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Tree Value System: Users Guide

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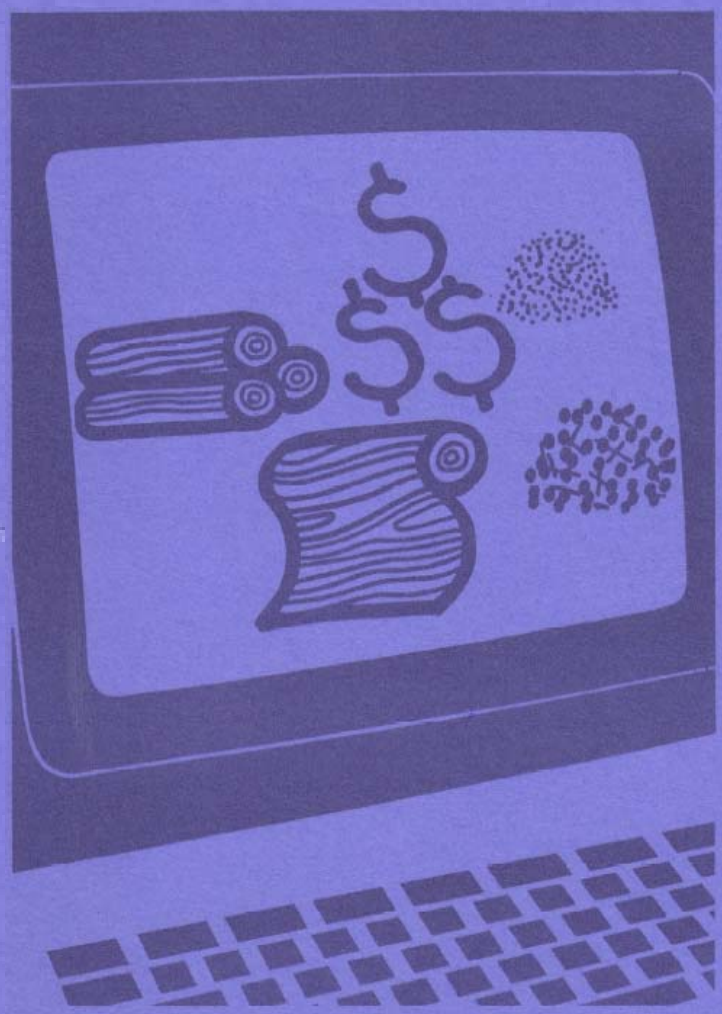

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Abstract

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This paper instructs resource analysts on use of the Tree Value System (TREEVAL). TREEVAL is a microcomputer system of programs for calculating tree or stand values and volumes based on predicted product recovery. Designed for analyzing silvicultural decisions, the system can also be used for appraisals and for evaluating log bucking. The system calculates results based either on optimized tree bucking or on simulated bucking from user input. Currently, TREEVAL contains data for young-growth Douglas-fir *(Pseudotsuga menziesii* (Mirb.) Franco var. *menziesii)*; however, other species can also be analyzed. The recovery equations now in the TREEVAL model are appropriate for natural stands but are not appropriate for plantations. Steps are explained for running the system on an IBM compatible microcomputer. The programs and data files are described.

Keywords: Tree value, tree volume, product recovery, software, microcomputer, users guide.

Contents

Introduction

Purpose and Recommended Use

This users guide explains how to run the Tree Value System of programs, known as TREEVAL. Companion publications explain the development and structure of the model. We make no attempt to teach potential uses or applications of TREEVAL in this publication. The guide includes information needed by microcomputer users to install and test TREEVAL on their equipment and information on the. system files. Some experience with IBM-compatible microcomputers and DOS is necessary; however, all the programs and data needed to test the model are explained.

This guide contains an overview of components of the TREEVAL system, the steps needed to install and run the programs, example runs of the system, and descriptions of the programs and data files. All examples and contents of data files are for young-growth Douglas-fir *(Pseudotsuga menziesii* (Mirb.) Franco var. *menziesii);* however, this model is not limited to a single species. As product recovery information becomes available, other species can be added.

The TREEVAL system predicts value and volume of trees, stands, or both, based on product recovery, and can be used to evaluate silvicultural decisions. The model can also be used for appraisal and to evaluate log bucking. You select either an optimized tree-bucking solution with computer-generated bucking or simulated bucking based on your log data. You also have the option of entering market criteria such as log diameters and lengths, manufacturing and logging costs, and product (lumber, veneer, chips, and pulp) values. Be sure to refer to the Assumptions section in "Tree Value System: Description and Assumptions" (Briggs, in press) for details on development of the model and restrictions on application and use. The recovery equations currently in the TREEVAL model are appropriate for natural stands but are not appropriate for plantations.

Equipment Required

You will need at least the following equipment:
IBM PC compatible microcomputer
DOS 3.1 , or later
256K available memory
two 360K disk drives or hard disk

Following are recommended items:
printer
math coprocessor

The programs are written in ANSI standard FORTRAN 77 and have been tested with IBM Professional FORTRAN. and Ryan-McFarland RM/FORTRAN. A FORTRAN program compiler is not necessary, however, because the programs are available in executable form.

Users Guide Conventions

- In this guide, any information you are to enter on the keyboard is in **BOLD** type.
- Square brackets are used when your entry is a specific key, for example, [ENTER].
- Press [ENTER] after each of your responses. This key is called [RETURN] on some microcomputers and shown by an arrow [↵] on others.
- The [CTRL] and [ALT] keys are used in combination with other keys. For example, when you see [CTRL] [Break], hold down the [CTRL] key then press the [Break] key. The [ALT] key works the same way.

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[1] The use of trade, firm, or corporation names in this publication is for the information and convenience of the reader. Such use does not constitute an official endorsement or approval by the U.S. Department of Agriculture of any product or service to the exclusion of others that may be suitable.

- Uppercase or lowercase may be used. The microcomputer will automatically convert all lowercase file names to uppercase.

- (Y IN) means that either a "yes" or "no" response is required. You need to type only the single letter in uppercase or lowercase.

Installing TREEVAL

1. As with any new software system, you should make a backup copy of the TREEVAL system diskette. This may be done with the DISKCOPY command or the COPY *.* command (see your DOS Manual).

2. Check your computer's file CONFIG.SYS and, if necessary, make the following changes. Add or modify the following two lines in the CONFIG.SYS file:

FILES=15 (15 is the minimum you should have)
BUFFERS=10

If you do not have a file called CONFIG.SYS, then create one with the above two lines in it and copy CONFIG.SYS to either the bootable diskette or the root directory of the hard drive ,if you have one (see DOS manual for details).

3. (a) If you have a microcomputer with a hard disk, create a directory that will contain all the TREEVAL system and data files, for example:

Type: C:
Type: **MD TREEVAL** (or any appropriate directory name)
Type: **CD TREEVAL**
Copy all the files from the diskette to your hard-disk sub directory TREEVAL. For example, with the TREEVAL system diskette in drive A:
Type: **COPY A:*.***

-OR-

(b) If you have a microcomputer without a hard disk, insert the TREEVAL system diskette in drive A: and a blank, formatted data diskette in drive B:.

Type: **A:** (to change the default drive)
Type: **FLOPPY** (installs the batch file and data files on your data diskette)

Overview of the System Components

The TREEVAL Programs

Three programs are in the TREEVAL system (fig. 1). The first program, BUCKIT, creates the data files required by the other two programs, BUCKDP1 and BUCKSM1. Only one of the other two programs is used at a time, depending on whether you use your own bucking pattern (BUCKSM1) or optimized bucking (BUCKDP1).

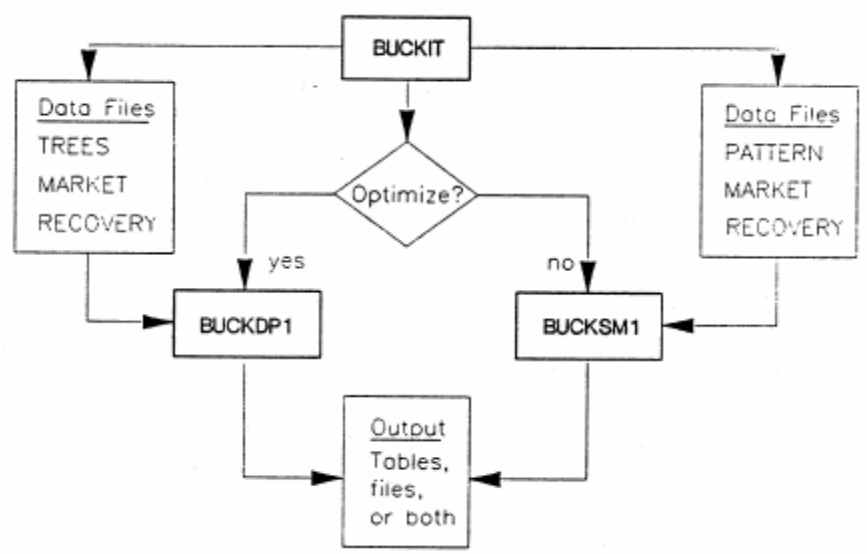


Figure 1—Diagram of the TREEVAL system.

Data entry: the BUCKIT program—The BUCKIT program collects all necessary processing data. BUCKIT is an interactive program that will guide you through the data-entry process. Menus were written to give you a choice of processing options. The various options are designed so that you do not need to know a lot of details about how the computer runs or how the TREEVAL system runs. This program has a built-in connection to the other two programs.

Simulate: the BUCKSM1 program—The BUCKSM1 program bucks trees based on the bucking patterns you specified with BUCKIT. The BUCKSM1 program simulates the bucking of trees with the data collected by BUCKIT and displays the results. These results will vary depending on the data you entered in the BUCKIT program.

Optimize: the BUCKDP1 program—The BUCKDP1 program optimizes the bucking of trees into logs. As with BUCKSM1, this program processes the data collected by the BUCKIT program, except that BUCKDP1 generates an optimum bucking solution. When running BUCKIT, you are asked to choose between the simulation and the optimization options. You simply select the bucking method, enter the appropriate data, and the program will be selected automatically.

Data Files

The TREEVAL system comes with a default set of data files. The default data files are designed for two purposes. The first is to verify that the system runs correctly on your computer. The second is to give you an idea of how the data can be set up and the kinds of results you can expect. The default data can then be used as the basis for tailoring new data files for your specific uses. The default data is set up for young-growth Douglas-fir and is listed in appendix A.

Four data files are required by TREEVAL. The BUCKIT program will automatically create the files and BUCKDP1 and BUCKSM1 will then use them. Each file can generally be described as follows (see the examples and Appendix B for additional information).

Tree or stand data—

File name:	**Description:**
TREES	A data file with a stand table and taper information, this file is used when creating a new priority-based bucking pattern with BUCKSM1 or when optimizing tree bucking with the BUCKDP1 program.

Log bucking data—

File name:	**Description:**
PATTERN	A data file with a stand table, taper information, and the breakdown of trees into logs by market, this file is used only when simulating tree bucking with the BUCKSM1 program. The pattern can be based on your specific tree-by-tree bucking pattern or your priority-based bucking rule.

Market data—

File name:	**Description:**
MARKET	This data file describes the product markets (log sizes and market names), product prices, and manufacturing costs.

Product recovery data—

File name:	Description:
RECOVERY	This data file contains coefficients for product recovery equations by product grades for young-growth Douglas-fir (Fahey, in preparation; Willits 1988).

Default data—The default data, supplied with TREEVAL, is stored in the files named ZZZTRE.DAT, ZZZPAT.DAT, ZZZMKT.DAT, and ZZZREC.DAT. These four files correspond with the four files described above. We suggest you leave the default data files intact for future reference.

Each time you use this system, you can modify any of the data files. The program will ask you to specify a file name for storing the modified data. The original data will stay intact if you enter a new file name. Good conventions for naming files are especially important if many modifications and runs are to be made.

Whether the default data or a user-specified data file is used, the BUCKIT program copies the data into the appropriate files named TREES, PATTERN, MARKET, and RECOVERY for use by BUCKDP1 or BUCKSM1. Each time the TREEVAL system is run, the data you selected is automatically copied into the four files; they will, therefore, always contain the most recently accessed data. The file names TREES, PATTERN, MARKET, and RECOVERY are reserved for use by the TREEVAL system.

Other Files

The TREEVAL system uses four files while it is running; their descriptions follow:

TREEVAL system batch files—

File name:	Description:
DF.BAT	This primary batch file is included with the TREEVAL system. Type DF to run the system. You may need to modify this file to match your microcomputer configuration because it was created for use on a hard-disk microcomputer operating with DOS 3.1. See the section "installing TREEVAL."
ZZZ. BAT	A secondary batch file, this is used by the BUCKIT program and the OF. BAT batch file. The file provides linkage to BUCKDP1 or BUCKSM1.

TREEVAL system temporary files—

File name:	Description:
SCRATCH	This file may be used by the BUCKIT program for temporary data storage while it is processing your data.
ZZZPRN.DAT	This file is used by the BUCKIT program for temporary data storage while it processes your data.

In addition, three files have been developed for use with LOTUS 1-2-3.

LOTUS 1-2-3 worksheet—

File name:	Description:
IMPORT.WK1	Supplied with the TREEVAL system, this is a LOTUS 1-2-3 version 2.01 spreadsheet file that includes the macro to import analysis data from output files SM-REG.PRN and DP-REG.PAN (described below). This file also includes a macro that will run a regression on the data from one of the two analysis files. A graph of the regression curve generated from the data in Example 1 is also included. (Example 1 was rerun to produce the summary table and the 1-2-3 file.) From within this spreadsheet, type [AL T] [D] to import the data from either file DP-REG.PRN or SM-REG.PAN. You will be asked to enter the path and then to select the data file that you want to import. Move the cursor to highlight either SM-REG.PRN or DP-REG.PRN and then press [ENTER]. Type [AL T] [R] to run the regression. For additional information, see Example 3.

Regression data—

Filename:	Description:
SM-REG.PRN	This data file has selected summary variables to generate a regression equation for total tree value per cubic foot of products as a function of diameter at breast height (d.b.h.). This file contains results from BUCKSM1 and is a standard ASCII file that you may import into LOTUS 1-2-3 or access in any other way you choose.

DP-REG.PRN This file is similar to 8M-REG.PRN, except that the results come from optimizing bucking with BUCKDP1. This is a standard ASC II file that you may import into LOTUS 1-2-3 or access in any other way you choose.

Summary tables—

File name:	**Description:**
SMTABLE. PRN	A data file that contains the summary data results from the simulation program BUCKSM1, this is a standard ASCII file that you may import into LOTUS 1-2-3 or access in any other way you choose.
DPTABLE. PRN	A data file that contains the summary data results from the optimization program BUCKDP1, this is a standard ASCII file that you may import into LOTUS 1-2-3 or access any other way you choose.

Program Results

Program results include a list of the data for the run plus the output in the form you select, either:

(1) a detailed description of log allocation, size, volume, and value or

(2) a summarized description of, volume and value.

These results are available for each tree or for the stand, depending on your input The results can either be sent to the printer or stored in a file. In addition, if you selected options 1 or 4 for the bucking program output, the summarized results will be in the ASCII files SMTABLE.PAN and SM-REG.PAN or OPT ABLE. PAN and OP-REG.PRN. This data can be accessed later with a text editor or word processor, or the data can be brought into a LOTUS 1-2-3 worksheet for further analysis (the 1-2-3 linkage is included as part of this system, see Example 3). For a detailed look at the program results, refer to appendix C.

How to Run the Model

Starting and Exiting TREEVAL

After installing the TREEVAL system (see section, "Installing TREEVAL) to run TREEVAL *from* a microcomputer with a hard disk, you:

Type: C: (to change the default drive)
Type: CD TREEVAL (to change to the TREEVAL subdirectory)
Type: DF (to start the system running with the batch file DF.BAT)

For a diskette-based microcomputer, put the TREEVAL system diskette in drive A: and your pre installed data disk in drive B:. Run the TREE VAL model from the B: drive, which is where your data files are stored:

Type: B: (to change the default drive)
Type: DF (to start the system running with the batch file OF. BAT)

If you want to stop the system, you have two options: you can "back out" of the menus until you stop the program, or you can enter [CTRL] [Break], (press [CTRL] and while holding it down, press [Break]). Because the programs are being run with batch files, you may have to enter another [CTRL] [Break] to exit the batch program and return to the DOS prompt.

Using the Menus

The BUCKIT program is written with a series of menus to help you create, access, and modify the data files needed to run the Tree Value System. As you answer questions and make selections, additional menus will appear. You can also, in many cases, back up to the previous menu; this is especially helpful for double checking or changing a previous entry. This method of manipulating data maintains consistency among the variables you enter and ensures appropriate interactions between variables.

The menu selections are numbered. You make a selection by typing the appropriate number and then pressing the [ENTER] key. Similarly, if a “yes"or “no" response is requested, type Y for "yes" or type N for “no" (either uppercase or lowercase) and press the [ENTER] key. If a file name is requested, type the name of an existing file or the name of a new file that you want to create, whichever is appropriate. The name can be a maximum of 12 characters, for example, RECOVERY.SM1. Please see your DOS manual for details on naming files.

Data Entry

The TREEVAL system uses menus to help you through the data-selection process. The menus should be self-explanatory, although more information is available in the examples.

For the first trial run, choose optimized bucking, option 2, and select the default data (3 from the menu) and "no" (N) when asked if you want to modify the data, you will have to do this three times, once for each data file. (See Example 1.)

When asked where you want the program results to print, you can enter either the name of a data file or your PC printer code (such as **PRN** or **LPT1**). Where the results go is an either-or choice. If the output is directed to print into a data file (you will be asked to enter a valid DOS file name), you can then view the program results in the data file using a text editor, word processor, or a spreadsheet like LOTUS 1-2-3. The file can then be printed at any time, if desired, by typing: **TYPE file name>PRN** ("file name" is the data file name you just entered).

If you enter an incorrect response to a question, the system may respond in several different ways. Refer to the next section, Errors, for further information.

Errors

The programs do some checking for data errors; however, you must be sure to enter values carefully. Only errors that are completely unreasonable may be caught by the programs, and then you will probably see one of the following messages:

Error:	**Explanation:**
Invalid response, try again. Execution suspended: Press [**ENTER**] to continue.	Look carefully at the data that you just entered, determine the correct response, press [**ENTER**], and proceed with the correct data.
Error found when trying to access file xxxxx. Be sure data disk is in the default drive, and/or check the file name you entered.	You have a maximum of 12 characters to describe the file name. See your DOS manual for details.

Your response may appear to be ignored, and the original question will be asked again.	Be sure that you answer the question correctly. Decimal values cannot be entered when an integer is required.

When you get an error message, it is important that you take the time to carefully look at the data that you just entered for possible misspelling or incorrect value. Note, if you enter a response that the programs were not designed to monitor, the programs may quit without an obvious reason.

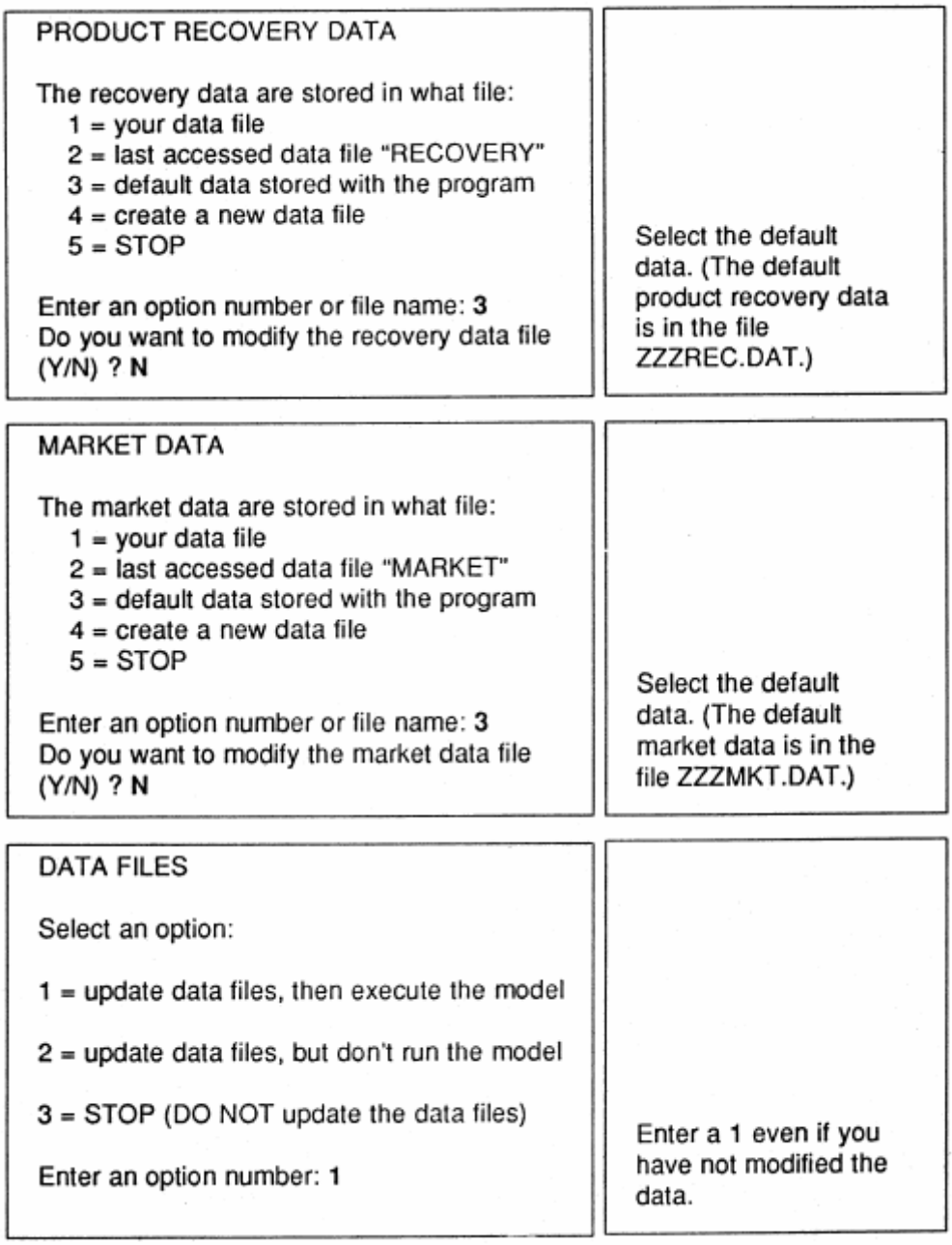
The MARKET and RECOVERY data files are closely linked. If you are having trouble with this data, we suggest that you start with the default data and modify it to meet your needs.

Examples

1 Optimize: Use Default Data

This first example introduces you to the TREEVAL system with the data in the default data files that come with the system. This will be a good check to ensure that the model will work correctly on your computer. In the following examples, the responses you should type are in **bold**. Square brackets indicate a specific key is to be pressed, as in the next sentence. After typing your response, always press the [ENTER] or [RETURN] key. The following information shows what you will see on your computer screen, along with additional comments on the right.

DF Execution suspended: Insert data disk, then press **[ENTER]** [↵] to continue. **[ENTER]**	Start the system from the batch file DF.BAT. Be sure the diskette with the default data is in the B: drive. For a hard-disk computer, just press **[ENTER]**.
- - - - TREE VALUE ESTIMATION - - - - SELECT THE BUCKING METHOD 1 = simulate bucking with your bucking pattern (BUCKSM1) 2 = optimize bucking (BUCKDP1) 3 = STOP Enter an option number: **2**	Select optimize.
OPTIMIZE BUCKING (BUCKDP1) The tree description data are in what file? 1 = your data file 2 = last accessed data file "TREES" 3 = default data stored with the program 4 = create a new data file 5 = STOP Enter an option number or file name: **3** Do you want to modify the tree data file (Y/N) ? **N**	Select the default data. (The default tree description data is in the file ZZZTRE.DAT.)


PRODUCT RECOVERY DATA
The recovery data are stored in what file:
1 = your data file
2 = last accessed data file "RECOVERY"
3 = default data stored with the program
4 = create a new data file
5 = STOP
Enter an option number or file name: 3
Do you want to modify the recovery data file (Y/N) ? N
Select the default data. (The default product recovery data is in the file ZZZREC.DAT.)
MARKET DATA
The market data are stored in what file:
1 = your data file
2 = last accessed data file "MARKET"
3 = default data stored with the program
4 = create a new data file
5 = STOP
Enter an option number or file name: 3
Do you want to modify the market data file (Y/N) ? N
Select the default data. (The default market data is in the file ZZZMKT.DAT.)
DATA FILES
Select an option:
1 = update data files, then execute the model
2 = update data files, but don't run the model
3 = STOP (DO NOT update the data files)
Enter an option number: 1
Enter a 1 even if you have not modified the data.

BUCKING PROGRAM OUTPUT: 1 = write summary to a file for 1-2-3 2 = print summary tables 3 = print detailed pattern for each tree 4 = both 1 and 2 above Enter an option number: **3**	This will produce a list of the log values and volume for each tree.
Where do you want the output tables to go? Enter either a file name or the printer code (e.g., PRN): **PRN** Execution suspended: Be sure printer is on, press **[ENTER]** [↵] to continue. **[ENTER]** Execution terminated: Data files have been updated, processing continues....	If you do not have a printer, enter a file name instead of PRN. There will be a pause while the BUCKDP1 program runs. The program is done when the DOS prompt returns. For an example of the results, see appendix C.

2 Simulate: Modify the Default Data

This example shows the steps required to create a new pattern of tree bucking for simulating tree value. The default data is used as the basic data that will be modified. This example uses the same data-entry conventions as described for Example 1.

The Display and Your Response:	Comments:
DF Execution suspended: Insert data disk, then press **[ENTER]** [↵] to continue. **[ENTER]**	Start the system from the batch file DF.BAT. Be sure the diskette with the default data is in the B: drive. For a hard-disk microcomputer, just press **[ENTER]**.
- - - - TREE VALUE ESTIMATION - - - - SELECT THE BUCKING METHOD 1 = simulate bucking with your bucking pattern (BUCKSM1) 2 = optimize bucking (BUCKDP1) 3 = STOP Enter an option number: **1**	Select simulate, option **1**.

SIMULATE BUCKING (BUCKSM1)

The bucking data are stored in what file?
1 = your data file
2 = last accessed data file "PATTERN"
3 = default data stored with the program
4 = create a new data file
5 = STOP

Enter an option number or file name: **4**

We want to create a new bucking pattern data file.

CREATE A NEW BUCKING PATTERN FOR SIMULATION

Select the method of determining the bucking pattern:

1 = "your" bucking pattern

2 = priority-based bucking rule
CAUTION: Tree description data file (e.g., TREES.xxx) must already exist (it is created during bucking optimization step). If it doesn't exist, enter an "X".

3 = STOP

Enter an option number (or X): **2**

See appendix D for information on selections 1 and 2.

Enter a file name to store the bucking pattern (e.g., PATTERN.yyy): **PATTERN.EX2**

Enter any valid DOS file name to store the bucking pattern that you will be creating.

Priority class 1. Enter market name. (Enter a blank to quit): **VENEER**	You can enter lumber, veneer, chips, or pulp.
Enter minimum dib and # of lengths. Separate with a blank or comma: **15 1**	dib = diameter inside bark; # = number. 15 inches (in) = the minimum log diameter acceptable in the veneer market; 1 = the number of different log lengths used for veneer.
Enter the first length for this priority, include trim. Start with the shortest length: **17**	17 feet (ft) = the veneer log length (see appendix D).
Priority class 2. Enter market name. (Enter a blank to quit): **LUMBER**	You can enter lumber, veneer, chips, or pulp.
Enter minimum dib and # of lengths. Separate with a blank or comma: **6 7**	6 in = the minimum log diameter acceptable in the lumber market; 7 = the number of different log lengths used for lumber.
Enter the first length for this priority, include trim. Start with the shortest length: **8.5**	8.5 ft = the first lumber log length.

Enter the next length for this priority, include trim: **10.5** Enter the next length for this priority, include trim: **12.5** Enter the next length for this priority, include trim: **14.5** Enter the next length for this priority, include trim: **16.5** Enter the next length for this priority, include trim: **18.5** Enter the next length for this priority, include trim: **20.5** Priority class 3. Enter market name. (Enter a blank to quit): **CHIPS** Enter minimum dib and # of lengths: **5 1** Enter the first length for this priority, include trim. Start with the shortest length: **4**	You can enter lumber, veneer, chips, or pulp. 5 in = the min. log diameter acceptable in the chip market; 1 = the number of different log lengths used for chips. 4 ft = the chips log length.

Priority class 4. Enter market name. (Enter a blank to quit): **[ENTER]** Do you want to print the patterns (Y/N) ? **Y**	This is the end of your data, so just press **[ENTER]**. The patterns for each tree size class will be listed, at your option.
Enter the name of the file containing the tree description data OR an "X" if you want to use the default data: **X** (Refer to the PATTERN file in appendixes A and B) Do you want to modify the pattern you just entered (Y/N) ? **N**	Unless you have created a new tree description file, the default data is the only data available at this time. The program will list one full screen at a time.
PRODUCT RECOVERY DATA The recovery data are stored in what file: 1 = your data file 2 = last accessed data file "RECOVERY" 3 = default data stored with the program 4 = create a new data file 5 = STOP Enter an option number or file name: **2** Do you want to modify the recovery data file (Y/N) ? **N**	

MARKET DATA

The market data are stored in what file:
1 = your data file
2 = last accessed data file "MARKET"
3 = default data stored with the program
4 = create a new data file
5 = STOP

Enter an option number or file name: **2**

Do you want to modify the market data file (Y/N) ? **Y**

Enter a file name to store the new market data (e.g., MARKET.yyy)
or an "X" if you want to STOP:
MARKET.EX2

(The descriptive title lines will display.)

Enter any valid DOS file name.

You may enter new information if you wish. If you do, the last line must be:
end

MODIFY MARKET DATA:

1 = values of products (grades, prices)
2 = market descriptions (acceptable diameters, log trim, product lengths)
3 = costs (logging, manufacturing)
9 = DONE (segment length, select output: detail/summary)

Enter an option number: **2**

Change the minimum log diameter for chips in the next step.

MARKET DESCRIPTIONS

1 = sawmill
2 = veneer
3 = chips
4 = pulp
9 = DONE

Enter an option number: **3**

CHIP MARKET DESCRIPTION

1 = minimum small-end log diameter (inches)
Old value: 6

2 = maximum small-end log diameter (inches)
Old value: 1000

3 = log trim (feet)
Old value: .000

4 = log length used (feet)
Old value: 4.0000

9 = DONE

Enter the number of an item that you want to change: **1**

Enter a new minimum diameter: **5**

The segment length currently is 0.5000
Do you want to change this (Y/N) ? **N**

This menu will repeat. Because you had only the one change, enter **9** three times to "back out" of the menus.

DATA FILES

Select an option:

1 = update data files, then execute the model

2 = update data files, but don't run the model

3 = STOP (DO NOT update the data files)

Enter an option number: **1**

BUCKING PROGRAM OUTPUT:

1 = write summary to a file for 1-2-3
2 = print summary tables
3 = print detailed pattern for each tree
4 = both 1 and 2 above

Enter an option number: **4**

You want to create the file SMTABLE.PRN for possible use later.

Where do you want the output tables to go?

Enter either a file name or the printer code (e.g., PRN): **PRN**

If you do not have a printer, enter a file name instead of PRN.

Execution suspended: Be sure printer is on, press **ENTER** to continue.

[ENTER]

Execution terminated: Data files have been updated, processing continues....

There may be a pause while the BUCKSM1 program runs. The program is done when the DOS prompt returns.

3 With LOTUS 1-2-3

This example shows how to use LOTUS 1-2-3 Release 2.01 to import file DP-REG.PRN. The same steps will work for file SM-REG.PRN. You must determine how to use this data, whether for regression analysis or some other spreadsheet function. This guide makes no attempt to provide LOTUS 1-2-3 or statistical training; therefore, this example and LOTUS 1-2-3 must be used at your discretion.

The Display and Your Response:	Comments:
Bring up LOTUS 1-2-3	We assume that you know the steps for your computer.
/ **F**ile **D**irectory **C:\TREEVAL**	Change to the default directory TREEVAL.
/ **F**ile **R**etrieve c:\treeval**IMPORT.WK1**	Get the worksheet that contains the macro.
[Alt] [D]	To import the data, invoke macro D.
[Enter]	Confirm the default directory TREEVAL.
DP-REG.PRN **[Enter]**	Move the cursor to highlight this file.

This worksheet IMPORT.WK1 contains several kinds of Information (fig. 2). In the upper left corner (A1..D7) is the data from file DP-REG.PRN. Directly to the right is macro \D, (F1..F7), the macro used to import the data. The worksheet also includes a graph of the data points that were just imported from file DP-REG.PRN (fig.3). Instructions for any additional graphs are not included here; please refer to your 1-2-3 reference manual for that information.

	A	B	C	D	E	F	G	H	I
1	Dbh	$/Cu.Ft.	$	Cu.Ft.		Import Summarized Results			
2	10.	0.783	12.56	16.035		Macro \D			
3	14.	0.995	39.89	40.094		/reA1..E200~			
4	18.	1.082	86.28	79.722		/wgc12~{home}/wcs5~			
5	22.	1.088	139.21	127.999		"Dbh{right}"$/Cu.Ft.{right}"${right}"Cu.Ft.			
6	26.	1.137	215.15	189.265		{home}{down}{beep}			
7	30.	1.199	312.07	260.197		/fd{?}~/fin{name}{?}~			

Figure 2—Contents of IMPORT.WK1.

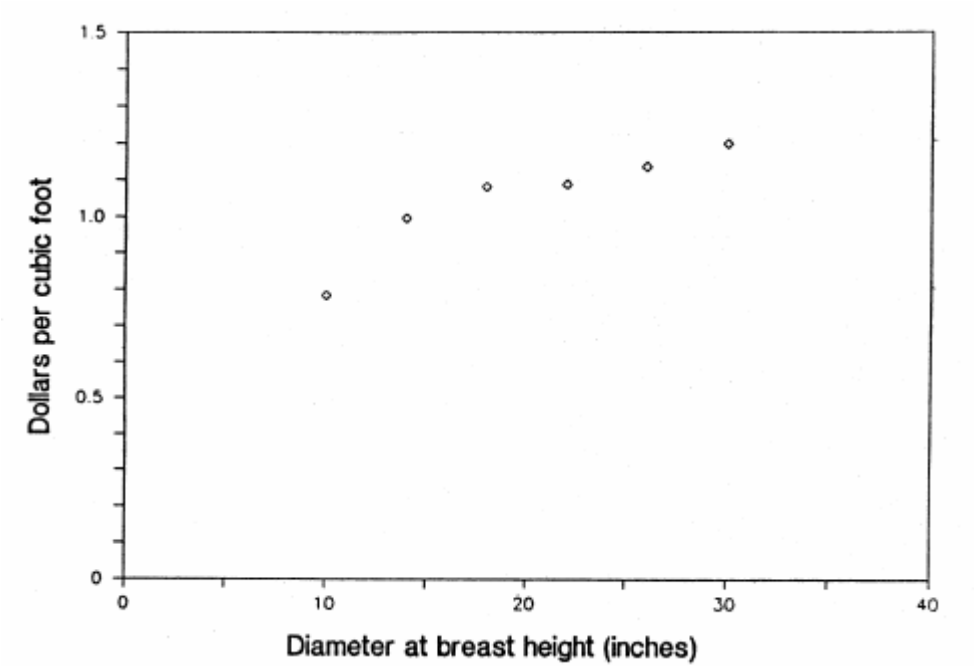


Figure 3—Total value per cubic foot by tree diameter at breast height for optimized bucking results from Example 1 (file DP-REG.PRN), using Lotus 1-2-3

References

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Bruce, David. Unpublished Douglas-fir taper equation. On file with: Biometrics Unit, Forestry Sciences Laboratory, Pacific Northwest Research Station, P.O. Box 3890, Portland, OR 97208-3890.

Fahey, Thomas D.; Willits, Susan. [in preparation]. Veneer recovery of Douglas-fir from the Coast and Cascade Ranges of Oregon and Washington. Res. Pap. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Kozak, A.; Munro, D.D.; Smith, J.H.G. 1969. Taper functions and their application in forest inventory. Forestry Chronicle 45(4): 278-283.

Willits, Susan; Fahey, Thomas D. 1988. Lumber recovery of Douglas-fir from the Coast and Cascade Ranges of Oregon and Washington. Res. Pap. PNW-RP-400. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 32 p.

Appendix

Appendix A: Contents of the Data Files

The data in these default files is set up for young-growth Douglas-fir.

TREES (default file ZZZTRE.DAT)—

Line: Data:

```
1     3  0.0000000  0.0000000  0.0000000  0.0000000  0.0000000  0.0000000
2          10.0        1.2        75.0        1.0         0
3          14.0        1.2       100.0        1.0         0
4          18.0        1.2       126.0        1.0         0
5          22.0        1.2       141.0        1.0         0
6          26.0        1.2       157.0        1.0         0
7          30.0        1.2       166.0        1.0         0
```

PATTERN (default file ZZZPAT.DAT)—

Line: Data:

```
1     3  0.0000000  0.0000000  0.0000000  0.0000000  0.0000000  0.0000000
2        10.0    1.2    75.0    1     2
3     'LUMBER'  20.5000
4     'LUMBER'  18.5000
5        14.0    1.2   100.0    1     5
6     'LUMBER'  20.5000
7     'LUMBER'  20.5000
8     'LUMBER'  20.5000
9     'CHIPS '   4.0000
10    'CHIPS '   4.0000
11       18.0    1.2   126.0    1     5
12    'LUMBER'  20.5000
13    'LUMBER'  20.5000
14    'LUMBER'  20.5000
15    'LUMBER'  20.5000
16    'LUMBER'  14.5000
17       22.0    1.2   141.0    1     6
18    'VENEER'  17.0000
19    'VENEER'  17.0000
20    'LUMBER'  20.5000
21    'LUMBER'  20.5000
22    'LUMBER'  20.5000
23    'LUMBER'  18.5000
24       26.0    1.2   157.0    1     7
25    'VENEER'  17.0000
```

```
26    'VENEER'  17.0000
27    'VENEER'  17.0000
28    'VENEER'  17.0000
29    'LUMBER'  20.5000
30    'LUMBER'  20.5000
31    'LUMBER'  20.5000
32      30.0     1.2    166.0    1    8
33    'VENEER'  17.0000
34    'VENEER'  17.0000
35    'VENEER'  17.0000
36    'VENEER'  17.0000
37    'VENEER'  17.0000
38    'LUMBER'  20.5000
39    'LUMBER'  20.5000
40    'LUMBER'  18.5000
```

MARKET (default file ZZZMKT.DAT)—

Line: Data:

```
 1    '               This is the default data set'
 2    'This run is used to demonstrate how the TREEVAL model works and is'
 3    'not intended to be a representative stand of trees.  The results from'
 4    'this run may be used in a Lotus 1-2-3 regression analysis.'
 5    'end'
 6     0.5000   4
 7     9   8  17  21  25  29  33  34  37  41
 8     0.000 0.500 0.500 0.500 0.500 0.500 0.000 0.500 0.500
 9    'LUMBER    '     6  1000  0  0  1  1  1  1  1  0  1  1
10    'VENEER    '    15  1000  0  0  0  0  0  0  0  1  0  0
11    'CHIPS     '     6  1000  0  1  0  0  0  0  0  0  0  0
12    'PULP      '     4  1000  0  1  0  0  0  0  0  0  0  0
13     7  275  275  275  275  275  275  275
14        213  213  224  215  229  220  226
15        192  192  192  186  210  196  204
16        165  165  165  165  165  165  165
17         85   85   85   85   85   85   85
18        1.12    0.28
19       220   110    55
20        1.12
21        70   0.30
22      0.0000       0.0000       0.0000       0.0000       0.0000
23      0.0000       0.0000       0.0000       0.0000       0.0000
24      0.0000       0.0000       0.0000       0.0000       0.0000
25      0.0000       0.0000       0.0000       0.0000       0.0000
26      0.0000       0.0000       0.0000       0.0000       0.0000
27      0.0000       0.0000       0.0000       0.0000       0.0000
28    171.0000       0.3350       0.0000   -1396.0000    6734.0000
```

```
29     182.0000       0.0000       0.0000      74.3000    3787.0000
30       0.0000       0.0000       0.0000       0.0000       0.0000
31       0.0000       0.0000       0.0000       0.0000       0.0000
```

RECOVERY (default file ZZZREC.DAT)—

Line: Data:

```
 1        10.0700   0.0530  0.0000  -23.6100  0.0000  0. 0. 0. 0. 0.
 2      2
 3      'CHIPPABLE '  22.6100   -0.5150   0.0000  172.3000  0.0000  0. 0. 0. 0. 0.
 4      'OTHER     '   8.5700   -0.0380   0.0000  -15.4100  0.0000  0. 0. 0. 0. 0.
 5      5
 6      'D&BTR SEL '  -2.8600    0.1800   0.0000   10.3300  0.0000  0. 0. 0. 0. 0.
 7      'SS & NO 1 '  21.5800    1.2900   0.0000  -63.6600  0.0000  0. 0. 0. 0. 0.
 8      'STD & BTR '  66.4600   -1.3500   0.0000   39.2600  0.0000  0. 0. 0. 0. 0.
 9      'UTIL      '  10.6700   -0.0600   0.0000    6.0500  0.0000  0. 0. 0. 0. 0.
10      'ECON      '   4.1500   -0.0600   0.0000    8.0200  0.0000  0. 0. 0. 0. 0.
11        48.0000  -0.4700  0.0000 -288.9000  0.0000  0. 0. 0. 0. 0.
12      1
13      'CHIPPABLE'  -50.1000    1.4700   0.0000  902.8000  0.0000  0. 0. 0. 0. 0.
14      3
15      'A-B       '  -4.4000    1.2100   0.0000   37.1000  0.0000  0. 0. 0. 0. 0.
16      'C-D       '  83.6000   -0.7100   0.0000  127.3000  0.0000  0. 0. 0. 0. 0.
17      'UTIL      '  20.8000   -0.5000   0.0000 -164.4000  0.0000  0. 0. 0. 0. 0.
18         1.0000
```

SMTABLE.PRN

The following is an example of the summary table output file. Called the SMTABLE.PRN file, you would create it when simulating bucking as in Example 2. The file DPTABLE.PRN has the same form as shown here. These files are ASCII files that can be accessed in any way you choose.

```
Dbh      Ht.    Trees   # Pcs.    Cu.Ft.      $$      Ave.D.  Use
10.00   75.00    1.00      4.00     14.83     11.71    6.17   COMBINED
                           2.00     13.44     10.74    6.94   LUMBER
                           0.00      0.00      0.00    0.00   VENEER
                           2.00      1.39      0.97    5.39   CHIPS
                           0.00      0.00      0.00    0.00   PULP
14.00  100.00    1.00      6.00     36.74     36.28    7.58   COMBINED
                           3.00     34.14     34.47    9.18   LUMBER
                           0.00      0.00      0.00    0.00   VENEER
                           3.00      2.59      1.81    5.99   CHIPS
                           0.00      0.00      0.00    0.00   PULP
```

18.00	126.00	1.00	6.00	76.25	79.80	9.60	COMBINED
			5.00	75.51	79.28	10.42	LUMBER
			0.00	0.00	0.00	0.00	VENEER
			1.00	0.74	0.52	5.50	CHIPS
			0.00	0.00	0.00	0.00	PULP
22.00	141.00	1.00	7.00	121.85	121.25	11.61	COMBINED
			4.00	61.21	63.26	10.46	LUMBER
			2.00	59.88	57.46	16.95	VENEER
			1.00	0.76	0.53	5.52	CHIPS
			0.00	0.00	0.00	0.00	PULP
26.00	157.00	1.00	9.00	188.62	200.81	12.76	COMBINED
			3.00	45.98	47.76	10.07	LUMBER
			4.00	141.08	151.96	18.39	VENEER
			2.00	1.56	1.09	5.56	CHIPS
			0.00	0.00	0.00	0.00	PULP
30.00	166.00	1.00	9.00	260.35	302.80	15.01	COMBINED
			3.00	44.53	44.71	9.63	LUMBER
			5.00	215.15	257.62	20.22	VENEER
			1.00	0.68	0.48	5.11	CHIPS
			0.00	0.00	0.00	0.00	PULP

DP-REG.PRN

A list of the data file that can be used for regression analysis follows; the file was produced by BUCKDP1 and is used for Example 3. It is an ASCII file that can be imported into a Lotus 1-2-3 worksheet or accessed in any way you choose. A similar file is created by BUCKSM1 called SM-REG.PRN.

Dbh	$/Cu.Ft.	$	Cu.Ft.
10.	0.783	12.56	16.035
14.	0.995	39.89	40.094
18.	1.082	86.28	79.722
22.	1.088	139.21	127.999
26.	1.137	215.15	189.265
30.	1.199	312.07	260.197

Appendix B: Variable Definitions

This section describes all the variables that are in the four data files (TREES, PATTERN, MARKET, RECOVERY). Variables are described line-by-line for each file. A cross-reference for the line numbers with actual data is available in appendix A, Default Data Files.

TREES

Line:	Variables:
1	Taper-equation selection code (1 = Kozak, 2 = Bruce's alder, and 3 = Bruce's Douglas-fir); taper-equation coefficients (10 possible).
2	D.b.h.; stump height; total tree height; number of trees for this d.b.h. and height; number of felling breaks for this d.b.h. and height (unused at this time).
3-7	Same variables as line 2, continue until all trees are included.

PATTERN

Line:	Variables:
1	Taper equation selection code (1 = Kozak, 2 = Bruces's alder, and 3 = Bruce's Douglas-fir); taper-equation coefficients (6 possible).
2	D.b.h.; stump height; total tree height; number of trees for this d.b.h. and height; number of logs for this d.b.h. and height (20 maximum logs per tree).
3-6	For each log (starts with the butt-log): market name (lumber, veneer, chips, or pulp); log length for the market.
7-48	Same variables as lines 2-6, continue until all trees are included.

MARKET

Line:	Variables:
1-4	Title lines to describe a particular run, can be as many lines as needed.
5	END - signifies the end of the title lines.
6	Segment length; number of markets (4 markets maximum).

7	Number of log lengths in all markets (20 lengths maximum); a list of the log lengths in ascending order (lengths include trim and are expressed in segment lengths; for example. if the segment length is 0.5 ft and the log length is 8.5 ft. the length used here would be 17 ft).
8	A list of trim (in feet) for each of the logs in the log length list on line 7 above. The order of the trims on this list matches the order of the log lengths on line 7.
9-12	Market name; minimum small diameter for this market; maximum small diameter for this market; scale code (unused); a list of zeros and ones that show what log lengths are used in this market (1 = yes it's used. 0 = no). This list of zeros and ones corresponds with the log length list on line 7 above and the trim list on line 8.
13	Number of lengths of lumber (20 lengths maximum); prices for each length (dollars per thousand board feet) for the first lumber grade.
14	Prices for each length for the second lumber grade.
15-17	Prices for each length for the remaining lumber grades. NOTE: the number of grades is in the RECOVERY data file.
18	Prices for sawmill residues (dollars per unit).
19	Prices for each grade of veneer (dollars per thousand square feet, 3/8-inch basis).
20	Price for veneer mill residues (dollars per unit).
21	Price for chip logs (dollars per cunit); price for pulp (dollars per ton).
22 23	Equation coefficients for stumpage cost.
24	" " " falling "
25	" " " bucking "
26	" " " yarding "
27	" " " loading "
28	" " " hauling "
	" " " manufacturing cost for the first market: lumber (dollars per thousand board feet).
29-31	" " " manufacturing cost for the remaining markets: veneer, chips, and pulp.

RECOVERY

Line:	Variables:
1	Equation coefficients for lumber recovery factor.
2	Number of lumber residues (2 lumber residues maximum).
3-4	For each lumber residue: residue name; equation coefficients for the lumber residue volume.
5	Number of lumber grades (13 lumber grades maximum).
6-10	For each lumber grade: grade name; equation coefficients for the lumber volume.
11	Equation coefficients for veneer recovery factor.
12	Number of veneer residues (2 veneer residues maximum).
13	Veneer residue name; equation coefficients for the veneer residue volume.
14	Number of veneer grades (13 veneer grades maximum).
15-17	For each veneer grade: grade name; equation coefficients for the veneer volume.
18	Pulp-yield coefficient.

Appendix C: Results from Example 1

BUCKDP1: assumes log scaling and recovery practices based on PNW study methods.
Log bucking and allocation are optimized.

This is the default data set.
The default data uses $/M Bd. Ft. lumber tally for lumber;
$/M Sq. Ft. 3/8" basis for dry veneer;
$/Cu. Ft. solid wood equiv. for chips;
$/Cunit for pulp.
This run is used to demonstrate how the TREEVAL model works and is not intended to be a representative stand of trees. The results from this run may be used in a Lotus 1-2-3 regression analysis.

Markets:	LUMBER	VENEER	CHIPS	PULP
Min. Diam:	6.0"	15.0"	6.0"	4.0"
Max. Diam:	1000.0"	1000.0"	1000.0"	1000.0"
Log length (a 1 means the length is used in the market)				
4.0'	0	0	1	1
8.5'	1	0	0	0
10.5'	1	0	0	0
12.5'	1	0	0	0
14.5'	1	0	0	0
16.5'	1	0	0	0
17.0'	0	1	0	0
18.5'	1	0	0	0
20.5'	1	0	0	0

LUMBER PRICES ($) BY LENGTH AND GRADE

	Length						
Grade	8'	10'	12'	14'	16'	18'	20'
D&BTR SEL	275.	275.	275.	275.	275.	275.	275.
SS & NO 1	213.	213.	224.	215.	229.	220.	226.
STD & BTR	192.	192.	192.	186.	210.	196.	204.
UTIL	165.	165.	165.	165.	165.	165.	165.
ECON	85.	85.	85.	85.	85.	85.	85.

Lumber Residue Prices ($)

CHIPPABLE	1.12
OTHER	0.28

VENEER PRICES BY GRADE ($)

Grade	Price
A-B	220.
C-D	110.
UTIL	55.

Veneer Residue Prices ($)

CHIPPABLE 1.12

Price for chip logs: $ 70.

Price for pulp: $ 0.30

- - - - Coefficients for Cost Equations - - -

Cost = a + b(D) + c(D*D) + d(1/D) + e(1/D*D)

	a	b	c	d	e
Stumpage	0.000	0.000	0.000	0.000	0.000
Fall	0.000	0.000	0.000	0.000	0.000
Buck	0.000	0.000	0.000	0.000	0.000
Yard	0.000	0.000	0.000	0.000	0.000
Load	0.000	0.000	0.000	0.000	0.000
Haul	0.000	0.000	0.000	0.000	0.000
LUMBER	171.000	0.335	0.000	-1396.000	6734.000
VENEER	182.000	0.000	0.000	74.300	3787.000
CHIPS	0.000	0.000	0.000	0.000	0.000
PULP	0.000	0.000	0.000	0.000	0.000

* *

Log bucking and allocation are optimized.

This run used Bruce's unpublished Douglas-fir taper equation.

- - - TREE - - -

Dbh	10.0"
Height	75.0'
Stump	1.2'
# of trees	1.0

- - - - - - - - - - - - - - - L O G S - - - - - - - - - - - - - - -

- - - - - Feet - - - - -			- - Inches - -				
Top Ht.	Base Ht.	Length	Small Diam.	Large Diam.	Volume Cu.Ft.	$ Revenue	Market
55.00	51.00	4.00	4.02	4.60	0.407	0.12	PULP
51.00	47.00	4.00	4.60	5.14	0.519	0.16	PULP
47.00	43.00	4.00	5.14	5.64	0.635	0.19	PULP
43.00	39.00	4.00	5.64	6.10	0.753	0.23	PULP
39.00	35.00	4.00	6.10	6.53	0.871	0.61	CHIPS
35.00	20.50	14.50	6.53	7.78	4.314	3.16	LUMBER
20.50	0.00	20.50	7.78	11.22	8.536	8.09	LUMBER

Conversion return for the stem = $ 12.56

- - - TREE - - -

Dbh	14.0"
Height	100.0'
Stump	1.2'
# of trees	1.0

- - - - - - - - - - - - - - - L O G S - - - - - - - - - - - - - - -

- - - - - Feet - - - - -			- - Inches - -				
Top Ht.	Base Ht.	Length	Small Diam.	Large Diam.	Volume Cu.Ft.	$ Revenue	Market
80.50	76.50	4.00	4.28	4.94	0.466	0.14	PULP
76.50	72.50	4.00	4.94	5.56	0.603	0.18	PULP
72.50	68.50	4.00	5.56	6.14	0.749	0.22	PULP
68.50	64.50	4.00	6.14	6.70	0.901	0.63	CHIPS
64.50	56.00	8.50	6.70	7.78	2.465	1.93	LUMBER
56.00	39.50	16.50	7.78	9.54	7.156	7.05	LUMBER
39.50	27.00	12.50	9.54	10.59	7.232	7.39	LUMBER
27.00	10.50	16.50	10.59	11.68	11.563	13.09	LUMBER
10.50	0.00	10.50	11.68	15.15	8.958	9.25	LUMBER

Conversion return for the stem = $ 39.89

- - - TREE - - -

Dbh	18.0"
Height	126.0'
Stump	1.2'
# of trees	1.0

- - - - - - - - - - - - - - - L O G S - - - - - - - - - - - - - - -

- - - - - Feet - - - - - Top Ht.	Base Ht.	Length	- - Inches - - Small Diam.	Large Diam.	Volume Cu.Ft.	$ Revenue	Market
106.50	102.50	4.00	4.47	5.17	0.509	0.15	PULP
102.50	98.50	4.00	5.17	5.83	0.662	0.20	PULP
98.50	94.50	4.00	5.83	6.46	0.825	0.25	PULP
94.50	90.50	4.00	6.46	7.06	0.998	0.70	CHIPS
90.50	86.50	4.00	7.06	7.63	1.178	0.82	CHIPS
86.50	70.00	16.50	7.63	9.76	7.156	7.05	LUMBER
70.00	53.50	16.50	9.76	11.56	10.647	11.76	LUMBER
53.50	37.00	16.50	11.56	13.05	13.657	15.63	LUMBER
37.00	16.50	20.50	13.05	14.53	21.490	23.75	LUMBER
16.50	0.00	16.50	14.53	19.01	22.601	25.97	LUMBER

Conversion return for the stem = $ 86.28

- - - TREE - - -

Dbh	22.0"
Height	141.0'
Stump	1.2'
# of trees	1.0

- - - - - - - - - - - - - - - L O G S - - - - - - - - - - - - - - -

- - - - - Feet - - - - - Top Ht.	Base Ht.	Length	- - Inches - - Small Diam.	Large Diam.	Volume Cu.Ft.	$ Revenue	Market
125.50	121.50	4.00	4.04	4.85	0.434	0.13	PULP
121.50	117.50	4.00	4.85	5.61	0.600	0.18	PULP
117.50	113.50	4.00	5.61	6.34	0.782	0.23	PULP
113.50	109.50	4.00	6.34	7.03	0.977	0.68	CHIPS
109.50	99.00	10.50	7.03	8.71	3.545	2.71	LUMBER
99.00	78.50	20.50	8.71	11.57	12.272	12.50	LUMBER
78.50	62.00	16.50	11.57	13.54	14.835	16.94	LUMBER
62.00	41.50	20.50	13.54	15.61	24.653	27.28	LUMBER
41.50	25.00	16.50	15.61	17.01	23.780	27.32	LUMBER
25.00	16.50	8.50	17.01	17.67	13.374	13.89	LUMBER
16.50	0.00	16.50	17.67	22.97	32.746	37.32	LUMBER

Conversion return for the stem = $ 139.21

- - - TREE - - -

Dbh	26.0"
Height	157.0'
Stump	1.2'
# of trees	1.0

- - - - - - - - - - - - - - LOGS - - - - - - - - - - - - - -

- - - - - Feet - - - - -			- - Inches - -				
Top Ht.	Base Ht.	Length	Small Diam.	Large Diam.	Volume Cu.Ft.	$ Revenue	Market
141.00	137.00	4.00	4.40	5.25	0.512	0.15	PULP
137.00	133.00	4.00	5.25	6.06	0.702	0.21	PULP
133.00	129.00	4.00	6.06	6.83	0.910	0.64	CHIPS
129.00	125.00	4.00	6.83	7.57	1.134	0.79	CHIPS
125.00	116.50	8.50	7.57	9.04	3.163	2.88	LUMBER
116.50	100.00	16.50	9.04	11.61	9.818	10.39	LUMBER
100.00	83.50	16.50	11.61	13.89	14.835	16.94	LUMBER
83.50	67.00	16.50	13.89	15.92	19.722	22.68	LUMBER
67.00	50.50	16.50	15.92	17.72	25.307	29.03	LUMBER
50.50	34.00	16.50	17.72	19.30	29.889	34.15	LUMBER
34.00	17.00	17.00	19.30	20.78	37.256	41.60	VENEER
17.00	0.00	17.00	20.78	26.85	46.017	55.69	VENEER

Conversion return for the stem = $ 215.15

- - - TREE - - -

Dbh	30.0"
Height	166.0'
Stump	1.2'
# of trees	1.0

- - - - - - - - - - - - - - - LOGS - - - - - - - - - - - - - - -

- - - - - - Feet - - - - - -			- - Inches - -				
Top Ht.	Base Ht.	Length	Small Diam.	Large Diam.	Volume Cu.Ft.	$ Revenue	Market
152.50	148.50	4.00	4.14	5.11	0.471	0.14	PULP
148.50	144.50	4.00	5.11	6.01	0.679	0.20	PULP
144.50	140.50	4.00	6.01	6.87	0.910	0.64	CHIPS
140.50	132.00	8.50	6.87	8.58	2.836	2.20	LUMBER
132.00	121.50	10.50	8.58	10.51	5.509	5.30	LUMBER
121.50	113.00	8.50	10.51	11.96	5.781	6.00	LUMBER
113.00	96.50	16.50	11.96	14.55	16.101	18.35	LUMBER
96.50	80.00	16.50	14.55	16.87	22.428	25.77	LUMBER
80.00	63.50	16.50	16.87	18.97	28.362	32.45	LUMBER
63.50	51.00	12.50	18.97	20.42	24.904	26.23	LUMBER
51.00	34.00	17.00	20.42	22.20	42.189	50.04	VENEER
34.00	17.00	17.00	22.20	23.88	49.227	62.61	VENEER
17.00	0.00	17.00	23.88	30.78	60.801	82.14	VENEER

Conversion return for the stem = $ 312.07

Appendix D: Notes

See the related publication (Briggs, in press) for additional details and background information for using the model.

Segment length—All log lengths plus trim must be an even multiple of the segment length. For example: 8 ft log + 0.5 ft trim = 8.5 ft log; therefore, the segment length would logically be 0.5 ft Using a smaller segment length, such as 0.1 ft is not advised. It increases the program solution time, but it does not improve the accuracy of the solutions.

Market names—The valid market names to use are: LUMBER, VENEER, CHIPS, or PULP.

Veneer logs—The only valid log length to use for the veneer market is 17 ft; it is "manufactured" into two 8.5 ft blocks for 8 ft veneer.

Taper equations—Three forms of taper equations are available in the programs: Kozak's (1969) taper equation, Bruce's (1968) red alder equation, and Bruce's (unpublished) Douglas-fir equation. The selected equation is used to calculate diameters at each segment length along the tree stem. The user can modify the coefficients for the first two equations, if desired. See the related publication (Briggs, in press) for examples of coefficients.

Bucking pattern versus priority-based bucking—When entering a bucking rule for simulated bucking, you can choose from two methods. A user-generated bucking pattern requires you to enter a d.b.h. and tree-height range that will have one market and one set of log lengths. The program increments diameter by 1-in classes and tree height by 1-ft classes. A word of caution: entering a bucking pattern with this option can potentially create a very large data file. Priority-based bucking is based on log diameter and the order that you enter markets and log lengths. The program will try to meet the diameter and length, criteria for the first market that you enter; if the diameter and length do not fit the tree, the program will continue down the list of markets until a match is made or the tree has been fully bucked. This method bucks the trees contained in the TREES file.

Cost and recovery equations—These equations are all based on small-end log diameter and are of the form: $a + b\,(D) + C\,(D^2) + d\,(1/D) + e\,(1/D^2)$. You can enter any value or zero for the coefficients a, b, c, d, and e. The equation coefficients are generally developed through regression analysis of a database.

Sachet, Janet K. Aye,; Briggs, David G.; Fight, Roger D. 1989. Tree value system: users guide Gen. Tech. Rep. PNW-GTR-234. Portland, OR: U.S. Department of Agriculture. Forest Service, Pacific Northwest Research Station. 45p.

This paper instructs resource analysts on use of the Tree Value System (TREEVAL). TREEVAL is a microcomputer system of programs for calculating tree or stand values and volumes based on predicted product recovery. Designed for analyzing silvicultural decisions, the system can also be used for appraisals and for evaluating Jog bucking. The system calculates results based either on optimized tree bucking or on simulated bucking from user input. Currently, TREEVAL contains data for young-growth Douglas-fir (Pseudorsuga menziesii (Mirb.) Franco var. menziesii however. other species can also be analyzed. The recovery equations now in the TREEVAL model are appropriate for natural stands but are not appropriate for plantations. Steps are explained for running the system on an IBM compatible microcomputer. The programs and data files are described.

Keywords; Tree value, tree volume, product recovery, software, microcomputer, users guide

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