COOPERATIVE EXTENSION UNIVERSITY OF CALIFORNIA

What's Happening in California Forestry

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USING THE COOPERATIVE REDWOOD YIELD PROJECT TIMBER OUTPUT SIMULATOR

--Collecting Data, Specifying Options, Interpreting Yield Table Output

The Cooperative Redwood Yield Project Timber Output Simulator (CRYPTOS) is an interactive computer program designed to simulate growth and harvests of single acre representations of forest stands in the north coastal region of California. This write-up is designed to provide foresters and forest landowners with a set of instructions on the type of information needed to use CRYPTOS, a set of blank data sheets to be filled in, and a representative example with filled out data sheets showing the type of output which would be obtained from CRYPTOS.

Users of CRYPTOS need to supply the following information: Site Index, Age, and Merchantability Standards (see Table 1); a Stand Table (see Table 2); the Method Used to Estimate Tree Height (see Table 3); and the forest Management Options to be evaluated (see Table 4).

SITE INDEX, AGE, AND MERCHANTABILITY STANDARDS

Table 1 must be filled out with some preliminary information on the stand to be evaluated.

TITLE

The first piece of information is the title for the stand or compartment, and may contain up to 20 characters.

SITE INDEX

One of the most important input variables is Site Index. CRYPTOS utilizes 50-year site index curves. Either redwood and/or Douglas-fir site index must be specified. If only one species is specified, the other will be automatically calculated, along with tanoak and alder site index. The redwood site index curves used in CRYPTOS are from Krumland & Wensel (1977a), and the site index curves for Douglas-fir are from King (1966). For a copy of both of these curves, and a description of the procedures to follow for estimating site index and converting from other site index curves [i.e., Lindquist and Palley (1961), McArdle (1949)], check with Krumland and Wensel (1977b), "Procedures for Estimating Redwood and Douglas-fir Site Indexes in the North Coastal Region of California."

AGE

Age is a descriptive feature only, and is not needed for the model to function. Providing age data is optional.

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MERCHANTABILITY STANDARDS

It is possible to specify merchantability standards for the following 4 variables:

1. Minimum DBH used in computing cubic foot volumes, basal area, and average DBH (default is 0.0").
2. Merchantable top limit for cubic foot volume estimation (may be 5, 6, 7 or 8 inches -- default is 5").
3. Minimum DBH used for calculating board foot Scribner volumes (default is 8.0").
4. Merchantable top limit for board foot estimation.

STAND TABLE

CRYPTOS generates yield tables for different management strategies using a stand table as the basic input variable. You should take the standard timber cruise data for a stand or compartment on a property, and make a stand table for each tree species on a per acre basis. The species which can be input into CRYPTOS are as follows:

1. Young growth Redwood
2. Young growth Douglas-fir
3. Other young growth conifers (Western Hemlock, Grand Fir, Bishop Pine, etc.)
4. Tanoak
5. Alder
6. Other hardwoods (California Laurel, Madrone, Black Oak, etc.)
7. Residual Redwood
8. Other residual trees

Table 2 gives the basic format for the stand table. Since this same table can be used to input ingrowth data into the model at a later point, make sure that you check the box indicating that this is initial stand data. More information will be given on ingrowth data in the "Management Options" section of this text. Your stand table should be broken into DBH classes (2-inch classes are suggested). In order for an accurate estimate of growth to be obtained, remember to sample for trees in submerchantable DBH classes (i.e., 2,4,6 inch DBH classes). For each DBH class, the model needs number of trees per acre, average total height, and average live crown ratio. Since many timber cruises in the past have not collected total height for all DBH classes, nor live crown ratios, the model will calculate missing data. However, for the best estimate of growth, you should start to get into the habit of collecting total height data (or constructing your own height-diameter curves) and making an occular estimate of live crown ratio.

ESTIMATING TREE HEIGHT

There are three methods for supplying tree heights. Table 3 gives the information which needs to be supplied.

1. Option 1 -- The average total height in feet for each DBH class is supplied in Table 2. Total height can be supplied in one of two ways: by measuring the total height of each sample tree in your timber inventory; or by measuring the total height of a subset of your sample trees, graphing diameter vs. height of this subset, drawing a free hand curve of the height-diameter relationship, reading the total height from this curve for DBH classes for which you do not have average total height, and filling in Table 2.

2. Option 2 -- This option requires that you supply the average DBH and height of the dominant trees in the stand. This can be done by taking the DBH of the trees you are using to determine site index. Fill in average DBH, height, and species for dominant trees in Table 3. The model will use this information to center a height-diameter curve, and calculate total height for each diameter class.

3. Option 3 -- Enter the average number of 16-foot logs (to the nearest 1/2 log) per DBH class to a minimum dib merchantability standard. Specify on Table 3 what dib merchantability standard you are using. Based on taper equations, the model will convert these merchantable log heights to total height in feet. For DBH classes less than the merchantability standard, enter a log height of 0. Total height will still be calculated using the taper equations.

MANAGEMENT OPTIONS

HARVESTING PRESCRIPTIONS

You can specify the management options you wish to evaluate by specifying how long you wish to grow the trees and different harvesting prescriptions. (No harvesting can be an option.) We will allow you to specify 3 management options to be evaluated for each stand. Table 4 should be filled in for each option. You will receive a yield table for each option you specify. A timber harvesting prescription needs to include the year(s) in which harvesting will occur, which species are to be cut (can be one, several, or all), the lower diameter to be harvested, the upper diameter to be harvested, the percentage of trees to be harvested in the lower diameter class and the percentage of trees to be harvested in the upper diameter class. (The percentage of trees harvested between the lower and upper diameter limits will be a weighted percentage between the lower and upper percentages.) You can specify a descriptive label for each harvest, which is quite useful in interpreting your output. Between harvests, the stand will be grown in the model until either the next harvest period is reached, or the end of the total time being evaluated is reached.

INGROWTH

CRYPTOS makes no special provisions for ingrowth. The presumption is that the initial stand table you supply contains representations of all stems in the stand down to about 15 feet tall and 2 inches DBH. If you wish to add more trees to your stand at some point in the simulation to represent, for instance, sapling reproduction 10 to 15 years after a heavy harvest, you must provide us with another stand table containing the ingrowth trees. Indicate on Table 4 the period(s) for which you will be adding ingrowth trees to the stand. Then, fill out another copy of Table 2 with the stand table for ingrowth trees, checking the box at the top indicating that the table is for ingrowth trees, and specifying which period these trees should be added to the stand.

EXAMPLE

DATA ENTRY

Shown on pages 9 through 14, are Tables 1 through 4 filled out for a sample stand to indicate to you how data should be entered. Note that on Tables 2 and 3, the method of tree height measurement is merchantable 16-foot log height to a 5-inch small end diameter. Three management options are specified in Table 4. The first option is to remove all the tanoak in the stand in the first year, and allow the stand to grow without further management input for 40 years. The second management option specified is as follows: remove all commercial tanoak trees in a commercial firewood harvest in the first year; selectively thin the stand in the 10th year, between the 8-inch diameter class and the maximum tree size, removing 30% of the 8-inch trees, 20% of the maximum size trees, and a weighted percentabe between 20 and 30% for the middle diameters; in

year 30, have a diameter limit commercial harvest for conifer species greater than 18 inches DBH, removing 60% of the 18-inch trees, 80% of the maximum diameter trees, and a weighted percentage between 80 and 60% for the trees between 18" and maximum; grow the stand for 10 more years for a total period of 40 years. The third management option is to do nothing to the stand, and just project growth over a 40-year period.

DATA OUTPUT

Page 15 to 18 gives the three yield tables for the three management options being simulated for our sample stand. In interpreting the output of CRYPTOS, the captions are somewhat terse for the sake of presenting concise summaries. The following is a list of the caption definitions shown on the yield tables:

et	Elapsed time in years since the start of the projection
d bar	Average stand quadratic mean DBH in inches
basar	Basal area per acre in square feet
cfvol	Cubic foot volume per acre in thousands
bdvol	Board foot volume per acre in thousands
tpa	Stems per acre
bagro	Five year basal area growth per acre in square feet
cvgro	Five year cubic foot volume growth per acre in thousands
bdgro	Five year board foot volume growth per acre in thousands

SUMMARY

CRYPTOS supplies you with the information to evaluate existing second growth stands. It has been tested throughout the northern coastal region of California, and validated by testing the results against known long-term growth and level of growing stock plots. However, you may find that the results are not consistent with your experience or data on the performance of a specific stand. We would appreciate any input you can give to us on where the model has been accurate in predicting stand performance, and where it has fallen down. This will allow us to target future research to refine CRYPTOS.

LITERATURE CITED

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Lindquist, J.L. and M.N. Palley. 1961. Site curves for young-growth redwood. Calif. For. and Forest Prod. 29:1-4.

McArdle, R.E. 1949. The yield of Douglas-fir in the Pacific Northwest. USDA Tech. Bul. 201. Washington, D.C.

Table 1

INITIAL INFORMATION

1. Stand or Compartment Label[1)] _____

2. Species	Site Index (Base Age 50)
Redwood	
Douglas-fir	

3. Species	Breast Height[1)] Age
Redwood	
Douglas-fir	

4. Minimum Diameter for Cubic Foot, Basal Area, Average DBH--- _____

Top Dib for Cubic Foot (circle one)---------- 5 6 7 8

Minimum Board Foot Diameter---------- _____

Top Dib for Board Foot (circle one)---------- 5 6 7 8

[1)] Descriptive Only -- Not needed for model to run.

Table 2

STAND TABLE

Check one:
Initial Stand Data ___
Ingrowth Data ___
Year of Ingrowth ___

SPECIES:				SPECIES:				SPECIES:			
DBH Class	# Trees/ Acre	Aver. Ht.[1]	Aver. Live Crown Ratio[2]	DBH Class	# Trees/ Acre	Aver. Ht.[1]	Aver. Live Crown Ratio[2]	DBH Class	# Trees/ Acre	Aver. Ht.[1]	Aver. Live Crown Ratio[2]

1) Either total height or # merchantable 16' logs to nearest 1/2 log (see Table 3 for height specifications).

2) Optional -- Will be estimated if data not available.

Table 3

SPECIFYING TREE HEIGHT

Check which Option you have used for calculating tree height.

____ OPTION 1

Total height (in feet) collected. Enter directly onto Table 2.

____ OPTION 2

DBH and total height of dominant trees supplied. Leave total height column on Table 2 blank.

Species	Average DBH	Average Total Height
Redwood		
Douglas-fir		
Tanoak		
Alder		

____ OPTION 3

Fill in number of merchantable 16' logs to nearest 1/2 log in average height column on Table 2.

Merchantable small end dib = _____ inches

Table 4

MANAGEMENT OPTION

Management Option # ______
(If no harvesting in option, leave columns below blank.)

Total period for yield table (nearest 5 years) ______

Harvest Year (5 year interval)	Harvest Label (Up to 40 characters)	Species To Be Cut	Min. DBH Harvested	% Min. DBH Harvested	Max DBH Harvested	% Max DBH Harvested

Stand Table(s) for Ingrowth Trees provided? (please check one): ( ) Yes ( ) No

Period(s) to be added: ______________________________

Table 1

INITIAL INFORMATION

1. Stand or Compartment Label[1] SAMPLE STAND

2.

Species	Site Index (Base Age 50)
Redwood	115
Douglas-fir	

3.

Species	Breast Height[1] Age
Redwood	20
Douglas-fir	20

4. Minimum Diameter for Cubic Foot, Basal Area, Average DBH--- 0.0

Top Dib for Cubic Foot (circle one)---------- (5) 6 7 8

Minimum Board Foot Diameter---------- 8.0

Top Dib for Board Foot (circle one)---------- (5) 6 7 8

[1] Descriptive Only -- Not needed for model to run.

Table 2
STAND TABLE

Check one:
Initial Stand Data X
Ingrowth Data
Year of Ingrowth

SPECIES: REDWOOD			
DBH Class	# Trees/ Acre	Aver. Ht.[1]	Aver. Live Crown Ratio[2]
4	35	0	
6	42	0	
8	36	1.0	
10	26	2.0	
12	10	2.5	
14	13	3.0	
16	8	3.0	
18	4	3.0	

SPECIES: DOUGLAS-FIR			
DBH Class	# Trees/ Acre	Aver. Ht.[1]	Aver. Live Crown Ratio[2]
4	16	0	
6	39	0	
8	25	1.5	
10	27	2.5	
12	13	3.0	
14	4	3.5	

SPECIES: TANOAK			
DBH Class	# Trees/ Acre	Aver. Ht.[1]	Aver. Live Crown Ratio[2]
2	20	0	
4	21	0	
6	35	0	
8	23	0	
10	11	1.0	
12	3	1.0	

1) Either total height or # merchantable 16' logs to nearest 1/2 log (see Table 3 for height specifications.

2) Optional -- Will be estimated if data not available.

Table 3

SPECIFYING TREE HEIGHT

Check which Option you have used for calculating tree height.

____ OPTION 1

Total height (in feet) collected. Enter directly onto Table 2.

____ OPTION 2

DBH and total height of dominant trees supplied. Leave total height column on Table 2 blank.

Species	Average DBH	Average Total Height
Redwood		
Douglas-fir		
Tanoak		
Alder		

X OPTION 3

Fill in number of merchantable 16' logs to nearest 1/2 log in average height column on Table 2.

Merchantable small end dib = 5.0 inches

Table 4

MANAGEMENT OPTION

Management Option # 1
(If no harvesting in option, leave columns below blank.)

Total period for yield table (nearest 5 years) 40

Harvest Year (5 year interval)	Harvest Label (Up to 40 characters)	Species To Be Cut	Min. DBH Harvested	% Min. DBH Harvested	Max DBH Harvested	% Max DBH Harvested
0	TANOAK REMOVAL	TANOAK	0.0"	100%	MAXIMUM	100%

Stand Table(s) for Ingrowth Trees provided? (please check one): ( ) Yes (X) No

Period(s) to be added: ______________________

Table 4

MANAGEMENT OPTION

Management Option # 2
(If no harvesting in option, leave columns below blank.)

Total period for yield table (nearest 5 years) 40

Harvest Year (5 year interval)	Harvest Label (Up to 40 characters)	Species To Be Cut	Min. DBH Harvested	% Min. DBH Harvested	Max DBH Harvested	% Max DBH Harvested
0	COMMERCIAL FIREWOOD HARVEST	TANOAK	6.0	100 %	MAXIMUM	100 %
10	SELECTION THINNING	ALL SPECIES	8.0	30 %	MAXIMUM	10 %
30	DIAMETER LIMIT HARVEST	REDWOOD	18.0	60 %	MAXIMUM	80 %
		DOUGLAS-FIR	"	"	"	"

Stand Table(s) for Ingrowth Trees provided? (please check one): ( ) Yes (X) No

Period(s) to be added: _____

Table 4

MANAGEMENT OPTION

Management Option # 3
(If no harvesting in option, leave columns below blank.)

Total period for yield table (nearest 5 years) 40

Harvest Year (5 year interval)	Harvest Label (Up to 40 characters)	Species To Be Cut	Min. DBH Harvested	% Min. DBH Harvested	Max DBH Harvested	% Max DBH Harvested

Stand Table(s) for Ingrowth Trees provided? (please check one): ( ) Yes (X) No

Period(s) to be added: _____

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YIELD SUMMARY: units = english

stand label = Sample Stand

redwood site 115. init. age 20.
doug fir site 134. init. age 0.

species	et	dbar	tpa	basar	cfvol	bdvol	bagro	cvgro	bdgro
redwds	0.	9.07	174.0	78.0	1.13	4.01	0.0	0.00	0.00
dougfr	0.	8.34	124.0	47.0	0.83	2.86	0.0	0.00	0.00
tanoak	0.	6.44	113.0	25.5	0.19	0.49	0.0	0.00	0.00
totals	0.	8.20	411.0	150.6	2.15	7.35	0.0	0.00	0.00
HARVESTS : Tanoak Removal									
redwds	0.	0.00	0.0	0.0	0.00	0.00			
dougfr	0.	0.00	0.0	0.0	0.00	0.00			
totals	0.	-0.58	113.0	25.5	0.19	0.49			
STAND AFTER HARVEST									
redwds	0.	9.07	174.0	78.0	1.13	4.01	0.0	0.00	0.00
dougfr	0.	8.34	124.0	47.0	0.83	2.86	0.0	0.00	0.00
totals	0.	8.77	298.0	125.0	1.96	6.87	0.0	0.00	0.00
redwds	5.	10.26	169.5	97.2	1.70	6.13	19.2	0.57	2.12
dougfr	5.	9.78	111.5	58.1	1.37	4.76	11.1	0.54	1.90
totals	5.	10.07	281.0	155.4	3.07	10.89	30.3	1.11	4.02
redwds	10.	11.33	165.9	116.1	2.32	9.17	18.9	0.62	3.04
dougfr	10.	11.20	106.9	73.1	2.08	8.42	15.0	0.70	3.66
totals	10.	11.28	272.8	189.3	4.40	17.59	33.9	1.32	6.70
redwds	15.	12.27	162.8	133.7	2.97	12.48	17.6	0.64	3.31
dougfr	15.	12.49	103.1	87.7	2.90	12.76	14.6	0.82	4.34
totals	15.	12.36	266.0	221.4	5.86	25.24	32.2	1.46	7.65
redwds	20.	13.09	160.2	149.8	3.66	16.00	16.1	0.70	3.52
dougfr	20.	13.66	100.0	101.8	3.76	17.83	14.1	0.86	5.08
totals	20.	13.32	260.2	251.6	7.42	33.84	30.2	1.56	8.60
redwds	25.	13.83	157.9	164.7	4.34	19.79	14.9	0.68	3.78
dougfr	25.	14.74	97.2	115.3	4.67	23.68	13.5	0.92	5.85
totals	25.	14.18	255.2	280.0	9.02	43.47	28.4	1.60	9.63
redwds	30.	14.49	155.9	178.4	4.99	23.66	13.8	0.65	3.87
dougfr	30.	15.75	94.9	128.3	5.63	30.02	13.0	0.96	6.34
totals	30.	14.98	250.8	306.7	10.62	53.68	26.7	1.60	10.21
redwds	35.	15.09	154.1	191.3	5.63	27.70	12.8	0.64	4.04
dougfr	35.	16.68	92.8	140.8	6.62	36.88	12.5	0.99	6.86
totals	35.	15.71	246.8	332.1	12.25	64.58	25.3	1.63	10.90
redwds	40.	15.64	152.4	203.3	6.27	31.69	12.0	0.63	3.99
dougfr	40.	17.55	90.9	152.8	7.62	44.16	12.0	1.00	7.28
totals	40.	16.38	243.3	356.1	13.88	75.85	24.0	1.64	11.27

YIELD SUMMARY: units = english

stand label = Sample Stand

redwood site 115. init. age 20.
doug fir site 134. init. age 0.

species	et	dbar	tpa	basar	cfvol	bdvol	bagro	cvgro	bdgro
redwds	0.	9.07	174.0	78.0	1.13	4.01	0.0	0.00	0.00
dougfr	0.	8.34	124.0	47.0	0.83	2.86	0.0	0.00	0.00
tanoak	0.	6.44	113.0	25.5	0.19	0.49	0.0	0.00	0.00
totals	0.	8.20	411.0	150.6	2.15	7.35	0.0	0.00	0.00

HARVESTS : Commercial Firewood Cut

redwds	0.	0.00	0.0	0.0	0.00	0.00
dougfr	0.	0.00	0.0	0.0	0.00	0.00
tanoak	0.	3.25	72.0	23.3	0.19	0.49
totals	0.	-0.10	72.0	23.3	0.19	0.49

STAND AFTER HARVEST

redwds	0.	9.07	174.0	78.0	1.13	4.01	0.0	0.00	0.00
dougfr	0.	8.34	124.0	47.0	0.83	2.86	0.0	0.00	0.00
tanoak	0.	3.19	41.0	2.3	0.00	0.00	0.0	0.00	0.00
totals	0.	8.30	339.0	127.3	1.96	6.87	0.0	0.00	0.00
redwds	5.	10.23	169.6	96.8	1.69	6.11	18.8	0.56	2.10
dougfr	5.	9.85	118.1	62.5	1.50	5.13	15.5	0.67	2.27
tanoak	5.	3.75	35.2	2.7	0.00	0.00	0.4	0.00	0.00
totals	5.	9.59	322.9	161.9	3.20	11.23	34.6	1.23	4.37
redwds	10.	11.27	166.0	115.0	2.30	9.07	18.2	0.61	2.97
dougfr	10.	11.24	113.4	78.1	2.26	9.22	15.7	0.75	4.09
tanoak	10.	4.12	34.4	3.2	0.00	0.00	0.5	0.00	0.00
totals	10.	10.71	313.8	196.3	4.56	18.29	34.4	1.36	7.06

HARVESTS : Selection Thinning

redwds	10.	0.09	30.2	22.4	0.46	1.77
dougfr	10.	0.03	24.9	17.5	0.51	2.08
tanoak	10.	0.00	0.0	0.0	0.00	0.00
totals	10.	0.18	55.1	39.9	0.97	3.85

STAND AFTER HARVEST

redwds	10.	11.18	135.7	92.6	1.84	7.30	18.2	0.61	2.97
dougfr	10.	11.21	88.5	60.6	1.75	7.14	15.7	0.75	4.09
tanoak	10.	4.12	34.4	3.2	0.00	0.00	0.5	0.00	0.00
totals	10.	10.53	258.6	156.4	3.59	14.45	34.4	1.36	7.06
redwds	15.	12.21	133.1	108.2	2.43	10.15	15.6	0.59	2.85
dougfr	15.	12.62	85.3	74.0	2.49	11.07	13.4	0.74	3.93

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tanoak	15.	4.52	33.5	3.7	0.00	0.00	0.5	0.00	0.00
totals	15.	11.63	251.9	186.0	4.92	21.22	29.6	1.33	6.78
redwds	20.	13.12	130.8	122.9	3.03	13.28	14.7	0.60	3.13
dougfr	20.	13.90	82.7	87.1	3.29	15.88	13.1	0.79	4.81
tanoak	20.	4.87	32.7	4.2	0.00	0.00	0.5	0.00	0.00
totals	20.	12.63	246.2	214.2	6.32	29.17	28.3	1.39	7.94
redwds	25.	13.94	128.9	136.6	3.66	16.76	13.7	0.63	3.47
dougfr	25.	15.08	80.5	99.8	4.14	21.25	12.7	0.85	5.37
tanoak	25.	5.17	31.8	4.6	0.00	0.00	0.4	0.00	0.00
totals	25.	13.54	241.2	241.1	7.80	38.01	26.8	1.48	8.84
redwds	30.	14.68	127.2	149.5	4.26	20.37	12.9	0.60	3.61
dougfr	30.	16.17	78.6	112.0	5.03	27.23	12.2	0.89	5.98
tanoak	30.	5.44	31.0	5.0	0.00	0.00	0.4	0.00	0.00
totals	30.	14.37	236.8	266.5	9.29	47.61	25.5	1.50	9.60

HARVESTS : Diameter Limit Harvest

redwds	30.	1.48	16.6	44.4	1.49	8.16
dougfr	30.	0.99	12.4	28.8	1.41	8.30
tanoak	30.	0.00	0.0	0.0	0.00	0.00
totals	30.	1.31	29.0	73.2	2.89	16.46

STAND AFTER HARVEST

redwds	30.	13.20	110.6	105.1	2.77	12.21	12.9	0.60	3.61
dougfr	30.	15.18	66.2	83.2	3.63	18.94	12.2	0.89	5.98
tanoak	30.	5.44	31.0	5.0	0.00	0.00	0.4	0.00	0.00
totals	30.	13.06	207.8	193.3	6.40	31.15	25.5	1.50	9.60
redwds	35.	13.94	109.1	115.7	3.26	15.12	10.6	0.49	2.91
dougfr	35.	16.32	64.7	94.0	4.42	24.28	10.8	0.79	5.35
tanoak	35.	5.73	30.1	5.4	0.00	0.00	0.4	0.00	0.00
totals	35.	13.91	203.9	215.0	7.68	39.40	21.7	1.28	8.25
redwds	40.	14.64	107.8	125.9	3.76	18.05	10.2	0.50	2.94
dougfr	40.	17.38	63.4	104.4	5.24	30.11	10.5	0.82	5.83
tanoak	40.	5.99	29.2	5.7	0.02	0.00	0.3	0.02	0.00
totals	40.	14.70	200.4	236.0	9.02	48.16	21.0	1.34	8.77

YIELD SUMMARY: units = english

stand label = Sample Stand

redwood site 115. init. age 20.
doug fir site 134. init. age 0.

species	et	dbar	tpa	basar	cfvol	bdvol	bagro	cvgro	bdgro
redwds	0.	9.07	174.0	78.0	1.12	4.01	0.0	0.00	0.00
dougfr	0.	8.34	124.0	47.0	0.83	2.86	0.0	0.00	0.00
tanoak	0.	6.44	113.0	25.5	0.19	0.49	0.0	0.00	0.00
totals	0.	8.20	411.0	150.6	2.15	7.35	0.0	0.00	0.00
redwds	5.	10.19	169.7	96.1	1.69	6.09	18.1	0.55	2.08
dougfr	5.	9.80	118.3	61.9	1.49	5.12	14.9	0.66	2.26
tanoak	5.	6.83	111.3	28.3	0.23	0.69	2.8	0.05	0.20
totals	5.	9.25	399.3	186.4	3.41	11.90	35.8	1.26	4.54
redwds	10.	11.20	166.1	113.6	2.28	8.88	17.5	0.59	2.79
dougfr	10.	11.15	113.7	77.1	2.21	8.92	15.2	0.72	3.80
tanoak	10.	7.14	109.5	30.5	0.27	0.87	2.2	0.04	0.19
totals	10.	10.21	389.3	221.2	4.76	18.68	34.8	1.35	6.78
redwds	15.	12.09	163.0	129.8	2.86	12.12	16.2	0.58	3.24
dougfr	15.	12.39	109.9	92.1	3.07	13.71	14.9	0.85	4.79
tanoak	15.	7.40	107.8	32.2	0.36	1.04	1.7	0.09	0.17
totals	15.	11.06	380.6	254.1	6.28	26.88	32.9	1.53	8.20
redwds	20.	12.87	160.3	144.7	3.51	15.34	14.9	0.65	3.21
dougfr	20.	13.54	106.6	106.5	3.99	19.08	14.5	0.92	5.37
tanoak	20.	7.61	106.0	33.5	0.43	1.20	1.3	0.06	0.15
totals	20.	11.83	373.0	284.8	7.92	35.62	30.7	1.64	8.74
redwds	25.	13.56	157.9	158.5	4.13	18.81	13.7	0.62	3.47
dougfr	25.	14.59	103.8	120.5	4.95	25.24	14.0	0.96	6.16
tanoak	25.	7.80	104.3	34.6	0.49	1.34	1.0	0.06	0.14
totals	25.	12.53	366.0	313.6	9.57	45.39	28.7	1.65	9.77
redwds	30.	14.19	155.8	171.2	4.76	22.47	12.7	0.63	3.66
dougfr	30.	15.57	101.4	134.0	5.96	31.94	13.5	1.01	6.70
tanoak	30.	7.95	102.5	35.4	0.52	1.47	0.8	0.03	0.13
totals	30.	13.17	359.7	340.5	11.24	55.88	27.0	1.67	10.49
redwds	35.	14.77	153.9	183.0	5.35	26.07	11.9	0.60	3.61
dougfr	35.	16.48	99.2	146.9	6.99	39.18	13.0	1.04	7.24
tanoak	35.	8.08	100.8	35.9	0.55	1.75	0.6	0.03	0.28
totals	35.	13.77	353.8	365.9	12.90	67.00	25.4	1.66	11.13
redwds	40.	15.30	152.1	194.2	5.94	29.84	11.1	0.59	3.77
dougfr	40.	17.33	97.3	159.3	8.05	46.83	12.4	1.05	7.66
tanoak	40.	8.20	99.0	36.3	0.57	1.88	0.4	0.02	0.13
totals	40.	14.32	348.3	389.8	14.56	78.56	23.9	1.66	11.55

```
Script started on Fri Apr  2 13:32:01 1982



% agen.out

 REDWOOD COOP STAND GENERATOR

enter control species (i1) 1


enter stand descriptors by species

 (xxx denotes an integer input field)
 (xx.x denotes a real field with a decimal point)

          tpa  si age  dbh  nr
         xxxx xxx xxx xx.x xxx
         ---------------------
redwood   200 120  35
doug fir  100
tan oak    50
alder      10


FIRST STAGE ESTIMATES AND DESCRIPTION

        rdwd  dfir  tok   alder
        ----------------------

stems    200.  100.   50.   10.
sites    120.  136.   75.   97.
ages      35.   31.   33.   35.
dbars    15.1  11.7   8.2  11.0
dom-ht   94.5  96.7  54.9  85.2
```

```
you can now look at graphs - type a 9 to quit


enter species code ( 0 for all species)0


All Species

 DBH  Trees |              30              60              90             120
            ..............................................................
0 - 2     0. |
2 - 4    10. |1111
4 - 6    60. |111111111111111111111111111111
6 - 8    50. |11111111111111111111111111
8 -10    57. |111111111111111111111111111111
10-12    61. |1111111111111111111111111111111
12-14    41. |11111111111111111111
14-16    27. |1111111111111
16-18    16. |1111111
18-20    22. |1111111111
20-22     7. |111
22-24     4. |11
24-26     5. |11
------------
total   360.

enter species code ( 0 for all species)1


Redwoods

 DBH  Trees |              15              30              45              60
            ..............................................................
0 - 2     0. |
2 - 4     0. |
4 - 6    34. |1111111111111111111111111111111111
6 - 8    23. |11111111111111111111111
8 -10    23. |11111111111111111111111
10-12    43. |1111111111111111111111111111111111111111111
12-14    18. |111111111111111111
14-16    15. |111111111111111
16-18    12. |111111111111
18-20    17. |11111111111111111
20-22     6. |11111
22-24     4. |1111
24-26     5. |11111
------------
total   200.
```

```
enter species code ( 0 for all species)2

Douglas-fir

 DBH  Trees |             15             30             45             60
            ..............................................................
0 - 2     0. |
2 - 4     5. |1111
4 - 6    17. |111111111111111
6 - 8    10. |1111111111
8 -10    22. |1111111111111111111111
10-12    10. |1111111111
12-14    16. |1111111111111111
14-16    11. |1111111111
16-18     4. |111
18-20     5. |1111
20-22     1. |1
------------
total   100.

enter species code ( 0 for all species)3

Tan-Oak

 DBH  Trees |             15             30             45             60
            ..............................................................
0 - 2     0. |
2 - 4     5. |1111
4 - 6     8. |11111111
6 - 8    16. |1111111111111111
8 -10     9. |111111111
10-12     6. |111111
12-14     5. |1111
14-16     1. |
------------
total    50.

enter species code ( 0 for all species)4

Alder
 DBH  Trees |             15             30             45             60
            ..............................................................
0 - 2     0. |
2 - 4     0. |
4 - 6     1. |1
6 - 8     2. |1
8 -10     3. |111
10-12     2. |1
12-14     2. |1
14-16     0. |
------------
total    10.

enter species code ( 0 for all species)9
```

```
enter 1(quit), 2(save stand), 3(start all over)2

 80% canopy closure height is =  64.0 ft.

display tree file (yes = y,  no = n)y

  sp    dbh height cr-rat    exp

  ------------------------------
  1.   4.27  32.83   0.29  14.33
  1.   5.87  41.06   0.26  19.88        This is a partial tree list
  1.   7.47  49.84   0.26  22.61
  1.   9.07  58.67   0.28  23.24
  1.  10.67  67.02   0.30  22.32
  1.  12.27  74.47   0.33  20.36
  2.   9.84  80.58   0.38  10.68
  2.  11.03  84.89   0.39   9.95
  2.  12.33  88.50   0.40   8.84
  2.  13.57  91.47   0.41   7.52
  2.  14.82  93.87   0.42   6.14
  4.   7.24  43.26   0.33   5.32
  4.   8.09  45.96   0.32   5.21
  4.   8.93  48.13   0.31   4.84
  4.   9.78  49.84   0.31   4.26
  4.  10.63  51.16   0.30   3.58
  4.  11.47  52.15   0.30   2.86
  4.  12.32  52.90   0.30   2.18
  5.   5.16  54.63   0.36   0.39
  5.   5.93  58.82   0.35   0.56
  5.   6.70  62.82   0.35   0.72
  5.  12.89  84.94   0.39   0.58
  5.  13.66  86.47   0.39   0.42
  5.  14.44  87.78   0.40   0.29
  5.  15.21  88.91   0.40   0.18

enter output file number - i2 (0 for no save)01

enter up to 20 characters as a stand identifier
test stand

stand saved on file    1


enter 1(quit), 2(save stand), 3(start all over)1

stop
```

```
    WELCOME TO CRYPTOS

    INITIALIZATION PROCEDURES

enter input file no. (i3)001

And here we go (current output file is 6  (the screen)



go:pc

    COMMANDS
    --------
    pc - print commands
    pi - initial description
    pm - print DBH minimums and merch tops
    dt - enter frequency routine
    dp - display tree file
    sv - save current stand status
    rt - restore stand previously saved
    st - print stock table
    ct - enter harvest routine
    et - print elapsed time
    gr - enter growth routine
    ns - start all over with new stand
    yd - print yield table up to this point
    cf - change output file number
    cg - print current 5 years growth
    ig - add ingrowth to tree file
    os - truncate yield table
    es - external (formatted) save of current stand
    pf - enter stand profile routine
    ex - quit


go:pi
Initial Description

stand  label = test stand
      rdwd  dougfir  tanoak  alder
sites 120.    136.     75.     97.
ages   35.     31.     33.     35.
```

```
go:st

        STOCK TABLE
        -----------
        elapsed time =    0. years

species   dbar     tpa   basar   cfvol  bdvol
-----------------------------------------------

redwds   13.26    200.   191.8    4.53   19.68
dougfr   11.32    100.    69.3    2.18    8.93
tanoak    8.57     50.    20.0    0.26    0.71
alder     9.92     10.     5.4    0.17    0.80
totals   12.09    360.   287.1    7.14   30.13


go:pf
enter species code ( 0 for all species)0
and species group indicator (blank is default) - 2i1

species = All Species

                 feet above ground
DBH  Trees |    24    48    72    96   120   144   168   192   216   240
           ..............................................................
0 - 2    0. |
2 - 4   10. |=====>>>>
4 - 6   51. |=======>>>
6 - 8   54. |=========>>>>>
8 -10   62. |==========>>>>>
10-12   41. |===========>>>>>
12-14   60. |============>>>>>>>
14-16   23. |============>>>>>>>>
16-18   21. |=============>>>>>>>>>
18-20   14. |=============>>>>>>>>>>
20-22   14. |=============>>>>>>>>>>
22-24    4. |=============>>>>>>>>>>>
24-26    3. |=============>>>>>>>>>>>
26-28    2. |=============>>>>>>>>>>>
------------
total  360.
```

```
go:gr
enter no. cycles, tree detail, and summary code,(i2,2i1)
02

go:st

         STOCK TABLE
         -----------
         elapsed time =   10. years

species   dbar     tpa   basar   cfvol  bdvol
-----------------------------------------------

redwds   14.89    193.   233.7    6.59   32.01
dougfr   13.71     93.    95.3    3.83   18.76
tanoak    9.00     49.    21.4    0.33    0.96
alder    11.07      9.     5.9    0.20    1.09
totals   13.79    344.   356.4   10.96   52.82

go:sv

go:ct
HARVEST ROUTINE - enter harvest label(up to 40 chars)
low thinning


cutgo:pc

    HARVEST COMMANDS
    ----------------
    pc - print harvest commands
    dt - enter frequency routine
    ch - print cumulative harvests since entering cut routine
    ih - print intermediate harvests since last "ih" call
    rm - remove some trees
    st - print current stock table
    pf - enter stand profile routine
    ex - exit cutting routine
```

```
cutgo:dt
enter species code ( 0 for all species)
and species group indicator (blank is default) - 2i1

species = All Species

dbh  trees |            30            60            90           120
           ..............................................................
0 - 2    0. |
2 - 4    1. |1
4 - 6   24. |111111111111
6 - 8   49. |1111111111111111111111111
8 -10   43. |1111111111111111111111
10-12   67. |1111111111111111111111111111111111111
12-14   45. |1111111111111111111111
14-16   29. |11111111111111
16-18   28. |11111111111111
18-20   17. |11111111
20-22   16. |11111111
22-24   11. |11111
24-26   10. |11111
26-28    3. |1
28-30    2. |1
------------
total  344.


cutgo:rm
enter dl,du,pl,pu, species I.D. and species list(opt.) (4f4.0,i1,9i1)
11.0,22.0,.80,.20

cutgo:ih

         IMMEDIATE HARVESTS
         ------------------
         elapsed time =   10. years

species   dbar     tpa   basar   cfvol  bdvol
-------------------------------------------------

redwds   -0.18     47.    52.1    1.38   6.08
dougfr    0.29     24.    27.8    1.15   5.66
tanoak    0.68      6.     5.5    0.09   0.34
alder     0.92      3.     2.4    0.08   0.49
totals    0.13     80.    87.8    2.71  12.57


cutgo:ex
```

go:st

STOCK TABLE
---
elapsed time = 10. years

species	dbar	tpa	basar	cfvol	bdvol
redwds	15.06	147.	181.6	5.21	25.93
dougfr	13.42	69.	67.4	2.69	13.10
tanoak	8.32	42.	16.0	0.23	0.63
alder	10.15	6.	3.5	0.12	0.60
totals	13.66	264.	268.6	8.25	40.25

go:gr
enter no. cycles, tree detail, and summary code,(i2,2i1)
05

go:st

STOCK TABLE
---
elapsed time = 35. years

species	dbar	tpa	basar	cfvol	bdvol
redwds	19.00	136.	268.2	10.24	60.85
dougfr	19.01	59.	117.2	6.62	42.33
tanoak	9.32	38.	18.1	0.36	1.36
alder	12.09	5.	3.6	0.14	0.87
totals	17.69	238.	407.1	17.36	105.41

go:cg

Current (past) 5 years growth - elapsed time = 35.
---

species	bagro	cvgro	bdgro
redwds	16.2	1.02	7.50
dougfr	9.4	0.82	6.53
tanoak	0.2	0.02	0.14
alder	-0.1	-0.00	0.01
totals	25.7	1.86	14.19

```
go:rt
Do you want to save the yield table for the old stand? (1 = yes)1
enter the file no. where you want it stored (less than 15)02
It is stored on file    2


go:st

         STOCK TABLE
         -----------
         elapsed time =   10. years

species   dbar     tpa   basar   cfvol  bdvol
-----------------------------------------------

redwds   14.89    193.   233.7    6.59   32.01
dougfr   13.71     93.    95.3    3.83   18.76
tanoak    9.00     49.    21.4    0.33    0.96
alder    11.07      9.     5.9    0.20    1.09
totals   13.79    344.   356.4   10.96   52.82


go:rm
HARVEST ROUTINE - enter harvest label(up to 40 chars)
high thinning

cutgo:dt
enter species code ( 0 for all species)0
and species group indicator (blank is default) - 2i1

species = All Species

dbh  trees |             30             60             90            120
           ..............................................................
0 - 2     0. |
2 - 4     1. |1
4 - 6    24. |111111111111
6 - 8    49. |1111111111111111111111111
8 -10    43. |1111111111111111111111
10-12    67. |1111111111111111111111111111111111111
12-14    45. |111111111111111111111111
14-16    29. |11111111111111
16-18    28. |11111111111111
18-20    17. |11111111
20-22    16. |11111111
22-24    11. |11111
24-26    10. |11111
26-28     3. |1
28-30     2. |1
------------
total   344.
```

```
cutgo:rm
enter dl,du,pl,pu, species I.D. and species list(opt.) (4f4.0,i1,9i1)
16.0,30.0,20 ,1.0

cutgo:ih

         IMMEDIATE HARVESTS
         ------------------
         elapsed time =   10. years

species   dbar    .tpa   basar   cfvol  bdvol
---------------------------------------------

redwds    1.98     31.    86.1    2.72   14.69
dougfr    1.01     11.    23.0    0.94    5.11
tanoak    0.00      0.     0.0    0.00    0.00
alder     0.03      0.     0.1    0.00    0.01
totals    1.54     42.   109.2    3.66   19.82


cutgo:dt
enter species code ( 0 for all species)0
and species group indicator (blank is default) - 2i1

species = All Species

dbh  trees |             30             60             90            120
           ..............................................................
0 - 2     0. |
2 - 4     1. |1
4 - 6    24. |111111111111
6 - 8    49. |1111111111111111111111111
8 -10    43. |1111111111111111111111
10-12    67. |1111111111111111111111111111111111
12-14    45. |1111111111111111111111
14-16    29. |11111111111111
16-18    20. |1111111111
18-20    10. |11111
20-22     8. |1111
22-24     4. |11
24-26     3. |1
26-28     0. |
28-30     0. |
------------
total   302.
```

```
cutgo:ex

go:rt
Do you want to save the yield table for the old stand? (1 = yes)

go:st

         STOCK TABLE
         -----------
         elapsed time =   10. years

species   dbar     tpa   basar   cfvol  bdvol
-----------------------------------------------

redwds   14.89    193.   233.7    6.59   32.01
dougfr   13.71     93.    95.3    3.83   18.76
tanoak    9.00     49.    21.4    0.33    0.96
alder    11.07      9.     5.9    0.20    1.09
totals   13.79    344.   356.4   10.96   52.82

go:ct
HARVEST ROUTINE - enter harvest label(up to 40 chars)
high thinning

cutgo:dt
enter species code ( 0 for all species)0
and species group indicator (blank is default) - 2i1

species = All Species

dbh  trees |            30            60            90            120
           ..............................................................
0 - 2    0. |
2 - 4    1. |1
4 - 6   24. |111111111111
6 - 8   49. |1111111111111111111111111
8 -10   43. |1111111111111111111111
10-12   67. |1111111111111111111111111111111111111
12-14   45. |111111111111111111111111
14-16   29. |1111111111111111
16-18   28. |1111111111111111
18-20   17. |11111111
20-22   16. |11111111
22-24   11. |11111
24-26   10. |11111
26-28    3. |1
28-30    2. |1
------------
total  344.
```

```
cutgo:rm
enter dl,du,pl,pu, species I.D. and species list(opt.) (4f4.0,i1,9i1)
18.0,30.0,.20,1.0

cutgo:ih

         IMMEDIATE HARVESTS
         ------------------
         elapsed time =   10. years

species   dbar     tpa   basar   cfvol  bdvol
-----------------------------------------------

redwds    1.56     22.    67.6    2.16   11.86
dougfr    0.59      5.    13.0    0.53    2.91
tanoak    0.00      0.     0.0    0.00    0.00
alder     0.00      0.     0.0    0.00    0.00
totals    1.15     27.    80.6    2.68   14.77

cutgo:dt
enter species code ( 0 for all species)0
and species group indicator (blank is default) - 2i1

species = All Species

dbh  trees |             30             60             90            120
           ..............................................................
0 - 2    0. |
2 - 4    1. |1
4 - 6   24. |111111111111
6 - 8   49. |1111111111111111111111111
8 -10   43. |1111111111111111111111
10-12   67. |1111111111111111111111111111111111111
12-14   45. |111111111111111111111111
14-16   29. |11111111111111
16-18   28. |11111111111111
18-20   12. |111111
20-22   10. |11111
22-24    5. |111
24-26    3. |11
26-28    0. |
28-30    0. |
------------
total  317.
```

```
cutgo:ex

go:pf
enter species code ( 0 for all species)0
and species group indicator (blank is default) - 2i1

species = All Species

                    feet above ground
DBH  Trees |    24    48    72    96   120   144   168   192   216   240
           ..............................................................
0 - 2    0. |
2 - 4    1. |=====>>>
4 - 6   24. |========>>>
6 - 8   49. |==========>>>>
8 -10   43. |============>>>>
10-12   67. |=============>>>>>>
12-14   45. |===============>>>>>>>>
14-16   29. |================>>>>>>>>
16-18   28. |=================>>>>>>>>>>
18-20   12. |=================>>>>>>>>>>
20-22   10. |=================>>>>>>>>>>>
22-24    5. |=================>>>>>>>>>>>>
24-26    3. |=================>>>>>>>>>>>
26-28    0. |=================>>>>>>>>>>>
28-30    0. |=================>>>>>>>>>>>
------------
total  317.

go:st

         STOCK TABLE
         -----------
         elapsed time =   10. years

species   dbar     tpa   basar   cfvol  bdvol
-----------------------------------------------

redwds   13.32    172.   166.1    4.44   20.15
dougfr   13.12     88.    82.3    3.31   15.95
tanoak    9.00     49.    21.4    0.33    0.96
alder    11.07      9.     5.9    0.20    1.09
totals   12.64    317.   275.7    8.27   38.05


go:gr
enter no. cycles, tree detail, and summary code,(i2,2i1)
05
```

go:st

STOCK TABLE
---
elapsed time = 35. years

species	dbar	tpa	basar	cfvol	bdvol
redwds	16.50	159.	236.9	8.34	45.18
dougfr	18.46	77.	142.5	8.12	51.08
tanoak	9.80	45.	23.3	0.46	1.76
alder	12.76	6.	5.8	0.22	1.40
totals	16.15	287.	408.5	17.15	99.43

go:cg

Current (past) 5 years growth - elapsed time = 35.
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species	bagro	cvgro	bdgro
redwds	13.0	0.78	5.26
dougfr	11.4	1.01	8.21
tanoak	0.2	0.02	0.14
alder	-0.2	-0.00	0.00
totals	24.3	1.81	13.62

go:ex
yield summary is on file 10

YIELD SUMMARY: units = english

stand label = test stand

redwood site 120. init. age 35.
doug fir site 136. init. age 31.

species	et	dbar	tpa	basar	cfvol	bdvol	bagro	cvgro	bdgro
redwds	0.	13.26	200.0	191.8	4.53	19.68	0.0	0.00	0.00
dougfr	0.	11.32	100.0	69.8	2.18	8.93	0.0	0.00	0.00
tanoak	0.	8.57	50.0	20.0	0.26	0.71	0.0	0.00	0.00
alder	0.	9.92	10.0	5.4	0.17	0.80	0.0	0.00	0.00
totals	0.	12.09	360.0	287.1	7.14	30.13	0.0	0.00	0.00
redwds	5.	14.11	196.5	213.4	5.55	25.45	21.6	1.02	5.77
dougfr	5.	12.55	96.2	82.6	2.98	13.60	12.8	0.81	4.68
tanoak	5.	8.80	49.3	20.8	0.30	0.84	0.8	0.03	0.13
alder	5.	10.56	9.4	5.7	0.19	0.97	0.4	0.02	0.16
totals	5.	12.97	351.4	322.6	9.02	40.86	35.5	1.88	10.74
redwds	10.	14.89	193.4	233.7	6.59	32.01	20.3	1.04	6.56
dougfr	10.	13.71	92.9	95.3	3.83	18.76	12.6	0.85	5.16
tanoak	10.	9.00	48.5	21.4	0.33	0.96	0.6	0.03	0.12
alder	10.	11.07	8.8	5.9	0.20	1.09	0.2	0.01	0.12
totals	10.	13.79	343.7	356.4	10.96	52.82	33.8	1.94	11.96

HARVESTS : low thinning

redwds	10.	-0.18	46.6	52.1	1.38	6.08
dougfr	10.	0.29	24.3	27.8	1.15	5.66
tanoak	10.	0.68	6.2	5.5	0.09	0.34
alder	10.	0.92	2.5	2.4	0.08	0.49
totals	10.	0.13	79.7	87.8	2.71	12.57

STAND AFTER HARVEST

redwds	10.	15.06	146.8	181.6	5.21	25.93	20.3	1.04	6.56
dougfr	10.	13.42	68.6	67.4	2.69	13.10	12.6	0.85	5.16
tanoak	10.	8.32	42.3	16.0	0.23	0.63	0.6	0.03	0.12
alder	10.	10.15	6.3	3.5	0.12	0.60	0.2	0.01	0.12
totals	10.	13.66	264.0	268.6	8.25	40.25	33.8	1.94	11.96
redwds	15.	15.94	144.2	200.0	6.18	32.11	18.3	0.97	6.18
dougfr	15.	14.68	66.3	77.9	3.42	18.18	10.4	0.73	5.08
tanoak	15.	8.57	41.5	16.6	0.26	0.76	0.6	0.03	0.14
alder	15.	10.72	5.9	3.7	0.13	0.70	0.2	0.01	0.11
totals	15.	14.56	257.9	298.1	10.00	51.76	29.6	1.74	11.51
redwds	20.	16.78	141.9	217.9	7.19	38.82	17.9	1.00	6.71
dougfr	20.	15.86	64.2	88.1	4.19	23.50	10.2	0.77	5.32
tanoak	20.	8.79	40.7	17.1	0.29	0.93	0.5	0.03	0.17
alder	20.	11.18	5.5	3.8	0.14	0.77	0.1	0.01	0.07
totals	20.	15.41	252.3	326.9	11.80	64.02	28.8	1.80	12.26
redwds	25.	17.56	139.9	235.3	8.20	46.07	17.3	1.01	7.25
dougfr	25.	16.97	62.4	98.1	4.93	29.30	10.0	0.80	5.80
tanoak	25.	8.99	39.9	17.6	0.32	1.08	0.4	0.03	0.15
alder	25.	11.55	5.2	3.8	0.14	0.82	0.0	0.00	0.05
totals	25.	16.22	247.3	354.7	13.64	77.26	27.8	1.84	13.24
redwds	30.	18.30	138.0	252.0	9.22	53.35	16.8	1.02	7.28
dougfr	30.	18.02	60.8	107.8	5.80	35.80	9.7	0.82	6.50
tanoak	30.	9.17	39.0	17.9	0.34	1.22	0.3	0.02	0.14
alder	30.	11.86	4.8	3.7	0.14	0.86	-0.1	0.00	0.04
totals	30.	16.98	242.7	381.4	15.50	91.23	26.7	1.86	13.96
redwds	35.	19.00	136.2	268.2	10.24	60.85	16.2	1.02	7.50
dougfr	35.	19.01	59.4	117.2	6.62	42.33	9.4	0.82	6.53
tanoak	35.	9.32	38.2	18.1	0.36	1.36	0.2	0.02	0.14
alder	35.	12.09	4.5	3.6	0.14	0.87	-0.1	-0.00	0.01
totals	35.	17.69	238.4	407.1	17.36	105.41	25.7	1.86	14.19

YIELD SUMMARY: units = english

stand label = test stand

redwood site 120. init. age 35.
doug fir site 136. init. age 31.

species	et	dbar	tpa	basar	cfvol	bdvol	bagro	cvgro	bdgro
redwds	0.	13.26	200.0	191.8	4.53	19.68	0.0	0.00	0.00
dougfr	0.	11.32	100.0	69.8	2.18	8.93	0.0	0.00	0.00
tanoak	0.	8.57	50.0	20.0	0.26	0.71	0.0	0.00	0.00
alder	0.	9.92	10.0	5.4	0.17	0.80	0.0	0.00	0.00
totals	0.	12.09	360.0	287.1	7.14	30.13	0.0	0.00	0.00
redwds	5.	14.11	196.5	213.4	5.55	25.45	21.6	1.02	5.77
dougfr	5.	12.55	96.2	82.6	2.98	13.60	12.8	0.81	4.68
tanoak	5.	8.80	49.3	20.8	0.30	0.84	0.8	0.03	0.13
alder	5.	10.56	9.4	5.7	0.19	0.97	0.4	0.02	0.16
totals	5.	12.97	351.4	322.6	9.02	40.86	35.5	1.88	10.74
redwds	10.	14.89	193.4	233.7	6.59	32.01	20.3	1.04	6.56
dougfr	10.	13.71	92.9	95.3	3.83	18.76	12.6	0.85	5.16
tanoak	10.	9.00	48.5	21.4	0.33	0.96	0.6	0.03	0.12
alder	10.	11.07	8.8	5.9	0.20	1.09	0.2	0.01	0.12
totals	10.	13.79	343.7	356.4	10.96	52.82	33.8	1.94	11.96

HARVESTS : high thinning

redwds	10.	1.56	21.8	67.6	2.16	11.86
dougfr	10.	0.59	5.3	13.0	0.53	2.91
tanoak	10.	0.00	0.0	0.0	0.00	0.00
alder	10.	0.00	0.0	0.0	0.00	0.00
totals	10.	1.15	27.1	80.6	2.68	14.77

STAND AFTER HARVEST

redwds	10.	13.32	171.6	166.1	4.44	20.15	0.0	0.00	0.00
dougfr	10.	13.12	87.7	82.3	3.31	15.85	0.0	0.00	0.00
tanoak	10.	9.00	48.5	21.4	0.33	0.96	0.0	0.00	0.00
alder	10.	11.07	8.8	5.9	0.20	1.09	0.0	0.00	0.00
totals	10.	12.64	316.6	275.7	8.27	38.05	0.0	0.00	0.00
redwds	15.	14.05	168.7	181.6	5.22	24.70	15.5	0.78	4.55
dougfr	15.	14.32	84.9	94.9	4.20	21.92	12.6	0.89	6.07
tanoak	15.	9.21	47.7	22.1	0.36	1.13	0.6	0.03	0.17
alder	15.	11.56	8.3	6.1	0.22	1.21	0.1	0.01	0.12
totals	15.	13.43	309.6	304.6	9.99	48.97	28.9	1.71	10.91
redwds	20.	14.72	166.1	196.3	6.00	29.47	14.8	0.78	4.76
dougfr	20.	15.45	82.4	107.3	5.14	28.35	12.4	0.94	6.43
tanoak	20.	9.39	46.9	22.5	0.39	1.32	0.5	0.03	0.19
alder	20.	11.96	7.8	6.1	0.22	1.30	0.0	0.01	0.10
totals	20.	14.17	303.3	332.3	11.75	60.45	27.7	1.76	11.48
redwds	25.	15.35	163.7	210.4	6.78	34.78	14.1	0.78	5.32
dougfr	25.	16.51	80.3	119.4	6.11	35.37	12.1	0.98	7.02
tanoak	25.	9.54	46.1	22.9	0.42	1.49	0.4	0.03	0.17
alder	25.	12.29	7.3	6.1	0.23	1.36	-0.0	0.00	0.06
totals	25.	14.87	297.5	358.8	13.54	73.01	26.5	1.79	12.56
redwds	30.	15.94	161.5	223.9	7.56	39.93	13.5	0.78	5.14
dougfr	30.	17.51	78.4	131.1	7.11	42.87	11.7	1.00	7.50
tanoak	30.	9.68	45.3	23.2	0.44	1.62	0.3	0.02	0.13
alder	30.	12.56	6.9	5.9	0.23	1.40	-0.1	-0.00	0.04
totals	30.	15.53	292.1	334.2	15.34	85.82	25.4	1.80	12.81
redwds	35.	16.50	159.5	236.9	8.34	45.18	13.0	0.78	5.26
dougfr	35.	18.46	76.7	142.5	8.12	51.08	11.4	1.01	8.21
tanoak	35.	9.80	44.5	23.3	0.46	1.76	0.2	0.02	0.14
alder	35.	12.76	6.5	5.8	0.22	1.40	-0.2	-0.00	0.00
totals	35.	16.15	287.2	408.5	17.15	99.43	24.3	1.81	13.62