



Building the Case for Urban Tree Canopy Inclusion in a State Implementation Plan

Planting Strategies for SIP Tree Planting

What is this factsheet about?

- This factsheet examines the question of planting strategies in a very large tree-planting program
- It is one of a series of short factsheets written to aid anyone considering the possibility of integrating tree-planting into a SIP

Why does it matter?

- A very large tree-planting program will need to decide its planting methods early
- Linked to planting method are questions such as costs, stock, timing, mortality, and oversight
- Anyone considering including tree planting in a SIP must recognize that will be difficult to plant high numbers of trees in a short time and keep the survival rate reasonably high

How does planting strategy affect SIP objectives?

- Planners of large planting programs must balance three major competing factors:
 - Tree survival and growth—the top priority for any SIP tree-planting program
 - Task scheduling—timelines must respect biological requirements
 - Labor and budget—limitations must be balanced with SIP objectives
- For high survival, one might think of medium-sized stock to be planted by careful—and carefully monitored—professionals, but the job would probably be expensive and slow
- For low cost, one might think of volunteers and small stock, but tree mortality rate would probably be high, project organization complicated, and supervision difficult

Which actual installation means will be appropriate?

- [Hand techniques](#) have a long history in urban and community forestry
 - These traditional techniques are easily mastered, and equipment is not costly
 - Work can proceed very quickly if small stock is being used: experienced hand planters can plant up to 1600 seedlings a day on a single site
 - Especially suited to sloped ground or individual plantings by volunteers
 - Good survival depends on [careful techniques](#)
- [Machine-aided planting](#) is a common municipal and landscaping approach
 - Many different large machines are used (backhoe, [tree spade](#), etc.)
 - Typically employed for saplings and young trees
 - A power auger with a depth control is an attractive option for SIP planting
 - Used either hand-held or attached to a tractor, skidsteer or similar machine
 - Typically used with branched liners
 - Can be [fast](#) (2000/day) and have [high survival rates](#)
 - Requires trained operator plus small ground crew
- [Mechanical planting](#) might be suitable for community forestry planting in this context
 - Large numbers can be planted at a time
 - Best used with conifer seedlings
 - Survival rates may be low, but will be higher if a ground crew accompanies machine
 - Some sites (e.g., transportation corridors) might be well suited
- Most SIP planting programs will probably need to use all three means
 - Planting very large numbers in a short time will require non-traditional approaches
 - Means will have to be matched to site, stock, and available personnel

How can the most serious planting errors be reduced?

- Bad planting technique accounts for most young tree mortality during the establishment period (first 3-5 years after transplanting)
- Common planting mistakes have fatal implications
 - Allowing pre-planting stress—roots dry out during transportation, [storage](#), and staging
 - [Planting too deep](#)—roots below grade, especially on clay or wet soils, suffocate and die
 - Leaving ties, wires, synthetic bags, or circling roots—stem girdling leads to root death
 - Failing to make proper soil-root contact—roots quickly die when exposed to air
- Mitigation of planting mistakes
 - Training—all personnel should be taught specific field techniques
 - Cover stock during transportation/storage, keep rootballs shaded during staging
 - Plant stock on undisturbed base with primary lateral roots at grade, except on [wet sites](#) where stock should be planted above grade
 - Cut any restriction to root growth before planting
 - Monitoring—both volunteers and professionals need oversight
 - Spot-check new volunteers' work so they can learn correct procedures
 - Set up [check system](#) and penalties in contracts with professionals
- Reducing the incidence of these mistakes will greatly improve tree survival, growth and condition—and so help attain the air quality benefits claimed in the SIP

What post-planting care is important?

- Because of the large scale of SIP tree planting, it will probably be necessary to omit some techniques commonly recommended for post-planting care of community trees
 - [Watering](#)
 - Beneficial during establishment
 - Difficult and expensive in large project
 - Select drought-tolerant species to reduce long-term water needs
 - [Staking](#)
 - Costly, both for installation and removal
 - Unnecessary for smaller stock in most situations
 - Helpful in some locations to protect the planting site
 - [Fertilization](#)
 - Costly for this number of trees
 - Can aid establishment on poor soils if weeds are suppressed and slow-release products are used
- Some techniques will be easy to implement and make a great difference on survival
 - [Mulching](#) can be done quickly and brings large number of benefits
 - [Weed control](#) is critical for trees planted in semi-wild areas

What special planting techniques should be adopted for poor-quality sites?

- Careful [species selection](#) will be the most cost-effective for large projects
- Good tree growth is possible on poor-quality sites such as [brownfields](#), [mining spoils](#), or [wetlands](#)
- For large-scale SIP programs, planting on such sites should be carefully evaluated from the perspectives of cost-benefit and resource analysis before being included

Where can more help be found?

- Detailed websites about planting methods for [urban](#) and [rural](#) locations can be helpful
- Large tree planting programs with good survival rates such as that of the [Sacramento Tree Foundation](#) or [Trees Forever](#) often contain useful advice

This factsheet was developed for the project “Building the Case for Urban Tree Canopy Cover Inclusion in State Implementation Plans,” funded by USDA Forest Service, Urban and Community Forestry Program. See <http://www.treescleanair.org/> for more information.