

Plant Selection, Forms & Sources

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This presentation will focus on **principles**



For specific information on species see resources on handout, books, instructors



Plant Selection: Principles

1. Project goals & objectives
2. Horticultural criteria
3. Ecological criteria
4. Social criteria
5. Financial & availability constraints

Plant Selection: Project goals & objectives

Select plant material with an eye toward

1. Directly fulfilling goals & objectives – ONLY!
 - Unconnected species may identify unstated goals /objectives
2. Restoration as a long term process (succession mgmt)
 - Material reasonable for successional stage(s)
 - Reservoirs of propagules for future successional stages
3. Other ecological principles influencing project
 - Biogeography, patch dynamics, etc.
4. Maintenance needs & likely support
 - How likely is maintenance relative to needs?

Plant Selection: Horticulture

Right plant – right place

Abiotic site characteristics important in determining plant selection (original & amended)

2 Handouts

- Rodney's list
- Sound Native Plants

Books

- Grow your own native landscape
- Others listed on handout

Web sites

Plant Selection: Horticulture

Right plant – right place

Abiotic site characteristics important in determining plant selection (original & amended)

1. Plant species exhibit a range of environmental tolerance
 - Changes with life stage
 - Varies with genetic stock (ecotypes)
 - Varies with season
 - Varies with form of plant material used
2. Consider more than the "average" conditions
 - extremes & variability
 - timing

Plant Selection: Horticulture

Abiotic site characteristics important in determining plant selection

BELOWGROUND FACTORS

Moisture Considerations

- Soil moisture constraints (too dry, too wet, timing)
- Water source (timing, chemistry)
- Soil characteristics influencing retention (texture, structure, OM, topography)
- Competition for moisture (timing)

Plant Selection: Horticulture

Abiotic site characteristics important in determining plant selection

BELOWGROUND FACTORS

Soil Nutrient Considerations

- More nutrients ≠ “better” soil
- Happy soil doesn’t always mean happy outcomes
 - ✓ Many natives tolerant of limited nutrient supply rates
 - ✓ Invasives often happy with high nutrient availability
- Soil OM is often listed a criteria – complex effects
- Soil nutrient concentrations ≠ nutrient availability
- Organic mulches can have complex effects on soil nutrients (decomposition, mineralization, microbial immobilization)

Plant Selection: Horticulture

Abiotic site characteristics important in determining plant selection

BELOWGROUND FACTORS

Slope Considerations

- Slope stability & erosion issues may influence plant species & form selection
- Identify the problem (surface erosion ≠ slope stability)
- Investigate species’ rooting characteristics & propagation (can be difficult to find information)

Plant Selection: Horticulture

Abiotic site characteristics important in determining plant selection

ABOVEGROUND FACTORS

Sunlight considerations

- Sunlight availability (too much, too little, timing, seasonal changes)
- Tolerance of extremes relative to growth stage
- Interaction with moisture & temperature

Plant Selection: Horticulture

Abiotic site characteristics important in determining plant selection

ABOVEGROUND FACTORS

Temperature considerations

- Thermal stress uncommon in Puget lowlands
- Can be a local problem in interaction with moisture and light

Wind considerations

- Exacerbates drought stress in exposed locales
- Can be a problem for container stock
- Some tree species may pose eventual safety issues

Plant Selection: Ecology

Ecological context

Consider the ecological context when choosing plant material

1. What effects will biological interactions have on the success of selected species?
2. What ecological functions are enhanced / restored by the selection of this species?
3. What ecological role(s) does this species play?
 - At present
 - In the future

Plant Selection: Ecology

Some ecological factors important in determining plant selection

Competition

- **Competitive context has a strong influence on survival**
 - ✓ May affect choice of plant form as well as species
- **Consider details of potential competitive interactions**
 - ✓ What is being competed for?
 - ✓ Does this shift with time (seasonal; long-term)?
- **Selecting competitive species** (to battle invasives)
 - ✓ Carefully consider the above two questions
 - ✓ Consider their long-term effects on succession (arrested?)

Plant Selection: Ecology

Some ecological factors important in determining plant selection

Herbivory

- **Presence of strong herbivores can influence plant selection**
 - ✓ May affect choice of plant form as well as species
(*Cost and survival considerations*)
 - ✓ Timing of herbivory relative to plant activity
- **Consider whether potential deterrents, protection or overplanting will be possible and sufficient for desired species**
- **Is herbivory desirable (driving succession)?**

Plant Selection: Ecology

Some ecological factors important in determining plant selection

Habitat Factors

1 Handout

- Native plants for wildlife (King Co.)

Books

- Landscaping for wildlife (Link)
- Others

Web sites

Plant Selection: Ecology

Some ecological factors important in determining plant selection

Habitat Factors

- **Plant species, density & dispersion create overall habitat structure**
 - ✓ Vertical & horizontal structure for physical features (e.g., cover) and biota (e.g., prey).
- **Plant species as sources of structural habitat elements**
 - ✓ Woody debris to forest floor
 - ✓ Features critical to reproduction (e.g., nest sites, egg mass attachment sites)
 - ✓ CPOM to stream
 - ✓ How long before species provides such elements?

Plant Selection: Ecology

Some ecological factors important in determining plant selection

Habitat Factors

- **Plant species as sources of food**
 - ✓ Pollen, seeds, fruits, leaf material, etc.

Plant Selection: Ecology

Some ecological factors important in determining plant selection

Community Development / Succession

- **Seed beds, seedling protection**
 - ✓ Will the selected species provide future beds or protection for coming species? Are these already in place?
- **Pollination, seed dispersal**
 - ✓ Are needed pollinators or seed dispersers in place?
 - ✓ Will the selected species provide habitat for such organisms?
- **Soil fungi**
 - ✓ Are needed mycorrhizal fungi in place?

Plant Selection: Ecology

Some ecological factors important in determining plant selection

Genetic Factors

- Selection of locally-adapted races / ecotypes can be important for plant success, ecological success, & local genetic integrity
- Selection of some species with certain sources and forms (e.g., clonal species or live stakes from limited stock) can reduce genetic diversity.

Plant Selection: Information Sources

See handout on information sources and resources on class web site

Plant Selection: Social considerations

Some human / social considerations in determining plant selection

Safety

- Some projects require plant selection that considers aspects of public safety
 - ✓ Dense vegetation and safety view corridors
 - ✓ Woody material fall
 - ✓ Hazards for children

Impact Management

- Some projects require plant selection that help to manage human movement and impact
 - ✓ Dense or thorny vegetation to deter paths

Plant Selection: Social considerations

Some human / social considerations in determining plant selection

Aesthetics

- Some projects require plant selection that considers aesthetic needs of stakeholders
 - ✓ View corridors
 - ✓ Color and texture

Cultural / Educational

- Some projects require plant selection that fulfill cultural and/or educational objectives
 - ✓ Plant selection for cultural importance (display or use)
 - ✓ Plant selection for educational use

Plant Selection: Commercial considerations

Some commercial considerations in determining plant selection

Availability

- Rapid commercial acquisition can be difficult
- Limited number of growers / distributors
- Native plant growing remains more project (order) - based
- Orders usually placed months (or years) prior to delivery
- Material of local provenance not always available

Plant Selection: Commercial considerations

Some commercial considerations in determining plant selection

Financial

- Limited market – commercial material can be expensive
- Species with less expensive available forms may be preferred (salvage, stakes, bare root, overstock, seed, etc.)

Plant Forms & Sources in Restoration Projects

5 Handouts

- Which native plants should I use? (Leigh 1999)
- Advantages and disadvantages of different forms of planting material (Ewing)
- Plants available for use in native plant projects in western Washington (Sound Native Plants)
- Live stakes and cuttings (Sound Native Plants)
- Salvaging native plants (Sound Native Plants)

Plant Forms & Restoration Projects

Understanding of plant horticulture & propagation is important in the selection of plant form to use

- Wide variety of forms based upon sexual and vegetative propagation
- Wide variety of lingo
- No one form is best – it depends
- Forms available vary with time & serendipity
- Some forms may or may not be interchangeable for project goals & objectives

Plant Forms & Restoration Projects

Whole Plants (in soil)

- Container plants
- Ball & burlap (B&B)
- Seedlings (liners)
- Plugs (in trays)
- Tree tubes

Whole Plants (bare roots)

- Bare root plants
- Seedlings (sets, divisions)

Transplants

- Salvage plants
- Divisions (e.g., rhizomatous plants)
- Pull-ups (live-rooted saplings)
- Cores; sod

Plant Forms & Restoration Projects

Sexual Propagules

- Seeds
- Haying
- Soil seed bank

Vegetative Reproduction

- Live stakes (hardwood cuttings)
- Layering (stems, tips, etc.)
- Bulbs, rhizomes, corms

Plant forms & restoration projects

Form	Pros	Cons
Containers	Immediate size impact; storage & transport easy; available year round	Expensive; hidden root problems; root system adjusted to artificial conditions

Plant forms & restoration projects

Form	Pros	Cons
Containers	Immediate size impact; storage & transport easy; available year round	Expensive; hidden root problems; root system adjusted to artificial conditions
Bare root	Cheap; lightweight (transport); easy to store (sawdust beds)	Limited timing (available in winter; plant before active); limited species

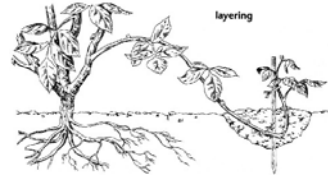


Plant forms & restoration projects

Form	Pros	Cons
Containers	Immediate size impact; storage & transport easy; available year round	Expensive; hidden root problems; root system adjusted to artificial conditions
Bare root	Cheap; lightweight (transport); easy to store (sawdust beds)	Limited timing (available in winter; plant before active); limited species
Salvage	Free; moral satisfaction; can be moderately large	Unpredictable availability; some species better than others (timing important); often need to replant quickly

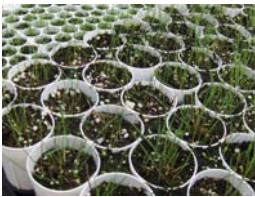
Plant forms & restoration projects

Form	Pros	Cons
Layering	Free; rapid spread (bioengineering)	Limited species



Plant forms & restoration projects

Form	Pros	Cons
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Plugs (in trays)	Cheap; easy; rapid establishment for some rhizomatous species	Root problems in small soil volume



Plant forms & restoration projects

Form	Pros	Cons
Layering	Free; rapid spread (bioengineering)	Limited species
Plugs (in trays)	Cheap; easy; rapid establishment for some rhizomatous species	Root problems in small soil volume
Cores	Cheap; easy; comes with native soil; rapid establishment for some rhizomatous species	Weeds may come along; damage to harvest areas

Plant forms & restoration projects

Form	Pros	Cons
Live stakes	Cheap to free; easy & fast (rapid planting with volunteers); rapid establishment & cover	Limited species; timing critical (harvest when dormant, plant before leaf-out); low genetic diversity



Plant forms & restoration projects

Form	Pros	Cons
Live stakes	Cheap to free; easy & fast (rapid planting with volunteers); rapid establishment & cover	Limited species; timing critical (harvest when dormant, plant before leaf-out); low genetic diversity
Seed	Cheap to free; easy to transport, store & distribute	High mortality (predation, disease, germination); slow establishment; not good in wetlands

