

# **2016 SHASTA FORESTRY CHALLENGE**

## **FOCUS TOPIC QUESTION**

### **Introduction:**

Forests are used in a variety of ways. Wood production is the primary use for forests owned by private companies. W.M. Beaty & Associates manages land for several clients. The company manages a 620-acre parcel called the Thatcher Ranch, which is now part of a much larger tract, owned by the Walker family. The ranch has a variety of uses, including cattle grazing (most of the Ranch is irrigated pasture), Christmas trees, and timber production. Three stands of trees were planted in 1977 and 1979 and are now 39 and 37 years old. They have reached a point at which some action may need to occur. It is time to make a decision on managing the plantation for the short term (the next 10 years).

The plantations are in need of some type of treatment for several reasons: they have grown to the point where stocking levels could become too high and limit tree growth, they are in an area prone to wildfire, and there has been an ongoing drought, which stresses the trees and makes them more susceptible to a successful bark beetle attack. All of these factors need to be taken into consideration when deciding what to do with the plantations.

### **Focus Topic Fieldtrip Location:**

We will use school vehicles to travel to the Thatcher Ranch, where we will assess the plantations and collect data. A map of the fieldtrip location and plot layout will be provided.

### **Background Information:**

#### **W.M. Beaty & Associates and Red River/Shasta Forestlands**

In 1969, Bill Beaty and four other foresters established W. M. Beaty & Associates, Inc. and opened its main office in Redding. The company was established to manage timber and associated resources for its three primary clients, Red River Forests, Shasta Forests, and Lassen Forest. W.M. Beaty strives to manage timberland to generate an economic return on private land investments while simultaneously maintaining the resources found in healthy forests (soils, watershed processes, wildlife habitat).

## The History of the Thatcher Ranch

The land was acquired from the original homesteaders in the late 1800's by the Thatcher family, who wanted to expand their ranching and timber holdings in the area. In 1912, the Thatcher family sold the ranch and an adjacent parcel to the Walker family, the family that owned Red River Lumber Company. There was a small mill on the property, which they dismantled and moved to the location where the town of Westwood is today. That small lumber mill was used to build the larger mill that was the main industry in Westwood for many years. In 1932, the Walker family sold the ranch back to the Thatcher family. Wally Thatcher became the owner of the ranch and, having no heirs and getting up in years, knew he had to sell the ranch. Having a strong land ethic, he did not want the land to be developed. In order to ease his concern, he worked with Bill Beaty to sell the land back to the Walker family in 1976 before he died, knowing they would take good care of it.

The areas where the plantations are now were dry (unirrigated) pastureland in 1976. The Walker family wanted to plant Christmas trees on as much of the dry pasture as they could, and they established Christmas trees in all the areas that would support them. However, one area (plantation 1) was too steep for Christmas trees, another area (plantation 2) had residual mature trees they didn't want to remove, and a third area (plantation 3) was narrow enough that there would be too much shade from adjacent trees to be good for growing Christmas trees. Because they were not suitable for Christmas trees, these three areas were planted with pine seedlings for timber production. A few giant sequoia were planted because they were left over from another job, and a few individuals of other species are in the stand because they were naturally seeded or were there prior to planting.

## Silviculture

"Silviculture" is the art and science of managing a stand of trees to meet identified management objectives. Silviculture is rooted in "silvics", which is a study of the relationship between trees and their environment (water, soil, air, and other plants). "Silviculture", then, is the art of applying the science learned in "silvics". The four main Silvicultural methods are Clearcut, Seed Tree, Shelterwood, and Selection. These methods produce two types of stands: "even aged" and "uneven aged". The three plantations on the Thatcher Ranch have trees of the same age so, by default, they are even-aged stands. Beaty sometimes converts even-aged stand to uneven aged stands, so the possibility of converting these stands to uneven-aged stands could be considered.

## Plantations

“Plantations” are stands of even-aged trees that are in the ground for 50 to 90 years, depending on how good the site is for growing trees. If these plantations were to be managed to maturity as even-aged stands, the growing cycle would be about 80 years, since the ground is of good (but not excellent) quality. Here is a history of this “stand”, which is the word we will use for the whole of the three parts, or plantations:

- Prior to Planting – Site Preparation: The ground is prepared for planting. This can include using heavy equipment to “contour till” the soil and the application of herbicide to prevent brush from sprouting.
- Year 0 – Planting: Seedlings grown from seed harvested from that geographical area are planted in a species mix and spacing specified by a Registered Professional Forester (RPF). Trained planting crews plant the trees and the RPF verifies that the trees were planted according to specification. Typically, 300 trees per acre are planted on a 12’ X 12’ grid. Beaty forester Len Lindstrand (now retired) planned and supervised the planting of these plantations.
- Years 1 to 7 – Monitoring: Trees are checked annually for survival, growth of competing brush and grass species, and other damaging agents such as gophers. If the brush is competing significantly with the seedlings, herbicides are applied, usually once or twice during the 6 year period.
- Year 7 – Pre-commercial thinning: Contracted crews select trees to remove, with the objective of attaining optimum spacing and maintaining species diversity. The trees are easy to cut, since they are only 6 to 8 feet tall. Approximately half of the trees are removed, leaving about 150 trees per acre.
- Years 7 to 25 – Monitoring: Trees are checked annually for pests and disease, and action is taken if necessary.
- Year 25 to 35 – Commercial Thin: In 2012, there was a “snip and chip” operation. Trees large enough to go to the mill were harvested (snipped) and made into products such as dimensional lumber and fencing material. The smaller trees were chipped and taken to a biomass plant.
- Year 35 to 60 – Commercial Thin: A second commercial thin can occur and, at this time, the stand can be moved toward an uneven aged stand. For this stand, at this point an important decision needs to be made – whether to continue growing this stand to full maturity and harvest it all at once, or to convert it to an uneven aged stand.
- Year 60 to 70 – Second Commercial Thin or Final Harvest: Usually, all trees are harvested at one time and the cycle starts over. However, there is an option to thin the trees and leave the remainder to grow even bigger.

## The Relationship between Tree Growth and Spacing

Once you know the average number of trees per acre, the basal area, and the average tree diameter, you can determine if the stand is properly stocked. When the trees start competing with each other, growth slows and the trees become weakened and susceptible to insect attack and disease.

## Pest and Fire Resistance

Healthy plantations are better able to resist bark beetle attacks, an increasing concern considering the recent four-year drought. When there are too many trees for the space, they begin to compete with each other and become less healthy due to the lack of resources such as water, sunlight, and nutrients. Typical ways to assess competition are to examine annual growth rings by using an increment borer to take a core sample, by determining percent canopy cover, and by looking at the amount of overlap of tree crowns.

Resistance to a wildfire is also a huge concern. The more spacing between trees, and the less fuel, in the form of low branches, surface fuel, and slash, the less chance of a fire becoming or maintaining itself as a crown fire, which will kill the trees. As with health, fire resistance can be increased by keeping the trees spaced adequately and the fuel loading to a minimum.

## California Forest Practice Rules

California is the most highly regulated place in the world in terms of forest management. The Rules specify a “retention standard” to be left after a commercial thin. For trees of an average dbh of 14” or more, the retention standard is 75 square feet of basal area per acre. That means that you cannot cut so many trees that the average drops below that level.

## Using Data Collected to Determine Total Standing Volume and Stumpage Value

To determine the total standing volume in a plantation, take the average dbh and use a volume table to compute the volume, then multiply that volume by the average number of trees per acre. Once we collect the data, we can compute the standing volume of these plantations. The current delivered log price for Ponderosa Pine at the SPI mill in Anderson is \$250/ Thousand Board Feet (MBF).

## Logging Costs

Logging: For tractor logging including felling, skidding, bucking, and loading, the cost is a function of cost per hour for each person or piece of equipment multiplied by the volume of wood they can process per hour. Assume \$150/MBF for this type of logging.

Hauling: Hauling from this location to Anderson is approximately one hour plus one hour for loading and unloading. Current rate is about \$90/hour. Figure two hours per load (\$180). Estimate 3.5 MBF/load. So, \$180 divided by 3.5 = \$50/MBF.

Total = \$150 for logging + \$50 for hauling = \$200/MBF

**Fieldtrip:** On Thursday, September 29, you will visit the Thatcher Ranch to conduct a quantitative and qualitative analysis of the even-aged stand.

Topics: Thatcher Ranch history, other land uses at the Ranch, tree health and vigor, how to collect data, attaining a desired condition

Activity: Collect data on pre-marked plots in the three plantations: trees per acre, basal area, and average diameter at breast height. Teams will also collect data on one of these additional parameters: canopy cover/crown overlap, total and sawlog tree height, recent growth rates, and pest/disease/mechanical damage.

## **Landowner Objectives and Desired Condition:**

### Objectives:

1. Produce income on the land to meet the costs of ownership
2. Increase the value of the land over time
3. Keep the timber stands healthy and vigorous

### Desired Condition:

The desired condition at age 50 is 150 trees per acre (17' x 17' spacing) and 150 square feet of basal area per acre. Remember that your treatment could exceed the desired condition with the idea that future growth will bring the stand back to the desired condition.

## Resources:

On Thursday evening, you will be given resources on a flash drive to load onto your team's computer. Additionally, you can use one of the designated computers to do internet research and use that information in your presentation.

## Preparing Your Presentation:

Your team will come up with a specific plan for managing this stand over the next 10 years. In order to do this, you will need to answer the following questions:

- What is the current condition of the stand? Specify trees per acre, basal area, and average diameter.
- How does the current stocking level compare to the desired condition in terms of trees per acre and basal area?
- How has the plantation been growing over the last few years? Is it healthy and vigorous? Did it “release” after the snip and chip operation in 2012?
- Is there evidence of pest, disease and/or mechanical damage? Would the trees be able to defend themselves against a bark beetle attack?
- **What treatment, or combination of treatments, would you conduct over the next 10 years, if any? How would your proposed treatment(s) meet the landowner objectives?** Would your action move the stand towards an uneven aged stand or maintain it as an even-aged stand?
- If your plan involves a harvest, would the logs pay their way to the mill? If not, how could you combine this harvest with other activities on adjacent Walker land to either break even or make a profit?

## Final Product:

Your goal is to produce a 15-minute PowerPoint presentation that **describes, in detail, the condition of the Thatcher Ranch plantations and your 10-year management plan that will meet the landowner objectives and the desired condition for the stand.** You are encouraged to use photos and information collected on the fieldtrip, interviews with resource professionals during the Challenge, and the maps, tables, and information in the resources provided. Additionally, use the judges' score sheet as a checklist, to make sure you cover the items on which you will be scored.