



Research Note 41

October 8, 1997

Missing site index for one or more species on the plot

by

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The growth projection process in CACTOS requires that the site index be known for each species present on the plot. Site index here is defined as the height of dominant or codominant trees at a breast height age of 50 years¹. However, you may have “minor” species on the plot that don’t have appropriate trees to use for the height/age relationship or you just want to save time by having CACTOS compute a site index for minor species. Of course, when proper site index trees don’t exist on the plot, the user is urged to use judgment and use site index information from trees off the plot that reflect the growing potential of each species present. But this is not always possible or you may just forget to fill in the site index for a minor species. In any event, you may still would like CACTOS to accept the data file without problems.

What is a *minor* species? In the areas covered by the CACTOS model, a minor species is one that makes up a *small* proportion of the basal area and the modeller has little interest in an accurate estimate of site index. The criterion as to which cases you are willing to live with a site index is up to the user, however.

The projection process has two steps. First, the average site index is computed for the following species (if present): ponderosa pine, Douglas-fir, and white fir (site index codes 1, 4 and 5). Second, the missing site index values are then computed as a percentage of this average site index. For example, if you have ponderosa pine and Douglas-fir on the plot with site index values given as 80 and 70, respectively, the average site index is 75. The site index for other species would be a percentage of 75. But what percentage?

Observations of site index relationships between species show considerable variation. However, where the species in question is a “minor” species on a plot, the ratio of the minor to the major species site index is smaller than if both are major species. These observations over 600 plots used to develop CACTOS led to the percentages given in Table 1. Recalling that the average site index of 80 is computed over PP², DF, and WF

¹ See Biging and Wensel (1985) or Biging (1985). CACTOS research notes are available on line at at www.cnr.berkeley.edu/~wensel/cactos/cactoss.htm

² Using the species abbreviations given in Table 1.

(if present), examples of the computed minor site index for are as follows: 80 for sugar pine and 54 for black oak.

Site index can also be estimated for PP, DF, or WF if they are not present using the percentage values 90, 90, and 80, respectively. For example, if site index is only present for PP, estimated site index for DF would be 90% of that given for PP.

What do you do if you don't agree with the percentages given in Table 1? You would then put your best estimate on the site index on the input file and give your suggested changes to Lee Wensel to be implemented in a future version of CACTOS. If there is a demand for it, the percentages could even be made accessible to the user.

To use this feature in CACTOS, enter "-1" (minus one) for as the site index for any species you wish to estimate³. This will show that you haven't forgotten about the missing value and that you clearly want CACTOS to estimate it.

Table 1. Percentage of average site index used to compute missing site index values.

no.	Species name	Species code	percentage
1	ponderosa pine	PP	90
2	sugar pine	SP	100
3	incense cedar	IC	67
4	Douglas-fir	DF	90
5	white fir	WF	80
6	red fir	RF	67
7	lodgepole pine	LP	67
8	white pine	WP	67
9	Jeffrey pine	JP	67
10	misc. conifer	MC	67
11	chinquapin	CQ	67
12	black oak	BO	67
13	tan oak	TO	67
14	misc. hardwood	MH	67

Literature Cited

Biging, G.S. and L.C. Wensel. 1985. Site index equations for young-growth mixed conifers of northern California. Research Note No. 8, Northern California Forest Yield Cooperative. University of California, Berkeley, California (available "on line" at www.cnr.berkeley.edu/~wensel)

Biging, G.S. 1985. Improved estimates of site index curves using a varying-parameter model. Forest Science 31(1): 248-259.

³ Any value that is "non-zero and less than or equal to 10" will do.

Appendix

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SUBROUTINE FIXSITE
C
C   Fixsite will substitute an adjusted average site for missing
C   sites that are needed.  Sites for species not present on plot
C   are left unaltered.
C
C   If needed, an average site index is computed for the species
C   PP, DF, and WF.  Missing site indeces that are needed are then
C   computed as site(i) = avesite x pct(i).
C
C   The variable pct(i), (i=1,14), comes from the cofil.41?
C
C
C   PARAMETER(IX=650,IY=12)
COMMON/TREE/XT(IX,IY),NREC
COMMON/STAND/SITE(14),AGEI(14),STEMSI(14)
COMMON/UNITS/KEY,KEYB,ISC,NF,NF2,NF3,IYD,IRP,LOF,IB,IBR,ISD,IES,
*ITL,ICM
dimension mspp(14), nspp(14)
common /site/pct(14)
DATA pct/ 0.90, 1.00, 0.67, 0.90, 0.80, 0.67, 0.67,
*         0.67, 0.67, 0.67, 0.67, 0.67, 0.67, 0.67/
C
C   Determine which species are on the plot:
C
C   write(isc,'(2x,14f5.0)') (site(i), i=1,14) ! site index
initially
C
C   DO 10 i = 1,14
10  nspp(i) = 0 ! 0 for missing
   DO 20 i = 1, nrec
     j = int(xt(i,1))
     IF (j .LT. 1 .OR. j .GT. 14) j = 14 ! range check
20  nspp(j) = 1 ! 1 for present
C
C   Is the site index missing for any of the species present?
C
C   npres = 0 ! initialize no. species present
C   mpres = 0 ! initialize no. S.I. present
DO 30 i = 1,14
  npres = npres + 1 ! 1 for present
  mspp(i) = 0 ! 0 for missing
  IF (nspp(i) .EQ. 1 .AND. site(i) .GT. 10.) THEN
    mspp(i) = 1 ! 1 for present
    mpres = mpres + 1 ! 1 for present
  END IF
30  CONTINUE
C
C   IF (npres .EQ. mpres) goto 90 ! all present?
C
C   At least one req'd site index is missing so compute average
C   site index for the major species (PP,DF,WF) and assign a value
C   to missing site index.
C
C   obs = 0.
C   sumsite = 0.
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if (site(1) .GT. 10.) then
  sumpsite = site(1)
  obs = 1.
endif
if (site(4) .GT. 10.) then
  sumpsite = sumpsite + site(4)
  obs = obs + 1.
endif
if (site(5) .GT. 10.) then
  sumpsite = sumpsite + site(5)
  obs = obs + 1.
endif
avesite = 10.
if (obs .GT. 0.) avesite = sumpsite / obs
c
DO 40 i = 1,14
IF (mspp(i) .EQ. 0 .AND. nspp(i) .EQ. 1) site(i)=pct(i)*avesite
40 CONTINUE
c
c   write(isc,'(2x,14f5.0)') (site(i), i=1,14) ! site after fix
c   write(isc,'(2x,14i5  )') (nspp(i), i=1,14) ! trees present
c   write(isc,'(2x,14i5  )') (mspp(i), i=1,14) ! S.I. present
c
90 RETURN
END
□

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