College of Natural Resources

Department of Forest Resources
Forest Measurements and Inventory
Laboratory 8

Care and use of an increment bore: auger, handle and spoon

What are increment bores useful for?

- Aging trees
- Determining tree growth rates
- Reconstructing what stands looked like in the past and how they've changed
- Dating fire scars to see how often fires occurred in the past
- Archaeology: dating ruins, charcoal pieces, etc.
- Determining how far wood preservatives have penetrated into poles and ties

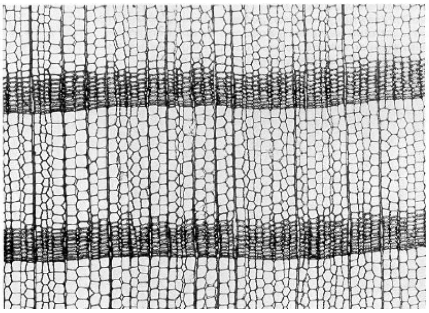


Figure 1. Early and latewood from a western larch (from Maeglin 1979).

Coring trees:

Coring height depends on the use. Most dendrochronologists core as close to the ground as possible while still allowing room for the handle to turn.

Bore parallel to the contour of the slope to avoid reaction wood.

Put the tip of the borer in the furrow of bark, point to where you think the pith is (you can estimate this by looking at branch angles). Start slowly, turning while pressing into the bark. Once started, rotate slowly, being careful not to wiggle up and down or side-to-side. Insert the extractor (be gentle, move it if necessary), then turn the increment bore at least one half turn out of the tree, until extractor "scoop" is up. Then pull the extractor out. Take the increment bore out of the tree as soon as you can after.

When it gets jammed, don't use anything metal from the cutting end of the bit. Instead, you can use a golf tee or a wooden chopstick, push the borer against a small branch, use the extractor to remove a piece at a time from the back of the borer, dry the core and then extract it, or take a very small diameter bit welded onto a rod and turn it by hand to remove the wood.

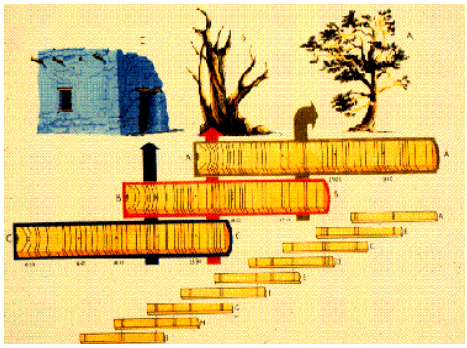
While you can count and measure tree rings in the field, it is often necessary to insert them into drinking straws (paper ones work well because you can crimp the ends, label them, and then dry the cores). Map tubes work well for transporting the straws and cores in the field.

Care of increment bores

Increment bores are expensive (about $320 for a nice 20-inch long one), but is one of the only tools for aging trees. It's important to learn the proper use and care of these precision instruments – how to keep them sharp and clean. With lubrication, cleaning, and sharpening, increment bores can last for many years.

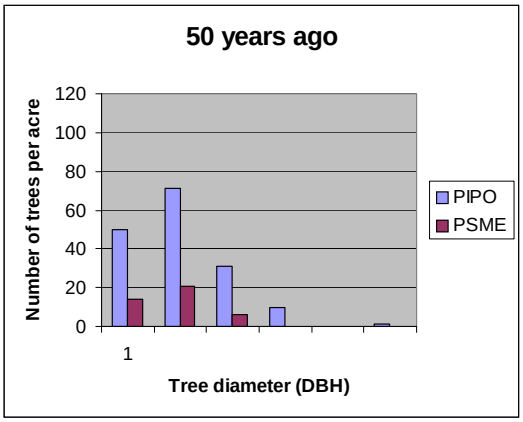
- Do keep them sharp (find and follow sharpening instructions) and clean (wipe with solvent and a soft cloth, then lightly oil).
- Don't use metal on the cutting edge (never insert metal into the cutting end of the bit to get a piece of wood out)
- Protect the cutting edges by preventing them from hitting against rocks, inside of the handle or other hard surfaces
- Beware of the sharp end of the auger and be cautious if the spoon has been bent as it might break.

Today we want you to:



1. Learn how to use an increment borer.
2. Core at least 4 trees. Before you do, make some predictions about what you'll find. Which trees will be older? Which are growing faster? How big were the trees 50 years ago?

Figure 2. Dendrochronology is the science of tree rings. Wood from old buildings, old instruments, stumps and logs can be dated by matching the patterns of narrow rings with long chronologies of tree rings built from living, dead, and cut trees. Dendrochronology has been used to date wood in ruins to see when they were built, to date fire scars on trees, to understand insect effects through time, and to reconstruct fire and climate relationships in many regions of the US.



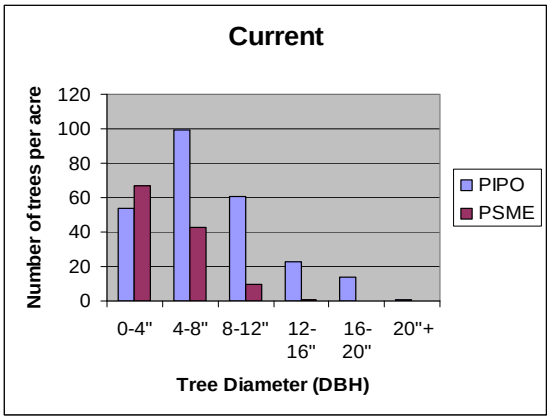


Figure 3. Changing forest stand conditions over 50 years on the Spokane Indian Reservation. in an area that once had frequent surface fires. Basal area is currently 129 ft^2/acre; it was 43 ft^2/acre 50 years ago. Fires occurred about every 10 years through the early part of this century and the last part of the 1800s. Despite very active management by the tribe, there is three times the basal area, mainly in young Douglas-fir and relatively small diameter ponderosa pine. These trends are similar to those occurring elsewhere in ponderosa pine/Douglas-fir/grand fir forests. However, the trends are much more dramatic elsewhere, contributing to a higher risk of crown fires, as well as risk of tree mortality due to bark beetles, root disease, fire, and other disturbances.

To learn more:

Maeglin, R. 1979. Increment Cores: How to collect, Handle, and Use Them. USDA Forest Service Forest Products Lab, General Technical Report FPLGTR-25. Available online: <http://www.fpl.fs.fed.us/documnts/fplgtr/fplgtr25.pdf>

Grissino-Mayer, Henri. Increment borers. Ultimate Tree-Ring Web Page: Available online: http://web.utk.edu/~grissino/borers.htm

Grissino-Mayer, Henri. 2003. A Manual and Tutorial for the Proper Use of an Increment Borer. Tree-Ring Research 59(2):63-79. Available online: http://web.utk.edu/~grissino/downloads/borer2003.pdf