Notes for the Eco-Hike (Dendro Walk)

What is Dendrochronology?

- Dendrochronology is the science of obtaining information from tree-rings. Since trees are long-lived organisms and they stay in one place during their lives, trees function as resident historians. The trees record information about the climate and environmental conditions that they experienced in the past.

What kind of information can be obtained from tree rings?

- The width of tree-rings (or the amount of wood that a tree can add during one year of growth) can provide dendrochronologists with information about the growing conditions in that year. For instance, if a tree is growing on a steep, rocky slope where moisture is limited, its growth will be restricted in a year with below-average rainfall. This means that the tree will produce a narrow growth ring for that year. ***This region experienced a severe drought in the 1960's. How would you expect this to be recorded by the trees? Many people thought the 1960's drought was a rare event. How could you test this assumption using tree-rings?***

- Not all trees produce tree-ring records that can be used for climate analyses. If a tree is growing on a moist site with deep soil, the tree may have enough water even in dry years. Trees that are not sensitive to changes in climate are called complacent. **[Find a tree rooted in rock outcrop compared with tree rooted in deep soil]** ***What would you expect the rings of these trees to look like?***

- Dendrochronologists can also gather information on forest disturbance from tree-rings. If a tree is damaged by a fire, landslide, tree-fall or disease, there is often a reduction in tree growth shown by narrow rings. Additionally, fires and landslides often cause damage to the trunks of trees, which produce scars that can be seen in the tree-rings. **[Find a tree with a scar on the stem]**

What kinds of trees do we have in the Lamont forest?

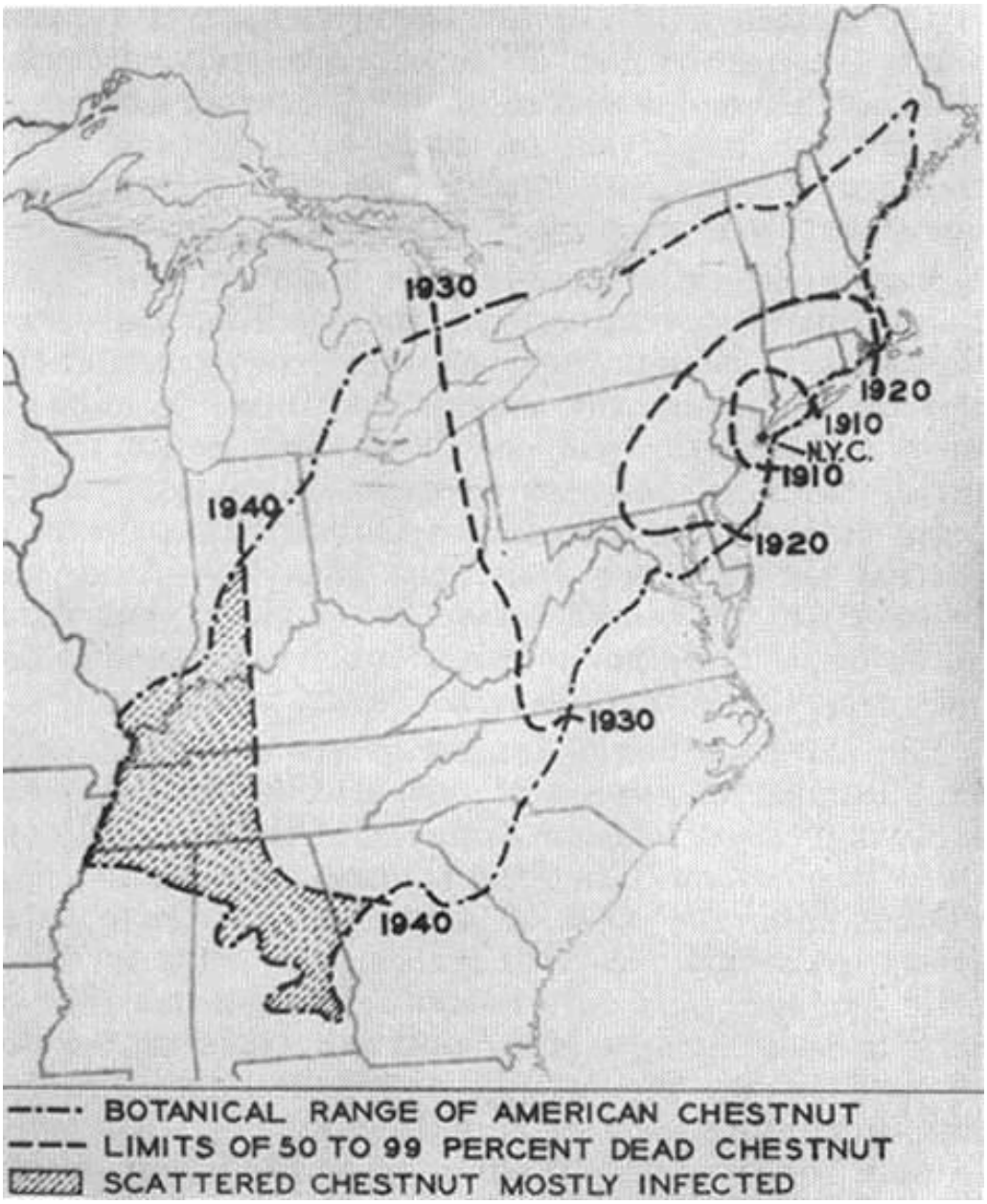
- The forest surrounding LDEO is located in a zone of transition between two biomes, or ecoregions. Species that are typical of the Hemlock-Northern Hardwoods region to the north, and species characteristic of the Oak-Hickory region to the south can be found here. This results in more species diversity here than forests to the north and south. Some trees typical of the northern region include eastern hemlock, sugar maple, and American beech. Species typical of the southern region include yellow poplar (tulip tree), sweetgum, pignut hickory and shagbark hickory. **[Examine samples of species of the two ecoregions.]** ***What factors influence the distribution of tree species? What can the past and present range extents of tree species tell us about climate change?***

- In addition to the native species that typify the northern and southern ecoregions, there are many exotic, or non-native species that can be found here. Trees such as Norway maple, and tree-of-heaven are species that have been brought to North America from their native habitats in Europe and Asia. Humans originally brought these species here as ornamental trees for gardens, but the trees escaped cultivation and have become invasive species that compete with native species for resources (light, water, soil nutrients, and space). Many invasive species are very successful in out-competing native species, leading to reduction in the diversity of plant life in a region. ***What are some characteristics that might help a plant out-compete its neighbors for resources?***

NOTE: Tree-of heaven is a very successful invasive species. It produces many seeds per tree (around 300,000 – 400,000!), the seeds have a high percentage of successful germination, the trees can also re-sprout from stumps or roots when cut down, and the trees produce chemicals in their roots that are toxic to the roots of other plants (allelopathy).

- Some introduced (invasive) species are not plants, but organisms that cause plant disease like insects, fungi, bacteria, or viruses. Many plant diseases have been introduced to our area from Europe and Asia. Some examples include the hemlock woolly adelgid beetle, and Dutch elm disease (a fungus). ***Why are these pathogens so devastating to our native species, but do not produce the same effect on trees in their original habitats (Europe, Asia)?***

- Introduced species often get a foothold in our area due to its close proximity to international ports like New York, Philadelphia, and Baltimore. For example, tree-of-heaven was originally brought to Philadelphia as a garden tree in 1784. Also, the American chestnut blight, a fungus that led to the extinction of the American chestnut, is believed to have arrived in lumber shipped to New York from Asia at the turn of the 20th century. **[See map below]**



Additional questions:

What can we learn from “blow-downs”?

What story does the maple and other saplings tell?

What is the soil like in the Lamont forest, compared with locations often used for farming? How does this affect the trees?

What story for the glacial erratics (loose rocks from elsewhere) tell?

What other stories are told by what you see here?

Notes: