

Report on Project #8CA52792:
Thinning Application of the Growing Space-Growth Rate
Relationship Developed Under Project #8CA30810

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As indicated in the Addendum to Research Project #8CA52792 prepared last spring (1987), the completion of this project has been delayed one year because of the number of modifications required to ensure that this experiment will show significant differences between "thinning" treatments, assuming they exist. In addition, time for marking and sales prep by the State Forest staff was not provided for in the initial scheduling of the project.

The design of this thinning experiment had to be changed from a complete randomized design to a randomized block design because of both the exceedingly clumpy nature of the stand that was selected and the site variability at Parlin Fork. A randomized block design was required to separate out the effects of stand structure and site quality on tree and stand growth. Each block consists of a pair of treatment areas with similar structures that occur on similar sites. Treatment areas in each block are randomly assigned to one of the two thinning treatments except where constrained because they are located adjacent to a treatment area in another block. In that case, they are assigned the same treatment as the adjacent treatment area to minimize the amount of border area required (Fig. 1).

To identify areas with similar stand structures, a map was made of all the clumps and single trees in the study area during the summer of 1986. Then, a three-dimensional model was constructed with dowelling (Fig. 2). Nineteen blocks were identified on the model, but five were rejected after an on-the-ground inspection revealed that the paired treatment areas differed in site quality (Fig. 1).

During the summer of 1986, inventory data was also collected for CRYPTOS to determine the stand thinning treatment that would maximize stand growth. Based on 1/5 acre plots, CRYPTOS invariably showed that maximum stand growth would be achieved with no thinning. Development of the thinning prescription for the growing space treatment areas required collection of additional leaf surface

area and growth data to calibrate the growing space-growth rate relationships established for Caspar Creek to Parlin Fork. This was completed during the fall of 1986 and the prescription was completed in the winter-spring of 1987 (Table 1).

The growing space treatment areas and their buffers were marked during the summer of 1987. These and the CRYPTOS treatment areas did not cover the whole timber sale area, however, because it could not be broken into structurally duplicable 1/5 acre treatment areas that could be assigned to one of the blocks in the experiment. Consequently, State Forest staff marked these intervening areas according to the growing space prescription.

This marking effort on their part along with the preparations that had to be carried out for the timber sale made it impossible to log the stand prior to this spring (spring 1988). Therefore, as mentioned previously, completion of this project has been delayed. The only field work remaining, once the logging takes place this spring, is measurement of the height, dbh, and live crown ratio of the residual trees. It will be completed by early summer, and the results will be reported under the new contract entered this year-- #8CA74343.

Table 1. Marking rules for the growing space treatment areas.

In general, the stand will be marked so that the residual codominant trees will be in the configuration of lines and triangles; the residual trees must have good form and be vigorous codominants; and a poorer crown class tree (e.g., an intermediate) cannot be used to justify the removal of a codominant. The specific rules are as follows:

1. Mark any trees, regardless of crown class, along lines that have codominant end trees $\leq 27'$ apart.
2. Mark tree(s) on lines that are within 4' of the codominant end trees if the end trees are $>27'$ and $\leq 35'$ apart.
3. Mark trees inside triangles with three sides $\leq 27'$. Try specifically for triangles with sides between 19 and 27'.
4. Mark all trees inside triangles which have two sides $\leq 27'$ and one $>27'$ except for trees that are (a) within 4' of the long side and (b) not within 4' of the codominant trees on the ends of the long side.
5. Mark all trees that are deflected $\leq 2'$ from a line or a side of a triangle that is $\leq 27'$
6. Mark trees forming a triangle with two or three sides $\leq 16'$ if a larger triangle with sides $\leq 41'$ can be made to include them.

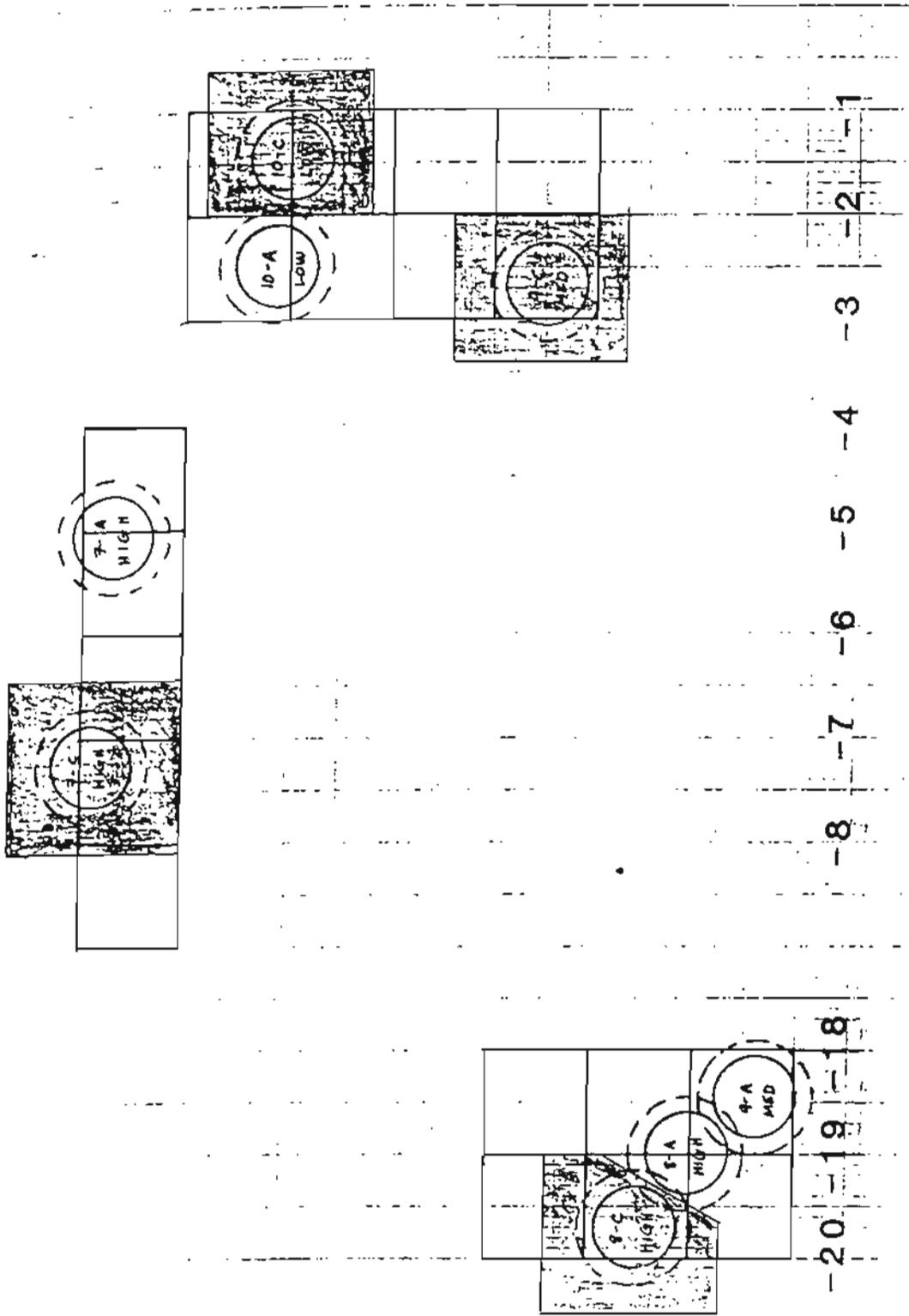


Figure 1 continued.



Figure 2. A portion of the three-dimensional model constructed to identify structurally similar treatment areas.