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Compare User's Guide: A Computer Program for Comparing Actual Growth with CACTOS /CRYPTOS Predictions Version 2.0

by

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Abstract

The COMPARE program enables the user to compare actual yields with those produced by the timber output simulator, CACTOS or CRYPTOS. Permanent plot records of an initial measurement and a subsequent remeasurement are entered into the simulator to prepare the yield files for COMPARE. The initial measurement is predicted to the same point in time as the remeasurement. The remeasurement is read by the simulator and a yield file is produced with no change. COMPARE then computes the differences between the actual and predicted growth. A composite summary for a sample of plots can then be used to judge the accuracy of the CACTOS or CRYPTOS predictions.

INTRODUCTION

How accurate are the growth predictions from **CACTOS** (Wensel and Daugherty, 1985) or **CRYPTOS** (Wensel, Krumland, and Meerschaert)? Region wide estimates of the behavior of the **CACTOS** growth models have been made at the individual tree level by Wensel and Koehler (1986). With the **COMPARE** program, users of **CACTOS** and **CRYPTOS** can do their own validation at the plot level for stands where sufficient remeasurement data are available.

The program **COMPARE**, described herein, was prepared to compute the relative difference between the actual and **CACTOS/CRYPTOS**-predicted change in basal area, board foot volume, and cubic foot volume. As illustrated in Figure 1, the actual and predicted growth values are obtained by running permanent plot data through **CACTOS/CRYPTOS** to produce comparable yield files. COMPARE then takes the difference between the actual and predicted growth of each permanent plot. Average differences are then computed for all plots being compared.

DESCRIPTION OF INPUT FILES

The input files for **COMPARE** are the yield files produced by **CACTOS/CRYPTOS**. There are two yield files required for each plot to be compared, one for the initial measurement and one for the remeasurement. The initial measurement (Appendix Table A) should be grown for the amount of time elapsed between measurements (without quintupling). To project the stand to a period that is not a multiple of 5 years, see the "Advanced Topics" section in either the CACTOS or CRYPTOS User's Guide (ibid.). The second file (Appendix Table B) is automatically produced (with no growth) when the remeasurement is read into **CACTOS**.

An additional master input file is required. This file contains keyword, "CACTOS" or "CRYPTOS" to indicate which simulator is being used, and the names of the input yield files and the optional output filenames for individual plot comparisons. The format is illustrated in Table 1 for eight demonstration plots on a hypothetical stand using CACTOS.

There should be one line of filenames for each plot simulated in **CACTOS/CRYPTOS**. If the output file is left blank, individual plot comparisons are skipped, while the aggregate comparison is accumulated as usual. After all of the files are processed the program will prompt the user for a file name into which the results of the aggregate comparison are written.

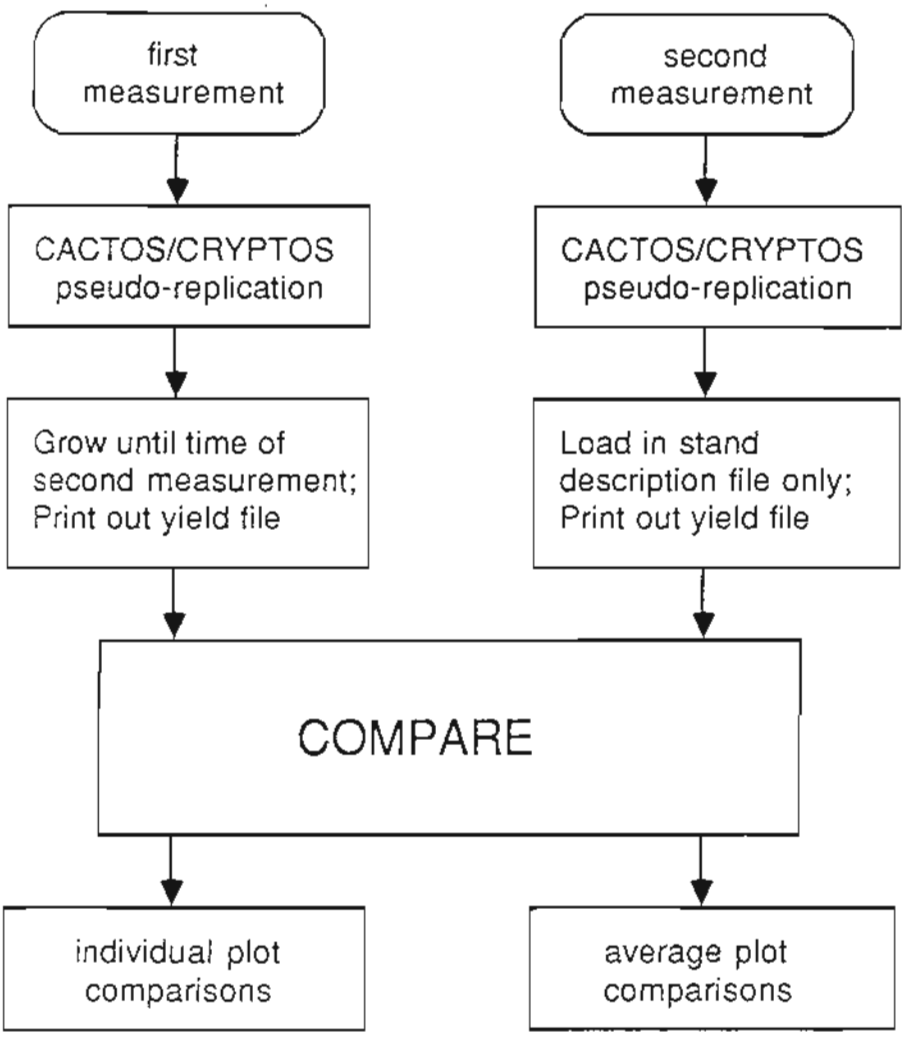

Figure 1. Organization of COMPARE for CACTOS/CRYPTOS data.

Table 1. Sample input file containing input and output filenames.

column

12345.....	16.....	31.....
CACTOS		
DEMO1.YD1	DEMO1.YD2	DEMO1.CMP
DEMO2.YD1	DEMO2.YD2	DEMO2.CMP
DEMO3.YD1	DEMO3.YD2	DEMO3.CMP
DEMO4.YD1	DEMO4.YD2	DEMO4.CMP
DEMO5.YD1	DEMO5.YD2	DEMO5.CMP
DEMO6.YD1	DEMO6.YD2	DEMO6.CMP
DEMO7.YD1	DEMO7.YD2	DEMO7.CMP
DEMO8.YD1	DEMO8.YD2	DEMO8.CMP

OUTPUT FILE FORMATS

There are two possible types of output files produced by COMPARE. The first contains the average comparison figures for the entire set of remeasurements. The second (optional) contains the file by file comparisons made for each plot. Files containing the plot-by-plot comparison are produced only if a filename is specified in the third column of the filename input file. An example of an individual plot comparison is shown in Appendix Table C.

The aggregate comparison file, shown in Appendix Table D, is produced every time the program is run. It is named by the user when the program finishes processing the specified yield files. This file reports the following average statistics: initial stocking, actual and predicted annual growth, residuals and their standard errors, and the number of plots on which those averages are based. These figures are reported for basal area (sq.ft./acre), board foot volume (MBF/acre), and cubic foot volume (MCF/acre). The composite table is computed by averaging the individual yield files. Standard errors are provided to show the statistical significance of the differences.

Appendix Table A. Sample CACTOS yield file for initial measurement.

YIELD SUMMARY: units = english

Cofile version 4.0 9/28/88 Contains new coefficients.

stand label = Compare Demo 1.1

	min. DBH	merch top
cubic ft.	.0	4
board ft.	8.0	6

species	site	init. age
Pond. Pine	85.	0.
Sugar Pine	83.	0.
Cedar misc	70.	0.
Douglas fir	84.	0.
White Fir	75.	0.

species	et	dbar	tpa	basar	cvol	bdvol	bagro	cvgro	bdgro
Sugar Pine	.00	31.76	15.0	82.5	3.00	18.77	.0	.00	.00
Cedar misc	.00	39.33	10.0	84.4	2.56	15.34	.0	.00	.00
Douglas fir	.00	30.40	5.0	25.2	.95	5.84	.0	.00	.00
White Fir	.00	10.84	165.0	105.7	2.84	14.81	.0	.00	.00
Totals	.00	16.73	195.0	297.7	9.35	54.76	.0	.00	.00
Sugar Pine	5.00	33.40	15.0	91.3	3.46	22.13	8.8	.45	3.36
Cedar misc	5.00	40.33	10.0	88.7	2.74	16.58	4.3	.18	1.25
Douglas Fir	5.00	32.06	5.0	28.0	1.11	6.98	2.8	.16	1.14
White Fir	5.00	11.52	165.0	119.5	3.41	18.29	13.9	.57	3.48
Totals	5.00	17.55	195.0	327.5	10.71	63.99	29.8	1.36	9.23

Appendix Table B. Sample remeasurement yield file produced by CACTOS.

```
    YIELD SUMMARY:  units = english
 Cofile version 4.0   9/28/88  Contains new coefficients.
    stand label = Compare Demo 1.2


                          min. DBH        merch top
            cubic ft.        .0               6
            board ft.       8.0               6

    species         site      init. age
    Pond. Pine       85.          0.
    Sugar Pine       83.          0.
    Cedar misc       70.          0.
    Douglas fir      84.          0.
    White Fir        75.          0.
```

species	et	dbar	tpa	basar	cvol	bdvol	bagro	cvgro	bdgro
Sugar Pine	.00	33.49	15.0	91.8	3.37	21.34	.0	.00	.00
Cedar misc	.00	39.64	10.0	85.7	2.63	15.87	.0	.00	.00
Douglas Fir	.00	30.00	5.0	24.5	.99	6.17	.0	.00	.00
White Fir	.00	11.50	165.0	119.0	3.42	18.49	.0	.00	.00
Totals	.00	17.37	195.0	321.0	10.40	61.87	.0	.00	.00

Appendix Table C. Sample of individual comparison yield file.

```
    YIELD SUMMARY:  units = english
 Cofile version 4.0   9/28/88  Contains new coefficients.
    stand label = Compare Demo 1.1     and Compare Demo 1.2

                          min. DBH        merch top
            cubic ft.        .0               6
            board ft.       8.0               6

    species          site       init. age
    Pond. Pine        85.           0.
    Sugar Pine        83.           0.
    Cedar misc        70.           0.
    Douglas-fir       84.           0.
    White Fir         75.           0.
```

species	et	dbar	tpa	basar	cvol	bdvol	bagro	cvgro	bdgro
Sugar Pine	.00	31.76	15.0	82.5	3.00	18.77	.0	.00	.00
Cedar misc	.00	39.33	10.0	84.4	2.56	15.34	.0	.00	.00
Douglas Fir	.00	30.40	5.0	25.2	.95	5.84	.0	.00	.00
White Fir	.00	10.84	165.0	105.7	2.84	14.81	.0	.00	.00
Totals	.00	16.73	195.0	297.7	9.35	54.76	.0	.00	.00
Sugar Pine	5.00	33.40	15.0	91.3	3.46	22.13	8.8	.45	3.36
Cedar misc	5.00	40.33	10.0	88.7	2.74	16.58	4.3	.18	1.25
Douglas Fir	5.00	32.06	5.0	28.0	1.11	6.98	2.8	.16	1.14
White Fir	5.00	11.52	165.0	119.5	3.41	18.29	13.9	.57	3.48
Totals	5.00	17.55	195.0	327.5	10.71	63.99	29.8	1.36	9.23
ACTUAL									
Sugar Pine	.00	33.49	15.0	91.8	3.37	21.34	.0	.00	.00
Cedar misc	.00	39.64	10.0	85.7	2.63	15.87	.0	.00	.00
Douglas Fir	.00	30.00	5.0	24.5	.99	6.17	.0	.00	.00
White Fir	.00	11.50	165.0	119.0	3.42	18.49	.0	.00	.00
Totals	.00	17.37	195.0	321.0	10.40	61.87	.0	.00	.00

Appendix Table D. Example of final aggregate comparison.

CACTOS Yield File Comparison

Filename: COMPARE.OUT

All Growth Figures are PER ACRE PER YEAR

BASAL AREA

species	initial stocking	actual growth	predicted growth	residual % of pred.	std. err. % of pred.	no. plots
Pond. Pine	97.780	1.984	2.696	-26.4%	9.0%	5.
Sugar Pine	79.150	2.235	2.000	11.8%	10.2%	4.
Cedar misc	51.475	.983	.965	1.8%	16.0%	8.
Douglas Fir	77.080	1.736	1.884	-7.9%	8.0%	5.
White Fir	46.200	1.225	1.365	-10.3%	9.3%	4.
Totals	223.425	5.040	5.512	-8.6%	5.4%	8.

CUBIC VOLUME

species	initial stocking	actual growth	predicted growth	residual % of pred.	std. err. % of pred.	no. plots
Pond. Pine	3.086	.101	.141	-28.4%	12.8%	5.
Sugar Pine	2.543	.095	.094	1.1%	11.9%	4.
Cedar misc	1.154	.029	.028	3.5%	19.4%	8.
Douglas Fir	2.820	.096	.107	-10.4%	5.9%	5.
White Fir	1.288	.041	.056	-27.0%	31.2%	4.
Totals	6.762	.219	.257	-14.7%	6.2%	8.

BOARD FOOT VOLUME

species	initial stocking	actual growth	predicted growth	residual % of pred.	std. err. % of pred.	no. plots
Pond. Pine	16.800	.660	.924	-28.6%	12.6%	5.
Sugar Pine	15.333	.661	.662	-.2%	13.0%	4.
Cedar misc	6.330	.178	.164	8.5%	23.1%	8.
Douglas Fir	17.390	.668	.741	-9.8%	6.6%	5.
White Fir	6.198	.224	.323	-30.5%	37.9%	4.
Totals	38.465	1.451	1.697	-14.5%	6.4%	8.