site or desired plant associations
  - – Baseline vegetation data
  - – Site observations
  - – Literature
- Determine successional stages between starting point and desired end product

  ☆ ⇨ - Grasses ⇩

  ☆ ☆ ☆ ⇨ - Grasses and forbs ⇩

  ☆ ☆ ⇨ - Shrubs ⇩

- Determine highest successional stage likely to ***succeed*** on site
- Determine species percentages

Determine Planting Rates

- **Determine desired number of Pure Live Seed (PLS) per square foot**

  PLS = % Germination x % Purity

- **Calculate planting rate**
  - Planting rate of commercial seeds in PLS lbs/acre

Aids to Re-establishing Vegetation

Mycorrhiza
The Living Soil

- In nature, plants grow in "Living Soil"
  - 100 Million Bacteria
  - Miles of Fungal Filaments

- One handful of undisturbed soil contains:
  - One million algae, protozoa, and nematodes

Got Mycorrhiza?

- Eroded?
- Graded or Excavated?
- Heavy Fertilization or Pesticide Use?
- Occupied with Non-mycorrhizal Plants?
- Little Original Topsoil?

"YES" - Need to inoculate

"NO" - Should be native AM fungi present

Summary

- The seed industry is relatively new and continues to strive to meet the growing demands of providing seed for large and small reclamation projects
- Many improved varieties of native grasses are available in large quantities for roadside reclamation projects

Summary (continued)

- Locally collected shrubs are easier to find and may be financially justified when compared to site collected grasses and forbs
- It is imperative to plant seed that is adapted to the area, matching the ecotype that is being planted with ecotype from which the seed comes