TOTAL BIOMASS CRUISE PROGRAM

by

Alexander Clark III, Research Scientist
Utilization of Southern Timber

and

Richard C. Field, Research Forester
Forestry Ecosystem Decisions

Forestry Sciences Laboratory
Athens, Georgia

ABSTRACT

The Total Biomass Cruise Program (TBCP) is a Fortran IV computer program for estimating the weight and volume of total trees, saw logs, pulpwood, and firewood from standard tree cruise data. TBCP may be run interactively via a remote terminal or by conventional batch procedures.

Input to the program consists of a cruise summary tree count by 2-inch d.b.h. classes or by d.b.h. and total height, height to 4-inch top or saw-log merchantable height classes for pine (natural or plantation), hard hardwood, and soft hardwood. Output consists of three tables--one showing biomass by d.b.h. classes, another showing board-foot volume by d.b.h. classes, and a summary table. Output can be expressed in tons, cords, cunits, or board feet per acre or per tract.

TOTAL BIOMASS CRUISE PROGRAM
USDA FOREST SERVICE & GEORGIA FORESTRY COMMISION -- A CLARK III AND R.C. FIELD

LANDOWNER - JOHN DOE
ADDRESS - LAKE RD. ATHENS, GA.
LOCATION - NORTH TRACT, MONROE CO., GA
FORESTER - SMITH

CASE NO.- 23
DISTRICT NO.- 17
TRACT SIZE(AC) - 31.00
DATE - 1/27/81

PHYSIOGRAPHIC REGION - 4 TYPE CRUISE - 4 BLOW-UP FACTOR- 1.00
STAND TYPE - 1 PINE TYPE - 1 SAWTIMBER FORM CLASS - 79.

NUMBER PLOTS SAMPLED - 1

TREE DIMENSIONS MEASURED

PINE SAPLINGS -- DBH	HARDWOOD SAPLINGS -- DBH
PINE PULPWOOD -- D+H4	HARDWOOD PULPWOOD -- D+H4
PINE SAWTIMBER-- D+MH	HARDWOOD SAWTIMBER-- D+MH

POUNDS PER CORD EQUIVALENT

PINE = 5250.
HARD HARDWOOD = 6000.
SOFT HARDWOOD = 5450.

TOTAL BIOMASS CRUISE PROGRAM
USDA FOREST SERVICE & GEORGIA FORESTRY COMMISION — A CLARK III AND R.C. FIELD

AMDOWNER - JOHN DOE
ADDRESS - LAKE RD. ATHENS, GA.
LOCATION - NORTH TRACT, MONROE CO., GA
OPERATOR - SMITH

CASE NO.- 23
DISTRICT NO.- 17
TRACT SIZE(AC) - 31.0
DATE - 1/27/81

TABLE 1__ SUMMARY OF PINE TREE COUNT INPUT DATA.

DBH	PINE - SAPLINGS TREE COUNT
2	0
4	620

PINE - PULPWOOD

DBH	HT.TO 4 IN.TOP(FT) 10	20	30	40	50	60	70	80	90
6	0	310	215	0	0	0	0	0	0
8	0	0	220	151	0	0	0	0	0

PINE -SAWTIMBER

DBH	MERCHANTABLE HT.(LOGS) 1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
10	124	154	151	0	0	0	0	0	0
12	50	50	124	75	25	0	0	0	0
14	0	49	73	121	73	0	0	0	0
16	0	24	71	71	117	47	0	0	0
18	0	0	46	23	46	29	0	0	0
20	0	0	0	22	44	15	0	0	0
22	0	0	4	12	20	5	0	0	0
24	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0

TOTAL BIOMASS CRUISE PROGRAM
USDA FOREST SERVICE & GEORGIA FORESTRY COMMISION -- A CLARK III AND R.C. FIELD

LANDOWNER - JOHN DOE
ADDRESS - LAKE RD. ATHENS, GA.
LOCATION - NORTH TRACT, MONROE CO., GA
FORESTER - SMITH

CASE NO.- 23
DISTRICT NO.- 17
TRACT SIZE(AC) - 31.0
DATE - 1/27/81

TABLE 1--SUMMARY OF HARDWOOD TREE COUNT INPUT DATA.

DBH	HARD HARDWOOD	SOFT HARDWOOD
	SAPLING -- TREE COUNT	
2	0	0
4	106	221

PULPWOOD -- HT. TO 4 IN.TOP (FT)

DBH	10	20	30	40	50	60	70	80	90	10	20	30	40	50	60	70	80	90
6	2	38	19	0	0	0	0	0	0	0	44	51	0	0	0	0	0	0
8	0	0	37	28	0	0	0	0	0	0	0	21	0	18	0	0	0	0
10	0	0	0	28	31	0	0	0	0	0	0	0	28	6	0	0	0	0

SAWTIMBER -- MERCHANTABLE HT. (LOGS)

DBH	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
12	23	12	0	0	0	0	0	0	0	0	0	31	10	0	0	0	0	0
14	10	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	10	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL BIOMASS CRUISE PROGRAM
USDA FOREST SERVICE & GEORGIA FORESTRY COMMISION -- A CLARK III AND R.C. FIELD

LANDOWNER - JOHN DOE
ADDRESS - LAKE RD. ATHENS, GA.
LOCATION - NORTH TRACT, MONROE CO., GA
FORESTER - SMITH

CASE NO.- 23
DISTRICT NO.- 17
TRACT SIZE(AC) - 31.0
DATE - 1/27/81

TABLE 2B-- PREDICTED SCRIBNER GROSS SAWLOG BD.FT. VOLUME BY DBH CLASSES.

DBH	AVERAGE HEIGHT			TREES			SAWLOG VOLUME-SCRIBNER,FC=,79.			
	PINE	HHWD	SHWD	PINE	HHWD	SHWD	PINE	HHWD	SHWD	ALL
(IN)	----(LOGS)----			------(NUMBER)-------			----(THOUSAND BOARD FEET)----			
				YIELD PER ACRE						
10	1.5	0.0	0.0	13.8	0.0	0.0	.5	0.0	0.0	.5
12	2.0	1.2	2.1	10.5	1.1	1.3	.8	.1	.1	.9
14	2.3	1.1	0.0	10.2	.4	0.0	1.3	.0	0.0	1.3
16	2.6	2.0	0.0	10.6	.2	0.0	2.1	.0	0.0	2.1
18	2.7	1.7	0.0	4.6	.6	0.0	1.2	.1	0.0	1.4
20	3.0	0.0	0.0	2.6	0.0	0.0	1.0	0.0	0.0	1.0
22	2.8	0.0	0.0	1.3	0.0	0.0	.6	0.0	0.0	.6
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ALL CLASSES				53.7	2.4	1.3	7.4	.2	.1	7.7

TOTAL BIOMASS CRUISE PROGRAM
USDA FOREST SERVICE & GEORGIA FORESTRY COMMISION -- A CLARK III AND R.C. FIELD

LANDOWNER - JOHN DOE
ADDRESS - LAKE RD, ATHENS, GA.
LOCATION - NORTH TRACT, MONROE CO., GA
FORESTER - SMITH

CASE NO.- 23
DISTRICT NO.- 17
TRACT SIZE(AC) - 31.0
DATE - 1/27/81

TABLE 3-- PREDICTED TOTAL TREE AND COMPONENT BIOMASS BY DBH CLASSES.

DBH	AVERAGE HEIGHT	TREES	TOTAL TREE	SAWLOGS	STEM PULPWOOD	CROWN >= 2 IN.	FIREWOOD >= 4 IN.
(IN)	(FT.&LOGS)	(NO.)	YIELD PER ACRE TONS				
			PINE				
2	0.0	0.0	0.0				
4	0.0	20.0	.9				
6	24.1	10.9	2.3		1.6	.0	
8	34.1	12.0	3.1		2.0	.1	
10	1.5	13.8	0.3	3.8	1.5	.1	
12	2.8	10.5	6.7	4.8	1.0	.2	
14	2.3	10.2	9.0	7.1	.8	.3	
16	2.6	10.6	15.5	11.7	1.4	.4	
18	2.7	4.6	8.3	6.3	.5	.5	
20	3.0	2.6	5.8	4.7	.3	.4	
22	2.8	1.3	3.3	2.7	.1	.3	
24	0.0	0.0	0.0	0.0	0.0	0.0	
26	0.0	0.0	0.0	0.0	0.0	0.0	
28	0.0	0.0	0.0	0.0	0.0	0.0	
30	0.0	0.0	0.0	0.0	0.0	0.0	
			HARD HARDWOOD				
2	0.0	0.0	0.0				
4	0.0	3.4	.2				
6	22.9	1.9	.4		.2	.1	
8	34.3	3.1	.9		.5	.2	
10	45.3	1.9	1.5		1.0	.3	
12	1.3	1.1	1.1			.4	
14	1.1	.4	.6	.4	.2	.4	.0
16	2.0	.2	.5	.3	.1	.1	.0
18	1.7	.5	1.0	.6	.4	.4	.2
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			SOFT HARDWOOD				
2	0.0	0.0	0.0				
4	0.0	2.1	.4				
6	25.4	1.1	.4		.3	.1	
8	36.2	1.3	.4		.3	.1	
10	41.8	1.1	.6		.4	.1	
12	2.1	1.3	1.2	.7	.2	.1	.0
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TOTAL BIOMASS CRUISE PROGRAM
USDA FOREST SERVICE & GEORGIA FORESTRY COMMISION -- A CLARK III AND R.C. FIELD

LANDOWNER - JOHN DOE
ADDRESS - LAKE RD, ATHENS, GA.
LOCATION - NORTH TRACT, MONROE CO., GA
FORESTER - SMITH

CASE NO.- 23
DISTRICT NO.- 17
TRACT SIZE(AC) - 31.0
DATE - 1/27/81

TABLE 3-- PREDICTED TOTAL TREE AND COMPONENT BIOMASS BY DBH CLASSES.

DBH	AVERAGE HEIGHT	TREES	TOTAL TREE	SAWLOGS	STEM PULPWOOD	CROWN >= 2 IN.	FIREWOOD >= 4 IN.
IN)	(FT.&LOGS)	(NO.)	CORDS				
			YIELD PER ACRE				
			BIGE				
2	0.0	0.0	0.0				
4	0.0	20.0	.3				
6	24.1	16.9	.6		.6	.0	
8	34.1	12.0	1.2		1.0	.0	
10	1.3	13.8	2.4	1.4	.4	.1	
12	2.0	10.3	2.6	1.8	.4	.1	
14	2.3	10.2	3.4	2.7	.2	.1	
16	2.6	10.5	5.0	4.5	.5	.1	
18	2.7	4.6	3.1	2.5	.2	.2	
20	3.0	2.6	2.2	1.8	.1	.2	
22	2.8	1.3	1.8	1.0	.1	.1	
24	0.0	0.0	0.0	0.0	0.0	0.0	
26	0.0	0.0	0.0	0.0	0.0	0.0	
28	0.0	0.0	0.0	0.0	0.0	0.0	
30	0.0	0.0	0.0	0.0	0.0	0.0	
			HARD HARDWOOD				
2	0.0	0.0	0.0				
4	0.0	3.4	.1				
6	22.9	1.9	.2		.1	.0	
8	34.3	2.1	.3		.1	.1	
10	45.3	1.0	.5		.3	.1	
12	1.2	1.1	.4	.1	.1	.1	.0
14	1.1	.4	.2	.1	.1	.0	.0
16	1.0	.2	.2	.1	.0	.0	.0
18	1.7	.6	.2	.2	.1	.1	.1
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			SOFT HARDWOOD				
2	0.0	0.0	0.0				
4	0.0	7.1	.2				
6	25.4	3.1	.3		.1	.0	
8	36.2	1.3	.3		.1	.0	
10	41.8	1.1	.3		.2	.0	
12	1.1	1.3	.4	.3	.1	.0	.0
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TOTAL BIOMASS CRUISE PROGRAM

USDA FOREST SERVICE & GEORGIA FORESTRY COMMISION -- A CLARK III AND R.C. FIELD

LANDOWNER - JOHN DOE
ADDRESS - LAKE RD, ATHENS, GA.
LOCATION - NORTH TRACT, MONROE CO., GA
FORESTER - SMITH

CASE NO.- 23
DISTRICT NO.- 17
TRACT SIZE(AC) - 31.0
DATE - 1/27/81

TABLE 3-- PREDICTED TOTAL TREE AND COMPONENT BIOMASS BY DBH CLASSES.

DBH	AVERAGE HEIGHT	TREES	TOTAL TREE	SAWLOGS	STEM PULPWOOD	CROWN >= 2 IN.	FIREWOOD >= 4 IN.
(IN)	(FT.6LOGS)	(NO.)	(CUNITS)				
			YIELD PER ACRE				
			PINE				
6	24.1	16.9	.6		.5	.0	
8	34.1	12.0	.9		.5	.0	
10	1.5	13.8	1.7	1.1	.5	.0	
12	3.0	10.3	1.9	1.4	.3	.1	
14	5.3	10.2	2.5	2.1	.3	.1	
16	7.6	10.6	3.3	3.2	.4	.1	
18	9.7	4.5	2.3	1.9	.1	.1	
20	3.0	2.6	1.6	1.4	.1	.1	
22	7.8	1.3	.9	.8	.0	.1	
24	0.0	0.0	0.0	0.0	0.0	0.0	
26	0.0	0.0	0.0	0.0	0.0	0.0	
28	0.0	0.0	0.0	0.0	0.0	0.0	
30	0.0	0.0	0.0	0.0	0.0	0.0	
			HARD HARDWOOD				
6	22.9	1.9	.1		.1	.0	
8	34.3	1.4	.2		.1	.0	
10	45.3	1.0	.4		.1	.0	
12	1.2	1.1	.3		.1	.0	.0
14	1.1	.4	.1	.1	.1	.0	.0
16	2.0	.2	.1	.1	.0	.0	.0
18	2.7	.5	.4	.2	.1	.0	.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			SOFT HARDWOOD				
6	23.4	2.1	.1		.1	.0	
8	35.2	1.5	.1		.1	.0	
10	41.8	1.1	.2		.1	.0	
12	1.1	1.2	.3	.2	.1	.0	.0
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TOTAL BIOMASS CRUISE PROGRAM
)SDA FOREST SERVICE & GEORGIA FORESTRY COMMISION -- A CLARK III AND R.C. FIELD

,NDOWNER - JOHN DOE
)DRESS - LAKE RD. ATHENS, GA.
)CATION - NORTH TRACT, MONROE CO., GA
)RESTER - SMITH

CASE NO.- 23
DISTRICT NO.- 17
TRACT SIZE(AC) - 31.0
DATE - 1/27/81

,BLE 4--SUMMARY OF PREDICTED TOTAL TREE AND TREE COMPONENT WEIGHT AND VOLUME.

ESTIMATED YIELD PER ACRE

:OMPONENT	PINE	H-HARDWOOD	S-HARDWOOD	ALL TREES
GREEN TONS OF WOOD AND BARK				
)TAL TREE(ALL)	61.2	6.8	3.1	71.0
,PLINGS(< 5 IN.)	.9	.2	.4	1.6
)TAL TREE(>= 5 IN)	60.3	6.6	2.6	69.5
)TAL STEM TO 4 IN TOP	51.0	4.5	2.0	57.5
SAWLOGS-1	41.4	1.5	.7	43.6
PULPWOOD	9.6	3.0	1.3	13.9
)TAL CROWN	9.3	2.1	.6	12.0
CROWN FIREWOOD>=2IN	2.8	1.2	.3	4.3
CROWN FIREWOOD>=4IN	0.0	.3	.0	.3
CORDS OF WOOD AND BARK-2				
)TAL TREE(ALL)	23.3	2.3	1.1	26.7
,PLINGS(< 5 IN.)	.3	.1	.2	.6
)TAL TREE(>= 5 IN)	23.0	2.2	1.0	26.1
)TAL STEM TO 4 IN TOP	19.4	1.5	.7	21.7
SAWLOGS-1	15.8	.5	.3	16.5
PULPWOOD	3.7	1.0	.5	5.1
)TAL CROWN	3.5	.7	.2	4.5
CROWN FIREWOOD>=2IN	1.1	.4	.1	1.6
CROWN FIREWOOD>=4IN	0.0	.1	.0	.1
VOLUME OF WOOD (CUNITS)				
)TAL TREE(>= 5 IN)	16.8	1.5	.7	19.1
)TAL STEM TO 4 IN TOP	14.7	1.1	.6	16.4
SAWLOGS-1	11.9	.4	.2	12.5
PULPWOOD	2.7	.8	.4	3.8
)TAL CROWN	2.1	.5	.2	2.7
CROWN FIREWOOD>=2IN	.8	.3	.1	1.2
CROWN FIREWOOD>=4IN	0.0	.1	.0	.1
SAWLOG BOARD-FOOT VOLUME--(MBF)				
,WLOGS (SCRIBNER)	7.4	.2	.1	7.7
BASAL AREA PER ACRE (SQ.FT.)				
,PLING TREES	1	0	0	1
ILPWOOD TREES	7	2	1	10
,WTIMBER TREES	58	2	1	61
.L TREES	66	4	2	72

- SAWLOG MERCHANTABLE TOP; 7-INCH DOB FOR PINE, 9-INCH FOR HARDWOODS OR THRU LOG GRADE NUMBER 3 MERCHANTALITY
- POUNDS PER CORD: PINE =5250., SOFT HARDWOOD =5450., HARD HARDWOOD =6000.