

TASS:

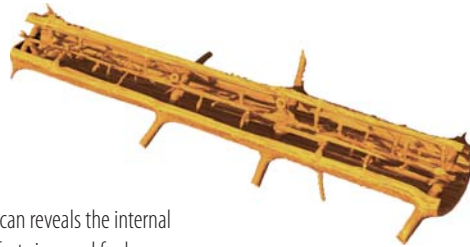
Predicting British Columbia's Future Forests

The Tree and Stand Simulator (TASS) model has been predicting the growth and value of British Columbia's future forests for over 45 years. TASS is a decision support tool that synthesizes and integrates extensive multi-disciplinary and multi-agency research, with an emphasis on response to silviculture. The next version of TASS, currently in development, will extend applications to stands with complex vertical structure and multiple species.

TASS and its derivatives, including the widely distributed Table Interpolation Program for Stand Yields (TIPSY), are used extensively in British Columbia to project the growth and value of managed stands. Today, these stands occupy nearly 25% of the provincial timber harvesting land base, and that area grows by almost 1% every year. Silviculturists use TASS and TIPSY to evaluate the impact of silvicultural treatments, such as thinning, fertilization, and the use of improved seed, on tree size, volume, and product value. TIPSY enables timber supply analysts to predict future volumes for a variety of harvesting patterns and silvicultural regimes ranging from clearcutting to variable retention.

What does the future hold for the forests of British Columbia with so many innovative forest management practices and intensive silvicultural treatments being considered today? The underlying structure of TASS is sufficiently flexible to make predictions for the complicated species mixes and spatial patterns of trees created in novel practices and treatments.

Addressing Ministry of Forests and Range Business Needs and Priorities



Computed tomography (CT) scan reveals the internal structure of trees to assess defects in wood for logs, lumber, and engineered products.

FPInnovations

Product value: Collaboration with wood scientists at the University of British Columbia and FP Innovations (FORINTEK division) enabled prediction of wood quality attributes (juvenile wood, knot size, fibre characteristics) within TASS to enhance predictions of wood value for various silvicultural treatments.

Glulam beams at Richmond Olympic Oval.

www.naturallywood.com

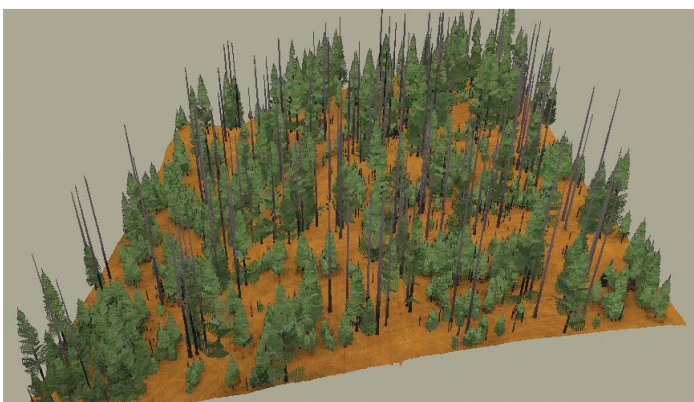


Variable retention harvesting. www.naturallywood.com

Silviculture: TASS informs silvicultural decisions, policies, and legislation (e.g., *Forest and Range Practices Act*), including stocking standards, genetic gain, fertilization, thinning, and variable retention. Investment analyses based on predicted log and lumber yields are possible with SYLVER (Silviculture on Yield, Lumber Value, and Economic Return), an integrated value-chain decision support tool that incorporates TASS. TIPSy includes a similar user-friendly economic and financial analysis tool.

Climate change: The internal structure of TASS is sufficiently flexible to accommodate many of the predicted changes in tree growth and mortality under different climate change models. The fundamental biological relationships underlying tree growth and stand development are expected to remain stable.

Forest health: Joint projects with scientists at the Canadian Forest Service, Fibre Centre have enabled TASS to predict the impact of spruce weevil, root rot, and mountain pine beetle on wood production.



TASS simulation of dead pine in a mixed-species stand.
Ken Polsson, MFR



Adrian Walton, MFR



Converting agricultural fields to forests to offset carbon emissions. Brian Raymer, MFR

Timber supply: TIPSy was developed in 1991 to provide Ministry of Forests and Range (MFR) timber supply analysts and silvicultural decision makers with user-friendly access to TASS simulations. TIPSy continues to support the routine application of enhanced managed stand yields within MFR's allowable annual cut determinations.



A snow covered log deck from a mixed wood stand. Paul Rehsler, MFR

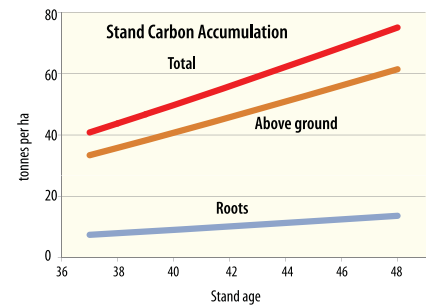
Sustainable forest management:

TASS is not used just for timber management. It also predicts stand structure and light regimes, which serve as inputs for other models that forecast a wide range of future non-timber forest values, including wildlife habitat, biodiversity, and visual quality.

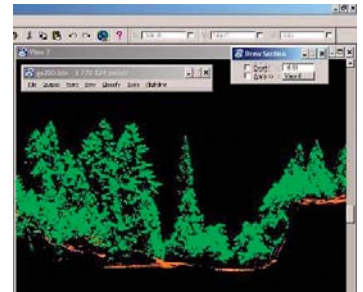


Ian McDougall, MFR

Carbon and biomass: TASS converts predicted tree size to biomass and carbon equivalents contained in various tree components (i.e., bole, foliage, branches, roots, and bark). This enables practitioners to explore the effects of proposed forest management practices on both carbon sequestration and biomass production for biofuel.



Remote sensing: A collaborative project with the Forestry Commission Great Britain is exploring opportunities for obtaining detailed stand and tree measurements via remote sensing (LiDAR). Potential benefits include enhancing TASS linkage to the British Columbia Forest Inventory to broaden its use in MFR business applications.



Juan Suarez, Forestry Commission GB

Research synthesis:

Conceived as a platform for research synthesis, TASS provides forest managers with reliable predictions that integrate current research in many disciplines. TASS predictions reflect the results from MFR's ecological, silviculture, and genetics research programs, as well as many others around the world.

A light model (tRAYci), which was linked to TASS through a co-operative international research project, has improved predictions for stands with complex vertical structure and multiple species. Such stands are being created by both natural disturbances (e.g., fire, insect infestations, disease agents) and ecosystem-based management practices (e.g., variable retention, clearcut-with-reserves).



Roger Painter, MFR Tree Improvement Program

TASS's Future

TASS development continues to emphasize research synthesis and extensive multi-disciplinary and inter-agency collaboration. Over the past decades, this approach has proven to be a responsive and cost-effective framework for supporting MFR business needs and addressing new forest management issues in British Columbia.



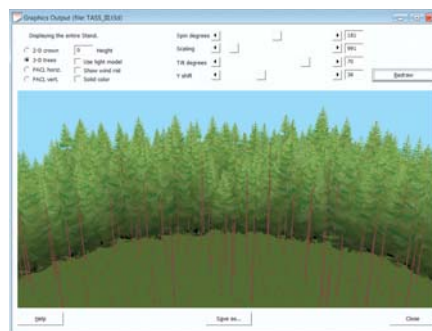
TASS data collection

Ongoing model development and validation requires data in many forms. Long-term plots are the best source of data for silvicultural treatment response, growth, and mortality. MFR's extensive legacy of silvicultural field experiments and permanent sample plots remains the primary source of these data. Collaboration with other research institutions and jurisdictions provides supplemental data, such as university research plot data, lodgepole pine data from Alberta and Sweden, and Douglas-fir data from France and New Zealand.

TASS calibration requires the felling and sectioning of selected trees to obtain detailed measurements of branches, needles, and tree rings for predicting light interception, annual growth, and wood production.

Evolving MFR priorities and the expanding suite of forest management practices continue to raise expectations for future forest prediction tools, in particular, those that apply to stands with complex vertical structure and multiple species. This is the focus of TASS III, the next generation of TASS, which is currently under development. Leveraging advances in computing speed and capability, TASS III will be the first public release of interactive TASS on the PC platform. A flexible Windows

interface is being integrated with powerful 3-D stand visualization software, a new graphing system, and on-line HELP.



Generated by TASS

Getting help from TASS



TIPSy, derived from TASS, remains British Columbia's most widely used growth and yield application. It continues to meet most operational decision support needs within silviculture and timber supply analysis. TIPSy has an intuitive Windows® operating system interface and produces a variety of outputs, including economic analysis and carbon yields, for a wide range of stand conditions and silvicultural treatments.

Practitioners may contact Branch staff to request custom TASS or SYLVER runs when TIPSy is not appropriate, or when they need to locate training or obtain expert advice based on current research and extensive experience.

For more information, visit the MFR Research and Knowledge Management Branch at:
www.for.gov.bc.ca/hre/



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www.for.gov.bc.ca/hfd/pubs/Docs/Bro/Bro90.htm