

# TIMBER MANAGEMENT AND TARGET STANDS IN THE WHITEBARK PINE ZONE

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## ABSTRACT

*Regardless of the mixture of land management objectives, quantification of the type of stands that will meet these objectives, target stands, is needed. Quantification of target stands is essential as the starting point for the diagnosis of treatment needs and to achieve consistency over time in the interpretation of a given management direction.*

*To facilitate quantification of target stands a U.S. Forest Service Regional form has been developed. This form provides one format for identifying various essential attributes.*

*For many resource objectives the desired conditions include the aggregate conditions of a number of stands in a given area over time. A Data General computer program has been developed to assist with the summarization and graphic representation of many stands projected over time by the Stand Prognosis Model. The summary and representation can be linked to key attributes that are descriptive of the target stands or to area conditions.*

## INTRODUCTION

Timber management can mean many things to different people. Within the whitebark pine (*Pinus albicaulis*) forest types of the Northern Region, Forest Service, U.S. Department of Agriculture, the activities that we usually associate with timber management will generally be done with little or no emphasis on sustained production of wood products.

Instead of identifying our management activities in the whitebark pine zone as timber management, it is more appropriate to refer to them as forest management: the application of our knowledge of silvics and forest ecology to create and maintain the types of stands that will meet our management objectives over time.

## NEED FOR TARGET STANDS

The desired future condition that we refer to when we talk about implementing National Forest plans has to be considered at both the level of the individual stand and their aggregates across the forest. For all of our management objectives we need stands that will provide the

desired conditions over time. How can we utilize our knowledge to ensure that we have such stands? How can we get from plans to the desired type of stands on the ground? How can we communicate with different resource managers over time about the type of stands we need? How can we achieve an adequate degree of consistency in the application of a given management direction between National Forests within a Region?

The use of site-specific evaluations of present and future stand conditions and the description of characteristic stands that meet Forest plan objectives are necessary to answer these questions. An essential part of being able to transfer our management objectives to the ground is to quantify what types of stands are needed to meet these objectives. Only by a comparison of an existing stand to a target stand can we devise a treatment or determine if no treatment is appropriate. All too often a treatment is prescribed simply because it is possible to use it; not because it is needed to modify existing stand conditions to achieve long-term management objectives.

## REGIONAL FORM FOR TARGET STANDS

To assist in the quantification of target stands the Northern Region has provided a standard format: Regional Form R1-FS-2470-24 (12/86). An example of its application has been taken from the Lewis and Clark National Forest in Montana (tables 1 and 2). The management objective addressed by these two target stands is for "timber production and livestock grazing." Each target stand represents the application of this resource objective to a specific set of habitat types each one featuring a different tree species and different density levels over time.

Target stands have not been defined for all ecosystems and resource management objectives, specifically not for whitebark pine. Nevertheless, we can identify some of the questions that must be answered to formulate a target stand for meeting important management objectives in whitebark pine ecosystem. For an objective of producing cones for grizzly bear food what should the stands be like? Do we want stands that are all whitebark pine? Or should they be a mixture of species? Should they have uniform spacing of trees, or clumpy spacing? How long will it take the stand to start producing an adequate number of cones for food? Will the stand need to be thinned to remove natural regeneration of spruce and subalpine fir in the understory? How do stands in the Gallatin National Forest compare to those in the Flathead National Forest in regard to these questions. Answers to these questions

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Table 1—Target stand description

| Development stage | Age    | Trees per ac | Basal area | QM dia | Structure    | Height | Species | Growth | I&D                          | Forage      | Remarks                            |
|-------------------|--------|--------------|------------|--------|--------------|--------|---------|--------|------------------------------|-------------|------------------------------------|
| Seedling          | 0-15   | 300-2000     | -          | 0-1    | Single story | 0-8    | LP      | -      | Dwarf Mstoe minor occurrence | B-400 H-100 | DF, S-acceptable                   |
| Sapling           | 15-30  | 500-1600     | -          | 2      |              | 8-25   | LP      | 10     |                              | B-300 H-75  | Begins providing game hiding cover |
| Pole              | 31-50  | 400-780      | 70-210     | 5      |              | 25-50  | LP      | 20     |                              | B-200 H-50  |                                    |
| Imm. saw          | 51-70  | 200-300      | 130-240    | 8      |              | 50     | LP      |        |                              | B-200 H-50  |                                    |
| Mature saw        | 71-110 | 200-300      | 180-240    | 10     |              | 65     | LP      | 30     |                              | B-200 H-50  |                                    |

MANAGEMENT AREA: MA-B  
 HABITAT TYPES: Abia/Vasc<sup>730</sup>, Abia/Libo-Vasc<sup>663</sup>, Psme/Libo-Caru<sup>232</sup>  
 PRIMARY RESOURCES: Timber and Livestock Grazing

Table 2—Target stand description

| Development stage | Age     | Trees per ac | Basal area | QM dia | Structure    | Height | Species | Growth | I&D                                | Forage      | Remarks |
|-------------------|---------|--------------|------------|--------|--------------|--------|---------|--------|------------------------------------|-------------|---------|
| Seedling          | 0-20    | 200-1700     | -          | 0-1"   | Single story | 0-4'   | DF      | -      | Budworm Low, Root Rot Mod 15% Area | B-400 H-600 |         |
| Sapling           | 21-40   | 200-1200     | -          | 2      |              | 5-25   | DF      | 3      | SBW Low RR - Low 5% Area           | B-300 H-450 |         |
| Pole              | 41-70   | 200-700      | 40-140     | 6      |              | 25-30  | DF      | 20     | SBW Low RR-Low                     | B-200 H-300 |         |
| Imm. saw          | 71-100  | 200-400      | 80-175     | 9      |              | 30-50  | DF      | 44     |                                    | B-200 H-300 |         |
| Mature saw        | 101-130 | 150-280      | 100-180    | 11     |              | 50-55  | DF      | 30     |                                    | B-200       |         |

MANAGEMENT AREA: MA-B  
 HABITAT TYPES: Picea/Sest<sup>460</sup>, Abia/Cips<sup>770</sup>, Psme/Juco<sup>260</sup>, Psme/Spbe<sup>340</sup>  
 PRIMARY RESOURCES: Timber with Livestock Grazing

are needed to quantify target stands that will meet our management objective of providing cones for grizzly bear food. Target stands for all other management objectives in the whitebark pine zone also need to be developed.

### NEED FOR ANALYSIS OF STAND AGGREGATES

The desired future forest condition goes beyond what we describe for the individual stand. Creating a 5-acre stand to provide cones as food may be meaningless if it is the only such food source within an entire area. As we look at areas, they should be a collection of individual stands. As there is variability in the types of stands

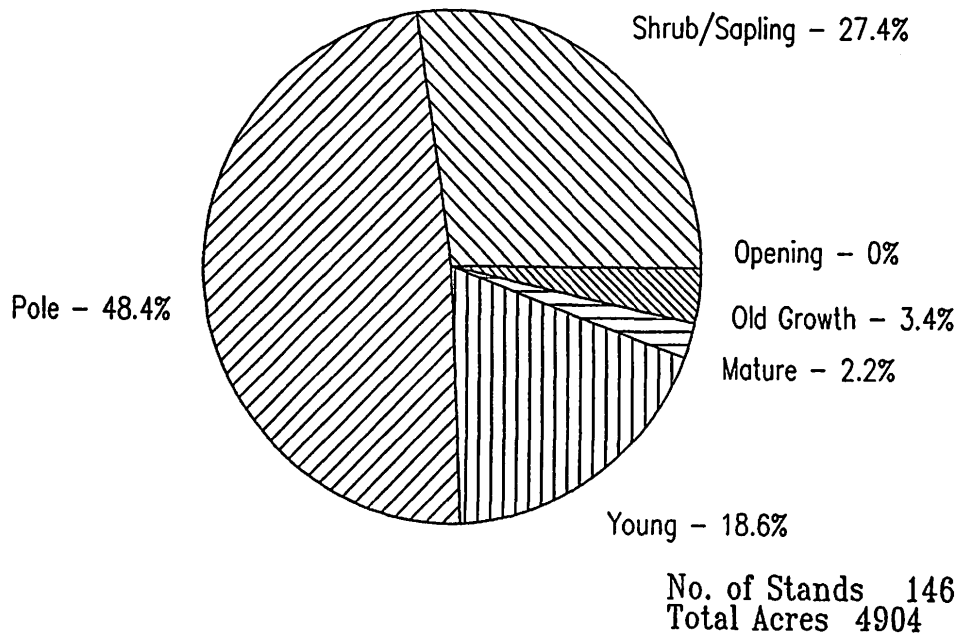
we can create, there is variability in how these stands respond to treatments over time. Evaluations of existing and future conditions over an area need to be as site specific as we can make them. This is perhaps more critical within the whitebark pine ecosystems than in many other forested ecosystems. Many of the presentations at this symposium have stressed how slowly whitebark pine ecosystems recover from impacts. Instead of using average responses over time, the Stand Prognosis Model (Wykoff and others 1982) allows us to generate site-specific values. We can evaluate our ability to meet given resource objectives in terms of the development of specific stands within a given area. The Northern Region has

linked a Data General graphics package with the Prognosis output to provide area summaries for resource attributes. For example the acres within different stand structural stages can be displayed for specific future decades (fig. 1). The changes in these attributes are stand specific based upon stand projections that will change with various treatment scenarios.

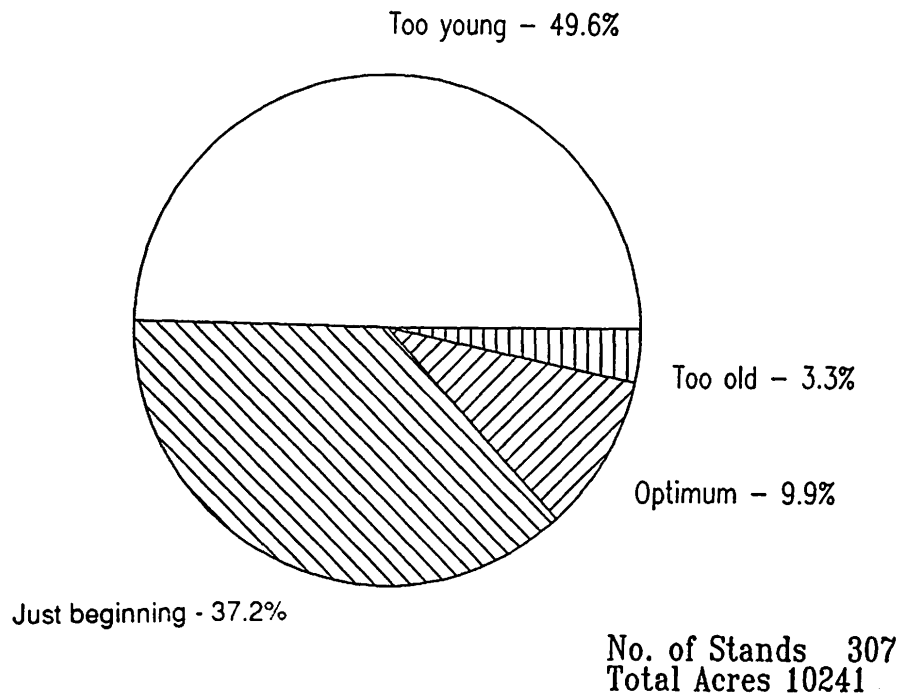
In terms of whitebark pine forests and the grizzly bear food management objectives discussed above, we can assess specific stand attributes such as blister rust status, crown ratio, tree height, and stand density for their influence on cone production. We can produce graphs similar to figure 1 to represent the effect of our management choices on acres in various cone

production stages over time (fig. 2 and 3). By projecting the subsets of stands relating to the different cone production stages of figure 2, we can develop a picture, decade by decade, of the efficiency of management in achieving our chosen desired future conditions. An example is shown in figure 4.

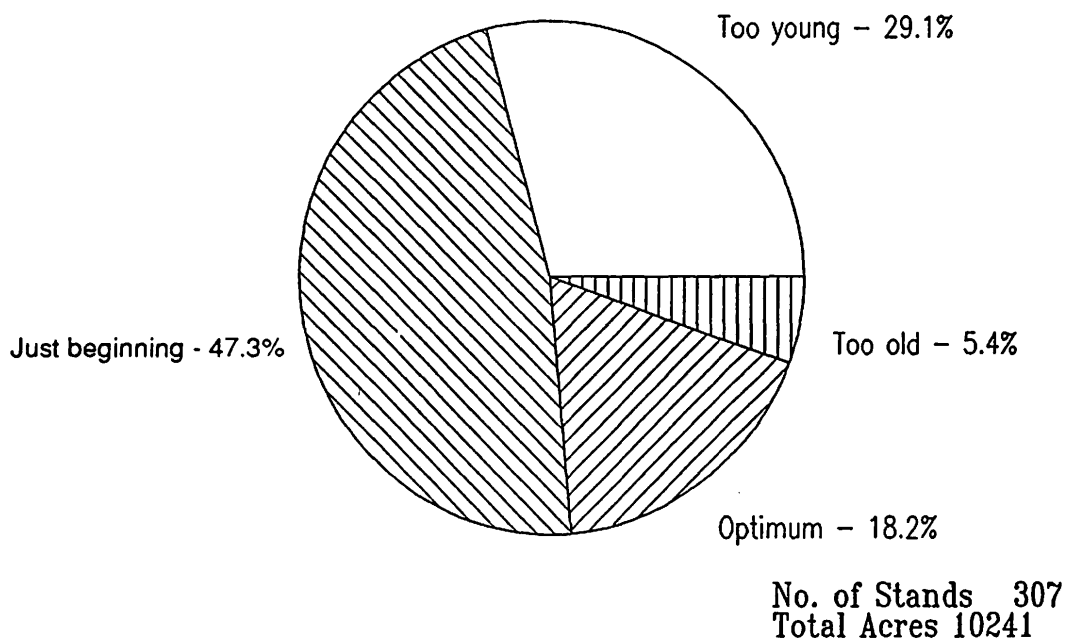
Other resource objectives might be given priority within the whitebark pine zone—for example, watershed enhancement. As in the approach outlined above, needed information would be developed to describe desired stand conditions that define target stands for achieving the water resource goals. Similarly, stand and area projections would be aggregated for the present and for future time periods to guide decisions and provide benchmarks for monitoring management performance.



**Figure 1**—Stand structure stages of whitebark pine stands for wildlife habitat of the Gallatin National Forest for decade starting in 2021.



**Figure 2**—Projected percent of whitebark pine stands in various stages of cone production for the decade starting in 1990.



**Figure 3**—Projected percent of whitebark pine stands in various stages of cone production for the decade starting in 2020.

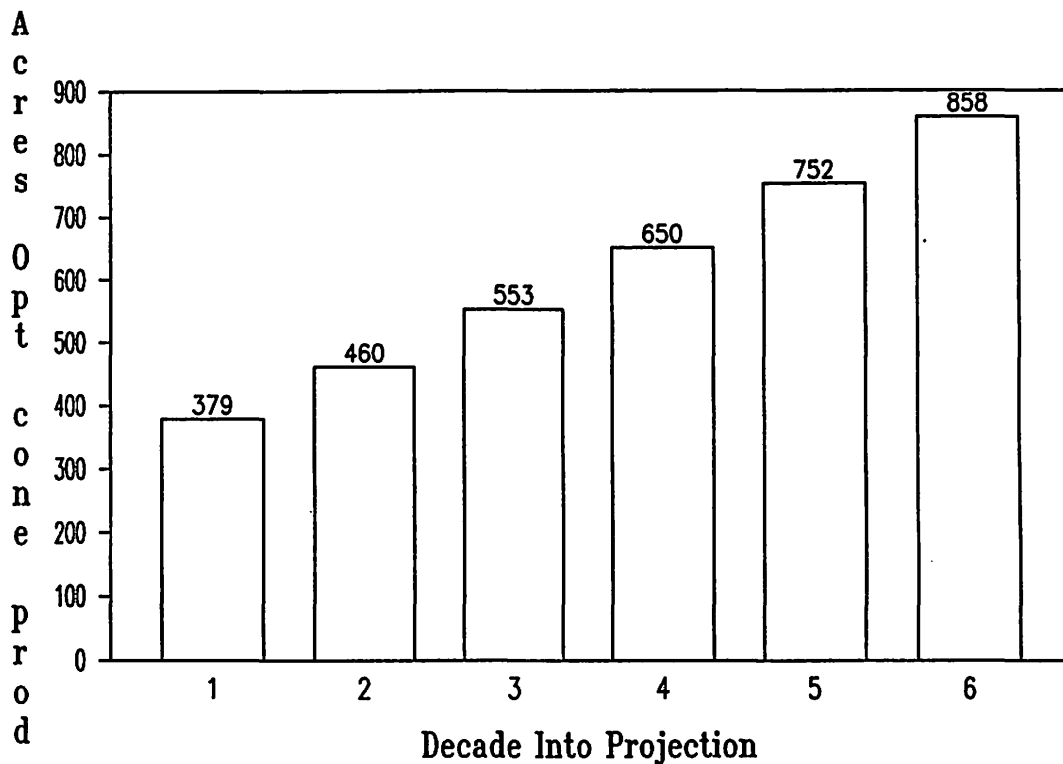


Figure 4—Projected acres of whitebark pine that will be optimum for whitebark pine cone production by decades. Projection is for 147 stands, 4,940 acres.

## SUMMARY

Whether our management objectives are for watershed management, timber production, wildlife habitat, visual management, or any mixture of these resources, quantification of target stands is essential. Quantification of target stands provides the starting point for the diagnosis of treatment needs and consistency for the many resource managers involved in the interpretation of a given management direction over time. Without the quantification, it becomes difficult to monitor and judge the success of vegetative treatments and to rationally modify them to ensure meeting management objectives.

## REFERENCES

Wykoff, William R.; Crookston, Nicholas L.; Stage, Albert R. 1982. User's guide to stand prognosis model. Gen. Tech. Rep. INT-133. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 112 p.

Speakers answered questions from the audience following their presentations. Following are the questions and answers on this topic:

Q. (from Earle F. Layser)—Is it not presumptuous for us to assume we can set objectives for these high-elevation forests? Do they not by their very nature dictate their own objectives?

A. The very nature of these forests sets limitations and defines potentials. What would be presumptuous would be that we, at this time, assume we know all there is to understand concerning the limitations of these high-mountain ecosystems.