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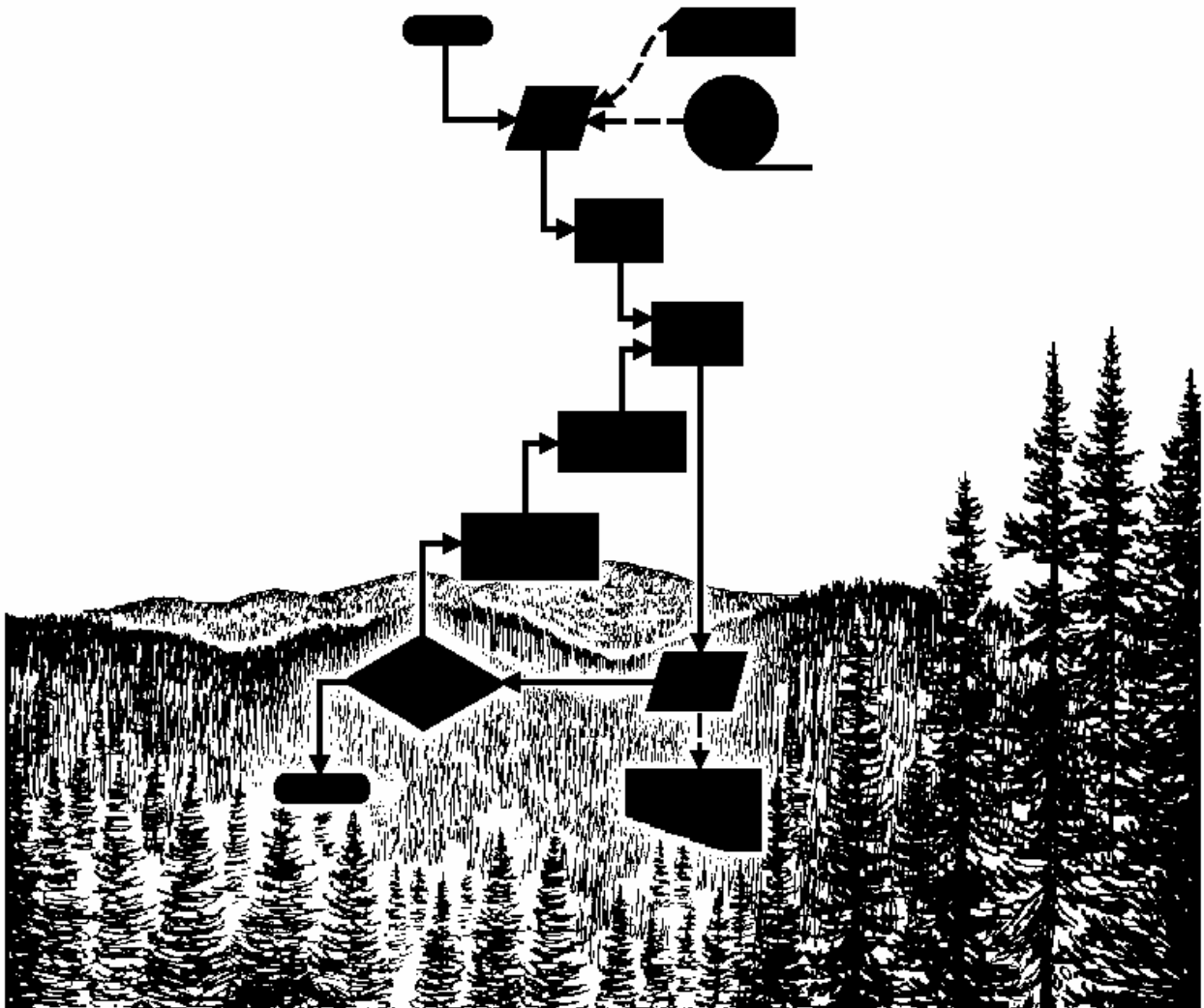
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# Keyword Reference Guide for the Forest Vegetation Simulator

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# Keyword Reference Guide for the Forest Vegetation Simulator

## CONTENTS

<b>Keyword Groups</b> .....	6
<b>Keyword Introduction</b> .....	8
<b>ADDFILE</b> .....(ADD a keyword FILE).....	11
<b>AGPLABEL</b> .....(Activity Group Policy LABEL) .....	11
<b>ALSOTRY</b> .....(ALSO TRY if-then activities) .....	12
<b>ATRTLST</b> .....(After TReatment Tree LIST file) .....	13
<b>BAIMULT</b> .....(Basal Area Increment MULTiplier).....	14
<b>BAMAX</b> .....(Basal Area MAXimum) .....	14
<b>BFDEFECT</b> .....(Board Foot DEFECT) .....	15
<b>BFFDLN</b> .....(Board Foot Form and Defect Log linear equation) .....	16
<b>BFVOLUMEQU</b> .....(Board Foot VOLume EQUation) .....	16
<b>BFVOLUME</b> .....(Board Foot VOLUME) .....	18
<b>BGCIN</b> .....(Bio-Geo-Chemical cycle model INitialization).....	19
<b>BMPPIN</b> .....(westwide pine Beetle Model for the Parallel Processor; INitialization)20	
<b>BRUST</b> .....(white pine Blister RUST model initialization) .....	20
<b>CALBSTAT</b> .....(CALiBratIon STATistics) .....	20
<b>CFVOLUMEQU</b> .....(Cubic Foot VOLume EQUation) .....	21
<b>CHEAPO</b> .....(Computer Help for the Economic Analysis of Prognosis Output) .....	22
<b>CLOSE</b> .....(CLOSE a file).....	22
<b>COMMENT</b> .....(insert COMMENTs).....	23
<b>COMPRESS</b> .....(COMPRESS the treelist).....	23
<b>COMPUTE</b> .....(COMPUTE variables).....	24
<b>COVER</b> .....(initialize COVER extension).....	25
<b>CRNMULT</b> .....(CRowN change MULTiplier) .....	25
<b>CRUZFILE</b> .....(Cruise file).....	26
<b>CUTEFF</b> .....(CUTting EFFiciency) .....	26
<b>CUTLIST</b> .....(CUT tree treeLIST) .....	27
<b>CWEQN</b> .....(Crown Width EQUation).....	28
<b>CYCLEAT</b> .....(CYCLE boundary occurs AT).....	28
<b>DATABASE</b> .....(DATABASE Initialization).....	28
<b>DATASCRN</b> .....(DATA SCReeN) .....	29
<b>DEBUG</b> .....(print DEBUG output).....	29
<b>DEFECT</b> .....(DEFECT) .....	29
<b>DELOTAB</b> .....(DELeTe Output TABles).....	30
<b>DESIGN</b> .....(sampling DESIGN) .....	31
<b>DFB</b> .....(Douglas-Fir Beetle model initialization).....	32
<b>DFTM</b> .....(Douglas-Fir Tussock Moth model initialization) .....	32
<b>DGSTDEV</b> .....(Diameter Growth STandard DEVIation).....	32
<b>ECHO</b> .....(ECHO) .....	33
<b>ECHOSUM</b> .....(ECHO the SUMmary table) .....	33
<b>END</b> .....(END special sequence).....	33
<b>ENDIF</b> .....(END an IF-then block).....	34
<b>ENDFILE</b> .....(END of FILE) .....	34
<b>ESTAB</b> .....(ESTABlishment model).....	34
<b>FERTILIZ</b> .....(FERTILIZe) .....	35

<b>FIXCW</b>	(FIXed Crown Width)	35
<b>FIXDG</b>	(FIXed Diameter Growth)	36
<b>FIXHTG</b>	(FIXed HeighT Growth)	37
<b>FIXMORT</b>	(FIXed MORTality)	37
<b>FMIN</b>	(Fire Model INitialization)	38
<b>FVSSTAND</b>	(FVS STAND tables)	39
<b>GROWTH</b>	(GROWTH measurement method)	39
<b>HTGMULT</b>	(HeighT Growth MULTiplier)	41
<b>HTGSTOP</b>	(HeighT Growth STOP)	41
<b>IF</b>	(begin IF-then block)	42
<b>INVYEAR</b>	(INVenTory YEAR)	43
<b>LOCATE</b>	(LOCATE the stand)	43
<b>MANAGED</b>	(MANAGED stand)	44
<b>MCDEFECT</b>	(Merchantable Cubic foot DEFECT)	44
<b>MCFDLN</b>	(Merchantable Cubic foot Form and Defect Log linear equation)	45
<b>MGMTID</b>	(ManaGeMenT IDENTification)	46
<b>MINHARV</b>	(MINimum HARVest)	46
<b>MISTOE</b>	(MISTleTOE model initialization)	47
<b>MODTYPE</b>	(MODEl TYPE)	47
<b>MORTMULT</b>	(MORTality MULTiplier)	49
<b>MPB</b>	(Mountain Pine Beetle model initialization)	50
<b>NOAUTOES</b>	(NO AUTOMatic ESTablishment)	50
<b>NOCALIB</b>	(NO CALIBRation scale factors)	50
<b>NODEBUG</b>	(NO DEBUG output)	51
<b>NOECHO</b>	(NO ECHO)	51
<b>NOHTDREG</b>	(NO HeighT-Diameter REGression)	51
<b>NOSCREEN</b>	(NO output to SCREEN)	52
<b>NOSUM</b>	(NO SUMmary table)	52
<b>NOTREES</b>	(NO TREE recordS)	52
<b>NOTRIPLE</b>	(NO tree record TRIPLE)	53
<b>NUMCYCLE</b>	(NUMber of CYCLEs)	53
<b>NUMTRIP</b>	(NUMber of times TRIPled)	53
<b>OPEN</b>	(OPEN a file)	54
<b>POINTREF</b>	(POINT REFerence)	55
<b>PROCESS</b>	(PROCESS the keywords)	55
<b>PRUNE</b>	(PRUNE trees)	55
<b>RANNSEED</b>	(RANdom Number SEED)	56
<b>RDIN</b>	(Root Disease model INitialization)	57
<b>READCORD</b>	(READjust CORrection for Diameter)	57
<b>READCORH</b>	(READjust CORrection for Height)	58
<b>READCORR</b>	(READjust CORrection for Regeneration)	58
<b>REGDMULT</b>	(REGeneration Diameter growth MULTiplier)	59
<b>REGHMULT</b>	(REGeneration Height growth MULTiplier)	59
<b>RESETAGE</b>	(RESET stand AGE)	60
<b>REUSCORD</b>	(REUSE CORrection for Diameter)	60
<b>REUSCORH</b>	(REUSE CORrection for Height)	60
<b>REUSCORR</b>	(REUSE CORrection for Regeneration)	60
<b>REWIND</b>	(REWIND an open file)	60
<b>SCREEN</b>	(output to SCREEN)	61
<b>SDIMAX</b>	(Stand Density Index MAXimum)	61
<b>SERLCORR</b>	(SERiaL CORRelation)	62
<b>SETPHIN</b>	(SETs Point THINning)	63
<b>SITECODE</b>	(SITE index CODE)	63
<b>SETSITE</b>	(SET SITE related parameters)	64
<b>SPCODES</b>	(SPECies CODES)	64
<b>SPECREF</b>	(SPECies removal PREFERence)	65

<b>SPGROUP</b>	(SPeCies GRoup)	66
<b>SPLABEL</b>	(Stand Policy LABEL)	67
<b>STANDCN</b>	(STAND Control Number)	68
<b>STATS</b>	(STATisticS)	68
<b>STDIDENT</b>	(STanD IDENTification)	69
<b>STDINFO</b>	(STanD INFOrmation)	69
<b>STOP</b>	(STOP processing)	71
<b>STRCLASS</b>	(STRuctural CLASS)	71
<b>SVS</b>	(Stand Visualization System input)	72
<b>SYSTEM</b>	(SYSTEM)	73
<b>TCONDMLT</b>	(Tree Condition MULTiplier)	73
<b>TFIXAREA</b>	(Total FIXEd plot AREA)	75
<b>THEN</b>	(schedule if-THEN activities)	75
<b>THINABA</b>	(THIN from Above to Basal Area target)	76
<b>THINATA</b>	(THIN from Above to Trees per Acre target)	77
<b>THINAUTO</b>	(THIN AUTOMatically)	79
<b>THINBBA</b>	(THIN from Below to Basal Area target)	79
<b>THINBTA</b>	(THIN from Below to Trees per Acre target)	81
<b>THINCC</b>	(THIN to Canopy Cover target)	82
<b>THINDBH</b>	(THIN from a DBH range)	83
<b>THINHT</b>	(THIN from a HeighT range)	85
<b>THINMIST</b>	(THIN trees with dwarf MISTletoe)	86
<b>THINPRSC</b>	(THIN by PReSCription)	87
<b>THINPT</b>	(THIN by Point)	87
<b>THINRDEN</b>	(THIN to Relative DENsity target)	89
<b>THINRDSL</b>	(THIN to Relative DENsity SiLvah target)	90
<b>THINSDI</b>	(THIN to Stand Density Index target)	92
<b>TIMEINT</b>	(TIME INTerval)	94
<b>TOPKILL</b>	(TOPKILL trees)	94
<b>TREEDATA</b>	(TREE DATA file)	95
<b>TREEFMT</b>	(TREE data ForMaT)	96
<b>TREELIST</b>	(TREELIST file)	98
<b>TREESZCP</b>	(TREE SiZe CaP)	98
<b>VOLEQNUM</b>	(VOLUME EQUation NUMber)	99
<b>VOLUME</b>	(cubic foot VOLUME)	100
<b>WSBW</b>	(Western Spruce BudWorm model initialization)	102
<b>YARDLOSS</b>	(YARDing LOSS)	102
<b>Appendix A: Species Codes by Variant</b>		103
<b>Appendix B: Default Site Index and Maximum Stand Density Index Values</b>		114
<b>Regeneration Establishment Model Keywords</b>		122
<b>AUTALLY</b>	(AUTomatic seedling TALLY)	123
<b>BUDWORM</b>	(spruce BUDWORM)	123
<b>BURNPREP</b>	(BURNing site PREParation)	123
<b>END</b>	(END of regeneration sequence)	124
<b>ESTAB</b>	(ESTABlishment model)	124
<b>EZCRUISE</b>	(Easy CRUISE)	125
<b>HABGROUP</b>	(HABitat type GROUPE)	125
<b>HTADJ</b>	(regeneration HeighT ADJustment)	126
<b>INGROW</b>	(INGROWth)	126
<b>MECHPREP</b>	(MECHanical site PREParation)	127
<b>MINPLOTS</b>	(MINimum number of PLOTS)	127
<b>NATURAL</b>	(NATURAL regeneration)	128
<b>NOAUTALY</b>	(NO AUTomatic seedling TALLY)	128
<b>NOINGROW</b>	(NO automatic INGROWth)	129
<b>NOSPROUT</b>	(NO stump or root SPROUTing)	129
<b>OUTPUT</b>	(OUTPUT tables)	129

<b>PASSALL</b> .....	(PASS ALL seedling records) .....	130
<b>PLANT</b> .....	(PLANT seedlings) .....	130
<b>PLOTINFO</b> .....	(PLOT INFOrmation) .....	131
<b>RANNSEED</b> .....	(RANdom Number SEED) .....	132
<b>RESETAGE</b> .....	(RESET stand AGE) .....	132
<b>SPECMULT</b> .....	(SPECies occurrence MULTiplier) .....	133
<b>SPROUT</b> .....	(stump or root SPROUTing) .....	133
<b>STOCKADJ</b> .....	(STOCKing ADJustment) .....	134
<b>TALLY</b> .....	(seedling TALLY) .....	134
<b>TALLYONE</b> .....	(seedling TALLY ONE) .....	135
<b>TALLYTWO</b> .....	(seedling TALLY TWO) .....	135
<b>THRSHOLD</b> .....	(automatic regeneration THReSHOLDS) .....	136

## Keyword Groups

### PROGRAM CONTROL

COMPRESS	NOAUTOES	NUMCYCLE	RANNSEED	STOP
CYCLEAT	NOTREES	NUMTRIP	RESETAGE	STRCLASS
DEBUG	NOTRIPLE	PROCESS	STATS	TIMEINT

### STAND AND TREE INFORMATION

COMMENT	INVYEAR	MODTYPE	SPCODES	TFIXAREA
DESIGN	LOCATE	SDIMAX	STDIDENT	TREEFMT
GROWTH	MGMTID	SITECODE	STDINFO	

### GROWTH AND MORTALITY MODIFIERS

BAIMULT	FIXDG	MANAGED	READCORH	REUSCORH
BAMAX	FIXHTG	MORTMULT	READCORR	REUSCORR
CRNMULT	FIXMORT	NOCALIB	REGDMULT	SDIMAX
CWEQN	HTGMULT	NOHTDREG	REGHMULT	SERLCORR
DGSTDEV	HTGSTOP	READCORD	REUSCORD	TOPKILL
FERTILIZ				

### THINNING KEYWORDS

CUTEFF	SPECREF	THINATA	THINBTA	THINPRSC
CUTLIST	TCONDMLT	THINAUTO	THINDBH	TOPKILL
MINHARV	THINABA	THINBBA	THINHT	THINSDI
POINTREF	THINRDEN	THINRDSL	THINPT	THINCC
PRUNE	SETPHIN	YARDLOSS		

### VOLUME CONTROLS

BFDEFECT	BFVOLEQU	CFVOLEQU	MCDEFECT	MINHARV
BFFDLN	BFVOLUME	DEFECT	MCFDLN	VOLEQNUM
VOLUME				

### INPUT/OUTPUT CONTROL KEYWORDS

ADDFILE	DATASCRN	MGMTID	SCREEN	TREEDATA
CALBSTAT	DEBUG	NODEBUG	SPCODES	TREELIST
CHEAPO	DELOTAB	NOSCREEN	STATS	
COMMENT	ECHO	NOSUM	STDIDENT	
CLOSE	ECHOSUM	NOTREES	STATS	
COMPUTE	ENDFILE	NOECHO	STRCLASS	
CUTLIST	FVSSTAND	OPEN	SVS	

### EXTENSIONS\*

AGPLABEL	CHEAPO	END	IF	RDIN
ALSOTRY	COMPUTE	ENDIF	MISTOE	SPLABEL
BGCIN	COVER	ESTAB	MPB	THEN
BMPPIN	DFB	FMIN	NOAUTOES	WSBW
BRUST	DFTM			

\* For CHEAPO II keywords refer to GTR-INT-211 (*User's Guide to CHEAPO II ...*)

For Event Monitor keywords refer to GTR-INT-275 (*User's Guide to the Event Monitor ...*)

For COVER keywords refer to GTR-INT-190 (*Cover: A User's Guide ...*)

ESTAB keywords are in a section at the end of this guide. For additional discussion refer to

GTR-INT-279 (*User's Guide to Version 2 of the Regeneration Establishment Model ...*)

For Fire Model keywords refer to *Reference Guide for Fire Model Keywords*

For insect and pathogen model keywords, refer to the keyword documentation for the model of interest.

## Keyword Introduction

Users communicate much of the information used by the Forest Vegetation Simulator (FVS) through the keyword system. This system consists of a set of mnemonic words (keywords) and associated data. A single keyword and its associated numeric data make up a keyword record.

## Keyword Records

A simulation file is comprised of a logical set of keyword records. The keyword always begins in the first column of the keyword record. Depending on the keyword, up to seven additional fields on the record may be used to transmit data. These fields are referred to as parameter fields and the data that they contain are used when the option is implemented. Each parameter field consists of 10 columns. If a decimal point is included in numeric data, the parameter may be entered anywhere within the field. If integer values or alphanumeric data are used, they must be right-justified. The first ten columns of the keyword record are reserved for the keyword name, therefore the first parameter field begins in column 11 (fig. 1)

	1	2	3	4	5	6	7	8
	.....0.....	.....0.....	.....0.....	.....0.....	.....0.....	.....0.....	.....0.....	.....0.....
DESIGN		0	1.0	999	5	0	16.	100
SITECODE		3	82					
THINBTA		2002	8.0	24.0	1.0	PP	50	0

Figure 1 — Example of a portion of a simulation file showing keyword records with keywords (columns 1 to 10) and up to 7 parameter fields (10-column fields beginning in column 11). The header with column designations is not part of the file and is included here only to help illustrate the format of the keyword records.

A simplifying feature of the keyword system is that default values exist for almost all program options. Keywords need only be used if the desired action differs from the default action. Similarly, most parameters associated with keywords have default values. If such a field is left blank, the default value will be used.

Many keywords contain a “year or cycle” parameter field. If the value entered in this field is in the range 0-40 it is interpreted as a cycle number. If the value entered is 1000 or greater it is interpreted as a year. No other values are legal for this type of parameter field unless otherwise noted.

Many keywords contain a “species” parameter field. Values entered in this field may be numeric or alpha codes. A numeric entry is interpreted as the species sequence number from the FVS variant that is being used. Alpha entries are interpreted as the alpha species code from the FVS variant that is being used. Refer to Appendix A for a list of species sequence numbers and species alpha codes.

## Supplemental Records

The final element of the keyword system is the supplemental data record. These records are required when the information needed does not fit the parameter field format. Supplemental data records are a maximum of 80 characters and occupy the records immediately following the keyword record. The exact format of the supplemental data records is dependent on the keyword selected, and will be described in the keyword description for the keywords that require them (fig. 2).



```

COMMENT
Supplemental records are at most 80 characters wide and begin on the record
that follows the keyword record. Syntax is unique to the keyword.
END
STDIDENT
0470003 Stand 002047.0003 at Clear Creek

```

Figure 2 — Example of a portion of a simulation file showing keywords with associated supplemental data records.

## PARMS Format

Many of the “activity” keyword records may be coded using the PARMs format. This is a special form of the keyword record. It is equivalent to the standard form of the keyword record, but it allows expressions in place of constant parameters. See the individual keyword descriptions to determine whether a particular keyword may use the PARMs format.

When using the PARMs format for a keyword record, the keyword is coded in the first eight columns, and the year/cycle (field 1) is coded right justified in column 20 as is done when this feature is not used. The remainder of the record is coded

PARMS (parameter<sub>2</sub>, parameter<sub>3</sub>, parameter<sub>4</sub>, ... , parameter<sub>n</sub>)

where the word PARMs begins somewhere in columns 21 through 30. Each “parameter<sub>n</sub>” corresponds to the n<sup>th</sup> field of the keyword. Its value is represented by an expression that uses constants, variables (Event Monitor pre-defined or user-defined), and/or Event Monitor functions. Refer to GTR INT-275, *User’s Guide to the Event Monitor: Part of Prognosis Model Version 6* for a discussion of legal uses of variables, operators, and functions. If the keyword record is long, an ampersand (&) is used to continue the record on the following line. Figure 3 shows several keyword records that use the PARMs format.

	1	2	3	4	5	6	7	8
	.....0.....	.....0.....	.....0.....	.....0.....	.....0.....	.....0.....	.....0.....	.....0.....
THINDBH	2010		PARMS(10.0, 999.0, 1.0, 0.0, 0.0, 0.0)					
THINDBH	2010	10.0	999.0	1.0	0.0	0.0	0.0	0.0
THINBTA	2020		PARMS(BTPA-SPMCDBH(1,0,3), 1.0, 0.0, 999.0, 0.0, 999.0)					

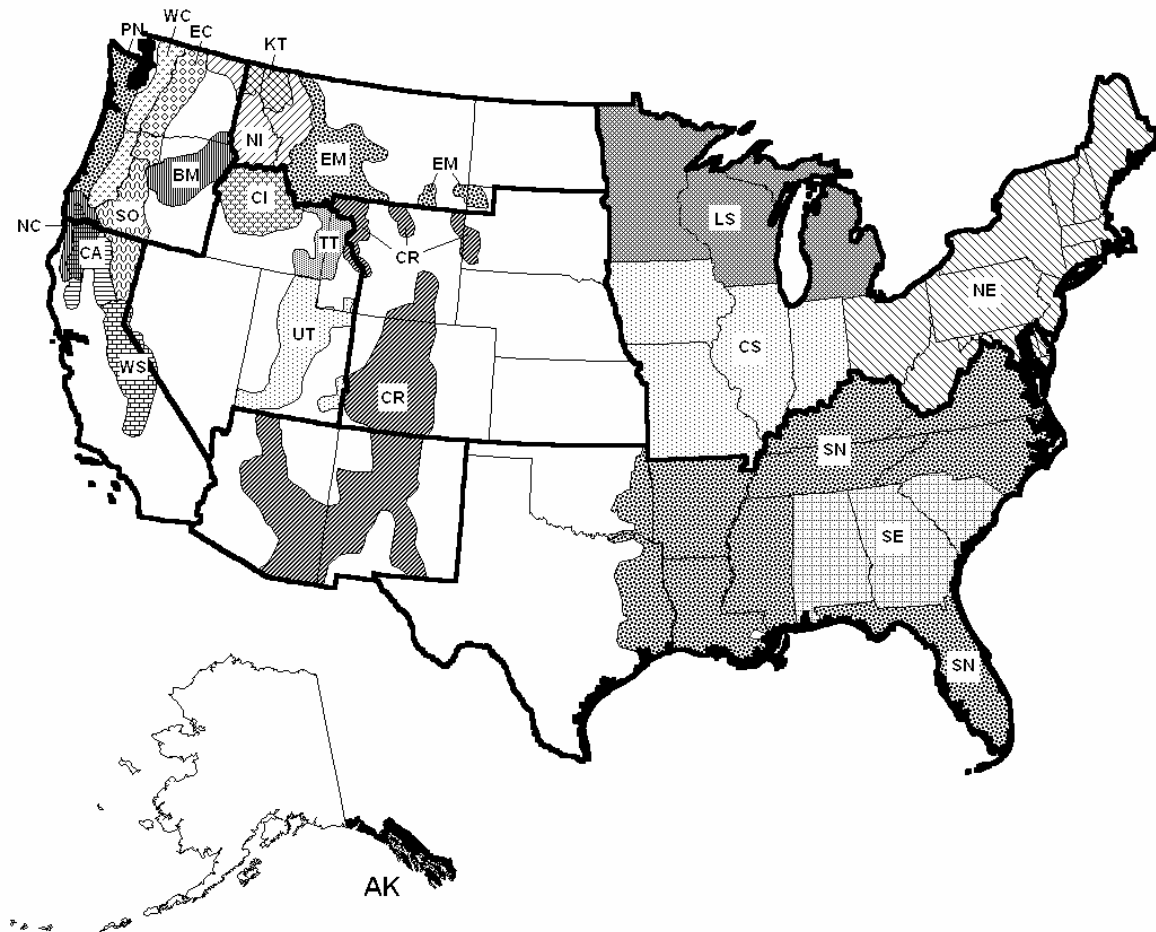
Figure 3 — Example of keyword records using the PARMs format. The two THINDBH keyword records are equivalent. For the THINBTA keyword the residual stand density (field 2) is calculated using a pre-defined variable (BTPA) and an Event Monitor function (SPMCDBH).

When using the PARMs format, supply all of the parameters used by the keyword. Defaults are not used when parameters are left blank. Ensure that all parameter values are within legal limits as FVS does not check for legal values when the PARMs format is used. Also ensure that variables are defined when the activity is called. If the PARMs function references a variable that is not defined when the activity is called, the activity is canceled.

## Geographic Variants

The different versions of the FVS model have been calibrated to specific geographic areas, and are referred to as “variants” (fig. 4). Each variant is actually a stand-alone application that contains growth parameters and other parameters based on data collected in the geographic area represented. The Central Rockies (CR) variant is unique in that it is comprised of submodels based on major forest type, each of which contains its own set of parameters. Individual variants may have a different subset of legal keywords, and may use different species codes than other

variants. Refer to individual keyword descriptions for a list of the variants for which use of the keyword is valid. Refer to Appendix A for a list of the valid species codes for each variant.



- |    |   |    |   |
|----|---|----|---|
| AK | Southeast Alaska, Coastal BC (SEAPROG)  | NE | Northeast                               |
| BM | Blue Mountains                          | NI | Northern Idaho (Inland Empire)          |
| CA | Inland CA, Southern Cascades (ICASCA)   | PN | Pacific Northwest Coast                 |
| CI | Central Idaho                           | SE | Southeast                               |
| CR | Central Rockies*                        | SN | Southern                                |
| CS | Central States                          | SO | South Central OR, Northeast CA (SORNEC) |
| EC | Eastside Cascades                       | TT | Tetons                                  |
| EM | Eastern Montana                         | UT | Utah                                    |
| KT | Kootenai/Kaniksu/Tally Lake (KOOKANTL)  | WC | Westside Cascades                       |
| LS | Lake States                             | WS | Westside Sierra Nevada (WESSIN)         |
| NC | Northern California (Klamath Mountains) |    |   |

\*Central Rockies Submodels:

- |    |                            |    |                |
|----|----------------------------|----|----------------|
| SW | Southwest mixed conifers   | SF | Spruce-fir     |
| SP | Southwest ponderosa pine   | LP | Lodgepole pine |
| BP | Black Hills ponderosa pine |    |                |

Figure 4 — Map of the geographic variants of the Forest Vegetation Simulator.

## **ADDFILE** (ADD a keyword FILE)

Variants: All

Related keywords: OPEN, CLOSE

Permits the adding of external keyword files to the simulation file. When FVS encounters an ADDFILE keyword in a keyword file it opens the auxiliary keyword file (see OPEN keyword) and reads in the keywords from that file. It then reads in the remaining keywords from the original file. Any number of ADDFILE requests can be included in a single simulation file (however, each must be preceded by an OPEN keyword and followed by a CLOSE keyword).

field 1: File reference number for the auxiliary keyword file (also known as an addfile). File reference numbers are a mechanism that FVS uses to keep track of external files. Numbers less than 30 are reserved for files that are currently used by FVS.

Note: Any number of ADDFILE keywords can be requested in a simulation file, however each ADDFILE keyword must be preceded by a corresponding OPEN keyword with the same file reference number.

Note: The ADDFILE and OPEN keyword combination require that the auxiliary keyword file (or addfile) be read every time the simulation is run. This differs from using the “Insert From File” feature of the Suppose interface program. The Suppose program actually embeds the keywords from the auxiliary file into the current simulation file. Changing the auxiliary keyword file after it has been embedded into the current simulation file has no effect on the current simulation file. When using ADDFILE and OPEN keywords, changing the auxiliary file will cause a change in the simulation when it is run again.

Caution: ADDFILE should not be used within the auxiliary keyword file.

Example:

```
OPEN           40
EXTRA.KEY
ADDFILE        40
CLOSE          40
```

Reference: Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 4.2.4

## **AGPLABEL** (Activity Group Policy LABEL)

Variants: All

Related keywords: SPLABEL, ALSOTRY, IF, THEN, ENDIF

Specifies a subset of stand policy labels (refer to the SPLABEL keyword description) that are to be used to selectively schedule conditional activities. Only stands having at least one of the specified labels in their stand policy label set will be considered for the conditional activities. This capability is useful only when multiple stands are included in a simulation, or when an addfile is to be applied differently to different stands. For example, three stands are to be managed. The first has the stand policy label *PineType*, the second has *PineType* and *Overstocked*, and third has *Overstocked*. AGPLABEL may be used to conditionally schedule a thinning that is to be applied only to stands with the label *Overstocked*. Only the second and third stands will be considered since these are the only stands with the label *Overstocked*. If AGPLABEL is used to conditionally schedule a second activity that to be applied only to stands with the label *PineType* only the first and second stands will be considered.

The AGPLABEL keyword record must follow the THEN keyword or ALSOTRY keyword to which it applies, and must precede the corresponding ENDIF keyword. If the specified condition is true for a stand and at least one of its stand policy labels matches one of the activity group

policy labels specified, the activities following the THEN or ALSOTRY keyword will be scheduled. If either the condition is not true or there is no match in policy labels for the stand, then the activities will not be scheduled.

Refer to the description for the SPLABEL keyword for an explanation and example of how to specify the stand policy labels. Refer to the description for the ALSOTRY keyword for an explanation and example of its use.

No fields are associated with this keyword. Labels are entered on a supplemental record.

Supplemental record:

Specifies the activity group policy labels. These are a subset of the stand policy labels for all the stands in the simulation. Labels are separated by a single comma. The total number of characters in the label set may not exceed 100. An ampersand (&) is used to indicate that the list of labels is continued on the next line. Any character may be used as part of a label except a comma, period, or ampersand.

Example: If the basal area exceeds 150 square feet per acre and the stand has the stand policy label *PineType*, then thin from below to 100 square feet per acre.

```

IF          0
BBA GT 150
THEN
AGPLABEL
PineType
THINBBA    0      100      1.0      0.0      999.0      0      999
ENDIF

```

Note: If no AGPLABEL keyword record is included after a THEN keyword, the default activity group policy label set is used. This default set is the union of all stand policy labels for all stands, so the activities will be scheduled in any stand in which the condition is true. A warning will appear in the main FVS output file stating that no activity group policy labels were specified.

References: GTR INT-275, User's Guide to the Event Monitor..., p. 7  
 GTR INT-281, User's Guide to the Parallel Processing Extension..., p. 9  
 Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.6.1

## ALSOTRY (ALSO TRY if-then activities)

Variants: All

Related keywords: SPLABEL, AGPLABEL, IF, THEN, ENDIF

Specifies an alternative set of activities that are to be conditionally scheduled when a condition is true, but the activity group policy label set (refer to the AGPLABEL keyword description) of the THEN block excluded some stands. Only stands that had none of the labels specified in the AGPLABEL keyword record in the THEN block, but have at least one label in common with the AGPLABEL keyword record following the ALSOTRY keyword will be considered for the conditional activities that also follow the ALSOTRY keyword. This capability is useful only when multiple stands are included in a simulation.

As an example, assume three stands are to be managed. The first has the stand policy label *PineType*, the second has *PineType* and *Overstocked*, and third has *Overstocked*. An AGPLABEL keyword record is included after the THEN keyword to restrict a thinning to only those stands with the stand policy label *Overstocked*. The second and third stands are considered. An ALSOTRY keyword follows the THEN block, and contains an AGPLABEL keyword record to

include stands with the stand policy label *PineType*. Only the first stand is considered. Even though the second stand also has the *PineType* label it was considered in the THEN block, and is therefore not available for consideration in the ALSOTRY block.

The ALSOTRY keyword and its associated AGPLABEL keyword record and activities must follow the THEN keyword and its AGPLABEL and activities. The ALSOTRY block must precede the corresponding ENDIF keyword.

Refer to the description for the SPLABEL and AGPLABEL keywords for explanations and examples of the use of policy labels.

No fields are associated with this keyword when used outside of the parallel processing extension.

Example: If the basal area exceeds 150 square feet per acre then, and only then, consider the following options. If the stand has the stand policy label *PineType*, then thin from below to 100 square feet per acre. If the stand does not have the label *PineType* but does have the label *Overstocked*, then thin from above to 95 square feet per acre.

```

IF          0
BBA GT 150
THEN
AGPLABEL
PineType
THINBBA    0      100      1.0      0.0      999.0      0      999
ALSOTRY
AGPLABEL
Overstocked
THINABA    0      95      1.0      0.0      999.0      0      999
ENDIF

```

Note: When ALSOTRY is used without the parallel processing extension (PPE) the activity group policy labels on its AGPLABEL keyword record cannot overlap those on the AGPLABEL keyword record in the THEN block.

References: GTR INT-275, User's Guide to the Event Monitor..., p. 7  
 GTR INT-281, User's Guide to the Parallel Processing Extension..., p. 9

## ATRTLST (After Treatment Tree LIST file)

Variants: All

Related keywords: TREELIST, CUTLIST

Generates an after treatment tree list file.

field 1: Year or cycle in which treelist is to be printed. Enter 0 (zero) to print output for every cycle. *Default = 1*

field 2: File reference number for the output file. File reference numbers are a mechanism that FVS uses to keep track of external files. Numbers less than 30 are reserved for files that are currently used by FVS. *Default = 3*

field 3: Value to determine which header will be printed with the treelist. *Default = 0*

1	Encoded header record (machine readable, -999)
0	Header records describing each column (human readable)
-1	Suppress all headers

Note: By default, the output file name will have a *.tls* extension.

## BAIMULT

(Basal Area Increment MULTiplier)

Variants: All

Related keywords: BAMAX, NOCALIB, CALBSTAT, READCORD, REGDMULT, FERTILIZ

Multiplier to change the large tree basal area increment prediction. This modifies the diameter growth rate of trees in the large tree model. The diameter break that separates the large and small tree models varies by variant (Refer to the variant overview).

field 1: Year or cycle in which the multiplier is applied. Once in effect it remains in effect until replaced by a subsequent multiplier. *Default = 0 (All cycles)*

field 2: Species code to which the multiplier is applied. *Default = All*

field 3: Multiplier value. (e.g. a value of 1.1 will increase the predicted basal area growth by 10%) *Default = 1.0 (no change from predicted value)*

Note: For any particular species this keyword remains in effect until a subsequent use of the keyword changes the multiplier for that species.

Note: The multiplier value itself remains constant over time, however this multiplier is applied after the scale factors have been applied. Scale factors may attenuate over time, therefore the modified basal area increment may also attenuate over time.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Caution: Many of the predictions in FVS are based on basal area increment. Changing the large tree basal area increment prediction also changes many of the other predictions made in the model.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 94  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.4

## BAMAX

(Basal Area MAXimum)

Variants: All

Related keywords: BAIMULT, SDIMAX

Modifies the maximum density and the associated mortality pattern for the stand. In the CI variant, crown ratio change is also affected. In all variants other than CI, EM, KT, and NI, BAMAX is used indirectly to set species SDI maximums if the SDIMAX keyword has not been used for that purpose.

field 1: Maximum basal area (square feet) per acre.

*Defaults by variant:* CI = 220  
NI, KT = 310<sup>a</sup>  
EM = 500  
All others = 0

<sup>a</sup>BA maximums for NI and KT are assigned by habitat type. 310 is the default for habitat type 260.

Habitat Code	BAMax	Habitat Code	BAMax
130	140	550	500
170	220	570	390

250	250	610	390
260	310	620	440
280	240	640	180
290	270	660	290
310	310	670	400
320	310	680	350
330	200	690	390
420	310	710	260
470	290	730	220
510	330	830	220
520	380	850	160
530	440	999	300

Caution: Use of this keyword can drastically change predicted yields.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.4

## **BFDEFECT** (Board Foot DEFECT)

Variants: All

Related keywords: MCDEFECT, DEFECT, BFVOLUME, BFFDLN

Specifies species-specific defect corrections for volume estimates. In the western half of the US this keyword specifies the board foot defect. (Cubic foot defect is specified using the MCDEFECT keyword.) In the eastern half of the US this keyword specifies both the board foot and cubic foot defect for the sawlog portion of trees. (Defect for the pulpwood is specified using the MCDEFECT keyword.) Defect percentages are specified by species for the following five dbh's: 5, 10, 15, 20, 25 inches. For example, if the expected defect correction for a five-inch tree is 35 percent, a value of .35 would be entered in the keyword field 3. A linear interpolation function calculates the defect percentage for the specified dbh of the tree. For trees smaller than 5 inches dbh or greater than 25 inches dbh, a constant value for defect correction is applied based on the values in fields 3 and 7 respectively.

field 1: Year or cycle in which the defect corrections are to take effect. Once in effect it remains in effect until replaced by a subsequent multiplier.  
*Default = 0 (all cycles)*

field 2: Species code that will be affected by the defect corrections.  
*Default = All*

field 3: Proportion of board foot volume defect for a 5-inch tree. All trees less than 5 inches dbh will be assigned this value. *Range: 0.0 - 1.0, Default = 0.0*

field 4: Proportion of board foot volume defect for a 10-inch tree.  
*Range: 0.0 - 1.0, Default = 0.0*

field 5: Proportion of board foot volume defect for a 15-inch tree.  
*Range: 0.0 - 1.0, Default = 0.0*

field 6: Proportion of board foot volume defect for a 20-inch tree.  
*Range: 0.0 - 1.0, Default = 0.0*

field 7: Proportion of board foot volume defect for a 25-inch tree. All trees greater than 25 inches dbh will be assigned this value. *Range: 0.0 - 1.0, Default = 0.0*

- Note: For any particular species this keyword remains in effect until a subsequent use of the keyword changes the multiplier for that species.
- Note: If used inside an IF-THEN-ENDIF sequence, BFDEFECT will not affect cycle 0 volumes.
- Note: The PARMs format may be used with this keyword. In the PARMs format, however, 0 (zero) may not be used in the year/cycle field, and hence the defect will not affect cycle 0 volumes. See the introduction for a description of this format.
- Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.3.3

**BFFDLN** (Board Foot Form and Defect Log linear equation)

Variants: All

Related keywords: MCFDLN, BFDEFECT, BFVOLUMEQU, BFVOLUME

Sets species specific parameters for a log-linear form and defect correction equation for volume estimates. In the western half of the US this affects the calculation of board foot volume. (MCFDLN affects calculation of merchantable cubic foot volume.) In the eastern half of the US this affects the calculation of board foot and cubic foot volumes for the sawlog portion of the trees. (BFFDLN affects calculation of pulpwood volumes.)

$$\ln(V_s) = a_0 + a_1 \ln(V_0)$$

where  $V_s$  = volume corrected for form and defect  
 $V_0$  = uncorrected volume  
 $a_0$  = intercept (field 2 value)  
 $a_1$  = slope coefficient (field 3 value)

field 1: Species code whose equation is to be changed. *Default = All*

field 2: Intercept term for log-linear equation ( $a_0$ ). *Default = 0*

field 3: Slope coefficient for log-linear equation ( $a_1$ ). *Default = 1*

- References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 24  
 Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.3.3

**BFVOLUMEQU** (Board Foot VOLume EQUation)

Variants: All

Related keywords: CFVOLUMEQU, BFVOLUME, BFDEFECT, BFFDLN

Sets species specific parameters for the board foot volume equation. This keyword is only recognized if the BFVOLUME keyword is used and field 7 of the BFVOLUME keyword has a value of 2 or 7.

$$V = b_0 + b_1D + b_2DH + b_3D^2H + b_4D^{b_5}H^{b_6}$$

where  $V$  = board foot volume  
 $D$  = tree diameter at breast height (dbh)  
 $H$  = tree height



- field 1: Species code whose equation is to be changed. *Default = All*
- field 2: Transition size code. *Default = 0*  
0 indicates that field 3 is based on DBH  
1 indicates that field 3 is based on DBH<sup>2</sup>H
- field 3: Transition size. If DBH (or DBH<sup>2</sup>H, based on the value in field 2) for a particular tree is less than this value, coefficients from the first supplemental record are used in the calculations. If greater than this value, coefficients from the second supplemental record are used.  
*Default = 20.5 (For PN and WC: default = 0.0)*

Supplemental Records:

Small-tree coefficients  $b_0$  to  $b_6$  are entered in the first seven 10-column fields of the first supplemental record. Large-tree coefficients  $b_0$  to  $b_6$  are entered in the first seven 10-column fields of the second supplemental record.

Note: This keyword is only recognized if the BFVOLUME keyword is used and field 7 of the BFVOLUME keyword has a value of 2 or 7.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.3.2

**BFVOLUME** (Board Foot VOLUME)

Variants: All

Related keywords: VOLUME, BFDEFECT, BFVOLEQU, BFFDLN

In the western half of the US, this keyword sets the merchantability limits for board foot volume calculation. In the eastern half of the US, this keyword sets the merchantability limits for sawlog volume calculation for both cubic foot and board foot volumes. (The merchantability limits for the pulpwood portion of sawlog trees can be set with the VOLUME keyword.)

field 1: Year or cycle number in which merchantability limits are to take effect. Once in effect they remain in effect until replaced by subsequent limits.  
*Default = 0 (all cycles)*

field 2: Species code for which the limits are to be changed. *Default = All*

field 3: Minimum merchantable DBH in inches.

*Defaults by variant:*

<i>BM, EC, EM, NI, KT, PN, WC</i>	<i>7.0 (lodgepole pine: 6.0)</i>
<i>CA</i>	<i>7.0 (knobcone pine: 6.0)</i>
<i>CI, TT, UT</i>	<i>8.0 (lodgepole pine: 7.0)</i>
<i>AK</i>	<i>9.0 (sitka spruce: 8.0)</i>
<i>NC, SO</i>	<i>9.0</i>
<i>WS</i>	<i>10.0</i>
<i>CS, LS, NE</i>	<i>hardwoods: 11.0, softwoods: 9.0</i>
	<i>Except on these forests</i>
	<i>Mark Twain:   hardwood: 9.0</i>
	<i>                  softwood: 9.0</i>
	<i>Ottawa:       hardwood: 11.0</i>
	<i>                  softwood: 9.0</i>
	<i>                  aspen: 9.0</i>
	<i>Chippewa:     hardwood: 9.0</i>
	<i>                  softwood: 7.0</i>
	<i>                  aspen: 11.0</i>
<i>SE, SN</i>	<i>hardwoods: 12.0, softwoods: 10.0</i>
<i>CR</i>	<i>region 3: 9.0, region 2: 7.0,</i>
	<i>Black Hills: 8.0</i>

field 4: Minimum top diameter (inside bark (DIB) in the eastern US, outside bark (DOB) in the western US).

*Defaults by variant:*

<i>BM, CA, EC, EM, KT, NI, PN, WC</i>	<i>4.5</i>
<i>AK, CI, CR, NC, SO, TT, UT, WS</i>	<i>6.0</i>
<i>SE, SN</i>	<i>hardwoods: 9.0, softwoods: 7.0</i>
	<i>(This value is fixed in SE and SN.</i>
	<i>Changing it will cause reported</i>
	<i>board foot volumes to be zero.)</i>

CS, LS, NE

hardwoods: 9.6, softwoods: 7.6  
(This value is fixed in CS, LS, NE.  
Changing it will cause no change  
in reported board foot volumes.)

field 5: Stump height in feet. *Default = 1.0*

field 6: Form class (used only in Region 6). Eastside: This is the diameter inside bark at a height of 17.3 feet as a percentage of outside-bark DBH. Westside: This is the diameter inside bark at a height of 33.6 feet as a percentage of outside-bark DBH. *Default = 80 (Defaults vary by forest, species and diameter class)*

field 7: Volume calculation method. *Default = 6*

- 1 Kemp equations with Allen adjustments.
- 2 Kemp equations with Allen adjustments and Brickell small tree and variable top adjustments, or user defined equation if BFVOLUME keyword is used.
- 3 Region 6 Eastside taper equations.
- 4 Region 6 Westside taper equations.
- 5 Western Sierra log rules.
- 6 National Volume Estimator Library equations (Scribner).
- 7 User defined equation using the BFVOLUME keyword.
- 8 Other volume equations:
  - AK Bruce and Demars (old FVS) equations.
  - CR Hann and Bare equations (region 2 forests use coefficients from the Cibola NF).
  - CS, LS, NE TWIGS volume equations.
  - NC, WS Western Sierra log rules.
- 9 International 1/4-inch equations (western variants only).

Note: For any particular species this keyword remains in effect until a subsequent use of the keyword changes the limits for that species.

Note: Form class for a species is the same regardless of whether cubic foot or board foot volume is being calculated. If both BFVOLUME and VOLUME are specified, the form class (field 6) used for both will be that specified on the keyword entered last.

Caution: If date or cycle are specified (i.e. the date/cycle is not blank and it is not zero) and the species field is either ALL or a species group, then you should be sure to specify all of the remaining parameters. If you do not specify all of the remaining parameters, then the default parameters for the other fields are the default parameters for species 1 (if ALL is selected) or species group 1 (species group is selected).

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 22  
GTR INT-208, Supplement to the User's Guide..., p. 18  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.3.1

## BGCIN

(Bio-Geo-Chemical cycle model Initialization)

Variants: Specialized variants that include the bio-geo-chemical cycle model

Related keywords: END

Signifies the beginning of keywords for the bio-geo-chemical cycle extension. This extension has its own unique set of keywords. The BGCIN keyword sequence must be terminated with an END

keyword. All keywords between BGCIN and END are considered bio-geo-chemical cycle extension keywords.

No fields are associated with this keyword.

Caution: At the time of the printing of this document, the BGC extension was experimental in nature, and the procedures were still under development. It had not yet been sanctioned for production use.

References: FVS-BGC: User's Guide to Version 1.0  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 8.9

## **BMPPIN**

(westwide pine Beetle Model for the Parallel Processor; Initialization)

Variants: Specialized parallel processor variants that include the westwide beetle model

Related keywords: END

Signifies the beginning of keywords for the westwide pine beetle model extension. This extension has its own unique set of keywords. The BMPPIN keyword sequence must be terminated with an END keyword. All keywords between BMPPIN and END are considered westwide pine beetle model extension keywords. This keyword works only with variants that have been designed to use the parallel processing extension to FVS. The parallel processing extension has its own unique set of specialized keywords.

No fields are associated with this keyword.

Reference: GTR-INT-281, User's Guide to the Parallel Processing Extension ...

## **BRUST**

(white pine Blister RUST model initialization)

Variants: Specialized variants that include the blister rust disease model

Related keywords: END

Signifies the beginning of keywords for the blister rust disease extension. This extension has its own unique set of keywords. The BRUST keyword sequence must be terminated with an END keyword. All keywords between BRUST and END are considered blister rust disease extension keywords.

No fields are associated with this keyword.

Note: The Suppose interface program automatically includes BRUST and END keywords whenever any keyword from the blister rust disease extension is included in a simulation through the Use FVS Keywords window.

References: White Pine Blister Rust Impact Model Keyword Reference Guide  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 8.5

## **CALBSTAT** (CALiBration STATistics)

Variants: All

Related keywords: BAIMULT, NOCALIB, OPEN

Outputs calibration scale factors computed from the input data to a file for later processing. By default the output will be written to unit 13, which is the same unit used for the CHEAPO output.

If desired, however, users can direct the output to a different file using a combination of the CALBSTAT and OPEN keywords.

field 1: File reference number for CALBSTAT output file. File reference numbers are a mechanism that FVS uses to keep track of external files. Numbers less than 30 are reserved for files that are currently used by FVS. *Default = 13*

field 2: Minimum number of diameter growth observations per species to calibrate the large tree diameter increment model. *Default = 5*

field 3: Minimum number of height growth observations per species to calibrate the small tree height increment model. *Default = 5*

Example sending output to new unit:

```
CALBSTAT      50
OPEN          50
CALIBRAT .TXT
```

Note: If using the Suppose interface program the CALBSTAT output file, by default, has the same base name as the simulation file with a *.chp* extension. This is the same file used, by default, for the CHEAPO output.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.3.3.3

## **CFVOLEQU** (Cubic Foot VOLume EQUation)

Variants: All

Related keywords: BFVOLEQU, VOLUME, MCDEFECT, MCFDLN

Sets species specific parameters for the volume equation used for all cubic foot volume calculations (this includes both sawlog and pulpwood volume in the eastern US). This keyword is only recognized if the VOLUME keyword is used and field 7 of the VOLUME keyword has a value of 1 or 7.

$$V = b_0 + b_1D + b_2DH + b_3D^2H + b_4D^{b_5}H^{b_6}$$

where V = board foot volume  
D = tree diameter at breast height (dbh)  
H = tree height

field 1: Species code whose equation is to be changed. *Default = All*

field 2: Transition size code. *Default = 1 for PP, 0 otherwise (PN and WC: default = 0)*  
0 indicates that field 3 is based on DBH  
1 indicates that field 3 is based on DBH<sup>2</sup>H

field 3: Transition size. If DBH (or DBH<sup>2</sup>H, based on the value in field 2) for a particular tree is less than this value, coefficients from the first supplemental record are used in the calculations. If greater than this value, coefficients from the second supplemental record are used.  
*Default = 6000 for PP, 0 otherwise (PN and WC: default = 0)*

Supplemental Records:

Small-tree coefficients  $b_0$  to  $b_6$  are entered in the first seven 10-column fields of the first supplemental record. Large-tree coefficients  $b_0$  to  $b_6$  are entered in the first seven 10-column fields of the second supplemental record.

Note: This keyword is only recognized if the VOLUME keyword is used and field 7 of the VOLUME keyword has a value of 1 or 7.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.3.2

## **CHEAPO** (Computer Help for the Economic Analysis of Prognosis Output)

Variants: All

Related keywords: OPEN

Generates an output file required for subsequent execution of the CHEAPO II economic analysis program. By default the output will be written to unit 13, which is the same unit used for the CALBSTAT output. , If desired, however, users can direct the output to a different file using a combination of the CHEAPO and OPEN keywords.

field 1: File reference number for CHEAPO output file. File reference numbers are a mechanism that FVS uses to keep track of external files. Numbers less than 30 are reserved for files that are currently used by FVS. *Default = 13*

Example sending output to new unit:

```
CHEAPO      40
OPEN        40
CHEAPDAT .TXT
```

Note: If using the Suppose interface program the CHEAPO output file, by default, has the same base name as the simulation file with a *.chp* extension. This is the same file used, by default, for the CALBSTAT output.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 86  
GTR INT-211, User's Guide to CHEAPO II..., p. 21  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 8.10

## **CLOSE** (CLOSE a file)

Variants: All

Related keywords: OPEN

Closes a file that was opened using an OPEN keyword.

field 1: File reference number for the file to be closed. This number must match the file reference number from the appropriate OPEN keyword. File reference numbers are a mechanism that FVS uses to keep track of external files. Numbers less than 30 are reserved for files that are currently used by FVS.

Note: The Suppose interface program automatically includes OPEN and CLOSE keywords for every tree data file included in the simulation.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.2.4

## **COMMENT** (insert COMMENTs)

Variants: All

Related keywords: END

Enters comments into the sequence of FVS keywords. The comments can be entered on as many supplemental records as desired. Signify the end of the comment with an END keyword. Including this set of keywords will not affect a simulation, however they are printed to the main FVS output file. Keywords contained in a COMMENT block are ignored in the simulation. To test the effects of omitting a keyword, a COMMENT keyword can be placed before it, and an END keyword can be placed after it.

No fields are associated with this keyword, however supplemental records are used.

### Supplemental Record(s):

Comments are entered in Columns 1-80 on as many supplemental records as desired. The END keyword must follow the last supplemental record.

### Example:

```
COMMENT
This is a comment.  Nothing placed
in here will affect the simulation.
END
```

Note: An alternative method for creating a single-line comment is to place an asterisk (\*) as the first character of a record. With few exceptions, that record is then ignored by FVS regardless of its placement in the keyword sequence. Records beginning with an exclamation point (!) are also ignored by FVS, but are not written to the output file. This convention is used by the Suppose interface program to insert the information it needs.

Note: If using the Suppose interface program comments may be added using the “Edit Simulation Notes” feature accessible through the Extras menu.

Reference: Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 4.1.3.2

## **COMPRESS** (COMPRESS the treelist)

Variants: All

Related keywords: TREELIST, CUTLIST, NOTRIPLE, NUMTRIP

Reduces the number of tree records stored inside FVS. This is done automatically when room is needed to store new trees created by the Regeneration Establishment process. You can use this keyword manually to schedule the tree compression process. When there are many records in the treelist, the record compression algorithm can reduce the number of records while minimizing loss of within-stand variation in tree attributes that are important for increment prediction. As a result, the number of calculations required for the projection can be reduced without significant bias.

Two methods are used to form new tree records. First, groups are formed by finding the largest differences between trees. Then those groups with the greatest variation are split to form new groups. Field 3 controls the weight given to these methods.

field 1: Year or cycle in which the treelist will be compressed. *Default = 1*

field 2: Number of tree records that will remain following compression. *Default = 675*

field 3: Percentage of new records that will be determined by finding the largest differences between trees. Remainder of records will result from splitting the classes with the greatest variation. *Range: 0 - 100, Default = 50*

field 4: Debug flag. Any numeric entry in this field will cause (a great deal of) output to be printed for the compression algorithm. *Default = blank (no debug output)*

Note: If COMPRESS is specified for the first or second cycle, the tree records will be subsequently tripled unless NOTRIPLE or NUMTRIP is used to suppress the record tripling feature.

Caution: Compression can cause trees to lose their plot specific identity, as they may be combined with “like” trees from a neighbor plot.

References: GTR INT-208, Supplement to the User’s Guide..., p. 19  
Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 7.6

## COMPUTE (COMPUTE variables)

Variants: All

Related keywords: END

The COMPUTE keyword is part of the FVS Event Monitor. It allows the user to define variables expressed as mathematical expressions containing constants, Event Monitor variables, Event Monitor functions, and variables previously defined using the COMPUTE keyword. The value of variables may depend on events such as harvest or mortality. Variables are defined using mathematical equations in supplemental records, which are up to 80 characters long. Each subsequent variable must be defined on a subsequent record. The END keyword must follow the last supplemental record.

field 1: Year or cycle in which the expressions are to be evaluated. Enter 0 (zero) to have the expressions evaluated for every cycle. *Default = 1*

Supplemental record(s):

Contains mathematical expressions that consist of a user-defined variable name on the left of the equal sign, and a value or expression that is already defined on the right of the equal sign. An END keyword must be included after the last supplemental record.

Note: Expressions may contain up to 200 characters. If an expression is too long to fit on a single 80-character record, use an ampersand (&) at the end of the record to indicate that the expression is continued on the next record.

Note: A variable name may no longer than eight characters and may not be a word that is reserved for use by FVS or the Event Monitor.

Note: A maximum of 200 variables may be computed for any simulation. This is the total number of all variables computed by all COMPUTE keywords.

Example:

```
COMPUTE          0
PI = 3.1416
REMVD_BA = BBA - ABA
DF_TPA = SPMCDDBH(1,DF,0)
END
```



In the above example, BBA and ABA are Event Monitor variables, and SPMCDBH( ) is an Event Monitor function. (See GTR INT-275, User's Guide to the Event Monitor)

References: GTR INT-275, User's Guide to the Event Monitor..., p. 5  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.6

## COVER

(initialize COVER extension)

Variants: BM, CI, EC, EM, KT, NC, NI, SO, TT, UT, WS

Related keywords: END

Signifies the beginning of keywords for the Cover extension. The Cover extension has its own unique set of keywords (see GTR INT-190, Cover: A User's Guide...) The COVER keyword sequence must be terminated with an END keyword. All keywords between COVER and END are considered Cover extension keywords.

field 1: Year or cycle in which COVER calculations begin. COVER calculations will also be performed in all cycles after the one specified. *Default = 1*

field 2: File reference number for COVER output file. If this field is left blank the COVER report will be written to the FVS output file. If the value is any number other than 16 or blank, then an associated COVER output file needs to be opened with OPEN keyword. *Default = 16*

Note: When using the Suppose interface program, the END keyword that terminates the cover keyword sequence is included automatically.

Example sending output to new unit:

```
OPEN          36
COVER.OUT
COVER          0          36
END
```

Note: The Suppose interface program automatically includes COVER and END keywords whenever any keyword from the Cover extension is included in a simulation through the Use FVS Keywords window.

References: GTR INT-190, Cover: A User's Guide..., p. 14  
GTR INT-208, Supplement to the User's Guide..., p. 18  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 8.1

## CRNMULT

(CRowN change MULTiplier)

Variants: All except CI, KT, and NI

Related keywords: HTGMULT, HTGSTOP, PRUNE

Alters the change in crown ratio by a specified proportion. In the case of crown dubbing (generating values for missing crown ratio data), the dubbed crown ratio is adjusted by the specified proportion. This multiplier may affect diameter and height growth in subsequent cycles.

field 1: Year or cycle in which the multiplier is applied. Once in effect it remains in effect until replaced by a subsequent multiplier. *Default = 1*

field 2: Species code to which the multiplier is applied. *Default = All*

field 3: Multiplier value. For example, a value of 1.1 will make the crown ratio change 10% greater. A tree that had a crown ratio going from 90 to 80 (a 10% change) would now have a crown going from 90 to 79 (an 11% change, or 1.1 times the original change). When applied to dubbed crowns, the initial crown ratio is multiplied by this value. *Default = 1.0*

field 4: Minimum dbh in inches (greater than or equal to) to which the multiplier is applied. *Default = 0.0*

field 5: Maximum dbh in inches (less than) to which the multiplier is applied. *Default = 999.0*

field 6: Dubbing flag. *Default = 0*  
0 Applied to the crown change and dubbed crowns.  
Positive number Applied to dubbed crowns only.

Note: For any particular species this keyword remains in effect until a subsequent use of the keyword changes the multiplier for that species.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.4

## **CRUZFILE** (Cruise file)

Variants: All

Creates a tree list for input into the National Cruise Program.

field 1: Cycle or year in which the output is to be printed. Enter 0 (zero) to print output for all cycles. *Default = 1*

field 2: Printing of treelist information. This field only has effect on the output if field 1 is 1 or the beginning year of the simulation. *Default = 0*

0	Print cycles 0 and 1
1	Print only cycle 1, suppress cycle 0
2	Print only cycle 0, suppress cycle 1

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 47  
GTR INT-208, Supplement to the User's Guide..., p. 14  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.3.3.1

## **CUTEFF** (CTTing EFFiciency)

Variants: All

Related keywords: THINxxx

Sets the proportion of trees represented by a tree record that can be removed in any thinning. For example, if a tree record that is designated for removal in a thinning represents 200 trees per acre and the cutting efficiency is set to 0.8, 160 trees per acre (80%) will be removed from that record leaving 40 trees per acre standing. The CUTEFF keyword alone does not remove trees. It must be followed by one or more thinning keywords that, in conjunction with the CUTEFF keyword, determine the number of trees to be removed from each tree record.

field 1: Cutting efficiency. This is the proportion of the sample trees represented by a record that is removed if a tree is designated for removal in a thinning.  
*Range: 0.01 - 1.0, Default = 1.0*

Note: Keyword order is important. The cutting efficiency specified on a CUTEFF keyword only applies to thinning keywords that follow the CUTEFF keyword.

Note: Multiple CUTEFF keywords can be included in a keyword set.

Note: There is also a cutting efficiency parameter on each thinning request keyword. If a value is specified as part of a thinning request, it only applies to that thinning request. If a value is not supplied with the thinning request, the cutting efficiency parameter associated with the CUTEFF keyword will be used.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 21  
GTR INT-208, Supplement to the User's Guide..., p. 15  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.2

## CUTLIST

(CUT tree treeLIST)

Variants: All

Related keywords: TREELIST, FVSSTAND, THINxxx, OPEN

Prints a list of all harvested tree records to an output treelist file. CUTLIST output is integrated into the same output file produced using the TREELIST keyword.

field 1: Year or cycle in which cut list is to be printed. Enter 0 (zero) to print output for every cycle in which a thinning occurs. *Default = 1*

field 2: File reference number for the output file. File reference numbers are a mechanism that FVS uses to keep track of external files. Numbers less than 30 are reserved for files that are currently used by FVS. *Default = 3*

field 3: Value to determine which header will be printed with the cut list. *Default = 0*

1	Encoded header record (machine readable, -999)
0	Header records describing each column (human readable)
-1	Suppress all headers

field 4: *Not used*

field 5: *Not used*

field 6: Cutlist format. *Default = 0*

0	Current format
1	Old version 6.1 format

Note: If the CUTLIST output is intended for use with post-processing programs, it must contain headers and be in the current format (i.e. field 3 must be 0, 1, or blank, and field 6 must be 0 or blank).

Note: If using the Suppose interface program the CUTLIST output file, by default, has the same base name as the simulation file with a .trl extension. This is the same file used, by default, for the TREELIST output.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 21  
GTR INT-208, Supplement to the User's Guide..., p. 15

**CWEQN** (Crown Width Equation)

Variants: All

Related keywords: FIXCW

Sets species specific parameters for the crown width equations used for the specified species.

$$CW = b_0 + b_1D + b_2D^{b_3}$$

Where CW = crown width

D = tree diameter at breast height (dbh)

field 1: Species code whose equations are to be changed. *Default = All*

field 2: Transition size. If DBH for a particular tree is less than this value, coefficients from the first four fields of the supplemental record are used in the calculations. If greater than this value, coefficients from the last four fields of the supplemental record are used.

*Default = 0*

Supplemental Records:

Small-tree coefficients  $b_0$  to  $b_3$  are entered in the first four 10-column fields of the supplemental record (fields 1 through 4). Large-tree coefficients  $b_0$  to  $b_3$  are entered in the last four 10-column fields of the second supplemental record (fields 5 through 8).

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.3.2

**CYCLEAT** (CYCLE boundary occurs AT)

Variants: All

Related keywords: TIMEINT, NUMCYCLE

Sets a cycle boundary to occur at the year specified in field 1. It is possible to have many CycleAt keywords in the same simulation.

field 1: Year *Default = none*

Note: If the year is prior to the inventory year, beyond the end of the simulation or the year is already a cycle boundary, no action is taken.

**DATABASE** (DATABASE Initialization)

Variants: All

Related keywords: END

Signifies the beginning of keywords for the Database Extension. This extension has its own unique set of keywords. The DATABASE keyword sequence must be terminated with an END keyword. All keywords between DATABASE and END are considered Database extension keywords.

Note: The Suppose interface program automatically includes DATABASE and END keywords whenever any keyword from the Database Extension is included in a simulation through the Use FVS Keywords window.

No fields are associated with this keyword.

## **DATASCRN** (DATA SCReeN)

Variants: All

Related keywords: TREEDATA

Allows users to screen out input data by diameter or species.

field 1: Smallest dbh in inches to be considered for input (greater than or equal).  
*Default = 0.0*

field 2: Largest dbh in inches to be considered for input (less than). *Default = 999.0*

field 3: Species code. All tree records with this species code outside the defined diameter range will be ignored.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.2.3.1

Note: This keyword cannot be used in the Event Monitor.

Note: This keyword must precede the TREEDATA keyword and can not be used in conjunction with the TREEDATA keyword to screen multiple species. It must also precede the DSNIN, TREESQL and STANDSQL keywords if data is being read in from a database.

## **DEBUG**

(print DEBUG output)

Variants: All

Related keywords: OPEN, NODEBUG

Used to request printing of program calculations as they occur. DO NOT use this keyword unless you have a good reason because a tremendous amount of output results.

field 1: Cycle for which full program debug output is requested. If blank, debug output will be printed for all cycles. *Default = All*

field 2: If debugs are desired for specific subroutines, a non-zero number is entered and the specific subroutines are listed on supplemental records. A blank or no entry will result in debugs for all subroutines. *Default = All*

field 3: File reference number for DEBUG output file. File reference numbers are a mechanism that FVS uses to keep track of external files. Numbers less than 30 are reserved for files that are currently used by FVS. The default is to send the output to unit 16, which is the main FVS output file. *Default = 16*

Caution: This keyword generates a tremendous amount of output.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 9.3

## **DEFECT**

(DEFECT)

Variants: All

Related keywords: BFDEFECT, MCDEFECT

Specifies species-specific defect corrections. In the eastern half of the US this keyword specifies defect for pulpwood and/or sawlog volume estimates. In the western half of the US this keyword

specifies defect for merchantable cubic and/or board foot volume. Defect percentages are specified by species for the following eight dbh's: 5, 10, 15, 20, 25, 30, 35, 40 inches. For example, if the expected defect correction for a five-inch tree is 35 percent, a value of .35 would be entered in field 1 of the supplemental record. A linear interpolation function calculates the defect percentage for the specified dbh of the tree. For trees smaller than 5 inches dbh or greater than 40 inches dbh, a constant value for defect correction is applied based on the values in fields 1 and 8 respectively of the supplemental record.

field 1: Type of volume effected. *Default = 0*

*Eastern Variants*

0 Both pulpwood and sawlog

1 Just pulpwood

2 Just sawlog

*Western Variants*

0 Both merchantable cubic and board foot

1 Just merchantable cubic

2 Just merchantable board foot

field 2: Species code that will be effected by the defect corrections.

*Default = All*

field 3: Specifies whether the defect read in from the input tree record will be used.

0 volume defect percentages read as part of the input data will be used to calculate volume. *Default = 0*

1 ≤ volume defect percentatges read as part of the input data will not be used to calculate volume.

Supplemental Records:

Defect values are entered in the first eight 10-column fields of the supplemental record (fields 1 through 8). Field 1 of the supplemental record assigns a defect value to the 5 inch dbh class. Field 2 of the supplemental record assigns a defect value to the 10 inch dbh class. The following fields assign a defect value to their respective dbh class.

*Range: 0.0 - 1.0, Default = 0.0*

Note: Once applied to a simulation this keyword effects all cycles. To schedule defect for a specific cycle, use the MCDEFECT or BFDEFECT keywords. This keyword may be used multiple times in the same simulation, to specify defect for pulpwood or merchantable cubic foot volume, defect for sawlog or board foot volume, and/or to specify different factors by species.

Note: This keyword cannot be used in the Event Monitor.

**DELOTAB** (DELete OUtput TAbles)

Variants: All

Used to selectively delete tables that are, by default, part of the standard FVS output.

field 1: Code for table that is to be deleted. *Default = blank (no tables deleted)*

1 = delete the stand composition table.

2 = delete the selected sample tree table.

3 = delete the summary statistics table.

4 = delete the activity summary table

NOTE: Multiple DELOTAB keywords are required to delete two or more portions of the FVS output.

NOTE: If field one is blank, the Standard FVS output will be produced.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.3.4

## DESIGN

(sampling DESIGN)

Variants: All

Related keywords: STDINFO, STDIDENT, TFIXAREA

Specifies information about the sampling design used to collect tree data.

field 1: A positive value is interpreted as a basal area factor for horizontal angle gauge (prism). A negative value is interpreted as the inverse of a large-tree fixed area plot. *Default = 40*

field 2: Inverse of the small-tree fixed area plot (e.g. if the fixed area plot is 1/100 acre, enter 100 in this field). *Default = 300*

field 3: Break point diameter in inches. Any trees smaller than this diameter were sampled using the small-tree fixed area plots. Trees with diameters greater than or equal to this diameter were sampled using the specified BAF or large-tree fixed area plots. *Default = 5.0*

field 4: Number of plots in the stand. If blank or 0 (zero), the number of plots in the stand is determined by counting the numbers of unique plot identification codes on the tree record data. *Default = blank (FVS count)*

field 5: Number of nonstockable plots in the stand (e.g. plots fell on a road or rock outcrop). If blank, count nonstockable plots on tree records (value class = 8). *Default = blank (FVS count)*

field 6: Sampling weight (usually acres) for the stand. This weight does not affect the projection, but is used in programs that aggregate projections to produce a composite yield table. *Default = blank (number of plots)*

field 7: Proportion of the stand considered stockable. A value entered in this field will override the calculation based on number of plots stockable versus total number of plots. *Range: 0.0 - 1.0, Default = 1.0*

Note: The Suppose interface program automatically includes a DESIGN keyword based on the stand and plot data in the stand list file. To override any field of the Suppose-generated DESIGN keyword, only enter values in the fields that are to be overridden.

Note: If small tree data are collected on a cluster of fixed plots instead of a single fixed plot, either the value in field 2 should reflect the total fixed plot area, or the TFIXAREA keyword should be included after the DESIGN keyword to reflect the total fixed plot area.

Note: The value entered in field 5 for sampling weight is available in the event monitor in the variable SAMPWT. Refer to the User's Guide to the Event Monitor.

Note: If the value entered for field 7 is greater than 1 it will be assumed to be a percentage rather than a proportion, and the value will be divided by 100.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 10  
GTR INT-208, Supplement to the User's Guide..., p. 15  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.1.2.3

## **DFB**

(Douglas-Fir Beetle model initialization)

Variants: Specialized variants that include the Douglas-fir beetle model

Related keywords: END

Signifies the beginning of keywords for the douglas-fir beetle extension. This extension has its own unique set of keywords. The DFB keyword sequence must be terminated with an END keyword. All keywords between DFB and END are considered Douglas-fir beetle extension keywords.

No fields are associated with this keyword.

Note: The Suppose interface program automatically includes DFB and END keywords whenever any keyword from the Douglas-fir beetle extension is included in a simulation through the Use FVS Keywords window.

References: Douglas-fir Beetle Impact Model Keyword Reference Guide  
GTR-RM-000, User's Guide to the Douglas-fir Beetle Impact Model  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 8.6.1

## **DFTM**

(Douglas-Fir Tussock Moth model initialization)

Variants: Specialized variants that include the Douglas-fir tussock moth model

Related keywords: END

Signifies the beginning of keywords for the Douglas-fir tussock moth extension. This extension has its own unique set of keywords. The DFTM keyword sequence must be terminated with an END keyword. All keywords between DFTM and END are considered Douglas-fir tussock moth extension keywords.

No fields are associated with this keyword.

Note: The Suppose interface program automatically includes DFTM and END keywords whenever any keyword from the Douglas-fir tussock moth extension is included in a simulation through the Use FVS Keywords window.

References: Douglas-fir Tussock Moth Outbreak Model Keyword Reference Guide  
GTR-INT-127, A User's Guide to the Combined Stand Prognosis and Douglas-fir Tussock Moth Outbreak Model  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 8.7

## **DGSTDEV**

(Diameter Growth STandard DEVIation)

Variants: All

Related keywords: NUMTRIP, NOTRIPLE

Changes the limits of the normal distribution from which random errors are drawn for diameter increment predictions. This region is, by default, bounded by  $\pm 2$  standard deviations.



field 1: Number of standard deviations that defines the bounds of distribution. If set to a value less than 1.0, random error will be completely suppressed. *Default = 2.0*

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 93  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.4.2

## ECHO

(ECHO)

Variants: All

Related keywords: NOECHO

Turns the echoing of keyword information, read on input, to the Options Selected by Input table of the Main Output file, back on, if it was turned off with the NOECHO keyword.

No fields are associated with this keyword.

## ECHOSUM (ECHO the SUMmary table)

Variants: All

Related keywords: CALBSTAT, NOSUM

Specifies that the summary statistics table from the standard FVS output file be written to a separate file. The summary statistics table will still be written to the standard FVS output file.

field 1: File reference number for the output file. File reference numbers are a mechanism that FVS uses to keep track of external files. Numbers less than 30 are reserved for files that are currently used by FVS. *Default = 4*

Note: This keyword is required in order to use the "Average Summary Table" post processor. This post processor uses the ECHOSUM output file as input.

Note: If using the Suppose interface program the ECHOSUM output file, by default, has the same base name as the simulation file with a *.sum* extension.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 48  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.3.3.2

## END

(END special sequence)

Variants: All

Related keywords: COMMENT, COMPUTE, COVER, ESTAB, FMIN

Signifies the end of a special keyword sequence. Essentially, the END keyword returns control of the simulation to the base FVS system after an extension (such as the Establishment Model) has been called.

No fields are associated with this keyword.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 85  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, ss. 4.1.3.2, 5.4.3, 5.6

## ENDIF

(END an IF-then block)

Variants: All

Related keywords: IF, THEN, ALSOTRY

Signifies the end of an Event Monitor IF-THEN block. Activities that follow the ENDIF keyword are scheduled normally.

No fields are associated with this keyword.

Note: When using the Suppose interface program, the ENDIF keyword will be added automatically whenever the keyword is correctly scheduled “by condition” using a keyword window.

References: GTR INT-275, User’s Guide to the Event Monitor..., p. 2  
Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 5.5.1

## ENDFILE

(END of FILE)

Variants: All

Related keywords: OPEN

Issues an end-of-file command for the specified file.

field 1: File reference number for the file to be terminated. This number must match the file reference number from the appropriate OPEN keyword. File reference numbers are a mechanism that FVS uses to keep track of external files. Numbers less than 30 are reserved for files that are currently used by FVS.

Reference: Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 4.2.4

## ESTAB

(ESTABlishment model)

Variants: All

Related keywords: END

Signifies the beginning of keywords for the Regeneration Establishment extension. This extension has its own unique set of keywords (see the Establishment keyword descriptions at the end of this guide, and GTR INT-279, User’s Guide to the Regeneration Establishment Model...) The ESTAB keyword sequence must be terminated with an END keyword. All keywords between ESTAB and END are considered Establishment extension keywords.

field 1: Year or cycle of disturbance or beginning of regeneration. The seedling tally sequence will begin in this year. *Default = 0 (all cycles)*

Caution: Some care is necessary when entering a disturbance date to insure that the regeneration establishment model is called at the correct time. Pay close attention to cycle boundaries when entering disturbance date.

Caution: If the ESTAB keyword is embedded in an IF-THEN-ENDIF sequence, year of disturbance (field 1) is interpreted as years from the time the condition is true until establishment, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to establish the stand.)

Note: The Regeneration Establishment extension keyword sequence must begin with an ESTAB keyword and end with an END keyword; all keywords contained within this sequence are considered Regeneration Establishment keywords.

Note: The Suppose interface program automatically includes ESTAB and END keywords whenever any keyword from the Regeneration Establishment extension is included in a simulation through the Use FVS Keywords window, or when the Planting and Natural Regeneration management action is used.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 86  
GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 11  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3

## FERTILIZ

(FERTILIZe)

Variants: All

Related keywords: HTGMULT, BAIMULT

Simulates application of fertilizer to the stand. Rates of application can be entered for nitrogen, phosphorus, and potassium. Currently, however, only applications of 200 pounds of nitrogen per acre are represented by the model. User supplied rates for all three nutrients are ignored. The effects of fertilization are accounted for after growth and mortality have been predicted, so only subsequent cycles are affected.

field 1: Year or cycle of fertilizer application. *Default = 1*

field 2: Rate of application for nitrogen in pounds per acre. *Currently fixed at 200*

field 3: Rate of application for phosphorus in pounds per acre. *Currently fixed at 0*

field 4: Rate of application for potassium in pounds per acre. *Currently fixed at 0*

field 5: Multiplier for modifying the predicted response to fertilizer application (e.g. 1.1 results in a 10% increase over the predicted fertilization response). *Default = 1.0*

Note: The effects are based on data from northern Idaho.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Caution: If this keyword is embedded in an IF-THEN-ENDIF sequence, field 1 is interpreted as years from the time the event is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after event is true to fertilize the stand.)

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.4

## FIXCW

(FIXed Crown Width)

Variants: All

Related keywords: CWEQN

Multiplier used to modify the crown width estimates for trees of the specified species within the specified diameter range.

field 1: Year or cycle in which the multiplier is applied. Enter 0 (zero) to affect all cycles. *Default = 1*

- field 2: Species code to which the multiplier will be applied. *Default = All*
- field 3: Multiplier value. (e.g. a value of 1.1 will increase the predicted crown width by 10%) *Range: 0.0 - 999.0, Default = 1.0 (no change from predicted value)*
- field 4: Minimum dbh in inches (greater than or equal to) to which the multiplier will be applied. *Default = 0.0*
- field 5: Maximum dbh in inches (less than) to which the multiplier will be applied. *Default = 999.0*

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Caution: If this keyword is embedded in an IF-THEN-ENDIF sequence, field 1 is interpreted as years from the time the event is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after event is true to apply the multiplier.)

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.4

## **FIXDG**

(FIXed Diameter Growth)

Variants: All

Related keywords: BAIMULT, DGSTDEV, READCORD, REGDMULT

Multiplier used to modify the diameter growth rate of the specified species within the specified diameter range. This modifier is applied after growth prediction calculations, therefore adjusting the diameter growth will not affect height growth for that cycle. However, the changed diameter growth and resulting change in basal area will affect mortality that cycle.

- field 1: Year or cycle in which the multiplier is applied. Enter 0 (zero) to affect all cycles. *Default = 1*
- field 2: Species code to which the multiplier will be applied. *Default = All*
- field 3: Multiplier value. (e.g. a value of 1.1 will increase the predicted diameter growth by 10%) *Range: 0.0 - 999.0, Default = 1.0 (no change from predicted value)*
- field 4: Minimum dbh in inches (greater than or equal to) to which the multiplier will be applied. *Default = 0.0*
- field 5: Maximum dbh in inches (less than) to which the multiplier will be applied. *Default = 999.0*

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Caution: Many of the predictions in FVS are based on diameter increment. Changing the diameter increment prediction also changes many of the other predictions made in the model.

Caution: If this keyword is embedded in an IF-THEN-ENDIF sequence, field 1 is interpreted as years from the time the event is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after event is true to apply the multiplier.)

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.4

## FIXHTG

(FIXed HeighT Growth)

Variants: All

Related keywords: HTGMULT, HTGSTOP, READCORH, READCORR, REGHMULT

Multiplier used to modify the height growth rate of the specified species within the specified diameter range. This modifier is applied after growth prediction calculations, therefore adjusting the height growth will not affect diameter growth for that cycle.

field 1: Year or cycle in which the multiplier is applied. Enter 0 (zero) to affect all cycles. *Default = 1*

field 2: Species code to which the multiplier will be applied. *Default = All*

field 3: Multiplier value. (e.g. a value of 1.1 will increase the predicted height growth by 10%) *Range: 0.0 - 999.0, Default = 1.0 (no change from predicted value)*

field 4: Minimum dbh in inches (greater than or equal to) to which the multiplier will be applied. *Default = 0.0*

field 5: Maximum dbh in inches (less than) to which the multiplier will be applied. *Default = 999.0*

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Caution: If this keyword is embedded in an IF-THEN-ENDIF sequence, field 1 is interpreted as years from the time the event is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after event is true to apply the multiplier.)

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.4

## FIXMORT

(FIXed MORTality)

Variants: All

Related keywords: MORTMULT, BAMAX, SDIMAX

Induces mortality of a fixed proportion of the trees per acre represented by tree record of the specified species and within the specified diameter range. This can replace the predicted mortality or be in addition to the predicted mortality, or the effective mortality can be the larger of the two. For example, if a tree record represents 200 trees per acre of the designated species and within the specified diameter range, and the mortality rate is set to 0.3 and set to replace predicted mortality, 60 trees per acre (30%) from that record will die strictly due to this keyword.

field 1: Year or cycle in which specified mortality rate is to take effect. Enter 0 (zero) to affect all cycles. *Default = 1*

field 2: Species code to which mortality rate will be applied. *Default = All*

field 3: Proportion of the tree record that will be killed. *If field 6 is 0, 1 or 2, Range: 0.0 - 1.0. If field 6 is 3, then field 3 can be greater than or equal to 0. Default = 0.0, for all options.*

field 4: Minimum dbh in inches (greater than or equal to) to which the mortality rate will be applied. *Default = 0.0*

field 5: Maximum dbh in inches (less than) to which the mortality rate will be applied.  
*Default = 999.0*

field 6: Effective mortality. *Default = 0*

- 0 Replaces the mortality rate calculated in the model.
- 1 Added to the mortality rate calculated in the model.
- 2 Compared to the mortality rate calculated in the model and the larger value is used.
- 3 Multiply model calculated mortality by the proportion specified in field 3.

field 7: Distribution of the mortality caused by this keyword. *Default = 0*

- 0 Mortality applied uniformly to the specified species in the specified dbh range.
- 1 Mortality applied to the specified species in the specified dbh range on a point basis, first on point 1, then on point 2, etc.
- 10 Mortality applied to the specified species in the specified dbh range by tree diameter, smallest to largest.
- 11 Mortality applied to the specified species in the specified dbh range on a point basis and by size, smallest to largest on point 1, then smallest to largest on point 2, etc.
- 20 Mortality applied to the specified species in the specified dbh range by tree diameter, largest to smallest.
- 21 Mortality applied to the specified species in the specified dbh range on a point basis and by size, largest to smallest on point 1, then largest to smallest on point 2, etc.

Note: If option 1 or 2 is entered into Field 6, then Field 7 only applies to the mortality resulting from the specific FIXMORT request; it does not redistribute the model-calculated base model mortality. However, if option 0 or 3 is entered into Field 6, then it can redistribute the model-calculated mortality. Insect and pathogen or fire model mortality is not affected by this keyword.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Caution: This keyword may override BAMAX and SDIMAX related mortality.

Caution: If the value for field 6 is 1 the effect of multiple FIXMORT keywords is cumulative.

Caution: If this keyword is embedded in an IF-THEN-ENDIF sequence, field 1 is interpreted as years from the time the event is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after event is true to apply the mortality.)

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.4

## **FMIN**

(Fire Model Initialization)

Variants: All

Related keywords: END

Signifies the beginning of keywords for the Fire and Fuels Extension. This extension has its own unique set of keywords. The FMIN keyword sequence must be terminated with an END keyword. All keywords between FMIN and END are considered Fire extension keywords.

Note: The Suppose interface program automatically includes FMIN and END keywords whenever any keyword from the Fire and Fuels extension is included in a simulation through the Use FVS Keywords window.

No fields are associated with this keyword.

Reference: Fire and Fuels Extension to the Forest Vegetation Simulator [draft]  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 8.2

## **FVSSTAND** (FVS STAND tables)

Variants: All

Related keywords: TREELIST, CUTLIST

Generates an output file specifically for running the FvsStand post processor. The post processor generates stand and stock tables in a variety of formats. The output file format is similar to that of the TREELIST and CUTLIST keywords. In addition FVSSTAND output files contain stand structure and age data, as well as past tree measurement data.

field 1: Cycle or year in which the output is to be printed. Enter 0 (zero) to print output for all cycles. *Default = 1*

field 2: Printing of treelist information. This field only has effect on the output if field 1 is 1 or the beginning year of the simulation. *Default = 0*

0	Print cycles 0 and 1
1	Print only cycle 1, suppress cycle 0
2	Print only cycle 0, suppress cycle 1

Note: Use of this keyword does not automatically start the FvsStand post processor program.

Note: The FVSSTAND output file has the same base name as the simulation file with a *.fst* extension.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.3.3.5

## **GROWTH** (GROWTH measurement method)

Variants: All

Specifies the methods used to measure and input diameter growth, height growth and mortality data. This information is used by FVS to determine how to interpret the diameter increment, height increment, and tree history fields of the input tree data. Growth estimates can be either directly measured or computed as the difference between two successive diameter or height measurements. Furthermore, the values for diameter and height can describe the tree at either the start or the end of the growth period.

field 1: Method used to measure diameter growth. *Default = 0*

0	Measured directly (e.g. increment core). Current diameter represents an outside-bark measurement at the end of growth measurement period, and diameter increment represents inside-bark previous growth.
1	Subsequent measurement. Current diameter represents an outside-bark measurement at the end of the growth measurement period, and diameter increment represents a total

- outside-bark diameter measurement at the beginning of the growth measurement period.
- 2 Measured directly (e.g. increment core). Current diameter represents an outside-bark measurement at the beginning of growth measurement period, and diameter increment represents inside-bark subsequent growth.
- 3 Subsequent measurement. Current diameter represents an outside-bark measurement at the beginning of the growth measurement period, and diameter increment represents a total outside-bark diameter measurement at the end of the growth measurement period.

field 2: Length of diameter growth measurement period. This is the number of years that the diameter increments in the tree data file represent. *Default = 10* (NC and SN default = 5)

field 3: Method used to measure height growth. *Default = 0*

- 0 Measured directly. Current height represents a measurement at the end of growth measurement period, and height increment represents previous growth.
- 1 Subsequent measurement. Current height represents a measurement at the end of the growth measurement period, and height increment represents a total height measurement at the beginning of the growth measurement period.
- 2 Measured directly. Current height represents a measurement at the beginning of growth measurement period, and height increment represents subsequent growth.
- 3 Subsequent measurement. Current height represents a measurement at the beginning of the growth measurement period, and height increment represents a total height measurement at the end of the growth measurement period.

field 4: Length of height growth measurement period. This is the number of years that the height increments in the tree data file represent. *Default = 5*

field 5: Length of the mortality observation period in years. Trees that have been dead for this amount of time or less when inventoried are coded as recent mortality in the tree data file. Trees that have been dead for longer than this amount of time are coded as older dead. *Default = 5*

Note: When diameter or height growth is to be computed as the difference between two successive measurements, the values recorded in the tree data file for diameter growth and/or height growth should be total heights and/or total outside bark diameters, not the difference between the two measurements.

Note: The Suppose interface program automatically includes a GROWTH keyword based on the appropriate fields in the stand list file if those values are other than the defaults.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 20  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.2.3.4



## HTGMULT (HeighT Growth MULTiplier)

Variants: All

Related keywords: HTGSTOP, CRNMULT, READCORH, READCORR, NOTHDREG

Multiplier to change the large tree height increment prediction. This modifies the height growth rate of trees in the large tree model. The diameter breaks that separate the large and small tree models vary by variant (Refer to the variant overview).

field 1: Year or cycle in which the multiplier is applied. Once in effect it remains in effect until replaced by a subsequent multiplier. *Default = 1*

field 2: Species code to which multiplier is applied. *Default = All*

field 3: Multiplier value (e.g. 0.9 will decrease the predicted height growth to 90% of the predicted value). *Default = 1.0 (no change from predicted value)*

Note: For any particular species this keyword remains in effect until a subsequent use of the keyword changes the multiplier for that species.

Note: Large tree height growth is weighted with small tree height growth for a portion of the diameter range, so both HTGMULT and REGHMULT could affect some trees.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 94  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.4

## HTGSTOP (HeighT Growth STOP)

Variants: All

Related keywords: TOPKILL, HTGMULT, CRNMULT

Stops or reduces height growth for randomly selected tree records that fall within the user-specified parameters for species and height.

field 1: Year or cycle in which height growth is to be stopped. *Default = 1*

field 2: Species code for which height growth is to be stopped. *Default = All*

field 3: Shortest tree in feet (greater than or equal) that will be affected. *Default = 0*

field 4: Tallest tree in feet (less than) that will be affected. *Default = 0*

field 5: Probability that a tree will not grow in height. *Range: 0.0 - 1.0, Default = 0.0*

field 6: Mean proportion of height growth retained (e.g. 0.8 will retain an average of 80% of the height growth on selected trees). *Value must be greater than 0.0. Default = 1.0*

field 7: Standard deviation of the distribution of the proportion of height growth retained. This allows for variability in height growth reduction among the selected trees. *Default = 0.0*

Note: The PARS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-208, Supplement to the User's Guide..., p. 20

## IF

(begin IF-then block)

Variants: All

Related keywords: THEN, ENDIF, ALSOTRY

Signifies the beginning of an Event Monitor IF-THEN block (also called scheduling by condition). The Event Monitor keyword sequence must begin with an IF keyword. The next record must be a condition statement that evaluates to true or false. The next record is a THEN keyword. The sequence ends with an ENDIF keyword. All keywords contained between the THEN and ENDIF keywords will be executed whenever the condition is true. The condition is checked every cycle, unless that cycle falls within the minimum waiting time since the last time the condition was true.

field 1: Minimum waiting time in years after the condition was found true before the condition will be evaluated again. Nothing in the IF-THEN block will occur until after this period of time has passed since the condition was last found true, and at that point the condition will again begin to be evaluated.

Syntax: IF            Minimum waiting time  
           Condition is true  
           THEN  
           Perform Activity  
           ENDIF

Example: If stand basal area exceeds 100 square feet per acre, thin the stand according to the THINDBH parameters. Once this condition is true, wait 30 years before checking the condition again:

```
IF          30
BBA GT 100
THEN
THINDBH    0      0      99      1.0      0      0      0
ENDIF
```

Caution: The year/cycle field on activity keywords changes meaning to become a delay period when the keywords are included in an Event Monitor IF-THEN block. Entering 2010 in the date field of an activity keyword that is in an IF-THEN block will cause a delay period of 2010 years.

Note: When using the Suppose interface program, scheduling by condition is accomplished by clicking the "Schedule by Condition" button in individual keyword windows, and then clicking the "Condition" button and selecting "Free Form" to set up the condition statement. The activity keyword that follows the THEN statement (the THINDBH keyword as shown in the example above) is not typed in explicitly, but is rather set up using the keyword window. When the condition statement has been typed in, the "OK" button is clicked to return to the keyword window to fill in the appropriate field values. The ENDIF keyword will be added automatically.

References: GTR INT-275, User's Guide to the Event Monitor..., p. 2  
 Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.5.1

## INVYEAR

(INVentory YEAR)

Variants: All

Related keywords: NUMCYCLE, TIMEINT

Specifies the starting year for a projection. The year entered is assumed to be the year that the stand was inventoried.

field 1: Starting year (4-digits) for the simulation (e.g. 1987). *Default = 0*

Caution: Any starting year may be used. Care must be taken to assure that the years for which options are requested fall within the range of dates defined by the parameters on the NUMCYCLE, TIMEINT and INVYEAR keywords.

Note: The Suppose interface program automatically includes an INVYEAR keyword based on the inventory year field in the stand list file. If this field is blank, Suppose will use the current year as the inventory year.

Note: The inventory year is available in the event monitor in the variable INVYEAR. This variable is different than the INVYEAR keyword. Refer to the User's Guide to the Event Monitor.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 8  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, ss. 4.1.2.3, 5.5.1

## LOCATE

(LOCATE the stand)

Variants: All

Related keywords: STDINFO

Specifies the location of the stand in terms of latitude, longitude, state and county. These values are then available as event monitor variables that can be included in a custom output file for use in a GIS system or elsewhere. If latitude and longitude are to be used, then both of those fields should be supplied or a default value will remain.

field 1: Latitude in decimal degrees. *Default = latitude of centroid of variant area*

field 2: Longitude in decimal degrees. *Default = lonitude of centroid of variant area*

field 3: State

field 4: County

Note: When the LOCATE keyword is used the Event Monitor variables that contain the specified values are respectively LAT, LONG, STATE, and COUNTY.

Note: If a latitude is entered on both the LOCATE and STDINFO keyword records, the value on the record occurring later in the keyword sequence will be used.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.1.2.2

## **MANAGED** (MANAGED stand)

Variants: EM, KT, PN, SE, SN, WC

Acts as a flag to signify that the stand is managed (e.g. a plantation) or unmanaged. Once set to “managed”, it remains in effect until a subsequent use of the keyword sets it to “unmanaged”. When the flag is set to “managed” (field 2 = 1), growth rates are modified in the particular model(s) listed below by variant.

Eastern Montana (EM)	Large tree diameter growth
Kookantl (KT)	Large tree diameter growth and small tree height growth
Pacific Northwest Coast (PN)	Small tree diameter growth
Southeast (SE)	Large tree diameter growth for shortleaf pine, longleaf pine, and loblolly pine
Southern (SN)	Large tree diameter growth for sand pine, slash pine, longleaf pine, eastern white pine, and loblolly pine
Westside Cascades (WC)	Small tree diameter growth

field 1: Year or cycle. *Default = 0 (all cycles)*

field 2: Management flag. *Default = 1*

0	Unmanaged
1	Managed

Note: If the MANAGED keyword is not present in the simulation, the stand is considered unmanaged.

Reference: Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 4.1.2.2

## **MCDEFECT** (Merchantable Cubic foot DEFECT)

Variants: All

Related keywords: BFDEFECT, DEFECT, MCFDLN, VOLUME

Specifies species-specific defect corrections for cubic-foot volume estimates. In the western half of the US this keyword specifies the merchantable cubic foot defect. (Board foot defect is specified using the BFDEFECT keyword.) In the eastern half of the US this keyword specifies defect only for the pulpwood that is smaller than the merchantable limits for sawlogs. (Defect for the sawlog portion of trees is specified using the BFDEFECT keyword.) Defect percentages are specified by species for the following five dbh’s: 5, 10, 15, 20, 25+ inches. For example, if the expected defect correction for a five-inch tree is 35 percent, a value of .35 would be entered in field 3. A linear interpolation function calculates the defect percentage for the specified dbh of the tree. For trees smaller than 5 inches dbh or greater than 25 inches dbh, a constant value for defect correction is applied based on the values in fields 3 and 7 respectively.

field 1: Year or cycle in which the defect corrections are to take effect. Once in effect it remains in effect until replaced by a subsequent multiplier.  
*Default = 0 (all cycles)*

field 2: Species code for which the defect corrections are to be applied.  
*Default = All*

field 3: Proportion of cubic foot volume defect for a 5-inch tree. All trees less than 5 inches dbh will be assigned this value. *Range: 0.0 - 1.0, Default = 0.0*

field 4: Proportion of cubic foot volume defect for a 10-inch tree.

*Range: 0.0 - 1.0, Default = 0.0*

field 5: Proportion of cubic foot volume defect for a 15-inch tree.

*Range: 0.0 - 1.0, Default = 0.0*

field 6: Proportion of cubic foot volume defect for a 20-inch tree.

*Range: 0.0 - 1.0, Default = 0.0*

field 7: Proportion of cubic foot volume defect for a 25-inch tree. All trees greater than 25 inches dbh will be assigned this value. *Range: 0.0 - 1.0, Default = 0.0*

Note: For any particular species this keyword remains in effect until a subsequent use of the keyword changes the multiplier for that species.

Note: If used inside an IF-THEN-ENDIF sequence, BFDEFECT will not affect cycle 0 volumes.

Note: The PARMS format may be used with this keyword. In the PARMS format, however, 0 (zero) may not be used in the year/cycle field, and hence the defect will not affect cycle 0 volumes. See the introduction for a description of this format.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.3.3

## **MCFDLN**

(Merchantable Cubic foot Form and Defect Log linear equation)

Variants: All

Related keywords: BFFDLN, MCDEFECT, CFVOLUME, VOLUME

Sets species specific parameters for a log-linear form and defect correction equation for cubic foot volume estimates. In the western half of the US this affects the calculation of merchantable cubic foot volume. (BFFDLN affects calculation of board foot volume.) In the eastern half of the US this affects the calculation of cubic foot volume only for the pulpwood that is smaller than the merchantable limits for sawlogs. (BFFDLN affects calculation of sawlog volumes.)

$$\ln(V_s) = a_0 + a_1 \ln(V_0)$$

where  $V_s$  = cubic foot volume corrected for form and defect  
 $V_0$  = uncorrected cubic foot volume  
 $a_0$  = intercept (field 2 value)  
 $a_1$  = slope coefficient (field 3 value)

field 1: Species code whose equation is to be changed. *Default = all*

field 2: Intercept term for log-linear equation ( $a_0$ ). *Default = 0*

field 3: Slope coefficient for log-linear equation ( $a_1$ ). *Default = 1*

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 24  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.3.3

**MGMTID** (ManaGeMenT IDentification)  
Variants: All

Specifies a 4-character alphanumeric code to identify the silvicultural treatment simulated in a projection. The code does NOT affect the projection, but is printed with each output table. When this keyword is not used, the code “NONE” is used.

No fields are associated with this keyword, however a supplemental record that contains the code entered in Columns 1-4 is required. When the supplemental record is blank, no code is printed.

Example:  
MGMTID  
ALT2

References: GTR INT-133, User’s Guide to the Stand Prognosis Model, p. 11  
Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 4.1.2.1

**MINHARV** (MINimum HARVest)  
Variants: All

Related keywords: THINxxx

Specifies minimum acceptable harvest standards for board-foot volume, merchantable cubic-foot volume, basal area per acre, or total cubic foot volume. The accumulated removals across all thinnings in a cycle must exceed the standards for all the units of measure (fields 2, 3, 4, and 5), or none of the thinnings in that cycle will be implemented.

field 1: Year or cycle in which minimum harvest standards will be applied. Once in effect, it remains in effect until a subsequent MINHARV keyword changes the standards. *Default = 1*

field 2: The minimum acceptable harvest volume in merchantable cubic-feet per acre. (Sawlog CF volume in eastern US variants) *Default = 0*

field 3: The minimum acceptable harvest volume in board-feet per acre. (Sawlog BF volume in eastern US variants) *Default = 0*

field 4: The minimum acceptable harvest in square feet of basal area per acre. *Default = 0*

field 5: The minimum acceptable harvest in total cubic feet per acre. (Merchantable cubic foot volume in eastern US variants) *Default = 0*

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-133, User’s Guide to the Stand Prognosis Model, p. 22  
Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 5.2.1

## MISTOE

(MISTleTOE model initialization)

Variants: All in the western half of the US

Related keywords: END

Signifies the beginning of keywords for the dwarf mistletoe extension. This extension has its own unique set of keywords. The MISTOE keyword sequence must be terminated with an END keyword. All keywords between MISTOE and END are considered dwarf mistletoe extension keywords.

No fields are associated with this keyword.

Note: In western variants, whenever the tree data input to FVS contains dwarf mistletoe damage codes (30-34) and associated severity (Hawksworth rating of 1-6), the dwarf mistletoe extension will run by default. The effects of the dwarf mistletoe are not summarized and displayed in the main output file unless requested through the appropriate dwarf mistletoe extension keywords.

Note: The Suppose interface program automatically includes MISTOE and END keywords whenever any keyword from the dwarf mistletoe extension is included in a simulation through the Use FVS Keywords window.

References: Dwarf Mistletoe Impact Model Keyword Reference Guide  
MAG-95-2, Dwarf Mistletoe Impact Modeling System User's Guide  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 8.3

## MODTYPE

(MODel TYPE)

Variants: CR, SE, SN

Related keywords: STDINFO

Specifies the variant's model type, the physiographic region and the forest type. This information allows FVS to use the appropriate model type, which is a sub-model built into the variant.

field 1: Model type.

CR variant:

1 = Southwest mixed conifers	4 = Spruce-fir
2 = Southwest ponderosa pine	5 = Lodgepole pine
3 = Black Hills ponderosa pine	

<i>Defaults in CR variant are by forest:</i>	<i>Default</i>
<i>All region 3 forests</i>	<i>2</i>
<i>Black Hills, Nebraska</i>	<i>3</i>
<i>Grand Mesa, Uncompahgre, Gunnison</i>	<i>4</i>
<i>Pike, San Isabel, White River</i>	<i>4</i>
<i>Rio Grande, San Juan</i>	<i>4</i>
<i>Bighorn, Medicine Bow, Routt</i>	<i>5</i>
<i>Arapaho, Roosevelt, Shoshone</i>	<i>5</i>

SE Variant:

1 = SE TWIGS model type. *Default = 1*

SN Variant:

1 = Southwide model type. *Default = 1*

field 2: Physiographic Region (SE variant only). Either the 3-character alpha code or the numeric code may be used. *Default = 7*

1 = BLU (Blue Ridge Mountains)	5 = LPL (Limestone Plateau)
2 = CMP (Cumberland Plateau)	6 = MCP (Middle Coastal Plain)
3 = FCP (Flatlands Coastal Plain)	7 = PIE (Piedmont)
4 = HCP (Hilly Coastal Plain)	8 = VAL (Valley and Ridge)

field 3: Forest Type.

SE variant: *Default = 31*

4 = white pine	35 = redcedar
5 = loblolly pine plantation	36 = pond pine
6 = shortleaf pine plantation	38 = pitch pine
7 = longleaf pine plantation	40 = oak-pine
21 = longleaf pine	50 = oak-hickory
22 = slash pine	52 = chestnut oak
31 = loblolly pine	57 = southern scrub oak
32 = shortleaf pine	60 = oak-gum-cypress
33 = Virginia pine	70 = elm-ash-cottonwood

SN variant: Using any of the 3-digit codes shown below will specify the forest type at the time of inventory. For all subsequent points in time, FVS will determine the forest type based on the predominance of the different species in the stand. For example, using the code 103 specifies an eastern white pine forest type at the time of the inventory, but FVS will determine the forest type thereafter. Using a 4-digit code, created by prepending any non-zero digit before a 3-digit code, will specify the forest type to be used throughout the simulation. FVS will not determine the forest type at any point in time. For example, using the code 9103 specifies an eastern white pine forest type for the entire simulation. *The default is for FVS to determine the forest type at all points in time.*

103 = Eastern white pine	407 = Slash pine/Hardwood
104 = Eastern white pine/Hemlock	409 = Other pine/Hardwood
105 = Eastern hemlock	501 = Post oak/Blackjack oak
121 = Balsam fir	502 = Chestnut oak
124 = Red spruce/Balsam fir	503 = White oak/Red oak/Hickory
141 = Longleaf pine	504 = White oak
142 = Slash pine	505 = Northern red oak
161 = Loblolly pine	506 = Yellow-poplar/White/Red oak
162 = Shortleaf pine	508 = Sweetgum/Yellow-poplar
163 = Virginia pine	510 = Scarlet oak
164 = Sand pine	511 = Yellow-poplar
165 = Table-mountain pine	512 = Black walnut
166 = Pond pine	513 = Black locust
167 = Pitch pine	514 = Southern scrub oak
168 = Spruce pine	515 = Chestnut oak/Black/Scarlet oak
181 = Eastern redcedar	519 = Red maple/Oak
401 = E. white pine/Red oak/Wht.ash	520 = Mixed upland hardwoods
402 = Eastern redcedar/Hardwood	601 = Swamp chestnut/Cherrybark oak
403 = Longleaf pine/Oak	602 = Sweetgum/Nuttall, Willow oak
404 = Shortleaf pine/Oak	605 = Overcup oak/Water hickory
405 = Virginia pine/Southern red oak	606 = Atlantic white-cedar
406 = Loblolly pine/Hardwood	607 = Bald cypress/Water tupelo



608 = Sweetbay/Swp.tupelo/Red maple	708 = Red maple/Lowland species
701 = Black ash/Am.elm/Red maple	801 = Sgr.maple/Beech/Yellow birch
702 = River birch/Sycamore	802 = Black cherry
703 = Cottonwood	805 = Hard maple/Basswood
704 = Willow	807 = Elm/Ash/Locust
705 = Sycamore/Pecan/American elm	809 = Red maple/Upland species
706 = Sgrberry/Hckberry/Elm/Grn.ash	

Note: In the CR variant this keyword has the same effect as field 2 of the STDINFO keyword. If both keywords are included in a simulation, the one that appears later in the simulation file will determine the model type.

Note: When using the CR or SE variants with the Suppose interface program, Suppose automatically includes a MODTYPE keyword. The field values are based on the model type, physiographic region, and forest type fields in the stand list file. If any of these fields are blank, the default values are used.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.1.2.2

## **MORTMULT** (MORTality MULTIplier)

Variants: All

Related keywords: FIXMORT, SDIMAX, BAMAX

Multiplier used to alter predicted mortality rate. In variants AK, BM, CA, CR, EC, EM, KT, NC, NI, PN, SO, TT, UT, and WS, the multiplier is applied to the predicted background mortality only, and density related mortality is unaffected. (Use SDIMAX to modify density related mortality.) In the other variants the multiplier is applied to all predicted mortality.

field 1: Year or cycle in which multiplier is applied. Once in effect, it remains in effect until replaced by a subsequent multiplier. *Default = 1*

field 2: Species code to which multiplier is applied. *Default = All*

field 3: Multiplier value. (e.g. a value of 1.1 will increase the predicted background mortality by 10%) *Default = 1.0 (no change from predicted value)*

field 4: Minimum dbh in inches (greater than or equal to) to which the mortality multiplier is applied. *Default = 0.0*

field 5: Maximum dbh in inches (less than) to which the mortality multiplier is applied. *Default = 999.0*

field 6: *No longer used.*

Note: Only one MORTMULT keyword can be specified for each species in any cycle.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 94  
 GTR INT-208, Supplement to the User's Guide..., p. 17  
 Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.4

## **MPB**

(Mountain Pine Beetle model initialization)

Variants: Specialized variants that include the mountain pine beetle model

Related keywords: END

Signifies the beginning of keywords for the mountain pine beetle extension. This extension has its own unique set of keywords. The MPB keyword sequence must be terminated with an END keyword. All keywords between MPB and END are considered annosus root disease extension keywords.

No fields are associated with this keyword.

Note: The Suppose interface program automatically includes MPB and END keywords whenever any keyword from the mountain pine beetle extension is included in a simulation through the Use FVS Keywords window.

References: Mountain Pine Beetle Impact Model Keyword Reference Guide  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 8.6.2

## **NOAUTOES** (NO AUTOmatic Establishment)

Variants: All

Related keywords: ESTAB

Suppresses all natural regeneration and ingrowth features of the Regeneration Establishment model, including stump and root sprouting.

No fields are associated with this keyword.

Note: In the AK, CI, EM, KT, and NI variants, natural regeneration is automatically scheduled in a simulation after "significant" thinning events or in the absence of disturbance for a period of twenty years if the user schedules no regeneration. The NOAUTOES keyword cancels both types of automatic natural regeneration. The probability of stocking is set to zero, so if later in the simulation automatic regeneration is to be turned back on, the STOCKADJ Establishment Model keyword must be used in addition to the INGROW, AUTALLY, and/or SPROUT Establishment Model keywords.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.2.4

## **NOCALIB**

(NO CALIBration scale factors)

Variants: All

Related keywords: BAIMULT

Suppresses calculation of scale factors for large-tree diameter increment model and small-tree height increment model. Calibration is the default mode of the system and each species is calibrated independently. For a particular species, if there are at least five large-tree diameter increment measurements or three small-tree height increment measurements, a scale factor will be calculated for that species and growth will be adjusted accordingly. This keyword suppresses all calibration for a species (or for all species), therefore tree growth will be exactly as predicted by the model in the absence of growth information.

field 1: Species code for which calculation of scale factors is to be suppressed.

Note: Non-calibration is appropriate when growth measured in the sample is not typical. This might be the case during insect epidemics or prolonged drought, which would tend to

show artificially low growth rates. This might also be the case if only site trees were measured for growth, which would tend to show artificially high growth rates.

References: GTR INT-208, Supplement to the User's Guide..., p. 11  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, ss. 6.4.1, 6.5.2.1

## **NODEBUG** (NO DEBUG output)

Variants: All

Related keywords: DEBUG

Suppresses the printing of program calculations as they occur. In other words, cancels the effect of the DEBUG keyword.

No fields are associated with this keyword.

Note: Whenever the NODEBUG and DEBUG keywords are both present in a simulation file, the one that is placed later in the keyword sequence will take precedence.

Example: If using the Suppose interface program with a multiple stand simulation the DEBUG keyword might be specified for all stands and the NODEBUG keyword might be used to omit particular stands from having information written to the debug file.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 9.3

## **NOECHO** (NO ECHO)

Variants: All

Related keywords: ECHO

Suppresses the echoed keyword information, read on input, to the Options Selected by Input table of the Main Output file. By default keyword echo is on.

No fields are associated with this keyword.

Note: In a serial run, keyword echo returns to the default condition after processing each stand. The number of keyword records processed, and not echoed to the main output file, is reported. Warning and error messages and the Parallel Processing Extension (PPE) keywords are not affected by the NOECHO keyword.

## **NOHTDREG** (NO HeighT-Diameter REGression)

Variants: All

Related keywords: HTGMULT, READCORH

Suppresses the calibration of coefficients for height-diameter equations based on input tree data. Height-diameter equations are used in dubbing the heights of trees that have missing recorded heights. When the calibration of coefficients for the height dubbing process is suppressed, heights are dubbed using region-wide default coefficients. Calibration of coefficients for a species is automatically suppressed if less than three non-top-damaged trees of that species are available for the calculations.

field 1: Species code for which calibration of the coefficients for the height-diameter relationship will be suppressed. *Default = All*

field 2: Suppression flag. *Defaults: BM, EC, KT, NC, PN, SO, WC, SN, CA = 0*  
*others = 1*

0	Suppress calibration of coefficients (i.e. use defaults).
1 or greater	No suppression of calibration of coefficients.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 7.1.3.1

**NOSCREEN** (NO output to SCREEN)

Variants: All

Related keywords: SCREEN

Suppresses printing of an abbreviated copy of the summary statistics table to the terminal screen or a file during program execution. In other words, cancels the effect of the SCREEN keyword.

No fields are associated with this keyword.

Note: Whenever the NOSCREEN and SCREEN keywords are both present in a simulation file, the one that is placed later in the keyword sequence will take precedence.

Note: The Suppose interface program automatically includes a SCREEN keyword that sends the output to the terminal screen. Including a NOSCREEN keyword will cancel the effect of the SCREEN keyword.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.3.4

**NOSUM** (NO SUMmary table)

Variants: All

Related keywords: ECHOSUM, CALBSTAT

Suppresses the summary statistics table from the standard FVS output file from being written to a separate file. In other words, cancels the effect of the ECHOSUM keyword. The summary statistics table will still be written to the standard FVS output file.

No fields are associated with this keyword.

Note: Whenever the NOSUM and ECHOSUM keywords are both present in a simulation file, the one that is placed later in the keyword sequence will take precedence.

Example: If using the Suppose interface program with a multiple stand simulation the ECHOSUM keyword might be specified for all stands and the NOSUM keyword might be used to omit particular stands from having information written to the ECHOSUM file.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 48  
 Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.3.4

**NOTREES** (NO TREE recordS)

Variants: All

Related keywords: ESTAB

Specifies that no projectable tree records will be used as input, which permits "bare ground" simulations. The Regeneration Establishment Model can then be used to generate a list of

seedlings to be projected. If the NOTREES keyword is not used, at least two live-tree records must be present in the input tree data.

References: GTR INT-208, Supplement to the User's Guide..., p. 19  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.2

**NOTRIPLE** (NO tree record TRIPLE)

Variants: All

Related keywords: NUMTRIP, DGSTDEV

Suppresses record tripling. When a stand is represented by relatively few records (less than approximately 100) tripling is a mechanism to increase the number of replications to help stabilize the random effects (see DGSTDEV). Each tree record is split into three records such that the three records together represent the same number of trees per acre as the original record. The new records are similar except for diameter growth, and the weighted average of the new records is equal to the original record. Unless otherwise specified, records are tripled twice, once in the first cycle and once in the second cycle. If the total number of records would exceed 1350 tripling is not done.

No fields are associated with this keyword.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 92  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.4.2

**NUMCYCLE** (NUMber of CYCLEs)

Variants: All

Related keywords: TIMEINT, INVYEAR

Specifies the number of cycles to run the projection. A cycle is the period of time for which tree characteristics are predicted, and for which inventories are reported (see TIMEINT). The maximum number of cycles in a projection is 40.

field 1: Number of cycles to be projected.

Note: The Suppose interface program automatically includes a NUMCYCLE keyword (with a default of ten cycles). This may be overridden by using the "Set Time Scale" option, or by including an additional NUMCYCLE keyword. Use of a NUMCYCLE keyword will override the entries from the "Set Time Scale" option.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 8  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, ss. 4.1.3.1, 5.1.2

**NUMTRIP** (NUMber of times TRIPled)

Variants: All

Related keywords: NOTRIPLE, DGSTDEV

Specifies the number of times tree records will be tripled. Tripling will be attempted once in the first cycle and once in each subsequent cycle for the number of times specified. If the total number of records would exceed 1350 tripling is not done. When a stand is represented by relatively few records (less than approximately 100) tripling is a mechanism to increase the number of replications to help stabilize the random effects (see DGSTDEV). Each tree record is

split into three records such that the three records together represent the same number of trees per acre as the original record. The new records are similar except for diameter growth, and the weighted average of the new records is equal to the original record. Unless otherwise specified, records are tripled twice), once in the first cycle and once in the second cycle.

field 1: Number of times tripling will be attempted. *Default = 2*

Note: In a bare ground projection, the number of times that records will be tripled is one less than the number specified because tripling occurs before the addition of regeneration records to the treelist. For example, if you want the tree records to be tripled twice in a bare ground projection, set the value in field 1 to 3.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 92  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.4.2

## OPEN

(OPEN a file)

Variants: All

Related keywords: ADDFILE, CLOSE

Requests that an external file be opened for input (e.g. an addfile) or output (e.g. a treelist file). A supplemental record is required to specify a filename for the unit that is to be opened.

field 1: File reference number for the input or output file. File reference numbers are a mechanism that FVS uses to keep track of external files. Numbers less than 30 are reserved for files that are currently used by FVS.

field 2: Code for specifying the meaning of blanks in numeric fields. *Default = 0*

0	Treat blanks as zeros
non-zero	Treat blanks as null characters

field 3: File status code. *Default = 0*

0	Unknown (file may or may not currently exist)
1	New (file does not currently exist)
2	Old (file currently exists)

field 4: Maximum record length in the file (number of characters per line). *Default=150*

field 5: File format switch. Choose unformatted only when the sole purpose of creating this file is for use as input to another program that requires unformatted input.

1	Formatted
2	Unformatted

Supplemental record:

Specify a filename for the input or output file that is to be opened. The maximum permitted length of the filename is 40 characters, and there can be no leading blanks.

Note: There is no default value for the file reference number (field 1). If this field is left blank the OPEN request is ignored.

Note: The Suppose interface program automatically includes OPEN and CLOSE keywords for every tree data file included in the simulation.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.2.3.1

## **POINTREF** (POINT REFerence)

Variants: All

Related keywords: THINPOINT, SETPTHIN, COMPUTE

Specifies whether the point number entered on a keyword or Event Monitor function refers to the inventory point number or FVS sequential point number.

field 1: Point number reference

1 = Point number will be as entered in the input data

2 = Point number will be the FVS sequential point number

## **PROCESS** (PROCESS the keywords)

Variants: All

Signifies the end of a set of keywords that define a single projection and triggers the beginning of the simulation. The PROCESS keyword must be present or the projection will not run. Multiple PROCESS keywords (i.e. multiple projections) are possible within a single simulation file.

No fields are associated with this keyword.

Note: The Suppose interface program automatically includes a PROCESS keyword. If multiple stands are selected, multiple PROCESS keywords will be included and multiple projections will result.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 8  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.1.3.3

## **PRUNE** (PRUNE trees)

Variants: All

Related keywords: CRNMULT

Schedules pruning of a specified component of the stand. Removes portions of a trees crown ratio as part of a stand treatment scenario.

field 1: Year or cycle pruning is to be done. *Default = 1*

field 2: Method of pruning. *Default = 2*

- 1 Prune to a specified height to base of live crown (field 3) without regard to the proportion of live crown this would remove
- 2 Prune to a specified height to base of live crown (field 3). If this would result in removing more than a specified proportion (field 4) of the live crown ratio, only remove enough crown to reach the specified proportion, instead of the specified height.
- 3 Prune to a specified height to base of live crown (field 3). If this would result in removing more than a specified proportion (field 4) of the live crown ratio, do not prune the tree.
- 4 Remove a specified proportion (field 4) of the live crown.
- 5 Remove a specified length (field 3) of the live crown without regard to the proportion of live crown this would remove.
- 6 Remove a specified length (field 3) of the live crown. If this would result in removing more than a specified proportion (field 4) of the live

- crown ratio, only remove enough to reach the specified proportion, rather than removing the specified length.
- 7 Remove a specified length (field 3) of the live crown. If this would result in removing more than a specified proportion (field 4) of the live crown ratio, do not prune the tree.

field 3: Height in feet. *Default = 0*

If field 2 = 1, 2, or 3, this is the height to the base of live crown.

If field 2 = 5, 6, or 7, this is the length of crown to be removed.

field 4: Maximum proportion. *Range: 0.0 - 1.0, Default = 0.5*

If field 2 = 2 or 6, this is the maximum proportion of live crown that can be removed.

If field 2 = 3 or 7, this is the threshold that determines whether the tree will be pruned or not.

If field 2 = 4, this is the proportion of live crown to be removed.

field 5: Species code to be pruned. *Default = All*

field 6: Minimum dbh in inches (greater than or equal to) that will be considered for pruning. *Default = 0.0*

field 7: Maximum dbh in inches (less than) that will be considered for pruning. *Default = 99.0*

Note: All prunings are considered in the same context as thinnings, and are done at the beginning of the cycle in which they are scheduled.

Note: All thinnings scheduled within a cycle are done before any pruning requests are processed. (i.e. the only trees that will be pruned are those left after the thinning)

Note: If no trees remain after thinning, all pruning requests will be cancelled.

Note: If the combination of parameters on a pruning keyword results in no trees being pruned, the pruning request is cancelled.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Caution: If this keyword is embedded in an IF-THEN-ENDIF sequence, field 1 is interpreted as years from the time the event is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after event is true to prune the stand.)

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.6

## **RANNSEED** (RANdom Number SEED)

Variants: All

Reseeds the pseudorandom number generators used in the FVS model. If a 0 (zero) is used as the replacement value for the seed, the model will run stochastically (i.e. results will vary for multiple runs of the same simulation file). With any non-zero seed value the results will always be the same for multiple runs of the same simulation file.

field 1: Replacement value for the pseudorandom number seed (should be an odd integer). *Default = 55329*



Note: The FVS base model and the Regeneration Establishment extension use separate pseudorandom number generators. Each one can be reseeded independently. Using a RANSEED keyword inside an ESTAB-END sequence affects the Regeneration Establishment extension.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 94  
GTR INT-208, Supplement to the User's Guide..., p. 14  
GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 32  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.4.2

Refer to GTR INT-394, Implications of Random Variation in the Stand Prognosis Model, for a discussion of the stochastic nature of the model.

## **RDIN**

(Root Disease model Initialization)

Variants: Specialized variants that include the root disease model

Related keywords: END

Signifies the beginning of keywords for the western root disease extension. This extension has its own unique set of keywords. The RDIN keyword sequence must be terminated with an END keyword. All keywords between RDIN and END are considered western root disease extension keywords.

No fields are associated with this keyword.

Note: The Suppose interface program automatically includes RDIN and END keywords whenever any keyword from the western root disease extension is included in a simulation through the Use FVS Keywords window.

References: Root Disease Impact Model Keyword Reference Guide  
PSW-GTR-165, User's Guide to the Western Root Disease Model, Ver 3.0  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 8.4

## **READCORD** (READjust CORrection for Diameter)

Variants: All

Related keywords: READCORH, READCORR, REUSCORD, BAIMULT, NOCALIB

Readjusts the baseline estimate for the large-tree diameter growth model. For any particular species, the original baseline estimate is multiplied by the value from this keyword, and the result becomes the new baseline estimate. These adjustments are done prior to model calibration. Calculated scale factors will still attenuate toward a value midway between the calculated scale factor and the new baseline estimate.

No fields are associated with this keyword. Multipliers are entered on two or more supplemental records

Supplemental records:

Each supplemental record consists of eight 10-character fields, each of which contains a multiplier value for a species. Decimal points should be explicitly typed. The fields are in order of the species sequence number in the variant (see Appendix A). Multiple supplemental records are required. *The default value for all species in all variants is 1.0.* A blank or 0 (zero) is interpreted as a 1.0.

Example for a variant with 11 species:

READCORD								
	1.2	1.0	1.05	0.8	0.85	1.0	1.25	1.0
	1.0	0.85	1.0					

Note: If a significant number of previous FVS runs have shown that there is a consistent bias in the scale factors for any species, the average scale factor for that species can be entered using this keyword.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 90  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.2

## **READCORH** (READjust CORrection for Height)

Variants: All

Related keywords: READCORD, READCORR, HTGMULT, REUSCORH, NOCALIB

Readjusts the baseline estimate for the large-tree height growth model. For any particular species, the original baseline estimate is multiplied by the value from this keyword, and the result becomes the new baseline estimate. These adjustments are done prior to model calibration.

No fields are associated with this keyword. Multipliers are entered on two or more supplemental records

Supplemental records:

Each supplemental record consists of eight 10-character fields, each of which contains a multiplier value for a species. Decimal points should be explicitly typed. The fields are in order of the species sequence number in the variant (see Appendix A). Multiple supplemental records are required. *The default value for all species in all variants is 1.0.* A blank or 0 (zero) is interpreted as a 1.0.

Example for a variant with 11 species:

READCORH								
	1.3	1.0	1.15	0.7	0.75	1.0	1.25	1.0
	1.0	0.95	1.0					

Note: If a significant number of previous FVS runs have shown that there is a consistent bias in the large tree height growth for any species, an average multiplier value for that species can be entered using this keyword.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 90  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.2

## **READCORR** (READjust CORrection for Regeneration)

Variants: All

Related keywords: READCORH, READCORD, REUSCORR, NOCALIB

Readjusts the baseline estimate for the small-tree height growth model. For any particular species, the original baseline estimate is multiplied by the value from this keyword, and the result becomes the new baseline estimate. These adjustments are done prior to model calibration. Calculated scale factors will still attenuate toward a value midway between the calculated scale factor and the new baseline estimate.

No fields are associated with this keyword. Multipliers are entered on two or more supplemental records

Supplemental records:

Each supplemental record consists of eight 10-character fields, each of which contains a multiplier value for a species. Decimal points should be explicitly typed. The fields are in order of the species sequence number in the variant (see Appendix A). Multiple supplemental records are required. A blank or 0 (zero) is interpreted as a 1.0. *The default value for all species in all variants is 1.0.*

Example for a variant with 11 species:

READCORR	1.1	1.0	1.25	0.85	0.8	1.0	1.05	1.0
	1.0	0.65	1.0					

Note: If a significant number of previous FVS runs have shown that there is a consistent bias in the scale factors for any species, the average scale factor for that species can be entered using this keyword.

References: GTR INT-133, User’s Guide to the Stand Prognosis Model, p. 90  
Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 6.5.2.2

**REGDMULT** (REGeneration Diameter growth MULTipplier)

Variants: All

Related keywords: REGHMULT, BAIMULT

Specifies a growth multiplier for the small-tree diameter growth model.

field 1: Year or cycle in which multiplier is applied. Once in effect, it remains in effect until replaced by a subsequent multiplier. *Default = 1*

field 2: Species code to which multiplier is applied. *Default = All*

field 3: Multiplier value (e.g. a value of 1.2 will increase the predicted small tree diameter growth by 20%). *Default = 1.0*

Note: The PARMs format may be used with this keyword. See the introduction for a description of this format.

Note: Small tree height growth is weighted with large tree height growth for a portion of the diameter range, so both REGHMULT and HTGMULT could affect some trees.

References: GTR INT-133, User’s Guide to the Stand Prognosis Model, p. 94  
Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 6.5.2.4

**REGHMULT** (REGeneration Height growth MULTipplier)

Variants: All

Related keywords: REGDMULT, HTGMULT, READCORR

Specifies a growth multiplier for the small-tree height growth model.

field 1: Year or cycle in which multiplier is applied. Once in effect, it remains in effect until replaced by a subsequent multiplier. *Default = 1*

field 2: Species code to which multiplier is applied. *Default = All*

field 3: Multiplier value (e.g. a value of 1.2 will increase the predicted small tree height growth by 20%). *Default = 1.0*

Note: Changing the small-tree height increment also changes the small-tree diameter growth increment, and may have other cascading effects throughout the model.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 94  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.4

## **RESETAGE** (RESET stand AGE)

Variants: All

Sets the stand age to zero to make FVS model output correspond to the actual age of the stand. Age is strictly for reporting purposes and has no effect on growth or survival prediction. Its only effect is on the calculation of mean annual increment. This keyword is useful when average stand age has changed due to thinnings and plantings.

field 1: Year or cycle that stand age is to be changed (usually the year of disturbance).

field 2: New stand age. *Default = 0*

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.1.3

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

## **REUSCORD** (REUSE CORrection for Diameter)

## **REUSCORH** (REUSE CORrection for Height)

## **REUSCORR** (REUSE CORrection for Regeneration)

Variants: All

Related keywords: READCORD, READCORH, READCORR

In a multiple stand simulation, requests that the parameters specified for the previous stand on the READCORD, READCORH, or READCORR keyword record be reused for the current stand.

No fields are associated with this keyword.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.4

## **REWIND** (REWIND an open file)

Variants: All

Related keywords: OPEN, ADDFILE

In a multiple stand simulation, allows values from a file opened with the OPEN keyword record for the previous stand to be re-entered without closing the file and then re-opening it in the current stand.

field 1: File reference number of the file to be rewound. *Default = 2 (tree record file)*

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.2.4

## SCREEN

(output to SCREEN)

Variants: All

Related keywords: NOSCREEN

Requests printing of an abbreviated copy of the summary statistics table to the terminal screen or a file during program execution.

field 1: File reference number where the Screen output to be directed. The default is to direct output to unit 6, which is the terminal screen. If the value is any number other than 6 or blank, then an associated SCREEN output file needs to be opened with OPEN keyword. *Default = 6 (screen)*

Note: The Suppose interface program automatically includes a SCREEN keyword that sends the output to the terminal screen.

Example sending output to new unit:

```
SCREEN          50
OPEN           50
SCREEN.OUT
```

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.3.4

## SDIMAX

(Stand Density Index MAXimum)

Variants: All

Related keywords: BAMAX, MORTMULT

Specifies the maximum stand density index by species. The value of the maximum stand density index is an important variable in determining stand mortality and normal stocking for automatic thinnings. Also, in some variants, maximum SDI is used to model crown ratio change for individual tree records.

Maximum SDI for a stand is computed as a weighted average of the SDI maximums for each species in the stand. The weight for a species is calculated as the total basal area for that species divided by the total basal area in the stand. Maximum stand SDI is used in all variants to determine normal stocking for automatic thinnings. In addition, it is used to calculate density related mortality in all variants except CI, KT, and NI. If no SDIMAX keyword is present, maximum SDI defaults are assigned as shown in Appendix B. Defaults are based on the species in the stand or are a function of plant community.

field 1: Species code for which the maximum stand density index applies. *Default = All*  
field 2: Maximum stand density index value. *Defaults shown in Appendix B*  
field 3: *No longer used.*  
field 4: *No longer used.*  
field 5: Percentage of theoretical maximum density at which density-related mortality is invoked. *Default = 55, Lower limit = 10*  
field 6: Percentage of theoretical maximum density at which the stand reaches actual maximum density. *Default = 85, Upper limit = 95*  
field 7: Stagnation indicator (CR variant only). *Default = 0*  
0 No stagnation effect  
1 Include stagnation effect when stand SDI is above 70% of maximum SDI

SDI is computed using the following equation:

$$\text{Stand SDI} = 0.00490419 * (\text{SUMQ} / \text{TPA}_{\text{total}})^{0.8025} * \text{TPA}_{\text{total}} \\ + 0.01992714 * (\text{SUMQ} / \text{TPA}_{\text{total}})^{-0.1975} * \text{SUMQ}$$

where:  $\text{SUMQ} = \sum(\text{DBH}_i^2 * \text{TPA}_i)$

$\text{DBH}_i$  = diameter at breast height of the  $i^{\text{th}}$  tree record

$\text{TPA}_i$  = trees per acre represented by the  $i^{\text{th}}$  tree record

$\text{TPA}_{\text{total}}$  = total trees per acre in the stand

Caution: Use of this keyword can drastically change predicted yields.

Caution: If multiple SDIMAX keywords are used, fields 5, 6, and 7 should only be specified once.

Note: This keyword is processed before any tree data is read. If after reading the tree data it is found that the stand is above the upper limit of maximum density, the maximum SDI will be automatically recalculated without regard to the value set with this keyword.

Note: In all variants other than NI, KT, and CI, if both SDIMAX and BAMAX are specified, the SDIMAX values will override the BAMAX values.

Note: The overall stand maximum SDI is available in the event monitor in the variable BSDIMAX at the beginning of a cycle, and in the variable ASDIMAX after a thinning has occurred. Refer to the User's Guide to the Event Monitor.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.4

## **SERLCORR** (SERial CORrelation)

Variants: All

Replaces parameters for the serial correlation function of the autoregressive moving-average model, ARMA(1,1), which produces serial correlation between errors for successive diameter increment predictions. To some degree, diameter growths in one cycle can be made to correlate with diameter growths from the previous cycle. That is to say a tree growing well in one cycle will tend to keep growing well, relative to other trees, in the next cycle. The primary use of this keyword is to turn off the autocorrelation by setting both parameters to 0 (zero). Use of other values is strongly discouraged unless the user understands well the implications on the model.

field 1: Autoregressive operator  $\phi$  for the ARMA(1,1) model. *Default = 0.74*

field 2: Moving-average operator  $\theta$  for the ARMA(1,1) model. *Default = 0.42*

Note: Setting the value of both fields to 0 (zero) turns off the autocorrelation.

Caution: Many of the predictions in FVS are based on diameter increment. Changing the diameter increment prediction also changes many of the other predictions made in the model.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 7.5

## **SETPHIN** (SETs Point THINning)

Variants: All

Related keywords: THINPT, POINTREF, THINRDSL

Sets the parameters for a thinning by point, used in conjunction with the THINPT keyword.

field 1: Year or cycle that thinning is scheduled. *Default = 1*

field 2: Point number to be thinned. A point number is required or the keyword is ignored.

field 3: Point thinning (THINPT) residual attribute.

1 = Trees per acre

2 = Basal area

3 = Stand Density Index

4 = Percent Canopy Cover

5 = Relative Density (Curtis)

6 = Relative Density (SILVAH model)

Caution: This keyword must precede the THINPT keyword for it to effect the thinning.

Note: Field 2 must be set for this keyword to work. A value of 0 will render the keyword useless.

## **SITECODE** (SITE index CODE)

Variants: All except CI, KT, and NI

Sets species-specific site index values. If a SITECODE keyword is present, all species for which site index values were not explicitly set will be assigned site index values derived from the site index of the specified site species. If no SITECODE keyword is present, site index defaults are assigned as shown in Appendix B.

field 1: Species code. If blank, all species will be assigned the value in field 2.  
*Default = blank (all species)*

field 2: Site index in feet. For the NC, SO, and WS variants, a value less than 10 is interpreted as a Dunning site code and is converted to a site index for each species as described in the technical documentation for those variants.  
*Defaults shown in Appendix B*

field 3: Site species override code. A non-zero value designates the species in field 1 as the site species for the stand. *Default = 0*

Caution: The value entered in field 2 should be based on the site curves and base ages used to build the variant relationships. Refer to the variant overview for this information.

Note: Field 3 is ignored if field 1 contains a species group. If field 1 contains a species group and the site species has not been set, site species gets set to the first species in the species group.

Note: If field 3 is 0 (zero) or blank in each of the SITECODE keywords used, the species from the first SITECODE keyword with a non-zero, non-blank species code becomes the site species for the stand.

Note: If a Dunning site code is used it will apply the site code to all species, even if you specify one species in field 1. If you want one species to have a different site code than the others, you need to specify a site index value based on the site curve for that species.

Note: The Suppose interface program automatically includes a SITECODE keyword based on the site index and site species fields of the stand list file if those fields are not blank.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.1.2.2

## SETSITE

(SET SITE related parameters)

Variants: All

Related keywords: STDINFO, SITECODE

Stand habitat type, plant association, or ecological unit is entered using field 2 of the STDINFO keyword record. Site index values for individual species are entered using the SITECODE keyword. These values are usually regarded as constants throughout a projection. Climate change research suggests that these values might change over time. This keyword allows users to change these values during a projection.

field 1: Year or cycle in which the parameter will be changed. Enter 0 (zero) to affect all cycles. *Default = 1*

field 2: Habitat type, plant association, or ecological unit. *Default = blank (no change)*

field 3: Preference value for removal of species identified in field 2. A positive value increases the chance for tree removal and a negative value increases the chance for tree retention. *Default = 0*

Note: To specify the habitat type, plant association, ecological code or site index for the stand at inventory users should use the the STDINFO or SITECODE keywords.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.1.2.2

## SPCODES

(SPecies CODES)

Variants: All

Related keywords: TREEFMT

Identifies species codes used on the input tree records. This keyword is used when the species codes in the input tree records do not match the standard FVS species codes for the variant being used (see Appendix A). One or more supplemental records are required that contain the species codes from the input tree records.

field 1: FVS species sequence number (integer) whose alpha code is to be overridden. Do not enter the 2-character alpha species code. If blank, all species codes are to be replaced.

Supplemental record(s):

Species codes from the input tree records are left justified in 4-character fields. If field 1 identifies a specific species, the supplemental record consists simply of one 4-character field. If field 1 is blank, then all species codes are to be overridden and each supplemental record consists of up to twenty consecutive 4-character fields. In this case, the species codes are entered sequentially in the



order of the species sequence numbers (see Appendix A). If there are blanks in the sequence numbers, then those 4-character fields are left blank. Each species in FVS can be represented by only *one* code from the input tree records.

Example 1, single species:

```
SPCODES          7
LPP
```

Example 2, all species in a variant with 24 species:

```
SPCODES
SAF CF3 DF  217 WF2 MTH  68 WL5 BC  LP5 LPP PY  PP1 WBP WWP J   BS2 93  WTS ASP
CW  A99 990 999
```

Note: The codes in the supplemental records are interpreted literally and blanks are not equivalent to zeros. For example, “WP ” is different than “ WP” (trailing spaces vs. leading spaces). Also “ 3” is different than “ 03”.

Note: If all tree records are ultimately reported by FVS as “other species” or something similar, an error has probably been made in the preparation of either the SPCODES or TREEFMT keywords.

Reference: Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 4.2.3.3

## **SPEC**PREF (SPECies removal PREFerence)

Variants: All

Related keywords: TCONDMLT, THINxxx

Sets the removal preference for a species. This affects the order in which trees are selected for removal when a harvest is implemented. When a thinning is implemented, tree records with the highest removal priority are selected first, and selection continues based on removal priority until the parameters of the thinning have been met, or until all records have been selected. The removal priority is determined by the equation below:

$$\text{Removal Priority} = (\text{DBH} * F_D) + \text{SP} + (\text{TVC} * F_T) + (\text{MR} * F_M) + (\text{STS} * F_S)$$

All terms after the first default to zero. (See TCONDMLT and refer to the Dwarf Mistletoe Impact Model keyword documentation for MISTPREF for a discussion of the other terms). The relevant part of the equation for this keyword is:

$$\text{Removal Priority} = (\text{DBH} * F_D) + \text{SP}$$

where: DBH = diameter at breast height

$F_D$  = 1 for thinning from above, -1 for thinning from below

SP = species preference

For the species designated in field 2 of the SPEC/PREF keyword, the SP (species preference) term has the value assigned in field 3. Species preference for other species are set with additional SPEC/PREF keywords, otherwise they have a default value of 0 (zero). The SPEC/PREF keyword alone does not remove trees. It must be followed by one or more thinning keywords, which, in conjunction with the SPEC/PREF keyword, determine the order of tree records selected.

field 1: Year or cycle the preference is to be applied. Once in effect it remains in effect until replaced by a subsequent multiplier. *Default = 1*

field 2: Species code whose removal priority is to be changed. A valid code is required or the keyword is ignored.

field 3: Preference value for removal of species identified in field 2. A positive value increases the chance for tree removal and a negative value increases the chance for tree retention. *Default = 0*

Example: In a thinning from above, a 15-inch PP is selected for harvest before a 12-inch WF. If a SPEC\_PREF keyword is used to assign a preference of 5 to WF, then the WF (whose removal priority is now  $12 * 1 + 5$ , or 17) is selected before the PP, even though the PP is larger.

Note: For any particular species this keyword remains in effect until a subsequent use of the keyword changes the priority for that species.

Note: Keyword order may be important. If a SPEC\_PREF keyword is specified for the *same year* that a thinning keyword is specified, the species preference will affect the thinning only if the SPEC\_PREF keyword appears in the keyword sequence before the thinning keyword.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Caution: The SPEC\_PREF keyword has no effect on thinning done with the THINDBH or THINHT keywords.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 26  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.4.1

## **SPGROUP** (Species Group)

Variants: All

Related keywords: None

Defines a group of species that can be referenced by a single name, or FVS sequence number, and will be treated as a group in management actions or event monitor functions. Users may define up to 10 species groups with each group containing up to 50 species codes. If the species group name is entered in the species field of a keyword, the keyword action will apply to all species in the group. One or more supplemental records are required that contain the FVS species codes or FVS species sequence numbers.

When using keywords in FVS, species can be referenced by their 2-character alpha designation or numeric sequence number. Similarly, species groups can be referenced by their group name, defined in field 1, or by their FVS sequence number. FVS sequence numbers for species groups are assigned by FVS and are contained in the range (-1 to -10). When referencing species groups on keywords, users are encouraged to use the group name instead of the FVS group sequence number.

field 1: Species Group name. *Default = GroupXX where XX=01 for the first defined species group, 02 for the second, ..., 10 for the 10<sup>th</sup> defined species group. (e.g. Group01, Group02, ..., Group10)*

Supplemental record(s):

FVS species codes or species sequence numbers. A supplemental record can be up to 150 characters long, therefore up to 50 species can be placed on one supplemental record. The record is free form in format with each species code

separated by one or many blanks. Species can be continued onto an additional supplemental record by putting an “&” at the end of the line.

Example: For the NI variant, define two species groups, one group named BIGFOOT containing Douglas-fir, lodgepole pine, and ponderosa pine; the other using the FVS default naming convention containing grand fir, lodgepole pine, and western hemlock.

```
SPGROUP      BIGFOOT
DF 7 PP

SPGROUP
GF &
LP &
WH
```

The first group contains a mixture of the alpha species codes and FVS species sequence numbers (7 being Lodgepole in the NI variant). Also the species are left justified in fields on the supplemental record. This group could be referenced by the group name BIGFOOT or the FVS sequence number -1 since it is the first defined group.

The second group contains all alpha species codes with each code located on its own line with a “&” continuing the list onto the following line. This group could be referenced by the group name GROUP02 (i.e. the default group name) or the FVS sequence number -2 since it is the second defined group.

The keyword

```
THINDBH      2020.      5.      10.      1.      BIGFOOT
```

would remove all Douglas-fir, lodgepole pine, and ponderosa pine in the diameter range  $5.0 \leq dbh < 10.0$  in the year 2020.

The keywords

```
COMPUTE      0.
TPAG2 = SPMCDDBH(1, GROUP2, 0)
END
```

would compute the total trees per acre of grand fir, lodgepole pine, and western hemlock and store the result in the event monitor variable TPAG2.

Note: The SPGROUP keyword must precede any other keyword that references the species group

Note: The species group name must be between 3 and 10 characters long, cannot be “ALL” or any pre-defined event monitor variable name, and cannot contain any blanks. A species group may contain up to 50 species. An individual species may be included in more than one group.

Reference: Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 4.2.5

## **SPLABEL** (Stand Policy LABEL)

Variants: All

Related keywords: AGPLABEL, ALSOTRY, IF, THEN, ENDIF

Specifies a set of labels for the stand that may be used to selectively schedule conditional activities. This capability is useful only when multiple stands are included in a simulation. The stand policy labels are assigned to stands based on common meaningful characteristics. These

labels are then used to conditionally schedule similar activities in the stands with common policy labels using the AGPLABEL keyword. For example, three stands are to be managed. The first two are assigned a stand policy label *PineType*, and the second and third are assigned a stand policy label *Overstocked*. The second stand, therefore, has two stand policy labels in its set, *PineType* and *Overstocked*, whereas each of the other two stands has a single label. If an activity is conditionally scheduled, using AGPLABEL, to be applied only to stands with the label *PineType* only the first two stands will be considered since these are the only stands with the label *PineType*. If a second activity is conditionally scheduled to be applied only to stands with the label *Overstocked* only the second and third stands will be considered.

Refer to the description for the AGPLABEL keyword for an explanation and example of how to use the stand policy labels in conditionally scheduling activities.

No fields are associated with this keyword. Labels are entered on a supplemental record.

Supplemental record:

Specifies the stand policy labels. Labels are separated by a single comma. The total number of characters in the label set may not exceed 100. An ampersand (&) is used to indicate that the list of labels is continued on the next line. Any character may be used as part of a label except a comma, period, or ampersand.

Example:

```
SPLABEL  
PineType, Overstocked, &  
Age50-80
```

Note: If more than one SPLABEL keyword is used for a stand, the set specified latest in the sequence of keywords will be used and the others will be ignored.

References: GTR INT-275, User's Guide to the Event Monitor..., p. 7  
GTR INT-281, User's Guide to the Parallel Processing Extension..., p. 9  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.6.2

## **STANDCN** (STAND Control Number )

Variants: All

Related keywords: DATABASE

STANDCN allows you to use a variable called STAND\_CN, which is stored as a 40-character string. A stand-level CN is used in FSVeg as a primary key in the database. Relating the input from a database and output from FVS can be achieved using the database extension. STAND\_CN is a column in the database extension, FVS\_Cases table and FVS\_StandInit table. STAND\_CN can also be used in SQL preprocessing in the Database Extension.

No fields are associated with this keyword, however a supplemental record that contains the Stand Control Number (up to 40 characters) is required.

## **STATS** (STATisticS)

Variants: All

Requests that optional output tables that show a statistical description of the input (inventory) data for a projection be written to the standard FVS output file. Statistics reported include board-foot volume, cubic-foot volume, trees per acre, and basal area per acre for each species present in the stand. Also included are the mean, standard deviation, coefficient of variation, and confidence

limits across sample plots for stand totals of these volume and density measures. The user-defined significance level defines the corresponding Student's t-value computed by the program.

field 1: Significance level for computing confidence limits. *Default = 0.05*

Caution: No corrections are made to account for non-stockability if the stand contains non-stockable plots. These plots are included in the calculations.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.3.2.1

## **STDIDENT** (STanD IDENTification)

Variants: All

Specifies a stand identification code and optional descriptive title to label output tables.

No fields are associated with this keyword. Stand identification information is entered on a supplemental record.

Supplemental record:

Contains a stand identification code of up to 26 characters. This stand ID will appear with every output table. A blank character indicates the end of the stand identification code. Anything entered after the blank, up to column 80, is read as an optional "Title" that will appear with some of the output tables.

Example:

```
STDIDENT  
C24S112 Stand 112 in Clear Creek drainage
```

This example uses "C24S112" as the stand ID. This appears along with "Stand 112 in Clear Creek drainage" in the headings of tables in the main FVS output file.

Note: The Suppose interface program automatically includes a STDIDENT keyword based on the Stand ID field in the stand list file and the Location Name field in the locations file.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 11  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.1.2.1

## **STDINFO** (STanD INFOrmation)

Variants: All

Related keywords: MODTYPE, LOCATE

Describes the characteristics of the site where the stand is located. Default values for the different fields vary by variant and are listed in the table below the field descriptions.

field 1: Numeric Region and National Forest code where stand is located.  
RFF where R = region, FF = 2-digit forest code

For KT variant, RFFDDCCC where R = region, FF = forest, DD = district,  
CCC = compartment (used in growth equations)

For SE and SN variants, RFFDD where R = region, FF = forest, DD = district  
(used in volumes)

field 2: Stand habitat type code or plant community code (ecological unit code in SN.)

field 3: Stand age in years.

field 4: Stand aspect in degrees (0 or 360 = north).

field 5: Stand slope percent.

field 6: Stand elevation in 100's of feet (10's of feet in AK variant). For example, a code of 52 would mean elevation is 5200 feet (520 feet in AK).

field 7: Stand Latitude in degrees.

Field defaults by variant:

Variant	field						
	1	2	3	4	5	6	7
AK	1005	N/A	0	0	5	10	56
BM	616	CWG113	0	0	5	45	39
CA	610	XCWC221	0	0	5	35	45
CI	412	260	0	0	5	50	45
CR <sup>a</sup>							
SM	303	0	0	0	5	88	35
SP	303	0	0	0	5	88	35
BH	203	0	0	0	5	55	44
SF	211	0	0	0	5	90	40
LP	211	0	0	0	5	90	40
CS	905	N/A	0	0	5	12	30
EC	606	CPS241	0	0	5	45	45
EM	108	260	0	0	5	55	45
KT	114	571	0	45	30	35	48
LS	907	N/A	0	0	5	17	47
NC	505	N/A	0	0	5	45	45
NE	922	N/A	0	0	5	30	40
NI	118	260	0	0	5	38	45
PN	612	N/A	0	0	5	7	45
SE	803	N/A	0	0	0	0	36
SN	80106	231Dd	0	0	0	0	36
SO	601	N/A	0	0	5	45	45
TT	415	N/A	0	0	5	65	45
UT	408	N/A	0	0	5	83	45
WC	618	N/A	0	0	5	35	46
WS	517	999	0	0	5	45	39

<sup>a</sup>The Central Rockies (CR) variant has different defaults for the different sub-models as listed on subsequent lines (SM is southwest mixed conifer, SP is southwest ponderosa pine, BH is Black Hills, SF is spruce-fir, and LP is lodgepole pine).

Note: Any field on the STDINFO keyword that is left blank will retain the value assigned by a previous STDINFO keyword. If no value was previously assigned, the default is used.

Note: The values entered in fields 2-7 are available in the event monitor in variables HABTYPE, AGE, ASPECT, SLOPE, ELEV, and LAT respectively. Refer to the User's Guide to the Event Monitor.

Note: If a latitude is entered on both the STDINFO and LOCATE keyword records, the value on the record occurring later in the keyword sequence will be used.

Note: The Suppose interface program automatically includes a STDINFO keyword based on the corresponding fields in the stand list file.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 12  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.1.2.2

## STOP

(STOP processing)

Variants: All

Marks the end of the keyword record file. When the STOP keyword is encountered, program execution ends.

No fields are associated with this keyword.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 8  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.1.3.3

## STRCLASS (STRuctural CLASS)

Variants: All

Requests that structural class calculations are done by FVS. A table of structural statistics can be written to the main FVS output file. The structural class computation results are made available to the Event Monitor. The STRCLASS keyword must be present if the user is going to use Event Monitor structural stage variables (refer to the list in the Note that follows this description).

field 1: A nonzero entry causes FVS to print the table of structural statistics in the main FVS output file. 0 (zero) suppresses printing of the tables. *Default = 1*

field 2: The percentage of a tree's height that is used to define the minimum gap size. *Range: 0-100, Default = 30*

field 3: The dbh boundary (in inches) separating seedling/sapling-sized trees from pole sized trees. *Default = 5.0*

field 4: The dbh boundary (in inches) separating pole-sized trees from large trees that may be considered old. *Default = 25.0*

field 5: The minimum percent cover that must be exceeded for a potential stratum to qualify as an actual stratum. *Range: 0-100, Default = 5*

field 6: Minimum trees per acre that must be exceeded for a stand that has less than 5 percent cover to be classified stand initiation rather than bare ground. *Default = 200*

field 7: Percentage of the maximum stand density index that must be exceeded for a stand to be classified stem exclusion rather than stand initiation. *Range: 0-100, Default = 30*

Note: When the STRCLASS keyword is used the structural classification logic is triggered. Then, and only then, the following Event Monitor variables are automatically defined by FVS:

BSCLASS      Before-thinning structural class code

ASCLASS	After-thinning structural class code
BSTRDBH	Before-thinning weighted average dbh of the uppermost stratum
ASTRDBH	After-thinning weighted average dbh of the uppermost stratum
BCANCOV	Before-thinning percent canopy cover for the stand
ACANCOV	After-thinning percent canopy cover for the stand
BMAXHS	Before-thinning height of tallest tree in uppermost stratum
AMAXHS	After-thinning height of tallest tree in uppermost stratum
BMINHS	Before-thinning height of shortest tree in uppermost stratum
AMINHS	After-thinning height of shortest tree in uppermost stratum
BNUMSS	Before-thinning total number of valid strata
ANUMSS	After-thinning total number of valid strata

Reference: RMRS-GTR-24, Percent Canopy Cover and Stand Structure Statistics ...  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.3.2.2

## SVS

(Stand Visualization System input)

Variants: All

Generates output files specifically for running the Stand Visualization System (SVS) post processor. The SVS software is not a part of the FVS software. It is maintained by the Pacific Northwest Research Station. It generates 3D drawings of the stand based on information produced by FVS.

field 1: Plot geometry and tree placement. *Default = 1*

0	Square SVS layout, ignore FVS plot designations
1	Square SVS layout, position trees by FVS plot designation
2	Round SVS layout, ignore FVS plot designations
3	Round SVS layout, position trees by FVS plot designation

field 2: Grid size for ground surface definition file. This is the number of cells along each side of the square grid of colors used to cover the ground in the SVS images. A value of 0 (zero) indicates no ground surface definition file is to be used. *Range = 0-256, Default = 100*

field 3: Draw range poles. *Default = 0*

0	No range poles
1	Range poles are drawn at the edges of the SVS layout

field 4: Draw subplot boundaries. *Default = 0*

0	No FVS plot boundaries drawn
1	FVS plot boundaries are drawn as lines in the SVS layout

field 5: Ground grid color scheme for ground surface definition file. *Default = 2*

1	Reds/oranges	11	Khakis/browns
2	Tans	12	Light greens
3	Reddish browns	13	Dark bluegreens
4	Light greys	14	Chocolate browns
5	Lime greens	15	Dark tans
6	Dark greens	16	Yellows
7	Medium bluegreens	17	Medium greys
8	Dark greens	18	Browns
9	Dark greys	19	Greens
10	Light browns	20	Dark browns

field 6: Render SVS output in imperial or metric units. *Default = 0*



0	Output is generated in imperial units
1	Output is generated in metric units

Note: Use of this keyword does not automatically start the SVS post processor program.

Note: There are several output files created by the SVS keyword. An index file is produced which has the same base name as the simulation file with a *\_index.svs* appended. The image files associated with the index file are placed in a directory with the base name of the simulation file. The first image file is named with the simulation base name with *\_001.svs* appended, and subsequent files are named similarly using subsequent numbers in the names (e.g. simulation file *testrun.key* produces index file *testrun\_index.svs*, and image files *testrun\_001.svs*, *testrun\_002.svs*, etc.).

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.7

## SYSTEM (SYSTEM)

Variants: All

Related keywords:

A command that is processed by the operating system at the end off the scheduled cycle.

field 1: Year or cycle in which command is to be processed. If field is left blank then command will be processed as soon as it is read.

Supplemental record:

System command. *Default = echo system command*

## TCONDMLT (Tree Condition Multiplier)

Variants: All

Related keywords: SPEC\_PREF, THINxxx

Sets the tree value class multiplier, special tree status multiplier and or plot density multiplier in the harvest priority algorithm. This affects the order in which trees are selected for removal when a harvest is implemented. When a thinning is implemented, tree records with the highest removal priority are selected first, and selection continues based on removal priority until the parameters of the thinning have been met, or until all records have been selected. The removal priority is determined by the equation below:

$$\text{Removal Priority} = (\text{DBH} * F_D) + \text{SP} + (\text{TVC} * F_T) + \text{MR} + (\text{STS} * F_S) + (\text{PBA} * F_B) + (\text{PCCF} * F_C) + (\text{PTPA} * F_P)$$

All terms other than the first term default to zero. (See SPEC\_PREF and refer to the Dwarf Mistletoe Impact Model keyword documentation for MIST\_PREF for a discussion of the other terms). The relevant part of the equation for this keyword is:

$$\text{Removal Priority} = (\text{DBH} * F_D) + (\text{TVC} * F_T) + (\text{STS} * F_S) + (\text{PBA} * F_B) + (\text{PCCF} * F_C) + (\text{PTPA} * F_P)$$

where: DBH = diameter at breast height

$F_D = 1$  for thinning from above,  $-1$  for thinning from below

TVC = tree value class (column 48 of the standard input tree record;

1 = desirable, 2 = acceptable, 3 = undesirable)  
 $F_T$  = tree value class multiplier (field 2 value).  
 STS = special tree status (the severity code associated with a damage code of 55 in the input tree record)  
 $F_S$  = special tree status multiplier (field 3 value)  
 PBA = point basal area  
 $F_B$  = point basal area multiplier (field 4 value)  
 PCCF = point crown competition factor  
 $F_C$  = point crown competition multiplier (field 5 value)  
 PTPA = point trees per acre  
 $F_P$  = point trees per acre (field 6 value)

The tree value class multiplier  $F_T$  is applied to the value class of all tree records. A value of 0 (zero) causes value class to be ignored in determining removal priority. The special tree status multiplier  $F_S$  is applied to the special tree status of any records that were given a special tree status (a special tree status code is the severity code associated with a damage code of 55). Special tree status codes are arbitrary. They were incorporated as a mechanism to allow modification of the removal priority based on user-defined attributes that would be otherwise unavailable to the user. A value of 0 (zero) causes special tree status to be ignored in determining removal priority.  $F_B$ ,  $F_C$  and  $F_P$  are all multiplier that are applied based on point (or plot) density. Allowing users to increase (or decrease) the likelihood a tree will be removed based on the density of the tree's point (or plot). The TCONDMLT keyword alone does not remove trees. It must be followed by one or more thinning keywords, which, in conjunction with the TCONDMLT keyword, determine the order of tree records selected.

field 1: Year or cycle in which the change is to be implemented. Once in effect it remains in effect until replaced by a subsequent multiplier. *Default = 1*

field 2: Tree value class multiplier. A positive value increases the chance for removal of lower value class trees. A negative value increases the chance for removal of higher value class trees. *Default = 0*

field 3: Special tree status multiplier. A positive value increases the chance of removal of trees with a high special tree status code. A negative value increases the chance of retention of trees with a high special tree status code. *Default = 0*

field 4: Point basal area multiplier. A positive value increases the chance of removal of trees on the densest plots. A negative value increases the chance of retention of trees on dense plots. *Default = 0*

field 5: Point crown competition factor multiplier. A positive value increases the chance of removal of trees on the densest plots. A negative value increases the chance of retention of trees on dense plots. *Default = 0*

field 6: Point trees per acre multiplier. A positive value increases the chance of removal of trees on the densest plots. A negative value increases the chance of retention of trees on dense plots. *Default = 0*

Note: This keyword remains in effect until a subsequent use of the keyword changes the multipliers.

Note: Keyword order may be important. If a TCONDMLT keyword is specified for the *same year* that a thinning keyword is specified, the multipliers will affect the thinning only if the TCONDMLT keyword appears in the keyword sequence before the thinning keyword.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Caution: The TCONDMLT keyword has no effect on thinning done with the THINDBH or THINHT keywords.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 26  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.4.1

## **TFIXAREA** (Total FIXed plot AREA)

Variants: All

Related keywords: DESIGN

Specifies the total fixed-plot area for small-tree plots. This ensures that the trees per acre expansions are representative of the sampling design. This is useful when multiple small-tree plots are used at each of the plots specified in the tree data. For example, if at every point in a survey three 1/300-acre plots are installed for small trees, the total fixed area for the small-tree plots is 3/300 acre, which reduces to 1/100 acre. The value entered on this keyword is then is 100 (the inverse of 1/100). Trees per acre expansions for small trees will use a factor of 100 instead of 300.

field 1: Inverse of total small-tree fixed plot area (e.g. if there are 2 fixed area plots each of 1/100 acre on every plot, enter 50 in this field). *Default = 300*

Caution: Do not confuse multiple small-tree plots with a sampling design where different size small trees are recorded using different size fixed-plots. In the latter case the areas should NOT be added together. Instead, the tree counts for all small trees in the tree data will need to be modified to represent a single plot size, and the DESIGN keyword will specify the size of the new representative plot size used for the modified tree counts.

Note: The breakpoint diameter that determines the dbh below which trees were recorded using the small-tree fixed plots is specified on the DESIGN keyword.

Note: If a small-tree fixed plot area is specified on both the DESIGN and TFIXAREA keyword records, the value on the record occurring later in the keyword sequence will be used.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.1.2.3

## **THEN** (schedule if-THEN activities)

Variants: All

Related keywords: IF, ENDIF, AGPLABEL, ALSOTRY

Signifies the scheduling portion of an Event Monitor IF-THEN block. The Event Monitor keyword sequence must begin with an IF keyword. The next record must be a condition statement that evaluates to true or false. The next record is a THEN keyword. The sequence ends with an ENDIF keyword. All keywords contained between the THEN and ENDIF keywords will be executed whenever the condition is true. Any activity that can be normally scheduled can be alternatively scheduled within the Event Monitor IF-THEN block. The scheduling date (field 1) on the activity is then interpreted as a delay period. If the date entered is 10, the activity will be scheduled 10 years following the each date that the logical expression is true. Multiple activities can be scheduled in a single IF-THEN block, and all will be triggered by the same condition.

No fields are associated with this keyword when used outside the parallel processing extension.

Example: If stand basal area exceeds 100 square feet per acre, wait 10 years (first parameter of the THINDBH keyword is now a delay period) and then thin the stand according to the THINDBH parameters. Once this condition is true, wait 30 years (parameter on the IF keyword) before checking the condition again:

```
IF                30
BBA GT 100
THEN
THINDBH          10      0      99      1.0      0      0      0
ENDIF
```

Caution: The year/cycle field on activity keywords changes meaning to become a delay period when the keywords are included in an Event Monitor IF-THEN-ENDIF block. Entering 2010 in the date field of an activity keyword that is in an IF-THEN-ENDIF block will cause a delay period of 2010 years between the time the condition is true and the time the activity will be scheduled.

Note: When using the Suppose interface program, scheduling by condition is accomplished by clicking the “Schedule by Condition” button in individual keyword windows, and then clicking the “Condition” button and selecting “Free Form” to set up the condition statement. The activity keyword that follows the THEN statement (the THINDBH keyword as shown in the example above) is not typed in explicitly, but is rather set up using the keyword window. When the condition statement has been typed in, the “OK” button is clicked to return to the keyword window to fill in the appropriate field values. The ENDIF keyword will be added automatically.

References: GTR INT-275, User’s Guide to the Event Monitor..., p. 2  
Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 5.5.1

## THINABA

(THIN from Above to Basal Area target)

Variants: All

Related keywords: THINxxx, SPECPREF, TCONDMLT, CUTEFF

Schedules a thinning from above to a basal-area-per-acre target. Only trees with dbh’s and heights within the user-defined ranges are considered for removal. The tree record with the largest diameter within the specified range is considered for removal first, and the proportion of that tree record specified in field 3 is removed. The tree record with the next largest diameter is considered next, then the next largest and so on until the residual basal area target is met or all records in the specified range have been considered. The residual target basal area is specified only for the user-defined range of dbh and height, and does *not* represent the total residual unless the range of dbh’s and heights includes all trees in the stand.

field 1: Year or cycle that thinning is scheduled. *Default = 1*

field 2: Target basal area in square feet per acre for the segment of the dbh and height distribution defined in fields 4-7. *An entry is required*

field 3: Cutting efficiency parameter specific to this thinning request (refer to the CUTEFF keyword for description). *Range: 0.01-1.0, Default = 1.0*

field 4: Smallest dbh in inches to be considered for removal (greater than or equal). *Default = 0.0*

field 5: Largest dbh in inches to be considered for removal (less than). *Default = 999.0*

field 6: Shortest tree in feet to be considered for removal (greater than or equal).  
*Default = 0*

field 7: Tallest tree in feet to be considered for removal (less than). *Default = 999*

Caution: The specified residual target is for the user-defined range of dbh and height. The total residual will also include all trees that do not fall within this range.

Caution: If the cutting efficiency is set too low, the model may not be able to attain the residual target specified. The thinning request will be completed, but the residual stand condition will be greater than the specified target.

Caution: If a thinning keyword is embedded in an IF-THEN-ENDIF sequence, year (field 1) is interpreted as years from the time the condition is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to thin the stand.)

Note: If field 2 is blank the keyword is ignored.

Note: If the initial stand condition is already less than the target specified, the thinning will be cancelled. Look at the "Activity Summary" portion of the standard FVS output to see which requests were implemented and which were cancelled.

Note: A thinning is always done in the first year of the cycle in which it is scheduled, even if the year entered in field 1 is not the first year of the cycle. If a thinning must occur in a particular year, a TIMEINT keyword may be needed to change the length of a cycle so that the desired year for the thinning becomes the first year of a cycle.

Note: Multiple thinning keywords can be scheduled for the same year to simulate different aspects of a single harvest. Care must be taken to ensure that the dbh and height ranges do not unintentionally overlap, or the residual may not be what was expected. Total residuals must be calculated carefully.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 27  
GTR INT-208, Supplement to the User's Guide..., p. 16  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.4.2

## **THINATA** (THIN from Above to Trees per Acre target)

Variants: All

Related keywords: THINxxx, SPECREF, TCONDMLT, CUTEFF

Schedules a thinning from above to a trees-per-acre target. Only trees with dbh's and heights within the user-defined ranges are considered for removal. The tree record with the largest diameter within the specified range is considered for removal first, and the proportion of that tree record specified in field 3 is removed. The tree record with the next largest diameter is considered next, then the next largest and so on until the residual trees-per-acre target is met or all records in the specified range have been considered. The residual target trees per acre is specified only for the user-defined range of dbh and height, and does *not* represent the total residual unless the range of dbh's and heights includes all trees in the stand.

- field 1: Year or cycle that thinning is scheduled. *Default = 1*
- field 2: Target trees per acre for the segment of the dbh and height distribution defined in fields 4-7. *An entry is required*
- field 3: Cutting efficiency parameter specific to this thinning request (refer to the CUTEFF keyword for description). *Range: 0.01-1.0, Default = 1.0*
- field 4: Smallest dbh in inches to be considered for removal (greater than or equal). *Default = 0.0*
- field 5: Largest dbh in inches to be considered for removal (less than). *Default = 999.0*
- field 6: Shortest tree in feet to be considered for removal (greater than or equal). *Default = 0*
- field 7: Tallest tree in feet to be considered for removal (less than). *Default = 999*

Caution: The specified residual target is for the user-defined range of dbh and height. The total residual will also include all trees that do not fall within this range.

Caution: If the cutting efficiency is set too low, the model may not be able to attain the residual target specified. The thinning request will be completed, but the residual stand condition will be greater than the specified target.

Caution: If a thinning keyword is embedded in an IF-THEN-ENDIF sequence, year (field 1) is interpreted as years from the time the condition is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to thin the stand.)

Note: If field 2 is blank the keyword is ignored.

Note: If the initial stand condition is already less than the target specified, the thinning will be cancelled. Look at the "Activity Summary" portion of the standard FVS output to see which requests were implemented and which were cancelled.

Note: A thinning is always done in the first year of the cycle in which it is scheduled, even if the year entered in field 1 is not the first year of the cycle. If a thinning must occur in a particular year, a TIMEINT keyword may be needed to change the length of a cycle so that the desired year for the thinning becomes the first year of a cycle.

Note: Multiple thinning keywords can be scheduled for the same year to simulate different aspects of a single harvest. Care must be taken to ensure that the dbh and height ranges do not unintentionally overlap, or the residual may not be what was expected. Total residuals must be calculated carefully.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 27  
 GTR INT-208, Supplement to the User's Guide..., p. 16  
 Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.4.2

## **THINAUTO** (THIN AUTOatically)

Variants: All

Related keywords: THINxxx, SPEC\_PREF, TCONDMLT, CUTEFF

Schedules automatic stocking control. Thinning from below is automatically scheduled whenever the stand density exceeds the user-defined upper limit management threshold. The thinning reduces stand density to the user-defined lower limit management threshold. Thresholds are defined as percentages of maximum stand density index.

field 1: Year or cycle that automatic stocking control is to begin. The need for thinning will be evaluated in that cycle, and in all subsequent cycles. *Default = 1*

field 2: Percentage of maximum SDI that defines the lower management limit for stand density. *Default = 45*

field 3: Percentage of maximum SDI that defines the upper management limit for stand density. *Default = 60*

field 4: Cutting efficiency parameter specific to automatic stocking control request (refer to the CUTEFF keyword for description). *Range: 0.01-1.0, Default = 1*

Caution: Check the stocking guide used by the growth model to be sure lower and upper limits are appropriate for your area.

Caution: When using the KT or NI variant, an SDIMAX keyword must be included in the simulation file and the SDI maximums must be set for all species, otherwise this keyword will result in a clearcut.

Caution: If the cutting efficiency is set too low, the model may not be able to attain the lower limit specified. The thinning request will be completed, but the residual stand condition will be denser than the lower limit specifies.

Note: If field 2 is blank the keyword is ignored.

Note: This keyword can create management scenarios that are impractical to implement on the ground. Using the Event Monitor, other sets of keywords can be created that achieve automatic stand density control using other thinning keywords. In this way the deficiencies of this keyword can be overcome.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 28  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.4.3

## **THINBBA** (THIN from Below to Basal Area target)

Variants: All

Related keywords: THINxxx, SPEC\_PREF, TCONDMLT, CUTEFF

Schedules a thinning from below to a basal-area-per-acre target. Only trees with dbh's and heights within the user-defined ranges are considered for removal. The tree record with the smallest diameter within the specified range is considered for removal first, and the proportion of that tree record specified in field 3 is removed. The tree record with the next smallest diameter is considered next, then the next smallest and so on until the residual basal area target is met or all

records in the specified range have been considered. The residual target basal area is specified only for the user-defined range of dbh and height, and does *not* represent the total residual unless the range of dbh's and heights includes all trees in the stand.

field 1: Year or cycle that thinning is scheduled. *Default = 1*

field 2: Target basal area in square feet per acre for the segment of the dbh and height distribution defined in fields 4-7. *An entry is required*

field 3: Cutting efficiency parameter specific to this thinning request (refer to the CUTEFF keyword for description). *Range: 0.01-1.0, Default = 1.0*

field 4: Smallest dbh in inches to be considered for removal (greater than or equal). *Default = 0.0*

field 5: Largest dbh in inches to be considered for removal (less than). *Default = 999.0*

field 6: Shortest tree in feet to be considered for removal (greater than or equal). *Default = 0*

field 7: Tallest tree in feet to be considered for removal (less than). *Default = 999*

Caution: The specified residual target is for the user-defined range of dbh and height. The total residual will also include all trees that do not fall within this range.

Caution: If the cutting efficiency is set too low, the model may not be able to attain the residual target specified. The thinning request will be completed, but the residual stand condition will be greater than the specified target.

Caution: If a thinning keyword is embedded in an IF-THEN-ENDIF sequence, year (field 1) is interpreted as years from the time the condition is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to thin the stand.)

Note: If field 2 is blank the keyword is ignored.

Note: If the initial stand condition is already less than the target specified, the thinning will be cancelled. Look at the "Activity Summary" portion of the standard FVS output to see which requests were implemented and which were cancelled.

Note: A thinning is always done in the first year of the cycle in which it is scheduled, even if the year entered in field 1 is not the first year of the cycle. If a thinning must occur in a particular year, a TIMEINT keyword may be needed to change the length of a cycle so that the desired year for the thinning becomes the first year of a cycle.

Note: Multiple thinning keywords can be scheduled for the same year to simulate different aspects of a single harvest. Care must be taken to ensure that the dbh and height ranges do not unintentionally overlap, or the residual may not be what was expected. Total residuals must be calculated carefully.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 27  
GTR INT-208, Supplement to the User's Guide..., p. 16  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.4.2



## THINBTA (THIN from Below to Trees per Acre target)

Variants: All

Related keywords: THINxxx, SPECREF, TCONDMLT, CUTEFF

Schedules a thinning from below to a trees-per-acre target. Only trees with dbh's and heights within the user-defined ranges are considered for removal. The tree record with the smallest diameter within the specified range is considered for removal first, and the proportion of that tree record specified in field 3 is removed. The tree record with the next smallest diameter is considered next, then the next smallest and so on until the residual trees-per-acre target is met or all records in the specified range have been considered. The residual target trees per acre is specified only for the user-defined range of dbh and height, and does *not* represent the total residual unless the range of dbh's and heights includes all trees in the stand.

field 1: Year or cycle that thinning is scheduled. *Default = 1*

field 2: Target trees per acre for the segment of the dbh and height distribution defined in fields 4-7. *An entry is required*

field 3: Cutting efficiency parameter specific to this thinning request (refer to the CUTEFF keyword for description). *Range: 0.01-1.0, Default = 1.0*

field 4: Smallest dbh in inches to be considered for removal (greater than or equal). *Default = 0.0*

field 5: Largest dbh in inches to be considered for removal (less than). *Default = 999.0*

field 6: Shortest tree in feet to be considered for removal (greater than or equal). *Default = 0*

field 7: Tallest tree in feet to be considered for removal (less than). *Default = 999*

Caution: The specified residual target is for the user-defined range of dbh and height. The total residual will also include all trees that do not fall within this range.

Caution: If the cutting efficiency is set too low, the model may not be able to attain the residual target specified. The thinning request will be completed, but the residual stand condition will be greater than the specified target.

Caution: If a thinning keyword is embedded in an IF-THEN-ENDIF sequence, year (field 1) is interpreted as years from the time the condition is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to thin the stand.)

Note: If field 2 is blank the keyword is ignored.

Note: If the initial stand condition is already less than the target specified, the thinning will be cancelled. Look at the "Activity Summary" portion of the standard FVS output to see which requests were implemented and which were cancelled.

Note: A thinning is always done in the first year of the cycle in which it is scheduled, even if the year entered in field 1 is not the first year of the cycle. If a thinning must occur in a particular year, a TIMEINT keyword may be needed to change the length of a cycle so that the desired year for the thinning becomes the first year of a cycle.

Note: Multiple thinning keywords can be scheduled for the same year to simulate different aspects of a single harvest. Care must be taken to ensure that the dbh and height ranges do not unintentionally overlap, or the residual may not be what was expected. Total residuals must be calculated carefully.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 27  
GTR INT-208, Supplement to the User's Guide..., p. 16  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.4.2

## THINCC

(THIN to Canopy Cover target)

Variants: All

Related keywords: THINxxx, SPEC\_PREF, TCONDMLT, CUTEFF

Schedules a thinning from a specified dbh range for any, or all, species to a percent canopy cover target. Canopy cover is corrected for crown overlap. If the target canopy cover is nonzero and the cutting control flag is zero, thinning occurs uniformly throughout the specified dbh range until the target is met (the cutting efficiency parameter is ignored and the cutting efficiency needed to complete the thinning is automatically computed by the program). If the target canopy cover is nonzero and the cutting control flag is nonzero, then the cutting efficiency parameter is used, along with the Removal Priority Algorithm. If the cutting efficiency parameter is set so low that the target cannot be reached, the cutting efficiency is recalculated so that the target is met. Only trees of the user-specified species that are within the user-defined dbh range are considered for removal. The residual target canopy cover is specified only for that species and dbh range, and does *not* represent the total residual unless the dbh range includes all trees of all species in the stand.

field 1: Year or cycle that thinning is scheduled. *Default = 1*

field 2: Residual Canopy Cover (percent). *Default = 0*

field 3: Cutting efficiency parameter specific to this thinning request (refer to the CUTEFF keyword). *Range: 0.01-1.0, Default = model computed*

field 4: Species code for trees to be removed in this cut. *Default = 0 (All)*

field 5: Smallest dbh in inches to be considered for removal (greater than or equal). *Default = 0.0*

field 6: Largest dbh in inches to be considered for removal (less than). *Default = 999.0*

field 7: Cutting control flag. *Default = 0*

0 = thin throughout the specified diameter range

1 = thin from below in the specified diameter range

2 = thin from above in the specified diameter range.

Canopy cover is computed using the following equation:

$$C_1 = 100 ( \sum [TPA_i * A_i] ) / 43560$$

where:  $C_1$  = percent canopy cover without accounting for overlap

$TPA_i$  = trees per acre represented by the  $i^{th}$  tree record

$A_i$  = projected crown area of the  $i^{th}$  tree record in  $ft^2/acre$

$$C_2 = 100 [1 - \exp(-.01C_1)]$$

where:  $C_2$  = percent canopy cover that accounts for overlap  
 $C_1$  = percent canopy cover without accounting for overlap

Caution: The overlap correction only applies to the canopy cover percentage contained on an individual thinning request; the overlap correction does not account for overlap between multiple THINCC requests with different diameter ranges.

Caution: The specified residual target is for the user-specified species and user-defined range of dbh only. The total residual will also include all trees that do not fall within this range.

Caution: The Removal Priority Algorithm is only used when the cutting control flag is nonzero, (reference: SPECREF and TCONDMLT keywords)

Caution: If a thinning keyword is embedded in an IF-THEN-ENDIF sequence, year (field 1) is interpreted as years from the time the condition is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to thin the stand.)

Note: If the initial stand condition is already less than the target specified, the thinning will be cancelled. Look at the “Activity Summary” portion of the standard FVS output to see which requests were implemented and which were cancelled.

Note: A thinning is always done in the first year of the cycle in which it is scheduled, even if the year entered in field 1 is not the first year of the cycle. If a thinning must occur in a particular year, a TIMEINT keyword may be needed to change the length of a cycle so that the desired year for the thinning becomes the first year of a cycle.

Note: Multiple thinning keywords can be scheduled for the same year to simulate different aspects of a single harvest. Care must be taken to ensure that the dbh and height ranges do not unintentionally overlap, or the residual may not be what was expected. Total residuals must be calculated carefully.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR RMRS-24, Percent Canopy Cover and Stand Structure Statistics from the Forest Vegetation Simulator. pp 1-2.

Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 5.2.4.2.3

## **THINDBH** (THIN from a DBH range)

Variants: All

Related keywords: THINxxx, CUTEFF

Schedules a thinning from throughout a specified dbh range for any or all species to a basal area per acre or trees per acre target. If the target trees per acre or target basal area is nonzero, thinning occurs uniformly throughout the specified dbh range until the target is met (cutting efficiency is ignored). In other words, a calculated proportion of each of the eligible tree records is removed such that the target trees per acre or target basal area is exactly met. If both residual targets are 0 (zero), the cutting efficiency determines the proportion of trees represented by each eligible tree record that will be removed (residual targets are ignored). Only trees of the user-specified species that are within the user-defined dbh range are considered for removal. The residual target basal

area per acre or trees per acre is specified only for that species and dbh range, and does *not* represent the total residual unless the dbh range includes all trees of all species in the stand.

field 1: Year or cycle that thinning is scheduled. *Default = 1*

field 2: Smallest dbh in inches to be considered for removal (greater than or equal).  
*Default = 0.0*

field 3: Largest dbh in inches to be considered for removal (less than). *Default = 999.0*

field 4: Cutting efficiency parameter specific to this thinning request (refer to the CUTEFF keyword for description). *Range: 0.01-1.0, Default = 1*

field 5: Species code for trees to be removed in this cut. *Default = All*

field 6: Target trees per acre for the segment of the dbh distribution of the species defined in fields 2, 3, and 5. *Default = 0*

field 7: Target basal area in square feet per acre for the segment of the dbh distribution of the species defined in fields 2, 3, and 5. *Default = 0*

Caution: The specified residual target is for the user-specified species and user-defined range of dbh only. The total residual will also include all trees that do not fall within this range.

Caution: The Removal Priority Algorithm is not invoked with this keyword, therefore SPECREF TCONDMLT and MISTREF keywords have no effect on thinnings that use THINDBH.

Caution: If a thinning keyword is embedded in an IF-THEN-ENDIF sequence, year (field 1) is interpreted as years from the time the condition is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to thin the stand.)

Note: If the initial stand condition is already less than the target specified, the thinning will be cancelled. Look at the “Activity Summary” portion of the standard FVS output to see which requests were implemented and which were cancelled.

Note: A thinning is always done in the first year of the cycle in which it is scheduled, even if the year entered in field 1 is not the first year of the cycle. If a thinning must occur in a particular year, a TIMEINT keyword may be needed to change the length of a cycle so that the desired year for the thinning becomes the first year of a cycle.

Note: Multiple thinning keywords can be scheduled for the same year to simulate different aspects of a single harvest. Care must be taken to ensure that the dbh and height ranges do not unintentionally overlap, or the residual may not be what was expected. Total residuals must be calculated carefully.

Note: If both the basal area per acre target and the trees per acre target are specified on the same keyword, the trees per acre target is used.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-133, User’s Guide to the Stand Prognosis Model, p. 24  
Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 5.2.3.2

## THINHT

(THIN from a HeighT range)

Variants: All

Related keywords: THINxxx, CUTEFF

Schedules a thinning from throughout a specified height range for any or all species to a basal area per acre or trees per acre target. If the target trees per acre or target basal area is nonzero, thinning occurs uniformly throughout the specified height range until one of the targets is met (cutting efficiency is ignored). In other words, a calculated proportion of each of the eligible tree records is removed such that the target trees per acre or target basal area is exactly met. If both residual targets are 0 (zero), the cutting efficiency determines the proportion of trees represented by each eligible tree record that will be removed (residual targets are ignored). Only trees of the user-specified species that are within the user-defined height range are considered for removal. The residual target basal area or trees per acre is specified only for that species and height range, and does *not* represent the total residual unless the height range includes all trees of all species in the stand.

field 1: Year or cycle that thinning is scheduled. *Default = 1*

field 2: Shortest tree in feet to be considered for removal (greater than or equal).  
*Default = 0*

field 3: Tallest tree in feet to be considered for removal (less than). *Default = 999*

field 4: Cutting efficiency parameter specific to this thinning request (refer to the CUTEFF keyword for description). *Range: 0.01-1.0, Default = 1*

field 5: Species code for trees to be removed in this cut. *Default = All*

field 6: Target trees per acre for the segment of the height distribution of the species defined in fields 2, 3, and 5. *Default = 0*

field 7: Target basal area in square feet per acre for the segment of the height distribution of the species defined in fields 2, 3, and 5. *Default = 0*

Caution: The specified residual target is for the user-specified species and user-defined range of height only. The total residual will also include all trees that do not fall within this range.

Caution: The Removal Priority Algorithm is not invoked with this keyword, therefore SPECREF TCONDMLT and MISTPREF keywords have no effect on thinnings that use THINHT.

Caution: If a thinning keyword is embedded in an IF-THEN-ENDIF sequence, year (field 1) is interpreted as years from the time the condition is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to thin the stand.)

Note: If the initial stand condition is already less than the target specified, the thinning will be cancelled. Look at the "Activity Summary" portion of the standard FVS output to see which requests were implemented and which were cancelled.

Note: A thinning is always done in the first year of the cycle in which it is scheduled, even if the year entered in field 1 is not the first year of the cycle. If a thinning must occur in a particular year, a TIMEINT keyword may be needed to change the length of a cycle so that the desired year for the thinning becomes the first year of a cycle.

Note: Multiple thinning keywords can be scheduled for the same year to simulate different aspects of a single harvest. Care must be taken to ensure that the dbh and height ranges

do not unintentionally overlap, or the residual may not be what was expected. Total residuals must be calculated carefully.

Note: If both the basal area per acre target and the trees per acre target are specified on the same keyword, the trees per acre target is used.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.3.3

## **THINMIST** (THIN trees with dwarf MISTletoe )

Variants: All

Related keywords: THINxxx

Schedules a thinning based on Dwarf Mistletoe rating (DMR). Trees can be removed based on their Dwarf Mistletoe Rating and diameter.

field 1: Year or cycle that thinning is scheduled. *Default = 1*

field2: Dwarf Mistletoe Rating (DMR) code for trees that are to be removed in this thinning. *Default = 0, which means rating of 1-6, (i.e. all infected trees)*

field 3: Smallest dbh in inches to be considered for removal (greater than or equal). *Default = 0.0*

field 4: Largest dbh in inches to be considered for removal (less than). *Default = 999.0*

field 5: Cutting efficiency parameter specific to this thinning request (refer to the CUTEFF keyword for description). *Range: 0.01-1.0, Default = 1*

Caution: If a thinning keyword is embedded in an IF-THEN-ENDIF sequence, year (field 1) is interpreted as years from the time the condition is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to thin the stand.)

Note: A thinning is always done in the first year of the cycle in which it is scheduled, even if the year entered in field 1 is not the first year of the cycle. If a thinning must occur in a particular year, a TIMEINT keyword may be needed to change the length of a cycle so that the desired year for the thinning becomes the first year of a cycle.

Note: Multiple thinning keywords can be scheduled for the same year to simulate different aspects of a single harvest. Care must be taken to ensure that the dbh and height ranges do not unintentionally overlap, or the residual may not be what was expected. Total residuals must be calculated carefully.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.3.4.

## **THINPRSC** (THIN by PReSCription)

Variants: All

Related keywords: THINxxx, CUTEFF

Schedules a thinning based on prescription code. Prescription codes are numeric codes that are found in the input tree records (column 49). Prescription codes are user-defined, and have no inherent meaning in FVS. They are only useful in conjunction with this keyword. For example, if tree records that are to be removed have prescription code 2, and those that are to be left have prescription code 1, then field 3 of the THINPRSC keyword will be 2 and trees with that prescription code will be removed. The cutting efficiency determines the proportion of trees represented by a tree record that will be removed if that tree record contains the specified prescription code.

field 1: Year or cycle that prescription thinning is scheduled. *Default = 1*

field 2: Cutting efficiency parameter specific to this thinning request (refer to the CUTEFF keyword for description). *Range: 0.01-1.0, Default = 1*

field 3: Prescription code for trees that are to be removed in this thinning. *Range: 2-9*

Caution: If a thinning keyword is embedded in an IF-THEN-ENDIF sequence, year (field 1) is interpreted as years from the time the condition is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to thin the stand.)

Note: It may help to think of the prescription code in the input tree records (column 49) as a number painted on the live trees in the stand. Then think of the prescription code identified in this keyword (field 3) as instructing the harvest crew to cut trees with the identified number painted on them. The cutting efficiency determines the proportion of these trees to be cut.

Note: Prescription codes in the input tree records can be edited in a text editor. There is also an editing feature available through the Suppose interface program that displays the tree data in a template form that contains field descriptions. This feature is accessible through the "Edit FVS Tree Data" item in the "Options" menu.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.3.1

## **THINPT** (THIN by Point)

Variants: All

Related keywords: THINxxx, POINTREF, SETPTHIN

Schedules a thinning from a specified dbh range for any, or all, species to a density target, specified using the the SETPTHIN keyword.. If the target relative density is nonzero and the cutting control flag is zero, thinning occurs uniformly throughout the specified dbh range until the target is met (the cutting efficiency parameter is ignored and the cutting efficiency needed to complete the thinning is automatically computed by the program). If the target relative density is nonzero and the cutting control flag is nonzero, then the cutting efficiency parameter is used, along with the Removal Priority Algorithm. If the cutting efficiency parameter is set so low that the target cannot be reached, the cutting efficiency is recalculated so that the target is met. Only trees of the user-specified species that are within the user-defined dbh range are considered for

removal. The residual target relative density is specified only for that species and dbh range, and does *not* represent the total residual unless the dbh range includes all trees of all species in the stand.

field 1: Year or cycle that thinning is scheduled. *Default = 1*

field 2: Residual Target for attribute specified on the SETPThin keyword. *Default = 0*

field 3: Cutting efficiency parameter specific to this thinning request (refer to the CUTEFF keyword). *Range: 0.01-1.0, Default = model computed*

field 4: Species code for trees to be removed in this cut. *Default = 0 (All)*

field 5: Smallest dbh in inches to be considered for removal (greater than or equal).  
*Default = 0.0*

field 6: Largest dbh in inches to be considered for removal (less than). *Default = 999.0*

field 7: Cutting control flag. *Default = 0*

0 = thin throughout the specified diameter range

1 = thin from below in the specified diameter range

2 = thin from above in the specified diameter range.

Caution: The specified residual target is for the user-specified species and user-defined range of dbh only. The total residual will also include all trees that do not fall within this range.

Caution: The Removal Priority Algorithm is only used when the cutting control flag is nonzero, (reference: SPECREF and TCONDMLT keywords)

Caution: If a thinning keyword is embedded in an IF-THEN-ENDIF sequence, year (field 1) is interpreted as years from the time the condition is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to thin the stand.)

Note: If the initial stand condition is already less than the target specified, the thinning will be cancelled. Look at the "Activity Summary" portion of the standard FVS output to see which requests were implemented and which were cancelled.

Note: A thinning is always done in the first year of the cycle in which it is scheduled, even if the year entered in field 1 is not the first year of the cycle. If a thinning must occur in a particular year, a TIMEINT keyword may be needed to change the length of a cycle so that the desired year for the thinning becomes the first year of a cycle.

Note: Multiple thinning keywords can be scheduled for the same year to simulate different aspects of a single harvest. Care must be taken to ensure that the dbh and height ranges do not unintentionally overlap, or the residual may not be what was expected. Total residuals must be calculated carefully.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.



## THINRDEN (THIN to Relative DENsity target)

Variants: All

Related keywords: THINxxx, SPEC\_PREF, TCONDMLT, CUTEFF

Schedules a thinning from a specified dbh range for any, or all, species to a relative density target. If the target relative density is nonzero and the cutting control flag is zero, thinning occurs uniformly throughout the specified dbh range until the target is met (the cutting efficiency parameter is ignored and the cutting efficiency needed to complete the thinning is automatically computed by the program). If the target relative density is nonzero and the cutting control flag is nonzero, then the cutting efficiency parameter is used, along with the Removal Priority Algorithm. If the cutting efficiency parameter is set so low that the target cannot be reached, the cutting efficiency is recalculated so that the target is met. Only trees of the user-specified species that are within the user-defined dbh range are considered for removal. The residual target relative density is specified only for that species and dbh range, and does *not* represent the total residual unless the dbh range includes all trees of all species in the stand.

field 1: Year or cycle that thinning is scheduled. *Default = 1*

field 2: Residual Relative Density. *Default = 0*

field 3: Cutting efficiency parameter specific to this thinning request (refer to the CUTEFF keyword). *Range: 0.01-1.0, Default = model computed*

field 4: Species code for trees to be removed in this cut. *Default = 0 (All)*

field 5: Smallest dbh in inches to be considered for removal (greater than or equal). *Default = 0.0*

field 6: Largest dbh in inches to be considered for removal (less than). *Default = 999.0*

field 7: Cutting control flag. *Default = 0*

0 = thin throughout the specified diameter range

1 = thin from below in the specified diameter range

2 = thin from above in the specified diameter range.

Relative Density is computed using the following equation:

$$RD = BA_{cls} / (QMD_{cls})^{0.5}$$

where:  $BA_{cls}$  = basal area for the specified species in the specified diameter range

$QMD_{cls}$  = quadratic mean diameter at breast height of the specified Species in the specified diameter range

Caution: The specified residual target is for the user-specified species and user-defined range of dbh only. The total residual will also include all trees that do not fall within this range.

Caution: The Removal Priority Algorithm is only used when the cutting control flag is nonzero, (reference: SPEC\_PREF and TCONDMLT keywords)

Caution: If a thinning keyword is embedded in an IF-THEN-ENDIF sequence, year (field 1) is interpreted as years from the time the condition is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to thin the stand.)

Note: If the initial stand condition is already less than the target specified, the thinning will be cancelled. Look at the “Activity Summary” portion of the standard FVS output to see which requests were implemented and which were cancelled.

Note: A thinning is always done in the first year of the cycle in which it is scheduled, even if the year entered in field 1 is not the first year of the cycle. If a thinning must occur in a particular year, a TIMEINT keyword may be needed to change the length of a cycle so that the desired year for the thinning becomes the first year of a cycle.

Note: Multiple thinning keywords can be scheduled for the same year to simulate different aspects of a single harvest. Care must be taken to ensure that the dbh and height ranges do not unintentionally overlap, or the residual may not be what was expected. Total residuals must be calculated carefully.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: Curtis, Robert O. 1982. A Simple Index of Stand Density for Douglas-fir. Forest Sci., 28(1):92-94.  
Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 5.2.4.2.4

## **THINRDSL** (THIN to Relative DENSity SiLVah target)

Variants: All

Related keywords: THINxxx, SPECREF, TCONDMLT, CUTEFF

This keyword only works in the Northeast variant. The thinning will be cancelled unless the stand is one of the following five SILVAH forest types:

**Northern Hardwood** – stands that have at least 65% of total stand basal area in sugar maple, red maple, American beech, yellow birch, sweet birch, eastern hemlock, American basswood, cucumbertree, black cherry, white ash, or yellow-poplar.

**Northern hardwood-hemlock** – stands meeting the requirements for the northern hardwood type which also have at least 50% of their basal area in eastern hemlock.

**Allegheny hardwood** – stands meeting the requirements for the northern hardwood type that also have at least 25% of their basal area in black cherry, white ash, and yellow-poplar, and less than 50% of their basal area in eastern hemlock.

**Oak-hickory** – stands that have at least part of their basal area in any oak or hickory species.

**Transition** – stands that have at least 65% of their basal area in species of either the northern hardwood or oak-hickory types, but do not qualify for any of the other forest types alone.

This keyword schedules a thinning from a specified dbh range for any, or all, species to a relative density target. If the target relative density is nonzero and the cutting control flag is zero, thinning occurs uniformly throughout the specified dbh range until the target is met (the cutting efficiency parameter is ignored and the cutting efficiency needed to complete the thinning is automatically computed by the program). If the target relative density is nonzero and the cutting control flag is nonzero, then the cutting efficiency parameter is used, along with the Removal Priority Algorithm. If the cutting efficiency parameter is set so low that the target cannot be reached, the cutting efficiency is recalculated so that the target is met. Only trees of the user-specified species that are within the user-defined dbh range are considered for removal. The residual target relative density is specified only for that species and dbh range, and does *not* represent the total residual unless the dbh range includes all trees of all species in the stand.

field 1: Year or cycle that thinning is scheduled. *Default = 1*

field 2: Residual Relative Density. *Default = 0*

field 3: Cutting efficiency parameter specific to this thinning request (refer to the CUTEFF keyword). *Range: 0.01-1.0, Default = model computed*

field 4: Species code for trees to be removed in this cut. *Default = 0 (All)*

field 5: Smallest dbh in inches to be considered for removal (greater than or equal). *Default = 0.0*

field 6: Largest dbh in inches to be considered for removal (less than). *Default = 999.0*

field 7: Cutting control flag. *Default = 0*

0 = thin throughout the specified diameter range

1 = thin from below in the specified diameter range

2 = thin from above in the specified diameter range.

Relative Density is computed using the following equation:

$$RD = \sum_i \sum_j \{ (a_i + b_i * DBH_j + c_i * DBH_j^2) * TPA_{ij} \}$$

where: DBH = diameter at breast height of the j<sup>th</sup> tree of the specified species in the specified diameter range

TPA = trees per acre represented by the j<sup>th</sup> tree of the specified species in the specified diameter range

i = species subscript

j = tree record subscript

a,b,c = species group coefficients

Species Group 1: a = 0.0033033, b = 0.020426, c = 0.0006776

Species Group 2: a = -0.027142, b = 0.024257, c = 0.0015225

Species Group 3: a = -0.0027935, b = 0.0058959, c = 0.0047289

For the Northeast variant (provided by Susan Stout and Todd Ristau, USFS, NRS):

Species Group 1: ash species, white ash, yellow-poplar, black cherry, pin cherry

Species Group 2: eastern white pine, eastern hemlock, red maple, yellow birch, sweet birch, sweetgum, cucumbertree, quaking aspen, balsam poplar, eastern cottonwood, bigtooth aspen, northern red oak, other hardwood species, hackberry, common persimmon, American holly, magnolia species, blackgum, sourwood, black locust, sassafras, American basswood, white basswood, other elm species, American elm, slippery elm, boxelder, serviceberry, American hornbeam, flowering dogwood, hawthorn species, eastern hophornbeam

Species Group 3: sugar maple, hickory species, pignut hickory, shellbark hickory, shagbark hickory, mockernut hickory, American beech, white oak, bur oak, chinkapin oak, post oak, other oak species, scarlet oak, shingle oak, water oak, pin oak, chestnut oak, swamp white oak, swamp chestnut oak, black oak, cherrybark oak, willow oak, non-commercial hardwood species, striped maple

Northeast variant species not specifically assigned to a group use the coefficients for species group 2.

Caution: The specified residual target is for the user-specified species and user-defined range of dbh only. The total residual will also include all trees that do not fall within this range

Caution: The Removal Priority Algorithm is only used when the cutting control flag is nonzero, (reference: SPECREF and TCONDMLT keywords)

Caution: If a thinning keyword is embedded in an IF-THEN-ENDIF sequence, year (field 1) is interpreted as years from the time the condition is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to thin the stand.)

Note: If the initial stand condition is already less than the target specified, the thinning will be cancelled. Look at the "Activity Summary" portion of the standard FVS output to see which requests were implemented and which were cancelled.

Note: A thinning is always done in the first year of the cycle in which it is scheduled, even if the year entered in field 1 is not the first year of the cycle. If a thinning must occur in a particular year, a TIMEINT keyword may be needed to change the length of a cycle so that the desired year for the thinning becomes the first year of a cycle.

Note: Multiple thinning keywords can be scheduled for the same year to simulate different aspects of a single harvest. Care must be taken to ensure that the dbh and height ranges do not unintentionally overlap, or the residual may not be what was expected. Total residuals must be calculated carefully.

Note: The PARS format may be used with this keyword. See the introduction for a description of this format.

References: Stout, Susan, L., Nyland, Ralph D. 1986. Role of species composition in relative density measurement in Allegheny hardwoods. Can. J. For. Res. 16:574-579.  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.4.2.4  
Marquis, D. A.; Ernst, R. L.; 1992. User's guide to SILVAH. Gen. Tech. Rep. NE-162. Warren, PA: U. S. Department of Agriculture, Forest Service, Northeastern Research Station. 130p.

## THINSDI

(THIN to Stand Density Index target)

Variants: All

Related keywords: THINxxx, SPECREF, TCONDMLT, CUTEFF

Schedules a thinning from a specified dbh range for any, or all, species to a stand density index target. If the target stand density index is nonzero and the cutting control flag is zero, thinning occurs uniformly throughout the specified dbh range until the target is met (the cutting efficiency parameter is ignored and the cutting efficiency needed to complete the thinning is automatically computed by the program). If the target stand density index is nonzero and the cutting control flag is nonzero, then the cutting efficiency parameter is used, along with the Removal Priority Algorithm. If the cutting efficiency parameter is set so low that the target cannot be reached, the cutting efficiency is recalculated so that the target is met. Only trees of the user-specified species that are within the user-defined dbh range are considered for removal. The residual target stand density index is specified only for that species and dbh range, and does *not* represent the total residual unless the dbh range includes all trees of all species in the stand.

field 1: Year or cycle that thinning is scheduled. *Default = 1*

field 2: Residual Stand Density Index (SDI). *Default = 0*

field 3: Cutting efficiency parameter specific to this thinning request (refer to the CUTEFF keyword). *Range: 0.01-1.0, Default = model computed*

- field 4: Species code for trees to be removed in this cut. *Default = 0 (All)*
- field 5: Smallest dbh in inches to be considered for removal (greater than or equal).  
*Default = 0.0*
- field 6: Largest dbh in inches to be considered for removal (less than). *Default = 999.0*
- field 7: Cutting control flag. *Default = 0*  
 0 = thin throughout the specified diameter range  
 1 = thin from below in the specified diameter range  
 2 = thin from above in the specified diameter range.

SDI is computed using the following equation:

$$\text{Stand SDI} = 0.00490419 * (\text{SUMQ} / \text{TPA}_{\text{total}})^{0.8025} * \text{TPA}_{\text{total}} + 0.01992714 * (\text{SUMQ} / \text{TPA}_{\text{total}})^{-0.1975} * \text{SUMQ}$$

where:  $\text{SUMQ} = \sum(\text{DBH}_i^2 * \text{TPA}_i)$   
 $\text{DBH}_i$  = diameter at breast height of the  $i^{\text{th}}$  tree record  
 $\text{TPA}_i$  = trees per acre represented by the  $i^{\text{th}}$  tree record  
 $\text{TPA}_{\text{total}}$  = total trees per acre in the stand

Caution: The specified residual target is for the user-specified species and user-defined range of dbh only. The total residual will also include all trees that do not fall within this range.

Caution: The Removal Priority Algorithm is only used when the cutting control flag is nonzero, (reference: SPECREF and TCONDMLT keywords)

Caution: If a thinning keyword is embedded in an IF-THEN-ENDIF sequence, year (field 1) is interpreted as years from the time the condition is true until implementation, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to thin the stand.)

Note: If the initial stand condition is already less than the target specified, the thinning will be cancelled. Look at the “Activity Summary” portion of the standard FVS output to see which requests were implemented and which were cancelled.

Note: A thinning is always done in the first year of the cycle in which it is scheduled, even if the year entered in field 1 is not the first year of the cycle. If a thinning must occur in a particular year, a TIMEINT keyword may be needed to change the length of a cycle so that the desired year for the thinning becomes the first year of a cycle.

Note: Multiple thinning keywords can be scheduled for the same year to simulate different aspects of a single harvest. Care must be taken to ensure that the dbh and height ranges do not unintentionally overlap, or the residual may not be what was expected. Total residuals must be calculated carefully.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-133, User’s Guide to the Stand Prognosis Model, p. 24  
 Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 5.2.4.2.2

## TIMEINT

(TIME INTerval)

Variants: All

Related keywords: NUMCYCLE, INVYEAR

Specifies the length, in years, of any or all projection cycles. Many actions (e.g. thinnings) in FVS are implemented in the first year of the cycle in which they are scheduled, regardless of the actual year in the cycle that the action was scheduled. The only way to ensure that an action can be implemented in the same year that it is scheduled is to schedule the action in the first year of a cycle. This may not be possible if the cycles are left at their default length of ten years. A TIMEINT keyword can be used to change the length of a cycle so that the desired year for a particular action becomes the first year of a cycle.

field 1: Cycle number whose length is to be changed. Enter 0 (zero) to change the length of all projection cycles. *Default = 1*

field 2: Cycle length in years for the cycle(s) referenced in field 1. *Default = 10*  
(*NC default = 5*)

Note: This keyword affects only the specified cycle(s). The cycle immediately following does *not* represent the remainder of a cycle to return the simulation to the same cycle break years. Instead, subsequent cycles are affected by other TIMEINT keywords, or are assigned default lengths.

Note: Multiple TIMEINT keywords can be scheduled for a simulation. If multiple TIMEINT keywords are scheduled to affect any particular cycle, the last encountered use of the keyword will override the effects of all the previous.

Note: The Suppose interface program automatically includes a TIMEINT keyword whenever there are stands in a simulation that have different inventory years. The TIMEINT keyword is used to change the first cycle for stands that were inventoried earlier to bring all the simulations so a common year. Simulations for these stands will contain one additional cycle. From that point the simulations run with default cycle length.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 8  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, ss. 4.1.3.1, 5.1.2

## TOPKILL

(TOPKILL trees)

Variants: All

Related keywords: HTGSTOP, CRNMULT

Kills a portion of the top of trees for randomly selected tree records that fall within the user-specified parameters for species and height. This can be used to simulate damage from insects or logging.

field 1: Year or cycle in which topkill is to be applied. *Default = 1*

field 2: Species code for which topkill is to be applied. *Default = All*

field 3: Shortest tree in feet (greater than or equal) that will be affected. *Default = 0*

field 4: Tallest tree in feet (less than) that will be affected. *Default = 0*

field 5: Probability that a tree will sustain topkill. *Range: 0.0 - 1.0, Default = 0.0*

field 6: Mean proportion of total tree height lost to topkill (e.g. 0.2 will kill an average of 20% of the total height on selected trees). *Default = 1.0*

field 7: Standard deviation of the distribution of the proportion of total tree height killed. This allows for variability in topkill proportion among the selected trees. *Default = 0.0*

Note: Once a tree record has been affected by a TOPKILL keyword it will not get taller for the remainder of the simulation. Truncated height will be reported to the point of topkill. Reported volumes are calculated using the truncated height, however the old total tree height is used to determine stem form.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-208, Supplement to the User's Guide..., p. 20  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.2.4

## **TREEDATA** (TREE DATA file)

Variants: All

Related keywords: TREEFMT, SPCODES, OPEN

Specifies a file reference number for reading in tree data records. If this references an external file, a corresponding OPEN keyword must also be included. If the file reference number is 15, then tree data records are inserted directly into the keyword file as supplemental records to this keyword (the last supplemental record must be -999 to signify the end of the tree data records). Refer to TREEFMT for a description of the input format.

field 1: File reference number for the input tree data file. File reference numbers are a mechanism that FVS uses to keep track of external files. Numbers less than 30 are reserved for files that are currently used by FVS. If this field has a value of 15 then tree data records are entered as supplemental records. *Default = 2*

field 2: Flag to include plot specific site descriptors. Any numeric entry causes FVS to read plot descriptors from the tree data (columns 50-59). This information can be used by the Regeneration Establishment model.

field 3: Smallest dbh in inches to be considered for input (greater than or equal). All tree records with dbh less than this value will be ignored. *Default = 0.0*

field 4: Largest dbh in inches to be considered for input (less than). All tree records with dbh greater than or equal to this value will be ignored. *Default = 999.0*

field 5: Species code. All tree records with this species code will be ignored.

Caution: If a TREEFMT keyword is used, it must precede the TREEDATA keyword.

Note: The Suppose interface program automatically includes a TREEDATA keyword to read tree records from the file identified in the stand list file. The corresponding OPEN and CLOSE keywords are also included automatically.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 18  
GTR INT-208, Supplement to the User's Guide..., p. 17

**TREEFMT** (TREE data ForMaT)

Variants: All

Related keywords: SPCODES, TREEDATA

Provides a FORTRAN format statement that describes the layout of the tree data record. The following is the default tree format used to read the input tree variables

(I4,T1,I7,F6.0,I1,A3,F4.1,F3.1,2F3.0,F4.1,I1,6I2,2I1,I2,2I3,2I1,F3.0)

Where: I indicates "read as an integer" and the trailing number indicates the number of columns to read (e.g. I4 indicates 4 columns are to be read as integer input).

F indicates "read as decimal input" and the trailing numeric code indicates the total number of columns and number of decimal places (e.g. F4.1 indicates 4 columns are to be read as decimal input and 1 decimal place will be kept. If no decimal point is present, the last digit is assumed to be tenths).

A indicates "read as alpha characters" and the trailing number indicates the number of columns to read (e.g. A3 indicates 3 columns are to be read, and letters or other characters may be present. Blanks are read in as well).

T indicates a tab to a specific column. The trailing number indicates the column of the first character to be read using the next format listed.

Commas (,) separate individual format specifications.

Numbers that precede a letter indicate that the format specification is repeated that number of times (e.g. 2I3 is equivalent to I3,I3).

No fields are associated with this keyword. The format statement is entered on two supplemental records.

Supplemental records:

Two supplemental records are required, each a maximum of 80 characters long. The supplemental records comprise a FORTRAN format statement of the type described above. If the entire format statement is included in a single supplemental record, the second supplemental record will be blank, but it must still be included.

Example:

```
TREEFMT
(I2,T1,I6,T10,F7.1,I1,T8,A2,T16,F5.2,F3.1,
2F3.0,F4.1,I1,T80,6I2,2I1,I2,2I3,2I1,F3.0)
```

Default Tree Data Input Format

<i>VARIABLE</i>	<i>FORMAT</i>	<i>COLUMNS</i>
Plot ID	I4	1-4
Tree Number	I7	1-7
Tree Count	F6.0	8-13
Tree History	I1	14
Species	A3	15-17
Diameter at Breast Height	F4.1	18-21



DBH Increment	F3.1	22-24
Live Height	F3.0	25-27
Height to Top Kill	F3.0	28-30
Height Increment	F4.1	31-34
Crown Ratio Code	I1	35
Damage Code 1	I2	36-37
Severity Code 1	I2	38-39
Damage Code 2	I2	40-41
Severity Code 2	I2	42-43
Damage Code 3	I2	44-45
Severity Code 3	I2	46-47
Tree Value Class Code	I1	48
Cut/Leave Prescription Code	I1	49
Plot slope percent	I2	50-51
Plot aspect in degrees	I3	52-54
Plot habitat type code	I3	55-57
Plot topographic position code	I1	58
Plot site preparation code	I1	59
Tree Age	F3.0	60-62

Caution: If a TREEDATA keyword is used, it must follow the TREEFMT keyword.

Caution: If decimal input was specified in the format statement but no decimal point appears in the input, the decimal point will be assumed and its placement will be determined by the format statement. For example, the format statement F4.1 will cause input of 1234 to be read as 123.4.

Caution: Tree count is used in conjunction with the plot design information in the DESIGN keyword to determine the number of trees per acre each record represents. For example, a single seedling (tree count = 1) on one of five 1/100 acre fixed plots represents 20 seedlings per acre in the stand.

Note: Species and dbh are required fields. It is also suggested that minimally plot ID, tree count, tree history, and live height are included. In the absence of corresponding data, each tree record will be assumed to represent one live tree, all will be assumed to have been recorded on a single plot.

Note: If fields were not included in the tree data records tab to blank data columns and read blank data for those fields.

Note: If all tree records are ultimately reported by FVS as “other species” or something similar, an error has probably been made in the preparation of either the TREEFMT or SPCODES keywords.

Note: The Suppose interface program automatically includes a TREEFMT keyword with the default format. If the tree data records are in a different format, an additional TREEFMT keyword must be added with the proper format statement.

References: GTR INT-133, User’s Guide to the Stand Prognosis Model, p. 19  
Essential FVS: A User’s Guide to the Forest Vegetation Simulator, s. 4.2.3.2

## TREELIST (TREELIST file)

Variants: All

Related keywords: CUTLIST, OPEN

Prints a list of tree records to an output treelist file.

field 1: Year or cycle in which treelist is to be printed. Enter 0 (zero) to print output for every cycle. *Default = 1*

field 2: File reference number for the output file. File reference numbers are a mechanism that FVS uses to keep track of external files. Numbers less than 30 are reserved for files that are currently used by FVS. *Default = 3*

field 3: Value to determine which header will be printed with the treelist. *Default = 0*

1	Encoded header record (machine readable, -999)
0	Header records describing each column (human readable)
-1	Suppress all headers

field 4: Cycle 0/1 treelist printing flag. This field is ignored unless field 1 represents the first cycle of the simulation (i.e. field 1 = 1, or field 1 = first year of simulation). *Default = 0*

0	Print both cycle 0 and cycle 1
1	Print only cycle 1
2	Print only cycle 0 (beginning of simulation)

field 5: Live/dead treelist flag. *Default = 0*

0	Requests the normal live and recent mortality tree list
≠0 (any value not equal to zero)	Requests a dead tree list

field 6: *Not used*

field 7: Diameter increment printing for cycle 0. *Default = 0*

0	Print only cycle 0 dbh increments that were read from the input tree data
1	Print both cycle 0 input and cycle 0 estimated dbh increments

Note: If the TREELIST output is intended for use with post-processing programs, it must contain headers and be in the current format (i.e. field 3 must be 0, 1, or blank, and field 6 must be 0 or blank).

Note: If using the Suppose interface program the TREELIST output file, by default, has the same base name as the simulation file with a *.trl* extension. This is the same file used, by default, for the CUTLIST output.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 47  
GTR INT-208, Supplement to the User's Guide..., p. 14  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 4.3.3.1

## TREESZCP (TREE SiZe CaP)

Variants: All

Related keywords: MORTMULT, FIXMORT, BAIMULT, HTGSTOP

Sets morphological limits for maximum tree diameter and height for a given species, and specifies a minimum mortality rate to be used when tree diameter exceeds the specified limit. Diameter growth or height growth will be greatly reduced for individual trees that exceed the specified

diameter or height, respectively. Also, the specified diameter can be used as a surrogate for age to invoke senescence mortality. For example, if a tree record represents 10 trees per acre of the designated species and exceeds the specified maximum diameter, and the minimum mortality rate is set to 0.5, 5 trees per acre (50%) from that record will die due to this keyword if the normally predicted mortality rate for this tree record was less than 5 trees; if the normally predicted mortality rate for this tree record exceeded 5 trees, then that rate would be used and there would be no affect of this keyword on that tree record. These values are set once for the projection; they cannot be changed within a projection.

field 1: Species code to which the limits apply. *Default = All*

field 2: Morphological maximum diameter for this species. *Default = 999.0*

field 3: Minimum proportion of the tree record that will be killed. *Range: 0.0-1.0, Default = 1.0*

field 4: Maximum diameter use code. *Default = 0*

0 Use diameter for affecting both diameter growth and tree mortality.

1 Use diameter for affecting diameter growth only.

2 Use diameter for affecting mortality only.

field 5: Morphological maximum height for this species. *Default = 999.0*

Caution: This keyword may override BAMAX and SDIMAX related mortality..

Note: The PARMS format may not be used with this keyword.

References: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 6.5.5

## **VOLEQNUM** (VOLUME Equation NUMber)

Variants: All

Related keywords: BFVOLUME, VOLUME, BFVOLEQU, CFVOLEQU

Sets the volume equation number used to calculate volume. Equation numbers are from the Forest Service National Volume Estimator Library. If you do not set the equation number, by default FVS will use the volume equation numbers designated to be used by the Forest Service Regional Offices. If you are unsure what equation number is used FVS will write out the equation number for each species in the Options Selected by Default Section of the Main Output file (\*.out).

field 1: Species code for which volume equation number is applied. *Default = All*

field 2: Cubic Foot Volume Equation Number. *Default = Blank*

field 3: Boardfoot Volume Equation Number. *Default = Blank*

Note: Keyword does not work for the Lake States Varaint or Northeast Varaint of FVS..

Note: Form class for a species is the same regardless of whether cubic foot or board foot volume is being calculated. If both BFVOLUME and VOLUME are specified, the form class (field 6) used for both will be that specified on the keyword entered last.

Caution: If you are using a Region 6 variant, you can not change to a different length Behres Hyperbola. If you are on the east side of the Cascades you have to use 616 Behres or a

different model form (such as Flewelling) you can not switch to a 632 Behres. If you are on the west side of the Cascades you can not switch from a 632 Behres to a Behres 616. This is because FVS uses an internal form class based on the specified log length which can not be switched.

References: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.3.1

## VOLUME

(cubic foot VOLUME)

Variants: All

Related keywords: BFVOLUME, MCDEFECT, CFVOLUME, MCFDLN

Sets the merchantability limits for cubic foot volume calculation. In the western half of the US, this keyword sets the merchantability limits for merchantable cubic foot volume. In the eastern half of the US, this keyword sets the merchantability limits only for pulpwood that is smaller than the merchantable limits for sawlogs. (The merchantability limits for the sawlog portion can be set with the BFVOLUME keyword.)

field 1: Year or cycle number in which merchantability limits are to take effect. Once in effect they remain in effect until replaced by subsequent limits.

*Default = 0 (all cycles)*

field 2: Species code for which the limits are to be changed. *Default = All*

field 3: Minimum merchantable DBH in inches.

*Defaults by variant:*

<i>SE, SN</i>	<i>4.0</i>
<i>CR</i>	<i>5.0 (Black Hills: 9.0)</i>
<i>CS, LS, NE</i>	<i>hardwoods: 5.0, softwoods: 5.0</i>
	<i>Except on these Forests</i>
<i>Chippewa</i>	<i>hardwoods: 5.0</i>
	<i>softwoods: 4.0</i>
<i>Mark Twain</i>	<i>hardwoods: 5.0</i>
	<i>softwoods: 4.0</i>
<i>Shawnee:</i>	<i>hardwoods: 6.0</i>
	<i>softwoods: 5.0</i>
<i>Superior:</i>	<i>hardwoods: 6.0</i>
	<i>softwood: 5.0</i>
<i>Hoosier:</i>	<i>hardwood: 6.0</i>
	<i>softwoods: 5.0</i>
<i>Wayne:</i>	<i>hardwood: 6.0</i>
	<i>softwoods: 5.0</i>
<i>Allegheny:</i>	<i>hardwood: 6.0</i>
	<i>softwoods: 5.0</i>
<i>Green Mountain:</i>	<i>hardwood: 8.0</i>
	<i>softwoods: 5.0</i>
<i>WS</i>	<i>7.0</i>
<i>CA</i>	<i>7.0 (knobcone pine: 6.0)</i>
<i>BM, EC, EM, KT, NI, PN, WC</i>	<i>7.0 (lodgepole pine: 6.0)</i>
<i>CI, TT, UT</i>	<i>8.0 (lodgepole pine: 7.0)</i>
<i>NC, SO</i>	<i>9.0</i>
<i>AK</i>	<i>hardwoods: 11.0, softwoods: 9.0</i>

field 4: Minimum top diameter (inside bark (DIB) in the eastern US, outside bark (DOB) in the western US).

*Defaults by variant:*

<i>CS, LS, NE</i>	<i>4.0 (This value is fixed in CS, LS, and NE. Changing it will cause no change in reported merchantable cubic foot volumes.)</i>
<i>SE, SN</i>	<i>4.0 (This value is fixed in SE and SN. Changing it will cause reported merchantable cubic foot volumes to be zero.)</i>
<i>CR</i>	<i>4.0 (Black Hills: 6.0)</i>
<i>BM, CA, EC, EM, KT, NI, PN, WC, WS</i>	<i>4.5</i>
<i>CI, NC, SO, TT, UT</i>	<i>6.0</i>
<i>AK</i>	<i>hardwoods: 8.0, softwoods: 6.0</i>

field 5: Stump height in feet. *Default = 1.0*

field 6: Form class (used only in Region 6). Eastside: This is the diameter inside bark at a height of 17.3 feet as a percentage of outside-bark DBH. Westside: This is the diameter inside bark at a height of 33.6 feet as a percentage of outside-bark DBH. *Default = 80 (Defaults vary by forest, species and diameter class)*

field 7: Volume calculation method. *Default = 6*

- |                 |   |
|-----------------|---|
| 1               | Wykoff, Allen, et. al. , or user defined equation if CFVOLUME keyword is used.                    |
| 2               | Region 6 Eastside taper equations.  |
| 3               | Region 6 Westside taper equations.  |
| 6               | National Volume Estimator Library equations.  |
| 7               | Wykoff, Allen, et. al. , or user defined equation if CFVOLUME keyword is used (same as option 1). |
| 8               | Other volume equations:   |
| <i>AK</i>       | <i>Bruce and Demars equations formerly in FVS.</i>  |
| <i>CR</i>       | <i>Hann and Bare equations (region 2 forests use coefficients from the Cibola NF).</i>            |
| <i>CS,LS,NE</i> | <i>TWIGS volume equations.</i>  |
| <i>NC</i>       | <i>Western Sierra log rules.</i>  |

Note: For any particular species this keyword remains in effect until a subsequent use of the keyword changes the limits for that species.

Note: Form class for a species is the same regardless of whether cubic foot or board foot volume is being calculated. If both BFVOLUME and VOLUME are specified, the form class (field 6) used for both will be that specified on the keyword entered last.

Caution: If date or cycle are specified (i.e. the date/cycle is not blank and it is not zero) and the species field is either ALL or a species group, then you should be sure to specify all of the remaining parameters. If you do not specify all of the remaining parameters, then the default parameters for the other fields are the default parameters for species 1 (if ALL is selected) or species group 1 (species group is selected).

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 22  
 GTR INT-208, Supplement to the User's Guide..., p. 18  
 Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.3.1

## WSBW

(Western Spruce BudWorm model initialization)

Variants: Specialized variants that include the western spruce budworm model

Related keywords: END

Signifies the beginning of keywords for the western spruce budworm extension. This extension has its own unique set of keywords. The WSBW keyword sequence must be terminated with an END keyword. All keywords between WSBW and END are considered western spruce budworm extension keywords.

No fields are associated with this keyword.

References: GTR INT-274, User's Guide to the Western Spruce Budworm Modeling System  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 8.8

## YARDLOSS (YARDing LOSS)

Variants: All

Related keywords: THINxxx

Designates a portion of a harvest to be left in the woods. This may reduce harvest volumes and is also used in determining fuel loading for the fire extension model.

field 1: Year or cycle in which harvesting is to incur yarding loss. *Default = 1*

field 2: Proportion of cut stems left in the stand. *Range: 0.0-1.0, Default = 0*

field 3: Proportion of left stems that are down. *Range: 0.0-1.0, Default = 0*

field 4: Proportion of branch wood left from removed stems. (If using the SN variant then it is the proportion of unmerchantable wood left from removed stems.)  
*Range: 0.0-1.0, Default = 1*

Note: This keyword works in conjunction with the thinning keywords. A thinning that is scheduled for the same cycle as the YARDLOSS keyword is in effect will reflect the losses specified.

Note: Keyword order may be important. If a YARDLOSS keyword is specified for the *same year* that a thinning keyword is specified, the losses will be applied to the thinning only if the YARDLOSS keyword appears in the keyword sequence before the thinning keyword

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.2.5

## Appendix A: Species Codes by Variant

An alphabetical list by species code follows the variant-specific tables.

### AK — Southeast Alaska, Coastal British Columbia (SEAPROG)

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	WS	White spruce	8	SS	Sitka spruce
2	RC	Western redcedar	9	AF	Subalpine fir
3	SF	Pacific silver fir	10	RA	Red alder
4	MH	Mountain hemlock	11	CW	Black cottonwood
5	WH	Western hemlock	12	OH	Other hardwoods
6	YC	Alaska-cedar	13	OS	Other softwoods
7	LP	Lodgepole pine			

### BM — Blue Mountains

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	WP	Western white pine	7	LP	Lodgepole pine
2	WL	Western larch	8	ES	Engelmann spruce
3	DF	Douglas-fir	9	AF	Subalpine fir
4	GF	Grand fir	10	PP	Ponderosa pine
5	MH	Mountain hemlock	11	OT	Other species
6	--				

### CA — Inland California, Southern Cascades (ICASCA)

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	PC	Port-Orford-cedar	26	LO	Coast live oak
2	IC	Incense-cedar	27	CY	Canyon live oak
3	RC	Western redcedar	28	BL	Blue oak
4	WF	White fir	29	EO	Engelmann oak
5	RF	California red fir	30	WO	Oregon white oak
6	SH	Shasta red fir	31	BO	California black oak
7	DF	Douglas-fir	32	VO	Valley white oak
8	WH	Western hemlock	33	IO	Interior live oak
9	MH	Mountain hemlock	34	BM	Bigleaf maple
10	WB	Whitebark pine	35	BU	California buckeye
11	KP	Knobcone pine	36	RA	Red alder
12	LP	Lodgepole pine	37	MA	Pacific madrone
13	CP	Coulter pine	38	GC	Giant chinkapin
14	LM	Limber pine	39	DG	Pacific dogwood
15	JP	Jeffrey pine	40	FL	Oregon ash
16	SP	Sugar pine	41	WN	Walnut species
17	WP	Western white pine	42	TO	Tanoak
18	PP	Ponderosa pine	43	SY	California sycamore
19	MP	Monterey pine	44	AS	Quaking aspen
20	GP	Gray pine	45	CW	Black cottonwood
21	WJ	Western juniper	46	WI	Willow species
22	BR	Brewer spruce	47	CN	California nutmeg
23	GS	Giant sequoia	48	CL	California-laurel
24	PY	Pacific yew	49	OH	Other hardwoods
25	OS	Other softwoods			

**CI — Central Idaho**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	WP	Western white pine	7	LP	Lodgepole pine
2	WL	Western larch	8	ES	Engelmann spruce
3	DF	Douglas-fir	9	AF	Subalpine fir
4	GF	Grand fir	10	PP	Ponderosa pine
5	WH	Western hemlock	11	OT	Other species
6	RC	Western redcedar			

**CR — Central Rockies (GENGYM) - All submodels**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	AF	Subalpine fir	13	PP	Ponderosa pine
2	CB	Corkbark fir	14	WB	Whitebark pine
3	DF	Douglas-fir	15	SW	Southwestern white pine
4	GF	Grand fir	16	JU	Juniper species
5	WF	White fir	17	BS	Blue spruce
6	MH	Mountain hemlock	18	ES	Engelmann spruce
7	RC	Western redcedar	19	WS	White spruce
8	WL	Western larch	20	AS	Quaking aspen
9	BC	Bristlecone pine	21	CO	Cottonwood species
10	LM	Limber pine	22	OA	Oak species
11	LP	Lodgepole pine	23	OS	Other softwoods
12	PI	Pinyon pine	24	OH	Other hardwoods

**CS — Central States**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	RC	Eastern redcedar	49	SK	Southern red oak
2	JU	Juniper species	50	BO	Black oak
3	SP	Shortleaf pine	51	SO	Scarlet oak
4	VP	Virginia pine	52	BJ	Blackjack oak
5	LP	Loblolly pine	53	CK	Chinkapin oak
6	OS	Other softwoods	54	SW	Swamp white oak
7	WP	Eastern white pine	55	BR	Bur oak
8	WN	Black walnut	56	SN	Swamp chestnut oak
9	BN	Butternut	57	PO	Post oak
10	TL	Tupelo species	58	DO	Delta post oak
11	TS	Swamp tupelo	59	CO	Chestnut oak
12	WT	Water tupelo	60	PN	Pin oak
13	BG	Blackgum/black tupelo	61	CB	Cherrybark oak
14	HS	Select hickory	62	QI	Shingle oak
15	SH	Shagbark hickory	63	OV	Overcup oak
16	SL	Shellbark hickory	64	WK	Water oak
17	MH	Mockernut hickory	65	NK	Nuttall oak
18	PH	Pignut hickory	66	WL	Willow oak
19	HI	Hickory species	67	QS	Shumard oak
20	WH	Water hickory	68	UH	Other upland hardwoods
21	BH	Bitternut hickory	69	SS	Sassafras
22	PE	Pecan	70	OB	Ohio buckeye
23	BI	Black hickory	71	CA	Catalpa

*Continued next page*



**CS - Continued**

24	AB	American beech	72	PS	Common persimmon
25	BA	Black ash	73	HL	Honeylocust
26	PA	Pumpkin ash	74	BP	Balsam poplar
27	UA	Blue ash	75	BT	Bigtooth aspen
28	EC	Eastern cottonwood	76	QA	Quaking aspen
29	RM	Red maple	77	BK	Black locust
30	BE	Boxelder	78	OL	Other lowland species
31	SV	Silver maple	79	SY	Sycamore
32	BC	Black cherry	80	BY	Baldcypress
33	AE	American elm	81	RB	River birch
34	SG	Sugarberry	82	SU	Sweetgum
35	HK	Hackberry	83	WI	Willow species
36	WE	Winged elm	84	BL	Black willow
37	EL	Elm species	85	NC	Non-commercial hardwoods
38	SI	Siberian elm	86	AH	American hornbeam
39	RL	Slippery (red) elm	87	RD	Eastern redbud
40	RE	Rock elm	88	DW	Flowering dogwood
41	YP	Yellow-poplar	89	HT	Hawthorn species
42	BW	American basswood	90	KC	Kentucky coffeetree
43	SM	Sugar maple	91	OO	Osage-orange
44	AS	Ash species	92	CT	Cucumbertree
45	WA	White ash	93	MV	Sweetbay
46	GA	Green ash	94	MB	Mulberry species
47	WO	White oak	95	HH	Eastern hophornbeam
48	RO	Northern red oak	96	SD	Sourwood

**EC — Eastside Cascades**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	WP	Western white pine	7	LP	Lodgepole pine
2	WL	Western larch	8	ES	Engelmann spruce
3	DF	Douglas-fir	9	AF	Subalpine fir
4	SF	Pacific silver fir	10	PP	Ponderosa pine
5	RC	Western redcedar	11	OT	Other species
6	GF	Grand fir			

**EM — Eastern Montana**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	WB	Whitebark pine	7	LP	Lodgepole pine
2	WL	Western larch	8	ES	Engelmann spruce
3	DF	Douglas-fir	9	AF	Subalpine fir
4	--		10	PP	Ponderosa pine
5	--		11	OT	Other species
6	--				

**IE — Inland Empire 23 species**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	WP	Western white pine	13	LM	Limber pine
2	WL	Western larch	14	LL	Subalpine larch
3	DF	Douglas-fir	15	PI	Pinyon pine
4	GF	Grand fir	16	RM	Rocky Mountain juniper
5	WH	Western hemlock	17	PY	Pacific yew
6	RC	Western redcedar	18	AS	Quaking aspen
7	LP	Lodgepole pine	19	CO	Cottonwood species
8	ES	Engelmann spruce	20	MM	Rocky Mountain maple
9	AF	Subalpine fir	21	PB	Paper birch
10	PP	Ponderosa pine	22	OH	Other hardwoods
11	MH	Mountain hemlock	23	OS	Other softwoods
12	WB	Whitebark pine			

**KT — Kootenai/Kaniksu/Tally Lake - Flathead (KOOKANTL)**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	WP	Western white pine	7	LP	Lodgepole pine
2	WL	Western larch	8	ES	Engelmann spruce
3	DF	Douglas-fir	9	AF	Subalpine fir
4	GF	Grand fir	10	PP	Ponderosa pine
5	WH	Western hemlock	11	OT	Other species
6	RC	Western redcedar			

**LS — Lake States**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	JP	Jack pine	35	BO	Black oak
2	SC	Scotch pine	36	NP	Northern pin oak
3	RN	Red pine natural	37	BH	Bitternut hickory
4	RP	Red pine plantation	38	PH	Pignut hickory
5	WP	Eastern white pine	39	SH	Shagbark hickory
6	WS	White spruce	40	BT	Bigtooth aspen
7	NS	Norway spruce	41	QA	Quaking aspen
8	BF	Balsam fir	42	BP	Balsam poplar
9	BS	Black spruce	43	PB	Paper birch
10	TA	Tamarack	44	CH	Commercial hardwoods
11	WC	Northern white-cedar	45	BN	Butternut
12	EH	Eastern hemlock	46	WN	Black walnut
13	OS	Other softwoods	47	HH	Eastern hophornbeam
14	RC	Eastern redcedar	48	BK	Black locust
15	BA	Black ash	49	NC	Non-commercial hardwoods
16	GA	Green ash	50	BE	Boxelder
17	EC	Eastern cottonwood	51	ST	Striped maple
18	SV	Silver maple	52	MM	Mountain maple
19	RM	Red maple	53	AH	American hornbeam
20	BC	Black cherry	54	AC	American chestnut
21	AE	American elm	55	HK	Hackberry
22	RL	Slippery elm	56	DW	Flowering dogwood
23	RE	Rock elm	57	HT	Hawthorn species

*Continued next page*

**LS - Continued**

24	YB	Yellow birch	58	AP	Apple species
25	BW	American basswood	59	BG	Blackgum
26	SM	Sugar maple	60	SY	Sycamore
27	BM	Black maple	61	PR	Pin cherry
28	AB	American beech	62	CC	Chokecherry
29	WA	White ash	63	PL	Plum, cherry species
30	WO	White oak	64	WI	Willow species
31	SW	Swamp white oak	65	BL	Black willow
32	BR	Bur oak	66	DM	Diamond willow
33	CK	Chinkapin oak	67	SS	Sassafras
34	RO	Northern red oak	68	MA	American mountain-ash

**NC — Northern California (Klamath Mountains)**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	OS	Other softwoods	7	BO	California black oak
2	SP	Sugar pine	8	TO	Tanoak
3	DF	Douglas-fir	9	RF	California red fir
4	WF	White fir	10	PP	Ponderosa pine
5	MA	Pacific madrone	11	OH	Other hardwoods
6	IC	Incense-cedar			

**NE — Northeast**

Sequence	Code	Species name	Sequence	Code	Species name
1	BF	Balsam fir	55	WO	White oak
2	TA	Tamarack	56	BR	Bur oak
3	WS	White spruce	57	CK	Chinkapin oak
4	RS	Red spruce	58	PO	Post oak
5	NS	Norway spruce	59	OK	Other oak species
6	BS	Black spruce	60	SO	Scarlet oak
7	PI	Other spruce species	61	QI	Shingle oak
8	RN	Red pine	62	WK	Water oak
9	WP	Eastern white pine	63	PN	Pin oak
10	LP	Loblolly pine	64	CO	Chestnut oak
11	VP	Virginia pine	65	SW	Swamp white oak
12	WC	Northern white-cedar	66	SN	Swamp chestnut oak
13	AW	Atlantic white-cedar	67	RO	Northern red oak
14	RC	Eastern redcedar	68	SK	Southern red oak
15	OC	Other cedar species	69	BO	Black oak
16	EH	Eastern hemlock	70	CB	Cherrybark oak
17	HM	Other hemlock species	71	OH	Other hardwoods
18	OP	Other pine species	72	BU	Buckeye species
19	JP	Jack pine	73	YY	Yellow buckeye
20	SP	Shortleaf pine	74	WR	Water birch
21	TM	Table mountain pine	75	HK	Hackberry
22	PP	Pitch pine	76	PS	Common persimmon
23	PD	Pond pine	77	HY	American holly
24	SC	Scotch pine	78	BN	Butternut
25	OS	Other softwoods	79	WN	Black walnut
26	RM	Red maple	80	OO	Osage-orange
27	SM	Sugar maple	81	MG	Magnolia species
28	BM	Black maple	82	MV	Sweetbay

*Continued next page*

**NE - Continued**

29	SV	Silver maple	83	AP	Apple species
30	YB	Yellow birch	84	WT	Water tupelo
31	SB	Sweet birch	85	BG	Blackgum
32	RB	River birch	86	SD	Sourwood
33	PB	Paper birch	87	PW	Paulownia
34	GB	Gray birch	88	SY	Sycamore
35	HI	Hickory species	89	WL	Willow oak
36	PH	Pignut hickory	90	BK	Black locust
37	SL	Shellbark hickory	91	BL	Black willow
38	SH	Shagbark hickory	92	SS	Sassafras
39	MH	Mockernut hickory	93	BW	American basswood
40	AB	American beech	94	WB	White basswood
41	AS	Ash species	95	EL	Other elm species
42	WA	White ash	96	AE	American elm
43	BA	Black ash	97	RL	Slippery elm
44	GA	Green ash	98	NC	Non-commercial hardwoods
45	PA	Pumpkin ash	99	BE	Boxelder
46	YP	Yellow-poplar	100	ST	Striped maple
47	SU	Sweetgum	101	AI	Ailanthus
48	CT	Cucumbertree	102	SE	Serviceberry
49	QA	Quaking aspen	103	AH	American hornbeam
50	BP	Balsam poplar	104	DW	Flowering dogwood
51	EC	Eastern cottonwood	105	HT	Hawthorn species
52	BT	Bigtooth aspen	106	HH	Eastern hophornbeam
53	PY	Swamp cottonwood	107	PL	Plum, cherry species
54	BC	Black cherry	108	PR	Pin cherry

**NI — North Idaho (Inland Empire)**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	WP	Western white pine	7	LP	Lodgepole pine
2	WL	Western larch	8	ES	Engelmann spruce
3	DF	Douglas-fir	9	AF	Subalpine fir
4	GF	Grand fir	10	PP	Ponderosa pine
5	WH	Western hemlock	11	OT	Other species
6	RC	Western redcedar			

**PN — Pacific Northwest Coast**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	SF	Pacific silver fir	21	BM	Bigleaf maple
2	WF	White fir	22	RA	Red alder
3	GF	Grand fir	23	WA	White alder/Pacific madrone
4	AF	Subalpine fir	24	PB	Paper birch
5	RF	California red fir/Shasta red fir	25	GC	Giant chinkapin/Tanoak
6	SS	Sitka spruce	26	AS	Quaking aspen
7	NF	Noble fir	27	CW	Black cottonwood
8	YC	Alaska-cedar/Western larch	28	WO	OR white oak/CA black oak
9	IC	Incense-cedar	29	WJ	Western juniper
10	ES	Engelmann spruce	30	LL	Subalpine larch
11	LP	Lodgepole pine	31	WB	Whitebark pine
12	JP	Jeffrey pine	32	KP	Knobcone pine

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**PN - Continued**

13	SP	Sugar pine	33	PY	Pacific yew
14	WP	Western white pine	34	DG	Pacific dogwood
15	PP	Ponderosa pine	35	HT	Hawthorn species
16	DF	Douglas-fir	36	CH	Bitter cherry
17	RW	Coast redwood	37	WI	Willow species
18	RC	Western redcedar	38	- -	
19	WH	Western hemlock	39	OT	Other species
20	MH	Mountain hemlock			

**SN — Southern**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	FR	Fir species	46	MG	Magnolia species
2	JU	Redcedar species	47	CT	Cucumbertree
3	PI	Spruce species	48	MS	Southern magnolia
4	PU	Sand pine	49	MV	Sweetbay
5	SP	Shortleaf pine	50	ML	Bigleaf magnolia
6	SA	Slash pine	51	AP	Apple species
7	SR	Spruce pine	52	MB	Mulberry species
8	LL	Longleaf pine	53	WT	Water tupelo
9	TM	Table Mountain pine	54	BG	Blackgum/black tupelo
10	PP	Pitch pine	55	TS	Swamp tupelo
11	PD	Pond pine	56	HH	Eastern hophornbeam
12	WP	Eastern white pine	57	SD	Sourwood
13	LP	Loblolly pine	58	RA	Redbay
14	VP	Virginia pine	59	SY	Sycamore
15	BY	Baldcypress	60	CW	Cottonwood species
16	PC	Pondcypress	61	BT	Bigtooth aspen
17	HM	Hemlock species	62	BC	Black cherry
18	FM	Florida maple	63	WO	White oak
19	BE	Boxelder	64	SO	Scarlet oak
20	RM	Red maple	65	SK	Southern red oak
21	SV	Silver maple	66	CB	Cherrybark oak
22	SM	Sugar maple	67	TO	Turkey oak
23	BU	Buckeye/horsechestnut species	68	LK	Laurel oak
24	BB	Birch species	69	OV	Overcup oak
25	SB	Sweet birch	70	BJ	Blackjack oak
26	AH	American hornbeam	71	SN	Swamp chestnut oak
27	HI	Hickory species	72	CK	Chinkapin oak
28	CA	Catalpa	73	WK	Water oak
29	HB	Hackberry species	74	CO	Chestnut oak
30	RD	Eastern redbud	75	RO	Northern red oak
31	DW	Flowering dogwood	76	QS	Shumard oak
32	PS	Common persimmon	77	PO	Post oak
33	AB	American beech	78	BO	Black oak
34	AS	Ash species	79	LO	Live oak
35	WA	White ash	80	BK	Black locust
36	BA	Black ash	81	WI	Willow species
37	GA	Green ash	82	SS	Sassafras
38	HL	Honeylocust	83	BW	Basswood species
39	LB	Loblolly-bay	84	EL	Elm species
40	HA	Silverbell	85	WE	Winged elm
41	HY	American holly	86	AE	American elm

*Continued next page*

**SN - Continued**

42	BN	Butternut	87	RL	Slippery elm
43	WN	Black walnut	88	OS	Other softwoods
44	SU	Sweetgum	89	OH	Other hardwoods
45	YP	Yellow-poplar	90	OT	Other species

**SO — South-Central Oregon, Northeast California (SORNEC)**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	WP	Western white pine	18	RC	Western redcedar
2	SP	Sugar pine	19	WH	Western hemlock
3	DF	Douglas-fir	20	PY	Pacific yew
4	WF	White fir	21	WA	White alder
5	MH	Mountain hemlock	22	RA	Red alder
6	IC	Incense-cedar	23	BM	Bigleaf maple
7	LP	Lodgepole pine	24	AS	Quaking aspen
8	ES	Engelmann spruce	25	CW	Black cottonwood
9	SH	Shasta red fir	26	CH	Bitter cherry
10	PP	Ponderosa pine/Jeffrey pine	27	WO	Oregon white oak
11	WJ	Western juniper	28	WI	Willow species
12	GF	Grand fir	29	GC	Giant chinkapin
13	AF	Subalpine fir	30	MC	Curl-leaf Mountain Mahogany
14	SF	Pacific silver fir	31	MB	Birchleaf Mountain Mahogany
15	NF	Noble fir	32	OS	Other softwoods
16	WB	Whitebark pine	33	OH	Other hardwoods
17	WL	Western larch			

**TT — Tetons**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	WB	Whitebark pine	7	LP	Lodgepole pine
2	LM	Limber pine	8	ES	Engelmann spruce
3	DF	Douglas-fir	9	AF	Subalpine fir
4	--		10	--	
5	--		11	OT	Other species
6	AS	Quaking aspen			

**UT — Utah**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	WB	Whitebark pine	8	ES	Engelmann spruce
2	LM	Limber pine	9	AF	Subalpine fir
3	DF	Douglas-fir	10	PP	Ponderosa pine
4	WF	White fir	11	PI	Pinyon pine
5	BS	Blue Spruce	12	WJ	Western juniper
6	AS	Quaking aspen	13	OA	Oak species
7	LP	Lodgepole pine	14	OT	Other species

**WC — Westside Cascades**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	SF	Pacific silver fir	21	BM	Bigleaf maple
2	WF	White fir	22	RA	Red alder
3	GF	Grand fir	23	WA	White alder/Pacific madrone
4	AF	Subalpine fir	24	PB	Paper birch
5	RF	California red fir/Shasta red fir	25	GC	Giant chinkapin/Tanoak
6	--		26	AS	Quaking aspen
7	NF	Noble fir	27	CW	Black cottonwood
8	YC	Alaska-cedar/Western larch	28	WO	OR white oak/CA black oak
9	IC	Incense-cedar	29	WJ	Western juniper
10	ES	Engelmann /Sitka spruce	30	LL	Subalpine larch
11	LP	Lodgepole pine	31	WB	Whitebark pine
12	JP	Jeffrey pine	32	KP	Knobcone pine
13	SP	Sugar pine	33	PY	Pacific yew
14	WP	Western white pine	34	DG	Pacific dogwood
15	PP	Ponderosa pine	35	HT	Hawthorn species
16	DF	Douglas-fir	36	CH	Bitter cherry
17	RW	Coast redwood	37	WI	Willow species
18	RC	Western redcedar	38	--	
19	WH	Western hemlock	39	OT	Other species
20	MH	Mountain hemlock			

**WS — Westside Sierra Nevada (WESSIN)**

Sequence number	Species code	Species name	Sequence number	Species code	Species name
1	OS	Other softwoods	7	BO	California black oak/other hardwoods
2	SP	Sugar pine	8	JP	Jeffrey pine
3	DF	Douglas-fir	9	RF	California red fir
4	WF	White fir	10	PP	Ponderosa pine
5	GS	Giant sequoia	11	TO	Tanoak/Giant chinkapin
6	IC	Incense-cedar			

### Species Codes - All Western Variants

AF	Subalpine fir	IC	Incense-cedar	RA	Red alder
AS	Quaking aspen	IO	Interior live oak	RC	Western redcedar
BC	Bristlecone pine	JP	Jeffrey pine	RF	California red fir
BL	Blue oak	JU	Juniper species	RM	Rocky Mountain juniper
BM	Bigleaf maple	KP	Knobcone pine	RW	Coast redwood
BO	California black oak	LL	Subalpine larch	SF	Pacific silver fir
BR	Brewer spruce	LM	Limber pine	SH	Shasta red fir
BS	Blue spruce	LO	Coast live oak	SP	Sugar pine
BU	California buckeye	LP	Lodgepole pine	SS	Sitka spruce
CB	Corkbark fir	MA	Pacific madrone	SW	Southwestern white pine
CH	Bitter cherry	MB	Birchleaf Mountain Mahogany	SY	California sycamore
CL	California-laurel	MC	Curl-leaf Mountain Mahogany	TO	Tanoak
CN	California nutmeg	MH	Mountain hemlock	VO	Valley white oak
CO	Cottonwood species	MM	Rocky Mountain maple	WA	White alder
CP	Coulter pine	MP	Monterey pine	WB	Whitebark pine
CW	Black cottonwood	NF	Noble fir	WF	White fir
CY	Canyon live oak	OA	Oak species	WH	Western hemlock
DF	Douglas-fir	OH	Other hardwoods	WI	Willow species
DG	Pacific dogwood	OS	Other softwoods	WJ	Western juniper
EO	Engelmann oak	OT	Other species	WL	Western larch
ES	Engelmann spruce	PB	Paper birch	WN	Walnut species
FL	Oregon ash	PC	Port-Orford-cedar	WO	Oregon white oak
GC	Giant chinkapin	PI	Pinyon pine	WP	Western white pine
GF	Grand fir	PP	Ponderosa pine	WS	White spruce
GP	Gray pine	PY	Pacific yew	YC	Alaska-cedar
GS	Giant sequoia				
HT	Hawthorn species				

### Species Codes - All Eastern Variants

AB	American beech	BP	Balsam poplar	EL	Elm species
AC	American chestnut	BR	Bur oak	FM	Florida maple
AE	American elm	BS	Black spruce	FR	Fir species
AH	American hornbeam	BT	Bigtooth aspen	GA	Green ash
AI	Ailanthus	BU	Buckeye/horsechestnut species	GB	Gray birch
AP	Apple species	BW	American basswood / Basswood species	HA	Silverbell
AS	Ash species	BY	Baldcypress	HB	Hackberry species
AW	Atlantic white-cedar	CA	Catalpa	HH	Eastern hophornbeam
BA	Black ash	CB	Cherrybark oak	HI	Hickory species
BB	Birch species	CC	Chokecherry	HK	Hackberry
BC	Black cherry	CH	Commercial hardwoods	HL	Honeylocust
BE	Boxelder	CK	Chinkapin oak	HM	Hemlock species
BF	Balsam fir	CO	Chestnut oak	HS	Select hickory
BG	Blackgum/black tupelo	CT	Cucumbertree	HT	Hawthorn species
BH	Bitternut hickory	CW	Cottonwood species	HY	American holly
BI	Black hickory	DM	Diamond willow	JP	Jack pine
BJ	Blackjack oak	DO	Delta post oak	JU	Juniper/Redcedar species
BK	Black locust	DW	Flowering dogwood	KC	Kentucky coffeetree
BL	Black willow	EC	Eastern cottonwood	LB	Loblolly-bay
BM	Black maple	EH	Eastern hemlock	LK	Laurel oak
BN	Butternut			LL	Longleaf pine
BO	Black oak			LO	Live oak

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**Eastern species codes - Continued**

LP	Loblolly pine	PP	Pitch pine	SR	Spruce pine
MA	American mountain-ash	PR	Pin cherry	SS	Sassafras
MB	Mulberry species	PS	Common persimmon	ST	Striped maple
MG	Magnolia species	PU	Sand pine	SU	Sweetgum
MH	Mockernut hickory	PW	Paulownia	SV	Silver maple
ML	Bigleaf magnolia	PY	Swamp cottonwood	SW	Swamp white oak
MM	Mountain maple	QA	Quaking aspen	SY	Sycamore
MS	Southern magnolia	QI	Shingle oak	TA	Tamarack
MV	Sweetbay	QS	Shumard oak	TL	Tupelo species
NC	Non-commercial hardwoods	RA	Redbay	TM	Table mountain pine
NK	Nuttall oak	RB	River birch	TO	Turkey oak
NP	Northern pin oak	RC	Eastern redcedar	TS	Swamp tupelo
NS	Norway spruce	RD	Eastern redbud	UA	Blue ash
OB	Ohio buckeye	RE	Rock elm	UH	Other upland hardwoods
OC	Other cedar species	RL	Slippery elm	VP	Virginia pine
OH	Other hardwoods	RM	Red maple	WA	White ash
OK	Other oak species	RN	Red pine (natural)	WB	White basswood
OL	Other lowland species	RO	Northern red oak	WC	Northern white-cedar
OO	Osage-orange	RP	Red pine (plantation)	WE	Winged elm
OP	Other pine species	RS	Red spruce	WH	Water hickory
OS	Other softwoods	SA	Slash pine	WI	Willow species
OT	Other species	SB	Sweet birch	WK	Water oak
OV	Overcup oak	SC	Scotch pine	WL	Willow oak
PA	Pumpkin ash	SD	Sourwood	WN	Black walnut
PB	Paper birch	SE	Serviceberry	WO	White oak
PC	Pondcypress	SG	Sugarberry	WP	Eastern white pine
PD	Pond pine	SH	Shagbark hickory	WR	Water birch
PE	Pecan	SI	Siberian elm	WS	White spruce
PH	Pignut hickory	SK	Southern red oak	WT	Water tupelo
PI	Spruce species	SL	Shellbark hickory	YB	Yellow birch
PL	Plum, cherry species	SM	Sugar maple	YP	Yellow-poplar
PN	Pin oak	SN	Swamp chestnut oak	YY	Yellow buckeye
PO	Post oak	SO	Scarlet oak		
		SP	Shortleaf pine		

## Appendix B: Default Site Index and Maximum Stand Density Index Values

The Base Age for each Site Index value is shown as a subscript. “T” indicates the base age is a total age—all others are breast height age. For additional information on site index and stand density index refer to the appropriate variant overview document.

### **AK — Southeast Alaska, Coastal British Columbia (SEAPROG)**

Species	LP	SS	AF	RA	CW	All others
Site Index	68 <sub>50</sub>	86 <sub>50</sub>	68 <sub>50</sub>	36 <sub>20T</sub>	120 <sub>100</sub>	80 <sub>50</sub>
Maximum SDI	750	750	750	750	750	750

### **BM — Blue Mountains**

Based on plant association (displayed values are for default plant association CWG113).

Default maximum SDI is the same for all species.

Species	WP	WL	DF	GF	MH <sup>1</sup>	--	LP	ES	AF	PP	OT
Site Index	73 <sub>50T</sub>	63 <sub>50</sub>	63 <sub>50</sub>	63 <sub>50</sub>	28 <sub>100</sub>	0	67 <sub>50T</sub>	100 <sub>100</sub>	100 <sub>100</sub>	100 <sub>100</sub>	63 <sub>50</sub>
Maximum SDI	546	546	546	546	546	0	546	546	546	546	546

<sup>1</sup> Site index values for MH are recorded in meters rather than feet in the BM variant.

### **CA — Inland California, Southern Cascades (ICASCA)**

#### Region 5

Based on Dunning’s site class

Species	PC	IC	RC	WF	RF	SH	DF	WH	MH	WB	KP
Site Index	72 <sub>50</sub>	61 <sub>50</sub>	72 <sub>50</sub>	80 <sub>50</sub>	80 <sub>50</sub>	80 <sub>50</sub>	80 <sub>50</sub>	72 <sub>50</sub>	72 <sub>50</sub>	72 <sub>50T</sub>	72 <sub>50T</sub>
Maximum SDI	570	570	570	760	800	800	600	580	580	460	430

Species	LP	CP	LM	JP	SP	WP	PP	MP	GP	WJ	BR
Site Index	72 <sub>50T</sub>	72 <sub>50T</sub>	72 <sub>50T</sub>	80 <sub>50</sub>	80 <sub>50</sub>	72 <sub>50</sub>	80 <sub>50</sub>	72 <sub>50</sub>	72 <sub>50</sub>	61 <sub>50T</sub>	61 <sub>50</sub>
Maximum SDI	580	430	460	430	430	460	430	430	430	330	580

Species	GS	PY	OS	LO	CY	BL	EO	WO	BO	VO	IO
Site Index	80 <sub>50</sub>	61 <sub>50</sub>	72 <sub>50</sub>	46 <sub>50T</sub>	46 <sub>50T</sub>	46 <sub>50T</sub>	46 <sub>50T</sub>	46 <sub>50</sub>	46 <sub>50</sub>	46 <sub>50</sub>	46 <sub>50T</sub>
Maximum SDI	570	570	430	550	550	550	550	550	550	550	550

Species	BM	BU	RA	MA	GC	DG	FL	WN	TO	SY	AS
Site Index	46 <sub>50T</sub>	46 <sub>50</sub>	46 <sub>50T</sub>	46 <sub>50T</sub>	46 <sub>50T</sub>	46 <sub>50</sub>	46 <sub>50</sub>	46 <sub>50T</sub>	46 <sub>50T</sub>	46 <sub>50T</sub>	46 <sub>50T</sub>
Maximum SDI	550	550	550	550	550	550	550	550	550	550	550

Species	CW	WI	CN	CL	OH
Site Index	46 <sub>50T</sub>	46 <sub>50T</sub>	46 <sub>50T</sub>	46 <sub>50T</sub>	46 <sub>50T</sub>
Maximum SDI	550	550	550	550	550

#### Region 6

Based on plant association (displayed values are for default plant association XCWC221)

Species	PC	IC	RC	WF	RF	SH	DF	WH	MH	WB	KP
Site Index	83 <sub>50</sub>	64 <sub>50</sub>	74 <sub>50</sub>	92 <sub>50</sub>	92 <sub>50</sub>	92 <sub>50</sub>	92 <sub>50</sub>	87 <sub>50</sub>	83 <sub>50</sub>	83 <sub>50T</sub>	83 <sub>50T</sub>
Maximum SDI	850	850	850	850	850	850	850	850	850	850	850

Species	LP	CP	LM	JP	SP	WP	PP	MP	GP	WJ	BR
Site Index	83 <sub>50T</sub>	83 <sub>50T</sub>	83 <sub>50T</sub>	86 <sub>50</sub>	92 <sub>50</sub>	86 <sub>50</sub>	86 <sub>50</sub>	83 <sub>50</sub>	83 <sub>50</sub>	70 <sub>50T</sub>	70 <sub>50</sub>
Maximum SDI	850	850	850	850	850	850	850	850	850	850	850

Species	GS	PY	OS	LO	CY	BL	EO	WO	BO	VO	IO
Site Index	92 <sub>50</sub>	37 <sub>50</sub>	70 <sub>50</sub>	26 <sub>50T</sub>	39 <sub>50T</sub>	31 <sub>50T</sub>	26 <sub>50T</sub>	37 <sub>50</sub>	52 <sub>50</sub>	70 <sub>50</sub>	26 <sub>50T</sub>
Maximum SDI	850	850	850	850	850	850	850	850	850	850	850

Species	BM	BU	RA	MA	GC	DG	FL	WN	TO	WY	AS
Site Index	70 <sub>50T</sub>	52 <sub>50</sub>	70 <sub>50T</sub>	70 <sub>50T</sub>	70 <sub>50T</sub>	37 <sub>50</sub>	64 <sub>50</sub>	37 <sub>50T</sub>	70 <sub>50T</sub>	70 <sub>50T</sub>	37 <sub>50T</sub>
Maximum SDI	850	850	850	850	850	850	850	850	850	850	850

Species	CW	WI	CN	CL	OH
Site Index	70 <sub>50T</sub>	23 <sub>50T</sub>	23 <sub>50T</sub>	23 <sub>50T</sub>	52 <sub>50T</sub>
Maximum SDI	850	850	850	850	850

### **CI — Central Idaho**

Site index and maximum SDI are not used in this variant.

Species	All
Site Index	0
Maximum SDI	403

### **CR — Central Rockies (GENGYM)**

#### Southwest Mixed Conifers Model

Species	AF	CB	DF	GF	WF	MH	RC	WL	BC	LM	LP
Site Index	64 <sub>100</sub>	56 <sub>100</sub>	70 <sub>100</sub>	68 <sub>100</sub>	64 <sub>100</sub>	51 <sub>100</sub>	59 <sub>100</sub>	70 <sub>100</sub>	35 <sub>100</sub>	29 <sub>100</sub>	54 <sub>100</sub>
Maximum SDI	735	735	560	735	735	735	770	650	470	470	675

Species	PI	PP	WB	SW	JU	BS	ES	WS	AS	CO	OA
Site Index	19 <sub>100</sub>	56 <sub>100</sub>	35 <sub>100</sub>	68 <sub>100</sub>	15 <sub>100</sub>	60 <sub>100</sub>	70 <sub>100</sub>	51 <sub>100</sub>	50 <sub>100</sub>	64 <sub>100</sub>	19 <sub>100</sub>
Maximum SDI	415	529	470	645	415	735	735	735	725	470	470

Species	OS	OH
Site Index	54 <sub>100</sub>	50 <sub>100</sub>
Maximum SDI	470	470

#### Southwest Ponderosa Pine Model

Species	AF	CB	DF	GF	WF	MH	RC	WL	BC	LM	LP
Site Index	77 <sub>100</sub>	70 <sub>100</sub>	86 <sub>100</sub>	87 <sub>100</sub>	77 <sub>100</sub>	57 <sub>100</sub>	80 <sub>100</sub>	86 <sub>100</sub>	43 <sub>100</sub>	39 <sub>100</sub>	67 <sub>100</sub>
Maximum SDI	735	735	560	735	735	735	770	650	470	470	675

Species	PI	PP	WB	SW	JU	BS	ES	WS	AS	CO	OA
Site Index	25 <sub>100</sub>	70 <sub>100</sub>	43 <sub>100</sub>	87 <sub>100</sub>	20 <sub>100</sub>	76 <sub>100</sub>	86 <sub>100</sub>	61 <sub>100</sub>	66 <sub>100</sub>	81 <sub>100</sub>	25 <sub>100</sub>
Maximum SDI	415	529	470	645	415	735	735	735	725	470	470

Species	OS	OH
Site Index	67 <sub>100</sub>	66 <sub>100</sub>
Maximum SDI	470	470

#### Blacks Hills Ponderosa Pine Model

Species	AF	CB	DF	GF	WF	MH	RC	WL	BC	LM	LP
Site Index	65 <sub>100T</sub>	57 <sub>100T</sub>	71 <sub>100T</sub>	69 <sub>100T</sub>	65 <sub>100T</sub>	52 <sub>100T</sub>	61 <sub>100T</sub>	71 <sub>100T</sub>	35 <sub>100T</sub>	29 <sub>100T</sub>	55 <sub>100T</sub>
Maximum SDI	735	735	560	735	735	735	770	650	470	470	675

Species	PI	PP	WB	SW	JU	BS	ES	WS	AS	CO	OA
Site Index	19 <sub>100T</sub>	57 <sub>100T</sub>	35 <sub>100T</sub>	69 <sub>100T</sub>	15 <sub>100T</sub>	61 <sub>100T</sub>	71 <sub>100T</sub>	51 <sub>100T</sub>	51 <sub>100T</sub>	65 <sub>100T</sub>	19 <sub>100T</sub>
Maximum SDI	415	529	470	645	415	735	735	735	725	470	470

Species	OS	OH
Site Index	55 <sub>100T</sub>	51 <sub>100T</sub>
Maximum SDI	470	470

**Spruce-Fir Model**

Species	AF	CB	DF	GF	WF	MH	RC	WL	BC	LM	LP
Site Index	68 <sub>100</sub>	61 <sub>100</sub>	75 <sub>100</sub>	74 <sub>100</sub>	68 <sub>100</sub>	53 <sub>100</sub>	66 <sub>100</sub>	75 <sub>100</sub>	38 <sub>100</sub>	32 <sub>100</sub>	58 <sub>100</sub>
Maximum SDI	735	735	560	735	735	735	770	650	470	470	675

Species	PI	PP	WB	SW	JU	BS	ES	WS	AS	CO	OA
Site Index	21 <sub>100</sub>	61 <sub>100</sub>	38 <sub>100</sub>	74 <sub>100</sub>	17 <sub>100</sub>	65 <sub>100</sub>	75 <sub>100</sub>	54 <sub>100</sub>	55 <sub>100</sub>	69 <sub>100</sub>	21 <sub>100</sub>
Maximum SDI	415	529	470	645	415	735	735	735	725	470	470

Species	OS	OH
Site Index	58 <sub>100</sub>	55 <sub>100</sub>
Maximum SDI	470	470

**Lodgepole Pine Model**

Species	AF	CB	DF	GF	WF	MH	RC	WL	BC	LM	LP
Site Index	75 <sub>100T</sub>	68 <sub>100T</sub>	83 <sub>100T</sub>	84 <sub>100T</sub>	75 <sub>100T</sub>	56 <sub>100T</sub>	77 <sub>100T</sub>	83 <sub>100T</sub>	42 <sub>100T</sub>	37 <sub>100T</sub>	65 <sub>100T</sub>
Maximum SDI	735	735	560	735	735	735	770	650	470	470	675

Species	PI	PP	WB	SW	JU	BS	ES	WS	AS	CO	OA
Site Index	24 <sub>100T</sub>	68 <sub>100T</sub>	42 <sub>100T</sub>	84 <sub>100T</sub>	19 <sub>100T</sub>	73 <sub>100T</sub>	83 <sub>100T</sub>	60 <sub>100T</sub>	63 <sub>100T</sub>	78 <sub>100T</sub>	24 <sub>100T</sub>
Maximum SDI	415	529	470	645	415	735	735	735	725	470	470

Species	OS	OH
Site Index	65 <sub>100T</sub>	63 <sub>100T</sub>
Maximum SDI	470	470

**CS — Central States**

Default maximum SDI is based on basal area maximum (SDI maximum = BA maximum / 0.54542).

Species	RC	JU	SP	VP	LP	OS	WP	WN	BN	TL	TS
Site Index	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>
Maximum SDI	550	550	550	550	550	550	550	504	504	504	504

Species	WT	BG	HS	SH	SL	MH	PH	HI	WH	BH	PE
Site Index	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>
Maximum SDI	504	504	458	458	458	458	458	458	458	458	458

Species	BI	AB	BA	PA	UA	EC	RM	BE	SV	BC	AE
Site Index	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>
Maximum SDI	458	458	458	458	458	458	458	504	458	458	458

Species	SG	HK	WE	EL	SI	RL	RE	YP	BW	SM	AS
Site Index	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>
Maximum SDI	504	504	458	458	458	458	458	458	458	458	458

Species	WA	GA	WO	RO	SK	BO	SO	BJ	CK	SW	BR
Site Index	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>
Maximum SDI	458	458	458	504	504	458	458	458	458	458	458

Species	SN	PO	DO	CO	PN	CB	QI	OV	WK	NK	WL
Site Index	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>
Maximum SDI	458	458	458	458	458	458	458	458	458	458	458

Species	QS	UH	SS	OB	CA	PS	HL	BP	BT	QA	BK
Site Index	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>
Maximum SDI	458	458	504	458	458	458	504	458	458	458	504

Species	OL	SY	BY	RB	SU	WI	BL	NC	AH	RD	DW
Site Index	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>
Maximum SDI	458	504	504	504	504	504	504	504	504	504	504

Species	HT	KC	OO	CT	MV	MB	HH	SD			
Site Index	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>			
Maximum SDI	504	504	504	504	504	504	504	504			

**EC — Eastside Cascades**

Based on plant association (displayed values are for default plant association CPS241)

Species	WP	WL	DF	SF	RC	GF	LP	ES	AF	PP	OT
Site Index	52 <sub>50T</sub>	49 <sub>50</sub>	49 <sub>50</sub>	49 <sub>50</sub>	78 <sub>100T</sub>	49 <sub>50</sub>	77 <sub>100T</sub>	75 <sub>100</sub>	75 <sub>100</sub>	75 <sub>100</sub>	23 <sub>100</sub>
Maximum SDI	237	238	281	281	281	281	248	281	257	237	281

**EM — Eastern Montana**

Default maximum SDI is based on habitat type (displayed values are for default habitat type 260).

Species	WB	WL	DF	--	--	--	LP	ES	AF	PP	OT
Site Index	53 <sub>100T</sub>	53 <sub>100T</sub>	70 <sub>50</sub>	70 <sub>50</sub>	70 <sub>50</sub>	70 <sub>50</sub>	70 <sub>100T</sub>	70 <sub>100</sub>	70 <sub>100</sub>	70 <sub>100T</sub>	53 <sub>100T</sub>
Maximum SDI	696	696	696	696	696	696	696	696	696	696	696

**KT — Kootenai/Kaniksu/Tally Lake - Flathead (KOOKANTL)**

Site index and maximum SDI are not used in this variant.

Species All

Site Index 0

Maximum SDI Same value for all species based on habitat type. 568 for default habitat type 260.

**LS — Lake States**

Default maximum SDI is based on basal area maximum (SDI maximum = BA maximum / 0.54542).

Species	JP	SC	RN	RP	WP	WS	NS	BF	BS	TA	WC
Site Index	60 <sub>50T</sub>	60 <sub>50T</sub>	58 <sub>50T</sub>	58 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>
Maximum SDI	413	413	550	642	550	642	642	596	550	458	642

Species	EH	OS	RC	BA	GA	EC	SV	RM	BC	AE	RL
Site Index	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>
Maximum SDI	550	550	550	458	458	458	458	458	458	458	458

Species	RE	YB	BW	SM	BM	AB	WA	WO	SW	BR	CK
Site Index	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>
Maximum SDI	458	458	458	458	458	458	458	458	458	458	458

Species	RO	BO	NP	BH	PH	SH	BT	QA	BP	PB	CH
Site Index	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	61 <sub>50T</sub>	61 <sub>50T</sub>	61 <sub>50T</sub>	54 <sub>50T</sub>	60 <sub>50T</sub>
Maximum SDI	504	458	458	458	458	458	458	458	458	504	504

Species	BN	WN	HH	BK	NC	BE	ST	MM	AH	AC	HK
Site Index	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>
Maximum SDI	504	504	504	504	504	504	504	504	504	504	504

Species	DW	HT	AP	BG	SY	PR	CC	PL	WI	BL	DM
Site Index	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>
Maximum SDI	504	504	504	504	504	504	504	504	504	504	504

Species	SS	MA
Site Index	60 <sub>50T</sub>	60 <sub>50T</sub>
Maximum SDI	504	504

**NC — Northern California (Klamath Mountains)**

Region 5

Species	OS	SP	DF	WF	MA	IC	BO	TO	RF	PP	OH
Site Index	90 <sub>50</sub>	100 <sub>50T</sub>	90 <sub>50</sub>	90 <sub>50</sub>	90 <sub>50</sub>	90 <sub>50</sub>	90 <sub>50</sub>	90 <sub>50</sub>	90 <sub>50</sub>	100 <sub>50T</sub>	90 <sub>50</sub>
Maximum SDI	624	647	547	759	588	706	382	759	800	571	759

Region 6

Based on plant association (displayed values are for default plant association CWC221)

Species	OS	SP	DF	WF	MA	IC	BO	TO	RF	PP	OH
Site Index	92 <sub>50</sub>	102 <sub>50T</sub>	92 <sub>50</sub>	92 <sub>50</sub>	92 <sub>50</sub>	92 <sub>50</sub>	92 <sub>50</sub>	92 <sub>50</sub>	92 <sub>50</sub>	102 <sub>50T</sub>	92 <sub>50</sub>
Maximum SDI	850	850	850	850	850	850	594	850	850	850	850

**NE — Northeast**

Default maximum SDI is based on basal area maximum (SDI maximum = BA maximum / 0.54542).

Species	BF	TA	WS	RS	NS	BS	PI	RN	WP	LP	VP
Site Index	67 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	80 <sub>50T</sub>	80 <sub>50T</sub>	80 <sub>50T</sub>	80 <sub>50T</sub>
Maximum SDI	550	504	642	642	642	642	642	550	550	550	550

Species	WC	AW	RC	OC	EH	HM	OP	JP	SP	TM	PP
Site Index	56 <sub>50T</sub>	56 <sub>50T</sub>	56 <sub>50T</sub>	56 <sub>50T</sub>	67 <sub>50T</sub>	67 <sub>50T</sub>	80 <sub>50T</sub>	80 <sub>50T</sub>	80 <sub>50T</sub>	80 <sub>50T</sub>	80 <sub>50T</sub>
Maximum SDI	550	550	550	550	550	550	413	413	550	550	550

Species	PD	SC	OS	RM	SM	BM	SV	YB	SB	RB	PB
Site Index	80 <sub>50T</sub>	80 <sub>50T</sub>	80 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>
Maximum SDI	550	550	413	458	458	458	458	458	458	458	504

Species	GB	HI	PH	SL	SH	MH	AB	AS	WA	BA	GA
Site Index	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	50 <sub>50T</sub>	50 <sub>50T</sub>	50 <sub>50T</sub>	50 <sub>50T</sub>
Maximum SDI	458	458	458	458	458	458	458	458	458	458	458

Species	PA	YP	SU	CT	QA	BP	EC	BT	PY	BC	WO
Site Index	50 <sub>50T</sub>	75 <sub>50T</sub>	75 <sub>50T</sub>	75 <sub>50T</sub>	75 <sub>50T</sub>	75 <sub>50T</sub>	75 <sub>50T</sub>	75 <sub>50T</sub>	75 <sub>50T</sub>	75 <sub>50T</sub>	71 <sub>50T</sub>
Maximum SDI	458	458	458	504	458	458	458	458	458	458	458

Species	BR	CK	PO	OK	SO	QI	WK	PN	CO	SW	SN
Site Index	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	73 <sub>50T</sub>	73 <sub>50T</sub>	73 <sub>50T</sub>	73 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>	71 <sub>50T</sub>
Maximum SDI	458	458	458	458	458	458	458	458	458	458	458

Species	RO	SK	BO	CB	OH	BU	YY	WR	HK	PS	HY
Site Index	73 <sub>50T</sub>	73 <sub>50T</sub>	73 <sub>50T</sub>	73 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>
Maximum SDI	504	504	458	458	458	458	458	504	504	458	504
Species	BN	WN	OO	MG	MV	AP	WT	BG	SD	PW	SY
Site Index	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>
Maximum SDI	504	504	504	504	504	504	504	504	504	504	504
Species	WL	BK	BL	SS	BW	WB	EL	AE	RL	NC	BE
Site Index	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	65 <sub>50T</sub>	56 <sub>50T</sub>	56 <sub>50T</sub>
Maximum SDI	504	504	504	504	458	458	458	458	458	458	504
Species	ST	AI	SE	AH	DW	HT	HH	PL	PR		
Site Index	56 <sub>50T</sub>	56 <sub>50T</sub>	56 <sub>50T</sub>	56 <sub>50T</sub>	56 <sub>50T</sub>	56 <sub>50T</sub>	56 <sub>50T</sub>	56 <sub>50T</sub>	56 <sub>50T</sub>		
Maximum SDI	504	504	504	504	504	504	504	504	504		

### **NI — Northern Idaho (Inland Empire)**

Site index and maximum SDI are not used in this variant.

Species All

Site Index 0

Maximum SDI Same value for all species based on habitat type. 568 for default habitat type 260.

### **PN — Pacific Northwest Coast**

Based on plant association (displayed values are for default plant association CHS133)

Species	SF	WF	GF	AF	RF	SS	NF	YC	IC	ES	LP
Site Index	139 <sub>100</sub>	98 <sub>50</sub>	98 <sub>50</sub>	139 <sub>100</sub>	98 <sub>50</sub>	98 <sub>50</sub>	139 <sub>100</sub>	139 <sub>100</sub>	139 <sub>100</sub>	139 <sub>100</sub>	104 <sub>50T</sub>
Maximum SDI	950	950	950	950	950	950	950	950	950	950	950
Species	JP	SP	WP	PP	DF	RW	RC	WH	MH <sup>1</sup>	BM	RA
Site Index	139 <sub>100</sub>	139 <sub>100</sub>	139 <sub>100</sub>	139 <sub>100</sub>	98 <sub>50</sub>	139 <sub>100</sub>	139 <sub>50</sub>	98 <sub>50</sub>	28 <sub>100</sub>	104 <sub>100</sub>	48 <sub>20T</sub>
Maximum SDI	950	950	950	950	950	950	950	950	950	950	950
Species	WA	PB	GC	AS	CW	WO	WJ	LL	WB	KP	PY
Site Index	90 <sub>100</sub>	209 <sub>100</sub>	97 <sub>100</sub>	104 <sub>100</sub>	118 <sub>100</sub>	97 <sub>100</sub>	32 <sub>100</sub>	98 <sub>50</sub>	97 <sub>100</sub>	139 <sub>100</sub>	35 <sub>100</sub>
Maximum SDI	950	950	950	950	950	950	950	950	950	950	950
Species	DG	HT	CH	WI	--	OT					
Site Index	83 <sub>100</sub>	35 <sub>100</sub>	70 <sub>100</sub>	70 <sub>100</sub>	0	139 <sub>100</sub>					
Maximum SDI	950	950	950	950	950	950					

<sup>1</sup> Site index values for MH are recorded in meters rather than feet in the PN variant.

**SN — Southern**

Default maximum SDI is based on forest type. Global default is 555.

Species	FR	JU	PI	PU	SP	SA	SR	LL	TM	PP	PD
Site Index	75 <sub>50T</sub>	54 <sub>50T</sub>	61 <sub>50T</sub>	81 <sub>50T</sub>	70 <sub>50T</sub>	70 <sub>50T</sub>	77 <sub>50T</sub>	83 <sub>50T</sub>	53 <sub>50T</sub>	69 <sub>50T</sub>	70 <sub>50T</sub>
Maximum SDI	555	555	555	555	555	555	555	555	555	555	555

Species	WP	LP	VP	BY	PC	HM	FM	BE	RM	SV	SM
Site Index	86 <sub>50T</sub>	81 <sub>50T</sub>	77 <sub>50T</sub>	73 <sub>50T</sub>	73 <sub>50T</sub>	63 <sub>50T</sub>	53 <sub>50T</sub>	53 <sub>50T</sub>	60 <sub>50T</sub>	68 <sub>50T</sub>	68 <sub>50T</sub>
Maximum SDI	555	555	555	555	555	555	555	555	555	555	555

Species	BU	BB	SB	AH	HI	CA	HB	RD	DW	PS	AB
Site Index	58 <sub>50T</sub>	60 <sub>50T</sub>	53 <sub>50T</sub>	28 <sub>50T</sub>	55 <sub>50T</sub>	60 <sub>50T</sub>	53 <sub>50T</sub>	28 <sub>50T</sub>	30 <sub>50T</sub>	43 <sub>50T</sub>	60 <sub>50T</sub>
Maximum SDI	555	555	555	555	555	555	555	555	555	555	555

Species	AS	WA	BA	GA	HL	LB	HA	HY	BN	WN	SU
Site Index	70 <sub>50T</sub>	72 <sub>50T</sub>	60 <sub>50T</sub>	70 <sub>50T</sub>	73 <sub>50T</sub>	33 <sub>50T</sub>	40 <sub>50T</sub>	53 <sub>50T</sub>	60 <sub>50T</sub>	60 <sub>50T</sub>	75 <sub>50T</sub>
Maximum SDI	555	555	555	555	555	555	555	555	555	555	555

Species	YP	MG	CT	MS	MV	ML	AP	MB	WT	BG	TS
Site Index	80 <sub>50T</sub>	80 <sub>50T</sub>	80 <sub>50T</sub>	80 <sub>50T</sub>	45 <sub>50T</sub>	80 <sub>50T</sub>	28 <sub>50T</sub>	35 <sub>50T</sub>	68 <sub>50T</sub>	70 <sub>50T</sub>	65 <sub>50T</sub>
Maximum SDI	555	555	555	555	555	555	555	555	555	555	555

Species	HH	SD	RA	SY	CW	BT	BC	WO	SO	SK	CB
Site Index	28 <sub>50T</sub>	43 <sub>50T</sub>	38 <sub>50T</sub>	73 <sub>50T</sub>	83 <sub>50T</sub>	60 <sub>50T</sub>	70 <sub>50T</sub>	70 <sub>50T</sub>	80 <sub>50T</sub>	70 <sub>50T</sub>	78 <sub>50T</sub>
Maximum SDI	555	555	555	555	555	555	555	555	555	555	555

Species	TO	LK	OV	BJ	SN	CK	WK	CO	RO	QS	PO
Site Index	45 <sub>50T</sub>	45 <sub>50T</sub>	65 <sub>50T</sub>	45 <sub>50T</sub>	65 <sub>50T</sub>	55 <sub>50T</sub>	73 <sub>50T</sub>	75 <sub>50T</sub>	80 <sub>50T</sub>	67 <sub>50T</sub>	55 <sub>50T</sub>
Maximum SDI	555	555	555	555	555	555	555	555	555	555	555

Species	BO	LO	BK	WI	SS	BW	EL	WE	AE	RL	OS
Site Index	80 <sub>50T</sub>	48 <sub>50T</sub>	60 <sub>50T</sub>	63 <sub>50T</sub>	48 <sub>50T</sub>	63 <sub>50T</sub>	63 <sub>50T</sub>	63 <sub>50T</sub>	63 <sub>50T</sub>	63 <sub>50T</sub>	43 <sub>50T</sub>
Maximum SDI	555	555	555	555	555	555	555	555	555	555	555

Species	OH	OT
Site Index	35 <sub>50T</sub>	35 <sub>50T</sub>
Maximum SDI	555	555

**SO — South-Central Oregon, Northeast California (SORNEC)****Region 5**

Species	WP	SP	DF	WF	MH <sup>1</sup>	IC	LP	ES	RF	PP	OT
Site Index	61 <sub>50T</sub>	85 <sub>100</sub>	50 <sub>50</sub>	50 <sub>50</sub>	26 <sub>100</sub>	50 <sub>50</sub>	55 <sub>50T</sub>	85 <sub>100</sub>	85 <sub>100</sub>	85 <sub>100</sub>	50 <sub>50</sub>
Maximum SDI	624	647	547	759	624	706	406	671	800	571	353

**Region 6**

Based on plant association (displayed values are for default plant association CPS111)

Species	WP	SP	DF	WF	MH <sup>1</sup>	IC	LP	ES	RF	PP	OT
Site Index	49 <sub>50T</sub>	70 <sub>100</sub>	45 <sub>50</sub>	45 <sub>50</sub>	21 <sub>100</sub>	45 <sub>50</sub>	49 <sub>50T</sub>	70 <sub>100</sub>	70 <sub>100</sub>	70 <sub>100</sub>	45 <sub>50</sub>
Maximum SDI	262	262	262	386	443	262	317	386	386	251	360

<sup>1</sup> Site index values for MH are recorded in meters rather than feet in the SO variant.



**TT — Tetons**

Species	WB	LM	DF	--	--	AS	LP	ES	AF	--	OT
Site Index	50 <sub>50T</sub>	50 <sub>50T</sub>	50 <sub>50T</sub>	50 <sub>50</sub>	50 <sub>50</sub>	50 <sub>80</sub>	50 <sub>50T</sub>	50 <sub>50</sub>	50 <sub>50</sub>	50	50 <sub>50T</sub>
Maximum SDI	400	400	440	560	560	450	540	625	625	400	400

**UT — Utah**

Species	WB	LM	DF	WF	BS	AS	LP	ES	AF	PP	PI
Site Index	28 <sub>50T</sub>	28 <sub>50T</sub>	40 <sub>50T</sub>	40 <sub>50</sub>	25 <sub>50</sub>	40 <sub>80</sub>	30 <sub>50T</sub>	34 <sub>50</sub>	41 <sub>50</sub>	34 <sub>50T</sub>	9 <sub>50T</sub>
Maximum SDI	400	400	440	560	625	450	540	625	625	400	415

Species	WJ	OA	OT
Site Index	8 <sub>50T</sub>	9 <sub>50T</sub>	28 <sub>50T</sub>
Maximum SDI	415	470	400

**WC — Westside Cascades**

Based on plant association (displayed values are for default plant association CFS551)

Species	SF	WF	GF	AF	RF	--	NF	YC	IC	ES	LP
Site Index	73 <sub>100</sub>	44 <sub>50</sub>	44 <sub>50</sub>	73 <sub>100</sub>	44 <sub>50</sub>	44 <sub>50</sub>	73 <sub>100</sub>	73 <sub>100</sub>	73 <sub>100</sub>	73 <sub>100</sub>	47 <sub>50T</sub>
Maximum SDI	778	778	778	778	778	0	778	778	778	778	778

Species	JP	SP	WP	PP	DF	RW	RC	WH	MH <sup>1</sup>	BM	RA
Site Index	73 <sub>100</sub>	73 <sub>100</sub>	73 <sub>100</sub>	73 <sub>100</sub>	73 <sub>100</sub>	73 <sub>100</sub>	73 <sub>100</sub>	44 <sub>50</sub>	22 <sub>100</sub>	55 <sub>100</sub>	18 <sub>20T</sub>
Maximum SDI	778	778	778	778	778	778	778	778	778	778	778

Species	WA	PB	GC	AS	CW	WO	WJ	LL	WB	KP	PY
Site Index	47 <sub>100</sub>	109 <sub>100</sub>	51 <sub>100</sub>	55 <sub>100</sub>	62 <sub>100</sub>	51 <sub>100</sub>	17 <sub>100</sub>	44 <sub>50</sub>	51 <sub>100</sub>	73 <sub>100</sub>	18 <sub>100</sub>
Maximum SDI	778	778	778	778	778	778	778	778	778	778	778

Species	DG	HT	CH	WI	--	OT
Site Index	44 <sub>100</sub>	18 <sub>100</sub>	36 <sub>100</sub>	36 <sub>100</sub>	73 <sub>100</sub>	73 <sub>100</sub>
Maximum SDI	778	778	778	778	0	778

<sup>1</sup> Site index values for MH are recorded in meters rather than feet in the WC variant.

**WS — Westside Sierra Nevada (WESSIN)**

Species	OS	SP	DF	WF	GS	IC	BO	JP	RF	PP	TO
Site Index	100 <sub>50T</sub>	100 <sub>50T</sub>	100 <sub>50T</sub>	100 <sub>50T</sub>	100 <sub>50T</sub>	100 <sub>50T</sub>	95 <sub>50</sub>	100 <sub>50T</sub>	82 <sub>50</sub>	100 <sub>50T</sub>	84 <sub>50</sub>
Maximum SDI	624	647	547	759	588	706	382	571	800	571	759

## Regeneration Establishment Model Keywords

This section provides descriptions of the keywords that are used with the Regeneration Establishment extension to the Forest Vegetation Simulator. With only a few exceptions, the keywords in this section are only recognized by FVS when they are contained in a sequence that begins with the keyword ESTAB and ends with the keyword END. Base model keywords are not recognized when they appear inside this sequence.

The following is a list of all the Regeneration Establishment model keywords. For a full description of the Regeneration Establishment model refer to GTR INT-279, *User's Guide to Version 2 of the Regeneration Establishment Model: Part of the Prognosis Model*.

AUTALLY  
BUDWORM  
BURNPREP  
END  
ESTAB  
EZCRUISE  
HABGROUP  
HTADJ  
INGROW  
MECHPREP  
MINPLOTS  
NATURAL  
NOAUTALY  
NOINGROW  
NOSPROUT  
OUTPUT  
PASSALL  
PLANT  
PLOTINFO  
RANNSEED  
RESETAGE  
SPECMULT  
SPROUT  
STOCKADJ  
TALLY  
TALLYONE  
TALLYTWO  
THRSHOLD

## **AUTALLY**

(Automatic seedling TALLY)

Full Regeneration Establishment Extension

Variants: AK, CI, EM, KT, NI

Related keywords: THRESHOLD, NOAUTALY, TALLY, TALLYONE, TALLYTWO

Requests automatic scheduling of regeneration following thinnings in which certain thresholds are exceeded. When 10 to 30 percent of the trees per acre or total cubic foot volume is removed, a single regeneration tally is scheduled. When more than 30 percent of the trees per acre or total cubic foot volume is removed, a tally sequence is scheduled. These percentages can be modified using the THRESHOLD keyword.

No fields are associated with this keyword.

Note: This keyword is only used in FVS variants that have the capability for automatic prediction of natural regeneration (AK, CI, EM, KT, and NI).

Caution: The base model keyword NOAUTOES invokes the NOAUTALY, NOINGROW and NOSPROUT keywords.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 8  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.2.4

## **BUDWORM**

(spruce BUDWORM)

Regeneration Establishment Extension

Variants: AK, CI, EM, KT, NI

Specifies defoliation histories for western spruce budworm and the effects of budworm defoliation on regeneration success.

field 1: Year or cycle that defoliation began. A 0 (zero) or blank results in an error message.

field 2: Last year of defoliation. A 0 (zero) or blank is replaced with the value in field 1 resulting in one year of defoliation.

Note: This keyword is only used in FVS variants that have the capability for automatic prediction of natural regeneration (AK, CI, EM, KT, and NI).

Note: Up to 20 BUDWORM keyword records can be present in a projection.

Note: If budworm effects are represented by the Budworm Model then this keyword is not necessary.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 11  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.1.5

## **BURNPREP**

(BURNing site PREParation)

Regeneration Establishment Extension

Variants: AK, CI, EM, KT, NI

Related keywords: MECHPREP

Specifies the percentage of regeneration plots receiving site preparation by burning. When site preparation treatments have not been specified or assigned with BURNPREP or MECHPREP

keywords, default equations are invoked. These equations predict the proportion of the stand receiving each of the three treatments (burning, mechanical scarification, and no disturbance) based on site characteristics such as slope, aspect, habitat type, residual basal area, elevation, and topographic position.

field 1: Year or cycle of site preparation. *Default = 0 (all cycles)*

field 2: Percentage of plots to be treated. *Range: 0-100, Default = 0*

Note: This keyword is only used in FVS variants that have the capability for automatic prediction of natural regeneration (AK, CI, EM, KT, and NI).

Note: The sum of mechanical and burn treatments must be less than, or equal to, 100 percent. If the sum is less than 100 percent, the difference is the percentage of undisturbed plots.

Note: Site preparations can be assigned to individual plots if desired. See PLOTINFO keyword.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 11  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.1.1

## END

(END of regeneration sequence)

Regeneration Establishment Extension

Variants: ALL

Related keywords: ESTAB

Signifies the end of the Regeneration Establishment sequence of keywords that was begun with the ESTAB keyword. Essentially, the END keyword returns control of the simulation to the base FVS system after the Regeneration Establishment extension has been called.

No fields are associated with this keyword.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 12  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3

## ESTAB

(ESTABlishment model)

Regeneration Establishment Extension

Variants: All

Related keywords: END

Signifies the beginning of keywords for the Regeneration Establishment extension. The ESTAB keyword sequence must be terminated with an END keyword. All keywords between ESTAB and END are considered Establishment extension keywords.

field 1: Year or cycle of disturbance or beginning of regeneration. The seedling tally sequence will begin in this year. *Default = 0 (all cycles)*

Caution: Some care is necessary when entering a disturbance date to insure that the regeneration establishment model is called at the correct time. Pay close attention to cycle boundaries when entering disturbance date.

Caution: If the ESTAB keyword is embedded in an IF-THEN-ENDIF sequence, year of disturbance (field 1) is interpreted as years from the time the condition is true until establishment, or in other words, a lag time. (e.g. a 5 in field 1 means wait 5 years after condition is true to establish the stand.)

Note: The Regeneration Establishment extension keyword sequence must begin with an ESTAB keyword and end with an END keyword; all keywords contained within this sequence are considered Regeneration Establishment keywords.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 11  
GTR INT-133, User's Guide to the Stand Prognosis Model, p. 86  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3

## **EZCRUISE** (Easy CRUISE)

Full Regeneration Establishment Extension

Variants: AK, CI, EM, KT, NI

Requests prediction of the small tree component at the time of the inventory. This keyword is used if the stand inventory did not include regeneration less than 3 inches dbh.

No fields are associated with this keyword.

Note: This keyword is only used in FVS variants that have the capability for automatic prediction of natural regeneration (AK, CI, EM, KT, and NI).

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 12  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.1.8

## **HABGROUP** (HABitat type GROUP)

Regeneration Establishment Extension

Variants: AK, CI, EM, KT, NI

Requests that an optional output table that shows habitat types within the habitat type groups shown in the regeneration summary output table be written to the standard FVS output file.

No fields are associated with this keyword.

Note: This keyword is only used in FVS variants that have the capability for automatic prediction of natural regeneration (AK, CI, EM, KT, and NI).

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 12  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.3

## HTADJ

(regeneration Height ADJustment)  
Regeneration Establishment Extension  
Variants: All

Specifies a species-specific initial height adjustment for newly established trees before the tree records are passed to the base FVS model.

field 1: Year or cycle the adjustment is to be applied. Once in effect it remains in effect until replaced by a subsequent multiplier. *Default = 1*

field 2: Species code for trees to be adjusted. *Default = All*

field 3: Height in feet to be added to the seedling height assigned by the Regeneration Establishment extension. A negative value results in a reduction in height. *Default = 0*

Note: The HTADJ keyword should not be confused with the FVS base model keyword REGHMULT, which is a multiplier.

Note: The value entered in field 3 can be positive or negative, but resulting heights will not be shorter than a preset minimum (usually 0.5 or 1.0 feet), nor taller than the height of a tree 3 inches dbh.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 13  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, ss. 5.4.3.2.1, 6.5.2.3

## INGROW

(INGROWth)  
Full Regeneration Establishment Extension  
Variants: AK, CI, EM, KT, NI  
Related keywords: NOINGROW

Requests addition of new trees in the absence of disturbance in recent cycles. Ingrowth will occur every 20 years after the completion of a regeneration period if there are no regeneration activities scheduled for the next cycle. The objective is to account for regeneration that continues to become established in sparsely stocked stands or under the canopy of the overstory. Tree records that are created for ingrowth tallies can include trees up to 20 years old, so an assortment of tree sizes is added to the simulation.

No fields are associated with this keyword.

Note: This keyword is only used in FVS variants that have the capability for automatic prediction of natural regeneration (AK, CI, EM, KT, and NI).

Caution: The base model keyword NOAUTOES invokes the NOAUTALY and NOINGROW keywords.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 8  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.2.4

## **MECHPREP** (MECHanical site PREparation)

Regeneration Establishment Extension

Variants: AK, CI, EM, KT, NI

Related keywords: BURNPREP

Specifies the percentage of regeneration plots receiving site preparation by mechanical means. When site preparation treatments have not been specified or assigned with MECHPREP or BURNPREP keywords, default equations are invoked. These equations predict the proportion of the stand receiving each of the three treatments (burning, mechanical scarification, and no disturbance) based on site characteristics such as slope, aspect, habitat type, residual basal area, elevation, and topographic position.

field 1: Year or cycle of site preparation. *Default = 0 (all cycles)*

field 2: Percentage of plots to be treated. *Range: 0-100, Default = 0*

Note: This keyword is only used in FVS variants that have the capability for automatic prediction of natural regeneration (AK, CI, EM, KT, and NI).

Note: The sum of mechanical and burn treatments must be less than, or equal to, 100 percent. If the sum is less than 100 percent, the difference is the percentage of undisturbed plots.

Note: Site preparations can be assigned to individual plots if desired. See PLOTINFO keyword.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 11  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.1.1

## **MINPLOTS** (MINimum number of PLOTS)

Regeneration Establishment Extension

Variants: All

Specifies the minimum number of regeneration plots to process. The regeneration model produces plot-to-plot variation in the number of trees per plot, species composition, and initial tree heights. Stand statistics are averages of plot predictions, so a large number of plots reduces the random variation for the stand. Plots are repeatedly doubled until the user-specified minimum number is reached.

field 1: Minimum number of plots to process. *Minimum = 20, Default = 50*

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 13  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.2.7

**NATURAL** (NATURAL regeneration)  
Regeneration Establishment Extension  
Variants: All  
Related keywords: PLANT

Specifies natural regeneration that will be added to the stand.

field 1: Year or cycle of regeneration. An entry is required, and must be equal to, or greater than, the disturbance date specified on the ESTAB keyword.

field 2: Species code for trees to be naturally regenerated. *Entry required*

field 3: Number of trees per acre of the species designated in field 2 to be regenerated.  
*Default = 0*

field 4: Percent survival expected for this species at the end of the current cycle.  
*Range: 0-100, Default = 100*

field 5: Average seedling age in years for the year specified in field 1. *Default = 2*

field 6: Average seedling height in feet five years from the time of seedling appearance or at the end of the cycle, whichever is earlier.

field 7: Shade code. *Default = 0*

- |   |  |
|---|--|
| 0 | Seedlings occur uniformly on plots throughout the stand.                 |
| 1 | Seedlings occur more frequently on plots with more overstory basal area. |
| 2 | Seedlings occur more frequently on plots with less overstory basal area. |

Note: A separate NATURAL keyword is necessary for each species.

Note: Use of this keyword sets STOCKADJ to 0.0 and activates the NOINGROW and NOAUTALY keywords.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 11  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.1.2

**NOAUTALY** (NO AUTomatic seedling TALLY)  
Full Regeneration Establishment Extension  
Variants: AK, CI, EM, KT, NI  
Related keywords: AUTALLY, NOINGROW, NOSPROUT

Suppresses the automatic scheduling of regeneration following thinnings (see AUTALLY).

No fields are associated with this keyword.

Note: This keyword is only used in FVS variants that have the capability for automatic prediction of natural regeneration (AK, CI, EM, KT, and NI).



Note: The base model keyword NOAUTOES invokes the NOAUTALY and NOINGROW keywords.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 13  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.2.4

## **NOINGROW** (NO automatic INGROWth)

Full Regeneration Establishment Extension

Variants: AK, CI, EM, KT, NI

Related keywords: INGROW, NOAUTALY, NOSPROUT

Suppresses the automatic scheduling of ingrowth (see INGROW).

No fields are associated with this keyword.

Note: This keyword is only used in FVS variants that have the capability for automatic prediction of natural regeneration (AK, CI, EM, KT, and NI).

Note: The base model keyword NOAUTOES invokes the NOAUTALY and NOINGROW keywords.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 13  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.2.4

## **NOSPROUT** (NO stump or root SPROUTing)

Regeneration Establishment Extension

Variants: All

Related keywords: SPROUT, NOINGROW, NOAUTALY

Suppresses the automatic scheduling of root and stump sprouting following thinning (see SPROUT).

No fields are associated with this keyword.

Note: The base model keyword NOAUTOES does not invoke the NOSPROUT keyword.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.2.4

## **OUTPUT** (OUTPUT tables)

Regeneration Establishment Extension

Variants: All

Specifies printing of regeneration summary tables.

field 1: Summary table output flag. *Default = 1*

0	Suppress all output (tree records still passed to FVS model)
1	Print standard regeneration summary table

field 2: File reference number for output. If this field is left blank output will be written to the FVS output file. If the value is any number other than 16 or blank, then an associated output file needs to be opened with OPEN keyword. *Default = 17*

Caution: The debug option produces a great deal of output that is not useful to most users.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 12  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.3

**PASSALL** (PASS ALL seedling records)  
Regeneration Establishment Extension  
Variants: All

Specifies the maximum number of "acceptable" (value class 2) predicted seedlings per species per plot to be passed from the Regeneration Establishment model to the FVS tree list during the tally. The Regeneration Establishment model automatically passes all of the "best" or "desirable" (value class 1) predicted seedlings, which includes all planted seedlings, to the FVS tree list during the tally. It also passes all sprouts as "acceptable" (value class 2). In addition, in the full establishment model, up to five "acceptable" (value class 2) naturally regenerating seedlings of each species per regeneration plot are passed by default. PASSALL specifies a new maximum number of "acceptable" naturally regenerating seedlings of each species per plot to be passed. This does not affect the number of "best" seedlings passed or the number of sprouts passed.

field 1: Maximum number of "acceptable" (value class 2) naturally regenerating seedlings of each species per plot to pass to the base model. *Default = 1*

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 4  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.1.7

**PLANT** (PLANT seedlings)  
Regeneration Establishment Extension  
Variants: All  
Related keywords: NATURAL

Specifies planting of seedlings that will be added to the stand.

field 1: Year or cycle of regeneration. An entry is required, and must be equal to, or greater than, the disturbance date specified on the ESTAB keyword.

field 2: Species code for trees to be naturally regenerated. *Entry required*

field 3: Number of trees per acre of the species designated in field 2 to be planted.  
*Default = 0*

field 4: Percent survival expected for this species at the end of the current cycle.  
*Range: 0-100, Default = 100*

field 5: Average seedling age in years for the year specified in field 1. *Default = 2*

field 6: Average seedling height in feet five years from the time of planting or at the end of the cycle, whichever is earlier.

field 7: Shade code. *Default = 0*

0	Seedlings occur uniformly on plots throughout the stand.
1	Seedlings occur more frequently on plots with more overstory basal area.

2 Seedlings occur more frequently on plots with less overstory basal area.

Note: A separate PLANT keyword is necessary for each species.

Note: Planted trees are in addition to natural regeneration and do compete with naturals in the best tree selection process.

Note: The STOCKADJ keyword can be used in conjunction with planting to suppress natural regeneration so that only planted trees are passed to the FVS model.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 11  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.1.2

## **PLOTINFO** (PLOT INFOrmation)

Regeneration Establishment Extension

Variants: All

Related keywords: NATURAL

Specifies plot specific values for slope, aspect, habitat type, topographic position, and site preparation. This keyword is used when plot information is not contained on the tree data records. A separate record is required for each plot (either as a supplemental record or as a record in the file designated in field 1 and opened with an OPEN keyword).

field 1: File reference number for input. If this field is left blank supplemental data records are assumed to follow immediately after the PLOTINFO keyword in the keyword file.

Supplemental record format:

Columns 1-10: Plot identification number coded the same as in the FVS model. A record with a negative number in these columns must be present to signify the end of PLOTINFO supplemental data records.

Columns 11-12: Plot slope percent.

Column 13-15: Plot aspect in degrees.

Column 16-18: Plot numeric habitat type code.

Column 19: Plot topographic position code.

1	Bottom
2	Lower slope
3	Mid-slope
4	Upper slope
5	Ridge top

Column 20: Plot site preparation code.

1	None
2	Mechanical
3	Burn
4	Road cut, road fill, or stockable road bed

References: GTR INT-279, User's Guide to the Regeneration Establishment Model, p.24,33  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.1.4

## **RANNSEED** (RANdom NUmber SEED)

Regeneration Establishment Extension

Variants: All

Reseeds the pseudorandom number generators used in the Regeneration Establishment model. If a 0 (zero) is used as the replacement value for the seed, the model will run stochastically (i.e. results will vary for multiple runs of the same simulation file). With any non-zero seed value the results will always be the same for multiple runs of the same simulation file.

field 1: Replacement value for the pseudorandom number seed (should be an odd integer). *Default = 55329*

Note: The FVS base model and the Regeneration Establishment extension use separate pseudorandom number generators. Each one can be reseeded independently. Using a RANNSEED keyword inside an ESTAB-END sequence affects the Regeneration Establishment extension.

References: GTR INT-133, User's Guide to the Stand Prognosis Model, p. 94  
GTR INT-208, Supplement to the User's Guide..., p. 14  
GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 32  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.2.6

Refer to GTR INT-394, Implications of Random Variation in the Stand Prognosis Model, for a discussion of the stochastic nature of the model.

## **RESETAGE** (RESET stand AGE)

Regeneration Establishment Extension

Variants: All

Sets the stand age to zero to make FVS model output correspond to the actual age of the stand. Age is strictly for reporting purposes and has no effect on growth or survival prediction. Its only effect is on the calculation of mean annual increment. This keyword is useful when average stand age has changed due to thinnings and plantings.

field 1: Year or cycle that stand age is to be changed (usually the year of disturbance).

field 2: New stand age. *Default = 0*

Note: This is also a base model keyword. Both have exactly the same effect.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.1.3

**SPECMULT** (SPECies occurrence MULTipplier)  
Full Regeneration Establishment Extension  
Variants: AK, CI, EM, KT, NI

Specifies a species-specific multiplier that increases or decreases the probability of a species' occurrence in natural regeneration. The multiplier does not set the probability of a species' occurrence; it is multiplied by the default probability to increase or decrease the probability of occurrence. Thus, a multiplier of 1.0 has no effect on the default probability for that species.

field 1: Year or cycle the multiplier takes effect. *Default = 1*

field 2: Species code to which the multiplier will be applied. *Entry required*

field 3: Multiplier value. *Range: 0.0-1.0, Default = 1.0*

Note: This keyword is only used in FVS variants that have the capability for automatic prediction of natural regeneration (AK, CI, EM, KT, and NI).

Note: A separate SPECMULT keyword record is needed for each species to be modified.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 13  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, ss. 5.4.3.2.3,  
6.5.2.3

**SPROUT** (stump or root SPROUTing)  
Regeneration Establishment Extension  
Variants: All  
Related keywords: NOSPROUT, INGROW, AUTALLY

Requests the automatic scheduling of root and stump sprouts after a thinning and allows users to change the number of regenerated sprouts and initial sprout heights. A value of less than 1.0 decreases the number and/or height of sprouts, and a value greater than 1.0 increases the number and/or height of sprouts. Only those species that are prone to stump or root sprouting will have this type of regeneration scheduled. This keyword has no effect on species that do not sprout. For most sprouting species this keyword is on by default.

field 1: Species to apply sprouting multipliers. *Default = all*

field 2: Number of sprouts multiplier. *Default = 1.0*

field 3: Sprout height multiplier. *Default = 1.0*

Caution: The base model keyword NOAUTOES invokes the NOAUTALY, NOINGROW and NOSPROUT keywords.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

Reference: Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.2.4

## **STOCKADJ** (STOCKing ADJustment)

Full Regeneration Establishment Extension

Variants: AK, CI, EM, KT, NI

Adjusts the probability of natural regeneration stocking upward or downward. The probability of stocking will be multiplied by the value entered in field 2, but the product will be bounded within the interval [0,1]. The multiplier is calculated by dividing the desired probability of stocking by the predicted probability of stocking. As an example, suppose the regeneration model predicts the probability of stocking 10 years after a harvest is 0.40 and it is desired to raise this figure to 0.50 in a subsequent run. The value to enter in field 2 is 1.25 ( $0.50/0.40 = 1.25$ ). In other words, the desired probability is 1.25 times the predicted probability.

field 1: Year or cycle the multiplier takes effect. *Default = 1*

field 2: Multiplier for the probability of stocking. *Default = 1.0 (CI default = 0.0)*

Note: This keyword is only used in FVS variants that have the capability for automatic prediction of natural regeneration (AK, CI, EM, KT, and NI).

Note: If field 2 is blank or 0 (zero) natural regeneration is cancelled so that only planted trees regenerate. This is useful in simulating growth of plantations or to input a list of trees on a habitat type for which the Regeneration Establishment extension is not presently calibrated.

Note: The PARMS format may be used with this keyword. See the introduction for a description of this format.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 15  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, ss. 5.4.3.2.2, 6.5.2.3

## **TALLY**

(seedling TALLY)

Regeneration Establishment Extension

Variants: All

Related keywords: TALLYONE, TALLYTWO, AUTALLY

Schedules a tally sequence for prediction of regeneration, and optionally supplies a disturbance year. Regeneration is reported in a summary called a tally. At each tally, new regeneration is added to the FVS Model tree list and a regeneration summary output table is printed. A tally will be predicted for every cycle boundary for 20 years following the beginning of the sequence. For example, if cycle lengths were 5 years, four tallies would result.

field 1: Year or cycle the tally sequence is to begin. *Entry required*

field 2: Optional field to supply the year of disturbance. This value takes precedence over the value in field 1 of the ESTAB keyword record. If blank, the year of disturbance is determined from field 1 of the ESTAB keyword record.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p. 13  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.1.6

**TALLYONE** (seedling TALLY ONE)  
Regeneration Establishment Extension

Variants: All

Related keywords: TALLYTWO, TALLY, AUTALLY

Specifies the year in which the first regeneration tally is to occur, and optionally supplies a disturbance year. New seedlings as well as advanced regeneration (those trees that germinated and became established prior to the disturbance date) are passed to the base model. Regeneration is predicted at the end of the cycle, so the specified tally year should be one year prior to the end of the cycle. For example, if, in a simulation using 5-year cycles, a regeneration harvest is scheduled for 2010 and the first tally is desired 10 years later, the tally year specified in the TALLYONE keyword should be 2019 (one year prior to the 2020 cycle boundary). The TALLYONE keyword takes precedence over the tally sequence scheduled by the ESTAB keyword or the TALLY keyword.

field 1: Year the first regeneration tally is to be reported. *Entry required*

field 2: Optional field to supply the year of disturbance. This value takes precedence over the value in field 1 of the ESTAB keyword record. If blank, the year of disturbance is determined from field 1 of the ESTAB keyword record.

Note: At the first regeneration tally (TALLYONE), both planted trees and natural regeneration are passed to the FVS model.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p.7,12  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.1.6

**TALLYTWO** (seedling TALLY TWO)  
Regeneration Establishment Extension

Variants: All

Related keywords: TALLYONE, TALLY, AUTALLY

Specifies the year in which a subsequent regeneration tally is to occur, and optionally supplies a disturbance year (see TALLYONE). A TALLYTWO may be scheduled any time after a TALLYONE and within 20 years of the disturbance date. Multiple TALLYTWO keyword records may be scheduled. If a TALLYTWO is scheduled without a TALLYONE being scheduled, the TALLYTWO is changed to a TALLYONE. Only new seedlings (those that germinated and became established subsequent to the previous tally) are passed to the base model. Regeneration is predicted at the end of the cycle, so the specified tally year should be one year prior to the end of the cycle. The TALLYTWO keyword takes precedence over the tally sequence scheduled by the ESTAB keyword or the TALLY keyword.

field 1: Year the second regeneration tally is to be reported. *Entry required*

field 2: Optional field to supply the year of disturbance. This value takes precedence over the value in field 1 of the ESTAB keyword record. If blank, the year of disturbance is determined from field 1 of the ESTAB keyword record.

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p.7,12  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.1.6

**THRSHOLD** (automatic regeneration THReSHOLDs)  
Full Regeneration Establishment Extension  
Variants: AK, CI, EM, KT, NI  
Related keywords: AUTALLY

Changes the threshold values that schedule automatic regeneration tallies following thinnings. Values refer to the percentage of either trees per acre or total cubic foot volume removed in the thinnings. A single regeneration tally is scheduled if the percentage removed falls between the lower and upper percentages specified on this keyword. An entire tally sequence is scheduled if the percentage removed is greater than the upper percentage specified on this keyword. If this keyword is not used the lower percentage is 10 and the upper percentage is 30.

field 1: Lower removal percentage. *Range: 2.5-95.0, Default = 10*

field 2: Upper removal percentage. *Range: 5.0-97.5, Default = 30*

Note: The value in field 1 must be lower than the value in field 2.

Note: This keyword is only used in FVS variants that have the capability for automatic prediction of natural regeneration (AK, CI, EM, KT, and NI).

References: GTR INT-279, User's Guide to the Regeneration Establishment Model..., p.8,13  
Essential FVS: A User's Guide to the Forest Vegetation Simulator, s. 5.4.3.2.5



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