



PORTLAND PARKS & RECREATION

Healthy Parks, Healthy Portland



Park Tree Inventory Manual

2019

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Introduction



Tree Inventories and Neighborhood Tree Plans

Walking around your neighborhood, do you see areas available for tree planting, trees in need of maintenance, and neighbors who are concerned about trees but don't know where to begin? Urban Forestry is helping Portlanders take action to improve their community's urban forest by conducting tree inventories and creating Neighborhood Tree Plans.

Active community groups interested in the cause begin by gathering volunteers to help conduct a tree inventory. Volunteers are guided by Urban Forestry staff, who provide training, tools, and event organization. Together, information is collected on the species, size, health, and location of trees. Data are analyzed by Urban Forestry staff, and findings are presented to neighborhood stakeholders. Achievable goals are set by Neighborhood Tree Teams to educate neighbors about the urban forest, identify opportunities for improving and expanding tree canopy, and connect the neighborhood with city and nonprofit resources. The result is a Neighborhood Tree Plan. The plan identifies the current status and health of neighborhood trees and provides recommendations for neighborhood action, serving as a catalyst for neighborhood implementation and stewardship.

Why a Tree Inventory is Important

Trees are an important asset in urban environments, where they provide multiple economic, environmental, and social benefits such as cleaner air and water, cooler summer temperatures, and safer streets. Conducting an inventory of trees is the first step in knowing more about our urban forest, so that we can make informed decisions about where trees are needed, what trees need care, and plan for an uncertain future of changing climate and new pests and diseases.

Portland's 200 developed parks and 7,900 acres of natural areas are an important public resource for residents, and home to 1.2 million trees. Trees in our parks and along our streets make up the population of trees most accessible to Portlanders, available for all residents to experience and enjoy. Neighborhood groups can help to protect and expand this public asset by using inventory data to raise awareness and educate neighbors about the important role of trees in the city. The Tree Inventory Project assists neighborhoods in telling the story of our parks through their trees, their history, and analysis of the data collected by volunteers.

A healthy urban forest that provides benefits to all of a city's residents depends on the active engagement of neighbors to care for both public and private trees. Empowering neighborhood groups to care for their trees is what the Tree Inventory Project is all about.

Volunteers are the Backbone of Tree Inventories

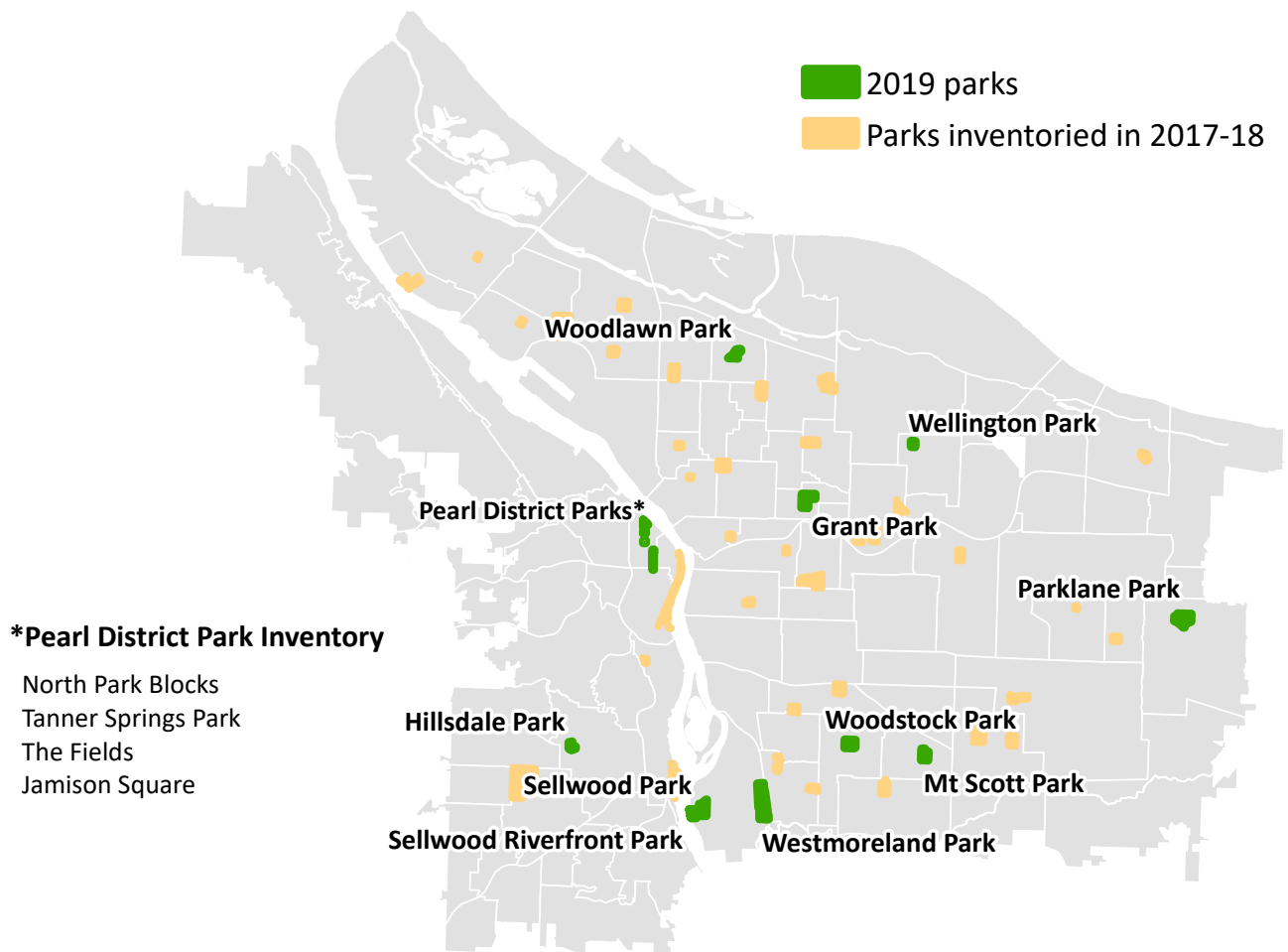
Tree inventories are organized and completed by volunteers. To date, more than 1,800 volunteers have devoted over 22,000 hours to collecting and entering data on nearly 235,000 trees—completing Portland’s most comprehensive citywide inventory of street trees, and in 2017 embarking on the city’s first complete inventory of trees in developed parks. This year Urban Forestry will continue its partnership with neighborhood tree teams and volunteers to gather information on the trees in Portland’s parks, working in 14 parks in 10 neighborhoods across the city. The Tree Inventory Project would not be successful without dedicated volunteers, in particular, inventory Team Leaders.

2019 Inventory Locations

This summer, inventories will be conducted in Grant, Hillsdale, Jamison Square, Mt. Scott, North Park Blocks, Parklane, Sellwood, Sellwood Riverfront, Tanner Springs, The Fields, Wellington, Westmoreland, Woodlawn, and Woodstock parks. Twelve work days are planned on Saturdays throughout the summer.

For more information visit:

<http://portlandoregon.gov/parks/treeinventory>



Section 1: Inventory Roles



Team Leader Role and Responsibilities

Role of the Team Leader

Team Leaders are responsible for data collection on inventory work days, acting as experts in tree identification, and leading volunteers in data collection. Team Leaders are also the public face of the Tree Inventory Project, educating the public about the program and the importance of trees to our communities.

In your Team Leader Training, we will teach you tips for identifying the most common Park trees in Portland, how to assess the health of a tree, and protocol for measuring and mapping trees in the field.

Expectations of a Team Leader

- Attend Team Leader Training: 1 classroom session and 1 field training session.
- Attend 3 inventory work days during the summer to practice tree ID and data collection.
- Instruct novice volunteers in data collection protocol and create a positive experience for participants.
- Ensure that data collected is correct and complete.
- Answer questions of the public about the Tree Inventory Project.
- Understand and promote the community benefits of trees.
- Report to UF staff any hazardous trees.

Talking With Residents

Volunteering with the Tree Inventory Project is a great way to meet your neighbors, many of whom love the trees in parks. Seeing someone in a yellow safety vest wrap a DBH tape around their favorite tree will usually elicit questions!

When talking with the public, always remember to mention the following:

- The Tree Inventory Project is an effort to learn more about neighborhood parks trees, and the data you collect will not result in removal or maintenance activities.
- You are a volunteer, and if they have specific questions about Park trees or tree health, direct them to a UF staff member in the park or call PP&R Urban Forestry at (503) 823-TREE.
- For those interested in the project, RECRUIT! Your clipboard will include a handout with more information and the dates of future inventory work days. For everyone else, always remember to be patient with questions, and remind residents that the goal of this project is to protect trees, not remove them.

Promoting the Benefits of Park Trees

Park trees provide numerous benefits to all of Portland's residents. The goal of the Tree Inventory Project is to work with neighborhood groups to increase and expand these benefits. Here is a small list for you to use when explaining the Tree Inventory Project or advocating for trees in your neighborhood:

Cleaner Environment

- Reduce air pollution
- Cool our homes and streets
- Improve water quality for humans and wildlife
- Provide important wildlife habitat

Safer, Healthier, and More Attractive Neighborhoods

- Create safe, beautiful areas to recreate
- Dampen noise from surrounding streets
- Improve mental and physical health of residents
- Reduce crime
- Provide year-round beauty



Benefits of Diversity

The information volunteers collect during inventory workdays is used to inform future plantings, ensuring the health and longevity of the trees that make up our urban forest. Diversifying the species in our parks and neighborhoods has a number of benefits:

- Reduced vulnerability to invasive pests and diseases. By not allowing just a few species of trees to make up the majority of the forest, we reduce the likelihood of a mass outbreak and increase our chances to contain and eradicate new threats.
- Resilience. A diverse urban forest ensures that the overall amount of benefits our trees provide will continue even if certain types of trees are lost to pests, disease, or environmental stress.
- A diverse urban forest provides year-round beauty, with a variety of flowers, textures, and even bark characteristics highlighted throughout the year.
- Diversity ensures a variety of habitats and food sources for wildlife during all seasons.

Other Volunteer Roles

There are many ways to volunteer for the Tree Inventory Project beyond your role as Team Leader. Opportunities include:

Join your Neighborhood Tree Team: If you live in an inventory neighborhood, join the group of residents who will be using inventory data to support their neighborhood Tree Plan and help organize community events to manage and enhance the neighborhood's urban forest.



Inventory events are open to all ages and skill levels

Lead a tree walk: PP&R Urban Forestry works with neighborhood volunteers to put on tree walks and other workshops across the city - not just in parks! Teach your neighbors and other nature lovers something about the forest they live in. Learn more about training opportunities and upcoming workshops at: <http://portlandoregon.gov/parks/trees>.

Inventory Work Day Timeline

Each Tree Team organizes 1-2 work days during which inventory data are collected. Tree Teams bring volunteers and Urban Forestry staff brings all supplies and materials. Work days follow this typical agenda:

Saturday Morning

- | | |
|------------|---|
| 8:00 a.m. | Participants arrive for registration and snacks. Inventory coordinator will pair Team Leaders and volunteers up in groups and assign sections. |
| 8:30 a.m. | Brief introduction and lesson on collecting data in the field. |
| 8:45 a.m. | Inventory begins! Teams walk to their assigned sections. |
| 9-noon | Volunteers conduct inventory. Staff and Arborists-on-call are available to answer questions as needed. Teams that finish early can call to request another section. Staff will return to meeting site by 11:30 a.m. / 7:30 p.m. |
| 11:45 a.m. | Teams return to the staging location. Data sections are reviewed, notes written, and all materials are handed in to staff. |
| 12:00 p.m. | Work day finished! |

Section 2: Inventory Protocol



Section 2: Inventory Protocol

Notes

Team Leader Materials

Team Leaders will be given the following materials to use during inventory work days:

- Clipboard containing a wayfinding map, recruitment flyers, and other information
- Tablet for entering and mapping tree information, with additional resources and apps to help in the field
- Diameter tape: one side of the tape measures diameter and the other side measures distance
- Measuring wheel
- Clinometer
- *Tree ID Cheat Sheets in the Team Leader Handbook*
- Ziplock bags for collecting samples of unknown species
- Safety vest
- Phone numbers for the arborist-on-call and UF staff



Team leaders will use mobile tablets to input data on park trees and instruct volunteers in using other inventory tools.

In addition to materials provided above, we recommend that you bring a cell phone, water bottle, and weather-appropriate clothing.

Safety

Safety is always a top priority. Always be aware of your team's surroundings and avoid any hazards. Look out for other park activities and users (basketball, dogs, children running, etc.). Skip unsafe areas and mark them on your map for staff to collect data at a later date. Remember:

- Wear yellow safety vests at all times. In addition to making you more visible, they also let park visitors know that you are part of a sanctioned event.
- When measuring tree height, you may need to cross the street. Although it is easy to walk around with your eyes in the canopy, always make sure to look for oncoming traffic before stepping into the road.
- If you encounter a person who makes you feel unsafe or uncomfortable, leave the area and notify inventory staff.
- Dress for the weather. Wear a hat, bring ample water, and dress in layers. It is often chilly in the mornings when we start, and very hot by the end of the work day.
- Wear closed-toe shoes, to protect from sharp objects and vegetation.

In case of an accident, call 911 immediately. Ensure that the site is safe for you and your team, then call inventory staff. Inventory coordinators will always have a first aid kit on hand in case of minor injuries—call for assistance.

Recording Tree Locations and Data

Each inventory team works in an assigned section of the park, indicated on your wayfinding map.

As a Team Leader you will be responsible for mapping each tree in your assigned section and recording data about each tree using the ESRI Collector for ArcGIS app on a tablet provided by Urban Forestry.

How to Read a Map in Collector for ArcGIS

The park map will be cued on your tablet when you receive it. If you need help finding your section, UF staff can help!

You can move the visible extent of the map by dragging your finger over the screen, and zoom with either a double tap, or a spreading motion with thumb and index finger. Features on the map are indicated by the following symbols:

- **Park boundaries:** Parks are outlined in green. Unless otherwise instructed, no data should be collected outside these boundaries.
- **Section boundaries:** Outlined in red and labeled with a number. Only collect data within your assigned section, and communicate with adjoining groups to ensure that all trees are inventoried only once.
- **Park trees:** Will populate as data is collected in the field, appearing as a tree icon.
- **Buildings:** Building footprints are outlined in gray. Buildings on private property will be labeled with a street address.
- **Park details:** Other park features, such as lights, picnic tables, courts, fences, and pathways are displayed on your map. Use them as reference for placing tree points, however be aware that these are not always accurate! Use your best judgement.
- **10' x 10' grid:** To assist groups in placing trees on the map.
- **Street trees:** Street trees inventoried in past years will appear on your map as an orange point. Use them to orient yourself while placing points for trees within the park.
- **Tax lot lines (private property):** Tax lot lines outside the park are represented with a light red line.
- **Sidewalk/concrete:** Appear as solid, darker grey areas, with a light blue line marking the curb.

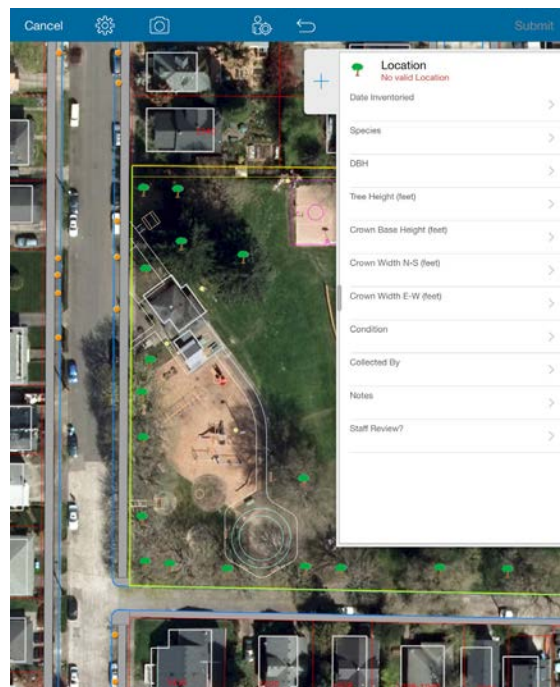


Sections will be clearly outlined and labeled on your device.

Which Trees to Inventory

Collect data on all trees in your section, however some Parks trees are excluded from this inventory. DO NOT inventory:

- **Trees in stands that resemble natural areas.** Some areas of parks are maintained as natural areas, allowing trees and understory plants to grow and reproduce as they would in a forest. Stick to developed areas of the park (where the grass is mowed, or in planting beds).
- **Shrubs and hedges**, typically with multiple stems and a mature height less than 15 feet. Examples include rhododendron, photinia, camellia, and arborvitae.
- **“Volunteer” trees less than 6 feet tall** (i.e. trees not intentionally planted).
- **Trees outside of your section.** These trees are assigned to another team or are outside the inventory area.



The map on Collector will have reference data to help you place your trees.

See the cheatsheets at the end of this manual (*page 30*) for help in determining whether to inventory a tree. If you are unable to decide, call over an Inventory staff member and they will help.

Recording Tree Data in Collector

The data for each tree you collect will correspond to a point in Collector. To create a new point, tap the “Collect a New Feature” (+) icon on the upper right side of the screen and select Park Tree Inventory. You will be prompted to create a new record in the attributes tab. This tab has a number of fields for entering information about the tree you’re collecting.

For each tree you will record the following information:

- **Species:** Select the species of the tree you are inventorying. Dead trees are coded as “unknown”. If you are unsure of the species leave this field blank and check the box for “Staff Review.” If you are unsure of the species but certain of genus, select the genus and check the box for “Staff Review.”
- **DBH:** Record the diameter at breast height (4.5 ft. above ground) in inches to one decimal point (e.g., 12.4). If the tree has more than one main stem refer to the section on how to measure DBH on **page 15**.
- **Tree Height:** Record tree height (in feet). Always have 2 team members take a measurement, and use the average of the two height measurements. If needed, take a measurement from two different angles.

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- **Crown Base Height:** Record height to the base of live crown (in feet). For dead trees, leave blank.
- **Crown Width N-S:** Record the width of live crown, North to South (in feet). For dead trees, leave blank.
- **Crown Width E-W:** Record the width of live crown, East to West (in feet). For dead trees, leave blank.
- **Condition:** Record the tree's condition as Good, Fair, Poor, or Dead. See **page 23** for tips on condition ratings.
- **Collected By:** Select "Volunteer."
- **Notes:** Only use this field to explain blank fields, why staff review is needed, or for tree ID questions.
- **Need Staff Review?** Check "Yes" if you are unsure of species ID, unable to take a measurement, or need staff to check the tree for any reason. Always add a note when checking this field.

Recording Tree Locations

When all fields are filled, record the specific location of the tree as a point on the map. Tap anywhere on the map screen to place a point. Use all clues at your disposal to place the point in the correct location, including aerial photos, physical landmarks, and street tree data.

Tap "Submit" when finished. Once you tap "Submit", you will see the point you just created appear on the map as a tree icon.

Resources on your tablet

In addition to the Collector app, where you will be entering tree data, the tablets in your hands include additional tools to help you. While in the field, double click the home button of your tablet to navigate out of Collector and access the tools below.

- **iFormula multi-stem DBH calculator:** Follow instructions on page 17 for calculating multi-stem trees.
- **Genus cheat sheets:** Your tablet comes loaded with all the genus cheatsheets, as well as this entire manual. Ask an Inventory staff member how to quickly access these materials.

Tips and Tricks for Using Collector

- **Filtering Species:** When you tap on the "Species" field, it will bring up a list of species in alphabetical order by genus. Use the search bar at the top of the screen to avoid scrolling through the list. You can search by typing out the scientific name or common name.

- **Placing a point:** For greater precision when placing a point, you can press and hold until a magnified view comes up. Drag the point into position and let go to place the tree. Use the 10' grid to help you measure the distance between trees.
- **Editing or deleting a point:** Tap a point to bring up its attributes. You can use the menu icon next to the species info to delete the point, or use “Edit” to modify attributes or alter the placement of the point.
- **Using aerial photos:** Aerial photos can be a useful tool to determine where to place a point, especially when there are no other features nearby. Tap the “Layers” icon to turn aerial photos on and off. You will see two types of aerial photos – “Summer 2017” and “2012 (Leaf-off)”. “Leaf-off” shows an aerial view from winter, and may be useful to pick out evergreen trees from among deciduous trees. Note that these photos are a snapshot in time, and some trees on the photo may no longer be standing in the park.
- **Editing data:** After a point is submitted, you can edit its attributes or location by tapping the point (now a tree icon) and then tapping the arrow on the top-right of the “Details” window. Use this function carefully, and make sure you are not editing another group’s point.

Quality Control

One of the most important roles of a Team Leader is to ensure that the data turned in at the end of the work day is correct and accurate. *Please ask UF staff for help or if you have questions.* Here are tips for ensuring quality data collection:

- Data should be entered into Collector by trained Team Leaders *only*.
- If you are unsure about the ID of a tree, call the arborist or take a sample and check “Staff Review” in Collector. Make sure to label the sample bag with park name, section number, and sample number. Add a note in Collector with the sample number. For example: “*Section 3, Sample 1*”
- Check in with Data Collectors and make sure they are using their tools correctly. It is easy to read the wrong side of DBH tape, or from the wrong scale in a clinometer. Don’t worry about hurting feelings by asking questions—we’re all here to collect good data!
- Always have a second person take each height measurement. If the top of the tree is difficult to see, measure from different angles.
- At the end of the day, double check that all fields have been entered for all data points by tapping each point in Collector and viewing details.



Team Leaders ensure that the data we collect is accurate and useful for managing the urban forest.

Measuring Tree Size

Tree size is measured using diameter at breast height (DBH), tree height, crown base height, and crown width. These measurements give an estimate of how large the tree and its canopy are. Team leaders are responsible for assigning measurement roles to novice data collectors. Suggested roles are:

- Data entry (holds tablet) – Team Leaders only
- Height measurer (holds clinometer)
- Distance measurer (holds measuring wheel and diameter tape)

Diameter at Breast Height

Tree size is measured using diameter at breast height (DBH), which is the diameter of the tree at 4.5 feet above ground. Diameter, the distance across the trunk, is measured indirectly by measuring circumference with a specially calibrated tape.

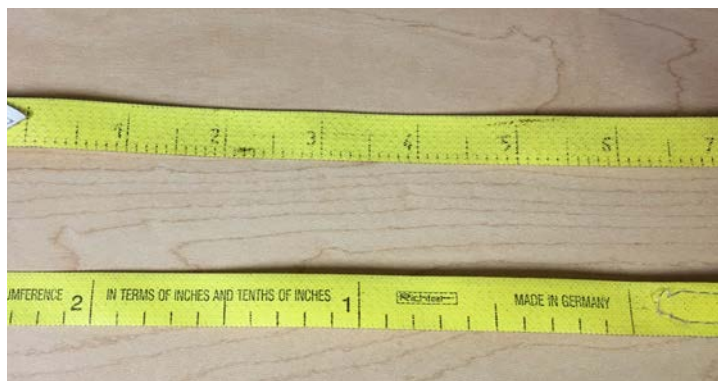


Professional diameter tape

Using a Diameter Tape

During work days, volunteers will use a professional diameter tape. These large diameter tapes have a claw hook that attaches to the tree.

Diameter tapes have two sides—one side calibrated for measuring tree diameter, and the other side for measuring distance. Always keep in mind which side of the tape you are using, and make sure that the tape is not twisted.

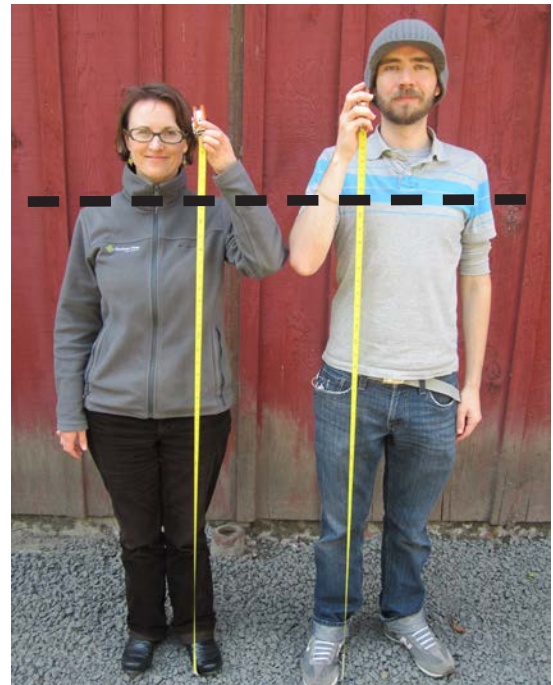


Distance measuring side, back of tape, (top) and diameter measuring side, front of tape, (bottom).

Measure DBH using the following steps:

1. Locate “breast height” (4.5’) on your body.

This will save you a lot of time in the field trying to measure 4.5 feet from the ground. Urban Foresters come in all shapes and sizes, and DBH will vary from person to person.



2. **Examine the tree and identify where you will measure DBH.** If the tree has a single stem and a gradually tapering trunk, measure at 4.5’. Unfortunately, not all trees grow in such a straightforward manner. A guide on other common scenarios follows this section.



3. **Attach the claw end of the tape to the tree, then stretch the tape around the trunk at breast height.** Ensure the tape does not twist and that you are using the diameter side of the tape for measuring.



4. **Read diameter from the mark that overlaps with zero on the tape.** Measurements are taken in decimal inches. Again, ensure that you are using the correct side of the tape and that it is not twisted. The diameter of this tree is 21.2 inches.



A common mistake is using the wrong side of the tape. Remember, one side measures distance, just like any other tape. Don't use that side! Use the other side, which reads diameter when the tape is wrapped around the trunk.

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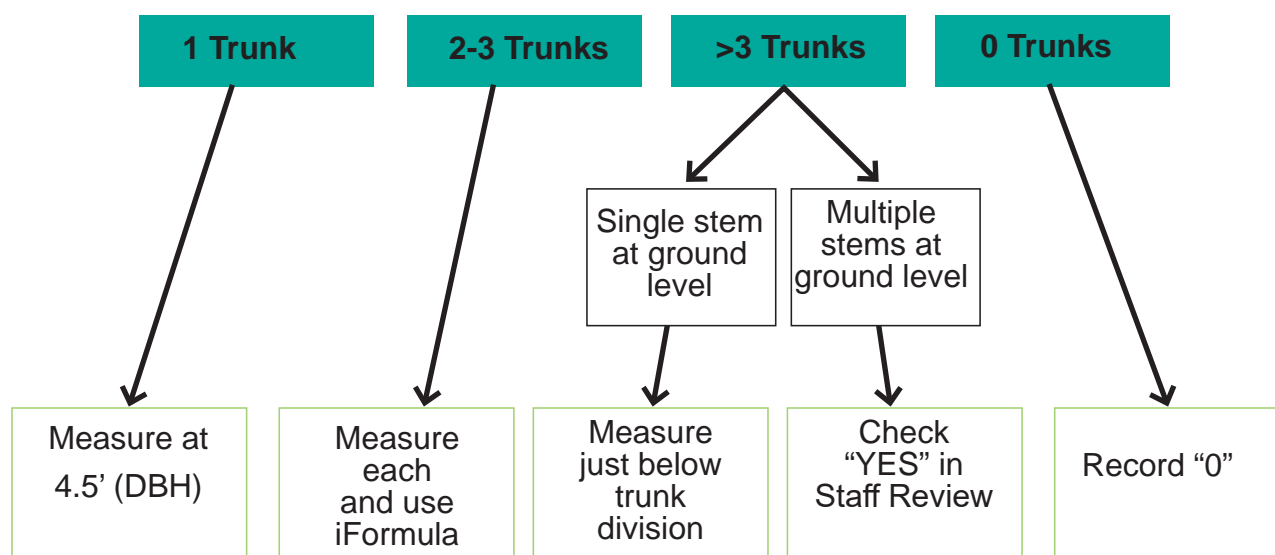
Measuring Stumps

This season we will be inventorying stumps in parks. A stump is a tree that has been cut down to less than 3' high. Create and place a point in Collector as usual.

What to enter in Collector:

- Species = Stump
- DBH = Diameter of stump. Use the inches (opposite) side of the DBH tape to measure across the stump.

Troubleshooting Where to Measure DBH



Tree is shorter than 4.5 ft.

Record "0" in the DBH field.

Remember: This will be very rare in developed parks. For a self-sown tree to be inventoried as part of this project, it must be at least 6 feet tall.



1 trunk at 4.5 ft.

Measure and record DBH to the closest tenth of an inch in the DBH field. If there is an anomaly or trunk divergence at 4.5 ft., measure below the anomaly or trunk divergence.



2 or 3 trunks at 4.5 ft.

- Double click the home button on the tablet
- Open iFormula app to calculate multistem DBH
- Measure and record the DBH for each trunk in the “stem 1,” “stem 2,” and “stem 3” fields. If there are only 2 stems, enter “0” for “stem 3”
- Record calculated DBH in the DBH field



Section 2: Inventory Protocol

More than 3 trunks at 4.5 ft. but has a single trunk at ground level

Measure tree diameter just below trunk divergence and record measurement in DBH field.



More than 3 trunks at 4.5 ft. at ground level

Large multi-stem shrubs are common in parks, so before you collect any information confirm with Inventory staff whether or not this is a tree.



Measuring Crown Width

Crown width is a measurement of the spread of living canopy in two directions: north-south and east-west. Crown width is measured with a measuring wheel.

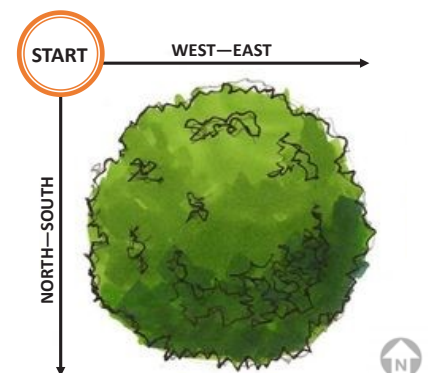
Using a measuring wheel

1. Holding the handle, place the wheel where you plan to start measuring
2. Push the reset button.
3. Walk in a straight line at a steady pace. To ensure you walk straight, set your eye on a distant landmark, or have a team mate stand in the distance and walk towards them looking ahead, not at the ground or measuring wheel.
4. When you reach the ending point, take your reading from the counter. Measurements are rounded to the nearest foot and are NOT in decimal feet.



To measure crown width with a measuring wheel:

1. Choose a starting point at the corner created by the widest N/S and E/W points. Look across in each direction to confirm that you are standing at the widest points of the canopy.
2. Have a team mate stand at the other edge of the tree canopy.
3. Roll the measuring wheel in a straight line north or south from your starting point to where your partner is standing.
4. Record measurement in the “Crown Width N-S” field.
5. Repeat this measurement in the east-west direction and record in “Crown Width E-W” field.



Use your best judgement when choosing a starting point and avoid physical obstructions or safety hazards. If the tree is situated on a steep slope, leave this field blank and check “Staff Review.” Walking a steep slope with a measuring wheel will not give an accurate measurement.

Section 2: Inventory Protocol

Measuring Tree Height

Tree height is measured using a clinometer, a tool that measures angles of slope. Height can be calculated from these angles when the observer is standing a known distance from the tree. Professional foresters use the standard distance of one “chain length” (66 feet).

Using the measuring wheel, start at the trunk of the tree and walk 66 feet away from the tree in a straight line.

If 66 feet away is not an option or you can’t see the top of the tree, you may walk 132 feet away. In this case you will need to multiply your final tree height by 2.

Using a clinometer

1. Face tree. Pinch the brass ring between your thumb and forefinger and raise the clinometer to your eye.
2. Look through the glass meter. The glass meter contains a dial with two rows of measurements, a left-hand scale and a right-hand scale. The left-hand scale is a measure of angle, and the right-hand scale is the calculated height in feet.
3. Look through the level clinometer until you see the scale reads “0” on both sides.
4. Keep both eyes open, which should create an optical illusion where you see both the level of the clinometer and the tree.
5. Point the clinometer at the top of the tree (or tallest point of living crown). Record the number from the *right-hand scale* that corresponds with your line of sight at the top of the tree.
6. Without moving your head, tilt the clinometer down to the base of the tree.
7. Record the number from the *right-hand scale* that corresponds with your line of sight at the bottom of the tree.
8. Ignoring the negative sign, add the numbers together.



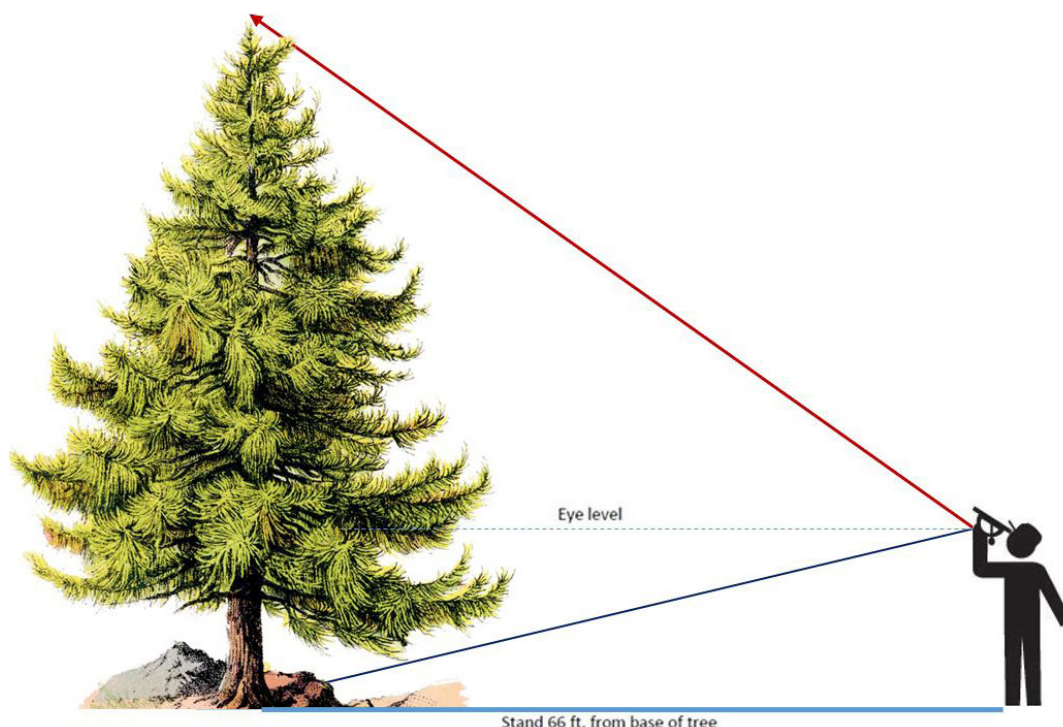
A clinometer is used for measuring tree height



Keep both eyes open when using the clinometer; to see both the instrument scale and the tree.

Tips for measuring tree height

- Take two measurements, from different sides of the tree if needed. Average these two measurements for your final height measurement. If your measurements differ greatly, take a third measurement.
- When choosing a direction to walk your 66 feet, walk in the direction of the sun, if possible. This way, the sun will be at your back as you look at the tree through the clinometer.
- If you feel the tree is leaning, leave this field blank and check “Staff Review.” For severely leaning trees, height is considered the distance along the main stem from the base to top of the tree. Measuring height with a clinometer may not give an accurate reading in these cases.
- If the tree is growing on a steep slope walking the slope with a measuring wheel will not give you an accurate reading of distance. Try to find a measuring point that is level to the base of the tree. If at 66 feet away the ground is more than 10 feet lower or higher than the base of tree, leave this field blank and check “Staff Review.”
- In dense groves it may be helpful to have a data collector stay near the base of the tree to help remind you which tree you are measuring.

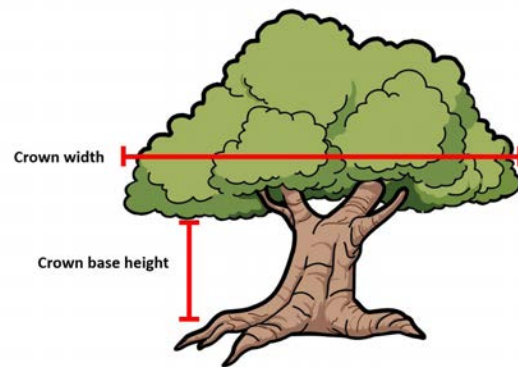


Measuring Crown Base Height

Crown base height is the height of the lowest living foliage in the tree crown (excludes suckers growing from the ground or main stem). Crown base height is measured as the point on the main trunk perpendicular to the lowest height of the crown. Measuring crown base height as a point on the trunk corrects for variables such as slope – a tree growing on a hill will have different distances between the crown and the ground depending on which side of the tree you measure from.

After measuring tree height, take a crown base height measurement from the same location (66 feet from the base of the tree).

1. Determine where the lowest living foliage is.
2. If this point is low enough, measure using your body. (*Tip: use the measuring tape to figure out your reach prior beginning your inventory. Measuring this way will be more accurate than using the clinometer*)
3. If you are unable to measure the crown base height directly, then picture a line running straight from the lowest foliage across the tree trunk. Make note of this point on the trunk.
4. Use a clinometer to measure the height of this point.



Tips for measuring crown base height

- The measuring wheel is 2.5' long. By holding it above your head you can quickly estimate the crown base height by adding 2.5' to your height.



Condition Rating

Tree condition is a general assessment of the well-being of the tree. Examine the tree from top to bottom, and circle the tree completely for a full visual assessment.

Tree condition is impacted by health problems, damage, and past pruning. After examining the tree, characterize the tree as either good, fair, poor, or dead.

Look for the following signs and symptoms of health problems or damage on each tree:

- **Wounds** are an opening or series of openings where bark has been removed or the inner wood has been exposed and no signs of advanced decay are present. Includes recent damage by mowers or pruning.
- **Decay** is degraded wood that has lost its structural strength. It is often soft and moist.
- **Conks** are the perennial fruiting body of wood-rooting fungi.
- **Cavities** are holes in the tree body. Cavities are signs of decay.
- **Dead branches** may be small or significant, and may indicate crown dieback.
- **Root heaving** is when roots are broken or pulled out of the ground by a leaning tree.
- **Cankers** are sunken, dead, or diseased wood on a branch or trunk.
- **Gummosis** is sap or liquid exuded from cracks at branch junctions.
- **Small and discolored foliage** is determined by comparing to a healthy tree of the same species.



Cavities



Conks



*Crown dieback
in a topped tree*



Canker

Section 2: Inventory Protocol

Depending on findings and severity of issues, place the tree into one of these categories:

Good: Tree is an excellent representative for its species. Roots are sound, trunk is solid with no bark damage, and crown is full with no significant structural problems. No wounds, decay, conks, cavities, root heaving or other symptoms.

Fair: Tree is in average condition. Tree may need some structural pruning and have some dead branches. Wounds are minimal and there is no major decay. Other signs and symptoms are minimal.

Poor: Tree is in a **general state of decline** as indicated by the presence of cavities, decay, conks, root heaving, or significant dead crown areas.

Dead: Tree is dead and stands over 3' high.



Good (*Metasequoia glyptostroboides*)



Fair (*Populus balsamifera trichocarpa*)



Poor (*Betula pendula*)



Dead

Need help or have questions during the inventory?

Help is available! Phone numbers are on the back of your clipboard.

Tree identification or tree condition questions:

1. Call the Arborist-on-Call for immediate assistance or flag down any UF staff.
2. If no one is available, leave the species field blank. Take a sample from the tree and label the sample bag with park name, section number, and sample number. Make a note in Collector with the section and sample number. For example: “Section 3, Sample 1.” Collect enough leaves to determine whether leaf arrangement is opposite or alternate, and an example of the fruit or flowers if possible. Return sample bags to Inventory staff at the end of the workday.

What if there is no code for my species on the list?

Every year, we find new tree species and add them to our list. If you have identified a tree, but can't find that species on the list, leave the species field blank and write the species in the notes section of Collector.

Inventory protocol, maps, or equipment problems:

Call Inventory staff - their number is on the back of the clipboard.



UF Staff are here to help troubleshoot inventory protocol, equipment issues and tree identification. Just wave us down!



Call the Arborist-on-Call! Our volunteer arborists are excited to help and troubleshoot with you on tree identification.

Notes

Section 3: Learning to Identify Portland's Trees



Tree Names

Tree names can be confusing because there are often many names for the same tree. Common names are written in English (or in German if you're in Germany, or in French if you're in France) but scientific names are always written in Latin, and typically *italicized* so they can be understood anywhere in the world.

Scientific names are also useful because they give you a clue about how different species are related to each other. A scientific name has two parts. The first part is the genus, *Acer*, and the second is the species, *platanoides* (the scientific name of Norway maple). Therefore if you encounter another *Acer*, for example *Acer rubrum* (or red maple), you know that these two plants are closely related and likely share some similar characteristics.

While most people are much more familiar with common names for trees (e.g. birch or oak) than their Latin counterparts, common names can be misleading. While different types of trees may have similar common names, no two types of trees will have the same scientific name. One of the most well-known native trees to Portland is a good example. Many people know the western redcedar (*Thuja plicata*) simply as a “cedar” tree, however true cedars (genus *Cedrus*) are native from North Africa to India and are only distantly related. Both western redcedars and true cedars are quite common in Portland, so using scientific names eliminates confusion. However, during data collection either common names or scientific names may be used to search the drop down menu in Collector.

A primary goal of the Tree Inventory Project is to identify trees accurately. In most cases this means identifying the tree to the genus and to the correct species.

When Do I Identify Only To Genus?

Trees are identified to both genus and species except for the following cases:

- Volunteer Arborist-on-call and Urban Forestry staff members determine additional research/resources are needed to determine species, and samples are collected for further investigation (see page 25 - protocol for collection and labeling).
- A species is collected that can be correctly identified, but not included in the drop-down list.
- A number of species are very difficult to tell apart with the tools we have. In these case we don't require identification to species. These are:
 - » *Larix* (Larch)
 - » *Magnolia*

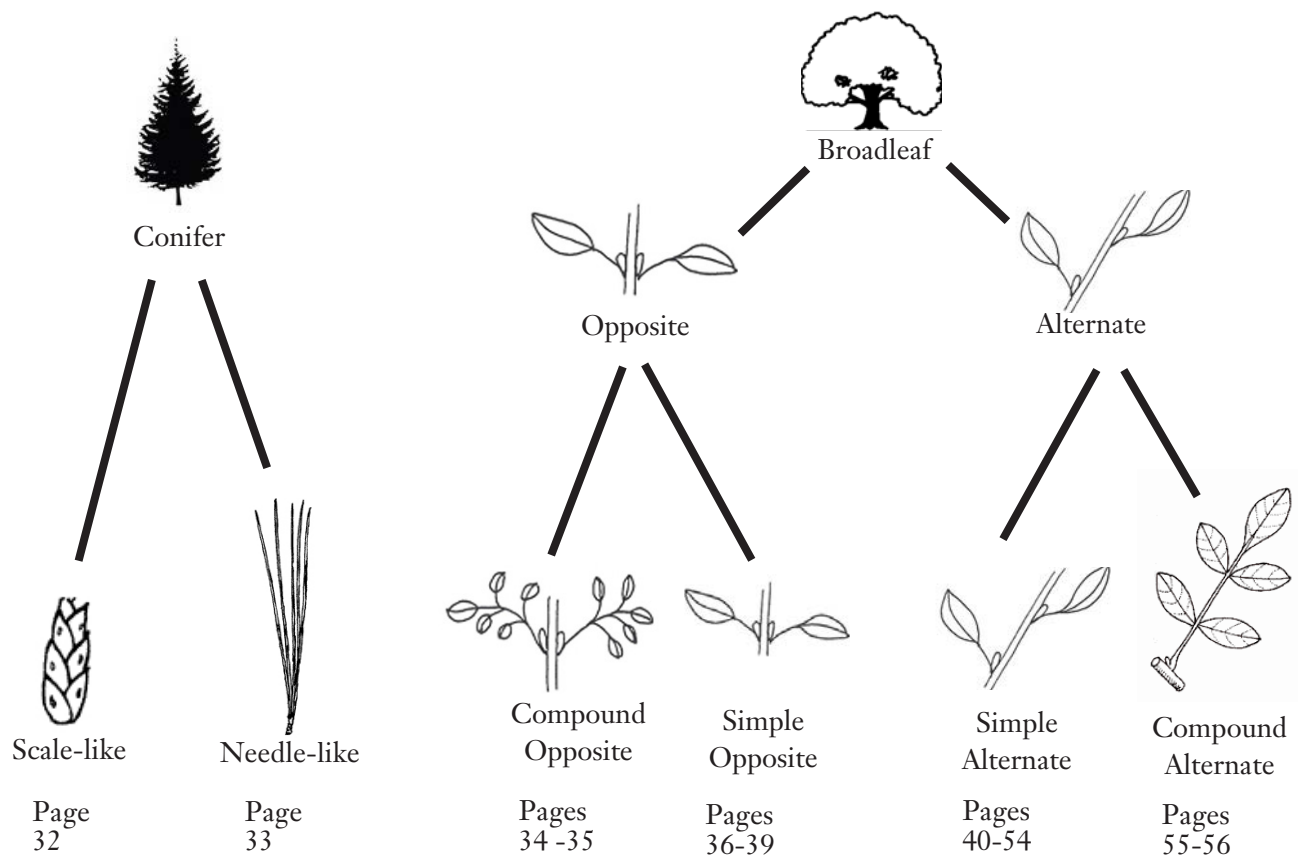
How to Identify a Tree Using a Key

Identifying trees is a lot like identifying people. You can easily recognize a close friend even if you only catch a glimpse. However, if you meet a room full of strangers, you need to concentrate on individual characteristics before you can tell them apart.

It is the same with trees. When you know a tree well, you will be able to name it whether you see its leaves, its fruit, its flowers, or even its silhouette.

Tree identification keys can help us learn to identify trees by narrowing down the possibilities. Each step along the key uses a characteristic such as leaf arrangement to split all possible tree types into smaller groups until we are left with a small number of possible tree types.

The key in this manual does not include all possible tree species you will come across during the inventory. We have only included our best estimate of most common trees in Portland's parks. Make sure to check the description in one of the guides at the workday to confirm your identification. If the description does not match, you may have just found a new tree species!



Species Cheatsheets

By Genus

Abies spp., True firs (*C)..... 31

Acer spp., Maple (*B) 34

Betula spp., Birch (B) 38

Carpinus spp., Hornbeam (B)..... 41

Cedrus spp., True cedars (C) 43

Cornus spp., Dogwood (B) 45

Crataegus spp., Hawthorn (B) 48

Fraxinus spp., Ash (B)..... 51

Picea spp., Spruce (C)..... 54

Pinus spp., Pine (C) 57

Platanus spp., Planes and Sycamores (B) 62

Prunus spp., Cherries, Plums, and Laurels (B) 63

Quercus spp., Oak (B) 66

Tilia spp., Lindens (B) 69

*C= Conifer B= Broadleaf

By Characteristics

Alternate, Simple Leaves 72

Alternate, Compound Leaves 74

Deciduous Conifers..... 75

Evergreen Conifers 77

False Cedars..... 78

Opposite, Simple Leaves 80

Tree or Not-A-Tree..... 81



Abies - True Firs

Characteristics

Fruit: Barrel-shaped cones that sit vertically on branches. Cones mature in top third of trees and disintegrate when mature. Cones may vary in color.



Leaves: Needles are blunt at tips and not as sharp as spruces ("friendly firs"). Needles and twigs are fragrant when crushed. Leaf scars on twigs are flat to branch and look like round suction cups.



Bark: Fir bark is usually thin and smooth and can furrow with age. It lacks the deep grooves of Douglas-firs and the plates of spruce bark. Sometimes resin blisters are present.



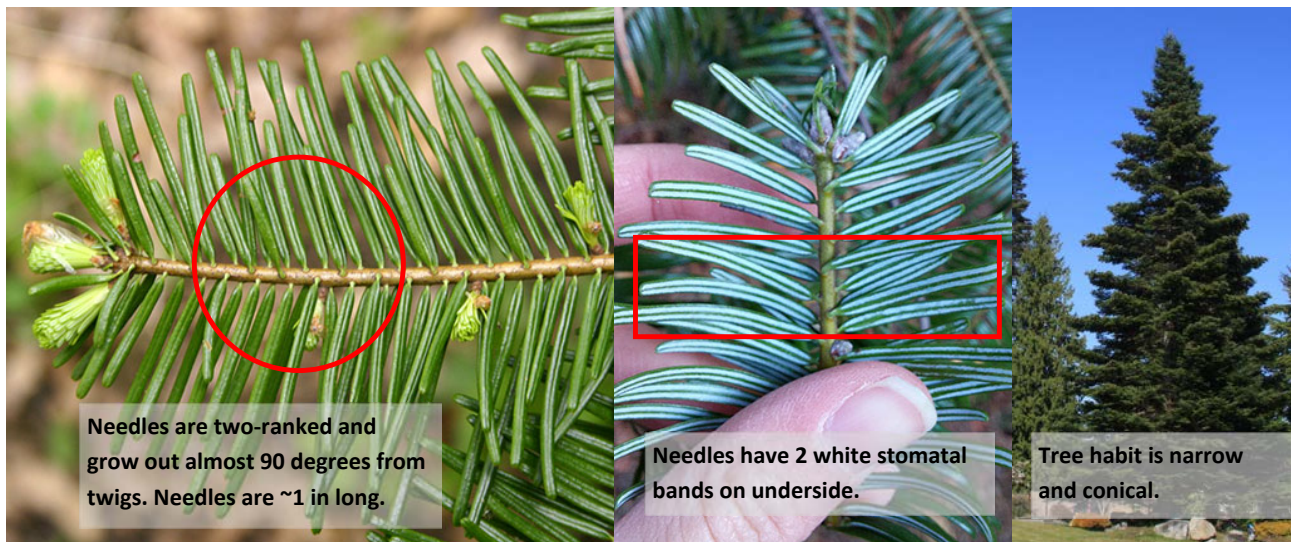
Form: True firs are typically large-form trees. Although small and dwarf cultivars exist, straight species seen in Portland tend to mature to around 100 ft. Firs are usually conical. Crown shape can vary by species.



Section 3: Learning to Identify Portland's Trees

Commonly Found Species

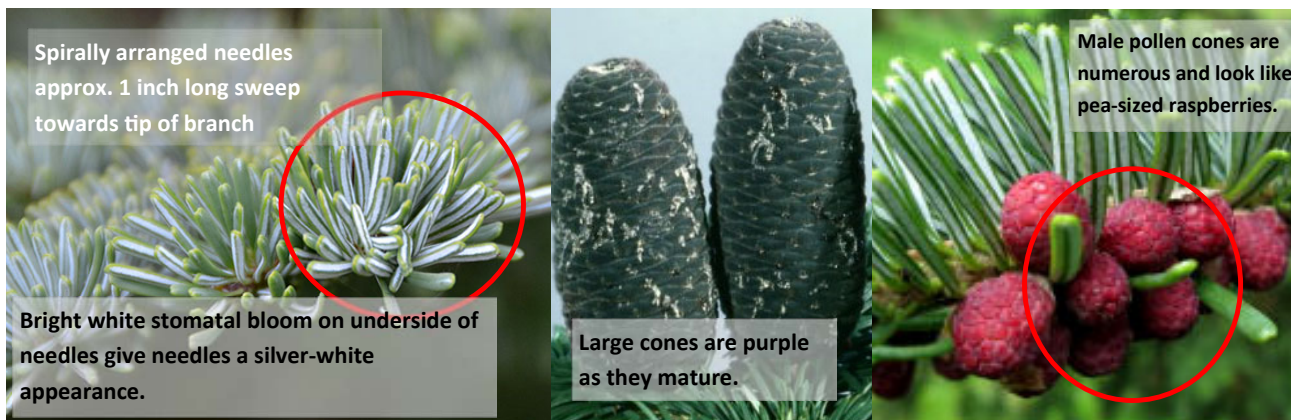
Abies grandis—Grand fir



Abies procera—Noble fir



Abies amabilis—Pacific silver fir



***Abies concolor*—White fir**



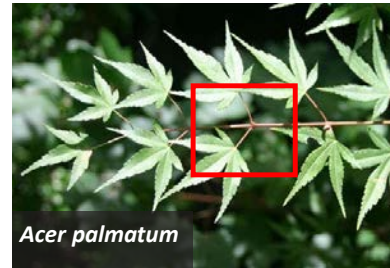
Many firs can look similar and there is a lot of variability between trees. This guide highlights species we know are in parks; however there are many species of true firs and we could find species not listed in this manual. Cones disintegrate on trees and are not always visible. If you are unsure, take a sample! If Urban Forestry staff is stumped, we'll send it to the experts at Hoyt Arboretum.

Section 3: Learning to Identify Portland's Trees

Acer - Maples

Characteristics

Arrangement: Most maples have opposite branch and leaf arrangement. Look for branches and leaves that originate from opposite points of the same branch. Look at different places on the tree. If branches or leaves have been lost, opposite arrangement may be hard to see at first.



Fruit: All maples have seeds called samaras that grow in pairs of two. Size of samaras, time of year that they mature, and the angle at which they grow can help you identify the tree to species.



Leaves: Most maples have lobed leaves that are palmately symmetrical. Margins, leaf size, lobe shape, number of lobes, and leaf color can vary widely across species. Leaves can be simple (sugar maple, Norway maple) or compound (paperbark maple, box-elder). Leaves can be a variety of colors depending on species and cultivar.

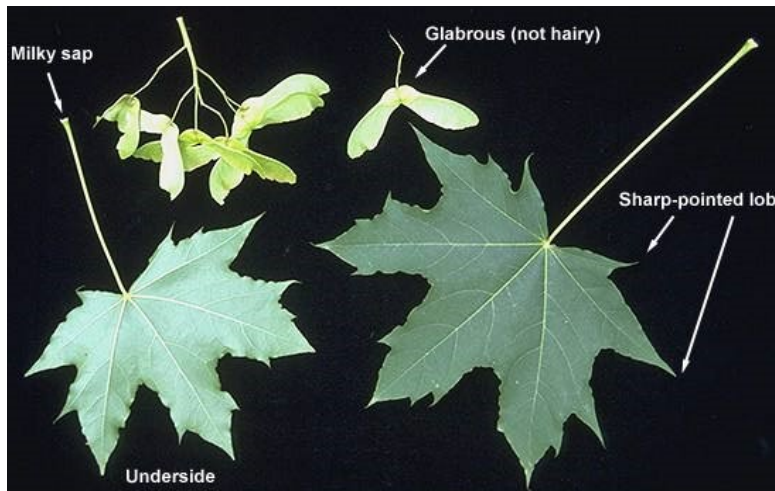


Form: Form varies widely across the *Acer* genus. Size at maturity and form can be very important species identifiers. Large maples (*A. saccharinum*, silver maple and *A. macrophyllum*, bigleaf maple) can mature to 100 ft tall. Norway maple (*A. platanoides*) matures to ~60 ft, and vine maple (*A. circinatum*) is a small tree. Many red maple cultivars are narrow with upright branching.



Commonly Found Species

Acer platanoides—Norway maple

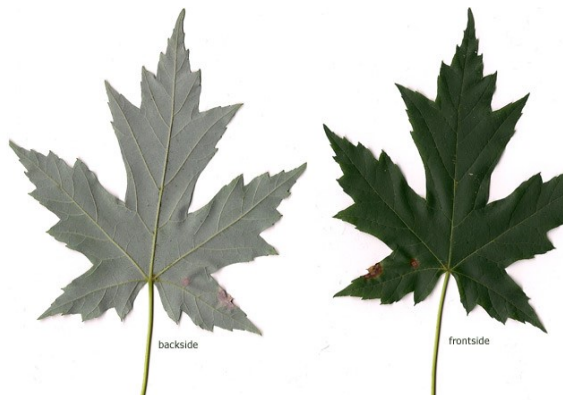


Lobes of leaves are sharply pointed. Samaras are shaped like a handlebar mustache. Petiole oozes milky sap when broken.



Form is round and tree is often as wide as it is tall. Mature trees can reach 80 ft.

Acer saccharinum—Silver maple



Leaves have lacy, deeply cut lobes.

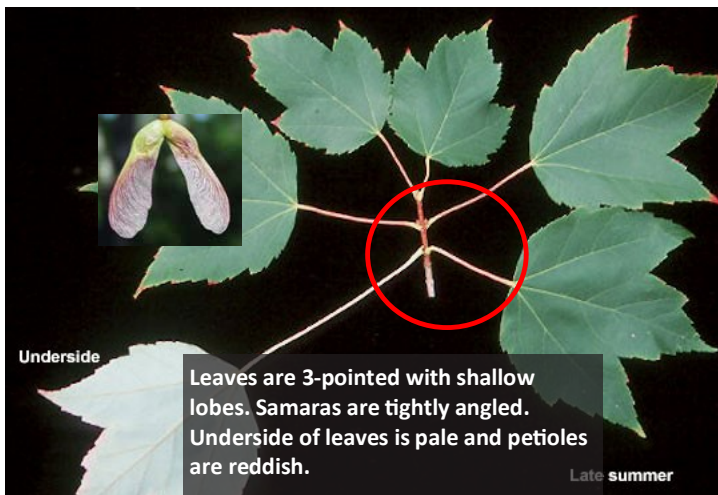


Samaras have a tight angle and mature in late spring.



Bark is grey and shaggy. Specimens in Portland tend to be old and large, with significant DBH and height.

Acer rubrum—Red maple



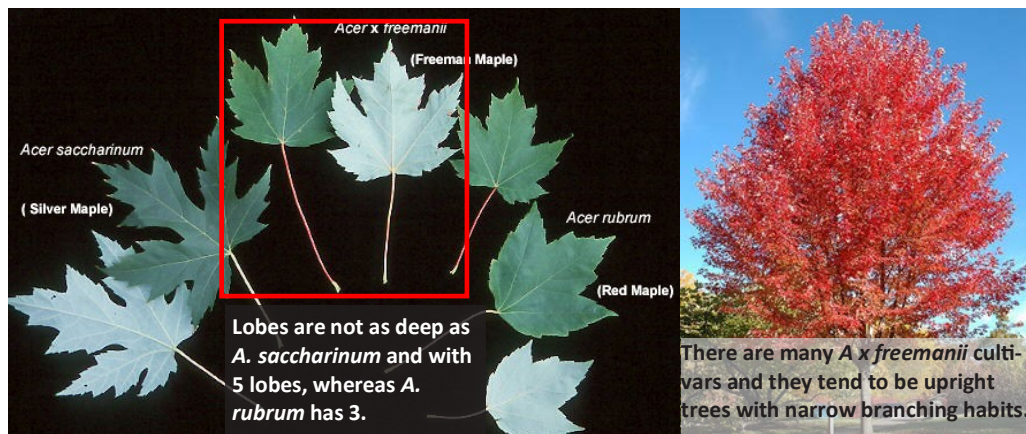
Leaves are 3-pointed with shallow lobes. Samaras are tightly angled. Underside of leaves is pale and petioles are reddish.



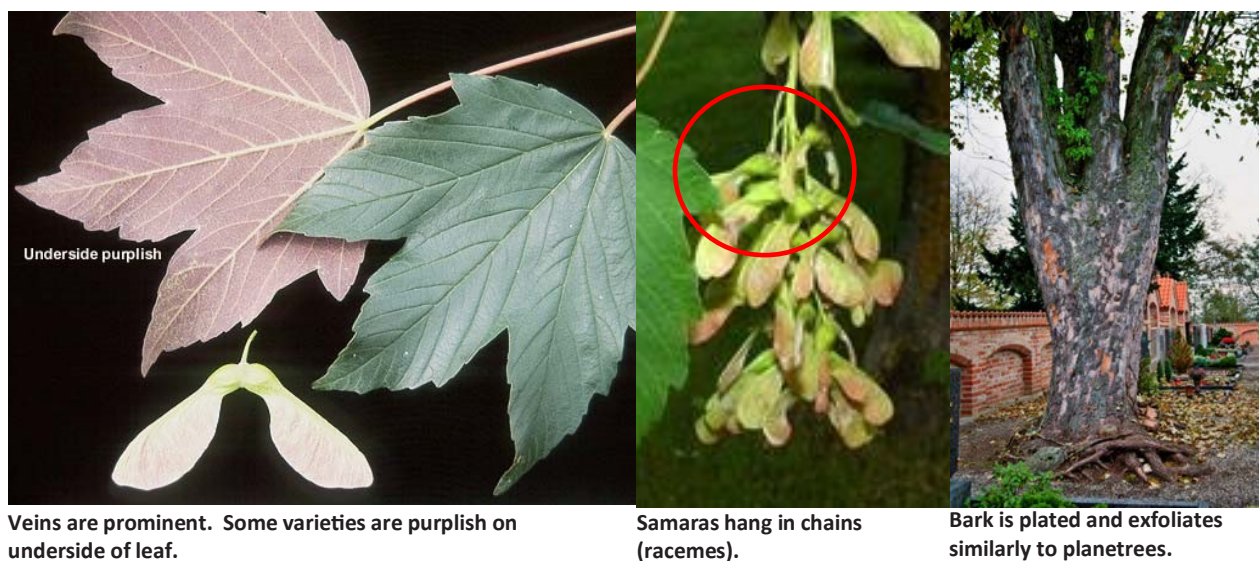
Bark is grey and smooth, furrowing with age. Form is round with branches that angle up and a round crown.

Section 3: Learning to Identify Portland's Trees

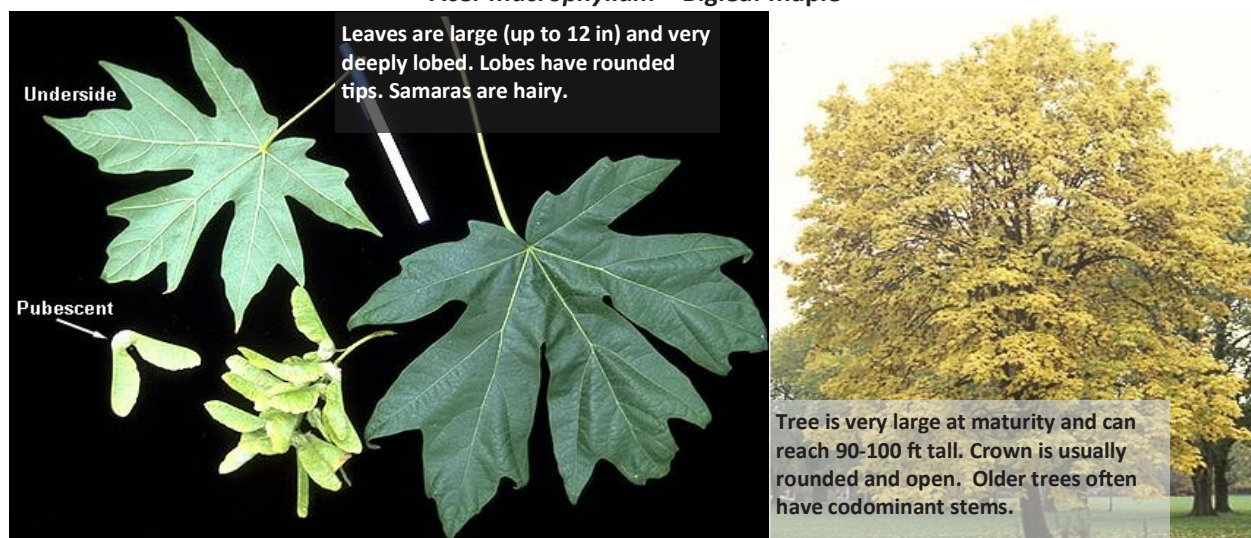
Acer x freemanii—Red-Silver hybrid



Acer pseudoplatanus—Sycamore maple



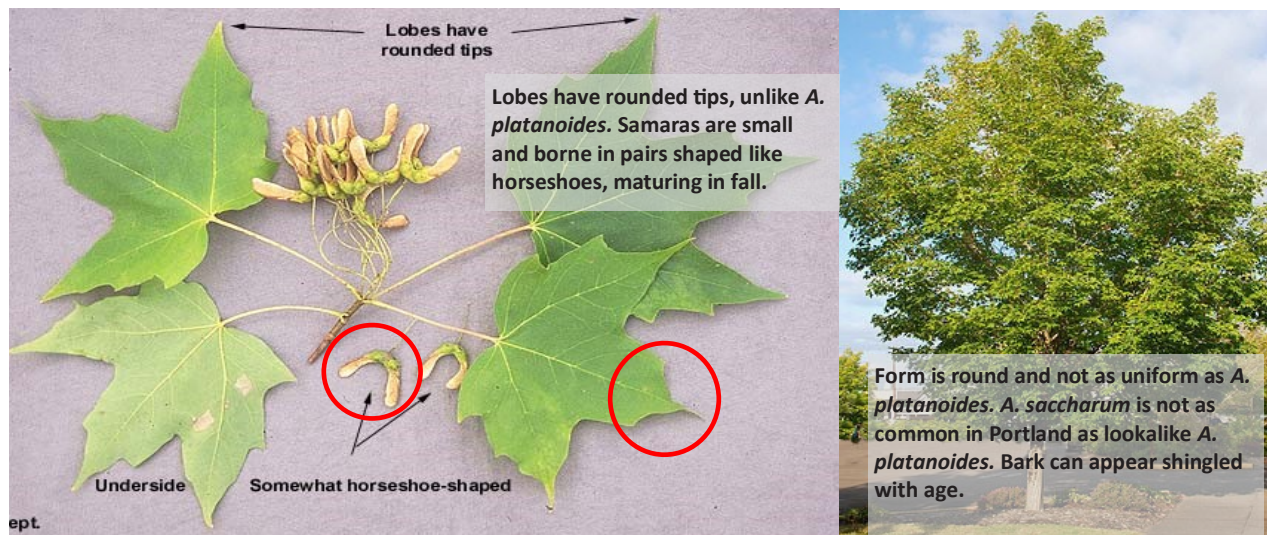
Acer macrophyllum—Bigleaf maple



Acer campestre—Hedge maple



Acer saccharum—Sugar maple



Acer circinatum—Vine maple



Section 3: Learning to Identify Portland's Trees

Betula - Birch

Characteristics

Bark: Birches typically have visible lenticels and pale bark. Lenticels are a horizontal raised line of pores where gas exchange takes place. Bark coloration, furrowing, and exfoliation are all clues to species ID.



Betula papyrifera



Betula nigra

Leaves: Birches have simple alternate leaves with serrated leaf margins and cordate (heart-shaped) leaves. Some cultivars of European birch have "cut leaves", which are finely lobed. Shape of leaf base and leaf size are important species indicators.



Betula papyrifera



Betula pendula

Fruit: Birch trees bear their seeds on a cone that is about an inch long. Cones disintegrate at maturity and winged seeds disperse. If cones are present, look for pubescence (hairs) on scales to determine species ID. Cones appear in late summer, after flowering. Flowers are nondescript catkins.



Betula alleghaniensis



Betula papyrifera

Form: Birch trees are medium-sized trees, maturing to a maximum of about 60 feet (depending on species). Many species can be multistemmed. Form is usually pyramidal. Branches can be pendulous.



Betula nigra

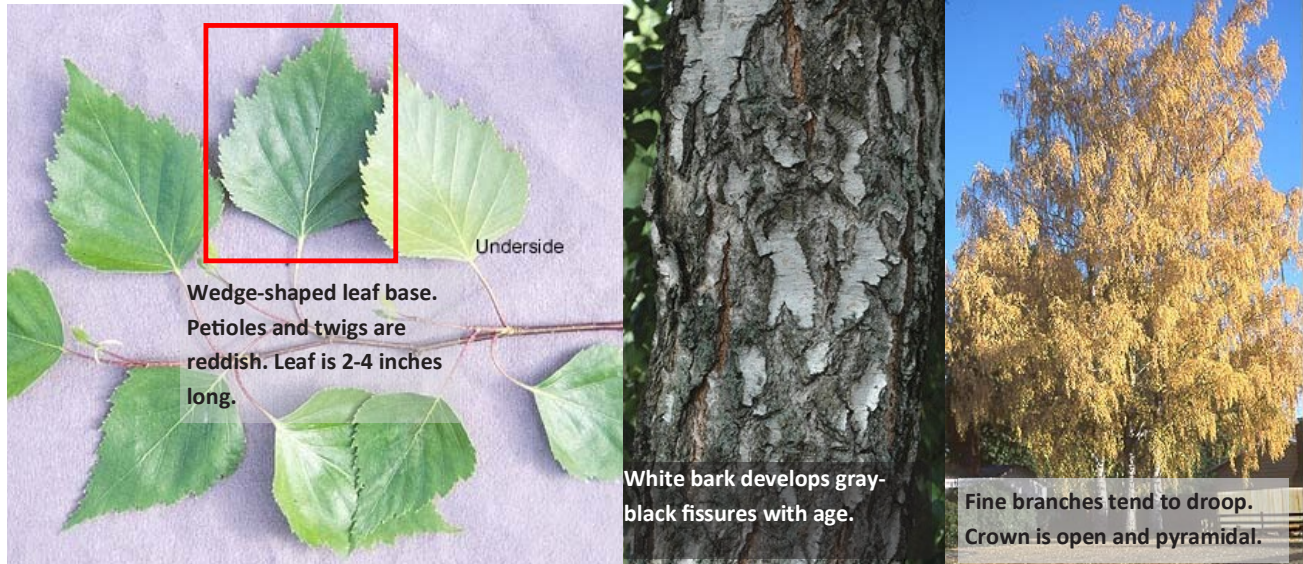


Betula papyrifera



Commonly Found Species

Betula pendula—European weeping birch



Betula nigra—River birch

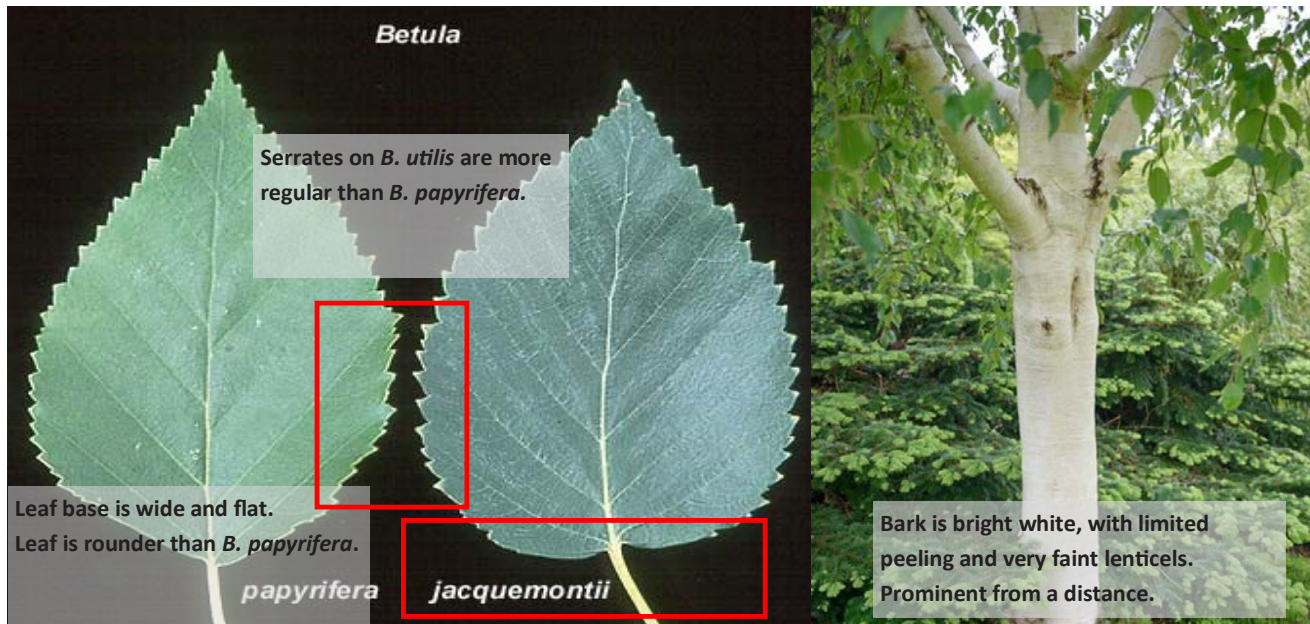


Betula papyrifera—Paperbark birch



Section 3: Learning to Identify Portland's Trees

Betula utilis var. *jacquemontii*—Himalayan white birch



Birch trees look very similar across species. There are many cultivars in the nursery trade and many variations from tree to tree. Key identifying features are small and may not be immediately apparent on every tree. If you are unsure of the species, please take a sample! If Urban Forestry staff doesn't know, we'll send it to the experts at Hoyt Arboretum.

Carpinus- Hornbeam

Characteristics

Leaves: Hornbeams have simple, alternate leaves with doubly-serrate margins. Doubly serrate means each serration along the leaf margin has its own teeth. Leaves tend to be small (1-3 inches long).



Fruit: Seeds are borne as a cluster of nutlets with winged bracts. Fruit matures in late summer. Angle at which bracts are held to fruit and presence of teeth on bracts are important species identifiers.



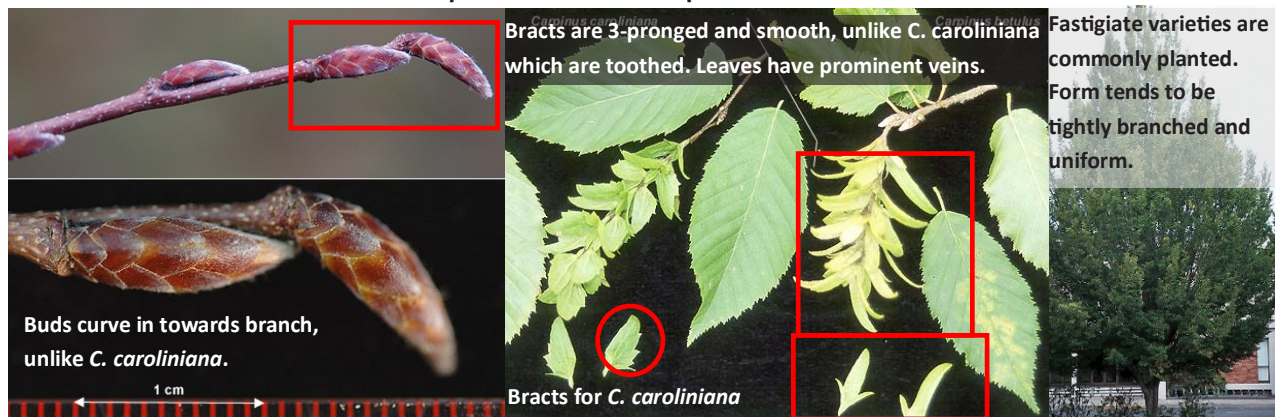
Form: Hornbeams are small to medium trees with round, irregular canopies. Some species are planted as fastigate (upright) varieties. Can be multistemmed.



Section 3: Learning to Identify Portland's Trees

Commonly Found Species

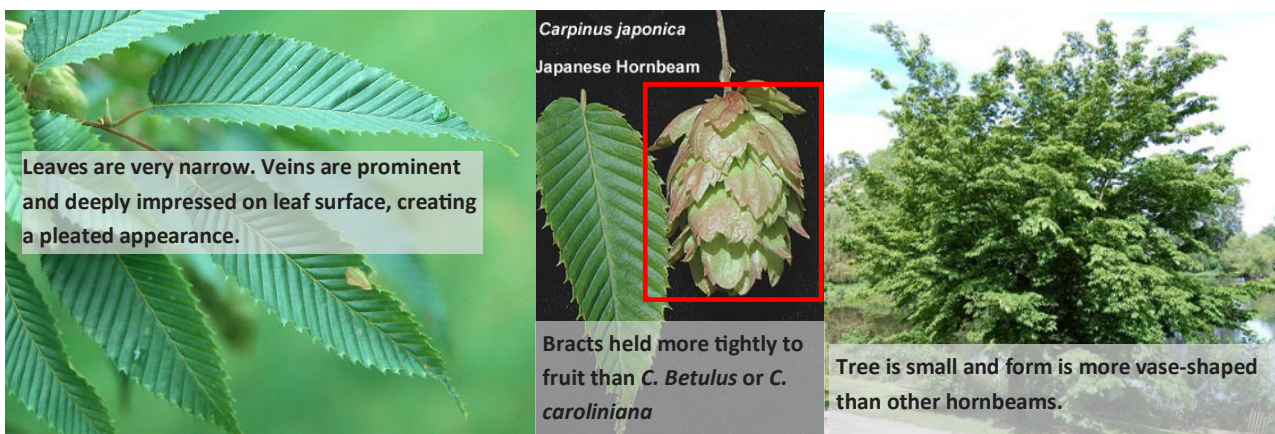
Carpinus betulus—European hornbeam



Carpinus caroliniana—American hornbeam



Carpinus japonica—Japanese hornbeam



Hornbeams look very similar. Key identifying features are miniscule and trees are extremely variable. Fastigate European hornbeam cultivars are commonly planted in Portland but the natural form is planted as well and looks almost identical to American hornbeam. If you are unsure, take a sample! If Urban Forestry staff is stumped, we'll send it to the experts at Hoyt Arboretum.

Cedrus- True Cedar

Characteristics

Leaves: Cedar needles are borne in clusters on spurs, with new growth borne singly. Spurs are short woody stubs originating from the branch. Needles are whorled. Foliage and branches are very fragrant when crushed. Length and coloration of needles are important for species ID.



Fruit: Female cones are large, barrel-shaped and mature over 2 seasons. Cones sit upright on branches and can be prolific on the tree. Cones disintegrate at maturity, similar to fir cones. Large, abundant male pollen cones mature in late summer/early autumn.



Bark: Bark is thin, silvery-grey, and scaly. Furrows and scales develop with age.



Form: True cedars are large trees, often maturing to over 100 feet tall with significant DBH. Branches are broad and level, often spaced to appear like scaffolding. Form is open and broad.



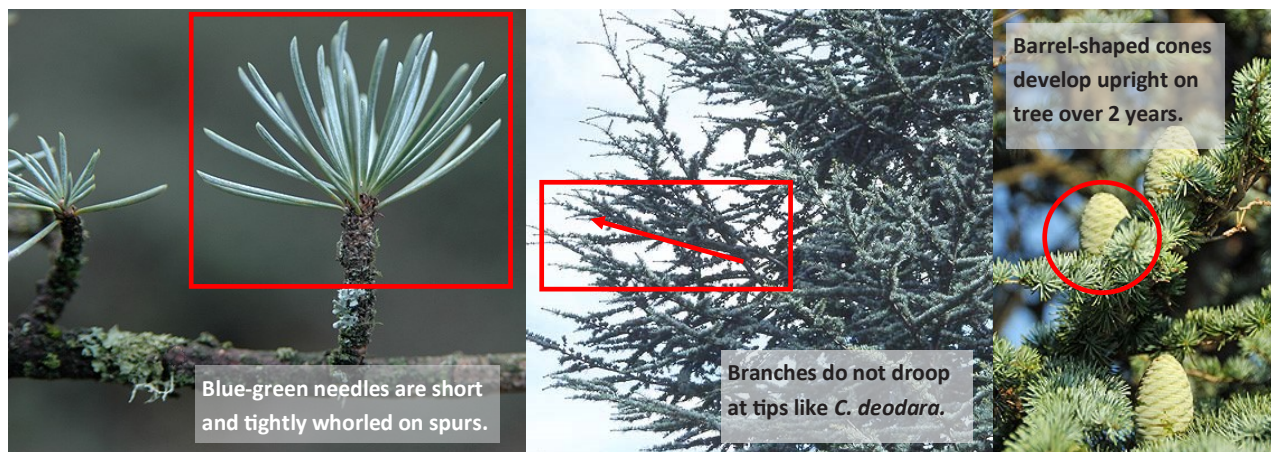
Section 3: Learning to Identify Portland's Trees

Commonly Found Species

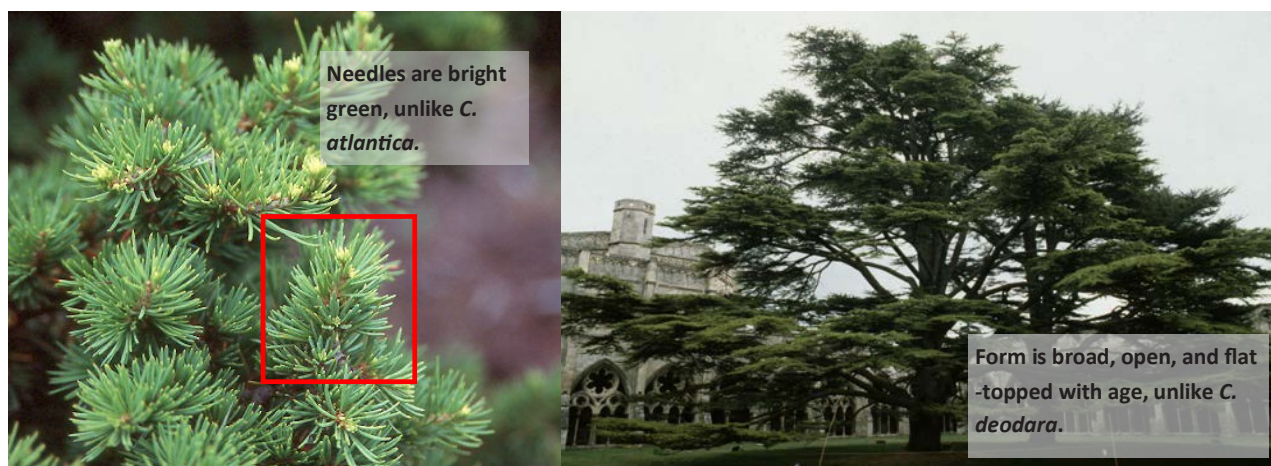
Cedrus deodara—Deodar cedar



Cedrus atlantica 'Glaucua'—Atlas cedar



Cedrus libani—Cedar-of-Lebanon



Atlas cedar and Cedar-of-Lebanon are so closely related that many consider Atlas cedar to be a subspecies of Cedar-of-Lebanon. Atlas cedar is blue and more commonly planted than Cedar-of-Lebanon. If you are unsure, take a sample! If Urban Forestry staff is stumped, we'll send it to the experts at Hoyt Arboretum.

Cornus- Dogwood

Characteristics

Leaves: Leaves are simple with an entire margin. Most dogwoods are oppositely arranged with few exceptions (*Cornus controversa*). When leaves are split gently, white fibrous hairs are present. Veins curve to run parallel to midrib. Leaves may be changing color or curling in late summer due to drought stress.



Cornus florida



Cornus florida

Fruit: Dogwood fruit varies by species but is usually a red-purple drupe maturing through summer.

Appearance, color, and number of fruits in cluster are all clues to species identification.



Cornus kousa



Cornus controversa

Flowers: Dogwoods bloom in early spring and summer. Most blooms are showy and colorful. Some species have large bracts surrounding smaller true flower clusters in the center.



Cornus nuttallii



Cornus mas



Cornus kousa

Form: Dogwoods tend to be small trees, with a round form and layered branching. Most mature to a maximum of 25 feet.



Cornus kousa



Cornus nuttallii

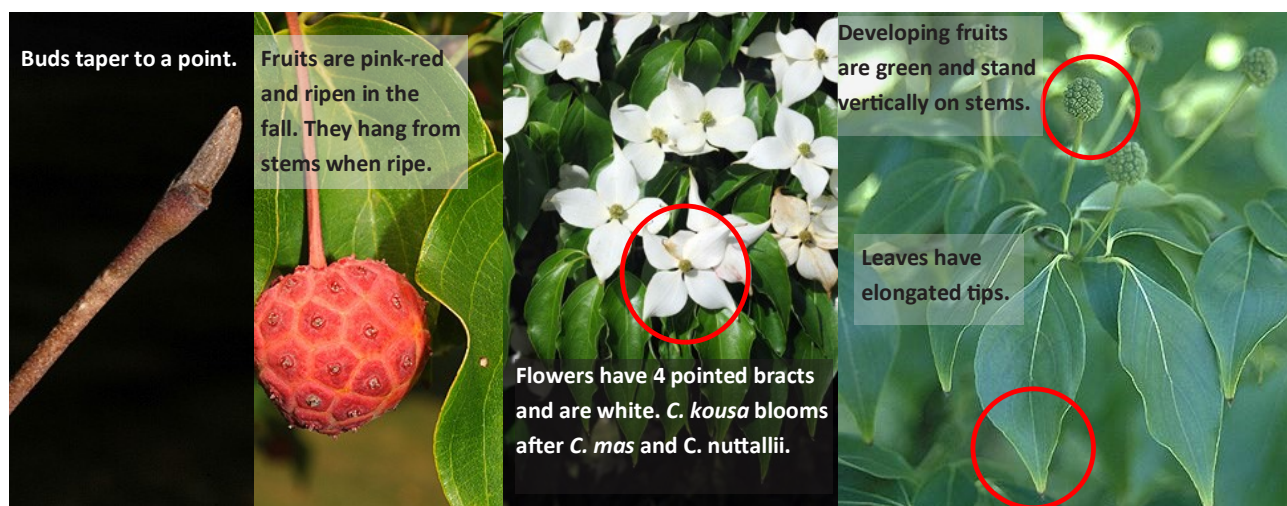
Section 3: Learning to Identify Portland's Trees

Commonly Found Species

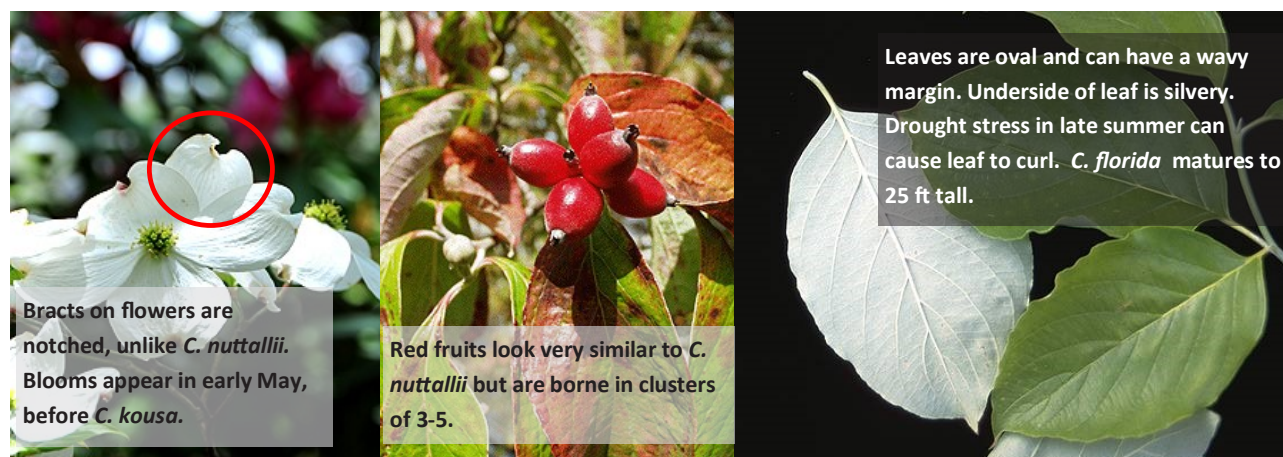
Cornus mas—Cornelian Cherry Dogwood



Cornus kousa—Kousa dogwood



Cornus florida—Flowering dogwood



Cornus controversa—Giant dogwood



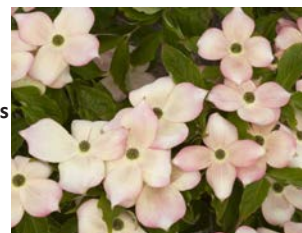
Cornus nuttallii—Pacific dogwood



Common *Cornus* Hybrids



Eddie's White Wonder is a hybrid between *C. nuttallii* and *C. florida*. It has 4-6 bracts surrounding the flowers and matures to 25 ft tall.



'Stellar Pink' is a hybrid cross between *C. kousa* and *C. florida*. Blooms are pale pink and bloom in mid-May.

Without blooms and fruits, dogwoods can be very difficult to identify to species. Dogwoods often look very stressed in late summer, which adds to the difficulty. If you aren't sure, take a sample! If Urban Forestry staff is stumped, we'll send it to the experts at Hoyt Arboretum.

Section 3: Learning to Identify Portland's Trees

Crataegus- Hawthorn

Characteristics

Leaves: Leaves are small and leaf arrangement is whorled. Margins are serrate. Leaves can be lobed but not always.



Fruit: Small fruits develop through summer at the end of flowering. Developing fruits are called haws and look like rosehips. Number of seeds can indicate species, so if fruits are present, dissect them to count the seeds.



Bark and Branches: Hawthorns have thorns on branches and twigs. Thorns can range in size from half an inch long to upwards of 2 inches. Hawthorn bark is thin and reddish brown. It can appear ropy, which gives trees a twisted appearance. Bark often gets plated with age.



Form: Hawthorns are small trees and can appear shrubby. Crown is irregular and bushy. Hawthorns can be invasive. Varieties planted as ornamentals tend to be single-stemmed with a regular form. Naturalized specimens tend to be multistemmed and shrubby.

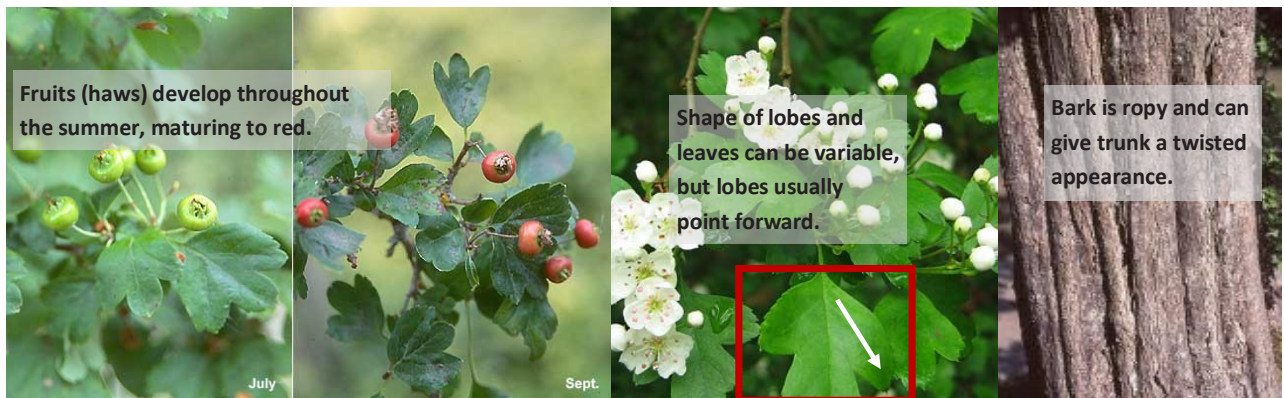


Commonly Found Species

Crataegus monogyna—Common hawthorn



Crataegus laevigata—English hawthorn



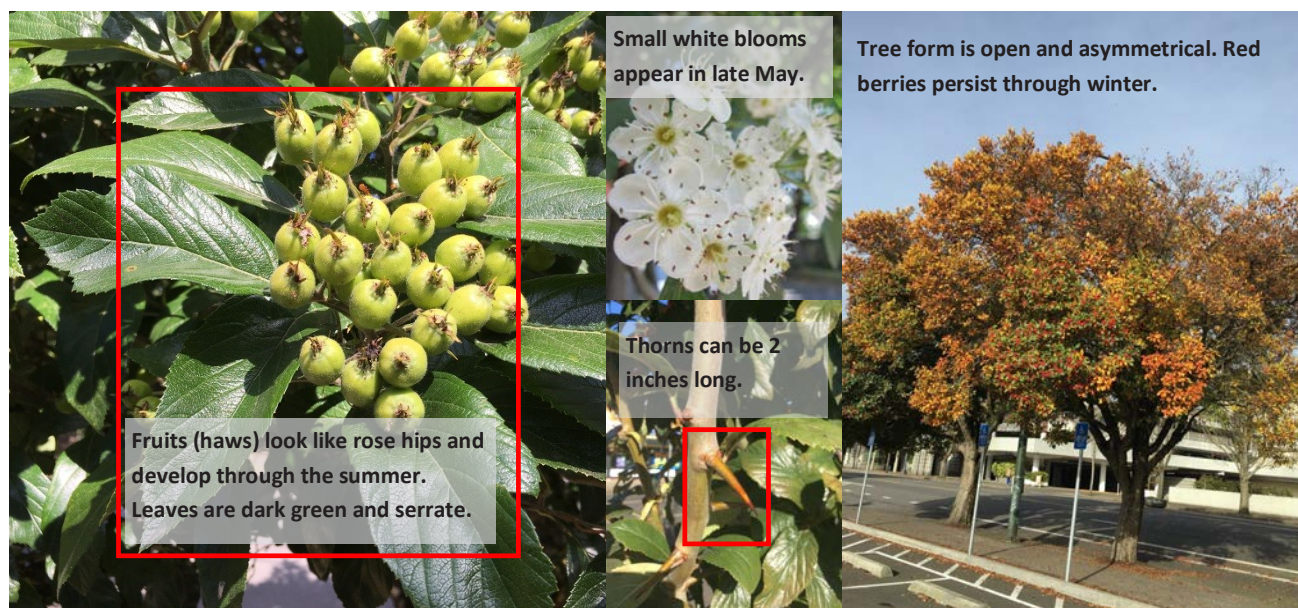
Crataegus Hybrids and Cultivars



C. laevigata and *C. monogyna* look very similar and can hybridize with each other (*C. x media*). The surefire way to distinguish between the two is to dissect a fruit, if present. One seed is *C. monogyna*; two seeds is *C. laevigata*. If you aren't sure, take a sample! If Urban Forestry staff doesn't know, we'll ask the experts at Hoyt Arboretum.

Section 3: Learning to Identify Portland's Trees

Crataegus x lavallei—Lavelle hawthorn



Crataegus phaenopyrum—Washington hawthorn



Fraxinus- Ash

Characteristics

Leaves: Ash leaves are compound and oppositely arranged. Leaves end with a terminal leaflet, unlike lookalike black walnut. Margins can be entire or serrated. Size, shape, presence of pubescence (hair), and leaflet stalks can all be indicators of species ID.



Fruit: Ash seeds are samaras, held singly instead of in pairs like maples. Samaras can be called keys. Samaras mature through the summer. There are many cultivars in the nursery trade that are sterile and do not produce samaras.



Bark and Branches: Ash bark furrows with age and develops a regular diamond-shaped pattern. Terminal buds are prominent and dark. They look like chocolate chips. Branches have a pronounced branch collar (ridge where branch attaches to trunk).



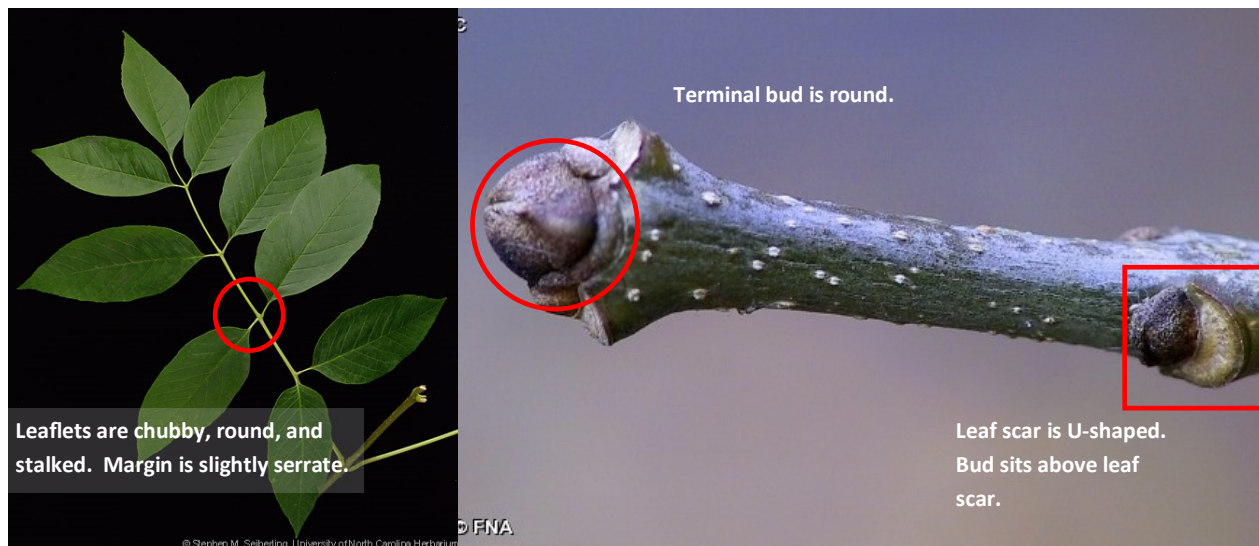
Form: Ash trees are medium-form tree, maturing to about 60 feet. Our native Oregon ash can mature to 80-90 feet. Crown is round and open.



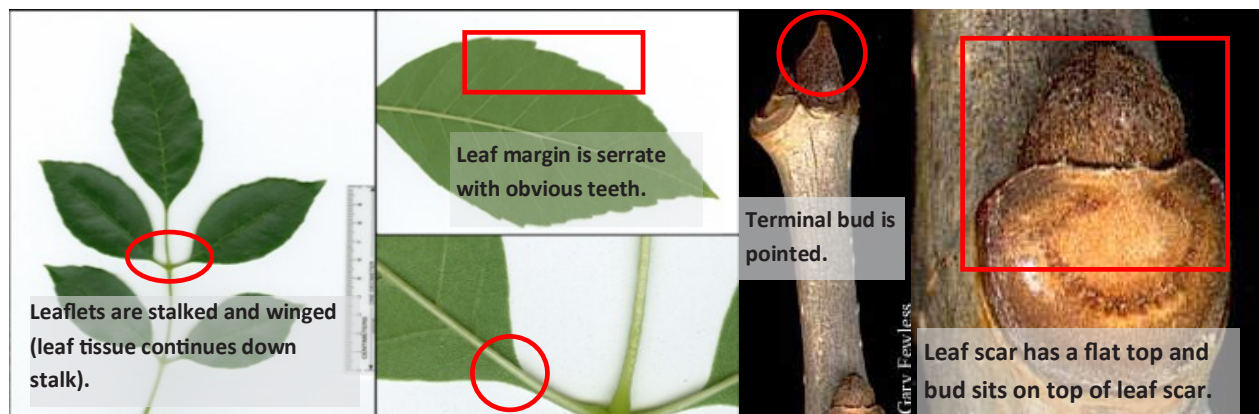
Section 3: Learning to Identify Portland's Trees

Commonly Found Species

Fraxinus americana—White ash



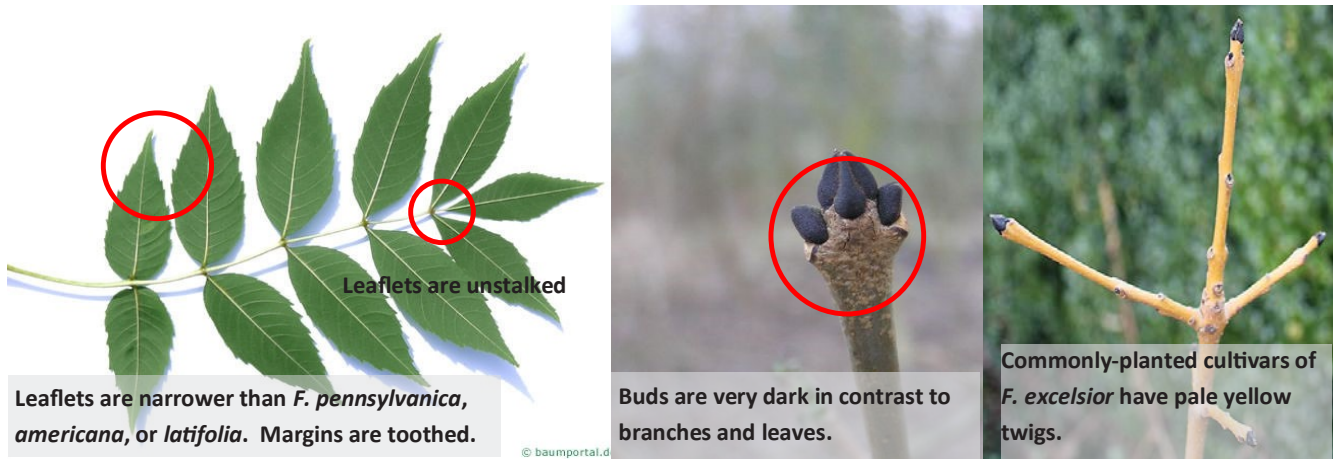
Fraxinus pennsylvanica—Green ash



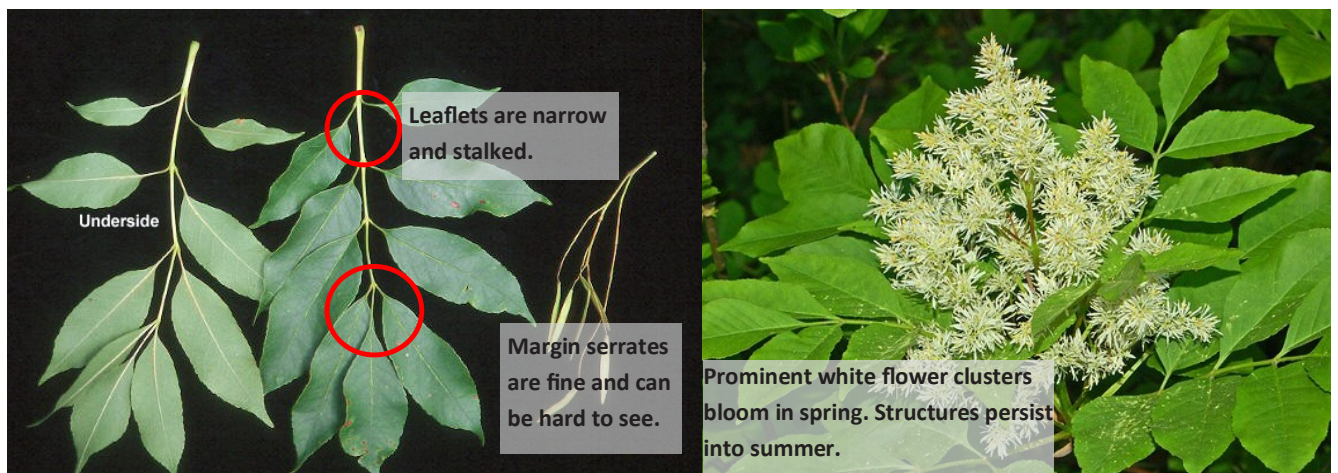
Fraxinus latifolia—Oregon ash



Fraxinus excelsior—Common ash



Fraxinus ornus—Flowering ash



Other Common Ash Varieties



Fraxinus angustifolia : Leaves are opposite but can appear whorled in groups of 3 or 4. Petioles often have a reddish tinge. Raywood is a common cultivar in Portland.



Golden Desert Ash: A common cultivar of *F. excelsior*. Leaves emerge yellow and fade to pale green.

Section 3: Learning to Identify Portland's Trees

Picea- Spruce

Characteristics

Leaves: Spruce needles are stiff and sharp. They leave a raised peg-shaped leaf scar when they are shed. Needles and twigs can be fragrant when crushed. They are spirally arranged, creating a bottlebrush appearance on twigs. Presence of stomatal bands, needle length, taste, and shape can help determine species ID.



Fruit: Spruces are conifers and bear cones. Spruce cones have papery bracts that protect seeds. Bracts may be smooth or toothed, depending on species. Cones hang down and mature through summer (some species may mature over two seasons). Size of cone and color and margins of bracts can help determine species.



Bark: Spruce bark is thin and plated, like overlapping puzzle pieces. Color varies across species from red-brown to grey. Bark can be resinous.

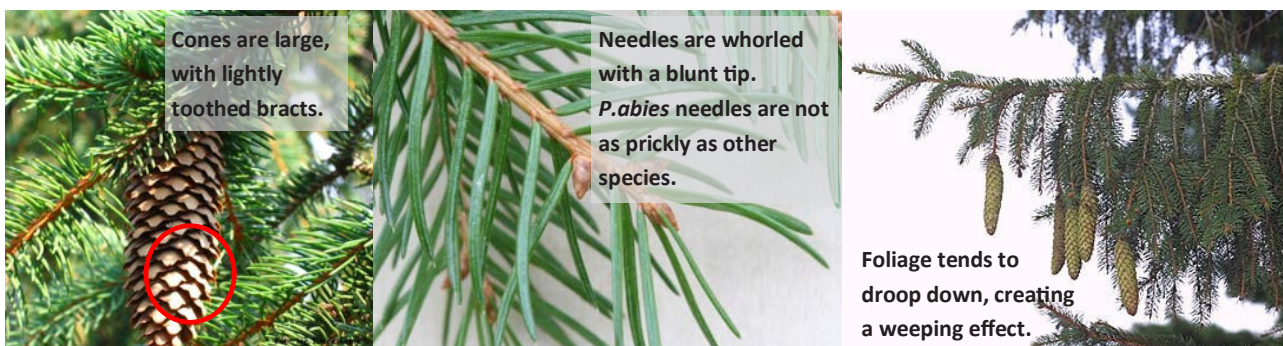


Form: Spruces are large conifers and can mature to 100 ft tall. They tend to be narrow, with conical crowns. Some can have very pendulous branches, which is a key to species identification.



Commonly Found Species

Picea abies—Norway spruce



Picea glauca—White spruce



Picea pungens—Blue spruce



P. pungens and *P. glauca* look very similar. *P. pungens* is more common and has larger cones than *P. glauca*. Some cultivars of *P. pungens* are more blue than others. Needles of *P. pungens* can be rolled between fingers and taste foul.

Section 3: Learning to Identify Portland's Trees

Picea breweriana—Brewer's spruce



Picea sitchensis—Sitka spruce



Spruce trees can be difficult to identify. Many species look very similar and there is a lot of variability between trees. There are also many cultivars in the nursery trade. This guide highlights species we know are in parks; however, we may see species not in this guide. Cones are not always present and needle coloration can be highly variable. If you are unsure, take a sample! If Urban Forestry staff is stumped, we'll send it to the experts at Hoyt Arboretum.

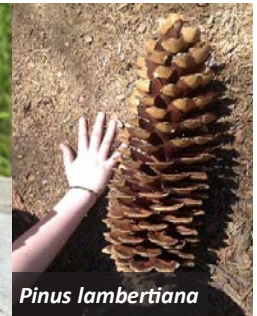
Pinus- Pine

Characteristics

Leaves: All pine trees bear their needles in bundles bound by a piece of tissue called a fascicle. The number of needles per fascicle can help determine species identification. Needles are usually slender. Texture, length, color, and stomatal banding are all clues to



Fruit: Pines bear pine cones with woody scales protecting seeds. Size, shape, and texture of scales varies widely by species. Cones typically mature over two seasons. Sometimes they are found readily on the ground beneath a tree; sometimes they can only be seen in the top of the tree.



Bark: Bark can also vary widely across species. Some fire-evolved pines have very thick, grooved bark. Bark can be plated with small or large plates or furrowed. Color can vary from dull grey to bright red. Pine bark is often resinous and fragrant. Bark can be a great clue to species ID.



Form: *Pinus* is the most widespread genus of conifers in the world. Pines can be small, medium, or large trees. They can be multistemmed and shrubby, or tall and conical. Most large pines have a single leader and a round crown. We will not inventory dwarf or shrub varieties like mugo pine.



Section 3: Learning to Identify Portland's Trees

Commonly Found Species

2-needed Pines

Pinus sylvestris—Scotch pine



Pinus thunbergii—Japanese black pine



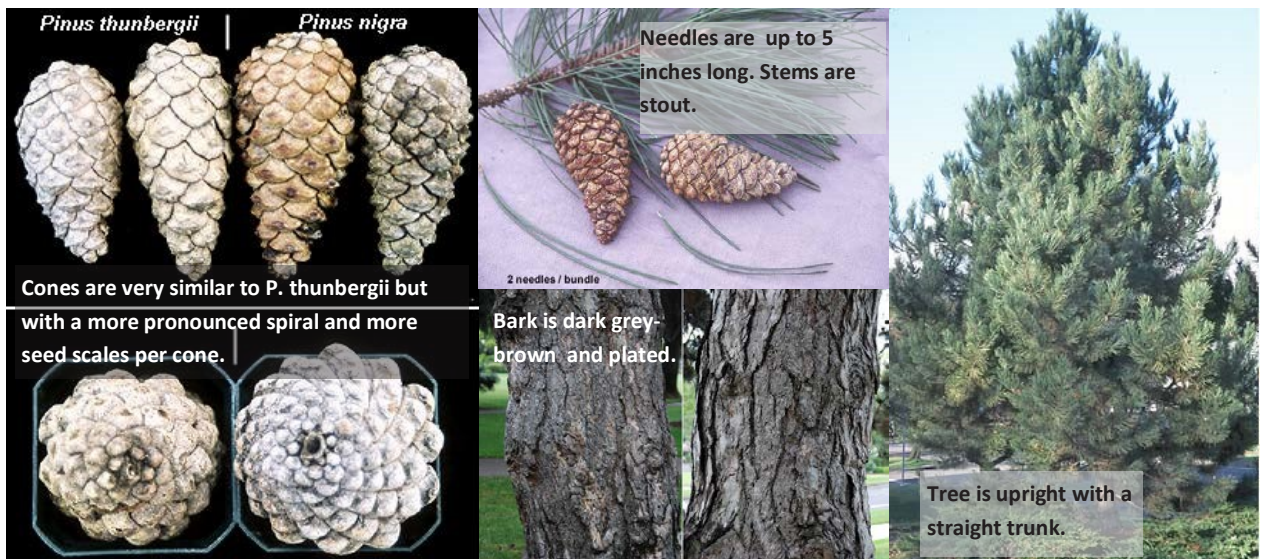
Pinus contorta—Shore pine, Lodgepole pine



***Pinus densiflora*—Japanese red pine**



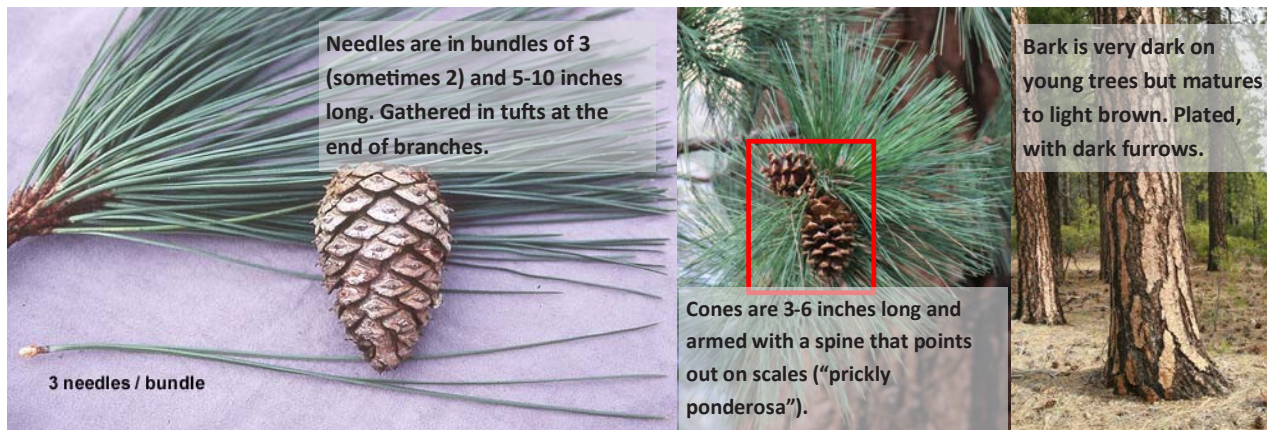
***Pinus nigra*—Austrian black pine**



Section 3: Learning to Identify Portland's Trees

3-needled Pines

Pinus ponderosa—Ponderosa pine



Pinus jeffreyi—Jeffrey pine



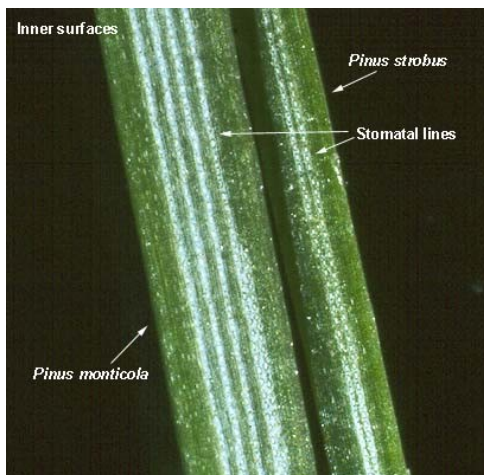
Ponderosa pine and Jeffrey pine look very similar and are easily confused. Trees and cones can be variable within each species. Ponderosa pine is far more common in Portland, but if you aren't sure, please take a sample! If Urban Forestry staff is stumped, we'll ask the experts at Hoyt Arboretum.

5-needled Pines

Pinus monticola—Western white pine



Pinus strobus—Eastern white pine



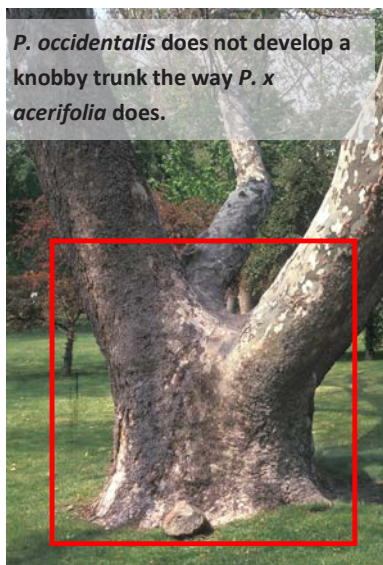
Western white pine and eastern white pine look extremely similar. Stomatal lines can be used to distinguish between the two but can only be seen with a magnifying glass. Western white pine tends to be more common in Portland. If you aren't sure, take a sample! If Urban Forestry staff doesn't know, we'll ask the experts at Hoyt Arboretum.

Section 3: Learning to Identify Portland's Trees

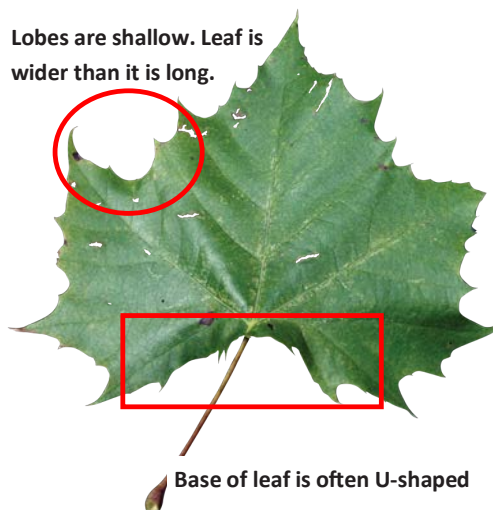
Platanus- Planetree

Characteristics for Common Species

Platanus occidentalis—American Sycamore



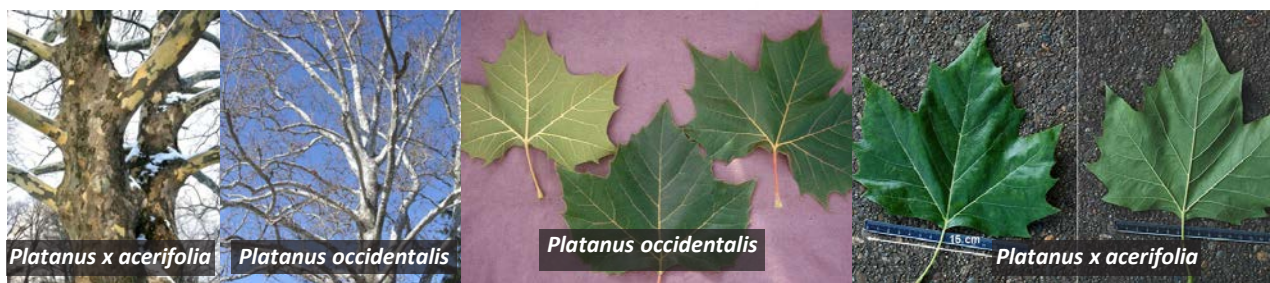
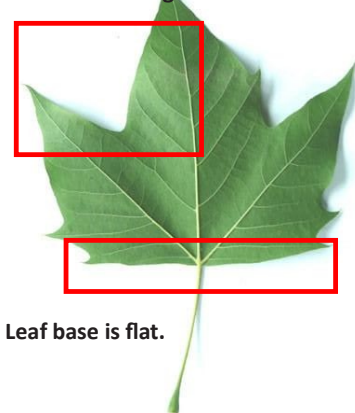
Lobes are shallow. Leaf is wider than it is long.



Platanus x acerifolia—London Planetree



Lobes are deep. Leaf is not as wide as it is long.



American sycamores and London planetrees are very closely related, and there is a lot of variability between individual trees from each species. If you are not sure, take a sample! If Urban Forestry staff is stumped, we'll ask the experts at Hoyt Arboretum.

Prunus- Cherries, Plums, and Laurels

Characteristics

Leaves: Leaves are simple and alternately arranged, sometimes appearing whorled. Leaves often have a serrated margin and acuminate tip. *Prunus* is a large and diverse genus with many cultivars on the market, resulting in a variety of leaf shapes and colors. Many *Prunus* are susceptible to shothole fungus, which presents as holes in leaves.



Prunus cerasifera 'Atropurpurea'



Prunus serrulata

Fruit: Fruit forms throughout the summer after flowering. Many nursery cultivars are bred to be fruitless, so fruits may not be visible on every tree. When fruit is present, it is a drupe (fleshy fruit surrounding a stone pit). Plums, nectarines, peaches, and cherries are all examples of *Prunus* fruit.



Prunus laurocerasus



Prunus cerasifera 'Atropurpurea'

Bark: Bark varies depending on species. Cherries tend to have visible lenticels and glossy bark that may or may not peel. Plums tend to have ropy bark that gives the tree a twisted appearance. Bark can be a great clue to species identification.



Prunus serrulata



Prunus cerasifera

Form: Trees can be small to medium form. Laurels are usually maintained as shrubs; we will only inventory those maintained as trees. Form can vary depending on cultivar and grafting. Crown is usually round. Cherries and plums are often as wide as they are tall.



Prunus serrulata

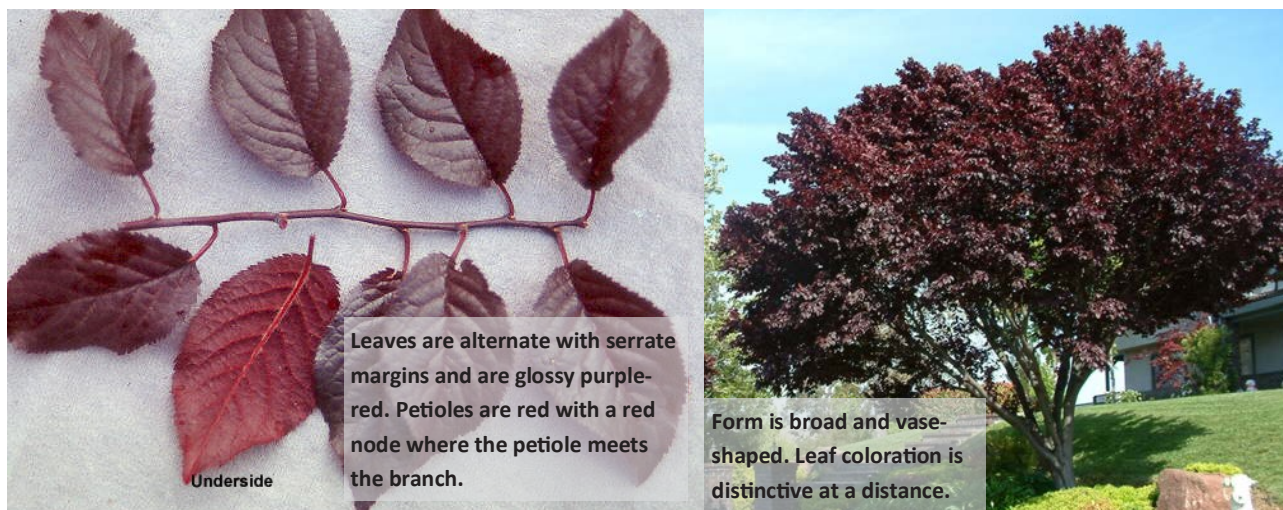


Prunus cerasifera

Section 3: Learning to Identify Portland's Trees

Commonly Found Species

***Prunus cerasifera*—Purple flowering plum**



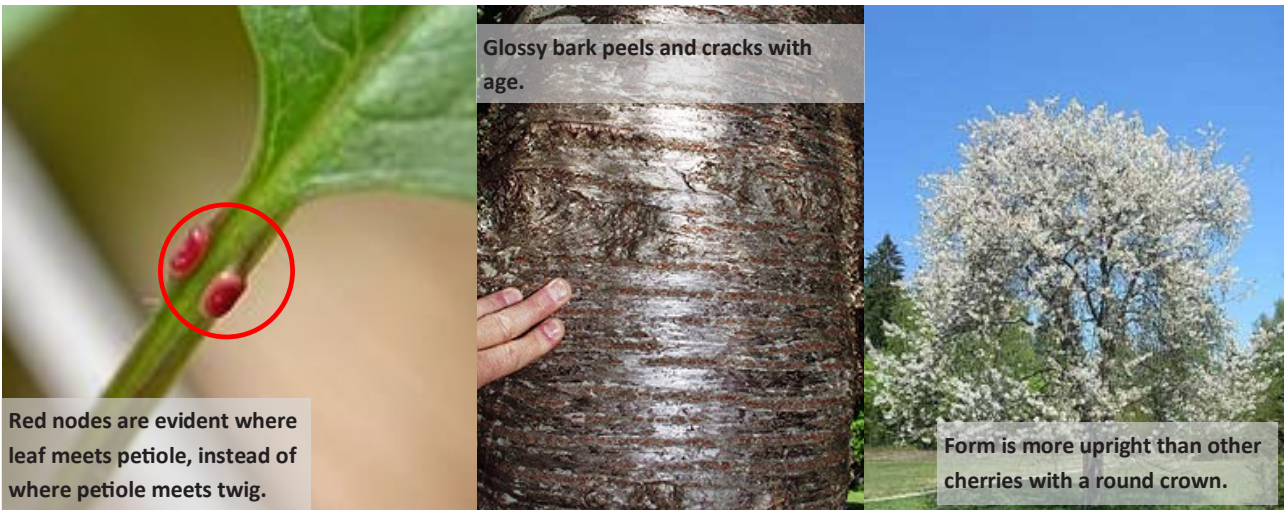
***Prunus serrulata*—Japanese flowering cherry**



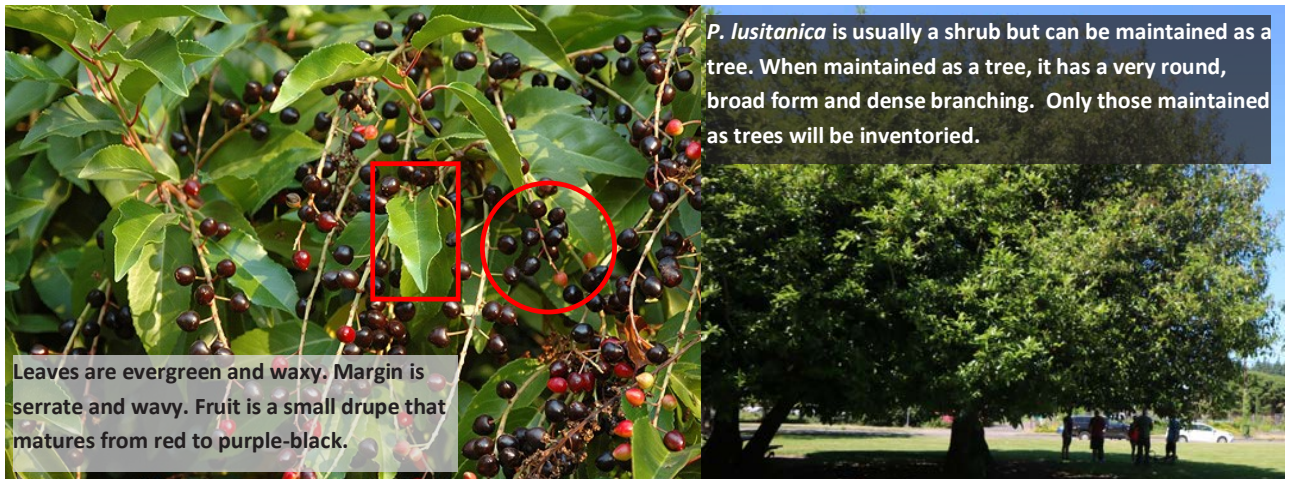
***Prunus serrula*—Tibetan cherry, Paperbark cherry**



Prunus avium—Sweet cherry



Prunus lusitanica—Portuguese laurel



Prunus laurocerus—English cherry laurel



Section 3: Learning to Identify Portland's Trees

Quercus- Oak

Characteristics

Leaves: Oak leaves are often lobed, but not always. They can be evergreen or deciduous. New growth can take a different shape than older leaves and leaf size will vary depending on sun.

Oaks in the red oak family usually have bristles at the leaf tip and end of lobes.

Oaks in the white oak family have rounded lobes and no bristles. Buds are clustered at the ends of branches.



Quercus alba



Quercus coccinea



Quercus bicolor



Quercus phellos



Quercus ilex



Quercus alba

Fruit: All oaks produce acorns. Size, shape, and color of acorns and caps are important species indicators.

Acorns may not be present, or may be abundant. Most acorns mature through summer and drop in early-mid Autumn.



Quercus rubra



Quercus robur



Quercus macrocarpa

Bark: Bark is usually thick, furrowed, and inconspicuous, with some exceptions. White oaks tend to have plated bark while red oaks tend to have vertical furrows. Coloration and texture varies and other features tend to be more reliable features for species ID.



Quercus palustris



Quercus garryana



Quercus suber

Form: Oaks are medium to large trees, with some mature oaks reaching significant heights and diameters. Form tends to be broad with a round, open crown, and large limbs, although this can vary by species.



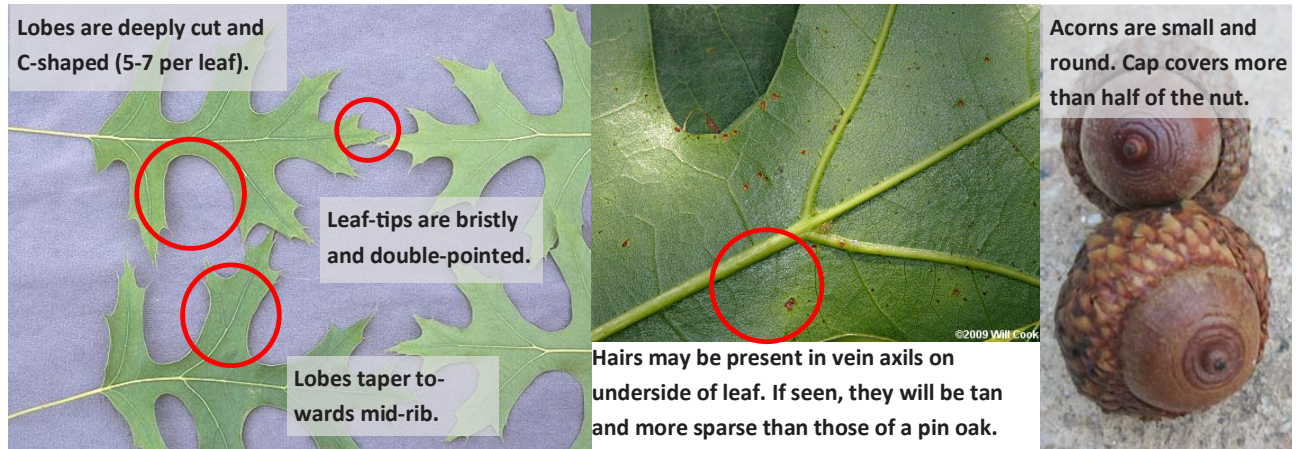
Quercus garryana



Quercus rubra

Commonly Found Species

Quercus coccinea—Scarlet oak



Quercus palustris—Pin oak



Quercus rubra—Red oak

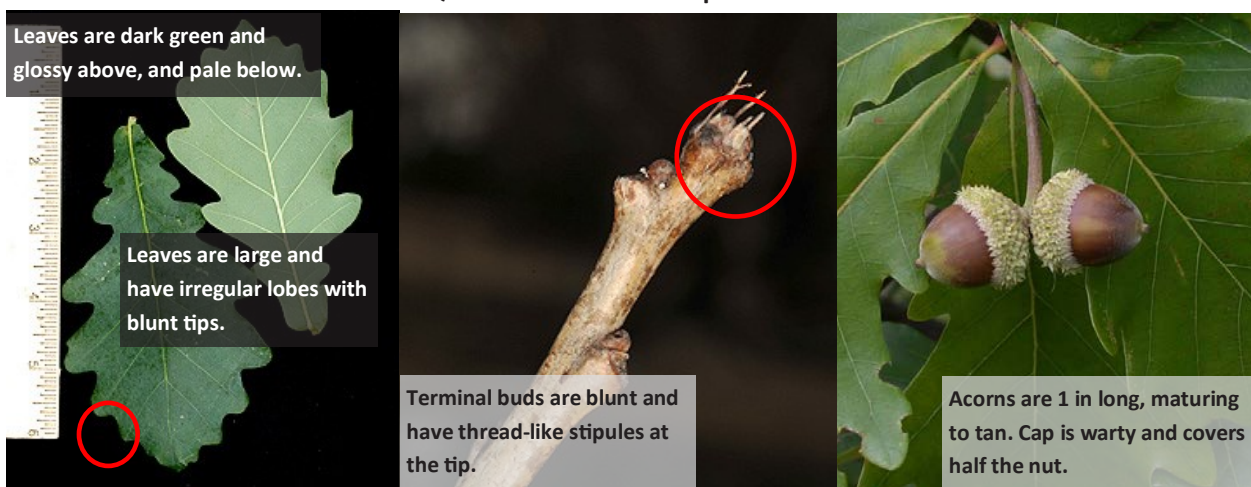


Section 3: Learning to Identify Portland's Trees

Quercus phellos—Willow oak



Quercus bicolor—Swamp white oak



Quercus garryana—Oregon white oak



There are over 600 species of oak trees. guide showcases just a few of the oaks we might see this summer. If you come across one that you have never seen before, please call staff or the arborist-on-call and take a sample! If Urban Forestry staff is stumped, we'll ask the experts at Hoyt Arboretum.

Tilia- Linden

Characteristics

Leaves: Lindens have alternately-arranged cordate (heart-shaped) leaves with uneven bases. Margins are serrate. Leaf size, presence of hairs, and color of underside are all important species identifiers.



Fruit and Flowers: When in flower, lindens are extremely attractive to pollinators. Blooms are tiny, yellow, and fragrant. Lindens bloom in mid-summer. Lindens produce tiny fruits (nutlets) that hang in clusters below pale green bracts, maturing through summer.



Bark: Linden bark is uniformly brown and furrows with age. It is inconspicuous in color and pattern.



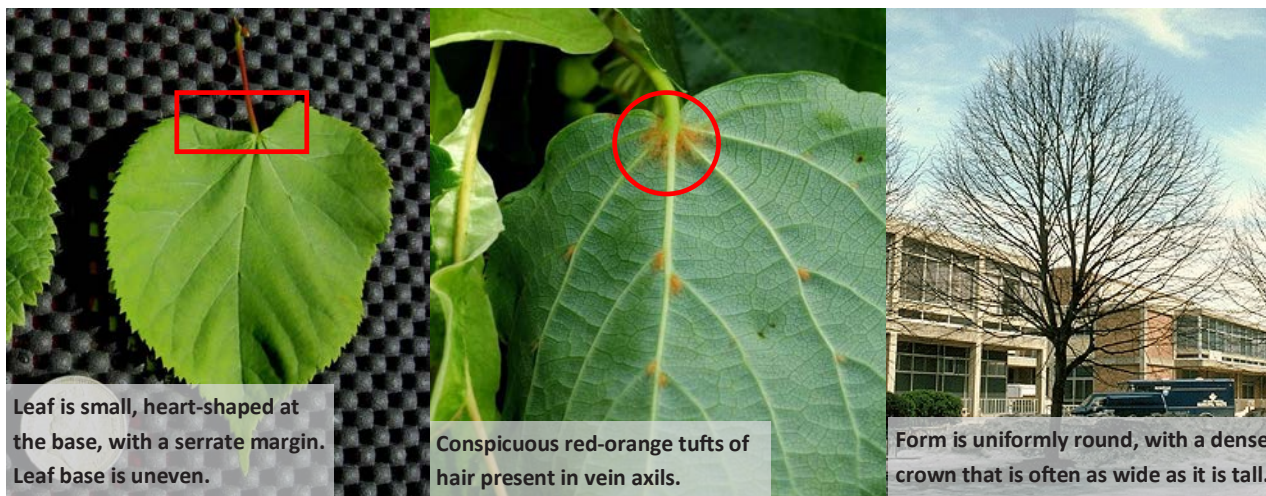
Form: Lindens are medium to large trees, depending on variety. There are many nursery cultivars on the market that range in size and form. Most lindens are broad. Some have a round crown, and others appear to be shaped like a teardrop. Lindens often sucker from the base when stressed.



Section 3: Learning to Identify Portland's Trees

Commonly Found Species

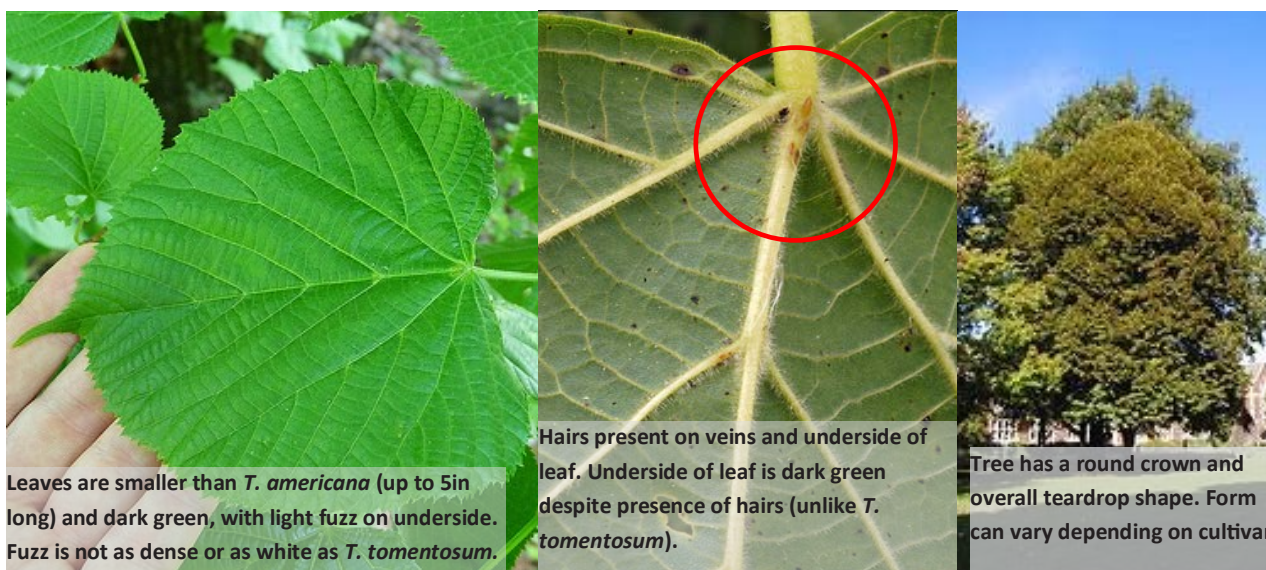
Tilia cordata—Littleleaf linden



Tilia tomentosa—Silver linden



Tilia platyphyllos—Large-leaf linden



Tilia americana—American linden



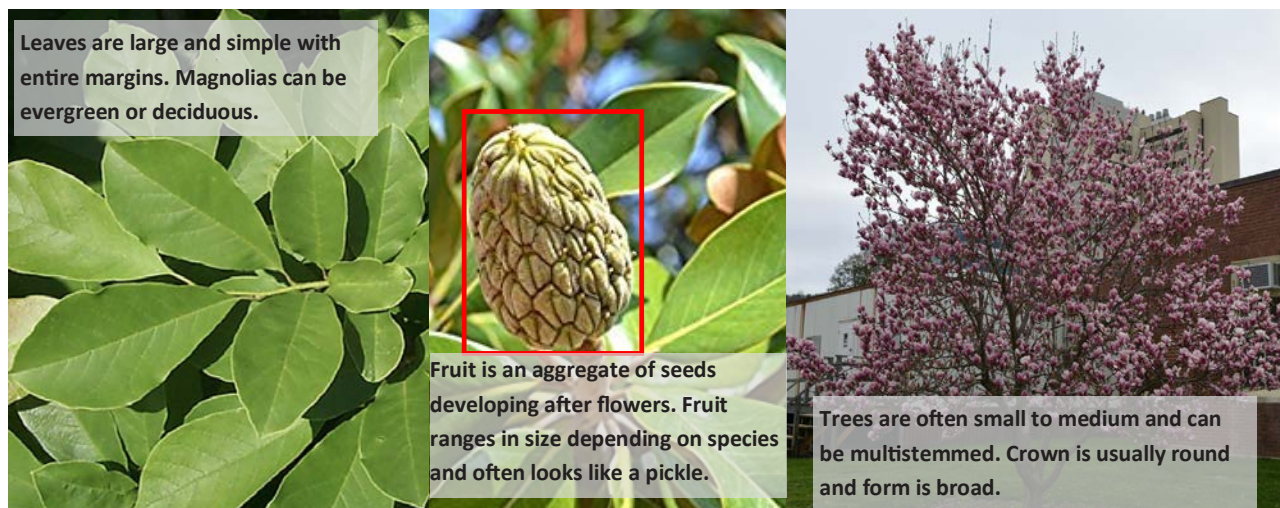
Lindens share many common characteristics, and key identifying features can be miniscule. There is a lot of variability between trees and identification can be tricky. Many nursery varieties are on the market, and those cultivars often have a different form than the straight species. If you are not sure of species, take a sample! If Urban Forestry staff is stumped, we'll ask the experts at Hoyt Arboretum.

Section 3: Learning to Identify Portland's Trees

Alternate- Simple Leaves

Common Species Characteristics

Magnolia spp. — Magnolias



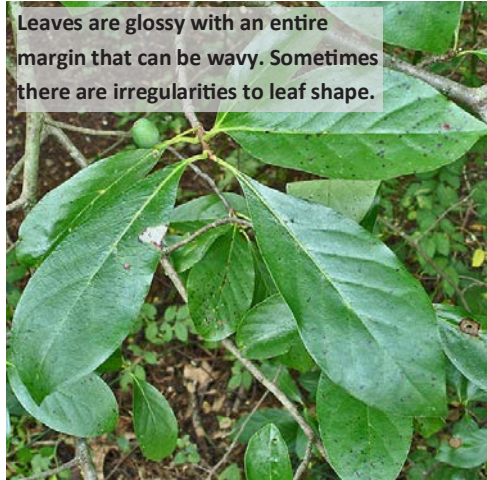
Ulmus spp.—Elm



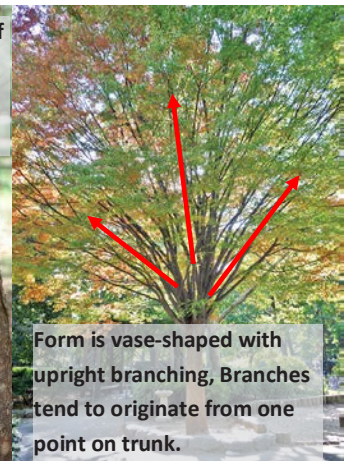
Fagus spp. — Beech



***Nyssa sylvatica*—Black tupelo**



***Zelkova serrata* — Zelkova**



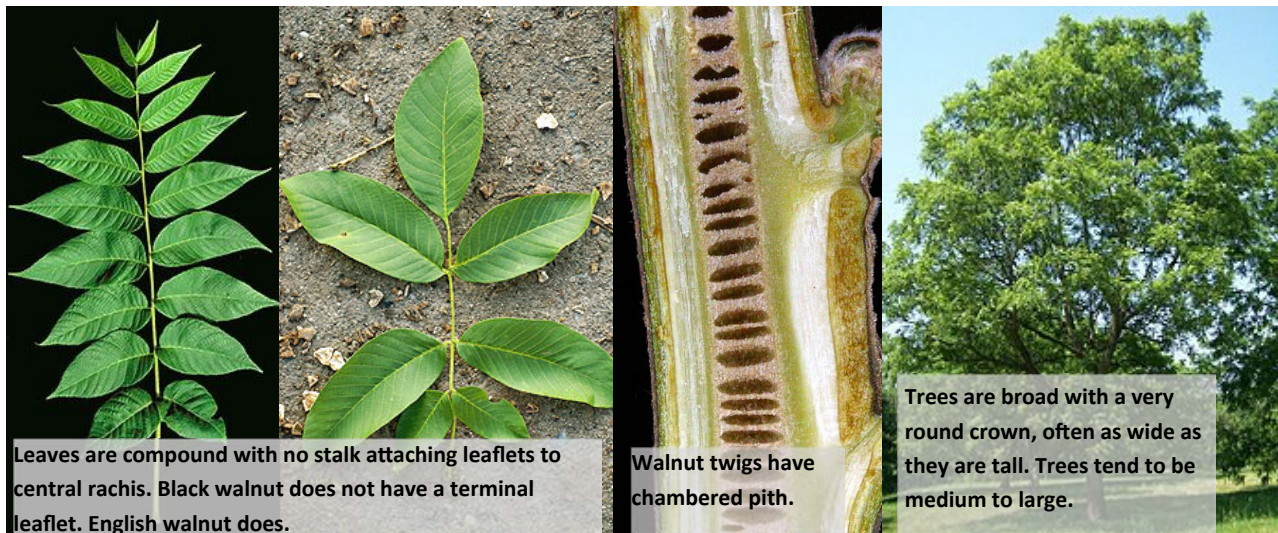
This guide highlights a few different genera of trees with alternate, simple leaves that are commonly planted in parks. We will likely see more trees than what this guide highlights. If you see something unfamiliar, take a sample or ask the arborist-on-call! If Urban Forestry is stumped, we'll send the sample to the experts at Hoyt Arboretum.

Section 3: Learning to Identify Portland's Trees

Alternate- Compound Leaves

Common Species Characteristics

Juglans sp.—Walnuts



Styphnolobium japonicum — Pagoda Tree



Gleditsia triacanthos—Honey Locust



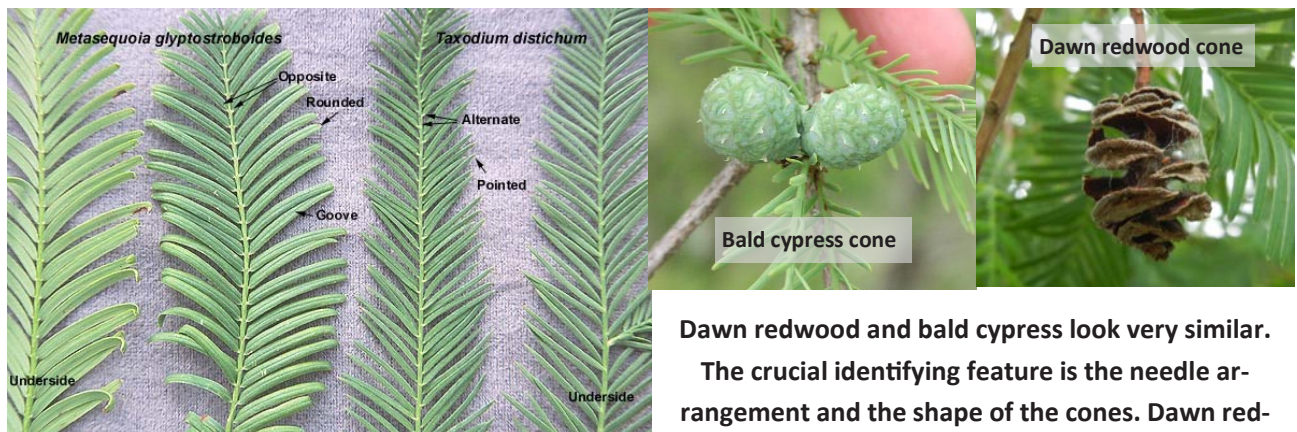
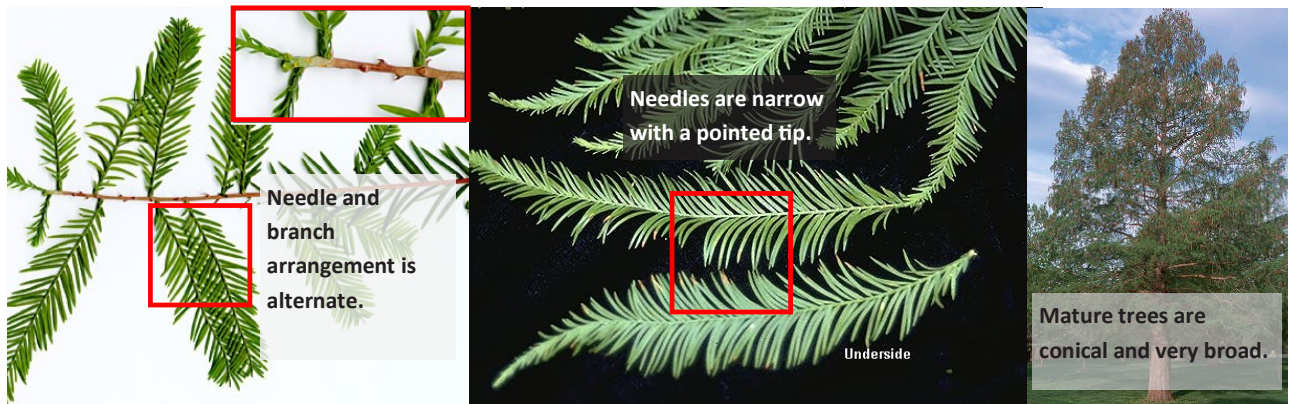
Deciduous- Conifers

Common Species Characteristics

Metasequoia glyptostroboides—Dawn redwood



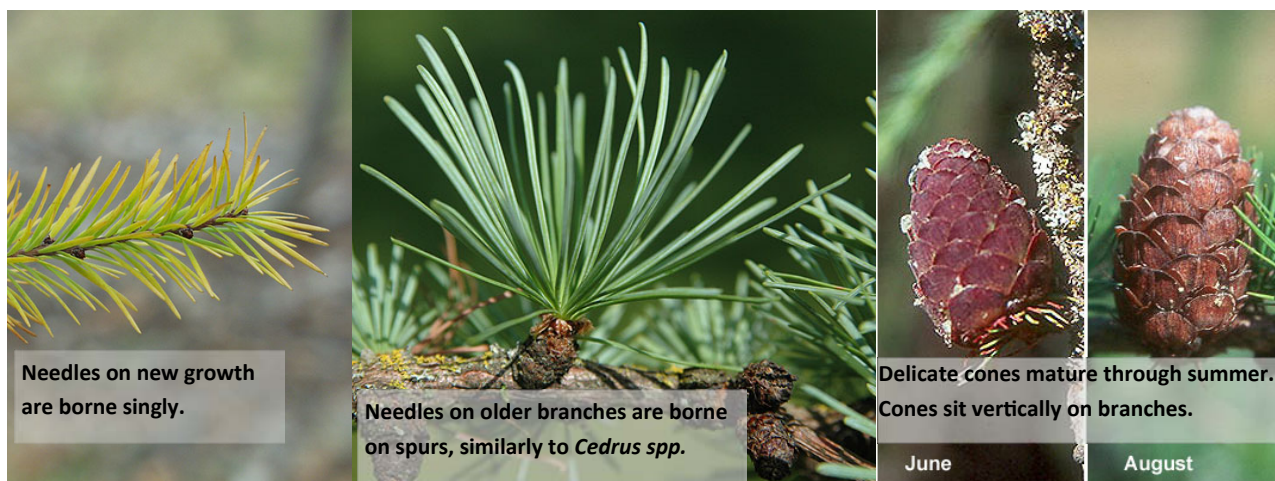
Taxodium distichum—Bald cypress



Dawn redwood and bald cypress look very similar. The crucial identifying feature is the needle arrangement and the shape of the cones. Dawn redwoods are more common than bald cypress. If you are unsure, take a sample! If Urban Forestry staff is stumped, we'll send it to the experts at Hoyt Arboretum.

Section 3: Learning to Identify Portland's Trees

Larix spp. — Larch



Pseudolarix amabilis—Golden larch



Larix spp. and *Pseudolarix* look very similar. *Larix* is more commonly planted than *Pseudolarix*; although is gaining popularity. Most *Pseudolarix* in Portland tend to be younger trees. If you are unsure, take a sample! If Urban Forestry staff is stumped, we'll ask the experts at Hoyt Arboretum.



Evergreen- Conifers

Common Species Characteristics

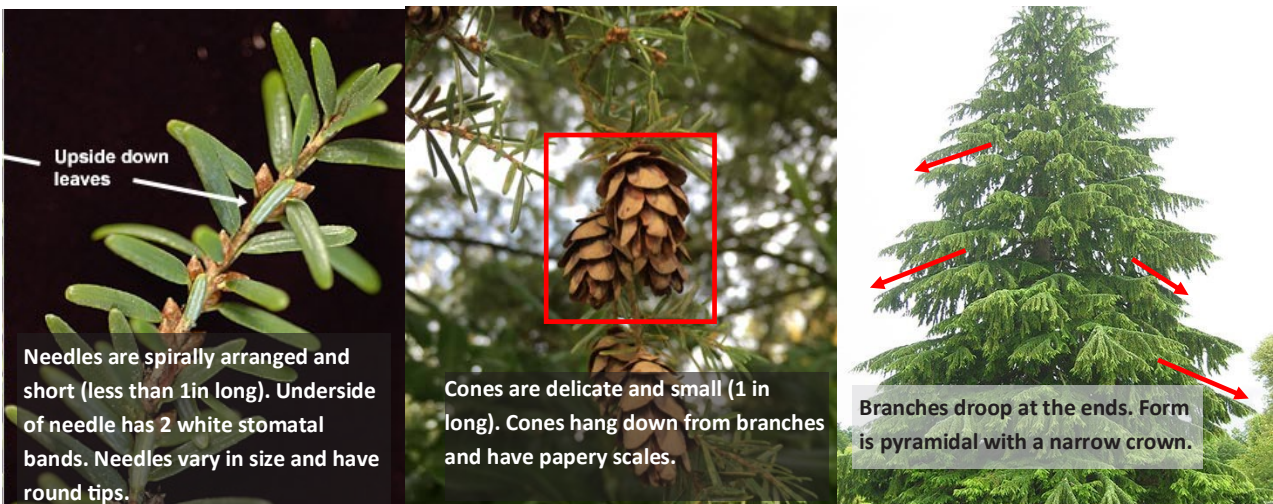
Sequoia sempervirens—Coast redwood



Sequoiadendron giganteum—Giant sequoia



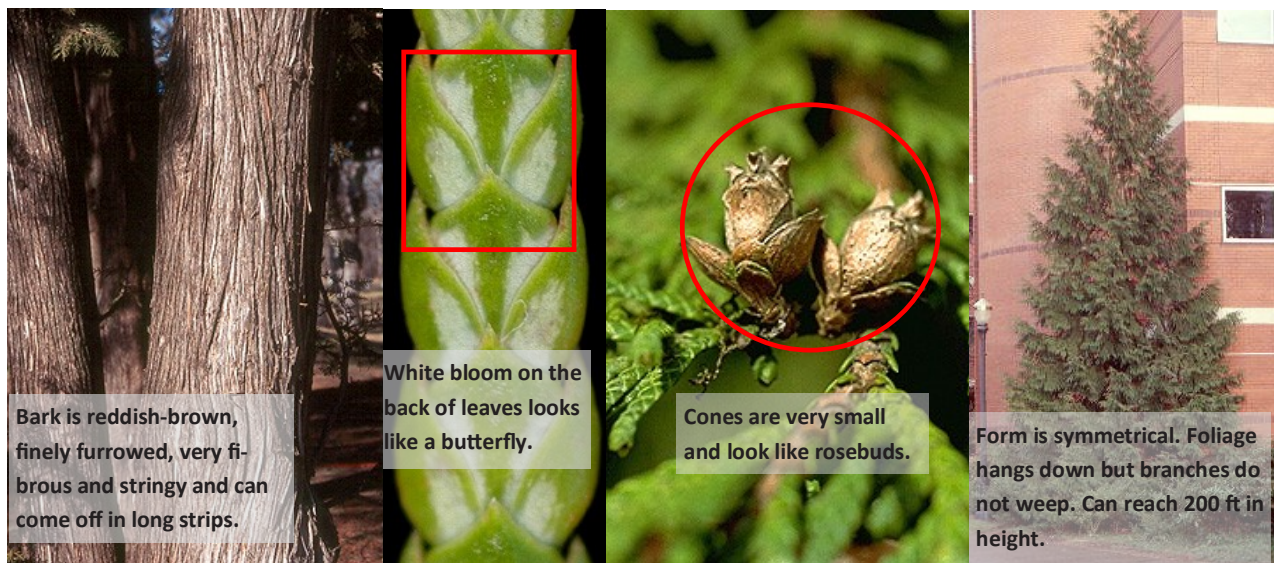
Tsuga heterophylla—Western hemlock



False Cedars

Common Species Characteristics

Thuja plicata—Western redcedar



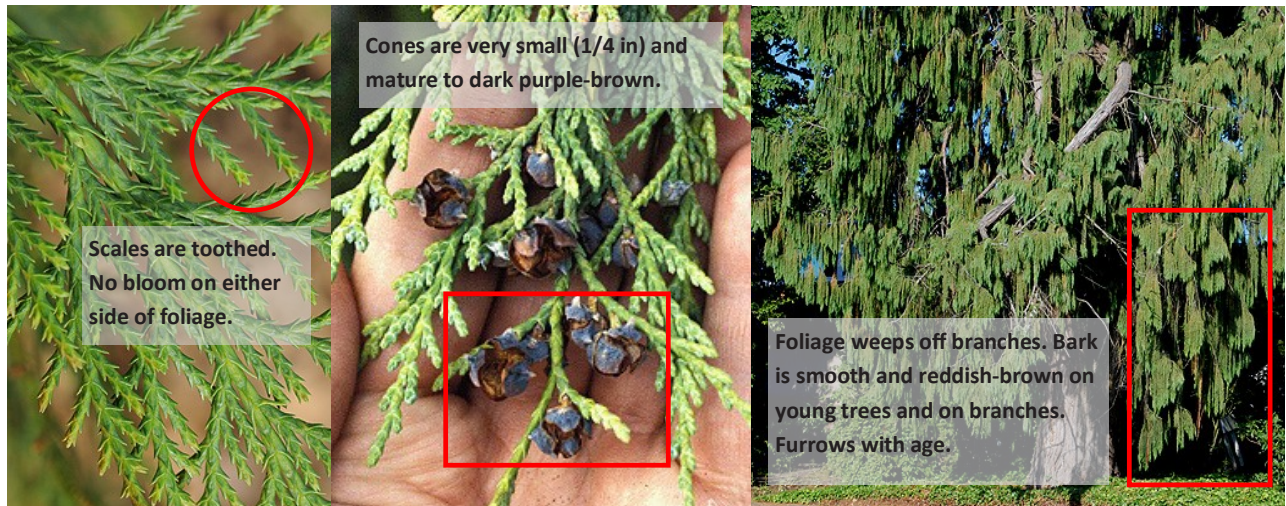
Calocedrus decurrens—Incense cedar



Chamaecyparis lawsonia—Port-orford cedar



Xanthocyparis nootkatensis—Alaska yellow-cedar



Chamaecyparis obtusa—Hinoki falsecypress



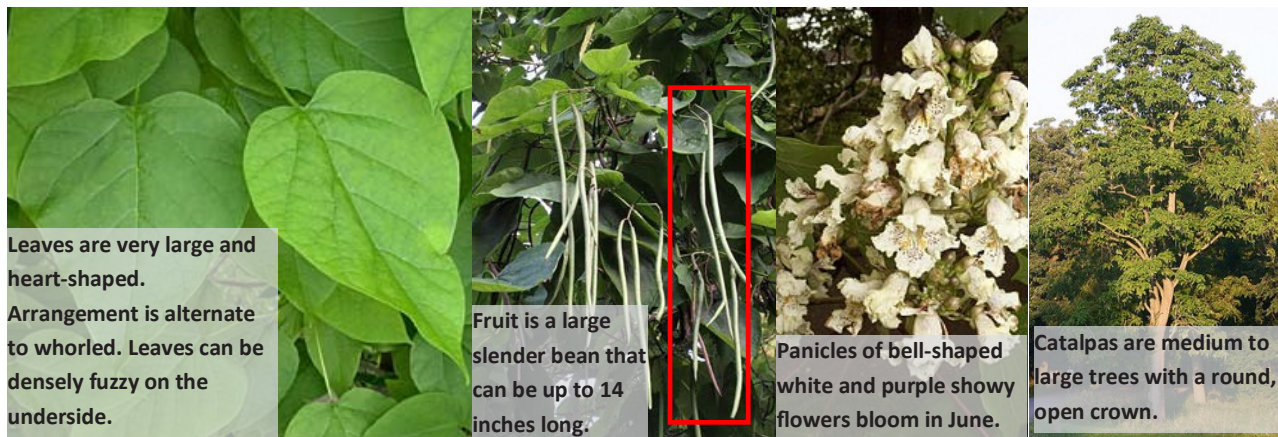
Four out of five of these false cedars are native to Oregon. Alaska yellow-cedar is the least common; the other four are commonly found in Portland parks. Trees can be variable and key identification features, like cones, may not be present on every tree. If you are unsure, take a sample! If Urban Forestry staff is stumped, we'll ask the experts at Hoyt Arboretum.

Section 3: Learning to Identify Portland's Trees

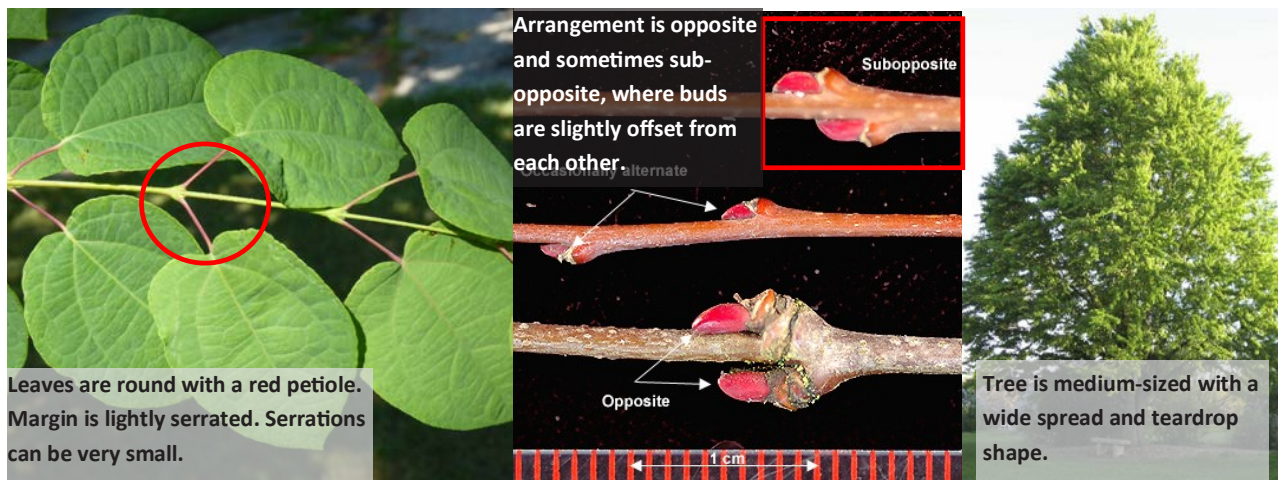
Opposite- Simple Leaves

Common Species Characteristics

Catalpa spp.—Catalpa



Cercidiphyllum japonicum—Katsura



Clerodendrum trichotomum—Glorybower



Tree vs. Not-A-Tree

Common Species Characteristics

ISA definition of a tree: *woody perennial usually having one dominant trunk and a mature height greater than 5 meters (16 feet).*

Things to note:

- Shrubs don't stop at 15 feet
- Just because it has a single stem does not mean it's a tree
- *One dominant trunk* is tricky for some tree species

What NOT to count:

Hedges (arborvitae, or tree species maintained as a shrub)



Dwarf varieties (Japanese maple, spruce, etc)



Volunteer (self-sown) trees under 6 feet



Large versions of what are generally thought of as shrubs:

Rhododendron, Camelia, Photinia, Sambucus, Cotoneaster, Ceanothus, Pinus mugo



Section 3: Learning to Identify Portland's Trees

What we WILL count:

All non-dwarf maple species (e.g. *Acer circinatum*, *Acer ginnala*, and non-dwarf *Acer palmatum*)



Most *Corylus*, *Salix*, and *Ilex* in developed areas (not in natural areas) that are being maintained as trees.



We will not count *Corylus cornuta* that are multistemmed.

Single-stemmed versions of borderline trees (e.g. *Amelanchier*, *Magnolia stellata*, *Prunus laurocerasus* and *Prunus lusitanica*)



It can be hard to determine if a plant is a tall shrub or a small tree. If you aren't sure, ask! Urban Forestry staff will be on hand at every workday to answer your questions and help you out.

Notes

Notes:

Section 4: Practicing Tree Identification



Section 4: Practicing Tree Identification

Recommended Resources

Urban Forestry recommends the following books and web sites for identification of trees in Portland. Together, these inexpensive sources cover nearly all species found in the city.

The Sibley Guide to Trees. Sibley, David Allen. 2009.

Smithsonian Handbooks: Trees. Coombes, Allen J. 2002. ISBN 078948989.

Trees to Know in Oregon. Oregon State University Extension Service. 2005. ISBN 1931979049.

Oregon State University Department of Agriculture Landscape Plants database.

<http://oregonstate.edu/dept/ldplants/>

This amazing database features images and information on over 1,700 landscape plants (mostly woody). All images were taken near the OSU campus in Corvallis, which means that they feature typical growth forms found in our area.

Virginia Tech Dendrology database

<http://dendro.cnre.vt.edu/>

University of Florida Tree Fact Sheets

http://hort.ifas.ufl.edu/database/trees/trees_scientific.shtml

Detailed descriptions of hundreds of species put together by Professor Ed Gilman.

Additional Resources

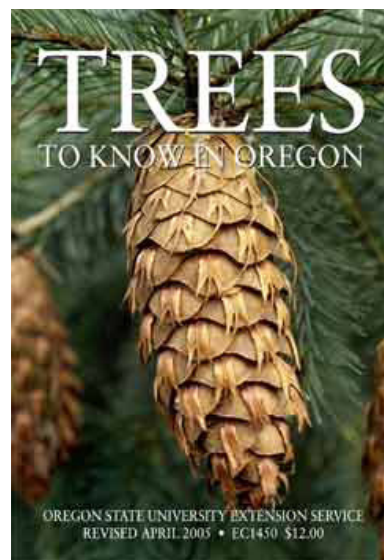
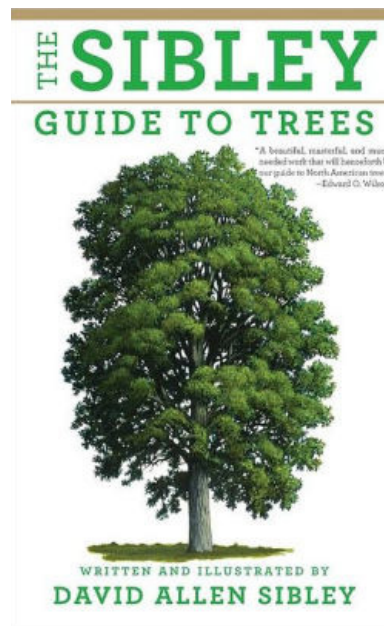
Many other great tree books on tree identification exist. Here are a few more of our favorites:

Dirr's Encyclopedia of Trees and Shrubs. Dirr, Michael A. 2011.

Northwest Trees: Identifying and Understanding Our Native Trees. Arno, Stephen F. and Ramona P. Hammerly. 2010.

Trees for All Seasons: Broadleaved Evergreens for Temperate Climates. Hogan, Sean. 2008.

Trees of North America and Europe. Phillips, Roger. 1978.



Portland Parks & Recreation Urban Forestry Resources

Portland Park Trees Webmap

Take yourself on a tour of Portland's trees using your phone or computer. This webmap includes all park and street trees inventoried between 2010 and 2017, shown as interactive points on the map. Explore from your home or take yourself somewhere the Tree Inventory Project has been and log on to:

www.tinyurl.com/pdyparktrees

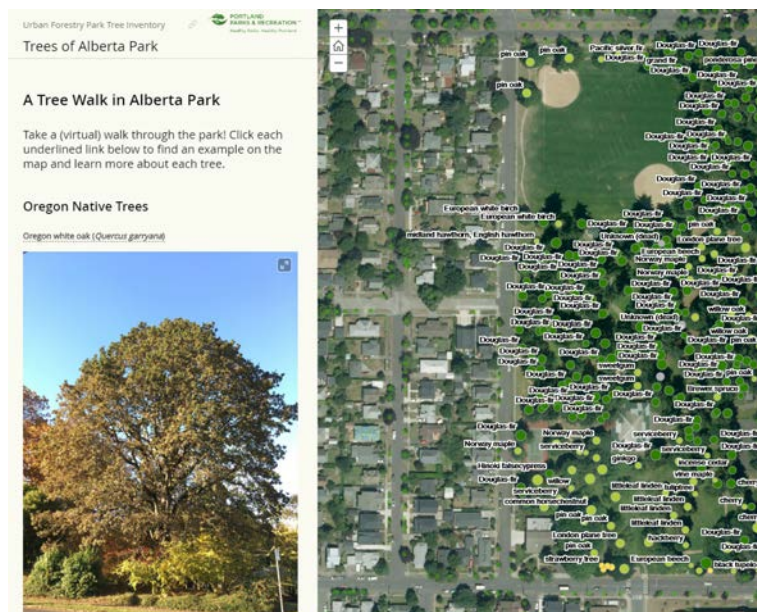
Virtual Tree Tours

Virtual tours of selected parks inventoried in 2017 & 2018 are available on the Tree Inventory Project website. These tours include not only an interactive map of every tree in the park, but also historic photos, stories, and more information on many of the species found.

Tree Walks

Portland Parks & Recreation
Urban Forestry has tree walk
maps on our website for
download.

www.portlandoregon.gov/parks/66728



Virtual tree tours of many Portland parks are available on the Tree Inventory website

Hoyt Arboretum

Hoyt Arboretum has a collection of over 1,000 species of trees. All are labeled with scientific and common names. Visit www.hoytarboretum.org for more information.

Section 4: Practicing Tree Identification

Tree Inventory Data

In addition to maps and virtual tours, the Tree Inventory website has a library of data and reports available for download. Whether you want to know the most common street tree in your neighborhood or download all the data to explore on your own, it's all there!

Visit <http://portlandoregon.gov/parks/treeinventory> and click on “Data, Reports, and Maps.”



Street tree inventory reports provide detailed information on each neighborhood's unique population of trees and recommendations for improving the health of the urban forest.

Inventory Work Days Listed by Date

Each park is assigned 1-2 work days, depending on the size of the park. Workdays are held from 8:30am-12pm on Saturday mornings.

No work days are scheduled for weekend after 4th of July.

Date	Day	Workday	Address	Registration
6/1/2019	Saturday	Team Leader Training Parklane Reformed Christian	16001 SE Main St	tinyurl.com/titlt19
6/8/2019	Saturday	Team Leader Field Session Wellington Park	6635 NE Mason St	tinyurl.com/tltf19
6/15/2019	Saturday	Grant Park	NE 33 rd Ave & Brazee St	tinyurl.com/gpti19
6/22/2019	Saturday	Woodlawn Park	NE 13 th Avenue & Dekum St	tinyurl.com/wdlwn
6/29/2019	Saturday	Grant Park	NE 36 th Ave & Brazee St	tinyurl.com/grnt192
7/13/2019	Saturday	Westmoreland Park	SE 23 rd Ave & Bybee Blvd	tinyurl.com/wstmrlnd
7/20/2019	Saturday	Woodstock Park	SE 49 th Ave & Steele St	tinyurl.com/wdstck19
7/27/2019	Saturday	Northwest Park Blocks	NW 11 th Ave & Overton St	tinyurl.com/nwpblks
8/3/2019	Saturday	Hillsdale Park	SW Dosch Rd & Flower Terrace	tinyurl.com/hlsdle
8/10/2019	Saturday	Sellwood Riverfront Park	1221 SW Oaks Park Way	tinyurl.com/slwdrfpk
8/17/2019	Saturday	Mt. Scott Park	SE 72 nd Ave & Harold St	tinyurl.com/mtsctpk
8/24/2019	Saturday	Sellwood Park	SE 7 th Ave & Malden St	tinyurl.com/slwdpk



PORTLAND PARKS & RECREATION

Healthy Parks, Healthy Portland

Join us for Tree Inventory Workdays this summer!

Sign up for workdays online at: <http://portlandoregon.gov/parks/treeinventory>

