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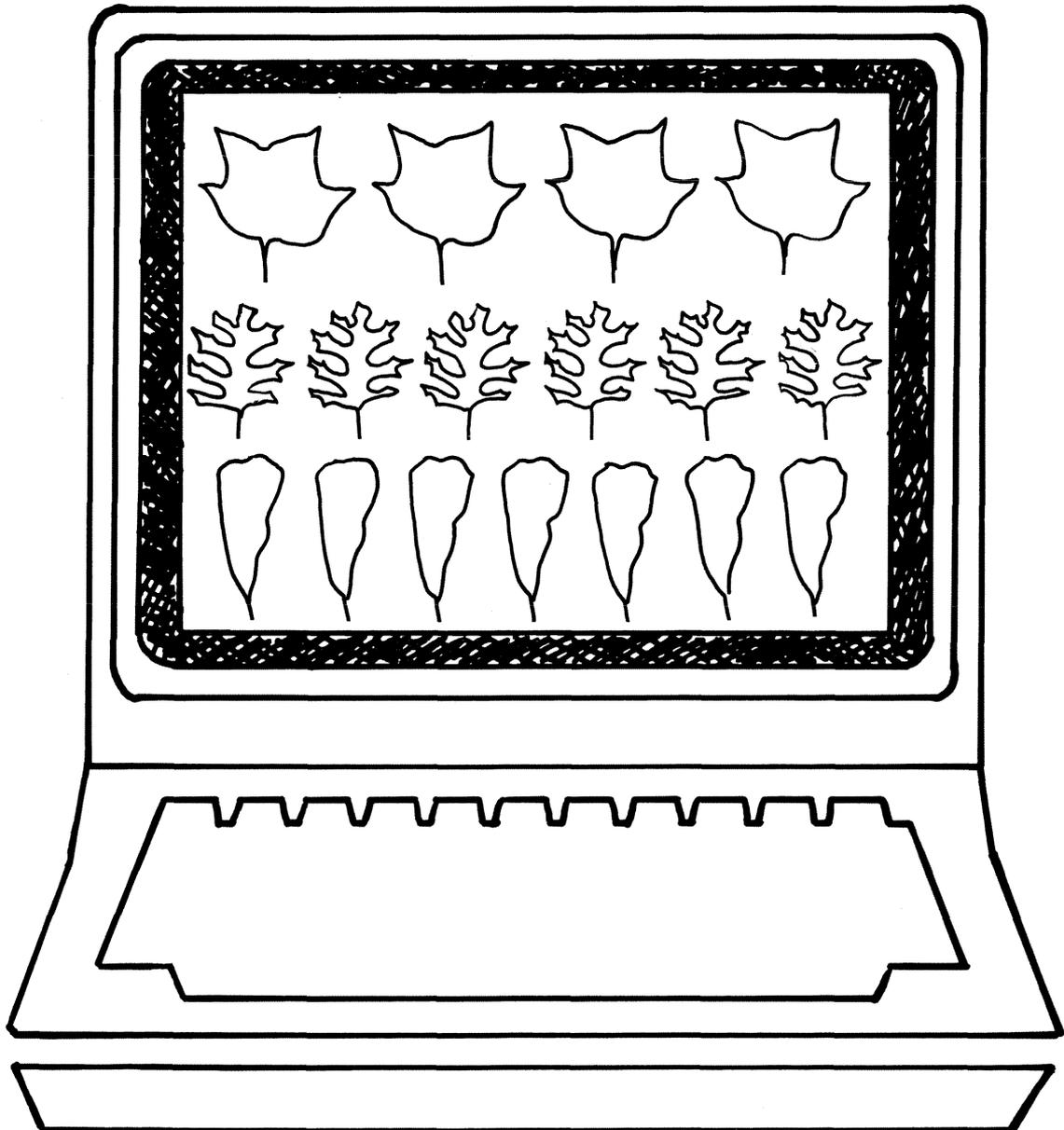
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SITEQUAL—A User's Guide

Computerized Site Evaluation for 14 Southern Hardwood Species

Constance A. Harrington and Bettina M. Casson



SUMMARY

An interactive computer program, SITEQUAL, has been developed from the widely-used Baker and Broadfoot field guides, which evaluate site quality for 14 southern hardwood tree species. The SITEQUAL program calculates site index for all species simultaneously and provides a breakdown of site index into the component contributions by each of the four major soil factors defined by Baker and Broadfoot. When the necessary soil-site information is available, SITEQUAL can be used to rapidly evaluate a series of site conditions for all species or to determine the relative sensitivity of these species to specific conditions including past or proposed land use practices.

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INTRODUCTION

In the late 1970's, James B. Baker and Walter M. Broadfoot of the Southern Forest Experiment Station published field guides for evaluating site quality for the commercially important hardwood species in the Southern United States (Baker and Broadfoot 1977, 1979). These field guides enable the user to evaluate the four major soil factors of physical condition, moisture availability, nutrient availability, and aeration, and then to calculate site index for any of the following 14 hardwood tree species: cottonwood (*Populus deltoides*), green ash (*Fraxinus pennsylvanica*), pecan (*Carya illinoensis*), sycamore (*Platanus occidentalis*), sweetgum (*Liquidambar styraciflua*), yellow poplar (*Liriodendron tulipifera*), hackberry (*Celtis occidentalis*), sugarberry (*C. laevigata*), cherrybark oak (*Quercus falcata* var. *pagodifolia*), Nuttall oak (*Q. nuttallii*), Shumard oak (*Q. shumardii*), water oak (*Q. nigra*), willow oak (*Q. phellos*), and swamp chestnut oak (*Q. michauxii*). The field guides require the user to answer a series of questions which quantify the soil and site conditions of the area being evaluated. Information is required on: soil depth, texture, structure, and compaction; presence of a pan; past use and present vegetative cover; topographic position including depth to water table, swampiness, length of flooding, and microrelief; soil age and geologic source of the parent material; pH, organic matter; and soil color. The questions are presented in a modified multiple-choice format with each species evaluated in separate site evaluation tables.

This report describes the use of an interactive computer program, SITEQUAL, which was developed from the Baker-Broadfoot field guides. SITEQUAL predicts site index for all 14 hardwood species at the same time. The program requires the same user-

supplied information as the published site evaluation tables and there are no differences in the site index¹ predicted for any species between the program and the Baker-Broadfoot field guides. SITEQUAL does differ from the Baker-Broadfoot field guides in the order and format in which questions are asked; these differences in organization allow all species to be evaluated simultaneously and reduce the overlap between questions. Several versions of the program are available for different types and models of computers.

The major advantages of using the SITEQUAL program are completeness and speed. In the past, users of the Baker-Broadfoot field guides would commonly evaluate only 3 or 4 hardwood species for a site rather than all of the 14 possible species. This partial evaluation ran the risk of overlooking species that might be more productive than the species evaluated. In addition, the speed at which different sets of site conditions can be evaluated makes the SITEQUAL program more efficient to use than the field guides, especially when a user has the necessary soil-site data already "in hand" for several areas.

Cautions

The SITEQUAL program only evaluates the site conditions used as input data, and all 14 hardwood species will be evaluated for a site, regardless of whether or not all species naturally occur on a particular soil. In addition, the broad geographic area of applicability for the program is the same as that specified in the field guides, i.e., "the southern hard-

¹In the Baker-Broadfoot field guides the phrase "site quality rating" was used to refer to potential or calculated site index. In this report, the more commonly used phrase, site index, is used in place of site quality rating.

wood region except in those mountainous areas where aspect is important" (Baker and Broadfoot 1979, p 2). Neither the program nor the field guides should be used without modification outside this region unless local testing indicates their applicability.

It is highly recommended that potential users of SITEQUAL read the Baker-Broadfoot field guides before using the program. The field guides illustrate how the site index values are calculated and contain useful background information on assessing soil and site properties.

PROGRAM SITEQUAL

Organization

The SITEQUAL program consists of 12 major program segments with each segment containing the calculations for 1 or 2 species. Hackberry and sugarberry are evaluated in one program segment, water oak and willow oak are evaluated together in another program segment, and the other 10 species are evaluated individually. The first program segment is for cottonwood; in addition to calculating site index for cottonwood, this segment also contains all of the questions, and accepts the answers for all of the other species. The answers given in the first program segment are checked to see if they are within acceptable ranges for that question. If an answer is not acceptable the question is repeated. If answers given in the first program segment are acceptable, they are automatically passed to the next 11 program segments for calculation of the site index values for the other species. The program logic is flowcharted in Appendix C.

Site index (SI) is calculated by summing the values obtained in each of four major soil factors: (1) Physical condition; (2) Moisture availability during the growing season; (3) Nutrient availability; and (4) Aeration. SITEQUAL calculates a factor value by summing the values assigned to the individual soil-site properties. The percentage of the maximum allowable value is also determined for each factor and species combination. Several individual soil-site conditions were considered by Baker and Broadfoot to indicate the site was unsuitable for a species. Those site conditions, given in table 1, result in the species being assigned an unsuitable rating in the output with a footnote indicating the reason for the rating (see examples in Appendix A). The computed SI value is also compared to the minimum acceptable value established by Baker and Broadfoot for each species (table 1). A footnote in the output table indicates if the calculated value is below the minimum acceptable value.

Questions and Answers

The SITEQUAL program requires information on various soil and site characteristics (table 2). Most answers can be selected from a multiple choice format. The user needs to press only one number key and then the <RETURN> or <ENTER> key. A site identification in the form of a number or name is required; any combination of letters, numbers, spaces, or special characters can be used, up to a maximum of 17 characters or spaces. Values for pH can be input as either whole numbers (e.g. 5) or with decimal fractions (e.g. 4.5). All other questions require a single digit response. Out of range answers result in the question being asked again.

Table 1.—Summary of minimum site index values and unsuitable soil-site conditions which result in comment footnotes in the program output

Tree species	Minimum SI ¹ acceptable for management	Condition resulting in unsuitable ratings and footnoted by program			
		Water table <1 foot	Water- logging	pH>7.5	Flooding continuous
	--- Feet ---				
Cottonwood	80	x	x		x
Green Ash	65		x		
Hackberry, Sugarberry	55	x	x		x
Cherrybark Oak	70	x	x	x	x
Nuttall Oak	75	x	x	x	x
Shumard Oak	70	x	x	x	x
Swamp Chestnut Oak	65	x	x	x	x
Water Oak, Willow Oak	70	x	x	x	x
Pecan	70	x	x		x
Sweetgum	75	x	x		x
Sycamore	70	x	x		x
Yellow Poplar	70	x	x		x

¹SI is site index at age 30 for cottonwood, age 50 for other species.

Table 2.—*Listing of SITEQUAL questions and possible answers. Questions preceded by a * are only asked if the user's response to a previous question triggers the program to ask for additional information.*

This program predicts site index for 14 southern hardwood species. It requires the user to answer questions on soil properties and site characteristics for each area that is evaluated. The questions are answered by pressing the appropriate key or keys (most answers are a 1-digit number) followed by pressing the <RETURN> key.

Do you wish to run this program?

- (1) Yes
- (2) No

Input Site number or name

Input presence of artificial or inherent pan from the following list:

- (1) Without pan
- (2) Plowpan
- (3) Inherent pan

*Input depth of soil that can be readily occupied by roots from the following list:

- (1) Deep soil; >4 feet
- (2) Medium soil; 2–4 feet
- (3) Shallow soil; <2 feet

Does the soil contain any stratified horizons within the effective rooting zone?

- (1) Yes, major horizons are stratified
- (2) No, major horizons are not stratified

Input the structure in rooting zone from the following list:

- (1) Granular
- (2) Massive (if silty, loamy, or mucky)
- (3) Massive (if clayey)
- (4) Single grained (if sandy)
- (5) Prismatic
- (6) Platy
- (7) Blocky

*Input the soil texture in rooting zone from the following list:

- (1) Fine-textured; clayey
- (2) Medium-textured; silty or loamy
- (3) Coarse-textured; sandy

Classify compaction in the surface foot from the following list:

- (1) No compaction; loose, porous, friable; (bulk density <1.4 g/cc)
- (2) Moderately compacted; firm, moderately tight; (bulk density 1.4–1.7 g/cc)
- (3) Strongly compacted; tight; (bulk density >1.7 g/cc)

Input present cover from the following list:

- (1) Forest cover (includes sites recently clearcut)
- (2) Open with grass cover
- (3) Open and bare

*How many years has this site been cultivated or pastured?

- (1) 0 (i.e. never cleared for cultivation or pasture)
- (2) 1–4 years
- (3) 5–9 years
- (4) 10–19 years
- (5) 20 years or more

*Did past farming cultural practices include annual fertilization?

- (1) Yes
- (2) No

Input average depth to water table during the growing season from the following list:

- (1) <1 foot
- (2) 1–2 feet
- (3) 2–6 feet
- (4) 7–10 feet
- (5) >10 feet

Table 2.—Listing of SITEQUAL questions and possible answers. Questions preceded by a * are only asked if the user's response to a previous question triggers the program to ask for additional information.—Continued

Input the topographic position from the following list:

- (1) Floodplain or stream bottom
- (2) Stream terraces or lower slopes
- (3) Upland

Input the microsite from the following list:

- (1) Concave; depression, pocket, trough
- (2) Level; flat
- (3) Convex; ridge, mound

Input flooding times from the following list:

- (1) Winter through spring
- (2) Winter only
- (3) None
- (4) Continuous

Input the geologic source from the following list:

- (1) Mississippi River, Loess, Blackland
- (2) Mixed Coastal Plain and other
- (3) Coastal Plain

Input the organic matter in A-horizon from the following list:

- (1) Organic matter $>2\%$
- (2) Organic matter $\geq 1\%$ or Organic matter $\leq 2\%$
- (3) Organic matter $<1\%$

Input depth of topsoil (A-horizon) from the following list:

- (1) >6 inches or no profile development
- (2) 3–6 inches
- (3) <3 inches

Input soil age from the following list:

- (1) Young; no profile development (Entisols)
- (2) Medium; moderate profile development (Inceptisols)
- (3) Old; well-developed profile, leached (Alfisols, Ultisols)

Input pH in rooting zone. EX. 5.5

Input swampiness from the following list:

- (1) Wet in winter only
- (2) Wet January-July
- (3) Waterlogged all year

Input mottling from the following list:

- (1) None to 18 inch depth
- (2) None to 8 inch depth
- (3) Mottled to surface or gray mineral soil

Input soil color in rooting zone from the following list:

- (1) Black, brown, red
- (2) Yellow, brownish-gray
- (3) Gray

Do you want a listing of your input values.

- (1) Yes, please provide a listing
- (2) No, input listing is not necessary

Do you want to do another set of site evaluations?

- (1) Yes
 - (2) No
-

Options

The program provides the user with three choices or options. When SITEQUAL begins, it presents an introductory paragraph and asks the user whether he or she wishes to run the program (table 2). If the user presses 1 (meaning Yes, followed by pressing <RETURN>), the program continues by asking the user to "Input site number or name". If the user presses 2 (meaning No, followed by pressing <RETURN>), the program goes to the END statement and stops. Thus, the first option provides the user a chance to exit the program gracefully (i.e. without "crashing").

The other two choices offered the user occur at the end of the program-user dialog. The user is first asked, "Do you want a listing of your input values?" If the question is answered affirmatively (by pressing 1 and then <RETURN>), a list of the input values for each soil-site property will be printed above the basic summary table (see table 3). The input values listed correspond to the categories selected by the user. For example the "1" printed to the right of "Presence of pan" in table 3 corresponds to the category "(1) With-

out pan" in the listing of the SITEQUAL questions (table 2). If the question on input values is answered negatively, only the basic summary table is provided. Immediately after answering this question, the output will begin printing (see discussion under "Versions of SITEQUAL" for systems without a printer). Following the printing of the output, the program will ask, "Do you want to do another set of site evaluations?" If the answer is Yes (i.e., 1 was pressed), the program will loop back to the beginning and restart. If No is selected (i.e., 2 is pressed), the program goes to the END statement and stops.

EXAMPLES AND USES

The output available from a run of SITEQUAL is illustrated in table 3. It is composed of a title, site identification, optional listing of input values, and summary table. For all 14 hardwood species the program calculates the number of points assigned in each of the four soil factors and the total site index. In addition, the calculated value for each factor is di-

Table 3.—Example of output obtained using SITEQUAL program and selecting the option to print the input values. SI is site index in feet at 30 years for cottonwood and 50 years for the other species

SITEQUAL—Site Evaluation for 14 southern hardwoods.					
Site ID Example 1					
Input values for each soil site property.					
Presense of pan	1	Soil depth	1		
Stratification	1	Soil texture	2		
Soil structure	1	Present cover	1		
Compaction	1	Topographic position	1		
Water table depth	4	Flooding times	1		
Microsite	2	Organic matter	1		
Geologic source	1	Soil age	1		
Topsoil depth	1	Swampiness	1		
pH	7	Soil color	1		
Mottling	1				
Number of points and % of total possible by factor					
Species	Physical condition	Moisture avail.	Nutrient avail.	Aeration	Total SI
Cottonwood	46(100%)	41(89%)	26(100%)	12(100%)	125
Green Ash	21(100%)	40(85%)	26(100%)	10(100%)	97
Hackberry, Sugarberry	25(100%)	22(88%)	25(100%)	25(100%)	97
Cherrybark Oak	31(100%)	34(89%)	23(92%)	31(100%)	119
Nuttall Oak	24(100%)	31(74%)	28(93%)	24(100%)	107
Shumard Oak	31(100%)	28(88%)	27(93%)	30(100%)	116
Swamp Chestnut Oak	28(100%)	29(94%)	22(92%)	26(100%)	105
Water Oak, Willow Oak	29(100%)	30(88%)	21(91%)	29(100%)	109
Pecan	27(100%)	27(90%)	30(100%)	28(100%)	112
Sweetgum	30(100%)	32(89%)	24(100%)	30(100%)	116
Sycamore	32(100%)	16(80%)	39(100%)	39(100%)	126
Yellow Poplar	40(100%)	27(90%)	25(100%)	30(100%)	122

vided by the maximum number possible and the resulting percentage is printed. This calculation enables the user to readily identify which of the four major soil factors is at the least optimum level. In the example given in table 3, two of the soil factors evaluated for Nuttall oak have similar values—Moisture Availability (31) and Nutrient Availability (28). In the model developed by Baker and Broadfoot, however, moisture availability during the growing season was considered to be more important than nutrient availability in determining site quality for Nuttall oak; thus, the percentage of total points possible differs between the two soil factors (74 percent versus 93 percent). The soil factor achieving the lowest percentage—moisture availability in the above example—was considered by Baker and Broadfoot as the factor that was most limiting to tree growth on that site.

Another possible use of the SITEQUAL program is to evaluate the relative sensitivity of these hardwood tree species to past land use practices (e.g., agricultural cropping) or proposed future practices (e.g., construction of a drainage system). For example, the values in table 4 were determined by using the same

basic soil characteristics as in table 3, but in the second case the site had been cropped for 30 years rather than having been under tree cover. For this scenario it was assumed that 30 years of cropping had caused development of a plow pan and moderate compaction in the surface foot of soil but that little topsoil had been lost due to erosion. Predicted site index was lower for all species (after cropping), but the magnitude of the reduction varied by species. Cottonwood was the species most sensitive to the site changes associated with cropping, losing a total of 36 feet of potential site index (125 minus 89). Pecan was the least sensitive, losing 23 feet of site index.

VERSIONS OF SITEQUAL

Similarities and Differences

SITEQUAL was written in the BASIC computer language; unfortunately since a standardized version of BASIC does not exist, several versions of the program needed to be created so the program could be run on different types and models of computers (table 5).

Table 4.—Example of SITEQUAL output. Soil and site conditions in this example are the same as in table 3 except for example 2 it was assumed the site had been cultivated for 30 years. As a result of cultivation, a plow pan and moderate compaction developed and organic matter content was decreased.

SITEQUAL—Site Evaluation for 14 southern hardwoods.

Site ID Example 2

Input values for each soil site property.

Presense of pan	2		
Stratification	1		
Soil structure	1	Soil texture	2
Compaction	2	Present cover	3
Past use	5	Fertilization	2
Water table depth	4	Topographic position	1
Microsite	2	Flooding times	1
Geologic source	1	Organic matter	3
Topsoil depth	1	Soil age	1
pH	7	Swampiness	1
Mottling	1	Soil color	1

Species	Number of points and % of total possible by factor				Total SI
	Physical condition	Moisture avail.	Nutrient avail.	Aeration	
Cottonwood	31(67%)	35(76%)	11(42%)	12(100%)	89
Green Ash	13(62%)	34(72%)	14(54%)	10(100%)	71
Hackberry, Sugarberry	16(64%)	17(68%)	15(60%)	25(100%)	73
Cherrybark Oak	20(65%)	29(76%)	14(56%)	31(100%)	94
Nuttall Oak	14(58%)	24(57%)	16(53%)	24(100%)	78
Shumard Oak	20(65%)	23(72%)	18(62%)	30(100%)	91
Swamp Chestnut Oak	17(61%)	22(71%)	14(58%)	26(100%)	79
Water Oak, Willow Oak	19(66%)	25(74%)	13(57%)	29(100%)	86
Pecan	17(63%)	22(73%)	21(70%)	28(100%)	88
Sweetgum	20(67%)	27(75%)	14(58%)	30(100%)	91
Sycamore	20(63%)	11(55%)	25(64%)	39(100%)	95
Yellow Poplar	26(65%)	21(70%)	16(64%)	30(100%)	93

Table 5.—Summary of SITEQUAL versions

Language of version	Tested on these machines	Special comments
HP BASIC	Hewlett Packard 9845	When doing repeated, sets of site evaluations, user can press <CONT> key for values that do not change between sites.
AppleSoft™ BASIC	Apple IIc, IIe	Both 40-and 80-column versions are available.
MicroSoft™ BASIC	IBM-PC, North Star Advantage, Cromemco, Panasonic or Partner, Compaq D G Dasher One	North Star version reloads program for subsequent runs, other MicroSoft™ versions go to question asking for site ID.
BASIC-11	DEC-PDP-11/23	Program creates output file; user must send output file to printer.

All versions of the program give identical answers. We have only run the program on the computer models listed in the table; however, virtually any machine that runs MicroSoft™ BASIC should run the MicroSoft™ BASIC interpreted version of SITEQUAL without changes. Although the language version of the program may be the same for many machines, the user must make sure he or she uses the right type of diskette, data cartridge, or tape and that it has been correctly formatted for his or her system.

The AppleSoft™ BASIC and BASIC-11 versions of the program differ from the other two major versions in that they do not utilize any IF/THEN/ELSE statements, and variable names are limited to two characters (Appendix B). Other machines with similar requirements for their type of BASIC may be able to run one of these program versions with little or no modification.

All versions of SITEQUAL except the BASIC-11 version automatically route the program output to the printer port. If a "printer version" of the program is run on a machine which is not connected to a printer, the output phase of the program will result in an error message or will cause the machine to "freeze". If the user wishes to run the program but does not have access to a printer, all LPRINT statements in the program (for the printer) must be changed to PRINT statements (for the screen).

With the Hewlett Packard Interpreter all soil-site variable values and all question values are retained in memory. Thus, when evaluating more than one site, the values from the first evaluation can be input

for the second evaluation by pressing <CONT>. This allows the user to change the value of any variable that is different, but eliminates the need to re-input values that are the same as were used in the evaluation of the previous site. On most other systems each time a site is evaluated the program is loaded back in memory, a process which erases any soil-site variable values or question values that were used previously. The user must supply a new value for each question every time a new site is evaluated.

The AppleSoft™ version of SITEQUAL is available in both 40 column and 80 column subversions. The versions are almost identical except for formatting. However, if the 80 column version is run on a machine that does not contain an 80 column card, the program will be scrambled. After initially turning on the 80 column card, it is not necessary to repeat the process, as the program does it automatically after each site evaluation table is printed.

Availability

A program listing, program documentation, or copies of the SITEQUAL program may be obtained by contacting the authors at the Southern Forest Experiment Station, Box 3516, Monticello, AR 71655, 501-367-3464. Requests by mail should include a name, address, and phone number as well as a blank diskette, data cartridge, or tape which is compatible with the version being requested. If a MicroSoft™ BASIC version is desired, please indicate whether a compiled or an interpreted program is needed. An interpreted program can be changed by the user; however, in order to actually run an interpreted program, the user must have a BASIC interpreter software program that is compatible with the user's system. Compiled programs can be run without additional software but cannot be altered.

LITERATURE CITED

- Baker, J.B., Broadfoot, W.M. A practical field method of site evaluation for eight important southern hardwoods. Gen. Tech. Rep. SO-14. New Orleans, LA: U.S. Department of Agriculture, Forest Service, Southern Forest Experiment Station; 1977. 31 p.
- Baker, J.B., Broadfoot, W.M. A practical field method of site evaluation for commercially important southern hardwoods. Gen. Tech. Rep. SO-26. New Orleans, LA: U.S. Department of Agriculture, Forest Service, Southern Forest Experiment Station; 1979. 51 p.

APPENDIX A

Examples of Special Cases

The following two examples illustrate the footnotes that appear when the site quality rating is below the minimum acceptable value established for a species (example 3) or when a specific soil-site property makes the site unsuitable for a species (example 4).

Site ID Example 3

Species	Number of points and % of total possible by factor				Total SI
	Physical condition	Moisture avail.	Nutrient avail.	Aeration	
Cottonwood	11(24%)	7(15%)	26(100%)	11(92%)	55@
Green Ash	6(29%)	22(47%)	26(100%)	9(90%)	63@
Hackberry, Sugarberry	11(44%)	11(44%)	25(100%)	23(92%)	70
Cherrybark Oak	15(48%)	14(37%)	23(92%)	27(87%)	79
Nuttall Oak	9(38%)	19(45%)	28(93%)	22(92%)	78
Shumard Oak	15(48%)	15(47%)	27(93%)	26(87%)	83
Swamp Chestnut Oak	12(43%)	14(45%)	22(92%)	24(92%)	72
Water Oak, Willow Oak	14(48%)	13(38%)	21(91%)	27(93%)	75
Pecan	14(52%)	15(50%)	30(100%)	25(89%)	84
Sweetgum	15(50%)	12(33%)	24(100%)	26(87%)	77
Sycamore	9(28%)	1(5%)	39(100%)	36(92%)	85
Yellow Poplar	13(33%)	16(53%)	25(100%)	24(80%)	78

@Total SI is below minimum site index considered reasonable for planting or managing this species unless soil conditions can be improved.

Site ID Example 4

Species	Number of points and % of total possible by factor				Total SI
	Physical condition	Moisture avail.	Nutrient avail.	Aeration	
Cottonwood	22(48%)	40(87%)	17(65%)	11(92%)	90
Green Ash	14(67%)	42(89%)	18(69%)	9(90%)	83
Hackberry, Sugarberry	15(60%)	21(84%)	21(84%)	23(92%)	80
Cherrybark Oak	.....	.....	.....*	.....	Unsuitable
Nuttall Oak	.....	.....	.....*	.....	Unsuitable
Shumard Oak	.....	.....	.....*	.....	Unsuitable
Swamp Chestnut Oak	.....	.....	.....*	.....	Unsuitable
Water Oak, Willow Oak	.....	.....	.....*	.....	Unsuitable
Pecan	16(59%)	26(87%)	26(87%)	25(89%)	93
Sweetgum	21(70%)	31(86%)	19(79%)	30(100%)	101
Sycamore	19(59%)	15(75%)	30(77%)	36(92%)	100
Yellow Poplar	20(50%)	25(83%)	18(72%)	24(80%)	87

*Site is classified unsuitable for this species because pH is above 7.5.

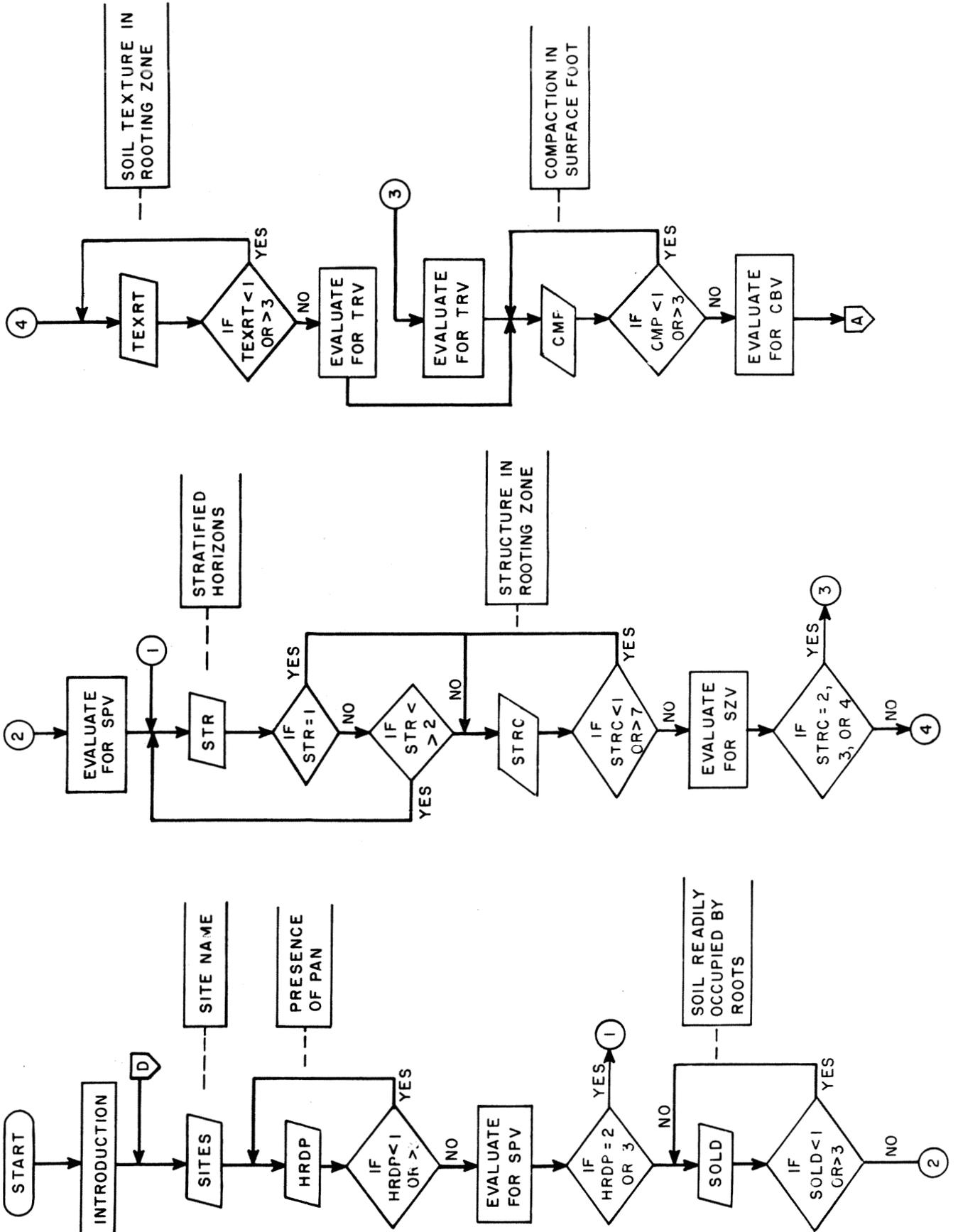
APPENDIX B

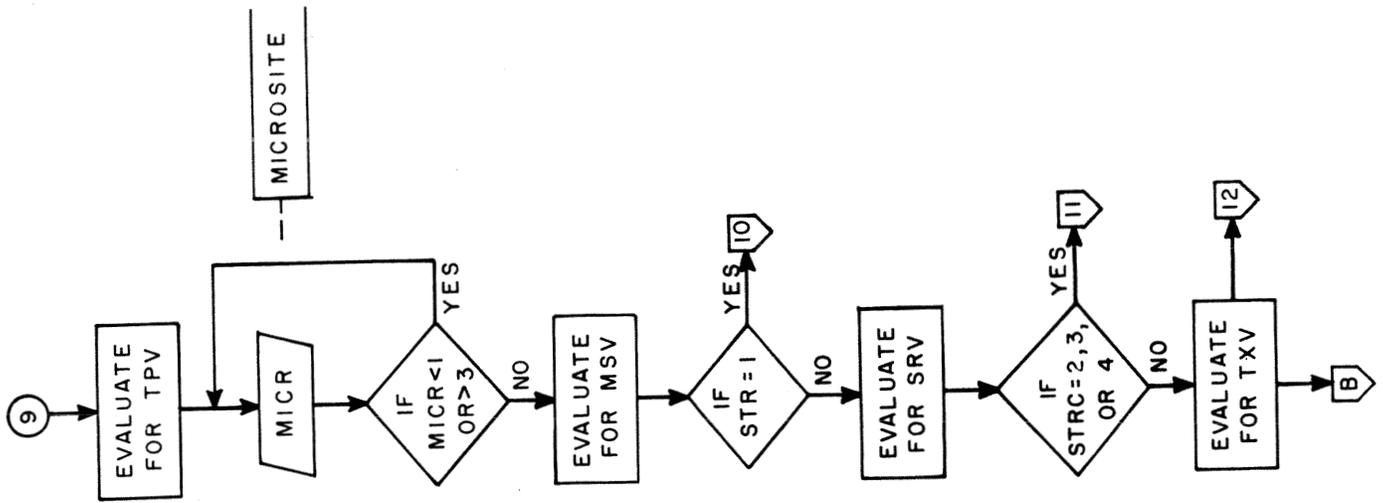
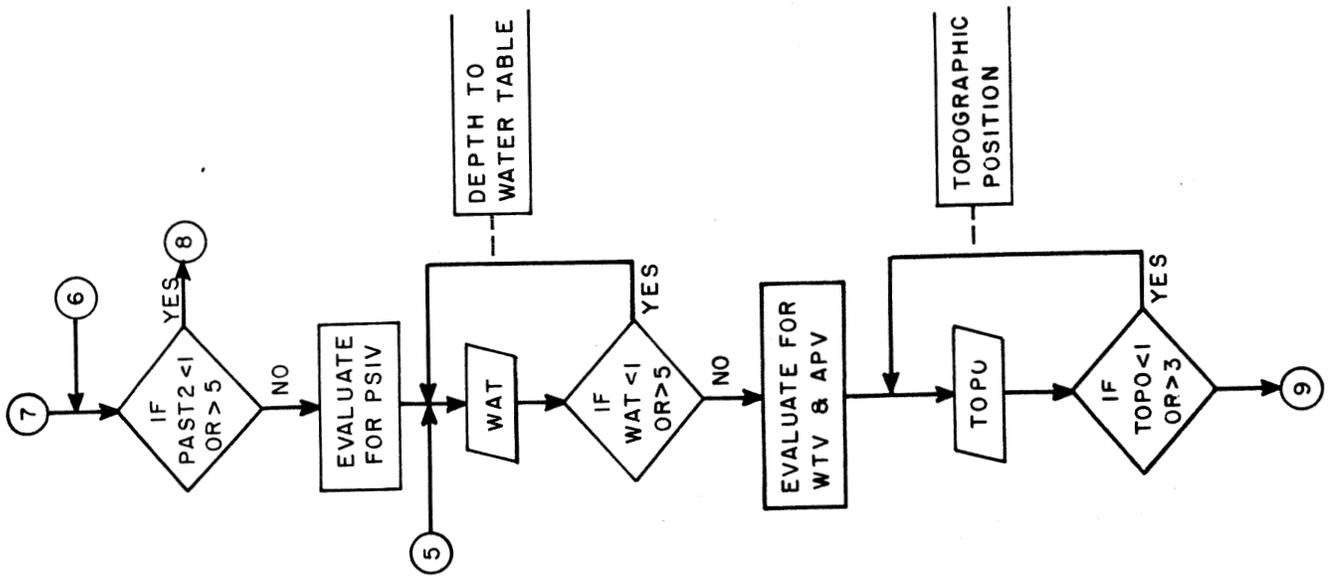
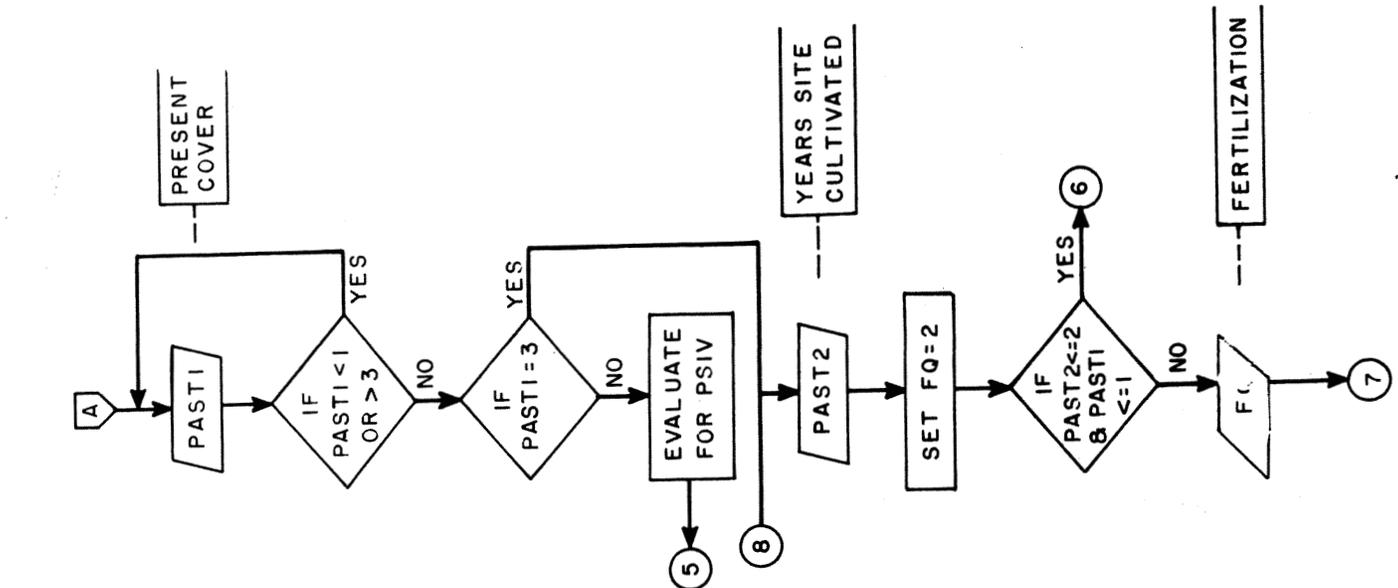
Soil-site and factor variable names by program version

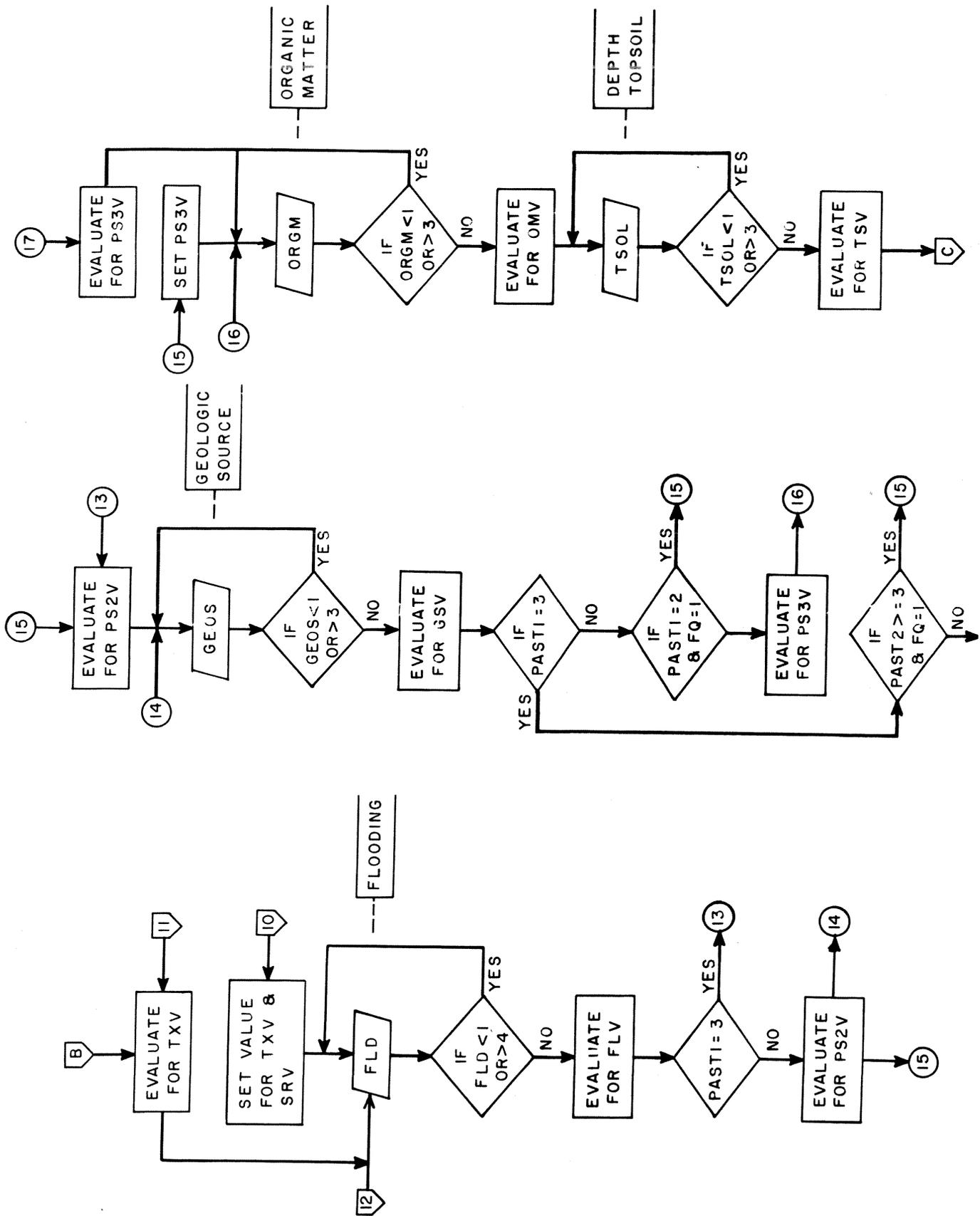
Soil-site variables		Conditions being quantified	Factor variables	
MicroSoft version	All other versions		MicroSoft version	All other versions
Factor 1. Physical condition				
HRDP	H1	Hardpan	SPV	S9
SOLD	S3	Soil Depth	SPV	S9
STRC	S5	Soil Structure	SZV	Z9
TEXRT	T1	Texture (Rooting Zone)	TRV	T9
CMP	C1	Compaction	CBV	C9
PAST1	P1	Present Cover	PS1V	P9
PAST2	P2	Cultivation	PS1V	P9
Factor 2. Moisture availability during the growing season				
WAT	W1	Water Table Depth	WTV	W9
HRDP	H1	Hardpan	APV	A9
TOPO	T2	Topographic Position	TPV	T8
MICR	M1	Microsite	MSV	M9
STRC	S5	Soil Structure	SRV	R9
STR	S4	Stratification	SRV	R9
TEXRT	T1	Texture (Rooting zone)	TXV	T7
FLD	F7	Flooding	FLV	F9
PAST1	P1	Present Cover	PS2V	P8
PAST2	P2	Cultivation	PS2V	P8
Factor 3. Nutrient availability				
GEOS	G1	Geologic Source	GSV	G9
PAST1	P1	Present Cover	PS3V	P6
PAST2	P2	Cultivation	PS3V	P6
FQ	F6	Fertilization	PS3V	P6
ORGM	O1	Organic Matter	OMV	O9
TSOL	T3	Topsoil	TSV	T6
SOLA	S1	Soil Age	SAV	A8
PH	P3	pH	PHV	P7
Factor 4. Aeration				
STRC	S5	Soil Structure	SZ2V	S8
SWP	S6	Swampiness	SWV	W8
MOTT	M2	Mottling	MTV	M8
SOLC	S2	Soil Color	SCV	C8

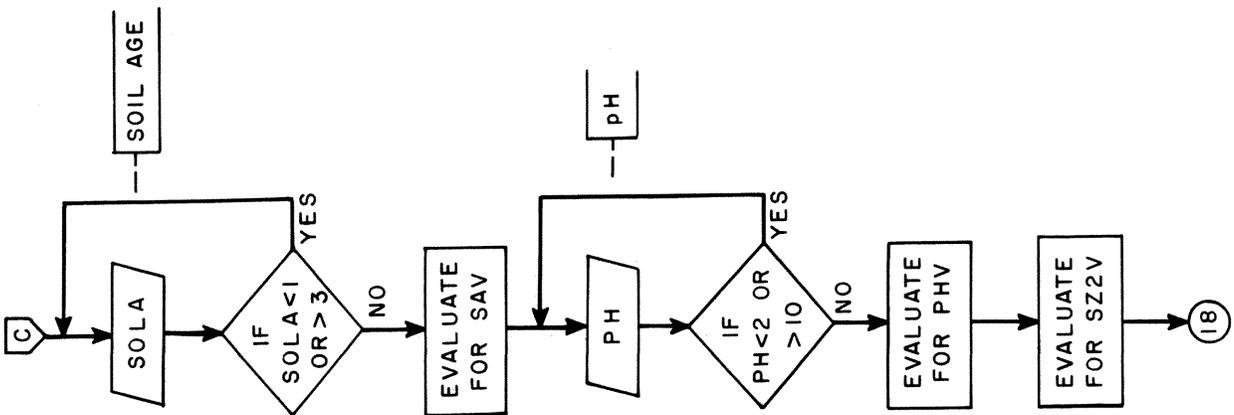
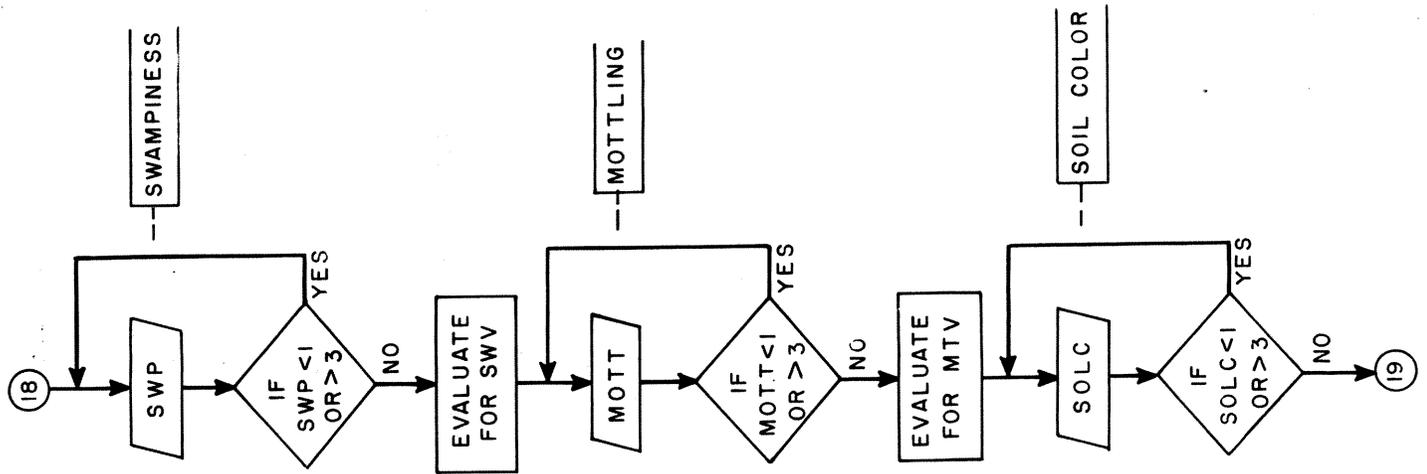
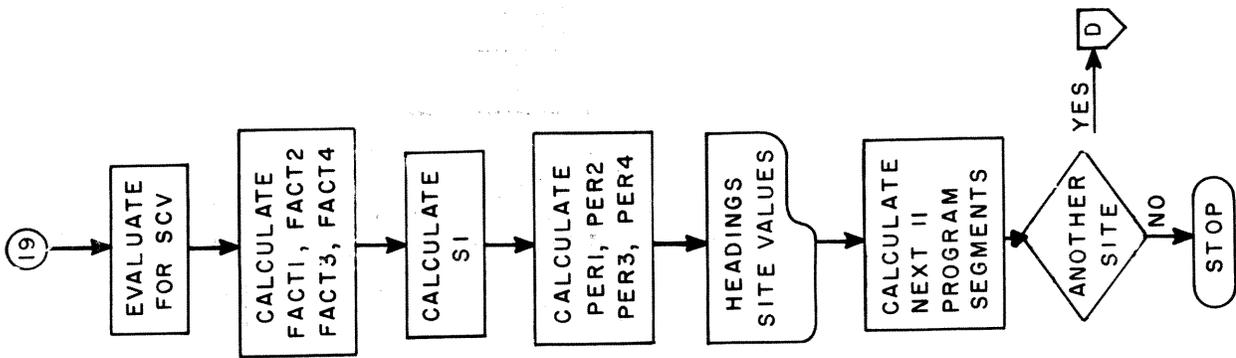
APPENDIX C

Flowchart of the SITEQUAL program









METRIC EQUIVALENTS

1 foot = 3.28 meters

1 inch = 2.54 centimeters

The use of trade or firm names in this publication is for reader information and does not imply endorsement by the U.S. Department of Agriculture of any product or service.

Harrington, Constance A., and Casson, Bettina M. SITE-QUAL—A user's guide. Computerized site evaluation for 14 southern hardwood species. Gen. Tech. Rep. SO-62. New Orleans, LA: U.S. Department of Agriculture, Forest Service, Southern Forest Experiment Station; 1986, 13 p.

SITEQUAL, an interactive computer program, evaluates site quality for 14 southern hardwood tree species. This report rapidly evaluates site conditions for all species or determines the relative sensitivity of these species to specific conditions, including past or proposed land use practices.

Additional keywords: Soil-site prediction, site index, site quality, computer programs/programming.