Stand Visualization (SVS)

Stand visualization can be used to make a graphical representation of the inventory information. The Stand Visualization System (SVS) is public software created at the University of Washington by Bob McGaughey of the USDA Forest Service Pacific Northwest Station. LMS utilizes this program for its stand visualization functions. For more information on SVS visit the web site:

http://forsys.cfr.washington.edu/svs.html

The inventory information includes species, diameter, height, crown ratio, trees per acre, volume, and maximum crown width. To perform stand visualization, spatial information including tree location is needed. Since this information is not included in the inventory information, tree locations for stand visualization are generated using a random algorithm. The tree list is processed, allocating random locations for each tree record in the tree list so that the per acre values are equal to those in the tree inventory information. If the tree record represents more than one tree, then one tree will be drawn for each of the whole trees and a random number will be picked to determine if an additional tree should be drawn to represent the partial tree. For example, the following tree record:

    DF, 28.9, 150.6, 0.58, 1.19, ...

 has an expansion factor of 1.19 trees per acre of 28.9 inch Douglas-fir. For stand visualization one tree will always be drawn and 19 out of 100 times a second tree will be drawn. Expansion factors for tree records result from the sampling type and intensity of the field inventory and subsequent growth and mortality projections in the growth models.
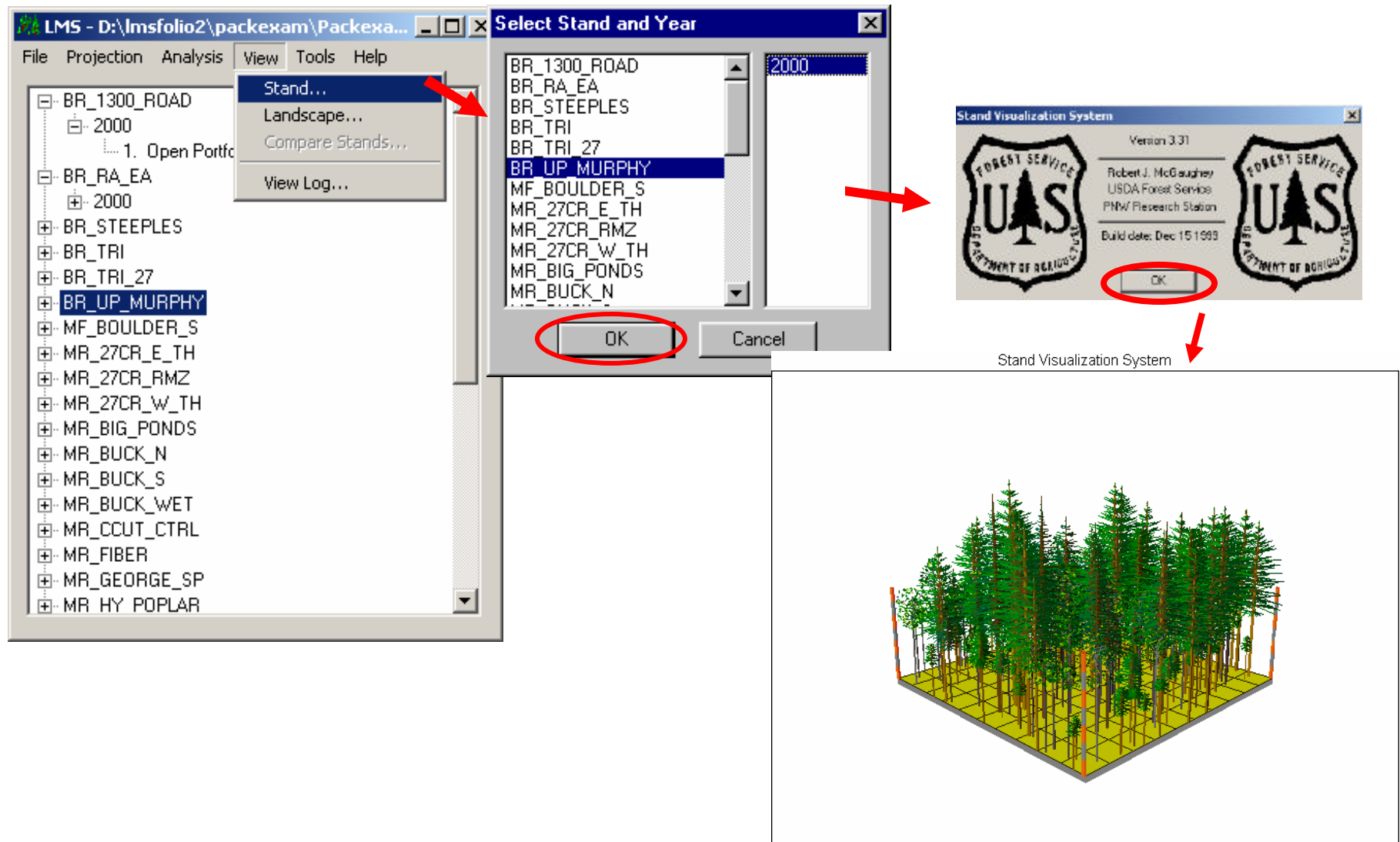
Figure 2.1. To view stands click **View in the Drop Down Menu**, click **Stand**, click to **select stand**, click to **select year,** and then click **OK**. An SVS title box appears. Click **OK.** A visual representation of the stand inventory will appear.
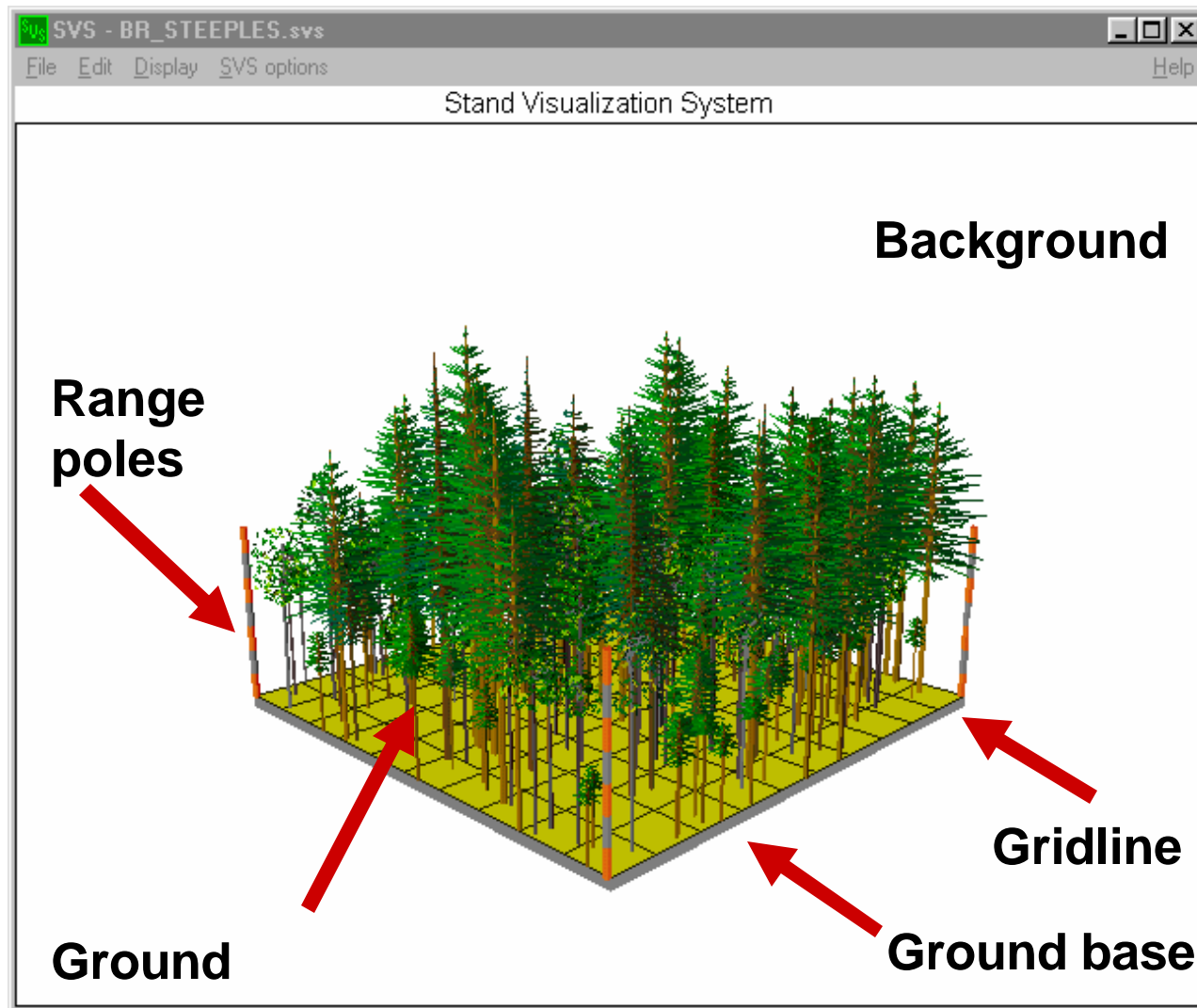
3

Figure 2.2. In the perspective view representation provided by the **Stand Visualization System (SVS)** images of tree information are randomly placed on a ground platform that is an acre in size. Relative height is displayed by range poles positioned on the corners of the platform.

4

SVS - BR_STEEPLES.svs

File   Edit   Display   SVS options

Stand Visualization System

Copy screen image to clipboard   Ctrl+C

Perspective view options...
Overhead view options...
Profile view options...
Marking and treatment...

Default parameters...

Ground surface definition...

Screen layouts   ▶

Tree designer...

New stand...
Open...
Save image as...
Save scene description   ▶

Print...
Page setup...
Printer setup...

Preferences...

Exit   Alt+X

Redraw all

Command line options
Tree list info

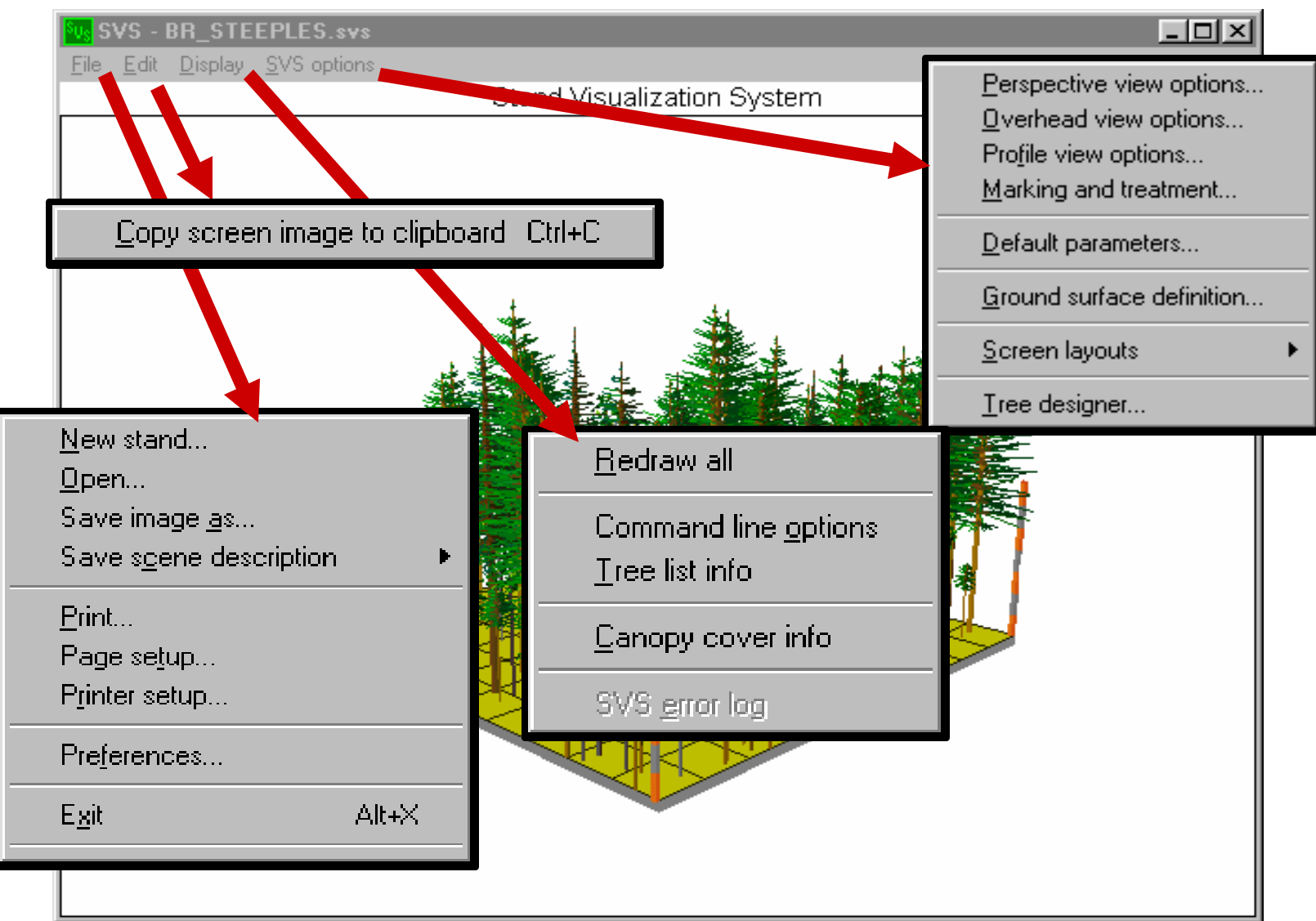Canopy cover info

SVS error log

Figure 2.3. The **Drop Down Menu** in the stand visualization provides a number of command opportunities. The **File** options are self explanatory or preset with defaults that should only be adjusted by advanced users familiar with SVS. The **Edit** option allows the image to be copied to the clip board for pasting into **MS Word documents** or **MS Power Point presentations**.
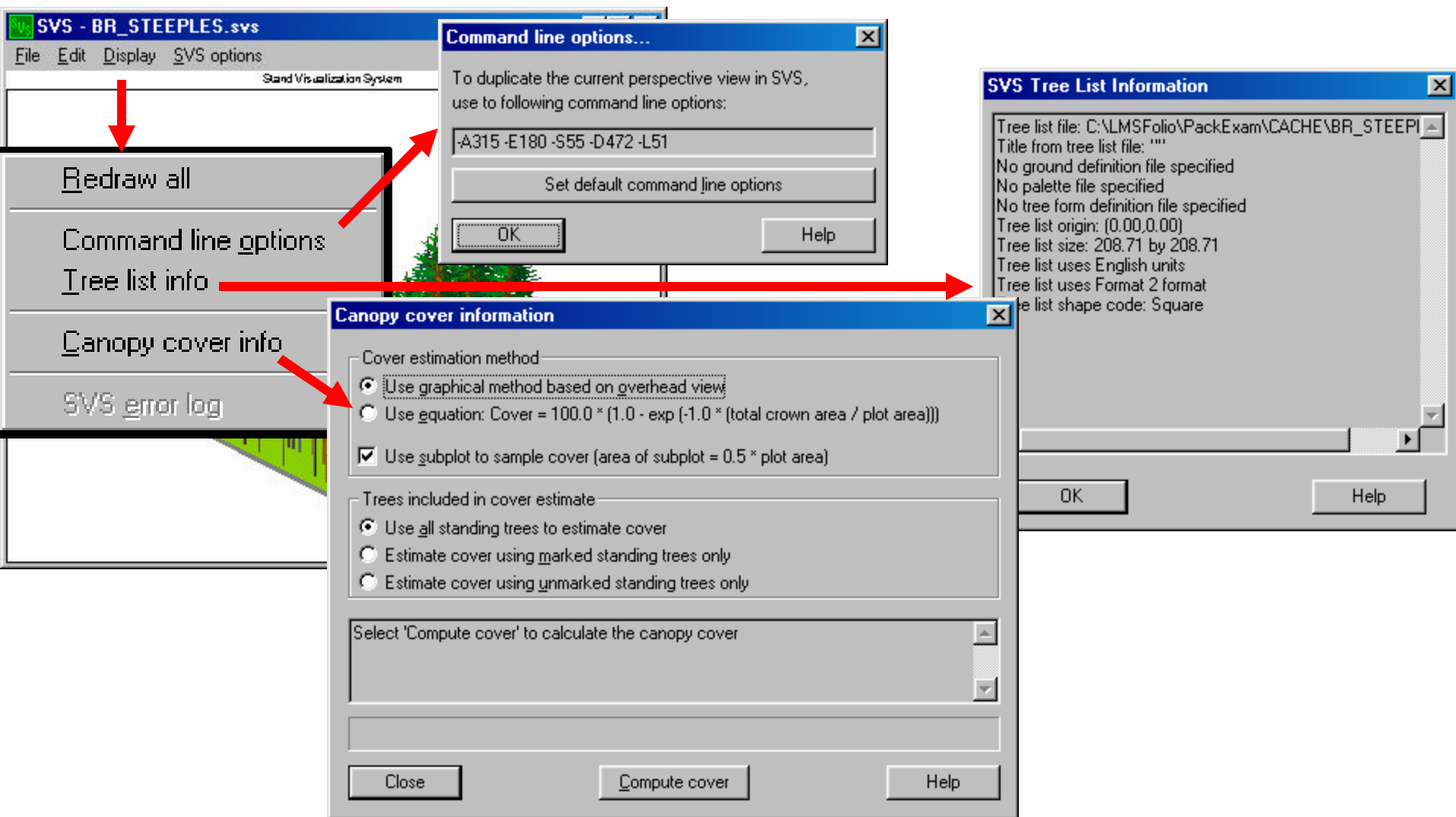
SVS - BR_STEEPLES.svs

File   Edit   Display   SVS options

Stand Visualization System

Redraw all

Command line options

Tree list info

Canopy cover info

SVS error log

Command line options...

To duplicate the current perspective view in SVS, use to following command line options:

-A315 -E180 -S55 -D472 -L51

Set default command line options

OK   Help

SVS Tree List Information

Tree list file: C:\LMSFolio\PackExam\CACHE\BR_STEEPL
Title from tree list file: ''''
No ground definition file specified
No palette file specified
No tree form definition file specified
Tree list origin: (0.00,0.00)
Tree list size: 208.71 by 208.71
Tree list uses English units
Tree list uses Format 2 format
Tree list shape code: Square

OK   Help

Canopy cover information

Cover estimation method
◉ Use graphical method based on overhead view
○ Use equation: Cover = $100.0 \times (1.0 - \exp(-1.0 \times (\text{total crown area} / \text{plot area})))$

☑ Use subplot to sample cover (area of subplot = 0.5 * plot area)

Trees included in cover estimate
◉ Use all standing trees to estimate cover
○ Estimate cover using marked standing trees only
○ Estimate cover using unmarked standing trees only

Select 'Compute cover' to calculate the canopy cover

Close   Compute cover   Help

Figure 2.4. The **Display Drop Down** offers options to **redraw**, to **duplicate perspective coordinates**, to **review visualization specifications**, and to **compute canopy cover**. Perspective coordinates may be adjusted by trial and error in the viewpoint parameters portion of SVS options/Perspective view options demonstrated in the next slide.   6
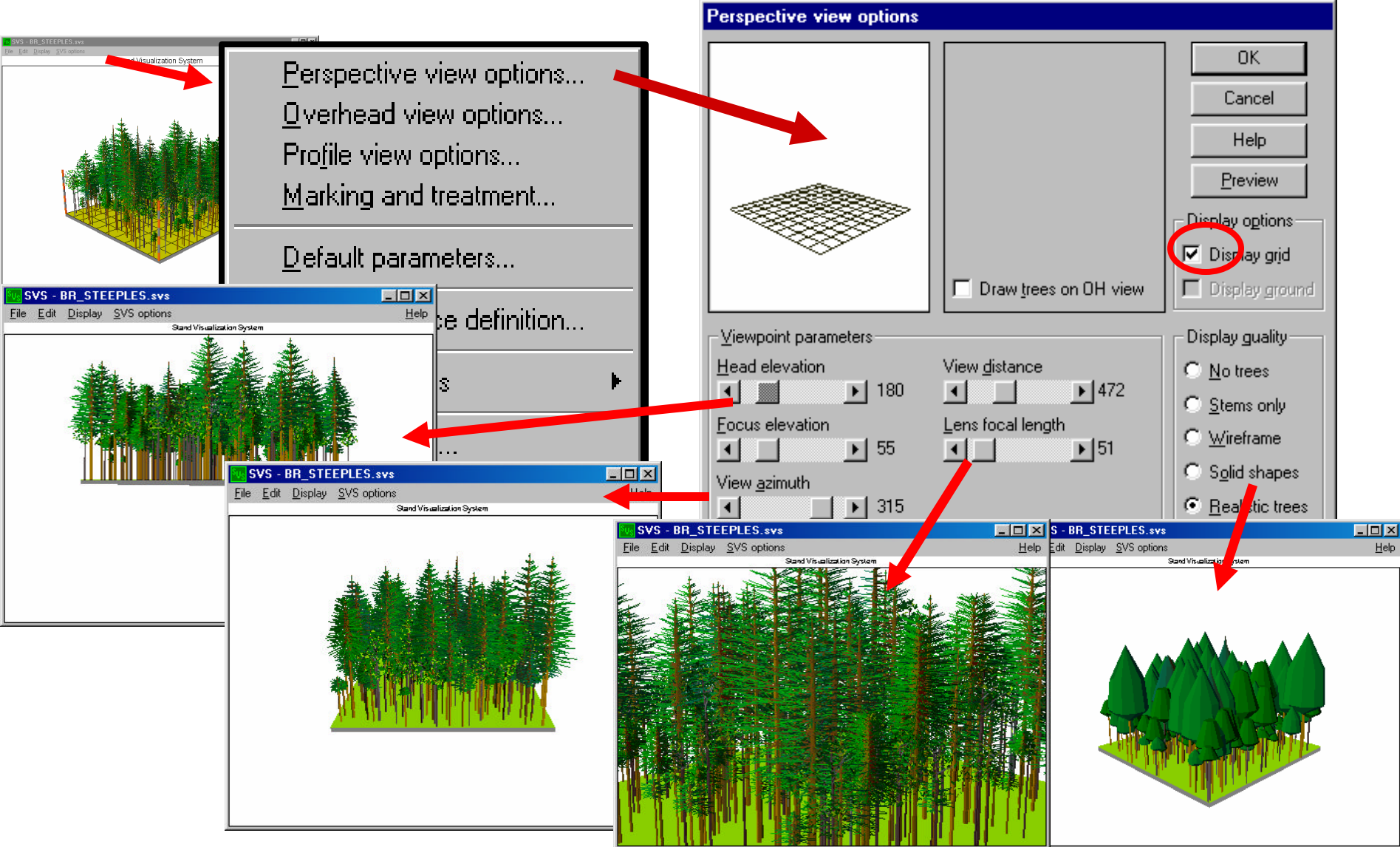
Figure 2.5. From the **SVS Options Drop Down**, click **Perspective view options**. From this dialogue window the **ground grid** can be eliminated, the **view perspective** altered, and the **tree display** changed. By removing the grid, adjusting the ground color in Default parameters, and adjusting the viewpoint parameters more realistic stand images of different perspectives may be created.
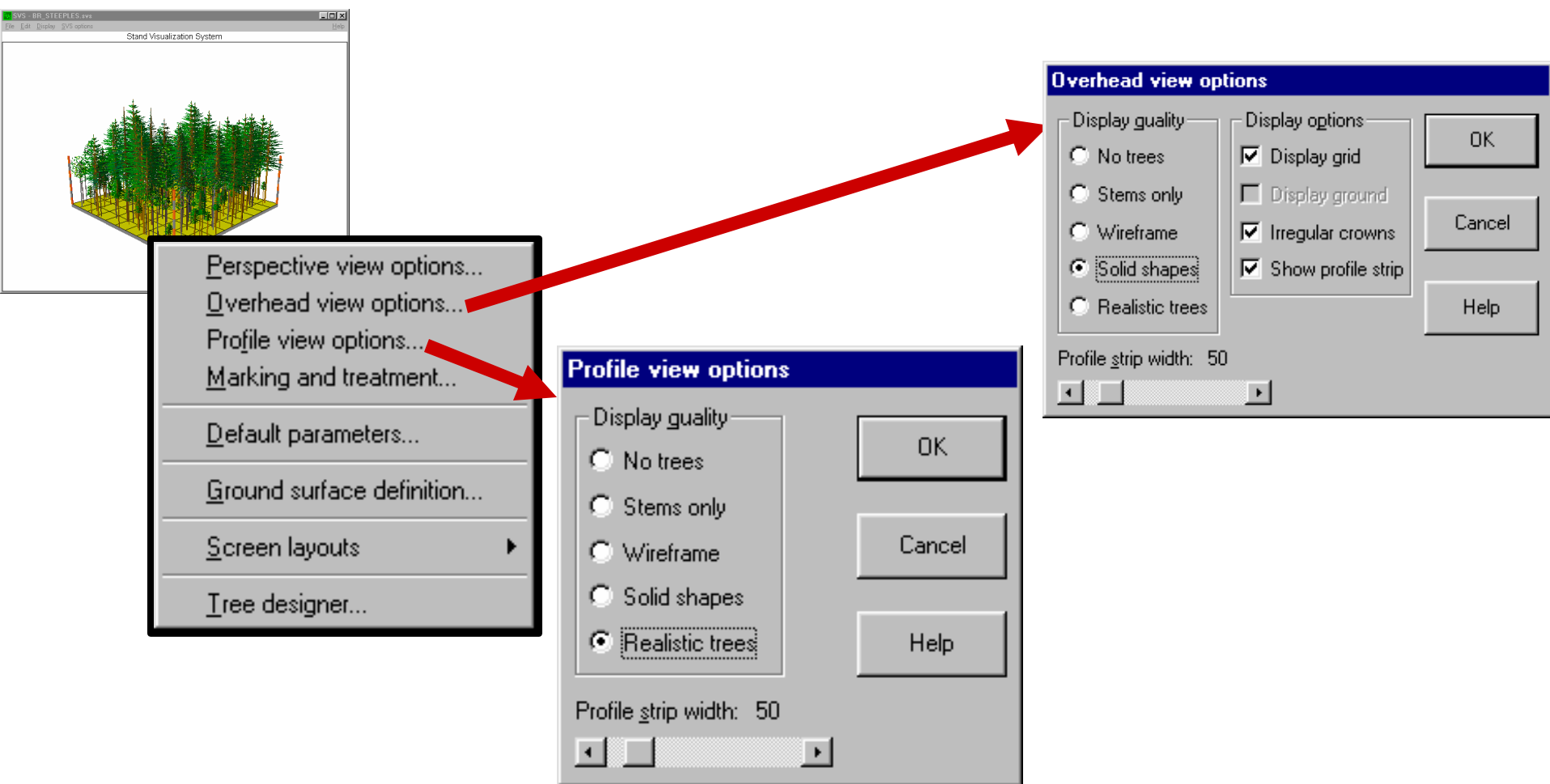
7

SVS - BR_STEEPLES.svs

File Edit Display SVS options   Help

Stand Visualization System

Overhead view options

Display quality
- ○ No trees
- ○ Stems only
- ○ Wireframe
- ◉ Solid shapes
- ○ Realistic trees

Display options
- ☑ Display grid
- ☐ Display ground
- ☑ Irregular crowns
- ☑ Show profile strip

OK
Cancel
Help

Profile strip width: 50
◄ ▬ ▬▬▬▬▬▬ ►

Perspective view options...
Overhead view options...
Profile view options...
Marking and treatment...

Default parameters...

Ground surface definition...

Screen layouts ►

Tree designer...

Profile view options

Display quality
- ○ No trees
- ○ Stems only
- ○ Wireframe
- ○ Solid shapes
- ◉ Realistic trees

OK
Cancel
Help

Profile strip width: 50
◄ ▬ ▬▬▬▬▬▬ ►

Figure 2.6. From the **SVS Options Drop Down**, click either **Overhead view options** or **Profile view options** to alter stand visualization parameters. In the Overhead view options dialogue the surface grid may be removed. In both windows different tree display qualities may be selected. Normally users select realistic trees. However, when trees are to marked in a dense stand, using the **Marking and treatment function** discussed later in this section, stems only or wire frame displays may be more desirable. When issues of canopy closure are considered, solid shape displays may be more useful. The profile strip width is set to define the profile view quality.

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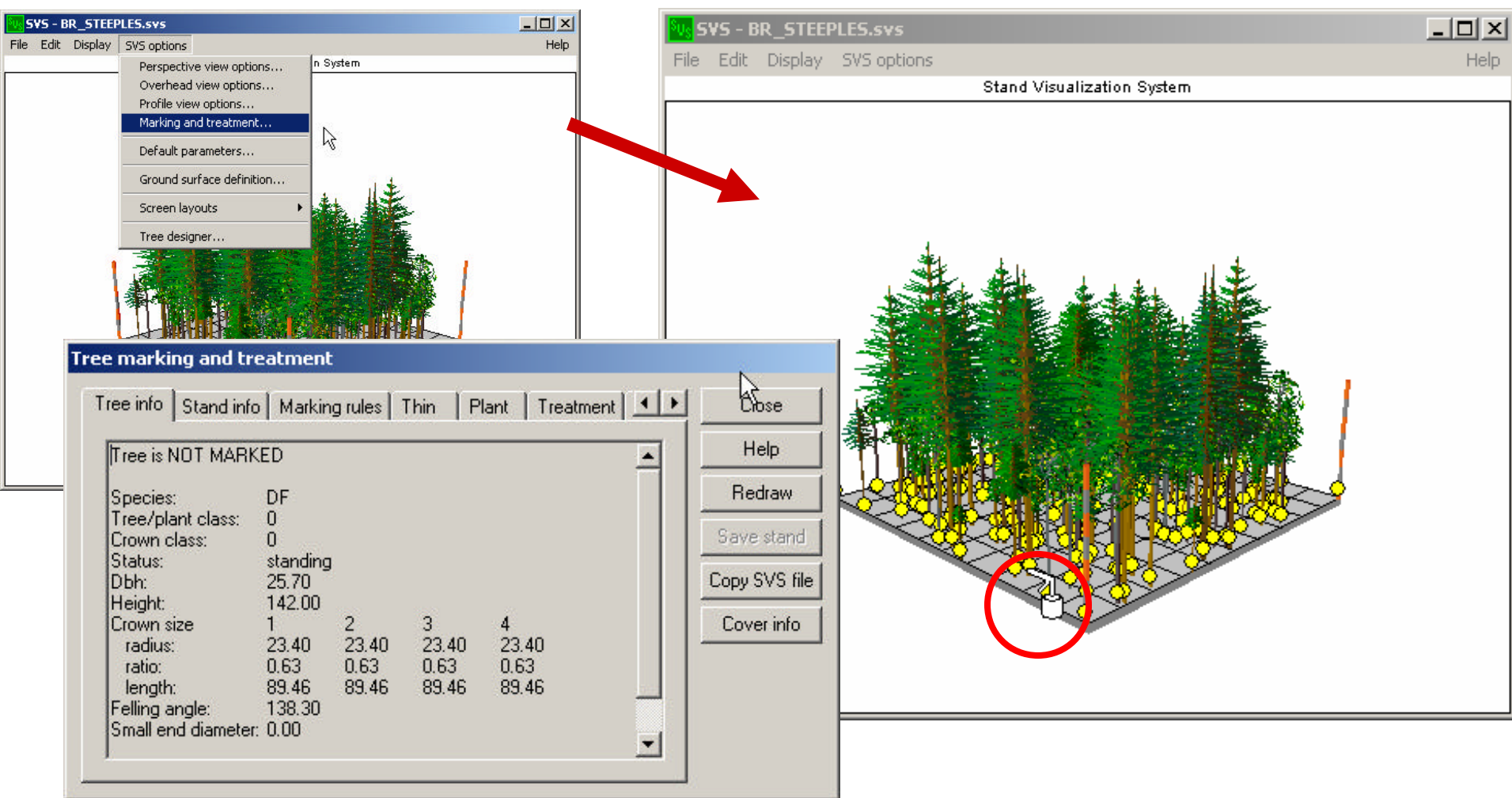
Figure 2.7. The **Marking and treatment** option opens a dialogue to provide the user access to the SVS tree marking and treatment program. The curser becomes a paint can that can be used to examine individual tree records as shown above. When the paint can is moved from tree to tree inventory information on that individual record is displayed in the Tree marking and treatment dialogue box.
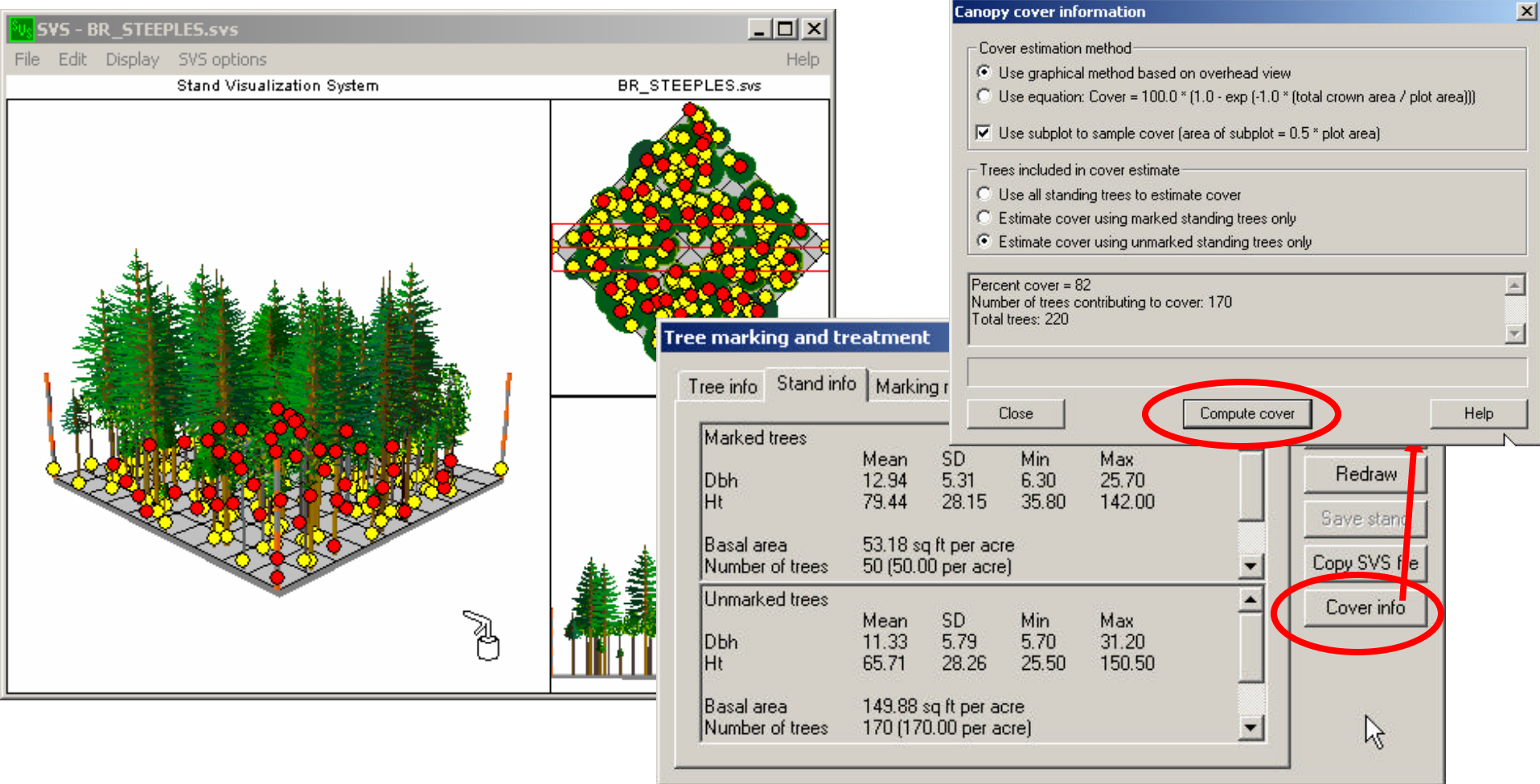
Figure 2.8. When the curser/paint can is used to click/mark trees for removal the yellow "paint mark" turns red. By looking on the **Stand info** page of the Tree marking and treatment dialogue window, the user can see information on marked and unmarked trees. In this case, 50 trees were marked leaving 170 unmarked. By clicking on the **Cover info** button, the user can compute the remaining canopy cover if marked trees were removed. Note, the visualization here is the 3-view layout with profile, perspective, and overhead stand presentations. This layout is useful for tree marking and will be discussed later in this section.

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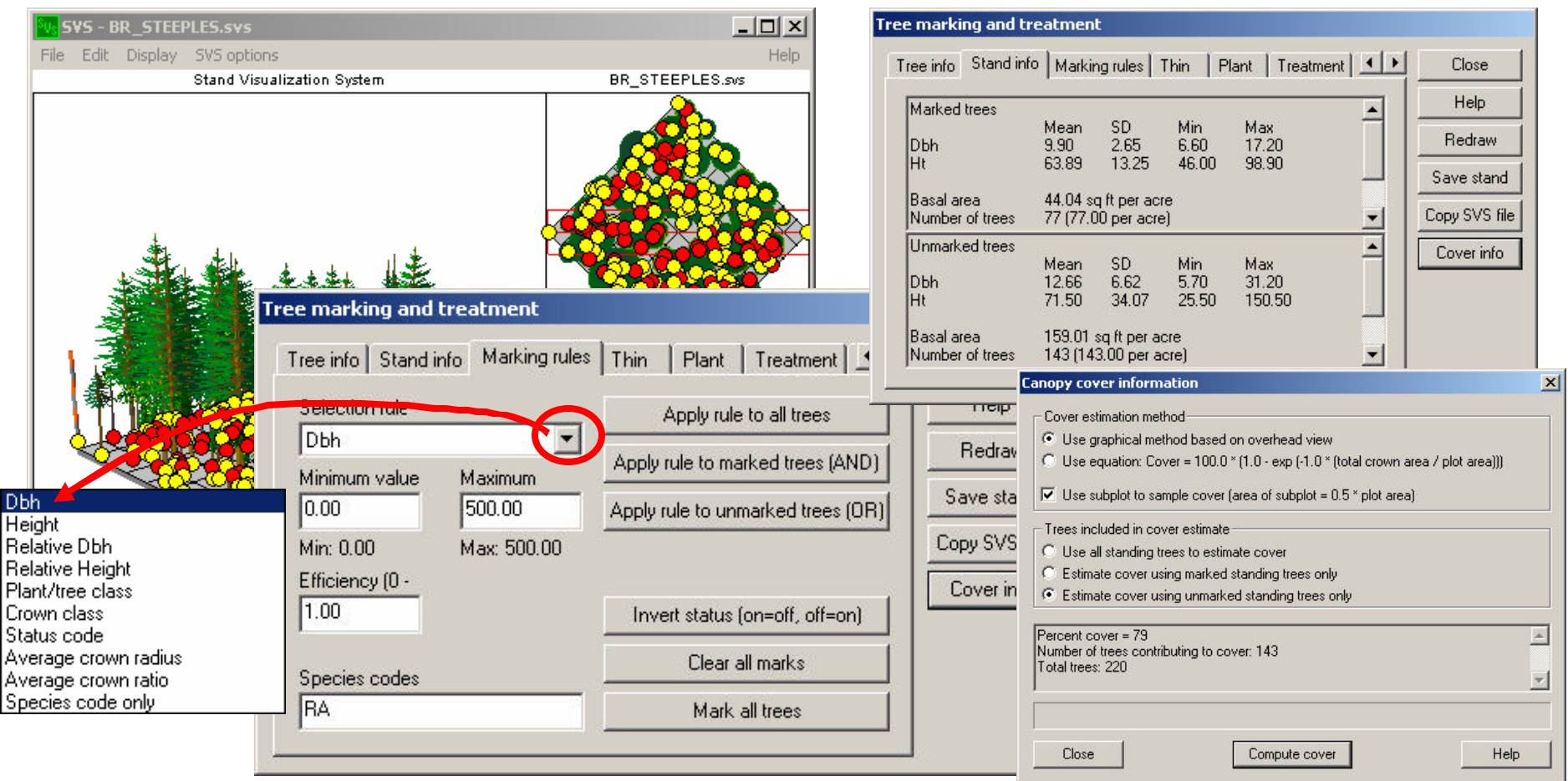
Figure 2.9. For this example, we have selected the **Marking rules page** of the Tree marking and treatment dialogue window. First, the previous marking has been cleared by clicking the **Clear all marks** button. Next all diameters of red alder (RA) were selected for marking and the **Apply rule to all trees** button was clicked. Next, by checking the **Stand info** and **Canopy cover information** pages the user sees that 77 alder trees were marked and removed leaving a canopy cover of 79%. The Marking rules page can be used to select a stand subset defined by any combination of tree attributes from the selection drop down, min/max values, and species codes options.

Figure 2.10. Also available in the SVS Tree marking and treatment dialogue window are command pages for **Thin** and **Plant**. These functions provide the user with further ability to experiment with management options. However, treatment functions in SVS are not hard wired back to LMS. Within LMS, stand treatments and projections are handled differently and are discussed later in this tutorial.
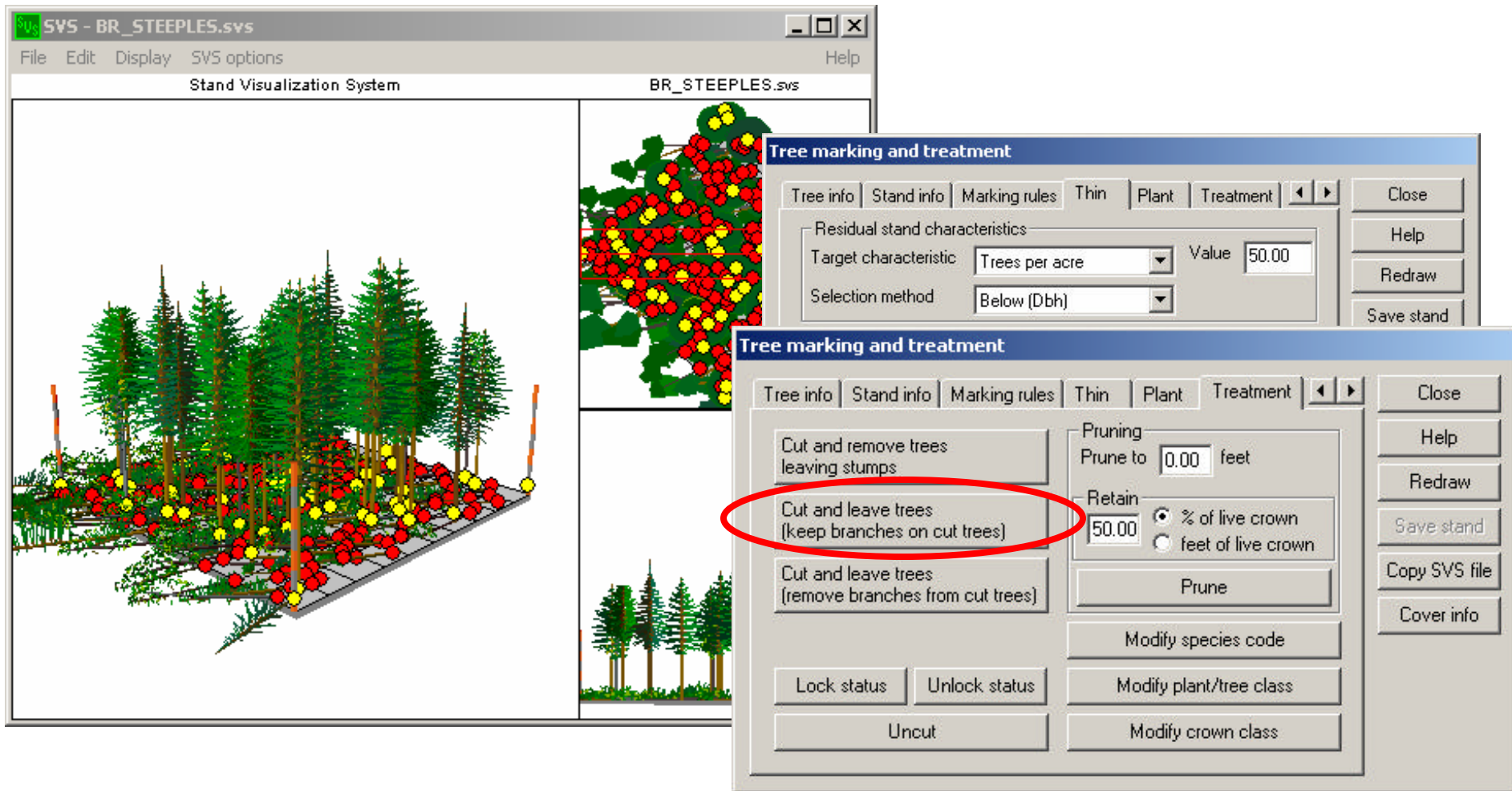
Figure 2.11. The last page in the SVS Tree marking and treatment dialogue window is the Treatment page. This page lets the user view the prescribed treatment (in this case thin from below by DBH to 50 TPA) with cut trees removed or shown as felled with or without branches on cut trees. The visualization depicted above is cut trees with branches. The Treatment page also lets the user experiment with pruning prescriptions.
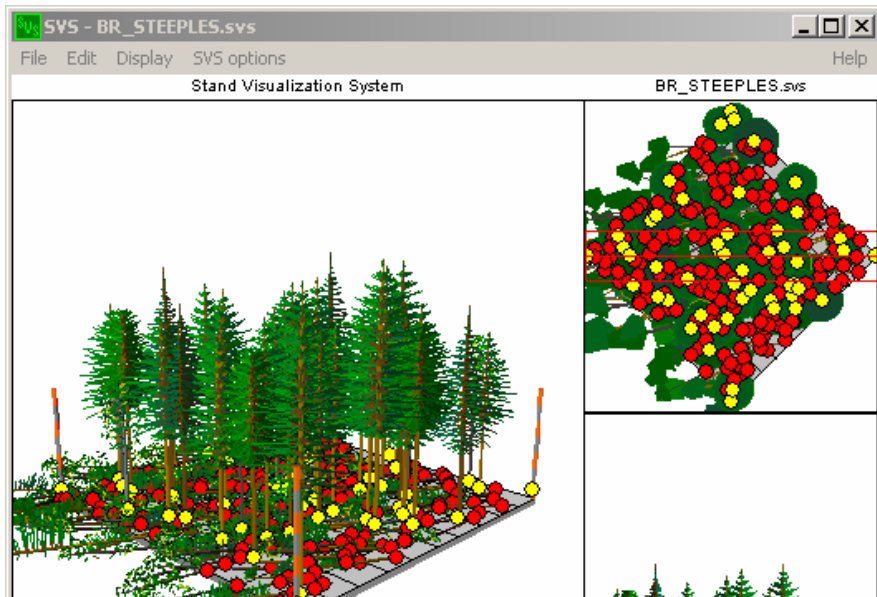
Figure 2.12 When the Treatment page is closed and the relative height range poles removed, the visualization becomes an image that approximates how the actual forest might appear with the selected trees cut but not removed. Also shown below in the smaller images to the right are the other two visualization choices of cut trees removed and cut trees shown without branches. Removal of range poles will be discussed later in this section.
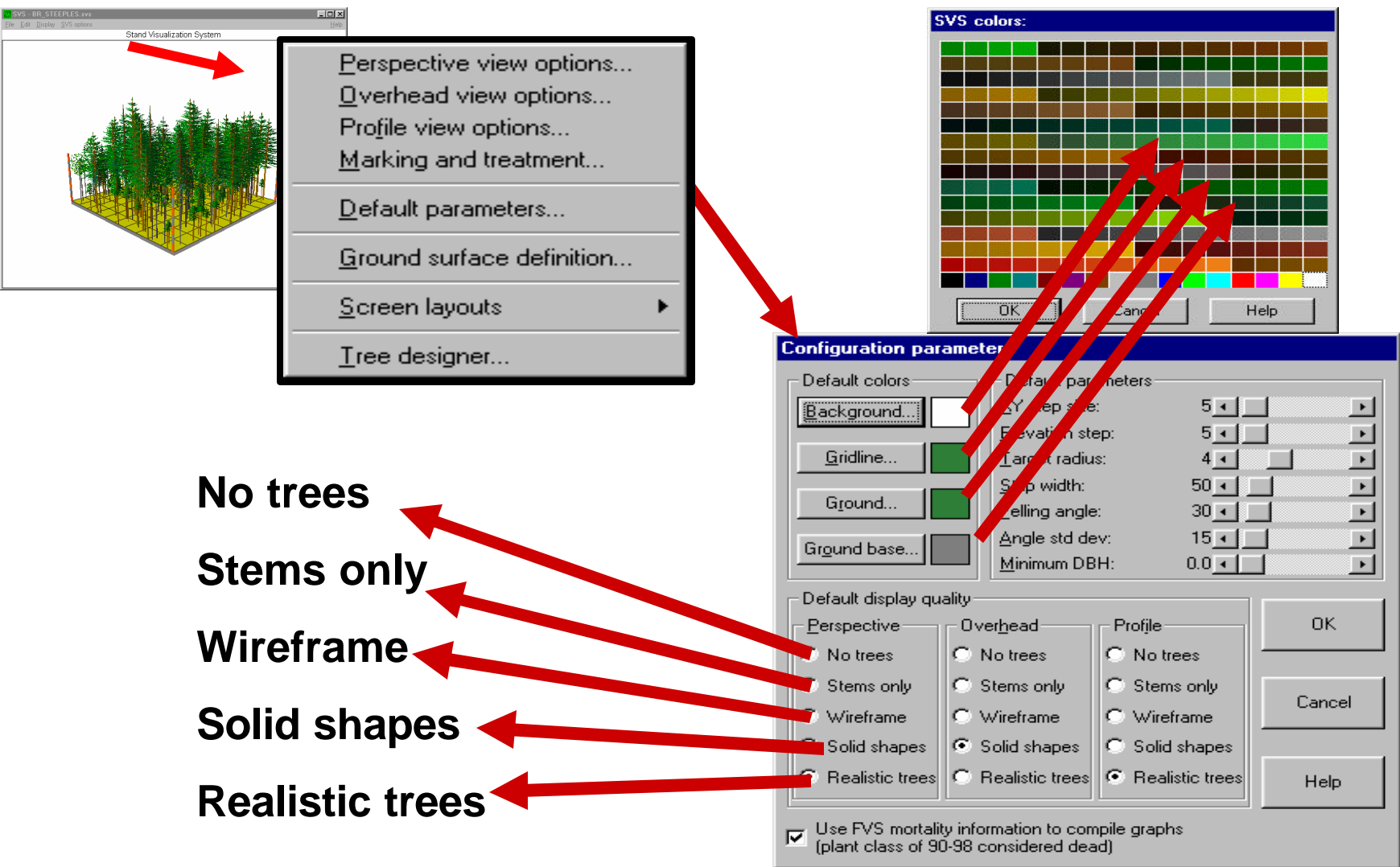
No trees

Stems only

Wireframe

Solid shapes

Realistic trees
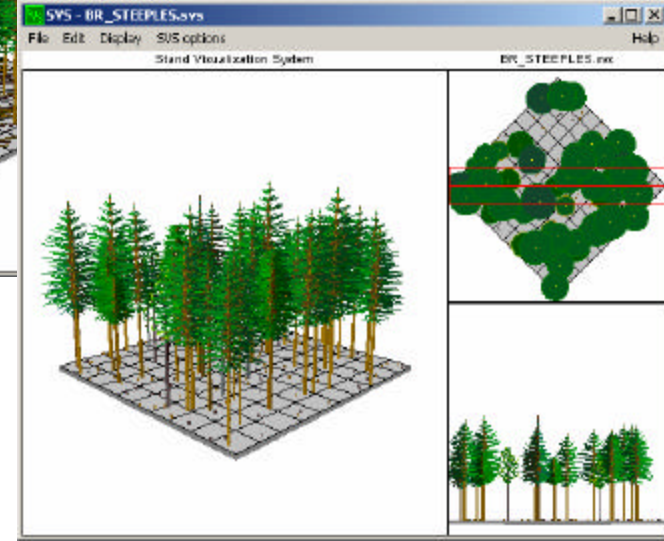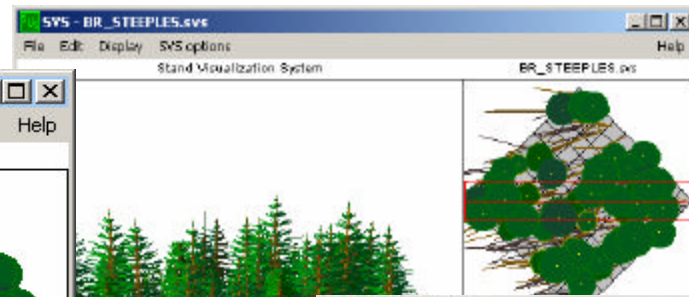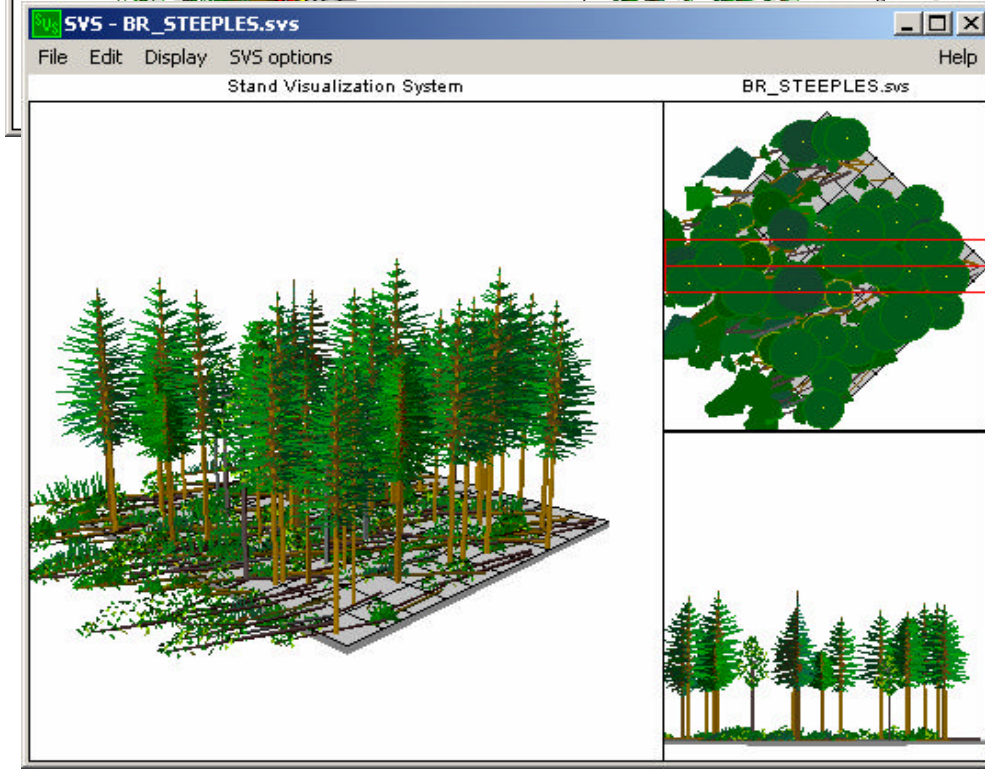
Figure 2.13. In SVS by clicking **SVS Options** and then clicking **Default parameters**, the user accesses the **Configuration parameters dialogue window**. In this window, adjustments to colors and other presentation characteristics are easily made.
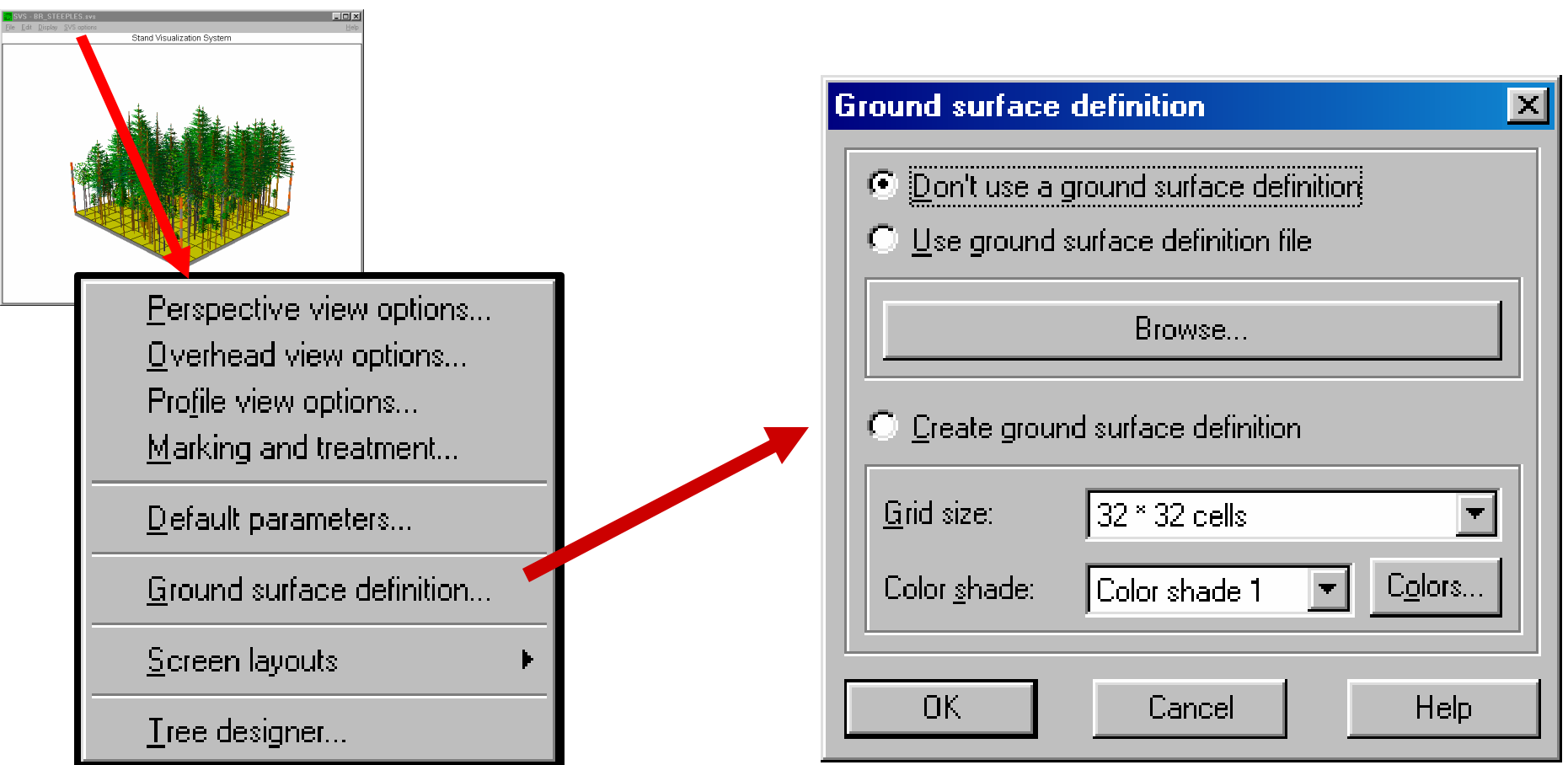
Figure 2.14. The **Ground surface definition** is an extended SVS capability. LMS users do not typically have need to alter the default characteristics. Users with specialized interest in this function should see SVS help.
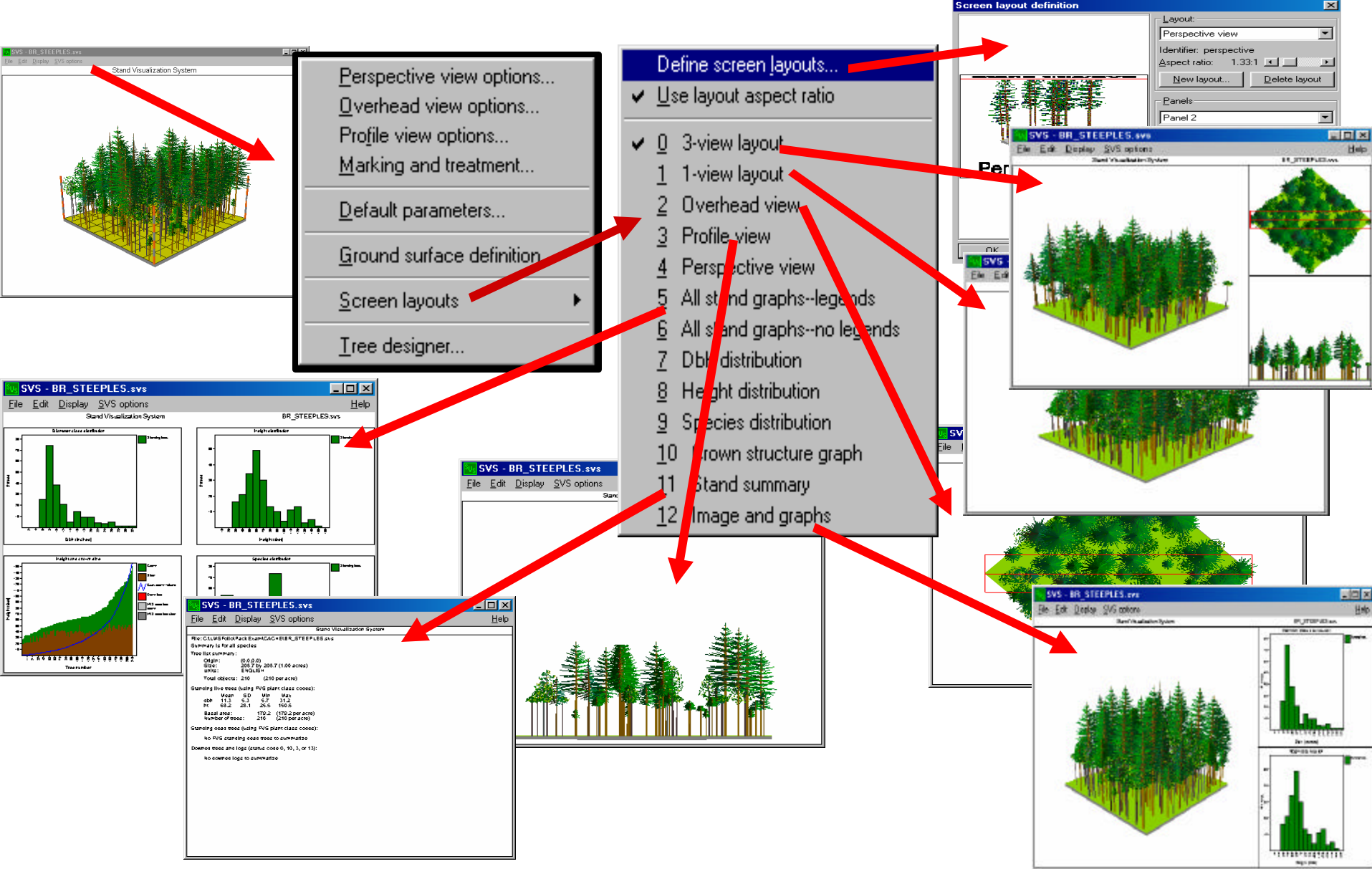
Figure 2.15. By clicking **SVS Options** and **Screen layouts**, the user accesses many different **visualization**, **chart, and data summary options** for a selected stand. Note that this is the command access for the 3-view layout used in previous slides discussing Marking and treatments functions.
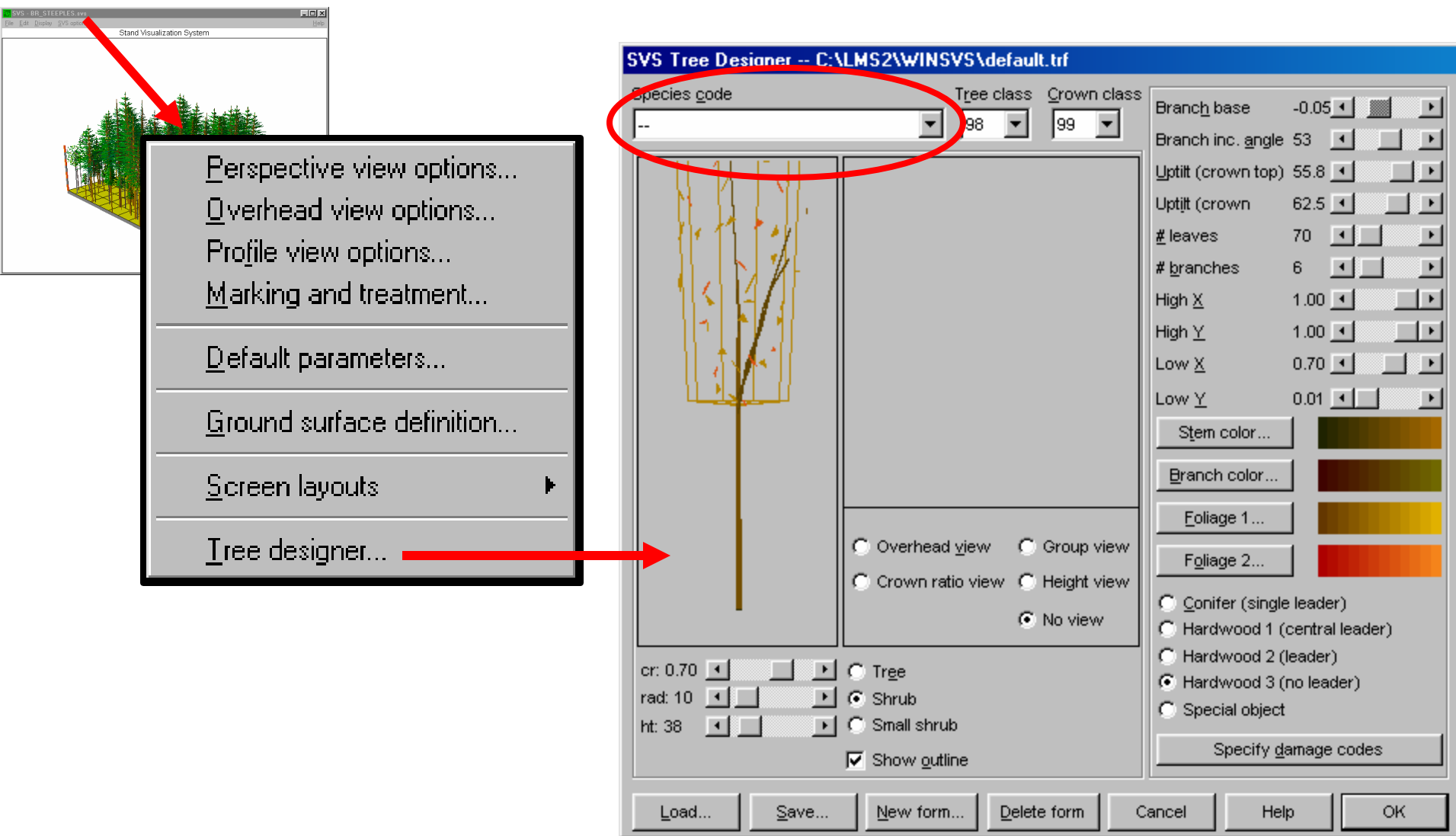
Figure 2.16. The **Tree designer option** is for adding tree definitions not supplied in LMS. LMS has default tree definitions for most species. Most LMS users will not need to add new tree designs. To view defaults scroll and click a species code (species codes may be numbers or abbreviations and are displayed for a variety of Forest Vegetation Simulator models in Section 11, pages 15-22) .
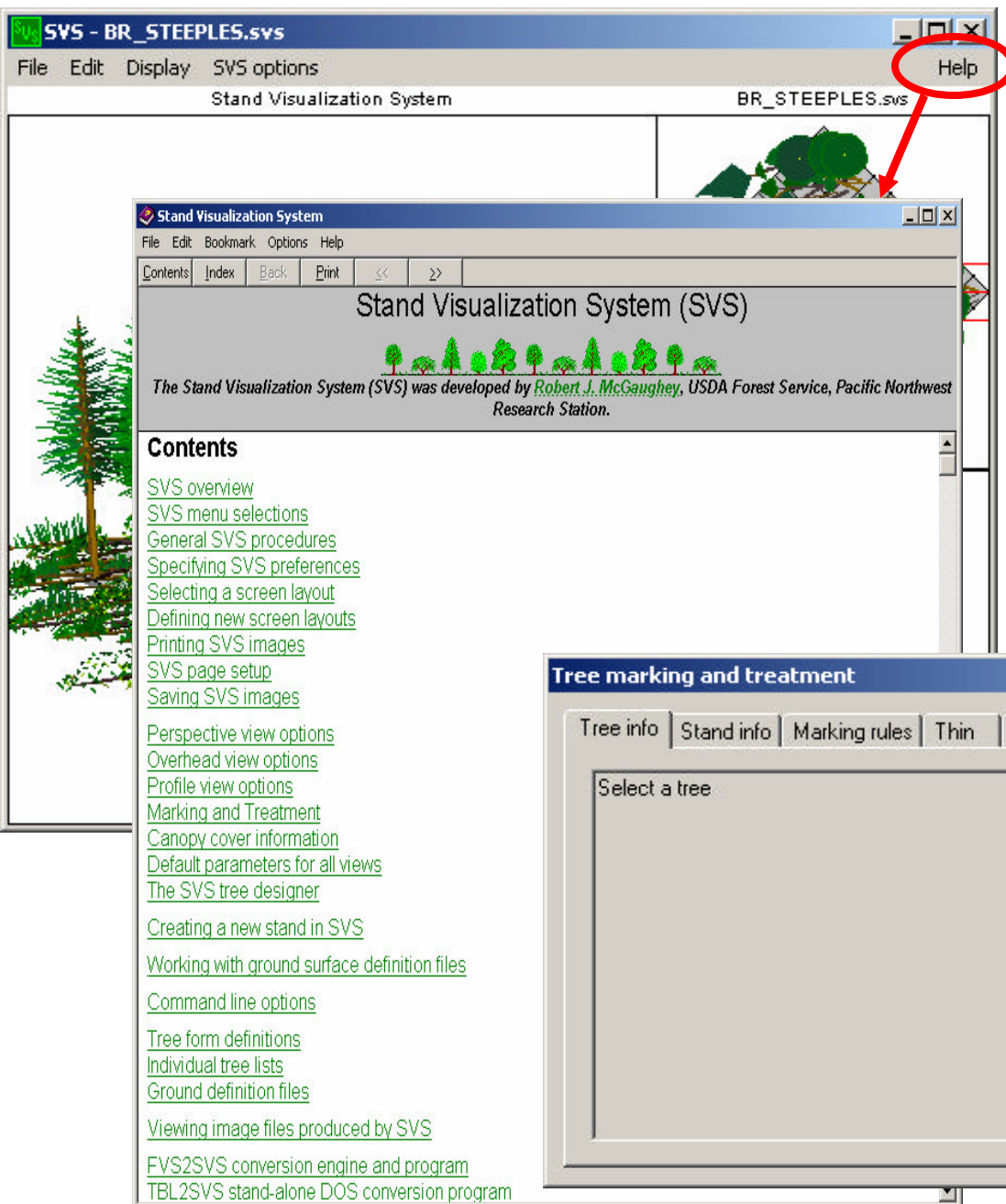
18

Figure 2.17. SVS is a stand alone program utilized within LMS as a stand visualization module. The SVS main window as well as each dialogue window offer Help buttons to assist the user with specific questions.
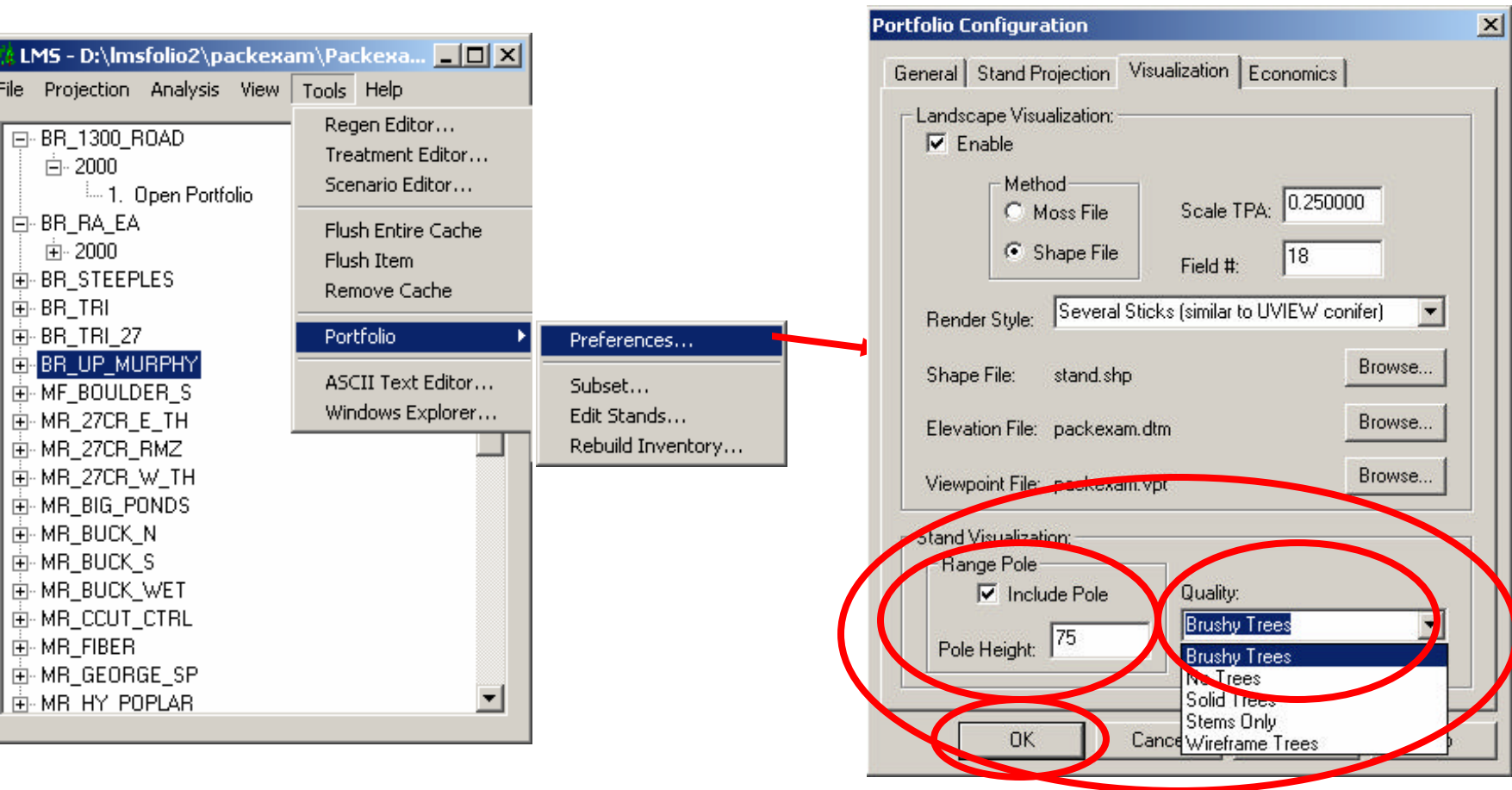
19

Figure 2.18. In the **Main Dialogue Window** select **Tools**, then click **Portfolio**, and then click **Preferences**. The **Portfolio Configuration** opens. Click **Visualization**. On the lower portion of the dialogue window the user can click on or off the stand visualization **range poles,** set the **range pole height**, and choose **tree presentation** quality. Different tree presentation qualities may be useful when considering different issues. For example, wireframes allow the user to see into the stand to design a thinning whereas for considerations of canopy closure solid trees may be a more useful presentation. Bushy is the default presentation. The upper portion of this window refers to Landscape Visualization parameters which will be discussed later in this tutorial. When appropriate adjustments have been selected click **OK**.
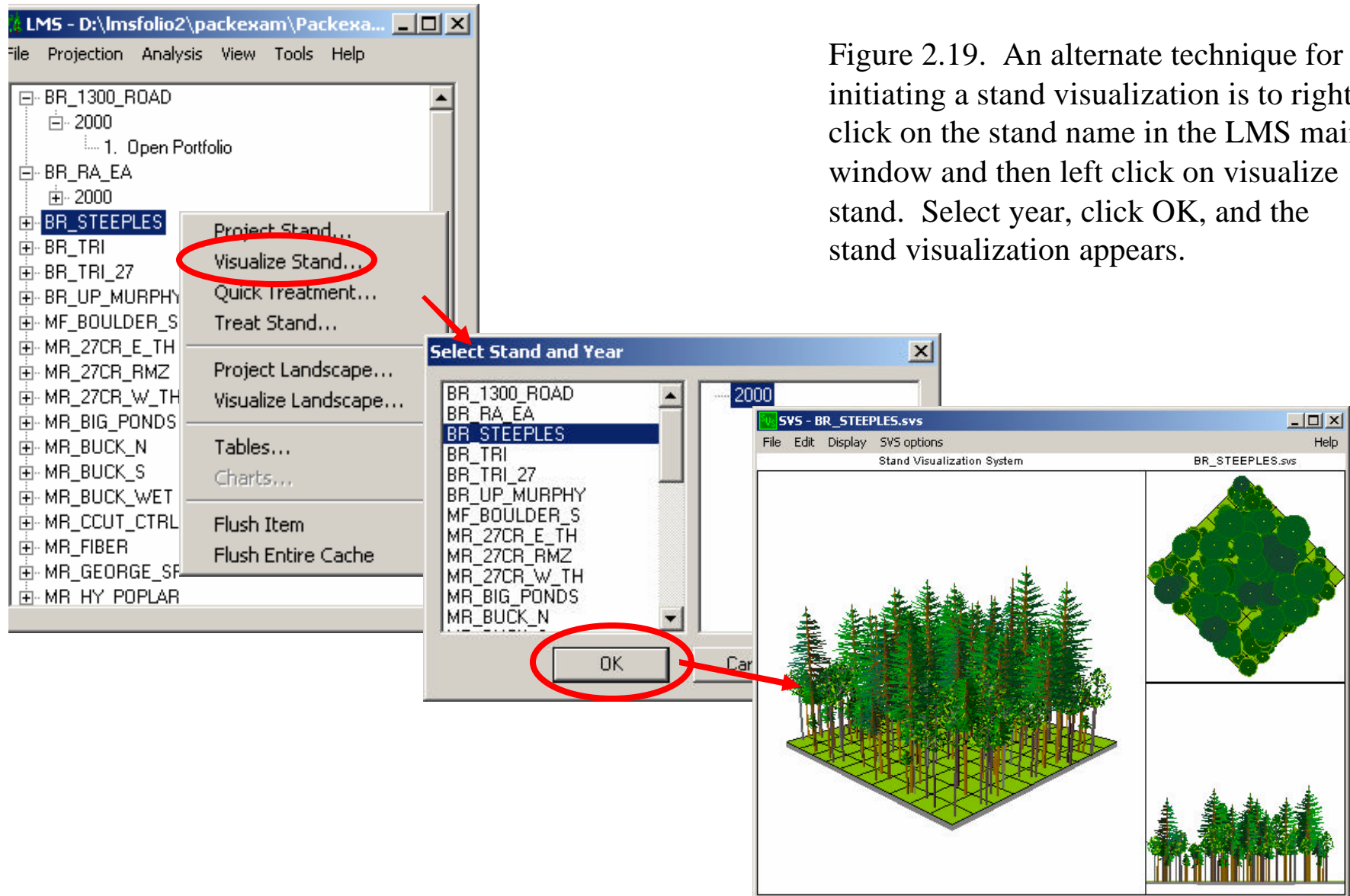
Figure 2.19. An alternate technique for initiating a stand visualization is to right click on the stand name in the LMS main window and then left click on visualize stand. Select year, click OK, and the stand visualization appears.

Exercise

- **View BR_Steeples from the following**
  - **perspective view**
  - **overhead view**
  - **profile view**
  - **3-view layout**
- **Change ground surface & grid colors**
- **Remove range poles**
- **View perspective view from 8 feet high**