PREDICTING OUTCOMES

Newsletter from the Stand Tending Unit, BC Ministry of Forests, Forest Practices Branch

MAY, 2001

Editor's Note

This is the sixth in a series of newsletters that provide updates on the activities of the Stand Tending Unit, Forest Practices Branch, BC Ministry of Forests. Although the Stand Tending Unit is involved in many activities, this series of newsletters is focused on a single theme—predicting outcomes of stand-tending treatments.

I hope you enjoy the brief, informal articles in this newsletter. Subsequent issues will be produced periodically if time and resources permit.

If you have any comments on anything you read in this newsletter, please contact me.

Patrick Martin, Editor
Phone: (250) 356-0305
Fax: (250) 387-2136
E-mail: Pat.Martin@gems8.gov.bc.ca

PrognosisBC: Progress Report

1995-98: Our initial efforts to calibrate the North Idaho Forest Vegetation Simulator (FVS) for use in B.C. involved developing a set of "OAFs" to adjust the Idaho model's growth predictions to match the growth observed in B.C.'s forests. We developed a Windows interface to house the model, and the results of this effort were released as PrognosisBC.

1998-to date: Our recent efforts to calibrate PrognosisBC involve revisiting each underlying growth and mortality relationship in the model and re-estimating the magnitude and shape of each relationship. We began this process 12 months ago, and we expect to complete our work in the IDF and ICH this summer. By next summer, we hope to have revised the growth and mortality relationships for the MS and ESSF.

The PrognosisBC initiative is an example of adaptive management—an ongoing cycle of using the model, identifying areas for improvement, collecting

Continued on page 2

Stand Tending Unit Staff

Ralph Winter
Stand Management Officer
Phone: 250-387-8906
Fax: 250-387-2136
email: Ralph.Winter@gems9.gov.bc.ca

Frank Barber
Stand Management Specialist
Phone: 250-387-8910
Fax: 250-387-2136
email: Frank.Barber@gems6.gov.bc.ca

Patrick Martin
Stand Development Specialist
Phone: 250-356-0305
Fax: 250-387-2136
email: Pat.Martin@gems8.gov.bc.ca

Brian Raymer
Silviculture Operations Specialist
Phone: 250-387-8909
Fax: 250-387-2136
email: Brian.Raymer@gems7.gov.bc.ca

Barry Snowdon
Complex Stand Specialist
Phone: 250-386-0183
Fax: 250-387-2136
email: Barry.Snowdon@gems7.gov.bc.ca

BRITISH COLUMBIA
Ministry of Forests

FOREST RENEWAL BC

Continued from page 1

data and analyzing data to improve the model, and releasing improved versions of the model. PrognosisBC is being progressively refined as more data become available.

To discuss PrognosisBC, call Barry Snowdon at 250-386-0183.

The Magic Number "3"

For rough approximations, the volume of a tree stem is sometimes calculated as tree height times tree basal area divided by 3:

$$\text{volume} = \frac{\text{height} \times \text{basal area}}{3}$$

where height is total tree height (m), basal area is calculated at breast height (m^2), and volume is estimated in m^3.

I've used this calculation myself, been taught it at SIBC, and read it in Forest Service publications—but I've always wondered about the "magic number" 3. It seems a little too good to be true. Is the magic number always 3? Under what conditions does it vary from 3?

For some pine, hemlock and cedar trees, I've used tree volume equations to calculate the exact value of the "magic number" for total volume (Figure 1). In terms of total volume (stem volume from ground level to tree top), the magic number varies by species. No surprise here. Those species we commonly think of as having more taper (for example, Cw and Hw) have a larger magic number for total volume (Figure 1).

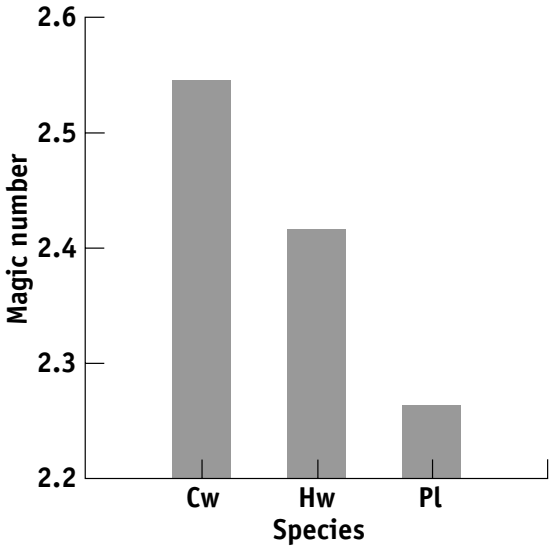

Figure 1. Magic number for total volume for lodgepole pine, western hemlock, and western red cedar trees with heights of 26 m and diameters of 30 cm[1].

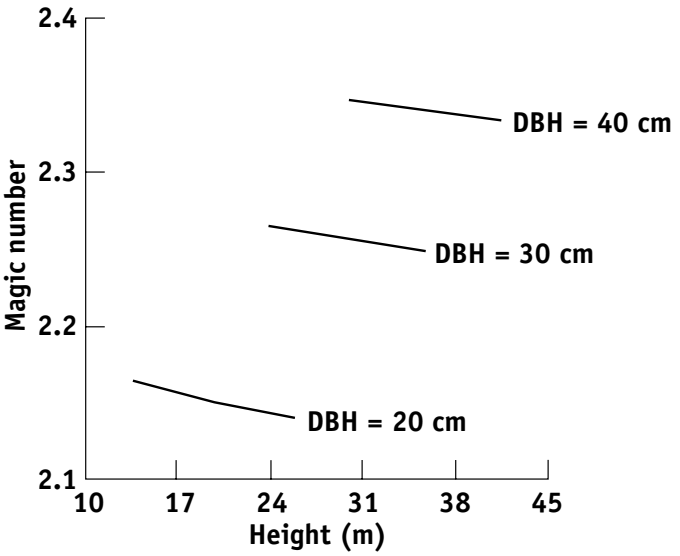

Figure 2. Magic number for total volume for lodgepole pine trees of various heights and diameters in the SBS[1].

1 Source: Kozak, A. 1995. Development of Schumacher's volume equation by BEC zones and species. Contract report to B.C. Ministry of Forests, Resources Inventory Branch, Victoria, B.C.

2 Source: Kozak's variable-exponent taper equation implemented in an Excel spreadsheet by Barry Snowdon, Forest Practices Branch.

Figure 2 demonstrates that the magic number varies with tree size. For lodgepole pine, smaller trees require a smaller magic number to calculate total stem volume.

When utilization limits are applied to tree volume, the magic number increases — and the effect of tree size on the magic number changes. For interior Douglas-fir trees of various sizes, Figure 3 compares the magic number required to calculate merchantable volume with that required to calculate total volume.

Magic numbers computed from volume equations apply to trees with good form. Forked tops, sweep, crooks, and other defects that must be bucked out, reduce recoverable volume—thus, increasing the magic number for recoverable volume (Figure 4).

So, is the magic number exactly 3? Sometimes—but not often. However, it's tough to propose a single number better than 3. The exact magic number depends on species, tree size, and merchantability limits. For very rough calculations of merchantable volume, "3" looks like an adequate number. For any serious volume compilations, use the volume equations or taper equations available from Ministry of Forests Resources Inventory Branch.

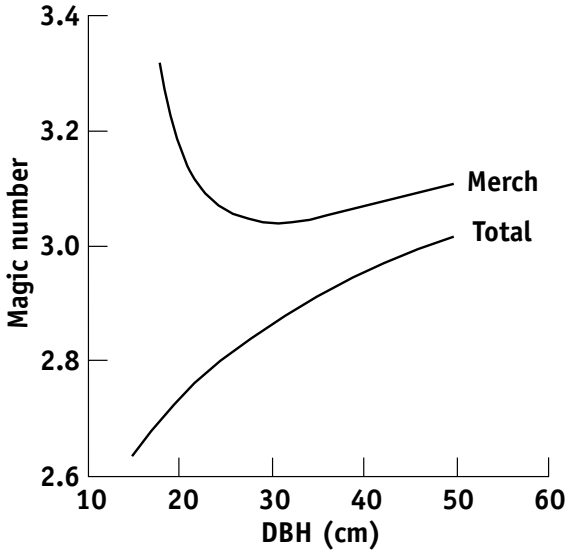

Figure 3. Magic number for total and merchantable volume (30 cm stump, 10 cm dib top) for interior Douglas-fir trees of various diameters with heights equal to 85 times diameter[2].

Figure 4. Defects increase the magic number for recoverable volume.

Fertilization

Interested in forest fertilization? If so, you may want to request a copy of Frank Barber's paper, "Forest fertilization in British Columbia: stand selection, types of fertilizers, delivery systems, and monitoring." Frank presented this paper at the recent forest fertilization conference in Edmonton, Alberta, in March.

To discuss fertilization, or obtain a copy of the paper, call Frank Barber at 250-387-8910.

On the Web

Strategic plans to guide FRBC-funded silviculture treatments (the Silviculture Strategy web site):
http://www.for.gov.bc.ca/hfp/silstrat/index.htm

Silviculture Notes 1-27: providing analyses and extension on issues of site preparation, fertilization at planting, vegetation management, and growth and yield:
http://www.for.gov.bc.ca/hfp/PubsSilvNotes.htm

Some material from the course, "Using growth and yield concepts to build effective stand tending programs:"
http://www.for.gov.bc.ca/hfp/forsite/training/growth-and-yield/index.htm

Guidelines for collecting input data for forest growth models used in British Columbia:
http://www.for.gov.bc.ca/research/gymodels/progbc/Support/G&Y%20Data%20Coll%2008Feb00.pdf

Stand tending impacts on environmental indicators:
http://www.for.gov.bc.ca/hfp/pubs/standtending/st_impacts.pdf