TREES COUNT 2015

Training Manual

NYC Parks

TreeKIT

Getting Started

1. Orientation

NYC Parks uses a street tree mapping method developed by TreeKIT, a non-profit organization based in NYC that helps city dwellers measure, map, and collaboratively manage urban forests. You will use the TreeKIT method to accurately map the location of street trees and, in the process, collect some data about each tree and its immediate environment.

Your training will take place online and in the field. This online training program will teach you all of the basic skills and knowledge you need to expertly map trees on NYC's streets. At the end of this brief training, you will have a chance to Explore Your Knowledge online and then RSVP for a field training event with NYC Parks or a partnering organization. When you finish your field training, you will be able to register for mapping events all across the city. You may also request special permission to map trees on your own time with help from a friend.

NYC Parks will use the data you collect to create a citywide map of street trees. This interactive map will be available online for everyone to explore. Volunteer street tree stewards will use the map to track their work and keep in touch with each other online. We hope you will join them; after all, you will have played an important role in putting all those trees on the map!

2. The Data Collection Tools

The toolkit provided by NYC Parks contains a **measuring wheel**, a **tape measure,** and a **tree identification guide**. You will use the measuring wheel to measure the distance between trees on a block and a tape measure to measure the circumference of every tree and the diameter of every tree stump. The tree ID guide will help you determine the species of each tree you map.

The **measuring wheel** measures distances in feet and tenths of a foot. A small odometer is attached to the wheel. The black rotors on the odometer display the number of feet you have walked with the measuring wheel. The white rotor displays the tenths of a foot you have walked with the measuring wheel. A small black button resets the numbers on the odometer to zero.

The **tape measure** is just like any ruler or a yardstick you have ever used. It measures in feet and inches.

The **tree ID guide** will help you identify the species of most of the trees growing on the streets of NYC. The guide contains colorful photos of tree leaves and helpful hints for figuring out the species of each tree you map.

Your **eyesight** is the last tool in your data collection toolkit. You will observe and record a list of different conditions related to each tree and its immediate surroundings, all of them based on simply looking at what is going on and recording what you see.

3. The Data Logging Tools

You will use the Trees Count! *Treecorder*, a simple mobile website, to record data about the location and the condition of street trees and their immediate surroundings. Log into the *Treecorder* website on your phone or tablet browser, using your personal Trees Count! 2015 userID and password for access. The *Treecorder* will navigate to a map of the neighborhood where you are mapping trees. Follow the on-screen instructions to begin mapping.

You may choose to collect data on a paper worksheet if your phone battery dies or you experience any other technical trouble in the field.

The Mapping Method

1. The Overall Mapping Method

NYC Parks uses the TreeKIT method instead of modern GPS because it is affordable, easy-to-learn, and more reliable than GPS in many cases. This mapping method involves measuring the location of trees along the edge of a single block, going from one intersection to another, one side of the street at a time. We call these chunks of the sidewalk "block edges." You may find it helpful to think of a block edge lined with street trees as a necklace strung with big green "beads" or a subway line with leafy green "stops" along the route.

The TreeKIT method measures the distances between street trees as you walk from one intersection to another on one side of the street. A computer transforms those distance measurements into a map on the Internet. The method is based on very old and very reliable site surveying techniques; some of the same techniques that were used to plot out the Manhattan street grid more than two hundred years ago.

2. Getting Started In the Field

You have:

- ☑ A kit that contains a measuring wheel, a tape measure, and a tree ID guide
- ☑ A set of block edges to map
- ☑ Travelled to your first block edge out in the field

You are ready to map the trees on your first block edge!

Log into the *Treecorder* on your phone or tablet and find your first block edge on the system map. Use the target to highlight your first block edge as a red line. Two blue circles will appear at each end of the block edge where it intersects with other streets. Click on the circle at the intersection where you will begin mapping. It will highlight in red along with the block edge once it has been selected.

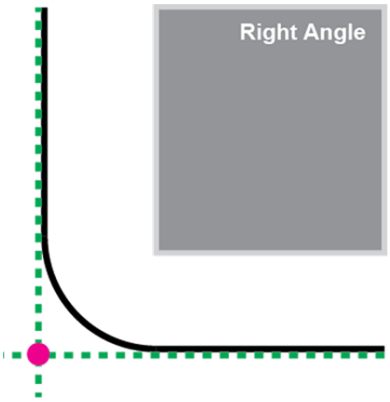
target on the block edge

start point selected

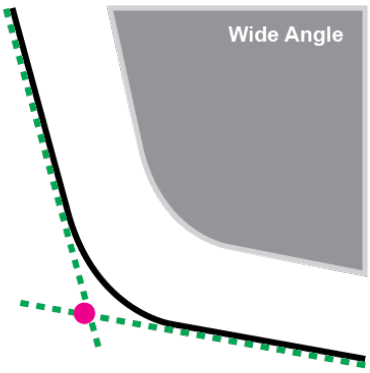
A block edge begins at one street intersection and ends at another street intersection; in other words, block edges begin and end at street corners. Most intersecting block edges come together at a gentle curve or rounded edge. Find your starting point for mapping

by estimating the spot where two block edges would intersect if their connecting corner were *not* curved. A “guesstimate” will suffice.

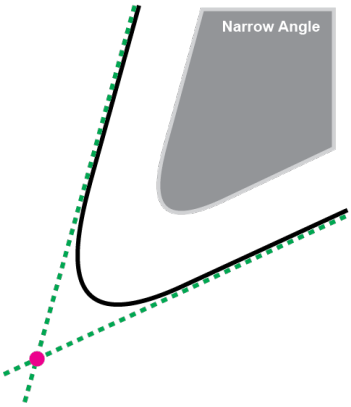
Most intersections, especially those in Manhattan, will have right angles like this one.



Intersections with wide angles will have start points that are closer to the connecting curve.

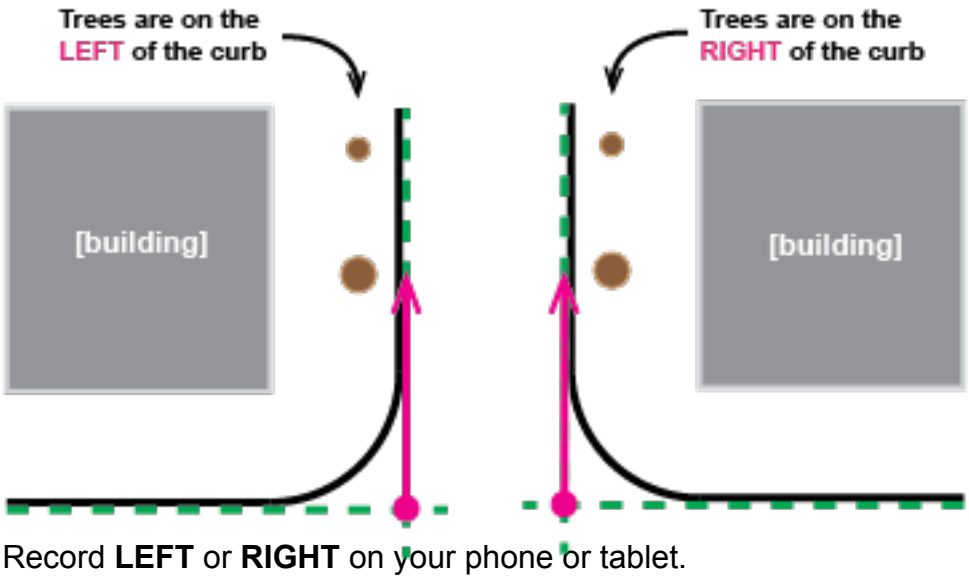


Intersections with narrow angles will have start points that are farther from the connecting curve.



Stand at your intersecting start point. Be careful to avoid oncoming traffic and other pedestrians. Remember, safety first!

Take a moment to consider the direction you are heading as you map from the starting intersection to the ending intersection. Based on the direction you are heading, are the street trees to the **LEFT** of the sidewalk curb or to the **RIGHT** of the sidewalk curb?

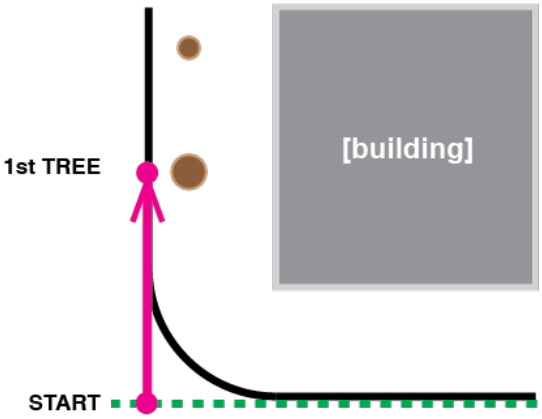


Record **LEFT** or **RIGHT** on your phone or tablet.

3. Mapping From The Start Point to the First Tree

Reset the odometer on your measuring wheel to zero.

Touch the edge of the wheel to your intersecting start point and walk toward the first tree on your block edge. Keep the wheel on the edge of the sidewalk curb to help make your measurements as accurate as possible.

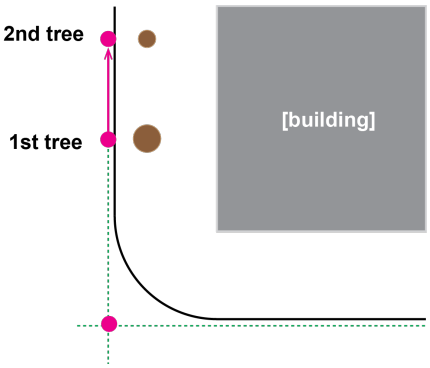


Keep walking and rolling until the wheel is centered on the middle of the first tree trunk on the block edge. Carefully note the precise spot where you stopped rolling. You may find it useful to mark the spot with a coin, nearby stick, or stone. Lift the wheel and read the distance on the odometer. Enter the distance number in the *Treecorder.*

Continue to map the location of every tree on the block edge after logging some basic information about the first tree and its immediate surroundings (more on this later).

4. Mapping the Distance Between Trees

Reset the odometer on the wheel to zero. Touch the wheel back down on the exact spot where you stopped rolling for the previous measurement. Walk along the curb edge and roll the wheel until you arrive at the approximate center of the next tree trunk on the block. Repeat the process for the distance between every tree on the block.

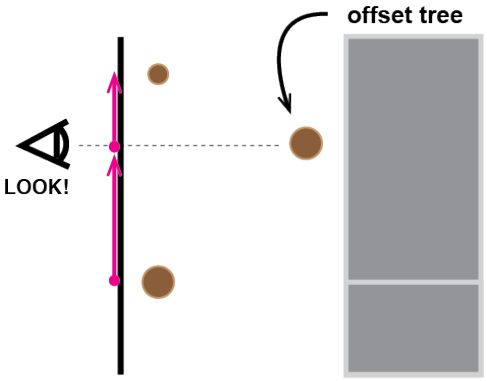


5. Mapping to the End Point

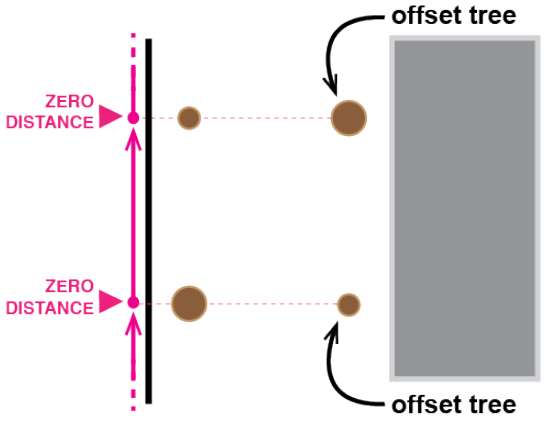
Find the end point at the ending intersection using the same method you used to find the start point at the starting intersection. Walk and roll the measuring wheel from the center of the last tree trunk on the block edge to the end point. Lift the wheel and record the distance number in the *Treecorder*.

6. Mapping Trees Away From The Curb

Some street trees are not planted near the sidewalk curb. That is OK! If the next tree you see is offset from the curb, just keep rolling the wheel along the curb until you arrive at the approximate center of the offset tree trunk. Log the tree as “Offset From The Curb” on your phone or tablet. The system will map the tree away from the curb later on. Just remember to keep going along the curb and logging each offset tree as you find them.



What if two trees are directly parallel to each other: one on the curb and one offset from the curb? Map and record data for the tree nearest to the curb *first*. When you are done logging data for the curbside tree, enter a distance of zero for the tree that is directly parallel and offset from the curb. When you are done logging data for the offset tree, return your measuring wheel to the point where you stopped on the nearby curbside tree. Roll to the next tree and record that distance, just as if there hadn’t been an offset tree.



7. **What If There Aren't Any Trees?**
   Some streets don't have street trees. That is OK! We need to record the block edges without street trees, too. After selecting your block edge, start point, and the side of the street you are mapping, you can click the "No Trees" button in the *Treecorder*, and that's it! The block edge has been recorded as having no trees.

Tree Data

1. Tree Structure

Street trees have one of three general structures: **alive**, **dead**, or cut down to a **stump**.

A **live** tree has living leaves or needles during the late spring, summer, and early autumn. Even a tree with very few living leaves or needles is still alive this season. Record any tree with living leaves or needles as alive.

A **dead** tree has no living leaves or needles. Record any tree with no living leaves or needles as dead.

A **stump** is the short length of trunk and underground roots left behind after a dead tree is cut down. Record any tree cut down to two feet or less in height as a stump. A stump should be no higher than your knee, more or less.

Why track tree structure?

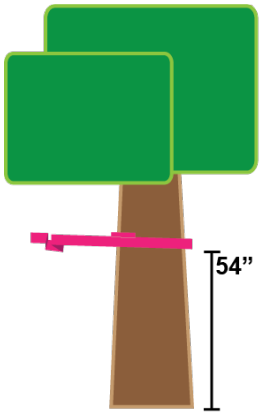
Dead trees and stumps need to be removed to make space for new trees in the future.

2. Tree Trunk Size

Trunk size is measured in circumference, or the girth of the tree. The circumference is always measured at a point on the trunk that is 4.5 feet, or 54 inches, from the ground.

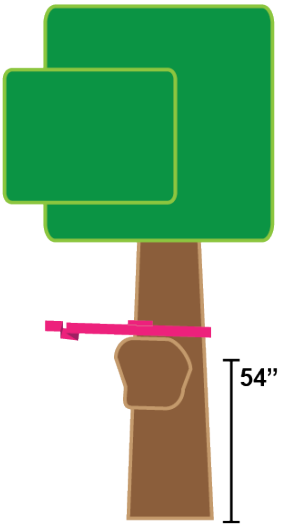
Find a spot on the front of your body that is 4.5 feet from the ground. Use your tape measure to find that spot, measuring from the sole of your shoe upward. Use a sticker or pin to mark the same spot on your clothing every time you map trees.

Approach the tree trunk. Use the spot on your body that is 4.5 feet from the ground to estimate the same height on the tree trunk. Wrap your tape measure around the trunk 4.5 feet from the ground. Estimate to the nearest inch on the tape measure. Record the circumference in the *Treecorder*.



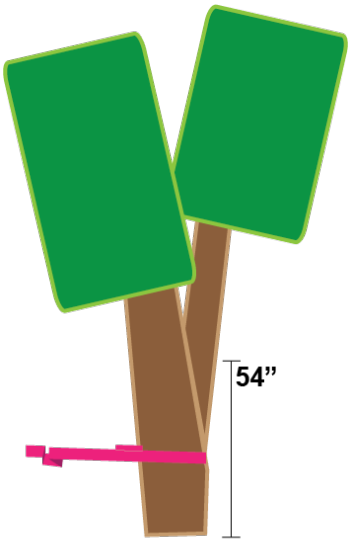
standard circumference

What if the tree trunk bumps out at 4.5 feet from the ground? Simple. Just move your tape measure up to the nearest point where the bump out ends and the trunk resumes a more or less uniform shape.



bump-out circumference

What if the tree has two or more significant trunks branching apart 4.5 feet from the ground? Move your tape measure to the nearest point below the point where the trunk branches out.



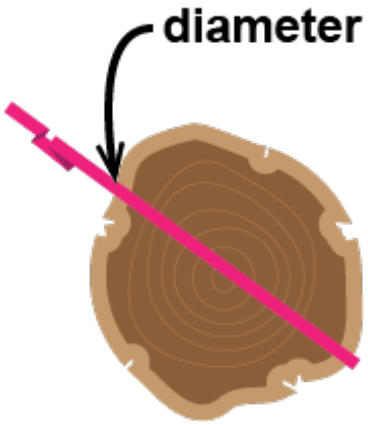
branching circumference

Why measure tree trunk size?

Tree trunk size tells us about the amount of carbon dioxide a tree soaks up from the atmosphere, the amount of electricity it conserves by shading and cooling the local environment, and the amount of water it soaks up during a rainstorm.

3. Tree Stump Size

Tree stump size is measured in diameter, or the width across the top of the stump. Make a quick visual guestimate of the widest distance across the top of a stump at the outside edge of the bark. Use your tape measure across that distance. Enter the diameter into the *Treecorder.*



Why measure tree stump size?

NYC Parks uses estimates of tree stump size to plan for stump removal efforts across the city.

4. Tree Species

Scientists have worked over centuries to categorize all of the different plants found on earth, grouping different kinds of plants together by the different physical features they have in common. You will look for the same set of physical features to identify and name all of the trees you find on the streets of New York.

Every street tree in NYC has two names: the first name is a “common name” that may vary from country to country or even state to state. For example, the tree known as *Little Leaf Linden* in NYC is known as a *Lime Tree* in the South and a *Tilia* in many European countries.

The second name is a scientific “Latin name” that is the same all over the world, no matter what language is spoken. The Latin name has two parts: the first part is the *Genus,* or a *general* category of trees that share a lot of traits. The second part is the *species*, or the *specific* name of each individual tree. It’s just like your first name and your family name, but in reverse! So, for example, the American Linden tree has the Latin name *Tilia americana, Tilia* being the name of a larger group of similar trees and *americana* being the specific name of the particular type of *Tilia* that is native to North America and has big, bright, green leaves.

NYC Parks will give you a copy of a Trees Count! 2015 tree ID guide*,* a comprehensive visual key to approximately 140 different kinds of street trees in the five boroughs. The guide mainly uses the physical features of tree leaves, with a few other helpful hints, to help you figure out each kind of tree you’re looking at out in the field. The guide folds out like an old-fashioned street map, and you should feel free to re-fold the paper in any way that helps you compare different kinds of leaves.

Step One: Identify the Leaf Shape and Edge

The shape of every NYC street tree leaf falls into one of eleven basic categories. Some leaves are shaped like a spade. Others are shaped like a teardrop. Some are shaped like a feathery fan. Others are shaped like a football. Some trees have needles instead of leaves. Each of these categories contains leaves with different kinds of edges: some are wavy, some are smooth, and some are jagged like the edge of a bread knife. Compare a leaf from each tree you find on the street to each of the leaf shape and edge categories on the guide.

Note: some leaves can be tricky and look like they belong in more than one category. Remember, when in doubt, look at more than one leaf from the same category to try and figure it out.

Step Two: Consider Tree Frequency

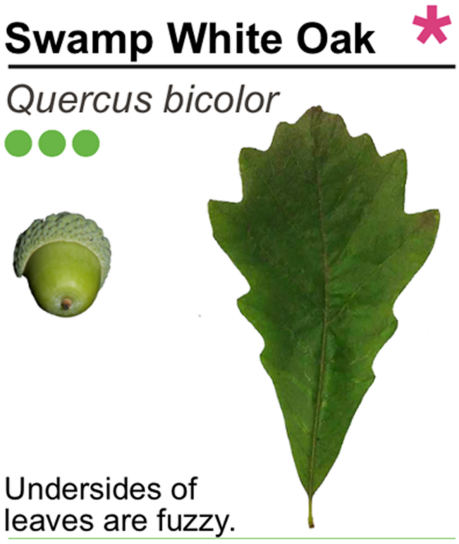
Some tree species are found in big numbers on streets throughout NYC. There are almost 95,000 London Plane trees scattered throughout the five boroughs, nearly 45,000 Pin Oak trees, and more than 20,000 Green Ash trees. Compare that to the less than twenty Scots Pine trees or the fewer than five Black Maples planted along the city's sidewalks. If you're holding a leaf that looks like it belongs to a London Plane Tree but you're confused because it also looks kind of like it might belong to a Black Maple, just trust the numbers; it's probably a London Plane tree. Each leaf in your tree ID guide will have some green dots below it: one dot means the tree is planted in low numbers (under 99 across all of NYC); two dots means the tree is planted in moderate numbers (between 100 and 999), three dots mean the tree is planted in high numbers (between 1,000 and 9,999), and four dots mean the tree is very frequently planted (more than 10,000). The top 24 most common street trees are also printed on the front and back of the guide. Look for a pink star next to the name of the top 24 most common street trees everywhere they appear in the guide.

Step 3: Consider Leaf Arrangement

Most tree leaves are arranged in one of two patterns on a branch: **opposite**, where each leaf has a mirror twin growing directly across from it on the branch; and **alternate**, where leaves zigzag down the length of a branch. Most NYC street trees have alternate leaf arrangements. Each tree with **opposite** leaf patterns will have a small icon in the tree ID guide. You can assume that all other trees have alternate leaf patterns.

Step 4: Consider Other Context Clues

Leaves are the first and most important physical feature used for identifying a tree species, but when the leaf isn't enough, you can turn to the tree bark, seeds, flowers, fruits, and other defining features for help. Your tree ID guide will include helpful tips for deciding whether the leaf you're holding in your hand matches the leaf on the paper.



Find the name of each tree you map in the tree ID guide. Begin to type the name of the tree into the *Treecorder* and the system will begin to show some options based on what you type. Select your tree from the options that appear.

What if I'm Not Sure?

Identifying a tree species can be challenging at first. Don't worry; you will get the hang of it quickly. Before long you will be able to impress all of your friends by naming the species of each tree on your block. Yet a tricky tree can sometimes stump even the most skilled foresters. If you find yourself spending too much time trying to figure it out, just make your best guess. You can rank your confidence in the *Treecorder* for each tree you identify: "Yes" if you're very confident; "Maybe" if you're moderately confident; "No" if you are in doubt of your choice.

5. Perceptions of Tree Health

The health of a living street tree is rated **good**, **fair**, or **poor**, depending on five factors: 1) the density of leaves in the tree canopy; 2) the overall color of the leaves; 3) the presence or absence of broken branches; 4) the presence or absence of trunk wounds; and 5) the shape of the tree after repeated pruning or branch loss.

A tree that is in **good** health may have a dense canopy of leaves or needles with few, if any, bald spots. Few of the tree leaves or needles have brown spots, holes, or other kinds of damage. Most leaves are consistently the same color. Few or none of the smaller branches may be broken. None of the larger branches are broken. There is little or no damage to the trunk and its bark.

A tree that is in **fair** health may have a canopy of leaves or needles with one or more obvious bald spots. Many of the tree leaves or needles may show brown spots, holes, or other kinds of damage. Many leaves show changes in color from the average. Some small branches may be broken. None of the larger branches are broken. There may be some damage to the trunk and its bark.

A tree that is in **poor** health may be missing many or most of its leaves. Any remaining leaves may show significant brown spots, holes, or other kinds of damage. Most leaves have changed color from the average. Small and large branches may be broken. There may be significant damage to the trunk and its bark.

Look at the whole tree. Observe the condition of the canopy of leaves, the branches, and the trunk. Take no more than 30 seconds to decide if the tree is in good, fair, or poor health. Record your observation in the *Treecorder.*

Why Measure Perceptions of Tree Health?
Tracking perceptions of tree health may help NYC Parks understand where there are trees that need extra help to survive.

Tree Surroundings

1. **Tree Guards**
   Tree guards come in all shapes and sizes. They protect the area around a tree. For a structure to count as a tree guard, it must be more than three inches tall and wrap around most of the perimeter of the tree or the tree bed. Select **not installed** in the *Treecorder* if a street tree does not have a guard. If a tree does have a guard, select **installed** in the *Treecorder* and enter whether it is **helpful, harmful** or if you are **unsure**.

Some trees will have **helpful** tree guards installed. Helpful guards wrap around three or four sides of the perimeter of the tree bed and can be made of many materials, including metal, wood, plastic, or rope/string. Select **Helpful Guard** in the *Treecorder* if you see any of these types of guards around a tree.

Some trees will have **harmful** tree guards installed. A tall and narrow metal guard installed close to the tree trunk is harmful. Any wall that allows soil to pile up against the trunk of the tree more than three inches from the ground is harmful. Select **Harmful Guard** in the *Treecorder* if you see any of these types of guards around a tree.

Some trees will have guards that are both helpful and harmful. If you're not sure which to choose, select **Unsure** in the *Treecorder.*

Why Track Tree Guards?

Tree guards can help protect trees if they are built and installed correctly. Tracking the many types of tree guards found on our streets can help NYC Parks understand how many guards are actually helping or harming street trees.

2. Stewardship Practices

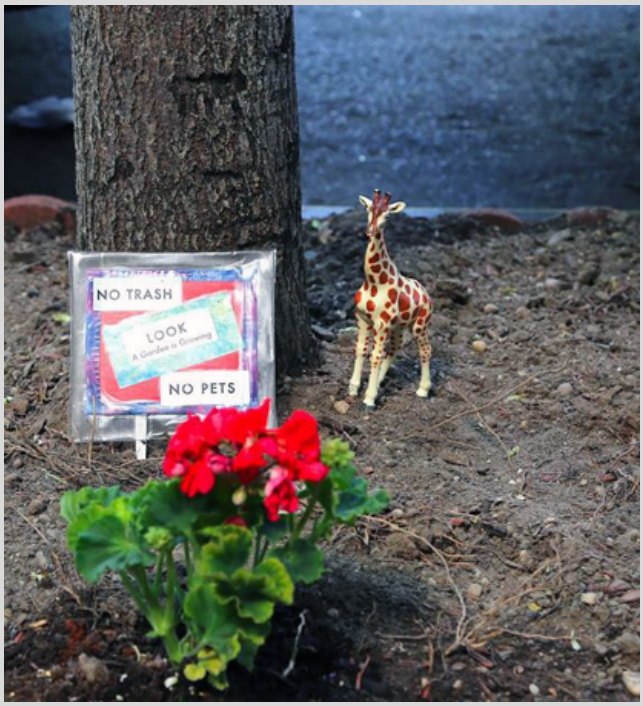
Evidence of street tree stewardship is measured as the number of different clues we find to suggest that someone is actively taking care of a tree. Stewardship, or volunteer tree care, comes in many different forms.

In addition to installing helpful **tree guards,** stewards may spread **mulch** or **woodchips** over a street tree bed. Mulch helps the soil around the tree hold onto water. It blankets the soil and makes it a warm environment for beneficial plants and animals. It also makes the soil healthy as it breaks down over time.

Tree stewards may plant **flowers** or other **plants** in a street tree bed. Plants and flowers help keep the soil loose and crumbly, letting air and water reach the tree roots down below. They also let other people know that the tree is loved and appreciated.

Tree stewards may install **signs** near a street tree in the tree bed. The signs may tell pet owners to curb their dogs away from the tree bed. Signs may also teach the general public about the importance of street trees. Do not count signs taped, nailed, stapled, or drilled into a tree. Do not count signs that have nothing to do with trees, such as no-parking signs or business flyers.

Tree stewards may install **decorations** near a street tree. Decorations may include stones, planters, bird boxes or even ceramic garden gnomes and plastic pink flamingos. As long as decorations do not penetrate the bark or restrict tree growth in any way, they help to define a tree's boundaries and let pedestrians know the tree is important. Decorations show that someone values the tree and its surroundings.



Tree stewards may install **seating** near a street tree, such as a small bench or a chair. Seating suggests that someone appreciates sitting in the shade of the tree.

You may find a steward actively taking care of a tree while you are mapping a block edge. Stewards water trees, pull weeds out of tree beds, loosen up soil with rakes and shovels, and pick trash out of tree beds. There is no better evidence of stewardship than seeing it happen right before your eyes!

You may also find other clues that stewardship is happening. Trust your gut. If you see something that suggests tree care is happening, include it in your count of different kinds of stewardship activity.

Count the number of different types of stewardship practices you see: tree guards, mulch, flowers or plants, signs, decorations, seating, or any active stewardship. In the *Treecorder,* select the range of different types of stewardship you count: **zero**, **one to two**, **three to four**, or **more than four**.

Why Measure Stewardship Practices
Finding evidence of stewardship may help NYC Parks understand where trees are actively maintained and where trees need more careful attention from volunteers.

3. Sidewalk Condition

Sidewalks surrounding street trees sometimes need to be repaired. Sidewalk conditions immediately surrounding the tree bed are tracked in two ways: 1) **no damage is seen**; and 2) **cracks or raised.** Look only at the sidewalk squares immediately touching the outside of the street tree bed.

Sidewalks where **no damage is seen** have no large cracks, though some small and fine cracks may be visible. Sidewalk squares are not lifted in any significant way.

Sidewalks where **cracks or raising** are seen have large and clearly visible cracks. Sidewalk squares are lifted more than one inch.

Observe the condition of the sidewalk squares immediately touching the tree bed. If there is no damage, select **No Damage** in the *Treecorder.* If you can see damage, select **Cracks or Raised** in the *Treecorder.*

Why Track Sidewalk Damage?
NYC Parks can use sidewalk damage data to for future maintenance programs. For more information about the Trees & Sidewalks program, visit the NYC Parks website.

4. Tree Problems

Street tree trunks, branches, and roots are sometimes choked by different kinds of objects and infrastructure. Tree problems are tracked in four categories: 1) **no tree problems**; 2) **root problems;** 3) **trunk problems**; and 4) **branch problems.**

Most trees will have **no problems.** Enter **No Problems** in the *Treecorder***.**

Some trees will have **root problems.** Root problems happen when roots grow over paving stones, bricks, sidewalk edges, metal grates, or any other hard surface on the ground. Select the type of root problem (**sidewalk or stones**, **metal grates**, or **other**) you see in the *Treecorder.*

Some trees will have **trunk problems.** Trunk problems happen when wires, stringed lights, and even tall tree guards restrict the trunk's growth. Enter the type of trunk problem (**wires or rope**, **lights**, or **other**) you see in the *Treecorder*.

Some trees have **branch problems**. Branch problems are often caused by lights, zip ties, or sneakers or shoes tossed into the tree canopy. Select the type of branch problem (**lights**, **sneakers**, or **other**) you see in the *Treecorder***.**

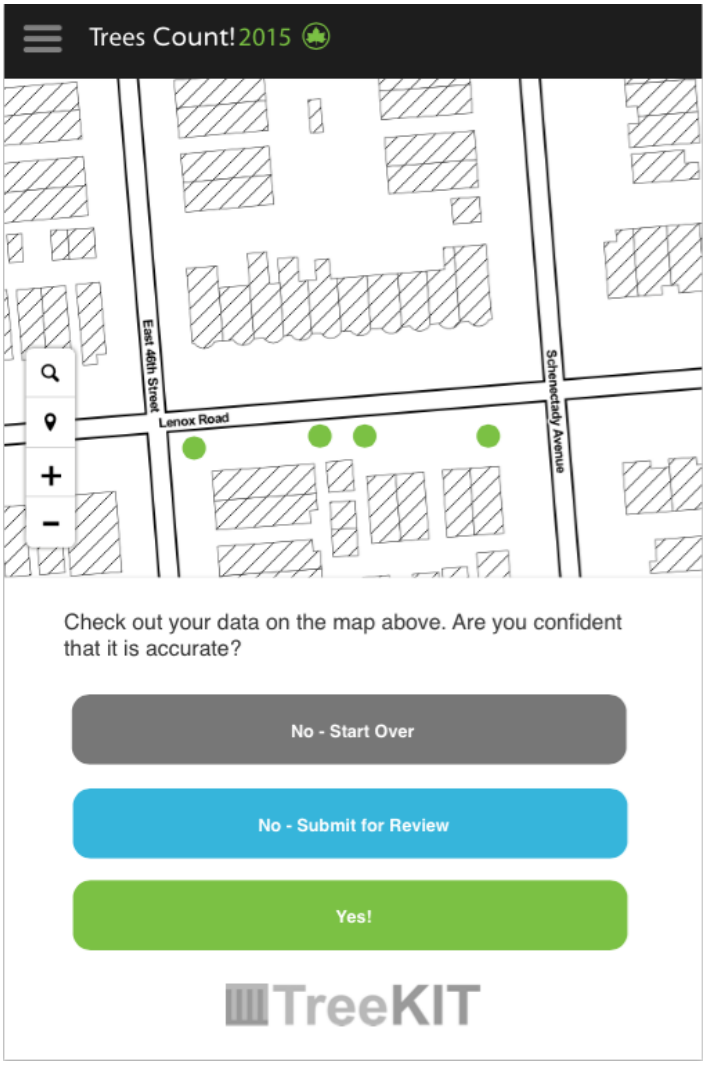
Why Track Tree Problems?

NYC Parks can sometimes rescue street trees with root, tree, or branch problems.

Wrapping Up

1. **Distance to End**
   Measure the distance between every tree on the block until you reach an end point at the next intersection. Enter the Distance to End in the *Treecorder.*

2. **Submitting Data**
   Click “Submit” at the bottom of the *Treecorder* to submit all of the data you collected for a block edge. The *Treecorder* will quickly make a map with all of your data and show it back to you on your phone or tablet. Look closely: does the map look accurate?



If your map looks inaccurate you can click “No - Start Over” to map the block edge again OR “No - Submit for Review” if you think you mapped everything accurately but something just doesn’t look right and you want NYC Parks to take another look.

If your map looks accurate, click “Yes!” to officially record your data.

Congratulations! You’ve reached the end of your at-home training.