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HYPERSTAND 1.0: A HYPERCARD COMPUTER PROGRAM FOR ESTIMATING YIELD OF EAST TEXAS PINE PLANTATIONS

by

Eric L. Taylor
and
A. Gordon Holley

REPORT NUMBER 24

THE EAST TEXAS PINE PLANTATION RESEARCH PROJECT

A STUDY OF LOBLOLLY AND SLASH PINE PLANTATIONS IN EAST TEXAS

CENTER FOR APPLIED STUDIES
SCHOOL OF FORESTRY
STEPHEN F. AUSTIN STATE UNIVERSITY
NACOGDOCHES, TEXAS 75962

FEBRUARY, 1989
HYPERSTAND 1.0: A HYPERCARD COMPUTER PROGRAM FOR ESTIMATING YIELD OF EAST TEXAS PINE PLANTATIONS

by

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ABSTRACT. A computer program for estimating per acre yield for loblolly and slash pine plantations in East Texas is presented. The program, HYPERSTAND 1.0, is written in HYPERCARD and is designed to run on MACINTOSH computers. In order to run, HYPERSTAND requires the application program HYPERCARD 1.2.
INTRODUCTION

Yield information is useful to East Texas pine plantation managers. Data on tree production can be combined with other resource information, such as wildlife and recreation, and included in appraisal analysis to determine management plans for the pine plantations that maximize specific measures of utility.

To assist plantation managers in estimating timber production from their stands, a yield prediction program (HYPERSTAND 1.0) written for HYPERCARD 1.2 for MACINTOSH personal computers has been developed as part of the East Texas Pine Plantation Research Project. HYPERSTAND is a companion yield prediction program to DIAYLDSUR and DIADISD.BAS, which are described in


respectively. All three programs incorporate identical mensurational information and computational techniques.

HYPERSTAND is a diameter distribution yield prediction program for a current plantation. Information on species, plantation age, site index and surviving trees per acre is inputted. Output from HYPERSTAND presents stand structure (trees per acre and basal area per acre) and yield (volume and weight per acre in total stem and complete tree) by diameter class.

A free copy of HYPERSTAND may be obtained by sending a 3.5” floppy computer disk to

Dr. J. David Lenhart
School of Forestry - SFASU
Nacogdoches, TX 75962,
and he will return it to you with HYPERSTAND loaded on it.
MENSURATIONAL COMPONENTS IN HYPERSTAND 1.0

All mensurational systems were developed by the ETPPRP, using data from ETPPRP permanent plots throughout East Texas, except for the Weibull parameter recovery procedure, which was developed at VPI&SU.

SITE INDEX

Uses equations developed by Blackard as part of his MSF thesis and reported in


INDIVIDUAL TREE HEIGHT

Uses equations developed by Dixon and reported in

INDIVIDUAL TREE CONTENT

Uses equations developed by Lenhart, Blackard, Wiswell, Hackett (part of his MSF thesis) and Laman (part of his MSF thesis) and reported in


RECOVERING WEIBULL PARAMETERS

Uses methods and equations developed by Burk, Burkhart and Lenhart and reported in


After calculations are completed, a picture of a flip chart with tabs appears on the screen. The tabs are:

1. Squirrel - click on it and information about HYPERSTAND is listed.

2. Characteristics - describes the parameters of the plantation.

3. Stem Content - presents stand structure and the volume and weight of the content of the total stem.

4. Complete Tree Content - lists stand structure and the volume and weight of the content of the complete tree (stem and branches).

5. Exit - allows the user to leave the flip chart and compute the yield of another plantation.

An example of the pages from the flip chart for a slash pine plantation are presented on pages 13-16 of this report.
Please Choose a Species for the Plantation to be Studied.

- Loblolly Pine
- Slash Pine
Please Specify Site Index for Your Slash Pine Plantation.

Site Index = 60

Note: Base Age of 25 yrs.
Please Enter the Current Age of Your Slash Pine Plantation.

Age = 12

Note: Age cannot be greater than 20yrs.
The Parameters for your Plantation are:

- **Species**: Slash
- **Site Index**: 60
- **Trees/Acre**: 400
- **Age**: 12
Predicted Stand Structure and Volume and Weight per Acre by DBH Class for A Slash Pine Plantation in East Texas

Based on Research Conducted in the East Texas Pine Plantation Research Project
School of Forestry
Stephen F. Austin State University
1982 - 1989
## Plantation Characteristics

### Your Stand Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species</td>
<td>Slash</td>
</tr>
<tr>
<td>Age</td>
<td>12</td>
</tr>
<tr>
<td>Trees/Acre</td>
<td>400</td>
</tr>
<tr>
<td>Site Index</td>
<td>60</td>
</tr>
</tbody>
</table>

### Weibull Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location (a)</td>
<td>1.6590</td>
</tr>
<tr>
<td>Scale (b)</td>
<td>3.6599</td>
</tr>
<tr>
<td>Shape (c)</td>
<td>2.9582</td>
</tr>
</tbody>
</table>

### Predicted Plantation Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Height of Ten Tallest Trees</td>
<td>36</td>
</tr>
<tr>
<td>Arithmetic Mean DBH</td>
<td>4.93</td>
</tr>
<tr>
<td>Quadratic Mean DBH</td>
<td>5.07</td>
</tr>
<tr>
<td>Minimum DBH</td>
<td>1.7</td>
</tr>
<tr>
<td>Maximum DBH</td>
<td>9.0</td>
</tr>
<tr>
<td>DBH (in)</td>
<td>Number of Trees</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>44</td>
</tr>
<tr>
<td>3</td>
<td>102</td>
</tr>
<tr>
<td>4</td>
<td>123</td>
</tr>
<tr>
<td>5</td>
<td>86</td>
</tr>
<tr>
<td>6</td>
<td>33</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
</tr>
</tbody>
</table>
### Complete Tree per Acre

<table>
<thead>
<tr>
<th>DBH (in)</th>
<th>Number of Trees</th>
<th>Basal Area (sq ft)</th>
<th>Avg. ind. Tree Ht. (ft)</th>
<th>Volume (cuft)</th>
<th>Green Weight (lbs)</th>
<th>Volume (cuft)</th>
<th>Green Weight (lbs)</th>
<th>Dry Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>0.1</td>
<td>16.0</td>
<td>11</td>
<td>52.9</td>
<td>0.5</td>
<td>41.4</td>
<td>17.7</td>
</tr>
<tr>
<td>2</td>
<td>44</td>
<td>2.2</td>
<td>19.9</td>
<td>26.4</td>
<td>1323.7</td>
<td>12.4</td>
<td>1065.3</td>
<td>471.2</td>
</tr>
<tr>
<td>3</td>
<td>102</td>
<td>8.9</td>
<td>23.2</td>
<td>125.8</td>
<td>6433.1</td>
<td>61.1</td>
<td>5278.3</td>
<td>2394.1</td>
</tr>
<tr>
<td>4</td>
<td>123</td>
<td>16.8</td>
<td>26.2</td>
<td>266.1</td>
<td>13811.5</td>
<td>132.4</td>
<td>11503.3</td>
<td>5320.0</td>
</tr>
<tr>
<td>5</td>
<td>86</td>
<td>16.9</td>
<td>28.9</td>
<td>294.3</td>
<td>15451.0</td>
<td>149.2</td>
<td>13027.3</td>
<td>6121.2</td>
</tr>
<tr>
<td>6</td>
<td>33</td>
<td>8.8</td>
<td>31.5</td>
<td>166.8</td>
<td>8850.5</td>
<td>86.0</td>
<td>7540.2</td>
<td>3590.9</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>2.4</td>
<td>33.8</td>
<td>49.4</td>
<td>2645.2</td>
<td>25.8</td>
<td>2273.8</td>
<td>1095.5</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>0.9</td>
<td>36.1</td>
<td>19.0</td>
<td>1026.4</td>
<td>10.1</td>
<td>889.4</td>
<td>432.9</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>57.0</td>
<td>400</td>
<td>948.9</td>
<td>49594.3</td>
<td>477.5</td>
<td>41619.0</td>
<td>19443.5</td>
</tr>
</tbody>
</table>

### Characteristics

- Stem Content
- Complete Tree Cont.