

Resident's Handbook

for Private Tree Data Collection



Please note that the methods described in this document are simplified versions of standard procedures for professional forest inventories, making them accessible to all.

1. Use the metric system to take measurements (meters (m), centimeters (cm), millimeters (mm)).

If your measuring tape uses the imperial system (feet (ft) and inches (in)), make sure to convert accordingly. Use **these tools** to perform the conversions:

[Feet \(ft\) and inches \(in\) --> centimeters \(cm\)](#)
[Feet \(ft\) and inches \(in\) --> meters \(m\)](#)

2. Count all the trees in your yard that have a **circumference of 12.5 cm** or more.

Refer to **section 6 of the handbook** or watch **video module 5** to learn how to measure the circumference.

3. Please **do not include shrubs** in this inventory.



A shrub is typically small, so generally less than 5 meters in height, bushy, with several thin branches clustering near the ground.

4. Is the tree **alive** or **dead**?



A tree is likely dead if it shows **no foliage in summer** while the surrounding trees have leaves.

If you believe the tree is dead, stop collecting data and **move on to the next tree**.

5. Observe the **growing conditions** within a **5-meter** radius around the tree. Check if the following **obstacles** are nearby:

- Building
- Concrete
- Asphalt
- Pervious rock (includes sand, gravel)
- One or more nearby tree(s)
- Panel or post
- Fence

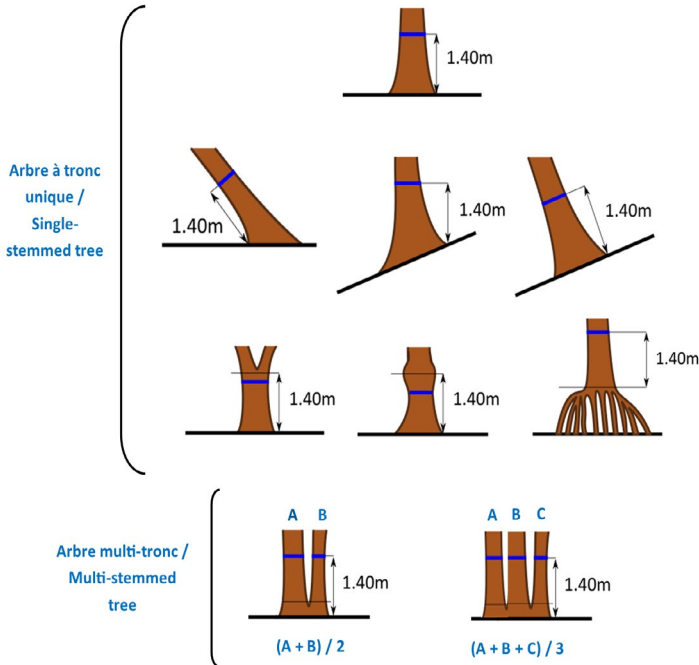


Photos taken by [Paul Raillard](#), Québec City



Several obstacles can limit the growth of a tree, especially in urban environments, such as paved surfaces, fences, and the proximity of other urban trees^{7,8}.

6. Use this diagram to determine where to measure the **circumference at breast height** (typically at 1.40 meters above the ground).



For a single-stemmed tree, record the measurement in **centimeters to the nearest millimeter**.

For a multi-stemmed tree, measure the circumference of all trunks at breast height and **calculate the average**.

The **Diameter at Breast Height (DBH)** will be automatically calculated in the form.

7. To enter the tree's **location** on the map, **stand next to the tree and capture the point**, or use the **satellite image to place the marker on the tree**.

Avoid taking data on trees **already inventoried** by the City of Quebec, marked on the map with green tree icons.

Find your bearings! Click on the **'My Location'** widget to detect your current position and automatically zoom the map to that spot.



8. Help us identify the **species**! Submit at least three (3) photos of the tree through the form. If you know the species, identify it in the form, but please **still submit the photos for validation**.



- Overview of the tree (photo taken from a distance)
- Close-up of the bark
- Close-up of the leaves, **including the stems that are attached, especially** if the tree has **compound leaves**.



1) Feuilles en forme d'aiguille / Needle leaves

2) Feuilles simples / Simple leaves

3) Feuilles composées / Compound leaves

Graphique adapté à partir de / Figure adapted from :

Morham, T. *How to Identify Trees*, <<https://www.concordiaoutdoorsclub.com/post/how-to-identify-trees>> (2020).

- If possible, add a fourth photo if the tree has flowers, fruits or seeds that are attached to the tree



Photo by [Danielle-Claude Bélanger](#), Laurentides, Québec

If you are unable to take close-up photos of the leaves or flowers directly on the tree due to its height, try to obtain photos using the **zoom** feature on your camera.

Make sure that all photos are **sharp and clear** for accurate identification.

9. What is the **total height** of the tree?

For trees that are small enough in height, you can measure the total tree height with your tape measure.

For very tall trees, use the “branch method” as described in **video module 8**. For a detailed explanation of this method, we invite you to watch the following video by **The Timberland Investor**: [How to Measure Tree Height With Just a Stick!](#)



How to Measure Tree Height With Just a Stick! ⋮



Don't forget to **add your eye level height** to the distance between your body and the tree trunk!

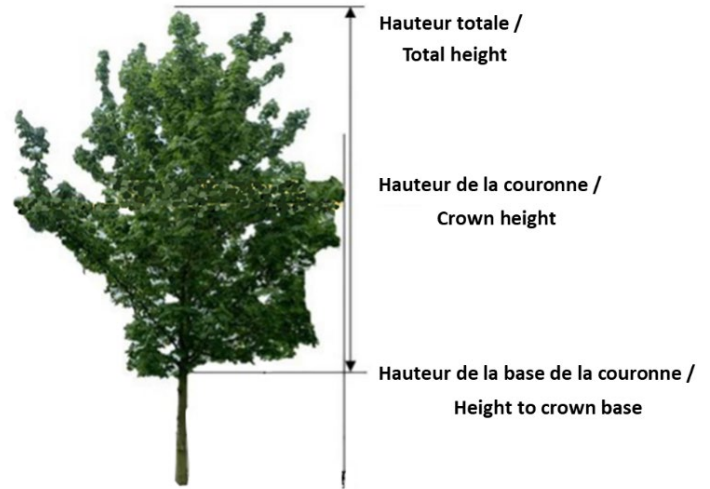


Be careful!

This method may require ample space, so **make sure to proceed safely**. If you encounter challenges with this approach, we recommend exploring alternative methods of estimating total tree height through your own research. Making a rough estimate by comparing the tree's height to a known reference object is likely better than nothing. At the end of the form, you will be asked to describe the method used, which will allow us to validate it.

10. What is the **height to crown base**?

To measure the height to crown base, use a **measuring tape** to measure the **distance from the ground to the point on the tree where the crown begins**, typically the point where the branches start bearing foliage.



Graphique adapté à partir de / Figure adapted from :

Zhu, Z., Kleinn, C. & Noelke, N. Assessing tree crown volume—a review. *Forestry: An International Journal of Forest Research* 94 (2020). <https://doi.org/10.1093/forestry/cpaa037>



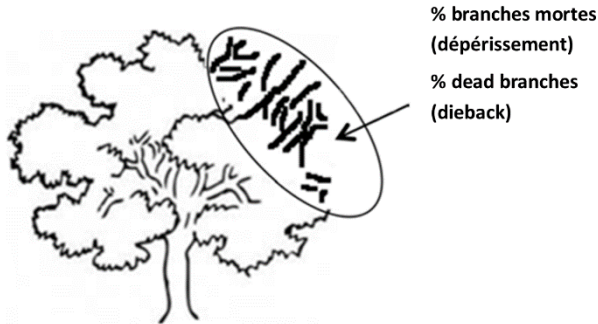
If the crown base is **too high**, you can use the same method with the branch as explained for the total height.



With the total height and the **height to crown base**, it is possible to calculate the **crown height** by subtracting the height to crown base from the total height. This measurement will be automatically calculated in the form.

11. What is the **percentage of dead branches (dieback)**?

Dieback is a condition where the crown begins to die gradually, **starting from the tips and spreading inward toward the trunk**. This situation is often caused by **disease** or unfavorable or **stressful** environmental conditions^{8,9}.



Graphique adapté à partir de / Figure adapted from :

Gordon, J. & Templeton, B. A Step-by-Step Guide to Taking Urban Forest Inventory Measurements. (Mississippi State University, 2015).

Start by envisioning an **outline** around the entire crown to the tips of the branches^{9,10}.

Then, determine the percentage of the total area that is composed of dead branches^{9,10}.



Ce graphique a été adapté à partir d'une image provenant de Ressources naturelles Canada, Service canadien des forêts, trouvée sur / This figure has been adapted from an image by Natural Resources Canada, Canadian Forest Service, found at:

Bouchard, J., Bussières, G., Deguire, G., Laffamme, G. & Tremblay, J. Dépérissement, <<http://arbres.ccdmd.gc.ca/fiche/desperissement/>> (2018).



This tree has a dieback (highlighted in yellow) of about 45%.

12. What is the transparency (%) of the crown?

This refers to the amount of **sky light** that can be seen through **small openings** in the typically leafy portion of the living canopy.



Large natural spaces and dieback are excluded from the estimation¹⁰.



To make this estimation, it can be helpful to **stand beneath the tree's canopy and look upwards**.

Focus on the small openings where light can penetrate. Use this simple diagram to determine the percentage of transparent canopy.

Échelle de transparence du feuillage Foliage Transparency Scale



Figure tirée de / Figure taken from :
Wilmot, S., Duncan, J., Pontius, J., Gudex-Cross, D. & Sandbach, C. Vermont Forest Health Monitoring Protocol, (University of Vermont, 2017).

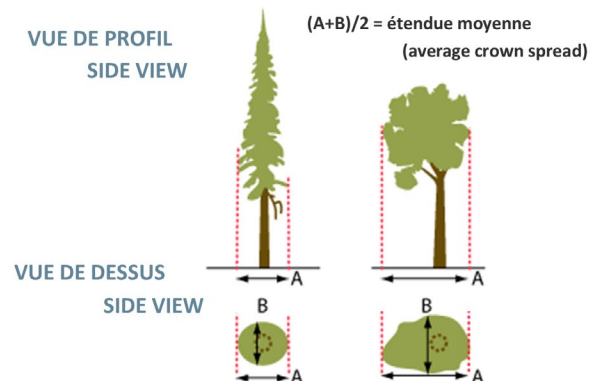
Figure originale / Original figure:
Barnard, J. E., Alexander, S. A. & Tallent-Halsell, N. G. Forest Health Monitoring - Field Methods Guide, (US Environmental Protection Agency, 1994).

13. What is the crown spread (canopy width)?

Many trees have an irregular shaped crown, so the crown spread is measured from one extremity to the other in **two perpendicular directions**, then the **average** is calculated¹².

Use your measuring tape to measure the widths **where they are the widest**.

Provide the measurements in **meters to the nearest centimeter** on the form. If your tape measure is not in meters, be sure to convert the measurements accordingly.



Graphique adapté à partir de / Figure adapted from:

The University of British Columbia - Faculty of Forestry. *Crown spread*, <<https://bigtrees.forestry.ubc.ca/measuring-trees/crown-spread/>>



The average of the two directions will be calculated automatically in the form.

14. Does the tree show any signs of **damage** or **defects**?

- Significant damage to the bark?



Pay close attention to the area around the base of the tree, as lawn mowers and weed eaters can cause considerable damage there⁴.



Lawn mower damage on Norway Maple, image found on: arbres.ccdmd.gc.ca (Blessures mécaniques)⁴

- Significant trunk or crown breakage?



Breakage can occur following strong winds or a storm.



Damage by the wind on an American Elm by Jacques Tremblay
Image found on: arbres.ccdmd.gc.ca (Vent)³

- Visible damage to the roots?



Roots may become damaged as a result of construction work⁴.



Root damage by construction work
Image found on: extension.umd.edu (Damaged Tree Roots)²

- **Minor defects or vandalism?**
- Signs of **browsing by animals?**
- An **insect infestation?**

This question aims to determine whether there is a **significant presence of visible insects** on the tree or any **significant insect activity**, such as holes in the leaves or the presence of webs.



An infestation of green apple aphids. Image found on: reseau.pommier.irda.gc.ca (Les Pucerons)¹



Browsing in a cedar grove by White-tailed deer. Image by Guy Deguire, found on: arbres.ccdmd.gc.ca (Blessures causées par des animaux)⁶

- **Girdling roots?**



Essentially, this is a root that visibly wraps around the tree trunk, appearing as though it is strangling the tree.



Screenshot from the video [Tree Root Girdling--What Is It & What to Do by Tagawa Gardens & Mike Landers, ISA Certified Arborist](#)⁴

If so, please take photos of the damages or defects.

15. Lastly, does the tree have any symptoms of **disease** or **pests**?

This question focuses on all the **abnormal symptoms** exhibited by the tree that could indicate the presence of diseases or pests, such as **wilting leaves**, **discoloration**, **unusual growths**, or signs of **rot**.



Symptoms of the emerald ash borer

If you suspect the presence of a disease or pest, please **take a photo**, and include it in the form.

Among the **tree pests** present in Quebec are the emerald ash borer, gypsy moth, and forest tent caterpillar. Regarding **diseases**, maple tar spot, black knot of cherry, Dutch elm disease, and beech bark disease affect our trees¹³.

To learn how to recognize them, we invite you to consult the summary sheet published by the Quebec Government's Ministry of Forests, Wildlife, and Parks (in French):

- [Summary Sheet: Some Pests and Tree Diseases in Quebec \(PDF\)](#)

There are other tree diseases that exist in Quebec. An excellent resource to help you determine the disease affecting your tree is the website [Identification des maladies qui affectent les arbres du Québec](#) developed by the Centre collégial de développement de matériel didactique (CCDMD), Collège de Maisonneuve.

You can also consult the [City of Quebec's website](#) for additional resources, to learn their **strategies for control**, and learn **how residents can assist the City in combating these diseases and invasive species**.

References and Resources

- 1 Morin, Y. & Chouinard, G. *Fiche 78 Les Pucerons*, <<https://reseau-pommier.irda.qc.ca/?p=6469>> (2024).
- 2 University of Maryland. *Damaged Tree Roots*, <<https://extension.umd.edu/resource/damaged-tree-roots/>> (2023).
- 3 Bouchard, J., Bussi eres, G., Deguire, G., Laflamme, G. & Tremblay, J. *Vent*, <<http://arbres.ccdmd.qc.ca/fiche/vent>> (2018).
- 4 TagawaGardens. Tree Root Girdling--What Is It & What to Do by Tagawa Gardens & Mike Landers, ISA Certified Arborist. *YouTube*, <<https://youtu.be/VMbfsqNpBXc?si=JtzVAq3R2amMtjEJ>> (2019).
- 5 Bouchard, J., Bussi eres, G., Deguire, G., Laflamme, G. & Tremblay, J. *Blessures m ecaniques*, <<http://arbres.ccdmd.qc.ca/fiche/blessures-mecaniques>> (2018).
- 6 Bouchard, J., Bussi eres, G., Deguire, G., Laflamme, G. & Tremblay, J. *Blessures caus ees par des animaux*, <<http://arbres.ccdmd.qc.ca/fiche/blessures-causees-par-des-animaux>> (2018).
- 7 Muscas, D., Fornaciari, M., Proietti, C., Ruga, L. & Orlandi, F. Tree growth rate under urban limiting conditions. *European Journal of Forest Research* **142**, 1423-1437 (2023). <https://doi.org/10.1007/s10342-023-01599-0>
- 8 Gordon, J. & Templeton, B. A Step-by-Step Guide to Taking Urban Forest Inventory Measurements. (Mississippi State University, 2015).
- 9 Wilmot, S., Duncan, J., Pontius, J., Gudex-Cross, D. & Sandbach, C. Vermont Forest Health Monitoring Protocol. (University of Vermont, 2017).
- 10 Winn, M. F. & Araman, P. A. An alternative method for estimating crown characteristics of urban trees using digital photographs. (U.S. Department of Agriculture, 2012).
- 11 Bouchard, J., Bussi eres, G., Deguire, G., Laflamme, G. & Tremblay, J. *D ep erissement*, <<http://arbres.ccdmd.qc.ca/fiche/deperissement>> (2018).
- 12 The University of British Columbia - Faculty of Forestry. *Crown spread*, <<https://bigtrees.forestry.ubc.ca/measuring-trees/crown-spread/>> (n.d.).
- 13 Ressources naturelles et For ets, G. d. Q. *Principaux insectes et maladies des arbres au Qu ebec*, <<https://www.quebec.ca/nouvelles/actualites/details/principaux-insectes-maladies-arbres-quebec-54513>> (2024).