Citizen Science Tree Monitoring Training Toolkit

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Background

- Chesapeake Bay Program's BMP Verification Guidance

- Chesapeake Bay partners have identified tree monitoring training and guidance identified as key priority

- Bureau of Forestry asked by DEP to develop methodology to monitor young trees planted through TreeVitalize program

- TreeVitalize also wanted to know program mortality rates

Inception and Development of Project

- Partnered with US Forest Service, Penn State Extension, and the City of Harrisburg

- Received pilot funding to develop a Citizen Tree Monitoring Training Toolkit

- Builds on existing work from Dr. Roman and PHS Tree Checkers

- Utilizes TreeVitalize Pennsylvania's online mapping tool Pennsylvania Community Tree Map
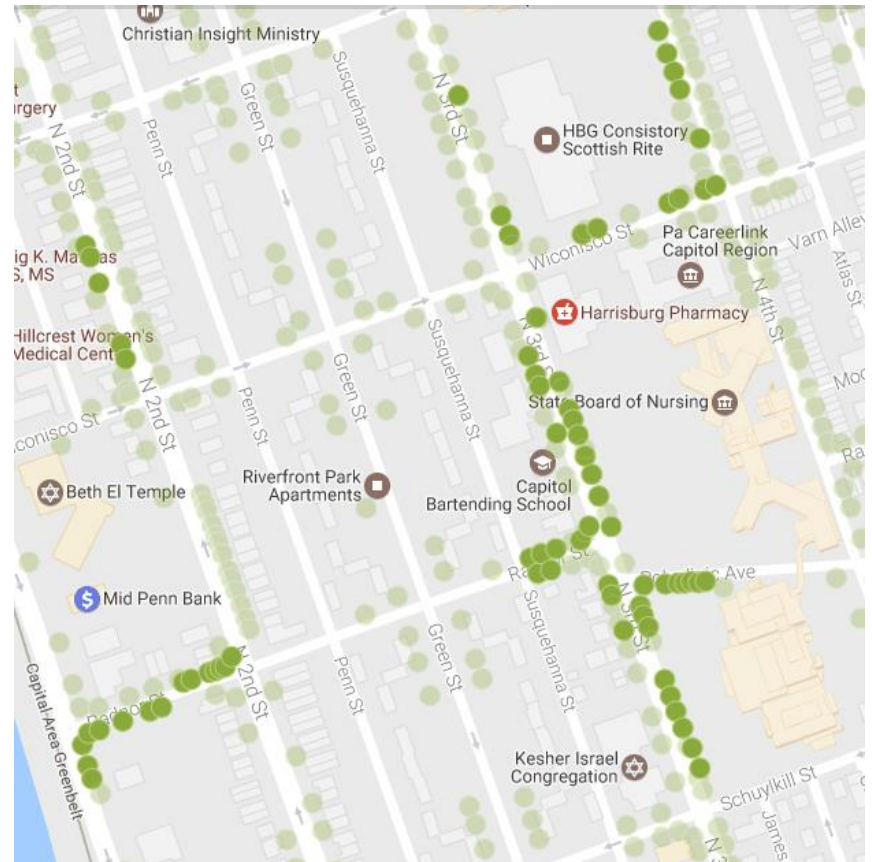
Outline

- Why monitor urban trees?

- Training run-through (select slides)

- Resources: Urban Tree Monitoring Toolkit

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- Resources: Urban Tree Monitoring Toolkit

Purpose of this webinar: Giving you the resources to run your own citizen science training for urban tree plantings!

The problem: young tree mortality

Photos: L.A. Roman

Why monitor?

- Document program performance
  - Tree mortality, growth and health are key performance indicators
  - Compare outcomes across the state

- Understand tree growth and mortality
  - What factors are related to growth and mortality?
  - What are realistic expectations for future environmental benefits?

- Engage the public
  - Citizen science to build public awareness

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Our <u>Urban Tree Monitoring Toolkit </u>is specifically for tracking young trees from a particular planting project (i.e., cohort monitoring)

Training run-through

Agenda

- Classroom training (and eat!) (1 hr 15 min)

- Field practice (30 min)

- Main field work (2 hrs)

- Re-convene (15 min)

- Total time: 4 hrs

- # People: 9 volunteers (in teams of 2-3)

- # Trees monitored: 86 (teams finished in 1 hr)

Introductions

name, affiliation, favorite tree

Methods Overview

- Location

- Tree species

- Photograph

- Crown Vigor

- Trunk diameter

- Mulch

- Discussion

Location

Why location matters

- Reliably re-locate this tree in the future

- Connect to other geospatial data sets

Accurate location data is critical!

Are you at the right tree?

Tree Species

Species Confirmation

- **X** species planted

- Check species to confirm you're at the correct tree

- Species from planting records should be correct
  - BUT sometimes there are errors in the planting record
  - If you suspect this has happened, write it in the notes

Species face-off

- **Training** that focuses comparing/contrasting leaves with similar shapes
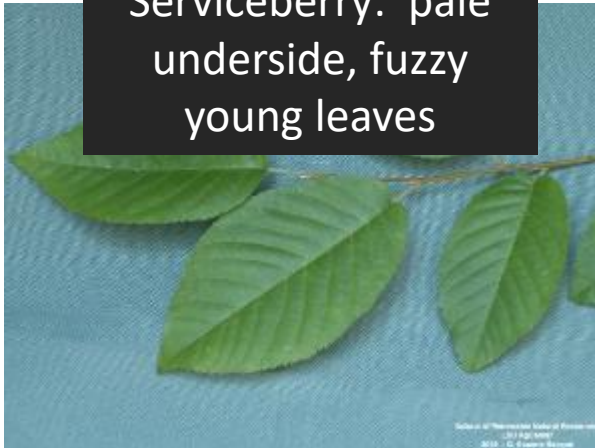
Cherry vs. Serviceberry vs. Linden

Cherry vs. Serviceberry vs. Linden

Cherry: bark has lenticels

Linden: almost heart-shaped, pale yellow flower

Serviceberry: pale underside, fuzzy young leaves

Photo

Take whole tree photo

- Photo is useful for
  - Data validation: Researchers can double-check species, crown vigor
  - Future field crews to confirm they are at the same tree

Photos: J.P. Fristeksky, B.C. Scharenbroch

Mortality status

Mortality Status

Category (Code)	Description
Alive (A)	Green leaves and/or live buds,; including trees with no leaves, but live buds and green tissue under bark
Standing Dead (D)	100% dead above ground, no green tissue under bark, branches snap, more than 12 inches in height
Stump (S)	Under 12 inches in height
Removed/Missing (R)	Tree has been removed from site
Not Planted (NP)	Tree was never planted (please note why in notes)
Unknown (U)	Can't find tree, perhaps due to confusion about location notes

Crown Vigor

Code	Description
1	Healthy
2	Light decline
3	Moderate decline
4	Severe decline
5	Dead

Crown Vigor

1 **Less than 10%** branch or twig mortality, defoliation, or discoloration present
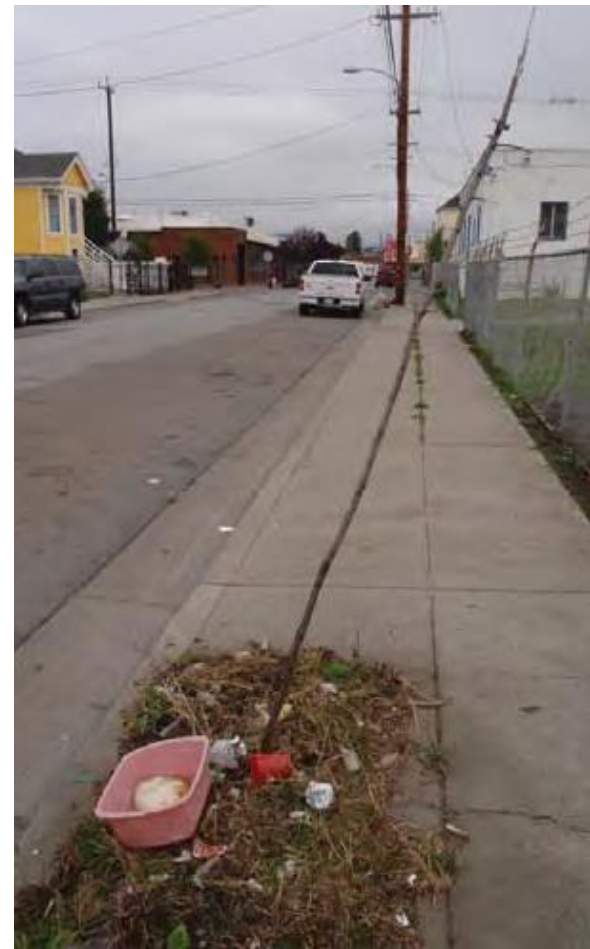
2 **10 -25 %**

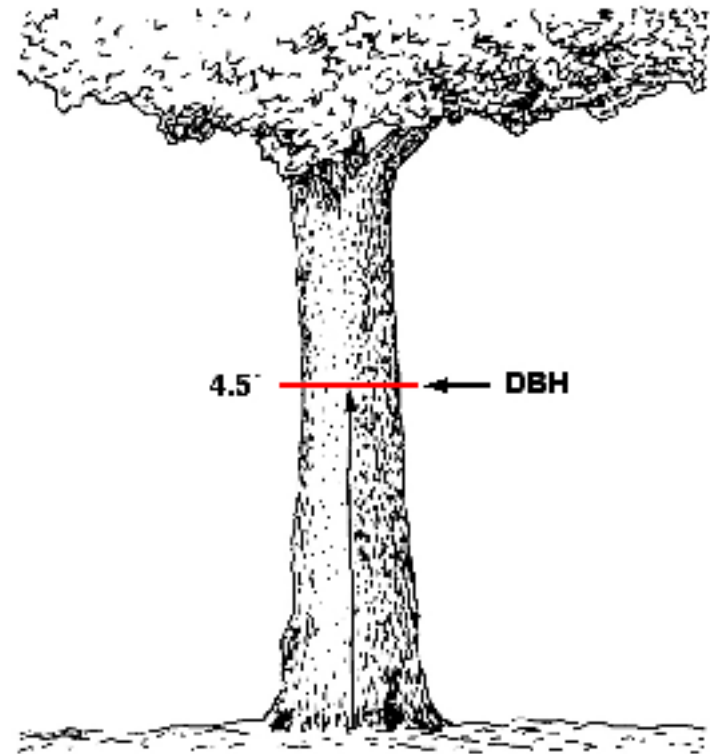**3** 26-50%   **4** More than 50%   **5** Dead

Trunk diameter

Diameter at breast height (DBH)

Diameter of trunk at 4.5 ft (54 in.)

But there are many rules

and special considerations...

What to measure

1. Diameter of stem(s)

2. Height of diameter measurement

- Often 4.5 ft (54 in.) but not always

- Necessary for reliable future re-measurement

Units

- diameter: inch (with 1 decimal)

- height of measure: inches (use whole inches)

Why DBH matters

- Standard size measurement in forestry & arboriculture

- DBH is the only size information you'll record

- Assess growth (indicator of vigor)

- Used in models of environmental benefits

- Describe size distribution of trees in the urban forest

Using d-tape

- Used to measure stems > 1 inch diameter

- Why does d-tape have 2 sides?
  - One side has normal units (use for measuring height or circumference)
  - One side instantly calculates diameter from circumference

    diameter = circumference / pi

USE THE CORRECT SIDE

INCHES
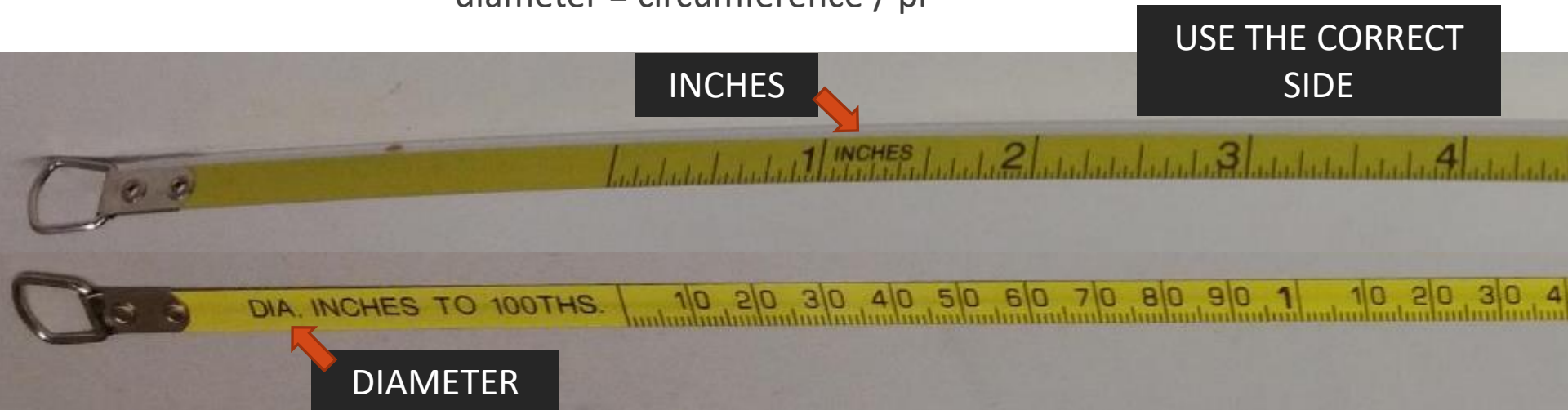
DIAMETER

Best practices for d-tape

- Measure diameter NOT circumference

- Keep the tape perpendicular to the trunk

- Pull the tape snug around the trunk

Problem: loose tape

Problem: not perpendicular

Photos: E. Desotelle

Best practices for d-tape

• Read the tape in the proper direction

• This diameter is 3.0 inches (2.97 rounded up)

• Record DBH to nearest $1/10^{th}$ inch (tape shows $1/100^{th}$)

• Record DBH height in whole inches

Measure where zero line hits

Multi-stem trees

- For trees that form at or below 4.5 ft (54 in)

- Measure the main trunk below the fork

- Avoid any irregularities or swelling
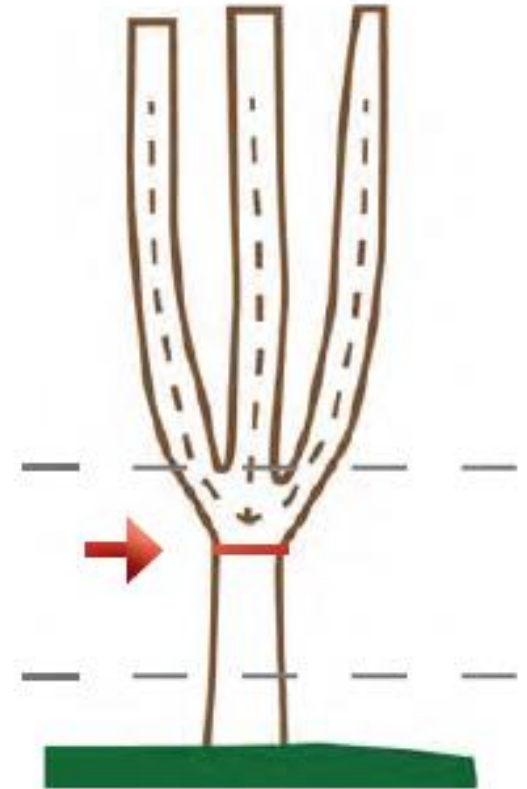
Examples of multi-stem trees: Where would you measure?

- Record 1 trunk for these species that tend to branch a lot around 4 ft

Pyrus spp.   *Prunus spp.*   *Malus spp.*   *Zelkova spp.*   *Crataegus spp.*

DBH: final message

- Rules are summarized in the "cheat sheet"

- Research goal: re-measure for trunk growth

Not sure where exactly to record DBH?
Don't sweat it! Record the height of the measurement.

Practice!

- Measure diameter of your neighbor's wrist

Mulch

Category (Code)	Description
Good (G)	2-4" deep, not touching tree
Too Little (L)	Less than 2" deep, less than 1' radius
Poorly Done (P)	More than 4" deep and/or touching tree, volcano mulching
None (N)	No organic material present (wood chips, shredded bark, compost, leaves)

Safety & Pedestrians

- Be aware of your surroundings

- Be careful of cars!

- If someone is bothering you, leave

- Stay hydrated

- For questions about tree planting, removal, and maintenance, contact **XXXX**

Sources of error

Ask participants:

What are potential sources of error?

How would you prevent or correct that error?

Equipment (per team)

- iPad

- Field Guide Cheat Sheet

- Street Tree Field Key

- d-tape

- Safety vests (1 per person)

Urban Tree Monitoring Tookit

Presentation slides

- Template: the expanded version of this ppt
  - Has Harrisburg information – customize for your project

Harrisburg Tree Monitoring Project Cheat Sheet

1. Location

- Verify you are at the correct location. Compare the address you are standing at to the address automatically generated in PA Tree Map.

2. Species Confirmation

- Verify the tree you are looking at matches the species listed.

- Use the provided tree ID key to help you confirm the species listed is correct. If you think species is incorrect, note this in the comments section.

3. Take Whole-Tree Photo

- Include whole tree within frame of photo, but avoid excess sky/ground beyond the tree.

- Taking photo from across the street side looking towards building/property is often the best angle.

- **Safety first: If it is unsafe to take a photo from the preferred angle, chose an alternative, safer angle.**

Example of a good photo of an entire tree.

Harrisburg Street Tree Field Key

Simple Leaves : Alternate Arrangement

Common, Botanical, Code	Leaves	Fruit, Flower, or Form		Common, Botanical, Code	Leaves	Fruit, Flower, or Form
Cherry Species* *Prunus spp* PR Leaf with bristle-tip margin, lighter bottom. Bark has horizontal lines	 Rob Routledge, Sault College, Bugwood.org	 Becca MacDonald, Sault College, Bugwood.org	‹VS›	Serviceberry Species* *Amelanchier spp* AM Dull, dark green leaf, pale below	 Chris Evans, University of Illinois, Bugwood.org	 Chris Evans, University of Illinois, Bugwood.org
European Hornbeam *Carpinus betulus* CABE Ovate, sharply-toothed, dark green leaves; smooth, gray bark with muscle-like fluting	 Robert Vidéki, Doronicum Kft., Bugwood.org	 Gil Wojclech, Polish Forest Research Institute, Bugwood.org	‹VS›	Japanese Zelkova *Zelkova serrata* ZESE Dull Leaf, balanced round base with wide serriations	 Richard Webb, Self-employed horticulurist, Bugwood.org	 Jason Fristensky

Online resources

- PA DCNR Urban Tree Monitoring Toolkit

- Urban Tree Growth & Longevity Working Group and the Urban Tree Monitoring: Field Guide

- Planted Tree Re-Inventory Protocol from the University of Indiana – Bloomington

- Study of volunteer observation error in urban forestry

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