

CRUISING WITH A CRYSTAL BALL

Estimating Timber Density with a Wedge Prism



Aforester

packs up his instruments and tools and heads out to a stand of forest to estimate the density of the timber. Among his tools is a small piece of glass that looks like a single lens from a pair of eyeglasses. This plain-looking, low-tech object, called a “wedge prism,” is actually one of the most important tools in a forester’s timber-cruising bag of tricks.

Timber cruising is the estimating of the density and size of timber in a stand of trees.

This information, called an “inventory,” helps private industries and government departments make smart decisions, such as what proportion and which trees

to cut down in order to maintain a healthy forest. There are two standard ways to cruise a forest, but the simplest is called variable-plot sampling. When using this method, a forester stands at a point in the forest and looks at the trees in a full circle around that point through a wedge prism.

“It’s understanding why and how it works that is the complication,” said OSU former assistant professor John Bell, an expert in variable plot sampling, “It’s very easy to use.” The forester looks through and over the prism and the image of the tree is displaced in the glass. If the edges of the displaced tree and the real tree overlap or meet, then the tree is counted. If there is a gap between the two images, then the tree is not counted. Each overlapping tree represents a certain amount of square feet of timber per acre, so all the forester has to do is count the trees to be able to estimate the amount of timber.

Sampling this way saves a lot of time! It takes just half to two-thirds as much time as the other method of timber cruising, called “fixed-area plot sampling,” to get the same results. Bell notes that he was using the fixed-area plot method in the 1950s when he “heard about this guy running around the woods with a crystal ball”—the wedge prism. After Bell learned to use the prism, he introduced the method to the Oregon State Forestry Department and began teaching foresters how to use the variable plot sampling method. As a result, “running around the woods with a crystal ball” is now a popular way to cruise!