



PCBRIDGE

A data reformatting utility for bridging
PERMCHECK files with CACTOS stand description files

by

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ABSTRACT

The PCBRIDGE program enables the user to convert computer text files formatted for input into PERMCHECK (or many other formats as well) to a format which is acceptable to the CACTOS¹/CRYPTOS² projection systems, or STAG³. Three types of input files are required for input to PCBRIDGE. One contains individual tree measurements, one contains plot level information (plot sizes, etc., from which tree expansion factors are computed), and one which lists the format of the input data (using standard FORTRAN 77 edit descriptors). If the user has more than one measurement sequence he wishes to convert, he can make corrections to previous measurements before their respective stand descriptions are completed by starting with the most recent data. The user is prompted for all filenames interactively when they are required by PCBRIDGE.

¹CACTOS is an acronym for CALifornia Conifer Timber Output Simulator

²CRYPTOS is an acronym for Cooperative Redwood Yield Project's Timber Output Simulator

³STAG is an acronym for Forest STAnd Generator

INTRODUCTION

Development of a regional growth simulator such as the CACTOS system (Wensel, and Biging 1988) is quite a large and complex undertaking. Maintaining and updating a permanent plot database such as that used by the Northern California Forest Yield Cooperative (NCFYC) for development and recalibration of the CACTOS models, can be quite a large job in itself. Due to the size of the database, many tasks associated with updating the database can be more efficiently handled by computer automation. One such computer program is PERMCHECK, a permanent plot data checking program (Swartz, Biging and Robards 1990), which can be used to verify the consistency of data between successive measurements. There may also be a need to "localize" regional growth estimates provided by the CACTOS model to conditions obtained on a particular property (see for example, Meerschaert and Wensel 1986). To this end, NCFYC members who have oriented their data for automated verification in PERMCHECK may find PCBRIDGE useful.

The purpose of PCBRIDGE is to provide a link, or bridge, between the data format required by PERMCHECK and programs that require a stand description file as input, including CACTOS and STAG (Biging and Wensel 1988). The PCBRIDGE program is written in FORTRAN 77 and runs on IBM and compatible microcomputers. The program is minimally interactive, prompting for names of input and output files only when required. Though the original goal was to enable the conversion of PERMCHECK files into CACTOS/STAG files, the user can supply their own valid FORTRAN formats in an external file which will be read by PCBRIDGE, thus enabling the conversion of data in almost any format into stand description file format.

PROGRAM INPUT

PCBRIDGE requires 3 types of flat files (standard ASCII text files) for input and control. These are described below.

The first file must contain plot information, from which PCBRIDGE will read the following variables (in the order given): UCID, COID, ELEV, PSA, PSB, PSC, MDA, MDB, and MDC. UCID represents Univ. of California plot code and must be read in as a two character alphanumeric string; COID represents company plot code and must be read in as a four character alphanumeric string; ELEV stands for plot elevation and must be an integer; PSA, PSB, PSC stand for size of the A, B, and C concentric plots and must be read in as real variables; MDA, MDB, and MDC stand for the minimum diameters measured on each of the respective plots and must be integers (typically, diameters are measured to the nearest tenth of an inch, which will mean that minimum diameters should be read in as ten times diameter).

The second file must contain individual tree measurements, from which PCBRIDGE will read the following variables (in the order given): UCID, TRID, SPP, DBH, H, C, STATUS, HERR, DERR, CERR, SPPEST, DEST, HEST, and CEST. UCID is as above; TRID stands for tree identification code, and is read in as a four character alphanumeric string; SPP is a species code, read in with a real format; DBH, H, C represent diameter breast height, total height, and height-to-crown base, respectively, and must be integers (DBH must be handled similarly to MDA, MDB, and MDC above; H and C must be to the nearest foot); STATUS is an integer code: 1 for live, 2 for dead, 3 for cut (only live trees are written to the stand description file); HERR, DERR, CERR represent NCFYC codes giving the reason for mismeasuring the previous total height, dbh, or height-to-crown base, respectively, read in as a two character alphanumeric code (may all be blanks if not applicable); SPPEST is a species code, read in as a real variable and present if the previous species code was incorrect (may be blank if not applicable); DEST, HEST, CEST are respectively, estimate of dbh at previous measurement if in error, estimate of height at previous measurement if in error, and estimate of height-to-crown base at previous measurement if in error (blanks if not applicable).

The third input file required by PCBRIDGE must be named PCBRIDGE.FMT, must be present in the same directory from which PCBRIDGE is launched, and must contain two lines. The first line should be a FORTRAN format string which PCBRIDGE will use to read in the tree information, the second line should be a FORTRAN format string used to read in the plot information. Both format strings should be enclosed in parentheses.

Standard FORTRAN format specifications are described briefly here. Real numbers are expressed in the form rFw.d where w is the field width (total number of characters including blanks and decimal); d is the number of characters to the right of the decimal; r is the number of times this format is repeated by this specification. An actual decimal point in the field to be read in overrides the number specified by d in Fw.d. For example, the format 2F4.1 specifies 2 real numbers 4 characters wide with 1 place to the right of the decimal. If the field contained say 3.1423.4, the numbers 3.14 and 23.4 would be read in by the 2F4.1 specification. But if the field contained 03140234, the numbers 31.4 and 23.4 would be read in. Integer specifications are of the form rIw, where w is the field width and r is the repeater. Character specifications are of the form rAw, where again, w is the number of characters in the field and r is the repeat number. There are also two useful specifications which enable more flexible data reading. One is the useful tab specification, Tn, which simply indicates that the following format specifications should be interpreted relative to the field starting in the nth column (*i.e.*, "tab to column n"). The other is the slash, "/". which is interpreted as a carriage return. For example, (2F4.1/2F8.3) would indicate that 2 real numbers 4 characters wide should be read by inserting a decimal between the 3rd and 4th character of each number unless one exists already, then skip whatever is left on the line (if

anything), and read 2 real numbers from the next line (with the appropriate width and decimal placement).

EXECUTION

If the user has a hard drive, it is generally a good idea to copy the PCBRIDGE.EXE file to the hard disk and run it from there. To execute PCBRIDGE, type 'PCBRIDGE' at the DOS prompt. A prompt will be given, allowing the user to enter the plot and tree information filenames. PCBRIDGE will then load the information described above from these files according to the user defined format into scratch files for fast access. The user is then queried for the stand description output filename. If dbh, height, or crown correction codes are present, the user will be given a choice to correct previous measurements, or to continue processing the current files without correcting any previous measurement files. If the user desires to correct a previous measurement file, *i.e.*, produce a corrected stand description file for the previous measurement, the user is prompted for the filenames of the previous plot and tree information files. When the current stand description file is written and the corrections to the previous measurements are completed, the user is asked to enter an output filename for the stand description based on the previous measurement information. This cycle continues until terminated by the user.

EXAMPLE

Suppose we have two measurements on three permanent plots: an initial measurement and one remeasurement. We wish to produce stand description files for both measurements. The tree files are in PERMCHECK format and the plot files follow the description given in Research Note No. 28, revision 2 (Swartz, Biging and Robards 1990). We have named the file containing the initial tree measurements TREE1.DAT, and we have given the name TREE2.DAT to the remeasurement data. Similarly, our plot information files for the initial and remeasurement data are named PLOT1.DAT and PLOT2.DAT, respectively. Exhibit 1 displays the first few records of both tree information files, and Exhibit 2 displays the records contained in the PLOT2.DAT file. The file TREE1.DAT must have the same format as TREE2.DAT, similarly for the plot data files. Exhibit 3 displays the contents of the PCBRIDGE.FMT file; the first line is the format used to read the tree file, the second line is the format used to read the plot file. Please note that by using the FORTRAN format 'T' (tab) edit descriptor, the columns in a flat file can be read in any order. For

example, as stated above, PCBRIDGE expects tree information in the order UCID, TRID, *etc.* If the tree file actually contains TRID, UCID, *etc.*, the following format will read them in just fine:

(T5.A2,T1,A4, ...)

which simply tells the program to tab to column five, read a two character UCID, then tab (back) to column one to read a four character TRID. Remember to include the left and right parentheses. Exhibit 4 gives a sample run stream from PCBRIDGE, showing how the described files would be processed. Studying this will reveal how PCBRIDGE prompts for information. Exhibit 5 displays the first few records of the stand description files produced by PCBRIDGE. The stand description file corresponding to the initial measurement was named MEAS1.SD, while MEAS2.SD was the name given to the remeasurement stand description file.

LITERATURE CITED

- Biging, G.S. and Wensel, L.C. 1988. STAG: A forest stand generator for producing complete CACTOS stand descriptions. In: Forest Growth Modelling and Prediction (A. Ek, S. Shifley and T. Burk, editors). Proceedings of the IUFRO conference, 23-27 August, 1987, Minneapolis, MN.
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- Wensel, L.C. and Biging, G.S. 1988. The CACTOS system for individual-tree growth simulation in the mixed conifer forests of California. In: Forest Growth Modelling and Prediction (A. Ek, S. Shifley and T. Burk, editors). Proceedings of the IUFRO conference, 23-27 August, 1987, Minneapolis, MN.

EXHIBIT 1

First dozen records from the tree information files.

TREE1.DAT contents

```
3A 1000102124055013 11C0030
3A 1000202151064036 11B
3A 10003140420250147 16C
3A 1000414052032011 12C
3A 1000514058030011 12C
3A 1000614049034012 11C
3A 10007010430220114 16C
3A 10008010530250239612C
3A 10009140460290116 12C
3A 1000A46042021016 12C
3A 1000B46035027011 11C
3A 1000C46051028017 12C
```

TREE2.DAT contents

```
3A 2000102136059017 11C
3A 2000202160067036 11B
3A 2000314048028018 716C C5 017
3A 2000414060037018 12C
3A 2000514066034017 12C
3A 2000614054039018 11C
3A 20007010440250204616C C5 020
3A 20008010560290236916C
3A 2000914053035015 12C
3A 2000A46045024016 12C
3A 2000B46036024015 12C H2 024
3A 2000C46052028018 12C
```

EXHIBIT 2

Contents of PLOT2.DAT plot information files.

```
3A 24N07W06142721 3650 25 38 0 0 5025100110 030 0080 0 010285
3B 24N07W07112623 4200130 56 0 0 5025100110 030 0080 0 290185
3C 24N07W17412826 3550 70 3835 4 5025100110 030 0080 0 301084
```

EXHIBIT 3

Contents of PCBRIDGE.FMT.

```
(1X, A2, 2X, A4, F2.0, 3I3, 2X, I1, T56, 3A2, F2.0, 3I3)
(1X, A2, T16, A4, T26, I4, T41, 2F2.2, F3.3, I3, T49, I3, I2)
```

EXHIBIT 4

Sample run stream from PCBRIDGE corresponding to example given.

<pre>WELCOME to PCBRIDGE A data reformatting utility for bridging PERMCHECK files with CACTOS stand description files A product of NCFYC. Specify the most recent tree data source. Enter filename here: TREE2.DAT Specify the most recent plot data source. Enter filename here: PLOT2.DAT Now processing tree file: TREE2.DAT Specify stand description destination- Enter filename here: MEAS2.SD Corrections to previous measurements are indicated, would you like to implement them? (y/n): Y Be ready to input the previous plot and tree data file names. [A]bort corrections, [C]ontinue corrections? C Now processing tree file: TREE2.DAT Specify the previous tree data source. Enter filename here: TREE1.DAT Specify the previous plot data source.</pre>	<p>In what follows, user responses will be indicated with bold type face.</p> <p>After a brief title page the user is prompted for a file name.</p> <p>Enter the name of the tree file for which conversion is required. Then enter corresponding plot file name.</p> <p>User names the file to contain the new stand description.</p> <p>'y'/'Y' creates an additional stand description for the prior tree measurements, 'n'/'N' creates a stand description for the current data only.</p> <p>Tree file that had corrections to prior data is displayed; a prompt is given for the previous tree and plot files.</p>
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Enter filename here: PLOT1.DAT

Now processing tree file: TREE1.DAT
Specify stand description destination-
Enter filename here: MEAS1.SD

User must name
each stand
description file
created by cycling
back through prior
measurements.

PLEASE NOTE

CACTOS requires Site Index for each species present, not handled in PCBRIDGE.
Thus, PCBRIDGE stand description files must be edited to include Site Index.

PCBRIDGE: Normal program termination.

Any text editor can
be used to add SI
to stand description

EXHIBIT 5

Sample of stand description files produced by PCBRIDGE.

MEAS1.SD - first 15 records

Plot 2721-3A					61	3650								
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2.000	12.400	55.000			.764	2.000								
2.000	15.100	64.000			.438	2.000								
14.000	4.200	25.000			.320	10.000								
14.000	5.200	32.000			.656	10.000								
14.000	5.800	30.000			.633	10.000								
14.000	4.900	34.000			.647	10.000								
1.000	4.300	22.000			.091	10.000								
1.000	5.300	25.000			.080	10.000								
14.000	4.600	29.000			.621	10.000								
46.000	4.200	21.000			.238	10.000								
46.000	3.500	24.000			.542	10.000								
46.000	5.100	28.000			.393	10.000								

MEAS2.SD - first 15 records

Plot 2721-3A					65	3650								
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2.000	13.600	59.000			.712	2.000								
2.000	16.000	67.000			.463	2.000								
14.000	4.800	28.000			.357	10.000								
14.000	6.000	37.000			.514	10.000								
14.000	6.600	34.000			.500	10.000								
14.000	5.400	39.000			.538	10.000								
1.000	4.400	25.000			.200	10.000								
1.000	5.600	29.000			.207	10.000								
14.000	5.300	35.000			.571	10.000								
46.000	4.500	24.000			.333	10.000								
46.000	3.600	24.000			.375	10.000								
46.000	5.200	28.000			.357	10.000								