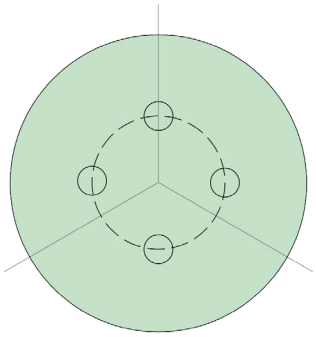
Maine TREE Foundation's

FERN
FOREST ECOLOGY RESEARCH NETWORK

Establishing a FERN Plot

The first step of bringing FERN to your classroom is establishing a FERN plot. Maine TREE Foundation connects teachers with forestry professionals to help set up new plots. This can be done as a class activity or as preperation, before students visit the site. Your forestry professional advisor can help you decide which process will best set your students up for success.

While traditionally the locations of forest monitoring plots are randomly determined, we work hard to provide students with a positive outdoor learning experience through FERN. We recommend being intentional in choosing a forested location that is easily accessible from the classroom and is comfortable to stand in (a dense understory makes navigating the plot frustrating!) FERN plots are 1/10th acre circles. The diameter of a 1/10 acre circle is just under 75 feet, or about 30 adult paces. There should be enough trees overhead that there is no question that it's a forest, but not so many that you can't see all of your students at one time. Once you have found a spot that seems about right, follow the procedure below to set up your plot. Remember, you don't have to do it alone! Forestry experts statewide are at the ready to support FERN curriculum delivery. We would love to help.

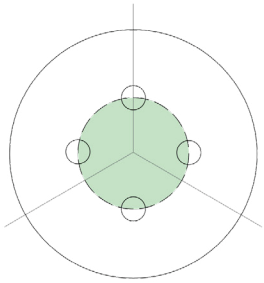


1/10 Acre FERN Plot

the 1/10th acre FERN Plot is the core of FERN programming.

Activities that take place on this plot scale:

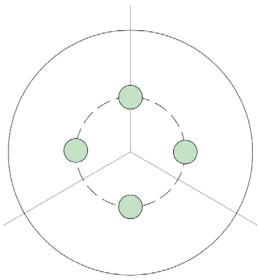
- Overstory
- Snags
- Wildlife
- Phenology
- Invasive species
- Tree health



1/50 Acre FERN Plot

Activities that take place on this plot scale:

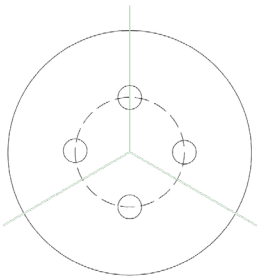
- Saplings



1/1000 Acre FERN Plot

Activities that take place on this plot scale:

- Seedlings



FERN Plot Transect Lines

Activities that take place on this plot scale:

- Course woody debris

The FERN curriculum takes place in a 1/10 acre circular forest plot. Some FERN activities instruct students to collect data in subplots within the main FERN plot. Subplots allow data collection to happen at various scales and guide students to think critically about *why* we might size down our data collection area for seedling counts but not for overstory tree counts.

Each included activity details where in the FERN plot data should be collected. Which activities take place at each plot scale is also visualized here.

Maine TREE Foundation
TIMBER RESEARCH & ENVIRONMENTAL EDUCATION

Plot Establishment Procedure

What You'll Need

- 4x4 inch post
- compass
- flagging
- grade stakes (4)
- hammer
- measuring tape
- nails
- permanent marker
- tree ID tags

1/10 Acre FERN Plot

The 1/10 acre plot is the core of your FERN plot. The Overstory, Snags, Wildlife, Phenology, Invasive species, and Tree health activities all take place at this scale.

1. Establish plot center with a 4 in. x 4 inch post. *Note: it's helpful if this post is colorful! It should be easy to spot each time you return to the plot.*
2. Using a compass, mark the cardinal directions on top of the post in permanent marker.
3. In each cardinal direction, measure 37.2 feet and mark the end point with a (colorful) wooden grade stake. These points are the north, south, east, and west edges of your external, circular plot boundary.
4. Tie colorful flagging on branches in an arc between each grade stake to define the circumferance of your plot.
5. Walk back to plot center and face north. Starting with the overstory tree closest to you and moving in a clockwise direction, asign each tree a **Tree ID number** sequentially. In the FERN curriculum, we define overstory trees as any tree with a **diameter at breast height** greater than 5.0 inches. Mark each tree with the appropriate numbered **tree tag** as you go. If two trees are lined up in your sightline from plot center, asign the tree closest to you before the one further away. When installing Tree ID tags, make sure they are placed just under **breast height**, 4.5 feet off of the ground on the downhill side of the tree. Make sure all tags are placed facing plot center and that each nail is only hammered in half way so the tree has room to grow

1/50 Acre Nested Plot

The 1/50 acre plot is uses the same plot center as the 1/10 acre FERN plot as is nested within it. The Saplings activity takes place at this scale.

6. Return to plot center as established in step 1.
7. In each cardinal direction, measure 16.65 feet and mark the end point with a (colorful) wooden grade stake. These points are the north, south, east, and west edges of your 1/50 acre nested plot.
8. Tie colorful flagging on branches in an arc between each grade stake to define the circumferance of your nested plot.

1/1000 Acre Nested Plots

There are four 1/1000 acre nested plots and each one has a unique plot center, which sits along the circumferance of the 1/50 acre nested plot. The Seedlings activity takes place at this scale

9. Return to plot center as established in step 1.
10. In each cardinal direction, measure 16.65 feet and mark the end point with a (colorful) wooden grade stake. *Hint: if you completed step 7 you already did this!* These points are the plot centers for four 1/1000 acre nested plots.

FERN
FOREST ECOLOGY RESEARCH NETWORK

11. Choose one 1/1000 acre plot to begin with and, using your compass, mark the cardinal directions on top of the stake.
12. From this plot center, measure 3.72 feet and mark the end point with a flag stake. These points are the north, south, east, and west edges of your 1/1000, circular plot boundary.
13. Repeat steps 11 and 12 for the other three 1/1000 acre plots.

Transects

Transects are 50ft lines that start from the 1/10 acre plot center and go through the external boundary of the 1/10 acre plot. These lines allow us to collect consistent data in a long, narrow, strip. The Woody Debris activity takes place at this scale.

14. Return to plot center as established in step 1.
15. Face north from plot center.
16. Measure 50 feet in a straight line due north. Mark the end point with a flag stake. When taking measurements on this transect, you can lay a measuring tape, or string from plot center to this flag stake to visualize your line.
17. Return to plot center as established in step 1. Use your compass to face 120 degrees from North at plot center. *Hint: you should be facing somewhere in between your South and East markings on your plot center stake.* Measure 50 feet in a straight line due Southeast. Mark the end point with a flag stake. When taking measurements on this transect, you can lay a measuring tape, or string from plot center to this flag stake to visualize your line.
18. Return to plot center as established in step 1. Use your compass to face 240 degrees from North at plot center. *Hint: you should be facing somewhere in between your South and West markings on your plot center stake.* Measure 50 feet in a straight line due Southwest. Mark the end point with a flag stake. When taking measurements on this transect, you can lay a measuring tape, or string from plot center to this flag stake to visualize your line.

Definitions:

Diameter at breast height: often shortened to **DBH**, this is a standardized height used to maintain consistency in reporting the diameter of trees. The diameter of a trunk is not consistent from the ground to the crown. Thanks to this rule, we know that changes we see in diameter across years are due to growth, not measuring different parts of the tree. DBH is defined as the diameter measurement taken at breast height, or the point on the trunk that is 4.5 ft up from the ground measured from the uphill side of the tree. (*hint: use your measuring tape!*)

Plot center: This is the middle point of your FERN plot: the center point of your 1/10, 1/50, or 1/1000 acre circle. We mark it as a reference point to build from as we set up the rest of the plot.

Tree ID number: Each overstory tree in a FERN plot is assigned a unique number. This allows us to measure and track the same tree over time and to know which tree our data refers to.

Tree tags: These metal, numbered tags allow us to mark overstory trees with their unique Tree ID number to keep track of which tree is which within the FERN plot.