# How to Look

- How to Read a Plot

# How to Read a Plot

## Introduction

You're walking around the city and you encounter some plants - maybe a park, a community garden, a street tree, abandoned lot, maybe a weed growing in a sidewalk crack. There are maybe some animals and insects as well. What sorts of plants are these? Why are they here? Why do we care about any of this?

(short motivation - not scientific, aesthetic, or environmental)

How do we learn about our neighbors?

## Environment

First, we need to evaluate the environment. Define the boundaries of the plot you're looking at. This guide will be most useful for areas smaller than around 100 square feet.

### Stable factors

- Where are we? What country, state, city, and neighborhood?
- What is the current habitat? Land or aquatic? If land, look at canopy coverage to determine forest, shrubland, meadow. If aquatic, is it wetlands, estuary, river, pond? An extra one for cities - urban street tree bed.
- What is the human history of the space? Primary or secondary forest, urban park, community garden. Who maintains the space? Were there previously buildings on this area?
- What ecoregion was this land before founding of New York City (eastern temperate forests)? Homegrown Natl Park Ecoregion Finder, Welikia Project. Who lived here?
- Which way is north (why do we care?)

### Conditional factors

- What season, month, weather, time of day?
    - You can come back at different times of day and year and redo same analysis over and over. Plants bloom at different times and some plants called spring ephemerals disappear completely after blooming in spring.
- How much sunlight is the plot receiving? Is it blocked by any trees or buildings? What is the path of the sun over the day, and how does it change throughout the year?
- Assess the soil. Is it sandy, loamy, clay-y? Moist or dry? Light or dark? Is the soil compacted or loose? What does each of these tell us about the soil properties?
- Was there rain or snow recently affecting the soil moisture?

## Inventory

Now we can start to inventory the organisms in the plot. At first, we don't know the names of anything, but that's fine. We can learn a lot just with our eyes and our hands, without looking anything up.
Make a list of all the plants, including trees, shrubs, herbs, graminoids (grass-like plants), vine, fern. Make up the names and give a rough count for each one. Are there multiples of a particular plant? How can you tell they are the same? Do they vary in form?
Describe each one -

- Form
  - Tree, shrub, herb, graminoid, vine, fern
- Buds
  - Color, shape, hairy or smooth
- Leaves
  - Shape, color, thickness, texture
  - Distribution (quantity/arrangement)
  - Alternate or opposite
  - Petiole or stipule
- Stem/bark
  - Thorns, diameter, texture, color.
- Fruit
  - Color, size, firmness
  - Any on ground? Any eaten?
- Seedheads
  - Spread by wind or by animals?
- Roots (generally, don't dig up roots)
  - Visible?
  - Color, thickness, extent
  - Spreading laterally or more downward
- Flowers
  - Color. If purple/yellow, probably pollinated by insects. If red, probably birds.
  - Flower type? Simple, compound.
  - Shape
- Habit
  - Height, width, sprawling or contained
  - Dense leaf coverage or lots of sunlight penetrating through?
  - Casting shade on other plants?
  - Stolons or rhizomes
  - Is the same plant present in the surrounding area outside of the plot?
- Health
  - Signs of disease
  - Potential causes of disease
  - Insect activity
  - Moisture conditions
  - Sunlight conditions

Make a list of insects, birds, and any other animals present. Make up the names and give each one a rough count. Describe each one.

At this point, it can be helpful to make a sketch of the plot. Focus on general shapes, the overall configuration, and the topology, rather than the details of individual plants. Try sketching from different angles. Indicate which way is north in each sketch, and include rough measurements of the plot area, as well as heights of plants.

## Human Activity

Now we will look for signs of human activity. What do you notice about

- borders of the plot
- any signage
- art or sculpture
- evidence of pruning
- deliberate arrangement of plants

Does the plot look like it was designed by humans? What was the goal of those designers? If not, how did the plants get here?
Does the plot look like it is regularly maintained? What is the goal of the maintainers? Is there a particular aesthetic or style the gardeners are intending?

## Relationships

Now we will analyze the relationships between organisms.
How much of the plot is each plant taking up? does it seem to be stable, thriving, or dying back? Why?
Write down the plant-plant, plant-animal, and plant-human relationships and interactions.

## Identification

Now that we have analyzed by ourselves, we can start to look at external resources. But first we need to figure out their names
in order to look them up.

- Humans: Ask the gardener
  - Humans are often wrong.
- Photo identification apps: iNaturalist, Plant.net, PictureThis
  - Photo identification only look at the visuals provided, which are often not enough to distinguish between similar species (e.g., American holly vs English holly). Often you need to measure leaves, look at the underside of leaves, feel the texture, look at the habit, etc., which these apps will not tell you to do. They are often overconfident about identifications that are completely wrong.
- iNaturalist: The app lets you upload pictures of organisms to their citizen science database, and other knowledgeable people will help identify (though this may take some time).

- Books: "Identifying Trees of the East", other field guides
  - Books are difficult because in an urban setting, especially in parks and gardens, many species will be non-native and won't appear in field guides. There are books that cover a more cosmopolitan range of plants but they are several thousands of pages long.
- Tree maps: NYC Tree Map, Greenwood Cemetery Tree Finder
- bplant.org has identification guides for telling apart similar species such as white/red mulberry, early/sweet goldenrod, etc.
  These are most reliable because they are written by botanists.
- Forums: reddit.com/r/PlantIdentification. Users can be helpful in providing suggestions but are also often wrong.
- Dichotomous keys: There are various dichotomous keys available on the internet for tree and plant id and they are reliable, but they can be quite technical and difficult to use for amateurs.
- Invasive species lists: nyis.info, Green Oasis Invasive Species guide
- Ecowiki has more resources on tree identification, in summer and winter

You may need to come back at a later time when flowers or fruit are available in order to identify a plant for certain.

When assessing a plant description, be aware that there can be great physical variation within the same species. Most guides do not describe how very young plants look, but their leaves are often very different from mature plants. Colorations and marking can very by geography and depending on local site conditions. Use the information you gathered in the inventory phase to inform your search - if you noted that the leaves are hairy, e.g., look up the plant you think it is to see if it matches.

Once you have a guess, search for similar looking plants and how to tell the difference between them. For example,
if the photo ID app says american holly, search "What is american holly confused with?", yielding "English holly." Then search
how to tell the difference between American and English holly. In parks and gardens, an additional complication is that the plants and trees may be commercial cultivars for which there won't really be any scientific information available online. In general, graminoids are very difficult to identify, especially when not flowering.

Insect and Animal Identification

- iNaturalist photo ID app
- iNaturalist: The app lets you upload pictures of organisms to their citizen science database, and other knowledgeable people will help identify (though this may take some time).
- Bees in your Backyard book
- Merlin app for bird identification

# Research

Now that you have identified the plant, research online or in books to determine

- Origin: is it native or non-native? Is it considered invasive? Why?
- What is the native range of the plant?
- Is it an annual, biennial, or perennial? If a grass, cool-season or warm-season?
- What sunlight and moisture conditions does it prefer?
- When does it flower and fruit?
- What other plants is it related to?
- What wildlife does the plant support?
- How does the plant grow? Primarily through rhizomes/stolons or through large amounts of seeds?
- For native plants, GrowitBuildit, Lady Bird Johnson Center, North Carolina Extension Gardener, The Plant Native, all good online resources

## Assessment

What do you think the plants and animals in this plot? Are they good neighbors to the other organisms around them? If you could add, remove, or modify the planting, how would you do so and why?

## Additional Testing

If you are intending to plant in this area, then it is useful to get a more thorough understanding of the environmental conditions.

- Field Soil Ribbon Test - texture of soil, sand/loam/clay (GrowitBuildit on YouTube)
- Field Compaction Test - using a soil corer (see YouTube)
- Field Soil Drainage Test (GrowitBuildit on YouTube)
- At-home Mason Jar Soil Test - more reliable way to test soil texture, takes a few days (GrowitBuildit on YouTube)
- Lab soil test - Send soil samples to Urban Soils Lab at Brooklyn College - takes a few weeks. There is sometimes free lead testing offered through the Urban Soils Institute.
- Solar map - On a sunny day, take a picture of the area every 1-2 hours and determine how many hours of sunlight it is getting. You can repeat this every month in order to get an idea of the sunlight exposure of this plot.