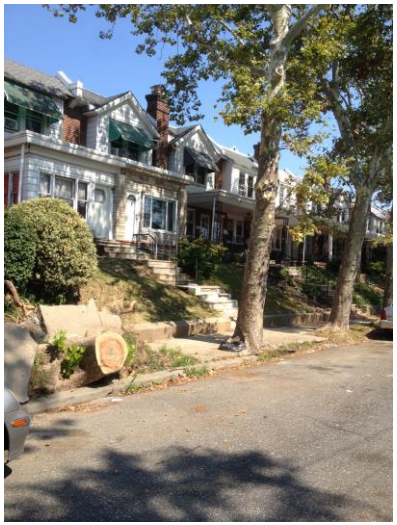
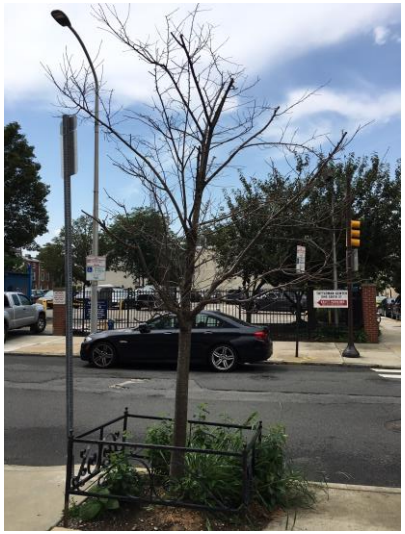
New guidance for tracking long-term tree survival, growth & health

USDA Forest Service Urban Forest Connections Webinar

September 9, 2020

Lara Roman & Natalie van Doorn
USDA Forest Service

Dana Dentice
Pennsylvania Horticultural Society

Outline

- Part I: The big picture
  - Why monitor?
  - Products overview
  - Getting started
- Part II: Making it happen
  - Key variables for monitoring
  - Managing field work
- Part III: Monitoring standards in action
  - Tree Checkers program in Philadelphia

Part I: The big picture

Lara Roman, USDA Forest Service

Why monitor?

- Evaluating planting program performance
- Evaluate factors associated with tree mortality, growth, and health
- Engage local communities
- Managing pruning cycles and tree risk

Why monitor?

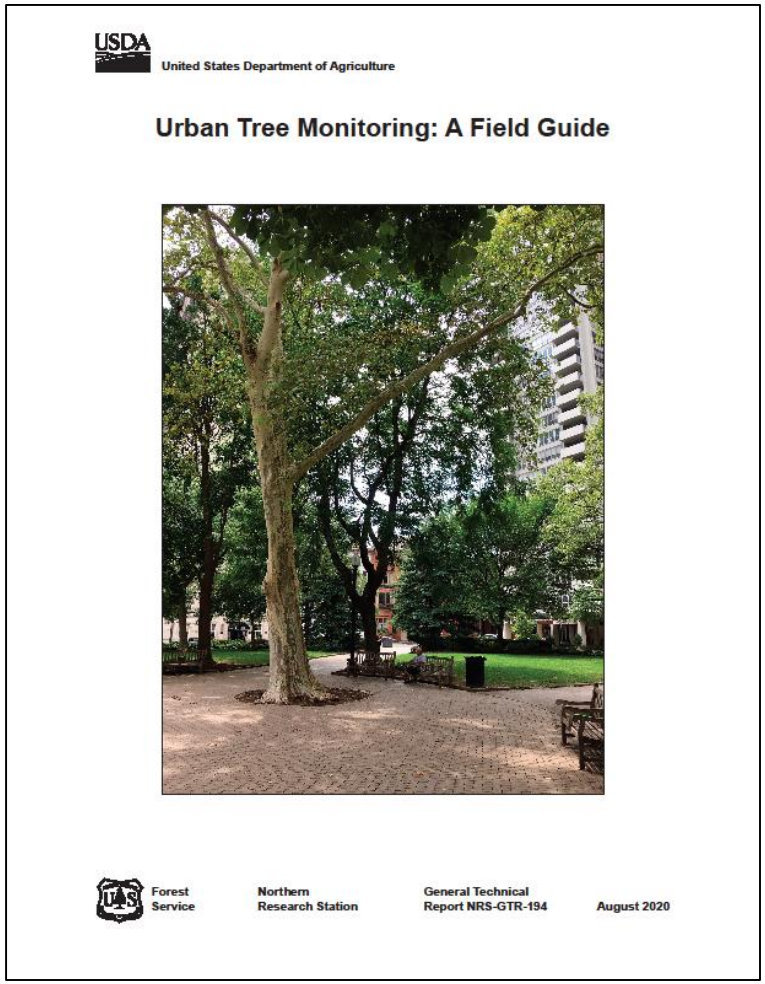
[Our organization] had an assumed survival rate when I started, but nothing to back it up. I wanted to have a legit number that we can claim as the success of our planting and care work.

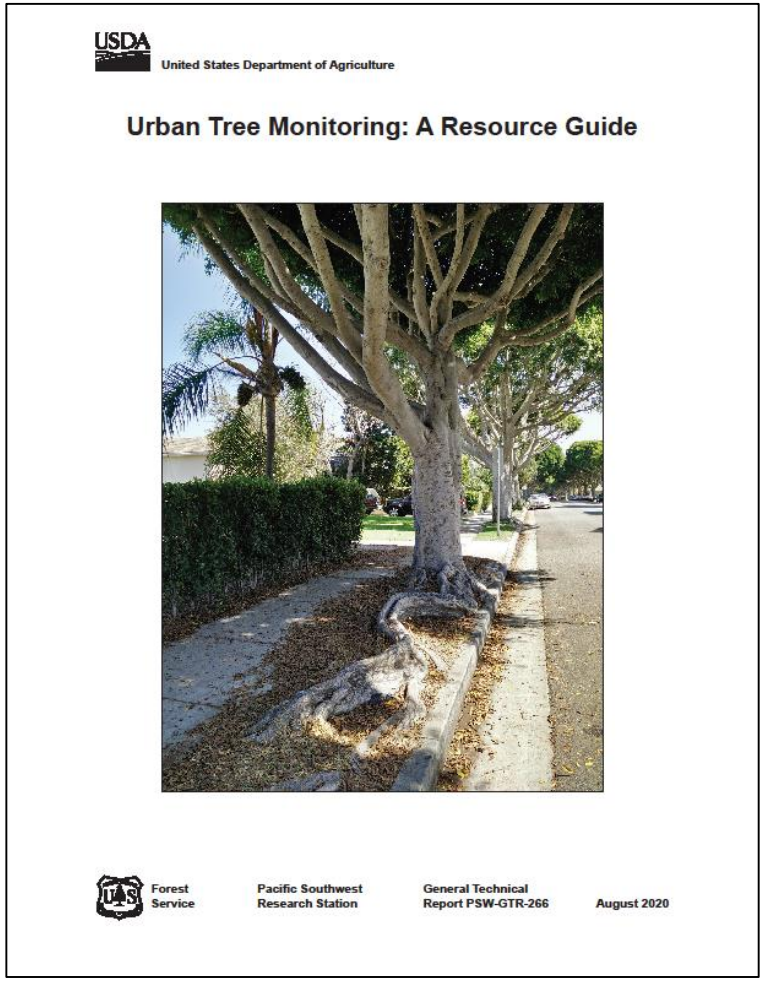
The sense that we were losing trees as fast as they were being planted made [us] want to see whether that was true, so getting some data together was essential to know if we were in fact gaining or losing ground.

Roman et al. (2013)

Products overview

- 2 General Technical Reports (GTRs)





Products overview

- 2 General Technical Reports (GTRs)
  - *Urban Tree Monitoring: A Field Guide*
  - *Urban Tree Monitoring: A Resource Guide*

- 5 training videos
  - Getting Started
  - Mortality Status
  - Trunk Diameter
  - Location Methods
  - Managing Field Work

How are these products different?

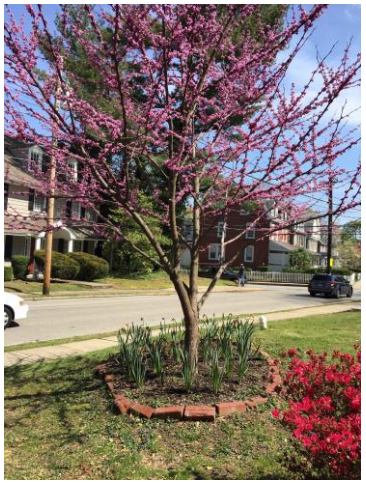
- Focused on monitoring for longitudinal tree data
  - Longitudinal: repeated observations on the same individual trees
- *Field Guide* has detailed protocols for
  - Re-measuring DBH to evaluate growth
  - Mortality status
  - Location methods
- *Resource Guide* has guidelines & best practices
  - Key considerations before starting a project
  - Managing field crews
  - Structuring longitudinal databases
- Informed by urban forestry professionals
  - Urban Tree Growth & Longevity working group of ISA

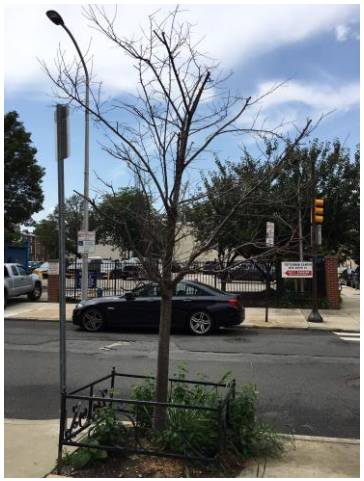
Inventory ≠ monitoring

	Typical urban tree inventory	New monitoring guidelines
Purpose	Manage tree crew workflow Understand current species & DBH distribution	Assess change over time: mortality growth health population size
DBH	Recorded to nearest inch DBH height point not noted	Recorded to nearest 1/10 inch or mm DBH height point noted
Mortality	Recorded as part of condition rating	Recorded separately, dead and removed trees distinguished
Location	Used to map trees, inform work crews where to do maintenance	Needed to find the same individual tree in the field in future years
Data structure	Static snapshot	Dynamic, with repeated observations Longitudinal database

Types of monitoring projects

Planting cohort monitoring





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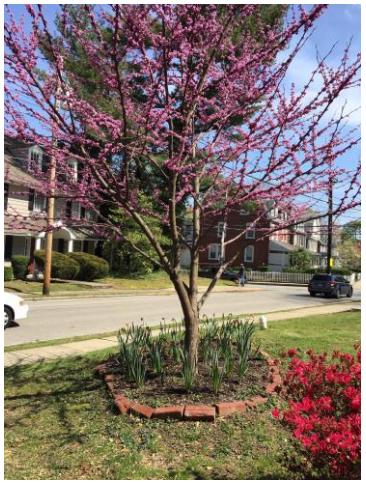
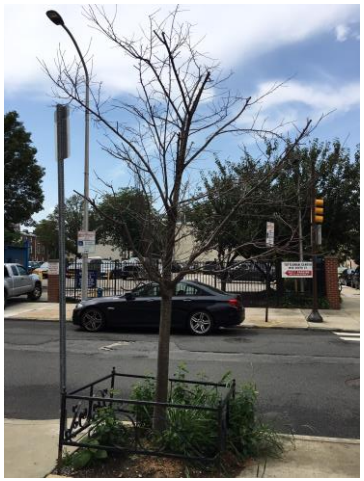
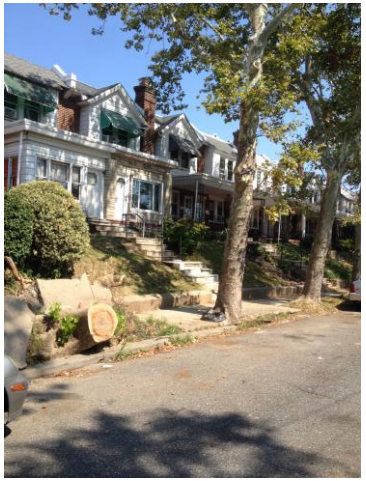



Multi-age inventory monitoring



Pg. 7 of *Resource Guide*

Baseline records

- Tree records from the first point in time for a particular monitoring project

Planting cohort monitoring

→ planting records are baseline

Multi-age inventory monitoring

→ first inventory/census is baseline

Baseline records

- Tree records from the first point in time for a particular monitoring project

Planting cohort monitoring

→ planting records are baseline

Multi-age inventory monitoring

→ first inventory/census is baseline

Baseline records need to be designed for monitoring!

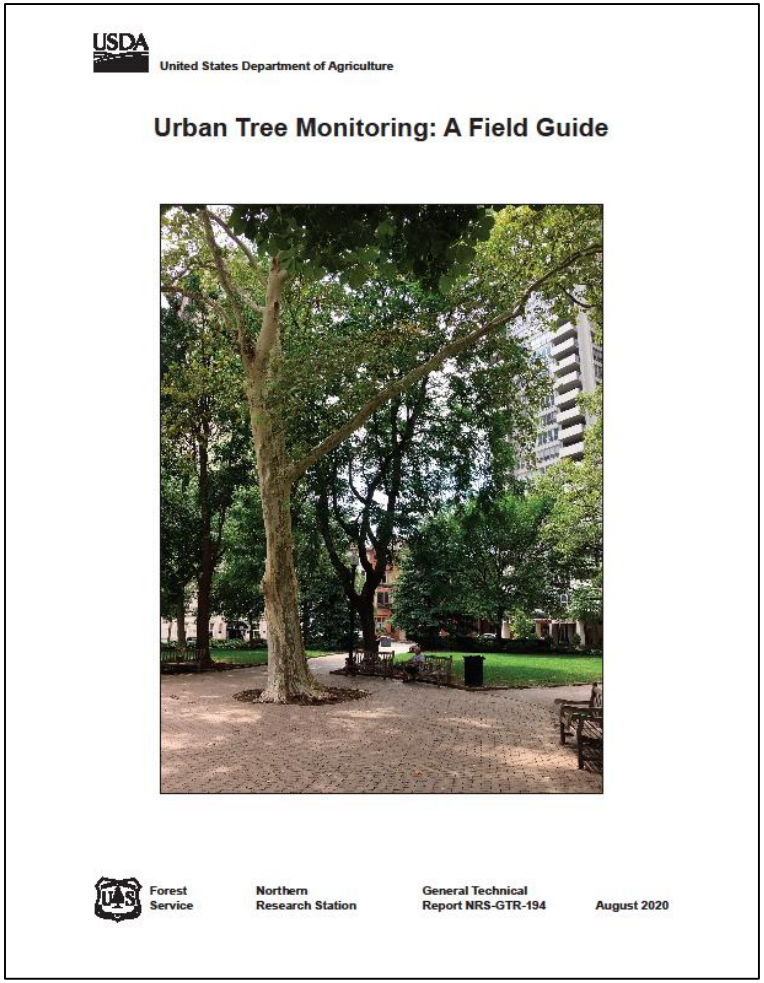
The *Field Guide* in action

- Residential yard tree monitoring in Massachusetts (6 towns, 5000 trees)
- Street tree health monitoring plots in Philly & NYC (6640 trees)
- Climate-ready trees project in California (432 trees)
- Undergraduate urban forestry course

Pg. 16 of *Resource Guide*

Variables in the Minimum Data Set

- Field crew identification
- Date of observation
- Tree record identifier
- **Location**
- Site type
- Land use
- Species
- **Mortality status**
- Crown vigor
- **Trunk diameter**
- **Height of trunk diameter**
- Notes for supervisory review


USDA United States Department of Agriculture

Urban Tree Monitoring: A Field Guide

Forest Service | Northern Research Station | General Technical Report NRS-GTR-194 | August 2020

Linking goals to variables

- Project goals determine variables collected
- Examples:

Goal: Promote property owner stewardship.

→ Add observations about adherence to maintenance for street and yard trees. Provide feedback to residents.

Linking goals to variables

- Project goals determine variables collected
- Examples:

Goal: Determine local tree growth rates.

→ Add more tree size measurements:

total height

crown width

Linking goals to variables

- Project goals determine variables collected
- Examples:

Goal: Determine local tree growth rates.

→ Add more tree size measurements:

total height

crown width

Don't collect a "laundry list" of variables!

You'll be "snowed by a blizzard of ecological details"!

Roman et al. (2013)

Defining “tree”

- There is no standard botanical or taxonomic definition of “tree”
- Palm trees? Large shrubs?
- What’s a “street tree”?
- Need consistent treatment of what’s “in” and “out” of the study to know if the overall population size is growing

Planning ahead, Pg. 19 of *Resource Guide*
Defining “tree”, Pg. 28 of *Resource Guide*