

GUERRILLA PROPAGATION FOR RESTORING FOREST ECOSYSTEMS

**Clayton J. Antieau
Horticulturist/Botanist
206-233-3711
clayton.antieau@seattle.gov**

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TOPICS

- **Definitions (ecosystems; restoration)**
- **Species Assembly Rules**
- **General Considerations for Restoring Forest Ecosystems**
- **Field Propagation Techniques, Facilities, Tools, and Resources**
- **Sharing Field Experiences**

ECOSYSTEMS

...organisms interacting with each other and their abiotic environment.

HIGHLY FUNCTIONING

ECOSYSTEMS ARE:

- **BIOLOGICALLY DIVERSE AND COMPLEX**
- **PRODUCTIVE (Biomass)**
- **RESISTANT TO CHANGE (Stable)**
- **RESILIENT WHEN CHANGED (Stable)**
- **INDEPENDENT (Require minimal inputs from humans)**



HIGHLY FUNCTIONING

ECOSYSTEMS:

- **FUNCTION BENEFICIAALLY** by providing ecosystem services

ECOSYSTEM SERVICES

...intact ecosystems perform many beneficial services

- atmospheric gas regulation
- disturbance regulation
- nutrient cycling
- soil generation
- regulation of water flows
- water storage
- water purification
- erosion control
- soil development and soil health maintenance
- waste treatment
- pollination
- population control
- food production
- bioremediation (chelation and transformation)
- genetic source pool, buffering, natural selection
- recreational opportunities
- cultural opportunities

ECOLOGICAL RESTORATION

...a practical management strategy that uses ecological processes to maintain ecosystem composition, structure, and function with minimal human intervention (Apfelbaum and Chapman 1997)

ECOLOGICAL RESTORATION

**...interventions that alter
ecosystem composition
(increasing biological diversity) to
obtain increased stability,
productivity, and functioning**

SPECIES ASSEMBLY RULES

Ecosystems are not created instantly, but are constructed through repeated invasions of species through time. Different invasion sequences produce alternative species compositions.

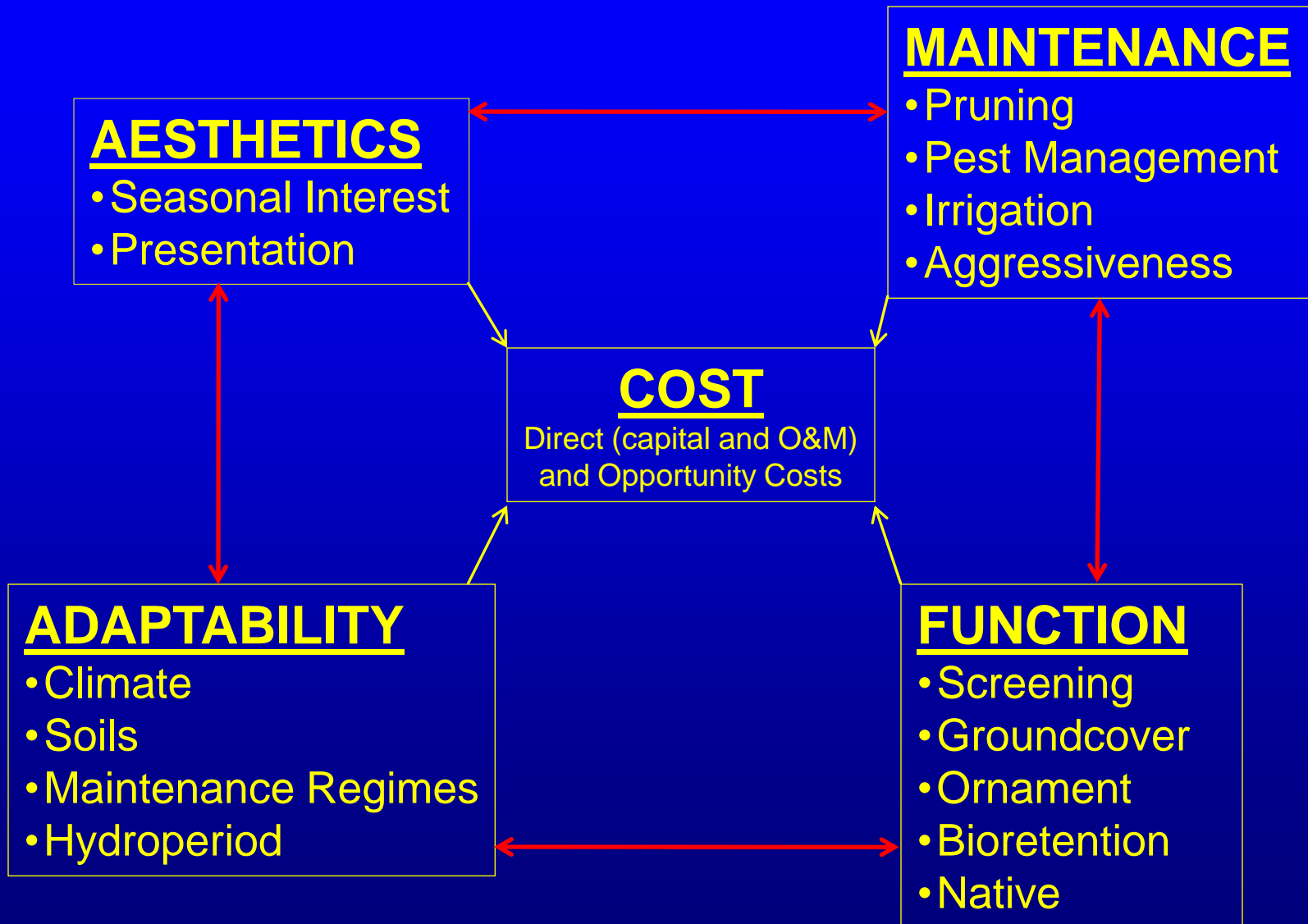
...how do species assemble into ecosystems??

- Sources of propagules**
- Vectors for dispersal**
- Germination substrate/conditions**
- Growing conditions (e.g. shade tolerance; soil food webs)**
- Tolerance to particular disturbance regimes**
- Niche availability and competition (“forbidden combinations”)**
- Predation, etc.**

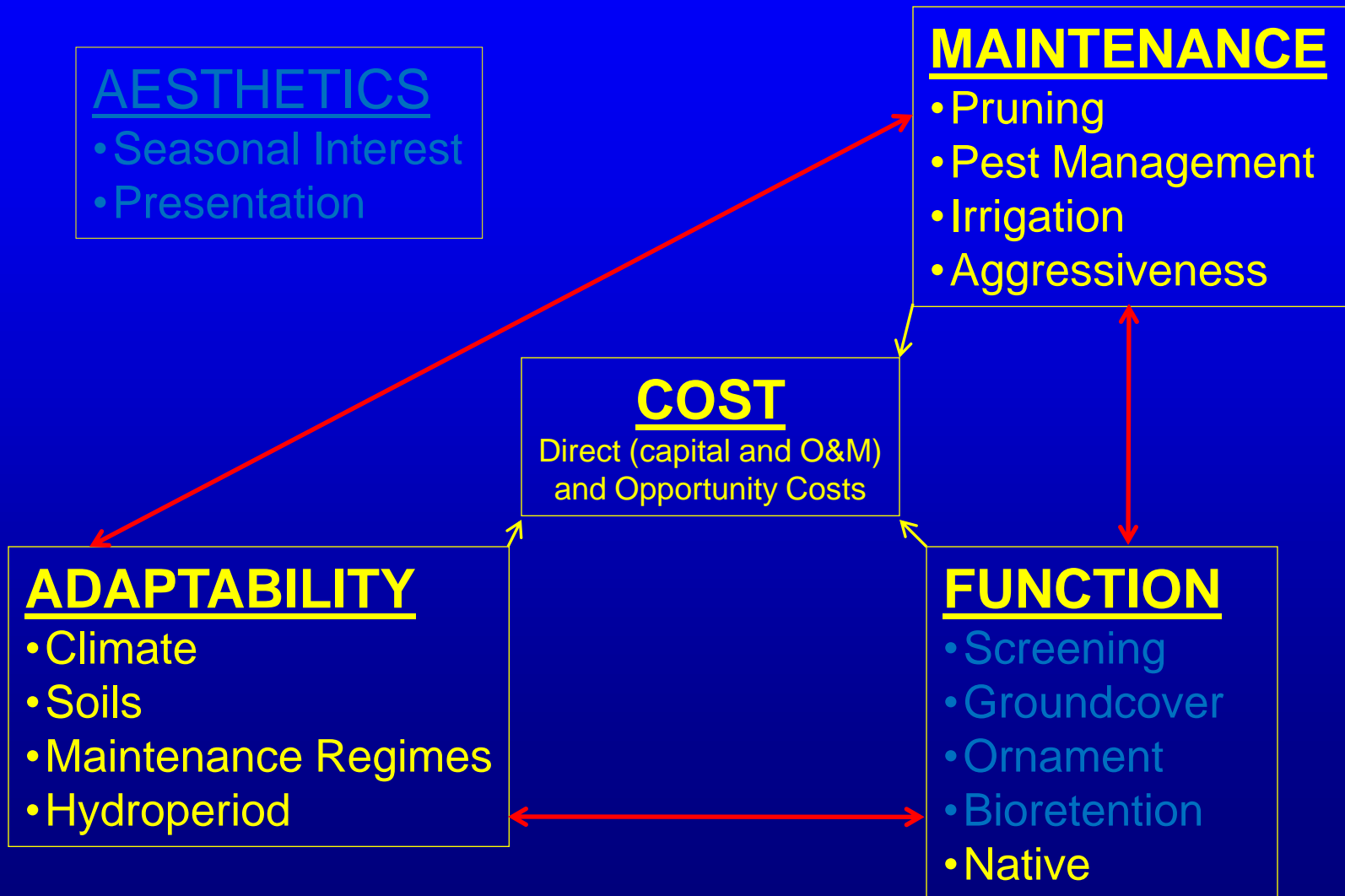


Carkeek Park, Seattle

PLANT SELECTION PROCESS



PLANT SELECTION PROCESS FOR ECOLOGICAL RESTORATION



CONSIDERATIONS: **RESTORING FOREST ECOSYSTEMS**

- 1. In the plant selection process for ecological restoration, evaluate native plants species individually for maintenance, function, adaptability, and cost.**
- 2. Many native plant species are available commercially, but not necessarily through usual channels.**
- 3. “Right Plant, Right Place” always applies.**

CONSIDERATIONS: RESTORING FOREST ECOSYSTEMS

4. Opt for locally collected and grown native plant material.
5. Cultivated varieties of native plants are appearing in the marketplace; use appropriately.
6. Native plants often require establishment periods and consideration of soil issues (compaction and foodweb).

CONSIDERATIONS: RESTORING FOREST ECOSYSTEMS

7. In the face of climate change, manage for resilience (species diversity) and adaptability (habitat connectivity)
8. Forest “evergreen-ness” is your best tool in building resistance/resilience to invasive plants. Otherwise, fill space aggressively.

PLANT SALVAGE

CONSIDERATIONS

- Before collecting on public lands, obtain all necessary permits.
- Get permission from property owners before entering private property for any reason.
- Collect carefully (or not at all) from wetlands and other environmentally sensitive areas.
- If a plant looks weak or unhealthy, do not collect. The extra stress may harm the plant, and you may transport disease.
- Do not waste. Collect only as much as you can use. Care properly for any material you collect. Share extras with other stewards, neighbors, and friends.
- When collecting cuttings, do not take more than 5 percent of any plant.
- Keep a list and/or consider labeling your collections (species, date, and collection location).
- Collect whole plants only from construction sites where native vegetation will be destroyed. Collect only from areas of the property that will actually be destroyed. Do not let roots dry out.

PLANT SALVAGE

LESSON LEARNED (c/o Anna Thurston, Pierce County Native Plant Salvage Program)

- It's far more efficient to salvage and re-plant to a similar habitat ASAP, than it is to process (propagate and pot-up plants) for later installation.
- Don't forget the herbaceous species. Know your species identification.
- Don't bother with plants difficult to propagate via salvage: salal; huckleberries; madrone; berberis; Garry oak(?); just about anything evergreen.
- Dig smaller individuals than larger.
- Dig things appropriately (straight down; obtain root masses).
- Use the correct tools (shovel vs spade vs sharpshooter; hand pruners; moisture, etc.).
- Timing is critical. Dig and transplant during the dormant season (October 15 to February 28); *the earlier the better.*

PLANT SALVAGE

RESOURCES:

Pierce County Plant Salvage Program

http://www.ssstewardship.org/salvage_guide.htm

Native Plant Salvage Foundation (Thurston County)

<http://www.nativeplantsalvage.org/nativeplants/1676-school-programs>

King County Native Plant Salvage Program

<http://www.kingcounty.gov/environment/stewardship/volunteer/plant-salvage-program.aspx>

CLOCHES

PURPOSE

- Moderates temperature
- Protects from excessive moisture
- Protects from predators (slugs)
- Extends growing season

CHARACTERISTICS

- Inexpensive (scrap lumber; rebar; PVC fiberglass, storm windows; plexiglass; pvc or alkathene plastic pipe and visqueen)
- Quick to assemble/disassemble
- Ventilated
- Wind resistant (if secured)



CAPILLARY BEDS

...supplies an on-demand and constant source of moisture to bare root, salvaged, and containerized plant materials.

ADVANTAGES: passive; low-tech; low cost; potentially recycled and recyclable

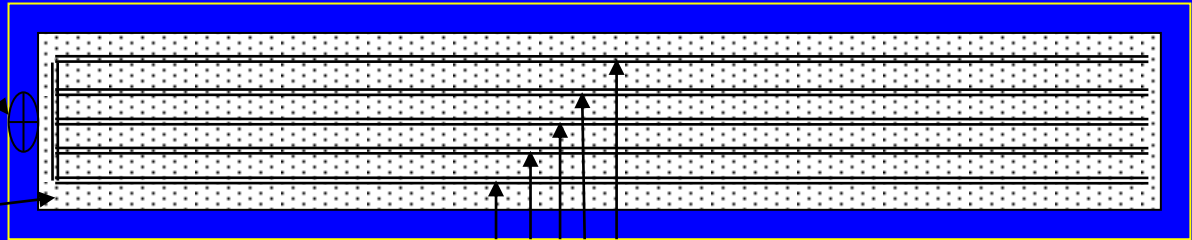
DISADVANTAGES:

- Remember to water and maintain!
- Short-term storage only (1 growing season)
- May need to apply shading to reduce heat loads and evaporative losses

CAPILLARY BED DESIGN POTENTIAL SPECIFICATIONS

30'

water source,
valve & timer
sand, mulch,
or sawdust

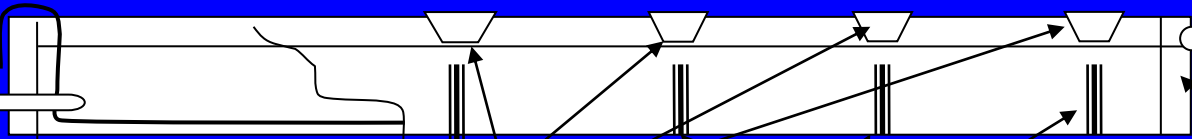


TOP VIEW

4'

1/4" drip line

liner
drain pipe



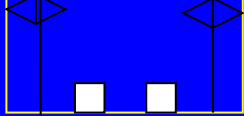
SIDE VIEW

8"

liner clips

re-bar

latches



END VIEW

bottom hinges

INEXPENSIVE 1-0 AND 2-0 STOCK

AVAILABLE NURSERY STOCK

- Relatively cheap (\$0.25-\$1.00 per, depending on size and quantity)
- Improved selection in recent years
- Uniform in grade
- Available in quantity
- Shipped directly to you, or pick-up

RESOURCES

- Fourth Corner Nursery
<http://fourthcornernurseries.com/>
- WA Assoc. Conservation District Plant Materials Center
<http://www.wacd.org/PMC>
- Lawyer Nursery
http://www.lawyernursery.com/bareroot_nursery_stock_handling_guide.asp

SEED

CONSIDERATIONS:

- Before collecting on public lands, obtain all necessary permits.
- Get permission from property owners before entering private property for any reason.
- Collect carefully from wetlands or other environmentally sensitive areas.
- Do not waste. Collect only as much as you can use. Care properly for any material you collect. Share extras with other stewards, neighbors, and friends.
- When collecting seeds, do not take more than 5 percent of a particular species' seeds in an area. Collect from as many different plants as possible. Be sloppy. Leave enough seed for each plant to regenerate itself and for wildlife.
- Label your collections with species, date, and collection location.
- Don't forget the herbaceous species. Know your species identification.
- Timing is critical. Be there at the right time; do not collect too early or too late to avoid wasting your time. Know seed ecologies of the species you collect.
- Use the correct tools (bags; hand pruners....)
- Don't bother cleaning, drying, stratifying, scarifying.... Scatter seed ASAP after collection; let Mother Nature do that work.

SEED

RESOURCES

- <http://www.insidepassageseeds.com/>
Inside Passage Seeds
- Frosty Hollow Ecological Restoration
P.O. Box 53, Langley, WA 98260 360-579-2332 wean@whidbey.net
- Northwest Native Seed (Ron Ratko)
17595 Vierra Canyon Road, #172, Prunedale, CA 93907
915 Davis Place S., Seattle, WA 98144 206-329-5804
oreonana@zipcon.com

END