Keeping it Real

Strategies to Maintain
"Wildness" in
Agriculturally Increased
Native Plant Seed

Sierra Smith
South Sound Conservation Nursery
Center for Natural Lands Management

Finding Common Ground

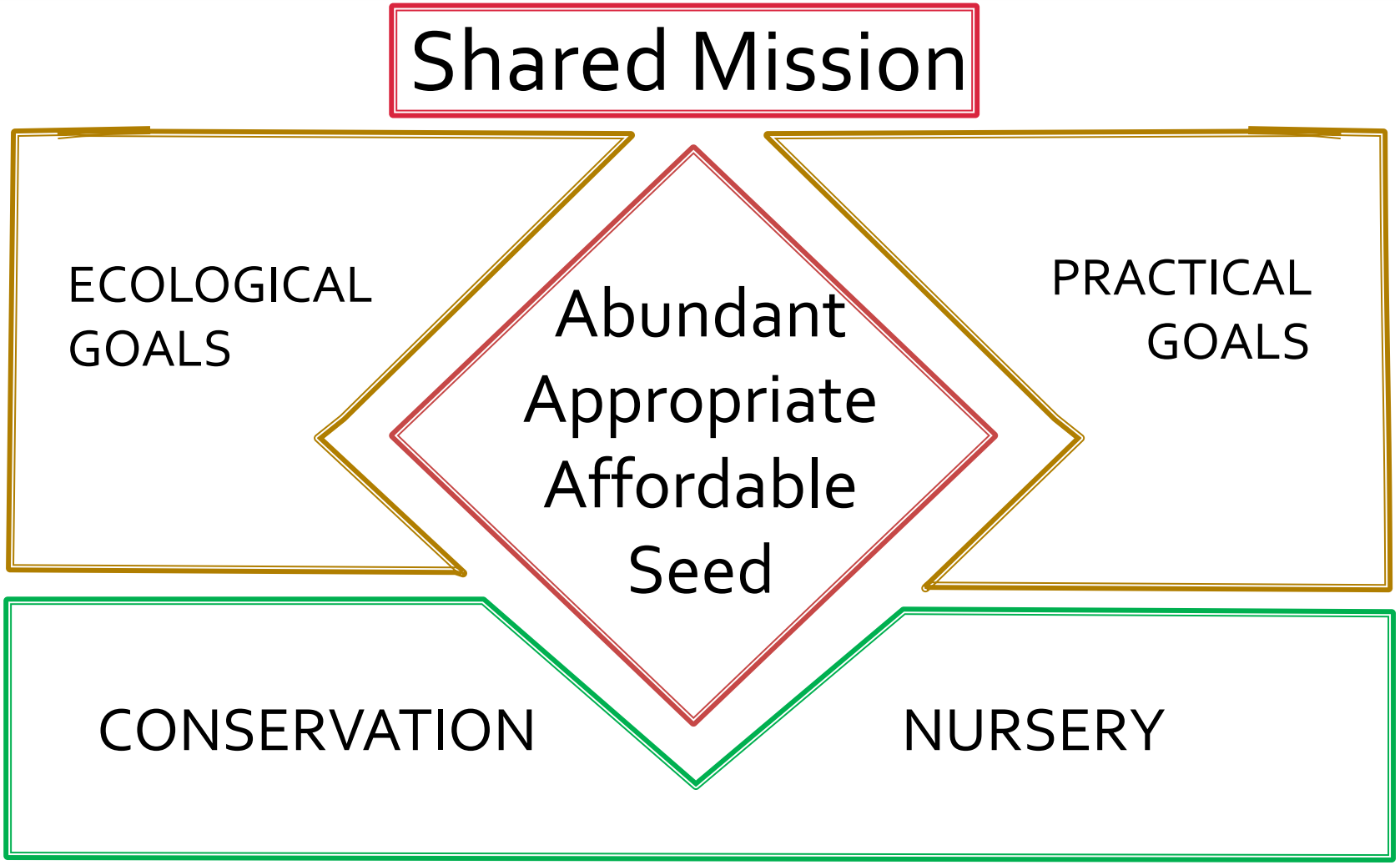
Strategies to

make genetically **appropriate** native seed

available and **affordable**

Sierra Smith
South Sound Conservation Nursery
Center for Natural Lands Management

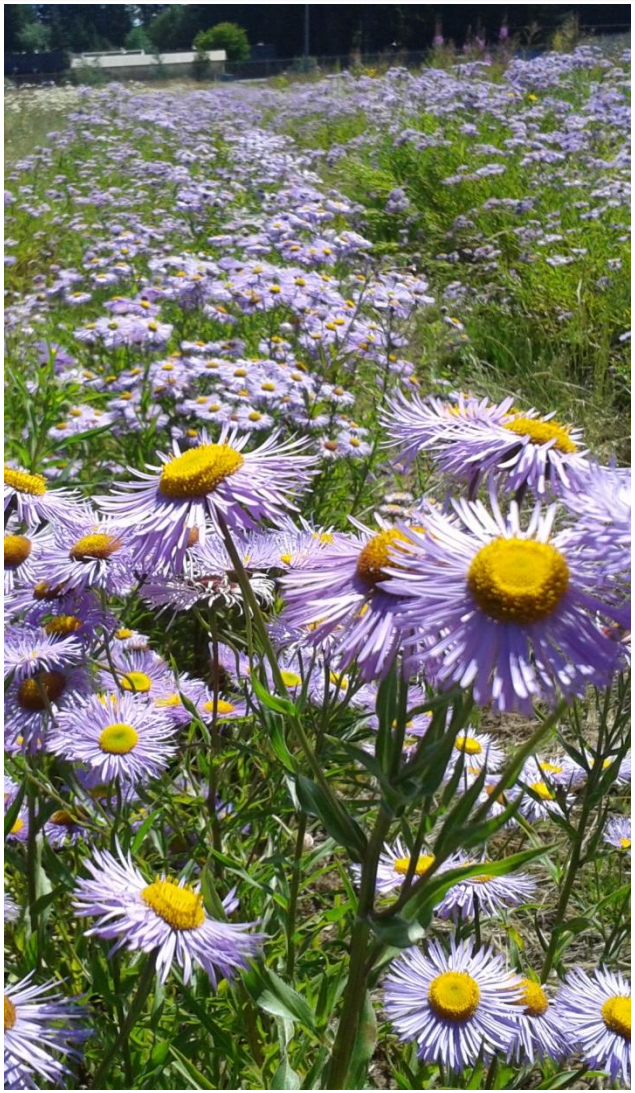
Finding Balance



Goals for Restoration Seed:

Ecological:

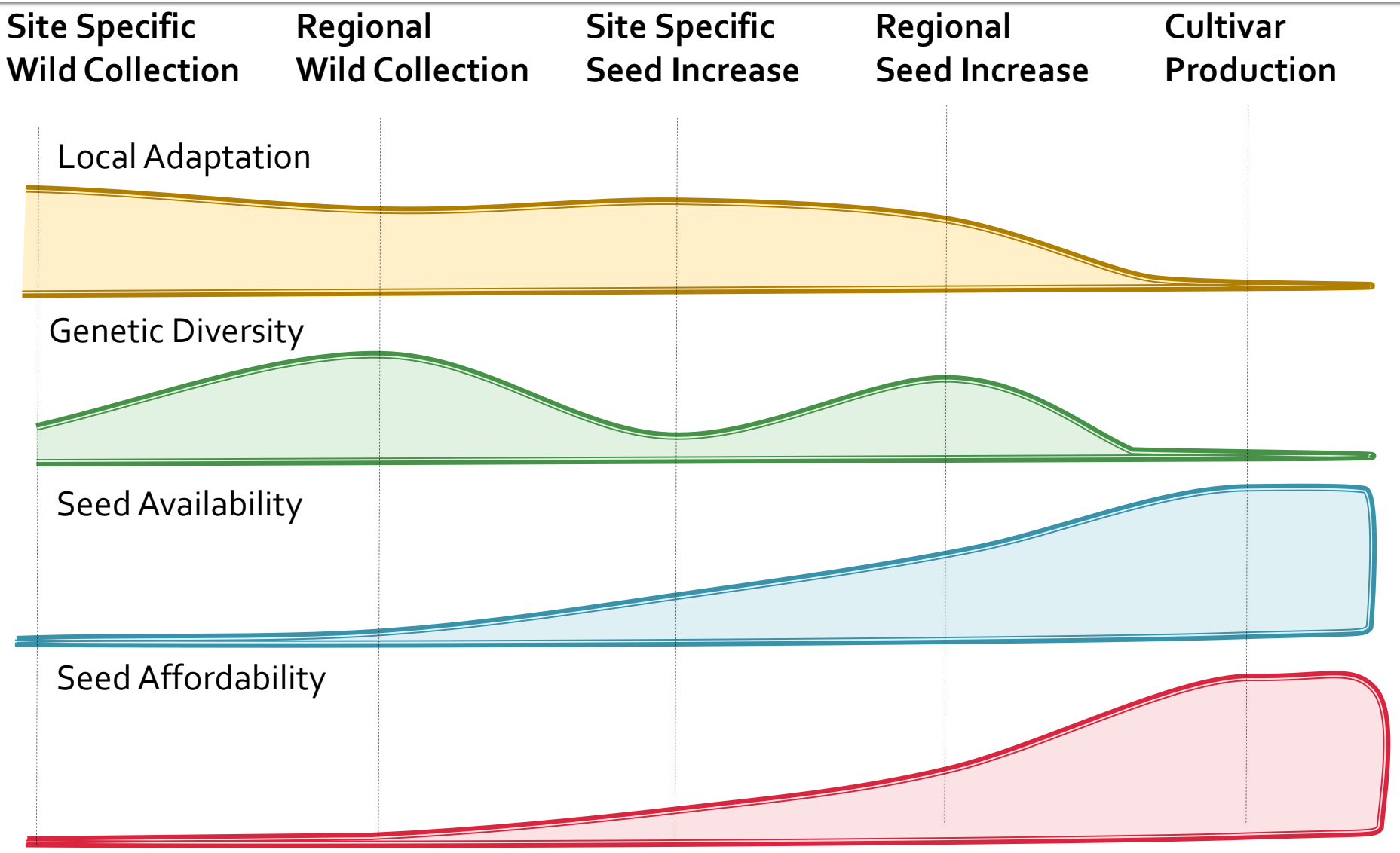
- Maintain any local adaptations
- Maximize genetic diversity



Practical:

- Large quantities of native seed
- Affordable price

Options for Seed Acquisition



Solving the Native Seed Shortage

Agricultural seed production is necessary for landscape scale restoration

Agriculture is powerful partner in restoration

- **Understand paradigms to enable communication**

Ag Primer:

Efficiency

Farmers are successful when they:

- Maximize harvest yield and quality
- Minimize labor and material inputs

Ag Primer:

Crop Uniformity

- Homogeneous plants increase efficiency
  - Support mechanization
  - Decrease labor
  - Increase yield
  - Reduce uncertainty

★ Genetically diverse native plants are **not** uniform

Ag Primer:

Selection Increases Uniformity

- **Intentional:**
  - Cultivar development: homogenous, highly productive, selected genotype
- **Unintentional:**
  - Mechanical selection
  - Vigor bias
  - Agricultural growing conditions
  - Seed cleaning

Restoration Agriculture: Balance

How do we maximize efficiencies while minimizing domestication?

Non-traditional agriculture practices: Focus on maintaining diversity

- Counters agricultural selection
- Increases cost of seed

Maximizing production efficiencies: Land Managers' Role

- Develop **Regional Collaborations**
- Standardize requirements with partners
- Adopt ecologically based seed regions

- Allows efficiency of scale
- Establishes meaningful "ecotypes" and genetic isolation
- Increases genetic pool

Case Study: South Sound Prairies

Example of close collaboration between land managers and farmers to supply a regional restoration effort with A3 seed (appropriate, abundant & affordable)

South Sound Prairies:
History: 15,000 years in 1 slide

- Formed by retreating glaciers 15,000 years ago
- Maintained open by native burning until European settlement 150 years ago
- Has since converted to forest, agriculture and development

South Sound Prairies

= rare ecosystem

Only 10% of the original prairieland remains
Less than 3% is pristine prairie

Four endangered/threatened species:

South Sound Prairies:

Nursery History

20 year regional collaboration to restore prairies and recover listed species.

Primary partners include:
DOD, USFWS, WDFW, WDNR, CNLM

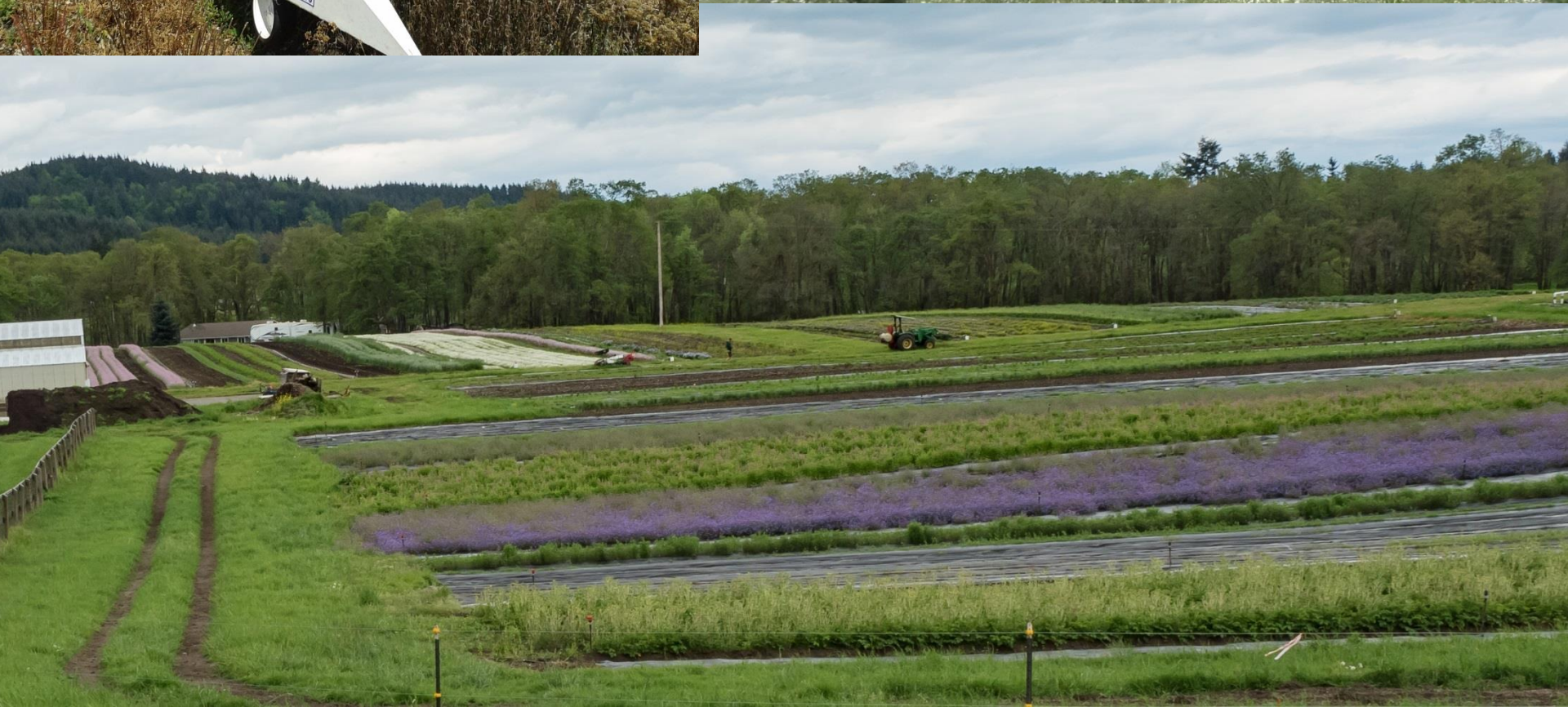
Lack of appropriate native seed was limiting factor to restoration

Individual partners seed increase efforts could not support regional restoration effort

Enter: South Sound Conservation Nursery Program

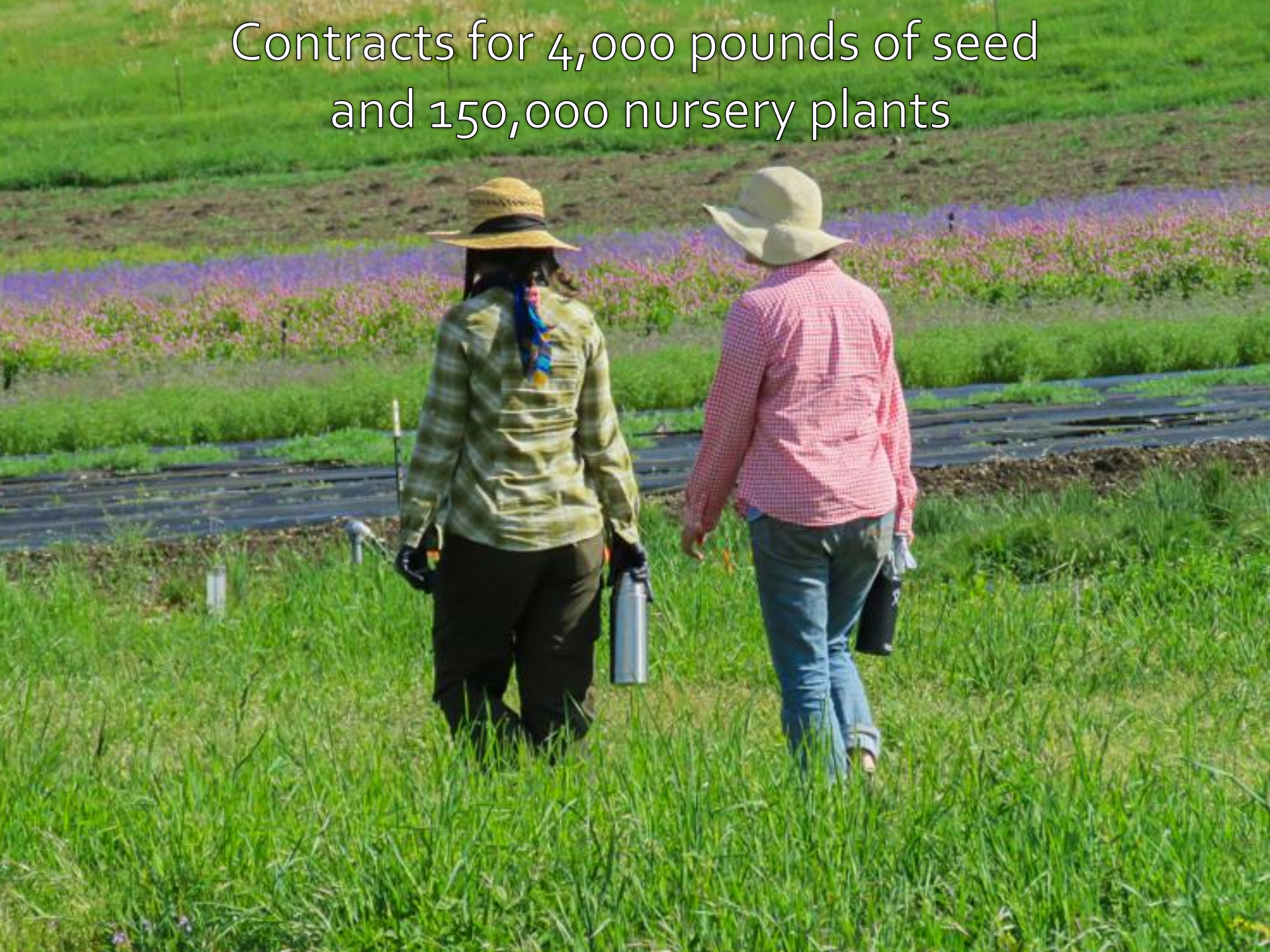

Now
Four Nurseries

Three Farms



Grows 1,500 pounds of seed


Of Over 100 Species


Contracts for 4,000 pounds of seed
and 150,000 nursery plants

South Sound Prairies:

Restoration Agriculture

Employs Non-traditional ag protocols:

- Maximize Diversity
- Minimize Selection

Must balance with associated:

- Increased labor
- Reduced yields

South Sound Prairies:
Restoration Agriculture

Non-traditional agriculture techniques include:

- Generation Control
- Removing Vigor Bias
- Multiple Harvests
- Ground Collection
- Extended Seed Cleaning

South Sound Prairies:
Restoration Agriculture

Generation Control:

- Perennial species seed beds established using only wild collected seed

  Benefits:
  - Restoration seed is only one generation removed from wild populations
  - Minimizes selection opportunities

  Costs:
  - Must maintain active wild collection program
  - Low viability and high variability in wild seed requires greenhouse plug production and transplants for good establishment
  - Record keeping and field demarcation of lots

South Sound Prairies:
Restoration Agriculture

Removing Vigor Bias:

- Plant the weak, thin by spacing

  Benefits:
  - Increases genetic representation
  - Avoids selection for nursery/field conditions

  Costs:
  - Lower seed yield
  - Less uniformity
  - Longer planting times
  - Slower canopy closure (more weeding)

South Sound Prairies:
Restoration Agriculture

Multiple Seed Harvests:

- Hand collection of early and late seeds

  Benefits:
  - Better maintains full representation of genetic diversity of source population

  Costs:
  - Substantially increases harvest time and expense for very limited increase in yield

South Sound Prairies:
Restoration Agriculture

Ground Collection of Seed:

Benefits:

- Better maintains full representation of genetic diversity of source population

Costs:

- Increased material and labor input to establish
- Seed loss to predation
- "Dirtier" seed

South Sound Prairies:
Restoration Agriculture

Preserve Seed Diversity in Cleaning:

- Salvage extremes of seed size and shape

  Benefits:
  - Better maintains full representation of genetic diversity of source population

  Costs:
  - Greatly increased seed cleaning times
  - Increased lots for lower grades
  - Decreased PLS

South Sound Prairies:

Collaborative Seed Production

Conservation Nursery worked with partners to:

- Adopt common genetic requirements
- Use established ecoregions instead of property lines
- Agree on common core species

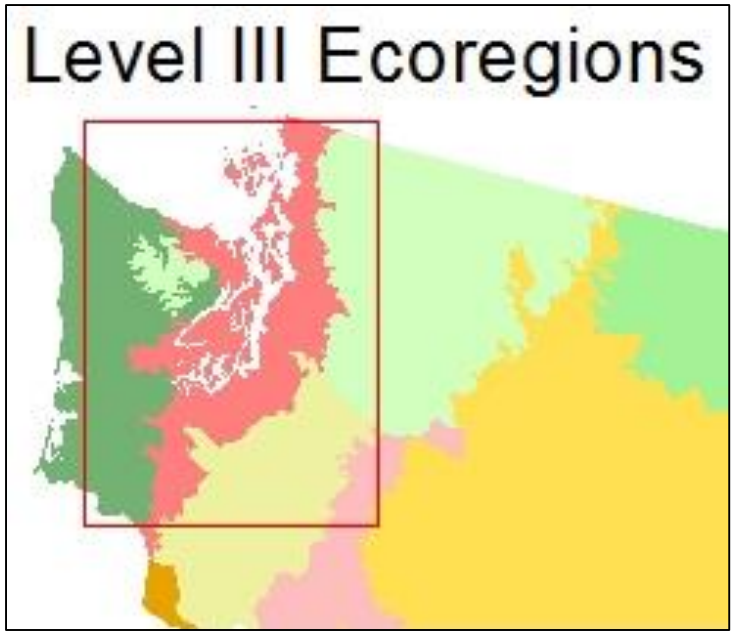
Benefits include:

- Efficiencies of scale
- Reduction in number of "ecotypes"
- Collaboration among partners outside of nursery

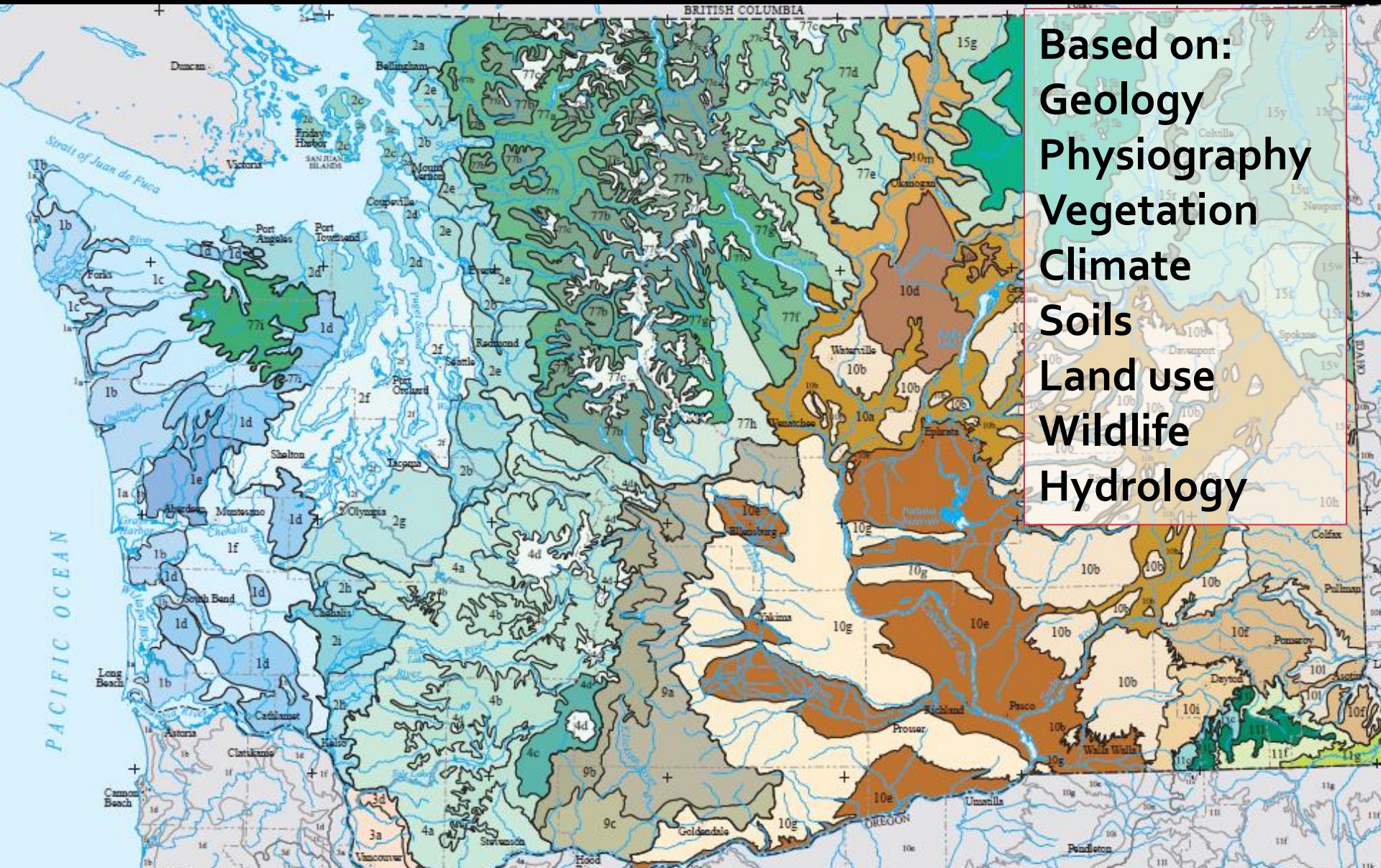
South Sound Prairies:
Genetic Management

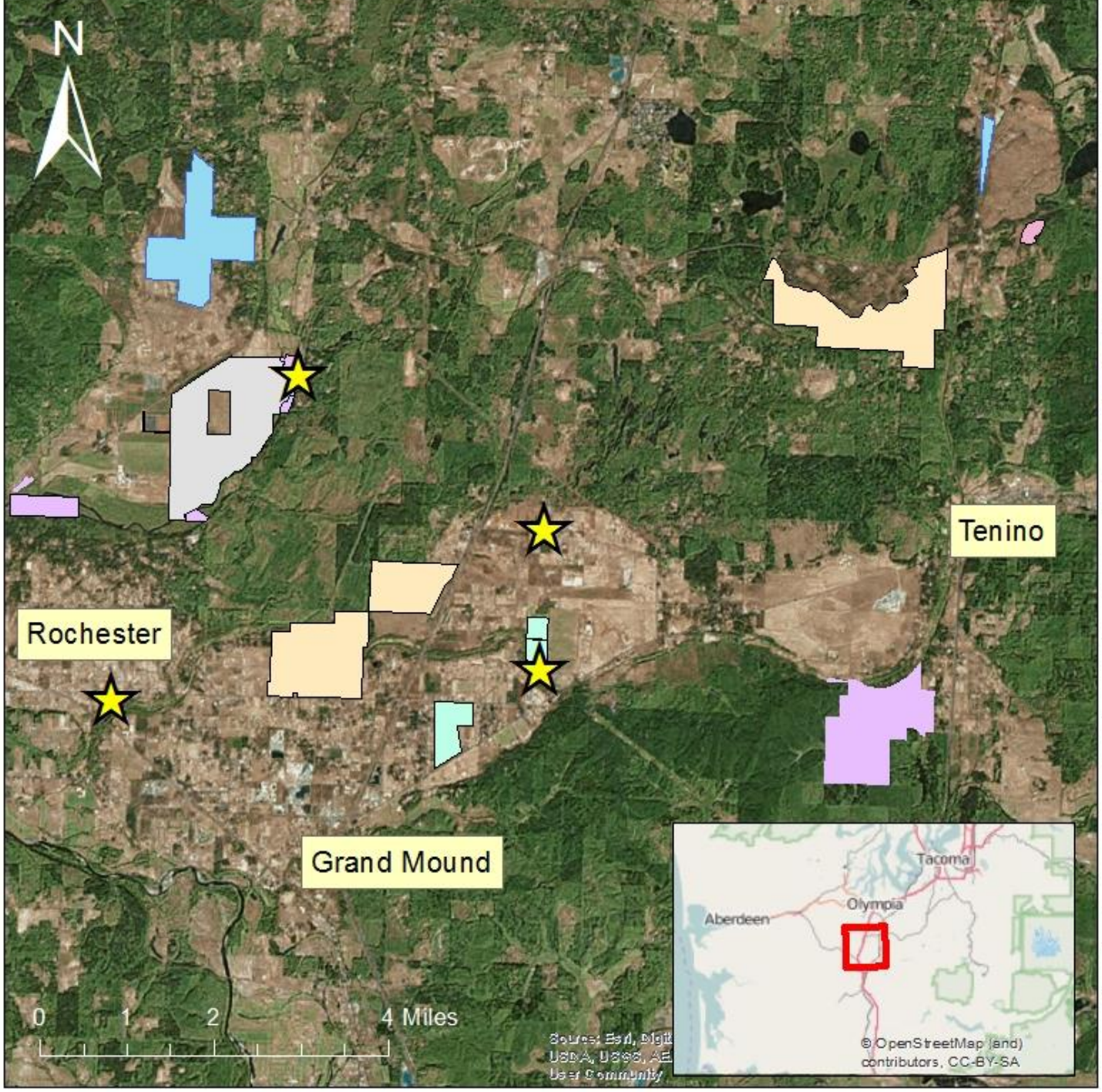
1. Fully isolate level III regions – no cross pollination

2. Within level III; produce level IV regions separately but allow gene flow



EPA Level IV Ecoregions





South Sound Prairies Conservation Nursery

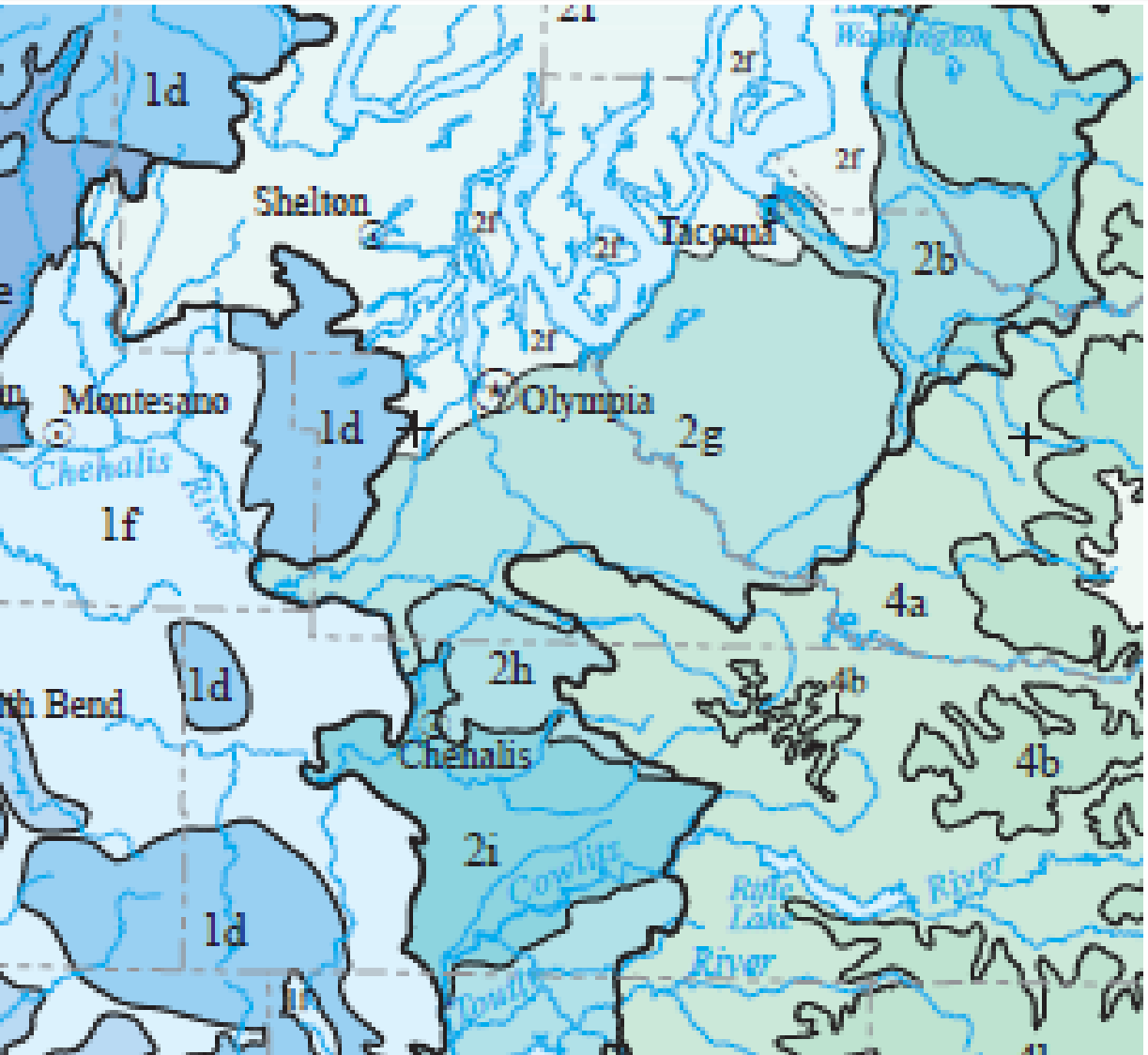
Restoration Sites and Nursery Locations

Prairie Restoration Sites By Land Owner

- DNR
  - *Mima Mounds NAP*
  - *Rocky Prairie NAP*
- The Nature Conservancy
  - *Black River Preserve*
  - *Cavness Ranch*
- CNLM
  - *Scatter Creek/Violet Prairie Preserve*
  - *Mazama Meadows*
- WDFW
  - *Scatter Creek WA*
  - *West Rocky Prairie*
- Thurston County
  - *Glacial Heritage Preserve*
- Wolf Haven International
- CNLM Nursery Sites

South Sound Prairies:

Basing "ecotypes" on ecology

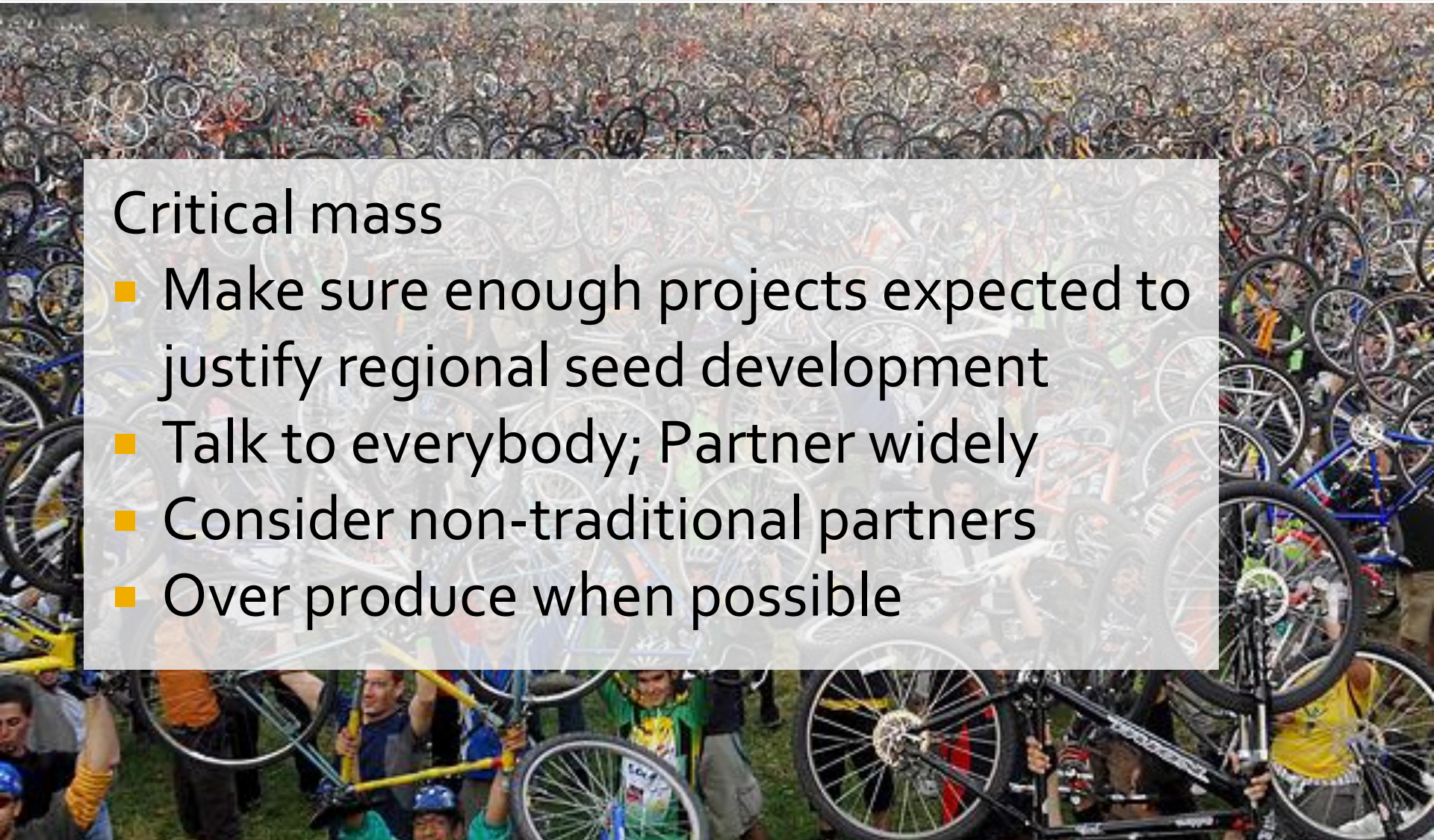


Combined Thurston and Pierce County prairies

Allow site/species specific exceptions

South Sound Prairies:
Common Core Species

Tips to partnership development



Critical mass

- Make sure enough projects expected to justify regional seed development
- Talk to everybody; Partner widely
- Consider non-traditional partners
- Over produce when possible

Tips to partnership development

Common funding source

- Brings partners to the table
- Encourages compromise
- Generates enthusiasm

Tips to partnership development

Guide but respect autonomy

- Land managers dictate their seed needs
- Farmers can help understand implications

Questions:

Thank you to the **Conservation Partners** and the **Farm Crew**