

Getting the Bad Plants Out and the Good Plants Growing

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**HOW DO WE HAVE A SUCCESSFUL
REFORESTATION PROJECT?**

First Things First

- Determine what your primary objective is

Why are we doing this?



What are you trying to accomplish?

- Increase tree canopy
- Increase diversity
- Promote native regeneration
- Stabilize soil
- Reduce flooding and stormwater runoff
- Improve wildlife habitat



Increase Tree Canopy

Photo by: Darren Fava

Increase Diversity



Promote Regeneration



Stabilize Soil



Reduce Flooding and Stormwater Runoff



Improve Wildlife Habitat



Order of Operation

- Evaluate the site
- Remove or kill invasive plants
- Plant native plants
- Monitor the site
- Repeat...

Value of Being Selective

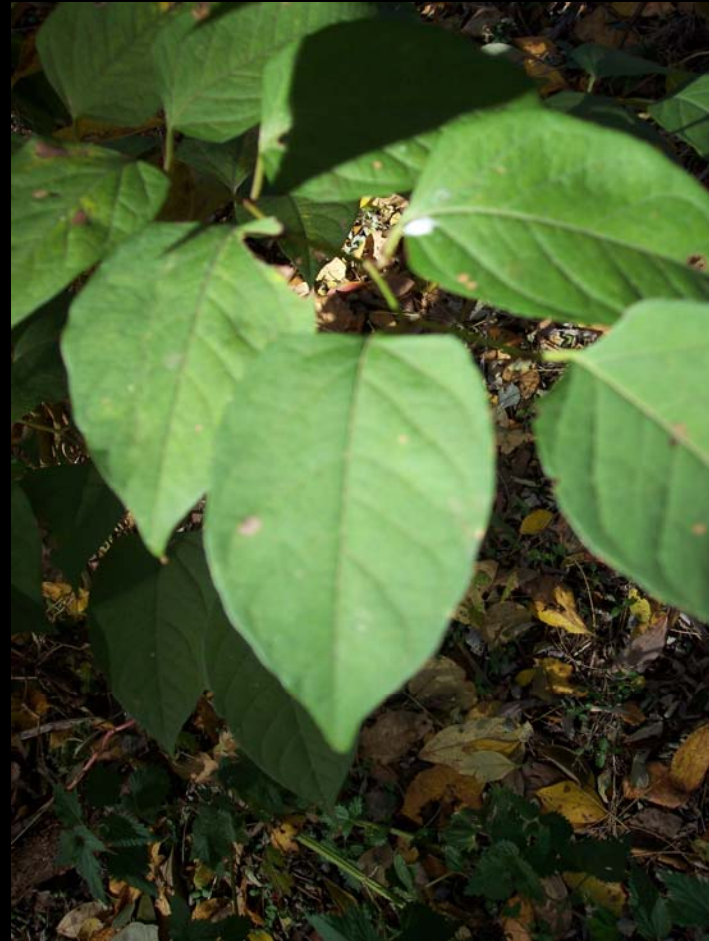
- Be deliberate about what you plant
- Be deliberate about what you take out
 - Reduce impact on established native plants and soil
- Less physical work, more intellectual work

Invasive Plant Removal

- Remember your objectives.
 - Let them guide you
- Don't get distracted by the invasive plants
 - Changing the structure of the forest can also help control invasive plants

Top Ten List... plus one

- Japanese knotweed
- Porcelainberry
- Mile-a-minute
- Bittersweet
- Purple loosestrife
- Phragmites
- Multiflora rose
- Devil's walking stick
- Barberry
- Norway maple



No Tolerance Policy

- Kudzu!



Choosing plants

- Plants have preferences
 - Right plant for the right place

Choosing plants

- Seedlings have different needs than mature trees
 - Select species that can reach maturity in your site
 - But keep in mind what the forest will look like in 30 years

Choosing plants

- Don't forget about shrubs



Mimic Nature

- Seedling density
 - Plant more!

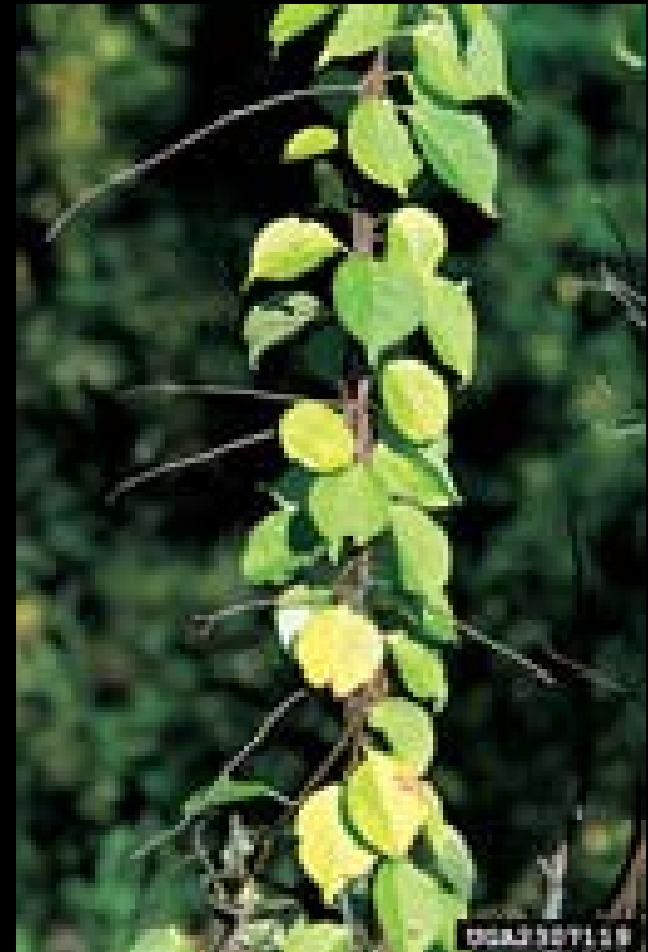
Survival Depends on Good Planting Techniques

- Dig a large hole... plenty of space for roots
 - Wide not deep
- Take nursery media off of the roots and spread the roots out
- Tamp but don't compact the soil
- Water immediately and often
 - Remember to water around the hole as well... water moves to dry soil

Monitor the site

- Look for newly invading plants

Remove Vines



Challenges to Consider

- Deer
- Vandalism

Cresheim Valley Planting



What we did?

- Selectively removed invasives
- Selectively sprayed invasives
- Planted
- Removed more invasives
 - Selectively
- Planted more
- Monitored
- Removed more invasives



What it looks like now?



Why it worked?

- Selective
- Long-term
- Used variety of resources
- Attention to detail during all phases

Schuylkill Watershed Congress

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Jim MacKenzie, Octoraro Native Plant Nursery (www.octoraro.com)

Specifications: Container Grown Native Trees and Shrubs for Environmental/Conservation/Naturalized Plantings

General Information:

- Understand plants are living, variable and adaptable species – recognize health, but allow for non-conformity
- Excessive and late season fertilization is detrimental to long-term success of plantings. Avoid plants and growers that “push” plants beyond their natural physiological tolerance
- Root health is the most important determination of plant survival

Do:

- Specify container size and plant size/height (or caliper) – but not all three (generally only use caliper at 1” or >)
- Specify good descriptive language without excessive detail – see example below
- Maintain good communication with grower and discuss problems or concerns when they occur (see also “Survival Expectations” below)
- Make efforts to visit preferred nurseries to fully understand their capabilities and see their plant material (recognize that there are better times of the year for these activities and schedule appropriately with the nursery)

Don't:

- Use forestry spec's or bare root spec's such as “whip”, “dbh” (diameter at breast height)
- Use American Standards for Nursery Stock – ANSI-Z60.1-2004 – as boilerplate spec (Jim's opinion)
- Use generic terms such as “tubling” unless you specify the container size also
- Use the term “gallon” – use the word “container” (i.e. #2 gallon – incorrect; #2 container – correct) New container labeling regulations accept industry standards for size of containers (i.e. #1) but not volume measurement reference

Good Examples:

- Plant / Container Specification: 3-4' height, #2 container (OR) 3-4' container grown
- ANLA / ANSI standard language on containers – good descriptive language
 - *“All container grown nursery stock shall be healthy, vigorous, well rooted, and established in the container in which it is growing. Container grown nursery stock shall have a well-established root system reaching the sides of the container to maintain a firm ball when the container is removed, but shall not have excessive root growth encircling the inside of the container.”*

Maintenance / Protection / Survival Rates:

General Information:

- Survival expectations – depends on the scope of the project, design and specifications, site conditions, plant quality & health, installation process and maintenance measures AND– there's a reason for this sequence!
- Nurseries are responsible for providing quality, healthy plants – the rest is beyond their control. This is why nurseries do not offer guarantees on plant survival. A good grower should respond to problems within their control.
- Contractor Guarantee vs. No Guarantee – be prepared to pay if contractor has little confidence in how the project was designed or control in how it will be implemented. Risk

and costs increase with length of time and survival rates required in the guarantee. Pros and cons either way. Generally guarantees are 1 or 3 years at certain %.

- Know your contractors. Hire contractors with experience. Low bid may not yield desired results. Form relationships
- Fertilizer – we generally tell people it isn't necessary if "right plant, right place" principal was considered in design along with site conditions. Fertilization won't hurt, but it adds to overall project cost and has green footprint impact.

Do:

- Adequately address, plan, budget for and implement appropriate maintenance / protection measures as necessary
- Identify acceptable goals for survival rates in advance and plan appropriately through implementation

Don't:

- Specify use of fertilizer after end of July (if at all), plants need to harden off before colder months
- Assume plant mortality is result of poor plant health. Must account for and evaluate all potential factors contributing to mortality and address them prior to replanting efforts (if applicable)

Examples:

- Typical Guarantee – 1-year guarantee with 85% survival. Contractor responsible for water, protection, maintenance as necessary to reach survival ratio or replant to reach desired goal. Keep in mind if project is poorly designed, replant relieves contractor of responsibility, but may not guarantee successful project.

Ordering / Availability / Substitutions

- When is the project planting? Spring? Fall? This year, next year, two years from now?
- Inventories are in a continuous state of change
- The contractor bid the project in December, the project isn't awarded until early March – plants aren't available now for planting – now what?
- Provide acceptable alternative / substitutions plant list – especially if project is quick turn-around
- "Contract growing" – is this an option? Very different time frame for herbaceous vs. woody plants – contract growing for herbaceous can be in terms of months. Woody trees and shrubs can take years depending on size.
- Technical support – assistance within reason – we can help, but we can't design your job for you via the phone or internet

Market Trends for Consultants and Green Industry

- New Perception of Water – multifaceted – reusable resource not disposal commodity
- Green Infrastructure / Stormwater Utility Impact fees / Non-structural alternatives
- Floodplain Management / Restoration
- Pollution / Wetland & Reforestation Mitigation Bank Trading Credits
- Air Quality - Carbon Sequestration -- Greening of American Urban Cores
- Green Roof Technology
- Greening of Corporate America
- Edible natives – persimmon, paw paw, American plum, walnuts etc
- Broadening Markets – retail, residential eco-chic gardening – larger plant material

Planting Density Guide

<u>Spacing</u>	<u>Qty/Acre</u>	<u>Plant Category</u>
1' X 1'	43,560	Herbaceous / Live stakes
2' X 2'	10,890	Herbaceous / Live stakes
3' X 3'	4,840	Herbaceous / Live stakes
4' x 4'	2,723	Shrubs
5' X 5'	1,742	Shrubs
6' x 6'	1,210	Shrubs
8' X 8'	680	Shrubs / Trees
10' X 10'	436	Shrubs / Trees
12' X 12'	303	Trees
15' X 15'	194	Trees
20' X 20'	109	Trees

Note

- Generally, reforestation projects specified with container grown plants ranges from 150 - 250 trees and shrubs (2:1 ratio) per acre.
- Qty's vary depending on project goals, anticipated survival and possibly local/state government requirements.

U.S. Fish and Wildlife Service Wetland Codes

OBL = obligate wetland species 99% probability of occurring in wetlands under natural conditions

FACW = facultative wetland species 67-99% probability of occurring in wetlands under natural conditions

FAC = facultative species 34-66% probability of occurring in wetlands under natural conditions

FACU = facultative upland species 1-33% probability of occurring in wetlands under natural conditions

UPL = upland species 1% probability of occurring in wetlands under natural conditions

+ Indicates more of a frequency to be found in wetlands

- Indicates less of a frequency to be found in wetlands

Container Size Information

Container Size	Top Diameter	Height	Gallon	Traditional Name
Container seedling / SP5	3" square	9" deep	51-63 cu. in.	Not applicable
#1 container	6 3/8"	7 1/4 "	.734	#1 gallon
#2 container	9"	8 1/2"	1.593	#2 gallon
#3 container	11"	9 1/2"	3.00	#3 gallon
#5 container	11 7/8"	11"	3.843	#5 gallon
#7 container	14"	11 1/2"	6.085	#7 gallon