Forêt
Capitale
Forest

A Guide to Planting

TINY FORESTS

Using the Miyawaki Method

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Forêt Capitale Forest

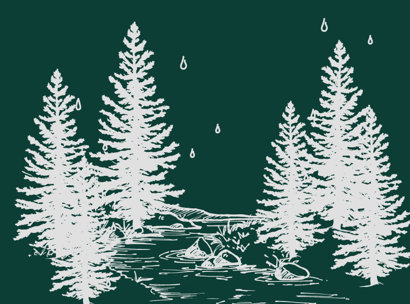
INTRODUCTION

Tiny Forests, also known as mini-forests, are planted using the Miyawaki method of afforestation. This method was developed by Japanese botanist Dr. Akira Miyawaki, and it is believed to have the potential to replicate a 100-year old forest in 25 years or less. We have seen a rapid growth in the demand for Tiny Forests as communities seek out environmental solutions for small, urban spaces. As of 2024, Forêt Capitale Forest (FCF) has planted 9 Tiny Forests in Ottawa, with more forecasted for the coming years. We have created this reference as a guide outlining how to plant a Tiny Forest, what we have learned, and how you can determine the cost that goes into building a Tiny Forest.

Benefits of a Tiny Forest:

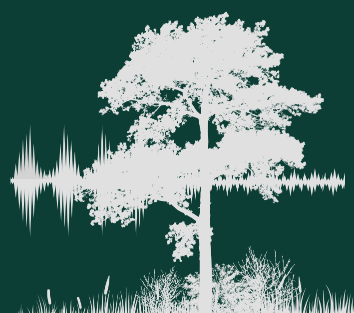
Reduces heat island effect

Improves biodiversity and protects habitat



Stormwater management

Carbon sequestration



Acts as an acoustic buffer

Promotes mental well-being

ARE YOU READY TO PLANT A TINY FOREST?

LAND

- **Do you have the physical space to plant a Tiny Forest?** (Minimum 16 m^2 and no narrower than 4 m at any point, according to the Miyawaki Method)
- **Do you have the landowner's permission to plant?**
- **What role will the landowner have in the planting?** Who is responsible for ensuring liability (insurance, locates, safety)?
- **Is the land suitable for tree planting?** Some sites may have a high risk of soil contamination from past industrial activity, may be part of protected habitat, may interfere with sightlines, or have utility lines passing directly through them. It is important to consult with professionals and look into the current, future, and historical state of the land.

How will you pay for the Tiny Forest? As you will soon see, Tiny Forests can be quite costly. This is to be expected and should be considered part of the investment into this accelerated afforestation method. You will need to determine how you will pay for the site preparation, materials, plant stock, maintenance, and any relevant staff costs. Some sources of funding include: corporate sponsorships, donations (from landowner/s or organizations), fundraising, and grants.

FUNDING

PEOPLE

- **Who will be preparing the site?**
- **Who will be sourcing materials?**
- **Who will be planting the trees?**
- **Who will be responsible for maintaining the site?**
- **Who are you planting the site for?** Think about the community you are planting the Tiny Forest in and how they will benefit from it. Consider creating a plan to engage and involve the community in creating the Tiny Forest.

STEP 1: SPECIES SURVEY

Background

- Selecting species that make up the various layers of a forest and are represented in the local plant community will improve resilience by mirroring the conditions of an already successful forest.
- Urbanization has reduced accessibility to natural forests and native species.
- There are resources that have provided us with information to determine the "potential natural vegetation" - the natural vegetation an area could theoretically support if human influence were not a factor.

STEP 1: SPECIES SURVEY

Instructions

1.1 If you are planting your Tiny Forest in a rural area, or near a publicly accessible naturally forested area (i.e. not a plantation or other man-made natural area):

- Head out to identify some of the plants and trees you see growing. You can use plant-identification mobile apps to assist with this (ex. iNaturalist, PlantNet, PictureThis, Plant.id) or use a field guide for the region.
- Make a list of the plants you see, and remove any plants that are not native to the region. You can determine whether a species is native to Ontario using the **Tree Atlas**, **OntarioTrees.com**, **OntarioWildflowers.com**, and the **ecoregion guides** by Pollinator Partnership. For Quebec, you can use references such **arboquebecium.com** and the **ecoregion guides** by Pollinator Partnership. For all of Canada, you can also use Watersheds Canada's **Plant Database**, and filter by province, or the **Network of Nature Plant Species Database** designed specifically for Tiny Forest plantings.

If you are planting your Tiny Forest in an urban area and do not have access to a natural forested area, you can use the above-mentioned websites to create a list of native species.

1.2 Determine the growth requirements and characteristics of the plants on your list.

- Whether the plant is an overstory species (>/= 10 m mature height), understory species (10 m < 2 m) or forest floor species (=/< 2 m)
- Whether the plant is deciduous or coniferous
- Soil requirements (type, moisture, drainage)
- Light requirements
- Pollution tolerance
- Companion species
- Vulnerability to wildlife, pests, and disease

IF YOU LIVE IN EASTERN ONTARIO, WE HAVE A SPECIES LIST COMING SOON!

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STEP 2: SOIL ASSESSMENT

Background

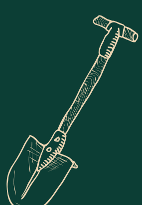
- The goal of a Tiny Forest is for the plants to feel as if they are growing in a natural forest to accelerate establishment and increase survival rates.
- A natural forest has a complex ecosystem that exists beneath the soil where many biological and chemical reactions take place to transform nutrients and resources into a form that plants can use to grow.
- Many sites have had these nutrients stripped and removed during the development of land for residential, commercial, industrial, or agricultural use.
- Completing a soil survey can show you what the current conditions of your site are and what amendments can be added to improve them.

STEP 2: SOIL ASSESSMENT

Instructions

2.1 Obtain utility locates. Get your utility locates at least 5 days prior to digging into the soil. This is a **legal requirement** to dig for any reason. If you are planting the Tiny Forest on either public or private property, you will submit this request through provincial services such as **Ontario One Call** (Ontario) or Info-Excavation (Quebec). If you are planting the Tiny Forest on private property, you will also need to hire a private contractor to locate private utilities (gas line for BBQ or pool heater, lights/signs on the property, electrical lines going to a shed or garage, sewer and septic tank systems, telecom or electrical lines feeding into security lines).

2.2 Classify your soil. There are many different types of soil types and tests you can do to determine their classification. For the purpose of applying the Miyawaki method, we are mostly interested in determining whether the soil is primarily **sandy, silty, or clayey** in texture. **Note that most soils are some mix of sand, clay, and silt. A true equal mix of the three (known as loam soil) is rare in Ontario, and it is more likely that there is a dominant texture.** The below tests are used to determine which texture is dominant.



Dig a hole (~8" deep) at your proposed site. Take a sample from the soil you removed in your hand.

→

Take about 1 tsp of the soil in your hands. Add a bit of water so that it is moist. Move it around with your fingers. How does it feel?
A. Gritty B. Smooth C. Sticky

↓

Roll the soil into a ball and squeeze. How easy is it to break the ball?
A. Easy B. Moderate C. Difficult

←

Roll the ball with your thumb and fingers to form a ribbon/tread. How long is the ribbon before it crumbles?
A. < 1" B. 1-2" C. > 2"

→

Mostly A's: Sandy soil
Mostly B's: Silty soil
Mostly C's: Clayey soil

*Repeat at at least 3 different locations on your site and take your average result.

STEP 2: SOIL ASSESSMENT

2.3 Determine which amendments your site needs. The type of amendments you choose will be based on your site conditions, local availability, and project budget. Generally, we recommend incorporating **at least one amendment in each of the following categories** to improve your soil:

Aeration: breaks up compacted soils to improve drainage, root development, and gas exchange
Nutrients: mimics the nutrients found in a natural forest floor
Moisture retention: helps to prevent drought
Weed suppression/insulation: reduces plant competition and frost damage

Depending on your soil conditions, you may want to prioritize some amendments over others. Sandy soils for example typically require more amendments to improve nutrients and moisture retention than they do to improve aeration. Whereas clayey soils require more amendments to improve aeration and nutrients rather than moisture retention. Silty soils benefit from a balance of all amendment types. According to the Miyawaki method, **all sites will require a final layer of mulch (6-12" deep) after planting** to improve weed suppression and insulation.

Amendment Types

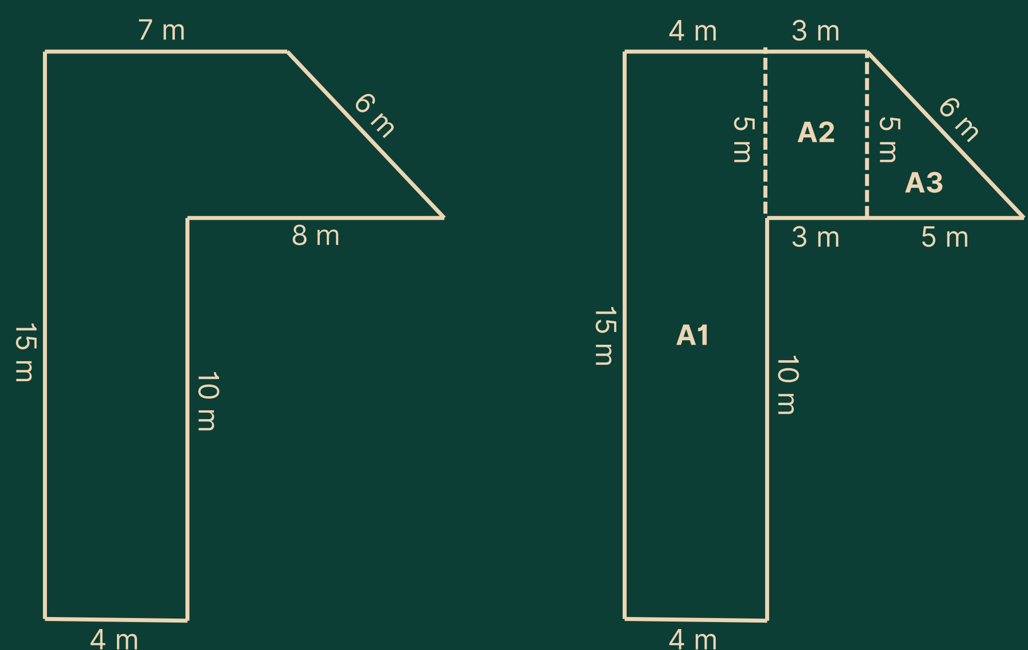
Aeration	Nutrients	Moisture Retention	Weed Suppression / Insulation
• Leaf mulch • Straw or hay bales • Compost • Gypsum	• Compost • Manure • Trace minerals • Mycorrhizal inoculant	• Coco coir • Biochar • Vermiculite • Compost • Manure	• Wood chips • Shredded mulch • Bark mulch • Bark nuggets • Leaves • Straw

STEP 2: SOIL ASSESSMENT

2.4 Calculate the area of your site. The first thing you need to do to determine how much of each amendment you need is measure the perimeter of your site to determine its total area.

- **If your site is regularly shaped** (square, rectangle, circle, oval, triangle, parallelogram, trapezoid) you can use a standard measuring tape or measuring wheel to toss the measurements required for the associated **area equation** of the shape.
- **If your site is irregularly shaped,** you will need to split it up into regular geometric shapes, calculate the area of each shape individually, then add the areas together (see examples below). You can use string to mark out the different shapes to make it easier to measure.

Example 1:

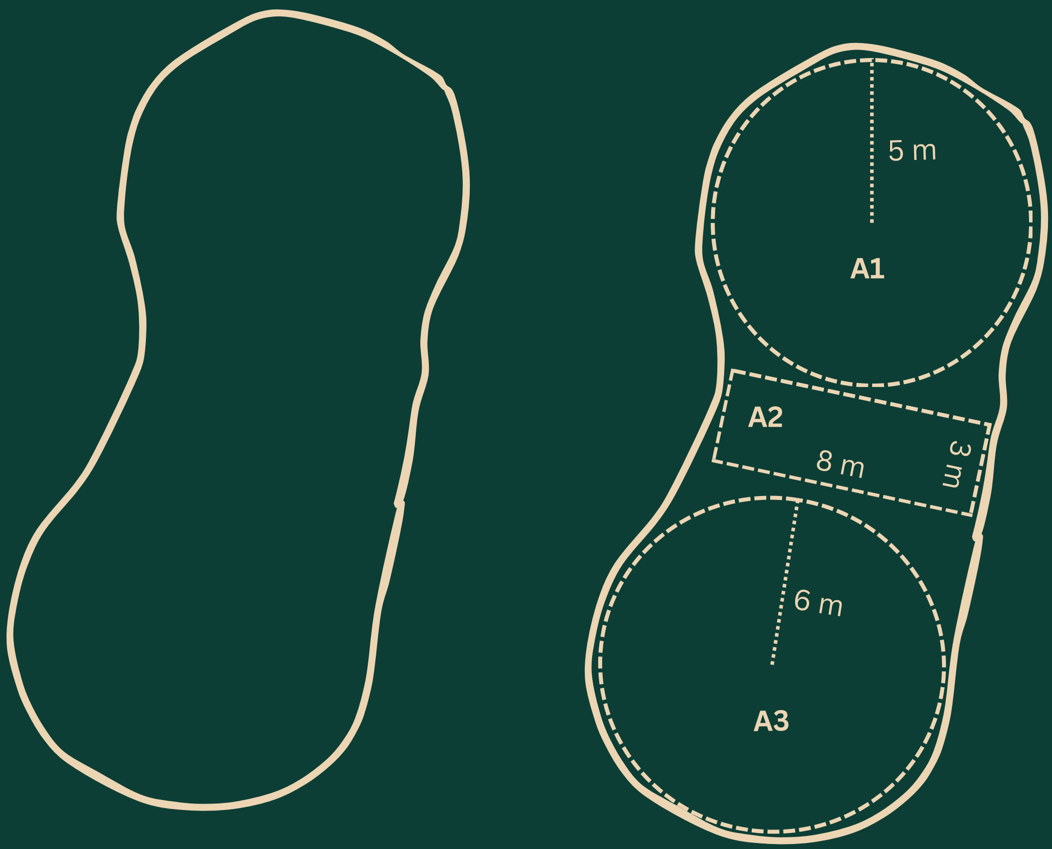


A1 = L*W = (15 m* 4 m) = 60 m^2
A2 = L*W = (5 m * 3 m) = 15 m^2
A3 = 0.5*b*h = 0.5*(5 m * 5 m) = 12.5 m^2

A = A1 + A2 + A3 = (60 m^2 + 15 m^2 + 12.5 m^2) = 87.5 m^2

STEP 2: SOIL ASSESSMENT

Example 2:



A1 = $3.14 * r^2 = 3.14 * (5\ m)^2 = 79\ m^2$
A2 = $L*W = (8\ m * 3\ m) = 24\ m^2$
A3 = $3.14 * r^2 = 3.14 * (6\ m)^2 = 113\ m^2$

A = $A1 + A2 + A3 = (79\ m^2 + 24\ m^2 + 113\ m^2) = 216\ m^2$

STEP 2: SOIL ASSESSMENT

2.5 Calculate the depth of amendments your site requires. If you look at the soil profile diagram below, you can see that the two uppermost layers (organic matter and topsoil) are where most of the nutrients for the plants are. These are also the primary layers that the tree roots penetrate. Many urban sites are lacking in these two layers, since they are often removed for development purposes and not replaced. We want these two layers together to be **0.3 m to 1 m deep (1 foot to 3 feet).**

O - Organic Layer
Very high in organic matter, mostly composed of roots or decomposing vegetation.

A - Topsoil Layer
High in organic matter, also containing minerals. Most beneficial for plant growth.

B - Subsoil Layer
Layer which is high in deposited materials and salts, with minimal organic matter that has leached from higher layers.

C - Parent Rock
Mainly composed of debris leftover from the last glaciation. It is high in mineral material but low in organic matter.

R - Bedrock
Layer completely composed of rock, scrapped clean during the last glaciation.

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STEP 2: SOIL ASSESSMENT

To measure how deep this layer is at your current site, ideally you will use a **soil auger** to extract multiple samples (~10 cm) and lay them out in a line to recreate the soil profile.

- **If you don't have access to an auger:**
    - Check with the property owner to determine if there have been any recent environmental or geotechnical studies on the site. If so, they may be able to provide you with information on the depth of these layers without having to dig.
    - If there have not been any recent studies, you can dig a test pit that is 0.6 - 1 m wide (2 - 3 ft) and up to 1 m (3 ft) deep (or until you can no longer penetrate). You can then evaluate the layers by analyzing the side of the pit. Note, however, that this method is very labour-intensive compared to the auger, and it is much more difficult for someone who is inexperienced in soil science to distinguish the different soil layers this way.
    - Alternatively, hire professional services to complete this work for you.

To determine the depth of the organic (O) and topsoil (A) layers, you will want to put a measuring tape next to the samples you've extracted or in your test pit, starting at the end with the darkest layer, and measure where the soil changes to considerably lighter soil.

- **If your depth is less than 0.3 m (1 ft):** Desired total depth (0.3 m, 0.6 m, 1 m) - (depth of O + A in ft/m) = Total depth of material to be added, in ft/m.
- **If your depth is 0.3 m (1 ft) or greater:** add at least 7.5 cm (3”) of material, or you can use the same equation as < 0.3 m to achieve a desired depth of 0.6 - 1 m.

For example, if the organic and topsoil layers at your site measured only 15 cm (6”) deep and you wanted to achieve a depth of 0.3 m, you would need to bring in:

0.3 m - 0.15 m = 0.15 m (6”) of material

STEP 2: SOIL ASSESSMENT

2.6 Calculate the volume of amendments you need to bring in. You would achieve the calculated depth by bringing in some combination of topsoil, compost, straw, and leaf mulch, since these add the most volume to the site out of all the amendments. For our previous example, we could decide to bring in 7.5 cm (3”) of topsoil, 5 cm (2”) of compost, and 2.5 cm (1”) of leaf mulch or straw. To calculate how much of each amendment we would require we would need to multiply these depths by the total area of the site, to achieve the volume (V). For example, if we assume our area of 87.5 m2 from our first irregular site example:

$$V_{topsoil} = \text{Depth} * \text{Area} = (0.075\text{ m} * 87.5\text{ m}^2) = 6.6\text{ m}^3$$

$$V_{compost} = \text{Depth} * \text{Area} = (0.05\text{ m} * 87.5\text{ m}^2) = 4.4\text{ m}^3$$

$$V_{straw/leaf\ mulch} = \text{Depth} * \text{Area} = (0.025\text{ m} * 87.5\text{ m}^2) = 2.2\text{ m}^3$$

Since these materials are typically ordered in cubic yards, we can **multiply these values by 1.3** to get **9 yd^3** of topsoil, **6 yd^3** of compost, and **3 yd^3** of leaf mulch or straw.

We will also want to order a thick layer of mulch to apply on the site (15-30 cm or 6”-12”):

$$V_{mulch} = \text{Depth} * \text{Area} = (0.15\text{ m} * 87.5\text{ m}^2) = 13\text{ m}^3 = \mathbf{17\ yd^3}$$

STEP 2: SOIL ASSESSMENT

Amendment Type	Example Sources	Cost Range	Example Cost Calculation
Compost (avoid products with peat)	• Greely’s Sand & Gravel • Manotick Gardens & Landscaping Supplies • Maurice Yelle LTD.	$30-$40 / yd^3 + delivery fee ($90-$160)	(6 yd^3 * $35) + $130 delivery = **$340**
Manure (recommend granulated, to avoid peat)	• Robert Plante Greenhouses • Ritchie Feed & Seed • Home Depot	$15-$20 per 10 kg Typically 1 kg per 10 m^2	(87.5 m^2 / 10 m^2) = 9 kg (1 bag) $20 * 1 = **$20**
Trace minerals (Azomite, seaweed/ kelp fertilizer, humic acid)	• Silver Creek Nursery • Optimize Organics • The Organic Gardener’s Pantry	$13-$26 per bag Typically >/= 1 bag per Tiny Forest	$20 * 1 Tiny Forest = **$20**
Mycorrhizal inoculant	• The Organic Gardener’s Pantry • Amazon	$2-$5 / m^2	87.5 m^2 * $3 = **$263**
Leaf mulch	• Ottawa Valley Waste Recovery Centre • Your local backyards	Free - $25 / yd^3	3 yd^3 * $25 = **$75**
Straw or rotting hay	• Carp Garden Centre • Ritchie Feed & Seed • Local farmers	Free - $15 / bale Typically 1 bale covers ~ 0.2 yd^3	3 yd^3 * (1 bale / 0.2 yd^3) = 15 bales 15 * $15 = **$225**
Coco coir	• Ritchie Feed & Seed • Lee Valley Tools • Canadian Tire	$25 - $50 per 50 L Typically 50 L per 40 m^2	(87.5 m^2 / 40 m) * $38 = $**84**

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STEP 2: SOIL ASSESSMENT

Amendment	Example Sources	Cost Range	Example Cost Calculation
Biochar	• Common Ground • The Organic Gardener's Pantry	\$3-15 per 1 m^2	87.5 m^2 * \$8 = **\$700**
Mulch (wood chips, leaves, bark mulch, shredded mulch)	• Greely's Sand & Gravel • Fisher Forest Products • Maurice Yelle Ltd.	\$35 - \$50 / yd^3 or free (ie. leaves) + delivery fee (\$90 - \$160)	17 yd^3 * \$45 + \$125 delivery = **\$890**
Topsoil (avoid products with peat)	• Greely's Sand & Gravel • Manotick Gardens & Landscaping Supplies	\$38 - \$60 / yd^3 + delivery fee (\$90 - \$160)	9 yd^3 * \$50 + \$125 = **\$575**

Other cost considerations for this step:

Private utility contractor: While public utility locates are free, you may need to hire a private utility contractor if the site is located on private property. These utility locates can cost $400 or more.

Vehicle rental: If you are not having the amendments delivered to your site by a company, you may need to rent a vehicle (and/or a trailer) to deliver the materials. Typically these rentals can range between $120-$500 per day, depending on the size required and distance traveled.

Staff time: If you have staff completing this project, you will need to consider the time it takes for the staff to request locates, source and procure the materials, coordinate with the property owner, deliver the materials to the site or meet the delivery driver on-site. If you have volunteers completing this part of the project, consider how much time they will be dedicating in-kind to this process.

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STEP 3: SOIL PREPARATION

Background

- Adding amendments to your site improves soil quality and promotes successful establishment.
- Mixing the amendments in with the pre-existing soil ensures a homogenous mixture so that roots continue to receive the benefits as they grow out and down.

STEP 3: SOIL PREPARATION

Instructions

3.1 Check your utility locates to make sure they are still valid. If you completed your soil test within 60 days of testing your soil, they will still be valid. Some utility locates will last past this time, but you will need to check your paperwork. If your utility locates have expired, you will need to renew them prior to excavating.

3.2 Outline your site perimeter. Use bright chalk or stakes to clearly mark the perimeter of the site where soil amendments and excavation will take place. Ensure the markings are clearly visible to anyone working on the site to prevent accidental damage to surrounding areas.

3.3 Determine the depth of excavation required. The Miyawaki method suggests 3 ft deep, but in certain conditions this is not possible (shallow sites, contaminated soil). If you cannot excavate, you should instead "build up" and add 1-3 ft to the soil surface using the amendments.

3.4 Source an excavator. For small sites, you can rent a mini-excavator from places such as Home Depot, Sunbelt Rentals, or United Rentals, provided someone working on your project knows how to use one. It will typically cost \$250-\$400 per day for the rental of a 1 ton mini excavator (price increases with size). If you are hiring a contractor to do the excavation, you can expect to pay anywhere from \$700-\$1500 per day. If you are building up the soil rather than excavating, you can mix the amendments and topsoil by hand. However the task is quite laborious and time consuming (expect it to take multiple days), and it is usually worth it to hire or rent an excavator.

STEP 3: SOIL PREPARATION

3.5 Excavation. For the excavation, remove 3 ft (or other determined depth) of the soil in your site and place it next to the site. Once the whole site is excavated, you will place half of the excavated soil back into the pit, followed by half of your amendments. Have the excavator mix these amendments in with the soil. Once thoroughly mixed, add the remaining soil and the remaining amendments, and mix again. Note that any bagged amendments (ie. fertilizer, trace minerals, coco coir) will likely need to be spread by hand before mixing.

3.6 Put up safety fencing. If your Tiny Forest is publicly accessible, you will want to put up safety fencing to prevent injury on the soft soil, vandalism, and browsing by large animals. You can use anything from snow fencing (though we suggest using wooden snow fencing over plastic) to garden netting to permanent wooden fencing (which may be preferred in a public park or school yard). If you use temporary fencing, you will need to make a plan to maintain it and remove the fencing in 1-2 years.

3.7 Allow resting time. According to the Miyawaki method, the site should sit for a period of 4-6 months prior to planting to allow the amendments to decompose and fortify the soil. If you are planning on a fall planting, you should apply the amendments in spring and let it sit until fall. If you are planning on a spring planting, you should apply the amendments in the fall before, and allow them to sit over winter. You may need to return to remove weeds at the site prior to planting day.

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STEP 4: PLANTING PLAN

Background

- It can take over 100 years for the multiple layers of a forest to become established through natural succession.
- Planting species that are known to naturally occupy different forest layers (i.e. overstory, understory, and forest floor layers) into your amended soil can help to accelerate this process.

STEP 4: PLANTING PLAN

4.1 Species selection. Using your list of native, regional species from Step 1, select species that suit the conditions of your site. The Miyawaki method suggests planting between 15-30 different species. You should make sure these species are diverse and include a mix of deciduous and coniferous species. A good rule of thumb is the 10-20-30 rule, where an urban planting contains no more than 10% of any one species, 20% of any one genus, or 30% of any one family.

You will be planning to plant 3-5 plants per metre^2, and you should expect to choose an equal mix of overstory, understory, and forest floor species. For example, if you planted a density of 3 plants per square metre on a site that is 100 m^2, we would have 300 plants total and we would aim for 100 to be overstory plants, 100 to be understory plants, and 100 to be forest floor plants. It's okay if the distribution isn't perfectly equal between the three layers, but they should be similar.

STEP 4: PLANTING PLAN

4.2 Source your plants. Source trees from reputable nurseries, conservation authorities, or local organizations that sell or give away native species and not just cultivars. Reputable nurseries will have sourced their seeds regionally and from diverse stands, which improves tree success and genetic diversity. It is most sustainable to source locally where possible, to reduce emissions from transportation.

There are various different tree stock types that are sold, namely bare-root (comes with roots exposed), potted stock (comes in nursery pots), and large caliper (larger, mature trees). For the best success, you will want to select bare-root or potted stock for your Tiny Forest. The recommended height of seedlings in the Miyawaki method is 30-50 cm. Bare-root stock is typically much cheaper than potted stock, but you will need to be prepared to either plant your trees in the Tiny Forest immediately after they are picked up or delivered or pot up the seedlings yourself until you plant them. You will have to care for the seedlings that you are not planting right away (whether re-potted bare root or potted stock) until planting day, by giving daily waterings at least twice a day during summer. Bare root stock will have a lower chance of survival due to prolonged exposure of their roots to the air (making them more susceptible to drought).

STEP 4: PLANTING PLAN

4.3 Renew your utility locates. If you have left your site to rest for 4-6 months, your utility locates may have expired. Check your paperwork, and renew your locates at least 5 days before planting day if they have expired.

4.4 Create a health and safety plan. Your health and safety plan for planting day should include:

- First aid kit on-site
- At least one member who is certified in first aid/CPR in a high-visibility vest, declare this person to participants
- Designated “rest zones” in the shade
- Personal protection (sunscreen, work gloves, close-toed shoes, bug spray, long pants if applicable)
- Drinking water and light refreshments available
- Incident reporting plan

4.5 Source your required supplies and equipment. Some examples include:

- Shovels
- Rake
- Garden gloves
- Watering plan (access to water through faucet or water tote, hose, water cans and/or buckets)
- Wheelbarrow

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STEP 5:
PLANTING DAY

STEP 5: PLANTING DAY

Instructions

5.1 Safety first. Create a designated rest area complete with shade, seating, and refreshments. Set out your tools in a designated area that leaves the path of travel clear. Have your utility locates and any land permits on-site.

5.2 Set up the site for planting 3-5 species per m^2. You can do this many ways. Some of the methods we have tried have included:

Grab-and-Go Method

Lay out a flat grid with 1 m x 1 m squares using string, chalk, or biodegradable paint (we prefer using string since it is reusable, but it can present a tripping hazard). Set the plants outside of your site separated into “overstory”, “understory” and “forest floor” sections with signs designating each section. Instruct the volunteers to grab one plant from each section and then select an empty square to plant them in. This method is more fun for the volunteers and leaves an opportunity to have an open pathway of travel, but it can be difficult for children to remember to grab all three plants (it helps if they are partnered with a “buddy” who is older). If you are planting at a density greater than 3 species per m^2, you can simply have the volunteers grab whatever is left at the end and pick a square to add them to.

STEP 5: PLANTING DAY

Bundle Method

Lay out a flat grid with 1 m x 1 m squares as mentioned previously, but instead have the plants sectioned into “bundles” of 3-5. Instruct the volunteers to select a bundle to plant in an empty square. This is still fun for the volunteers to pick, but makes it a bit easier for children to know they're supposed to take the whole bundle. The downside to this method is that it requires a bit more space outside of the planting area in order for the bundles to be evenly separated and distinguished from one another.

Plant-as-You Go Method

Randomly setting out the plants before volunteers arrive so that we have 3-5 species per m^2. The volunteers will then enter the site and plant as they go. This plan ensures that you maintain your desired planting density and avoids the need to lay down a grid. However, it removes the fun of “choosing” for the volunteers, and makes it difficult to navigate the site around all of the pots.

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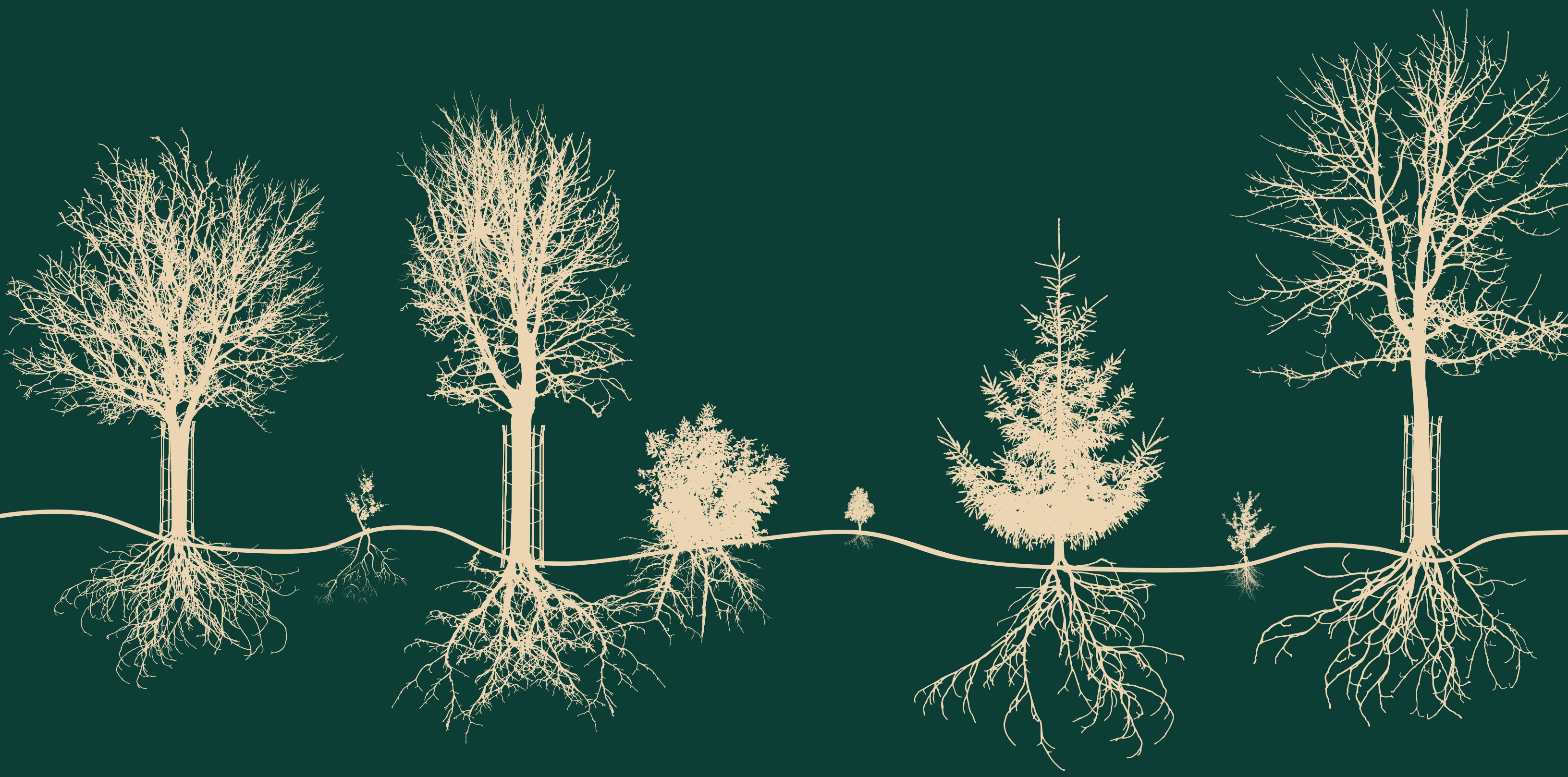
STEP 6: MAINTENANCE

Background

- Newly planted trees and plants are vulnerable to transplant shock due to moving from one environment (e.g. nursery pot) to another (e.g. ground).
- Routine maintenance following the planting of your Tiny Forest will help the plants become established and ensure the best chances of survival.
- The Miyawaki Method suggests two to three years of maintenance.



STEP 6: MAINTENANCE

Instructions

According to the Miyawaki Method, you will want to maintain your site for 1-3 years after planting. Typical site maintenance includes:

Watering

- Water at least once weekly between April and November (until the trees enter dormancy). Water more frequently during heat waves, or when soil feels dry to the touch (see How to Estimate Moisture Level).
- Ensure a water source remains available. If relying on a water tote, prepare to refill if the water level falls below half full. Empty the tote before winter to prevent the water from freezing and breaking the tote.

Weeding

- Remove weeds from the site at a minimum of twice per year. You can weed every 8 weeks during the growing season (April to November).
- You can cut larger weeds that have not gone to seed and leave them on the forest floor to decompose and provide nutrients to the soil. If the weeds have gone to seed, you should cut the seed heads and remove them from the Tiny Forest before cutting the rest of the weed and leaving it on site.

STEP 6: MAINTENANCE

Mulching

As your Tiny Forest grows, you should reapply mulch to any bare areas to maintain moisture retention and insulation. The layer should be between 15-30 cm thick.

Tree Protection

It is recommended to apply tree guards to tree stems near the end of the growing season (late September-November) to prevent grazing from animals. If your planting day takes place late enough in the fall, you can apply these as you plant them. They should be removed in April to allow for the tree to freely grow. You can use spiral style tree guards or netted style tree guards.

Site Maintenance

- Remove any litter that has been blown or discarded in the Tiny Forest.
- Monitor and maintain any damage to your safety fencing. You can remove temporary fencing after the first year.
- Watch for disease and/or pest pressure, and evidence of grazing. Apply control measures as needed.

COST BREAKDOWN

As mentioned earlier, a Tiny Forest is an investment both financially and in the level of commitment. The inputs are much more intensive than your standard tree planting, but the benefits are expected to be much greater and garnered sooner. You are not just planting trees, you are creating a habitat and communal space. There is a high upfront cost associated with implementing a new Tiny Forest, but after the two-year maintenance period, Tiny Forests are intended to be self-sustaining. The survival rates of the trees are also expected to be higher than a standard tree planting, which reduces costs down the road for replacing dead or dying trees.

A Note about Overhead Costs

The cost breakdown on the next page includes the costs associated with the physical implementation of a Tiny Forest. It does not include possible overhead costs such as staff time for landowner and community consultations, planning, material procurement, administration and the labour of actually preparing the site, planting the Tiny Forest, and annual maintenance. It estimated that **at least** 300 hours are spent implementing a Tiny Forest from start to finish. This time needs to be factored in whether you are paying staff to plant the Tiny Forest or expecting volunteers to contribute time in-kind. The cost breakdown also does not include the cost of insurance or any fees associated with obtaining required permissions or permits to plant on the site. Keep this in mind when considering a Tiny Forest for your community, or when reviewing quotes from an organization planting a Tiny Forest for you. The costs on the next page are meant to serve as a general benchmark for material costs.

COST BREAKDOWN

Item Description	Estimated Cost*
Step 1: Species Survey Could include: The purchase of field guides to assist with species identification or admission to a local park or natural area. Lower end of range is for those in Eastern Ontario who solely use our pre-made species list and do not purchase field guides.	**$0 - $500**
Step 2: Soil Assessment Could include: Professional fees (private utility locator, geoscientist consultation) or the purchase or rental of equipment such as a shovel or auger. Lower end of range is for those who have their own equipment already and do not require professional services.	**$0 - $1,000**
Step 3: Soil Preparation Could include: Soil amendments, private utility locator fees, contracting an excavator or equipment rental, safety fencing, and vehicle rental.	**$3,500 - $16,000**
Step 4: Planting Plan Could include: Plant stock, planting equipment, personal protective equipment, watering infrastructure (hoses, watering cans, water tote), private utility locator fees. Lower end of range is for those who only require plant stock (ie. already have equipment and do not require private utility locates).	**$10,000 - $30,000**
Step 5: Planting Day Could include: Refreshments, materials to make a grid, shade tent rental or purchase.	**$100 - $1,500**
Step 6: Maintenance Could include: Tree guards, supplemental mulch and water fees.	**$400 - $1,000**
TOTAL	**$14,000 - $50,000**

*These are purely estimates, not quotes of work completed by FCF. Cost range is estimated for one 200 m plot planted at a density of 4 plants per m . Costs may vary regionally and will change with plot size. Overhead and staff expenses are not included in these estimates.

APPENDIX

Additional Resources

Forêt Capitale Forest Resources

- Fôret Capitale Forest Presents: The Miyawaki Method (Video)
- Right Tree, Right Location (Presentation)
- Map of Tiny Forests planted by FCF

External Resources

- The Mini Forest Revolution (Book by Hannah Lewis)
- The tiny urban forests bringing nature to the heart of the city (Video by BBC)
- How to grow a tiny forest anywhere (TEDTalk by Shubhendu Sharma)
- The Miyawaki Method: Imagining a Mini-Forest's Potential (Article by Chelsea Green Publishing)
- Designing "Tiny Forests" as a lesson for transdisciplinary urban ecology learning (Research study by Monika Egerer and Michael Suda)
- Trees in Canada (Field Guide by John Laird Farrar)
- Shrubs of Ontario (Field Guide by James H. Soper and Margaret L. Heimburger)
- Newcomb's Wildflower Guide (Field Guide by Lawrence Newcomb)

APPENDIX

EASTERN ONTARIO NATIVE SPECIES LIST

COMING SOON