



Ministry of
Forests

The Tree and Stand Simulator (TASS)

Still providing understanding after
6 decades

Stand Development Modelling Group
Forest Analysis and Inventory Branch
British Columbia Ministry of Forests

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Acknowledgment



We acknowledge with respect that the BC Public Service operates throughout B.C. on the traditional lands of Indigenous Peoples. The BC Public Service is deeply committed to true and lasting reconciliation with Indigenous Peoples in B.C.

Overview



- TASS Reminder
- Emerging BC's Needs and Operational Technologies

Models

Models are simplifications
useful for understanding



TASS Vision



“The model represents an initial step in the evolution of a precise analytical tool for use in the development of optimum forest management regimes. Further, application as a teaching device and instrument of research is expected”

Mitchell, K. 1969. Simulation of the growth of even-aged stands of white spruce. Yale School of Forestry & Environmental Studies Bulletin Series. 62.

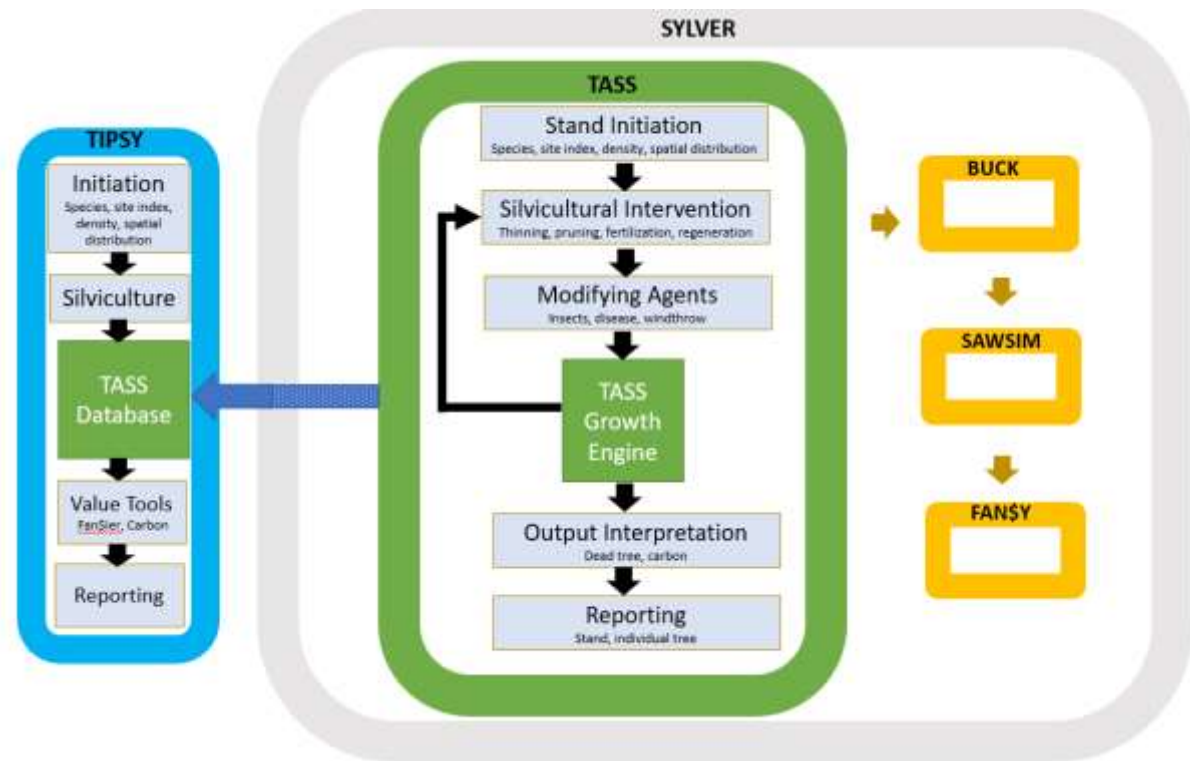
“TASS is a biologically oriented model designed to assess the effects of cultural practices and environmental factors on the growth and yield of Douglas-fir .. and other species.”

Mitchell, K. 1988. SYLVER: Modelling the impact of silviculture on yield, lumber value, and economic return. The Forestry Chronicle. April 1988. 127-131.

TASS Software

TASS Ecosystem

Platforms



TASS

TASS II – In house; command line; 8+13 species*

TASS III – In house; command line; light model; 4 species

TASS III – Public; Windows GUI; light model; 2 species

TIPSy

TIPSy – Public; Windows GUI;

Batch TIPSy – Public; Windows GUI;

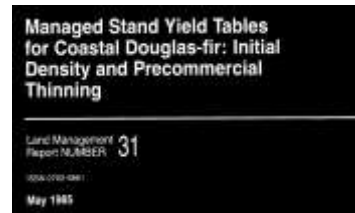
Batch TIPSy Composer – Public (soon); Windows GUI

TASS Uses and Usage

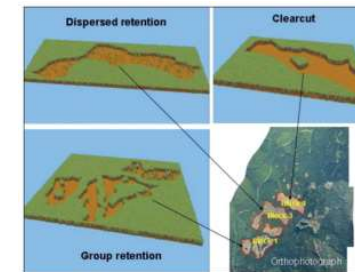
Silviculture



Yield Tables



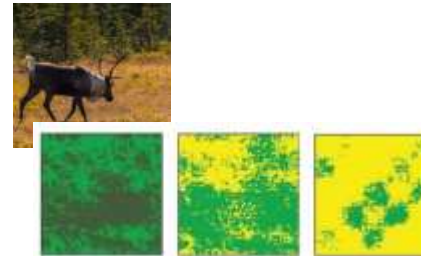
Research Design



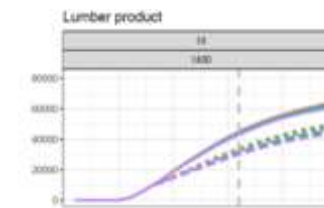
Stand Projection



Forest Health



Wildlife



Product / Economics

Examples of TASS use can be found in Goudie, J. et al. 2005. Application of simulation models to the design and analysis of silvicultural systems in British Columbia. Pages 175-184 in Peterson, C.E. and Maguire D.A., eds. Balancing ecosystem values: innovative experiments for sustainable forestry proceedings of a conference. Gen. Tech. Rep. PNW-GTR-635. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

TASS Engine Overview



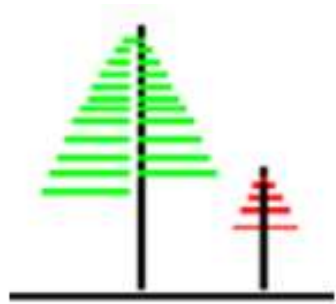
Ministry of
Forests

TASS is a spatially explicit individual tree model that is driven by height growth and crown dynamics

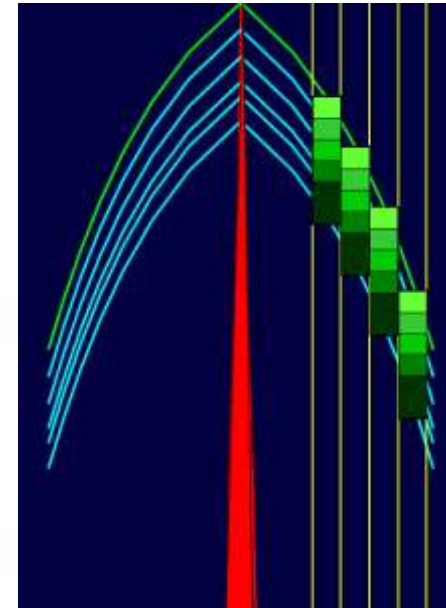


TASS Engine Overview

TASS is a **spatially explicit individual tree** model that is driven by height growth and crown dynamics

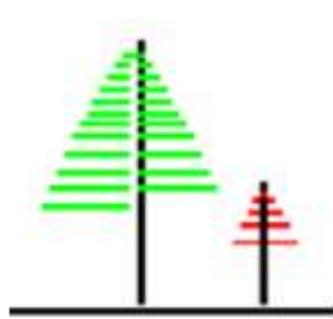


individual
tree

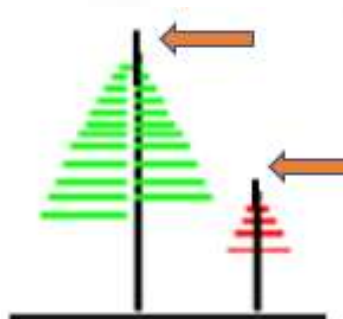


TASS Engine Overview

TASS is a spatially explicit individual tree model that is driven by **height growth** and crown dynamics



individual
tree



height
driven

$$\Delta h_{jy} = \Delta H_{Sy} \cdot v_{hj} \cdot m_{hj}$$

Site Index Function

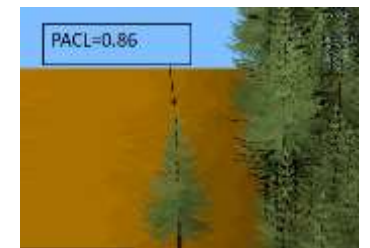
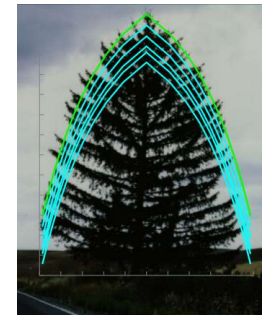
Height Vigor Coefficient

Height Growth Factor

TASS II – Foliar Volume

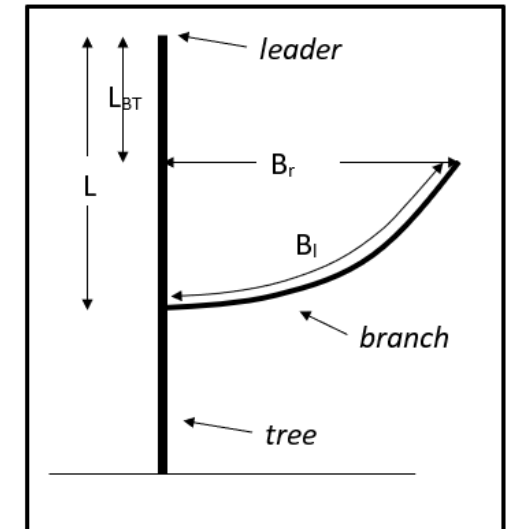
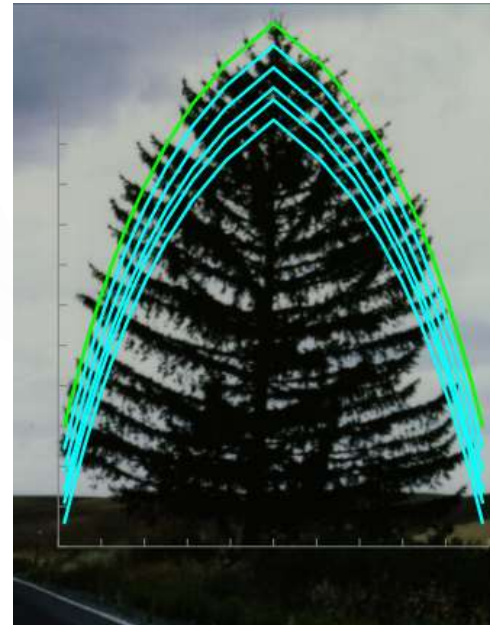
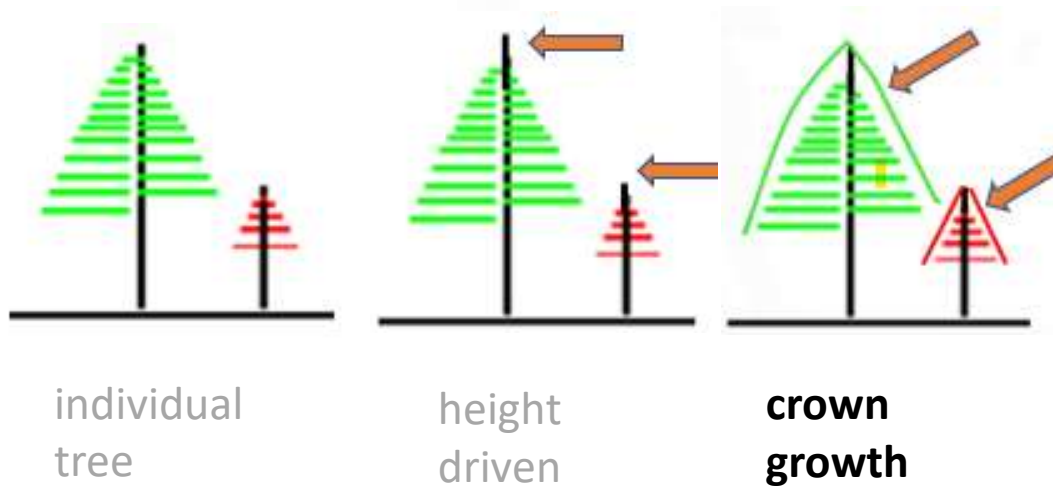
TASS III – PACL at leader

tree variability
genetic micro-site



TASS Engine Overview

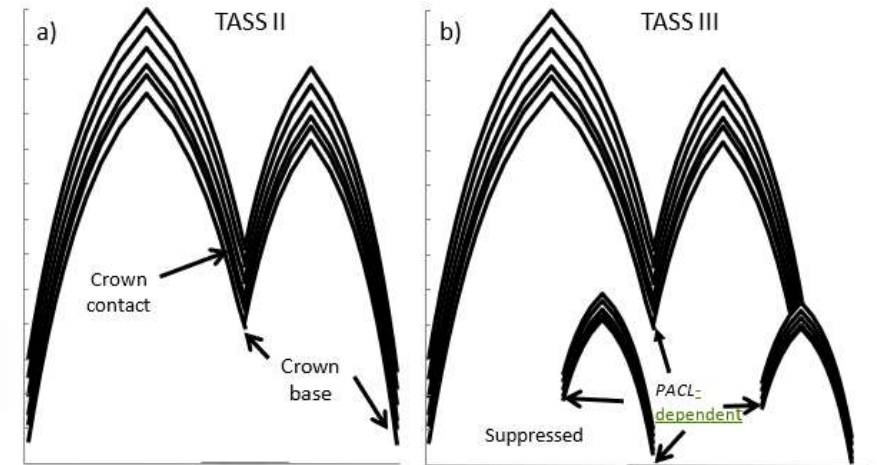
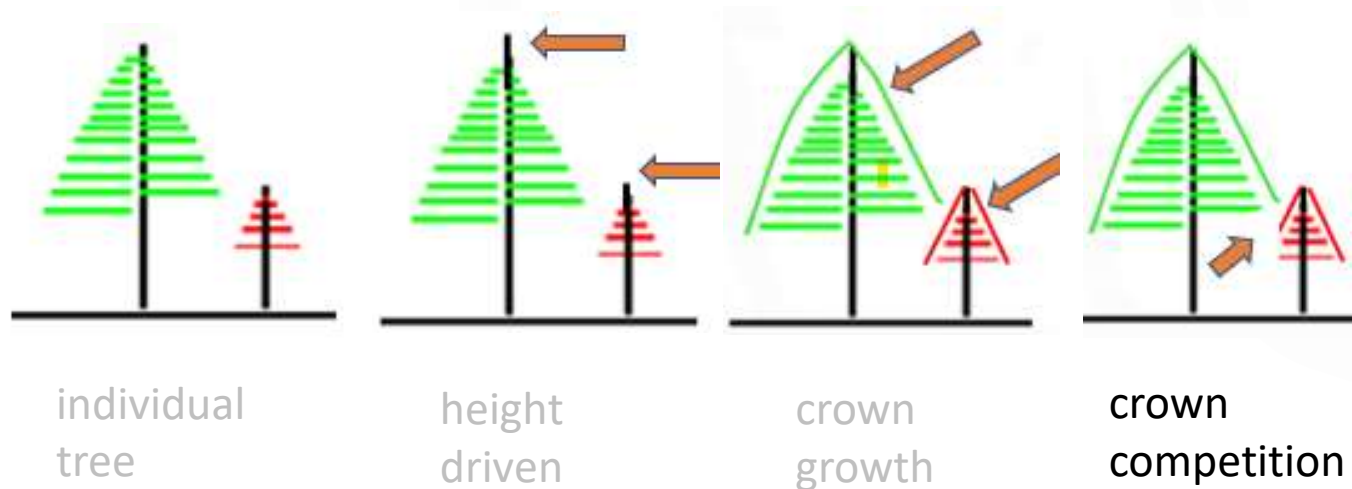
TASS is a spatially explicit individual tree model that is driven by height growth and **crown dynamics**



$$B_{rj} = (b_0 R^{b_2} + u_{0j}) \cdot \ln\left(\frac{L_{BT}}{b_1} + 1\right)$$

TASS Engine Overview

TASS is a spatially explicit individual tree model that is driven by height growth and **crown dynamics**

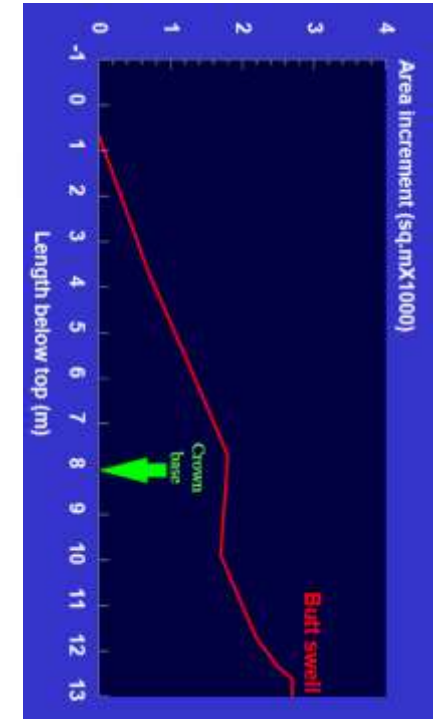
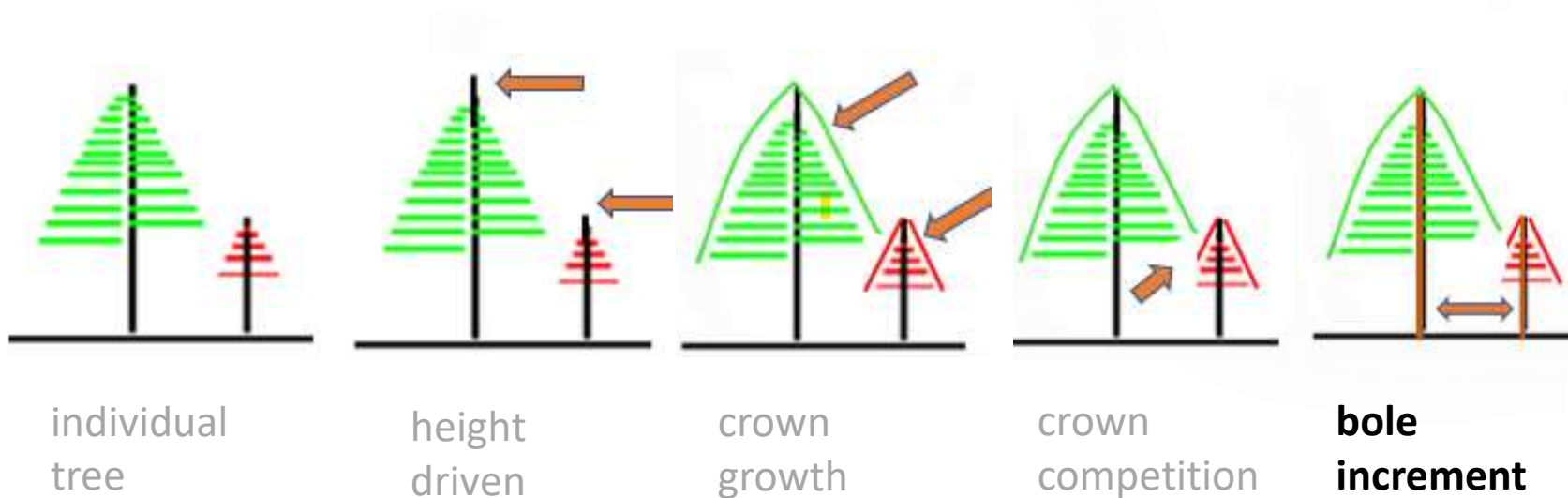


- Physical based

- Light based

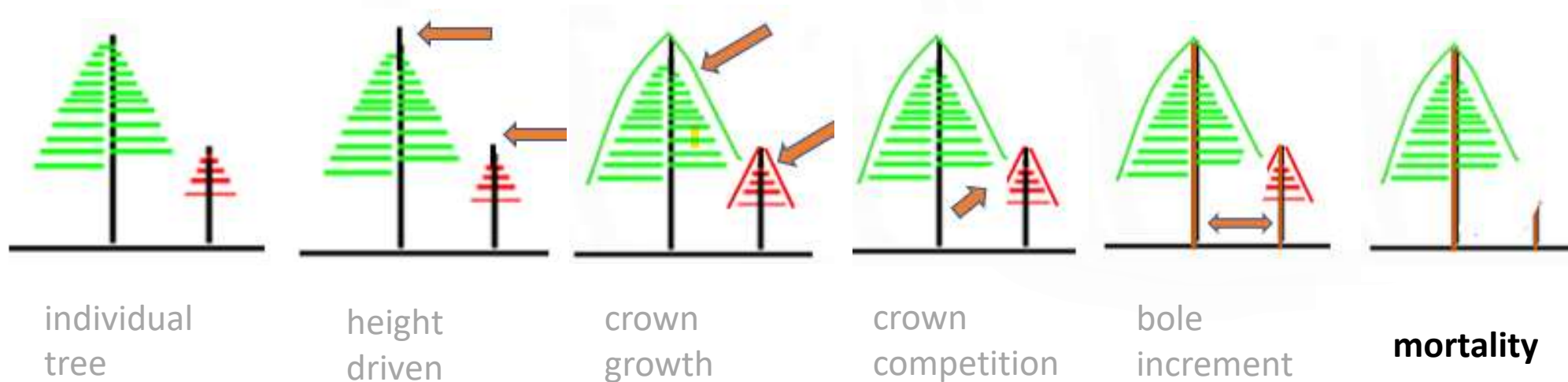
TASS Engine Overview

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Development

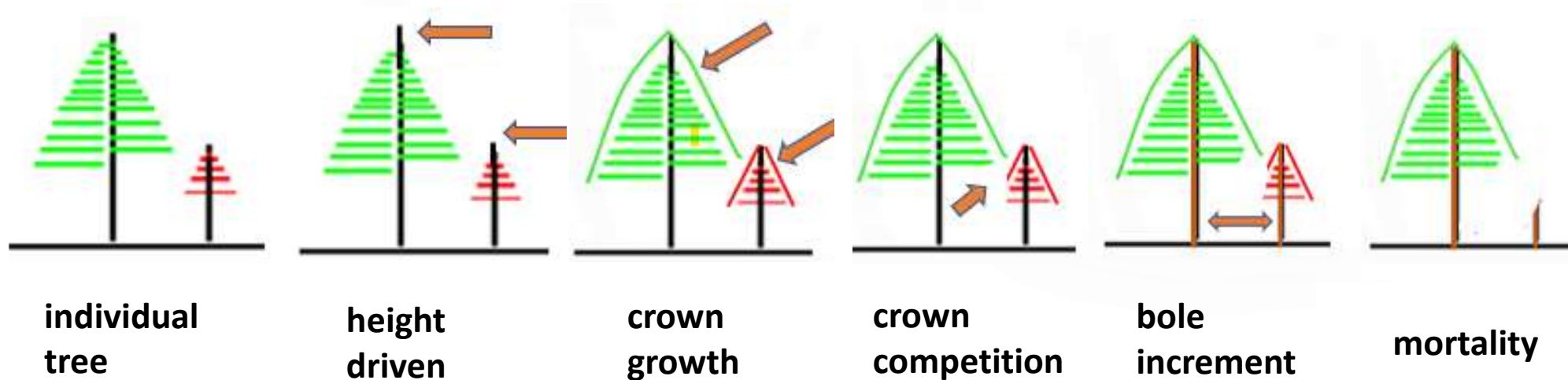
1. Juvenile
2. Overtopping
3. Small crown

Disturbance

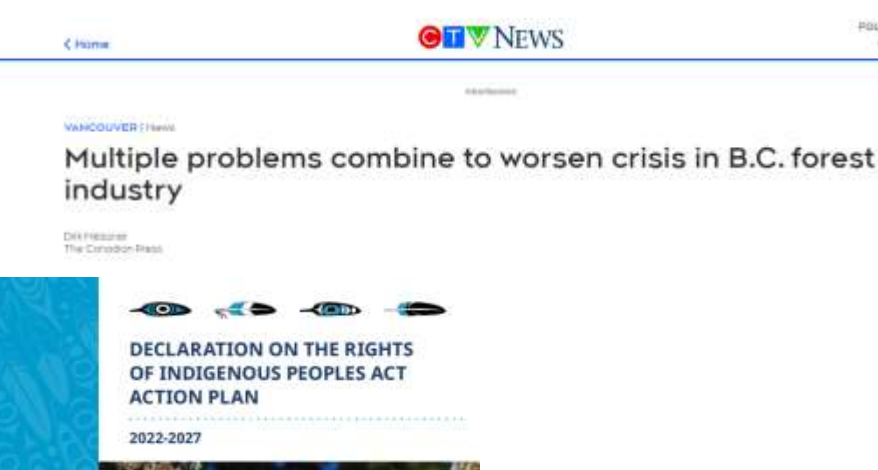
- Initiation
- Forest Health
- Thinning
- ...

TASS Engine Overview

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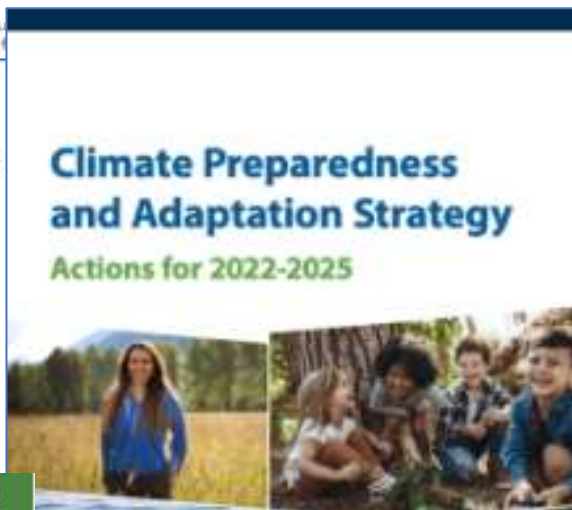
DRIVING ISSUES



Multiple problems combine to worsen crisis in B.C. forest industry

DIK HILLMAN
The Canadian Press

DECLARATION ON THE RIGHTS OF INDIGENOUS PEOPLES ACT ACTION PLAN
2022-2027



Climate Preparedness and Adaptation Strategy
Actions for 2022-2025



Modernizing Forest Policy in British Columbia
Setting The Intention and Leading the Forest Sector Transition



A NEW FUTURE FOR OLD FORESTS
A Strategic Review of How British Columbia Manages for Old Forests Within its Ancient Ecosystems



NEW Forest Landscape Planning
Sets direction under the *Forest and Range Practices Act (FRPA)*
Must be consistent with an approved Strategic Land Use Plan



Tactical Scale

- Is conducted in partnership with Indigenous peoples and in collaboration with forest and range license holders under *FRPA*
- Enables deeper engagement & greater transparency with local governments and stakeholders



Today's News

B.C. Government Investing \$38 Million to Collect High Quality LiDAR 3D Elevation Data Across British Columbia
Wednesday, April 19, 2023

[News Archive](#)



LidarBC - Open LiDAR Data Portal

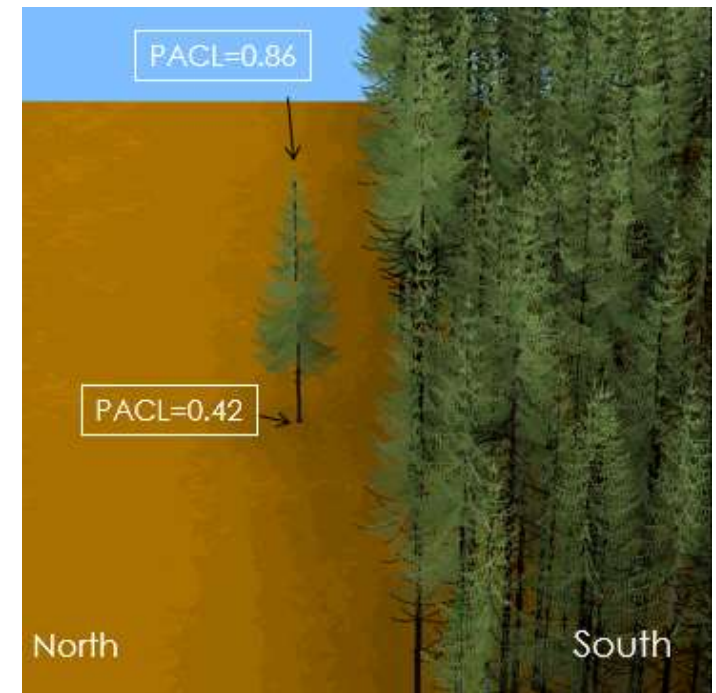
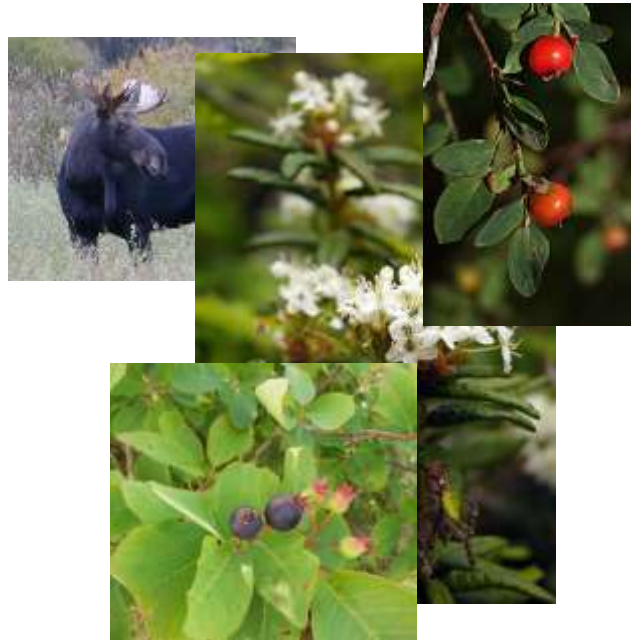
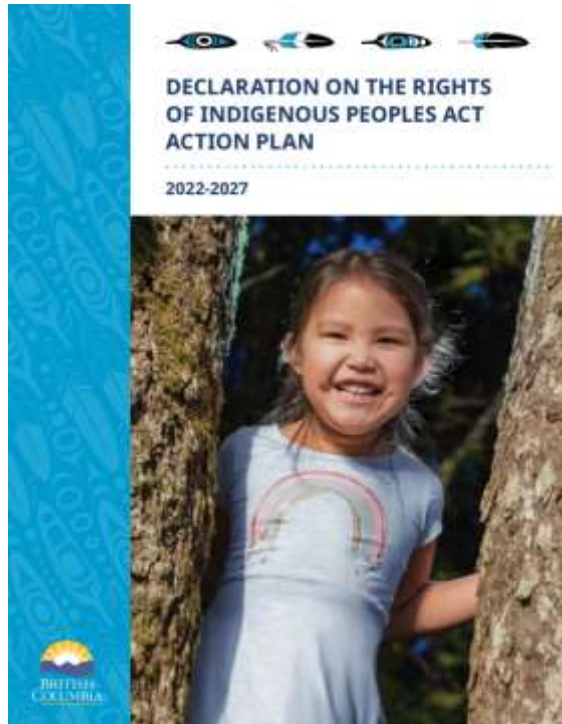
LidarBC



TOGETHER FOR WILDLIFE
Improving Wildlife Stewardship and Habitat Conservation in British Columbia

DRIVING ISSUES

- Declaration on the Rights of Indigenous Peoples Act



DRIVING ISSUES

- Forest Landscape Planning

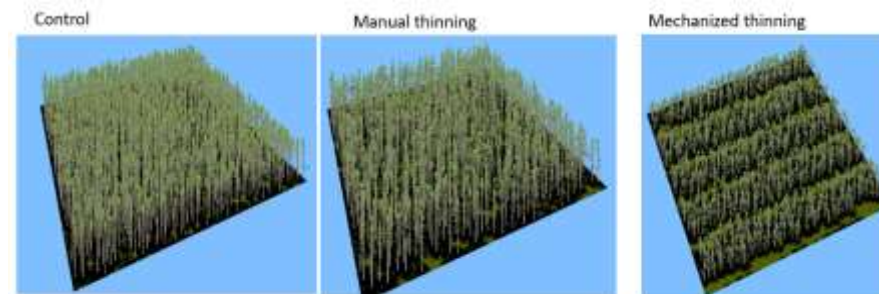
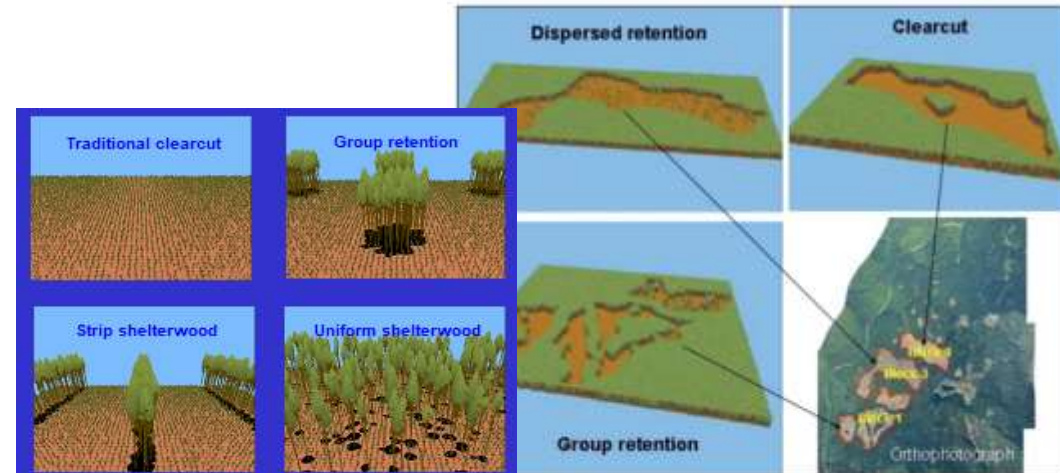
NEW Forest Landscape Planning

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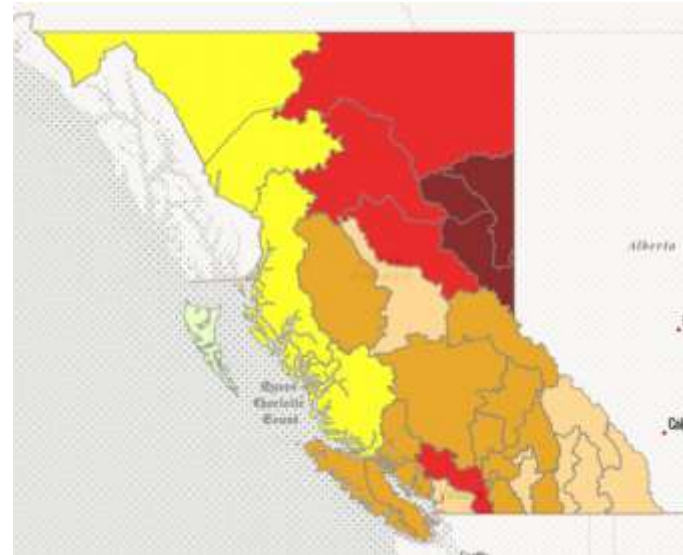
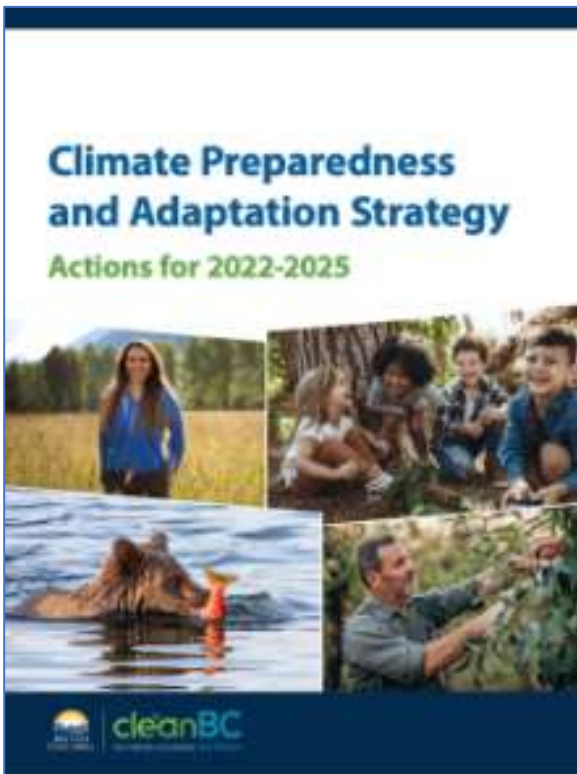
Tactical Scale

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DRIVING ISSUES

- Climate Change



Drought Level Classification		
Level	Impacts	General Response Measures
0	There is sufficient water to meet socio-economic and ecosystem needs	Preparedness
1	Adverse impacts to socio-economic or ecosystem values are rare	Conservation
2	Adverse impacts to socio-economic or ecosystem values are unlikely	Conservation Local water restrictions where appropriate
3	Adverse impacts to socio-economic or ecosystem values are possible	Conservation Local water restrictions likely
4	Adverse impacts to socio-economic or ecosystem values are likely	Conservation and local water restrictions Regulatory action possible
5	Adverse impacts to socio-economic or ecosystem values are almost certain	Conservation and local water restrictions Regulatory action likely Possible emergency response

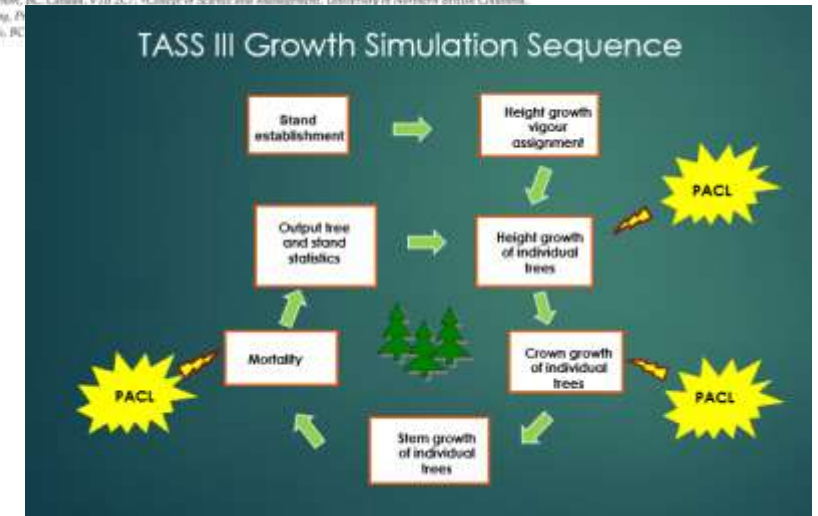
Global Change Biology

Global Change Biology (2011) 17, 3208–3217, doi: 10.1111/j.1365-2486.2011.02467.x

Linking population genetics and tree height growth models to predict impacts of climate change on forest production

GREGORY A. O'NEILL*† and GORDON NIGHT

*The Improvement Branch, BC Ministry of Forests, Lands and Natural Resource Operations, Radenstee Research Station, 3401 Research Road, Vernon, BC, Canada, V3B 5Y7; †College of Science and Management, University of Northern British Columbia, 3333 University Way, Prince George, BC, Canada, V2Y 1N1



DRIVING ISSUES

- Technology - LiDAR

Today's News

New Search

B.C. Government Investing \$38 Million to Collect High Quality LiDAR 3D Elevation Data Across British Columbia

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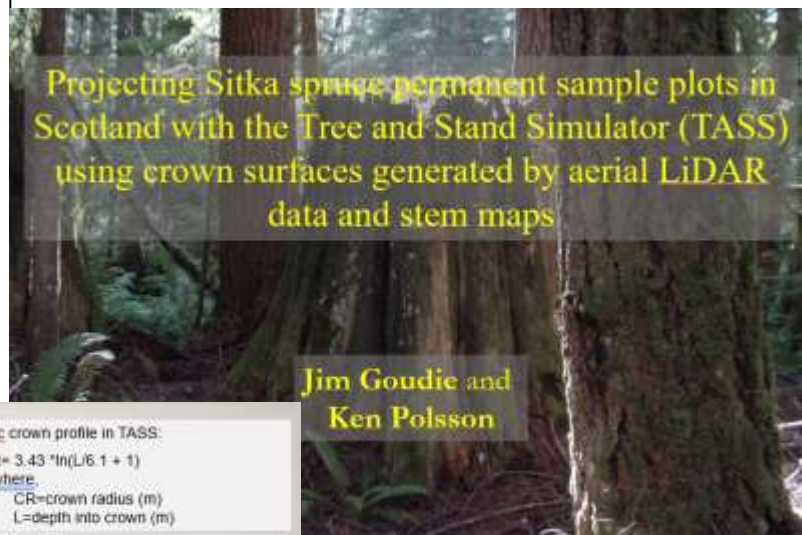


An Analysis of the Consequences of Stand Variability in Sitka Spruce Plantations in Britain using a combination of airborne LiDAR analysis and models

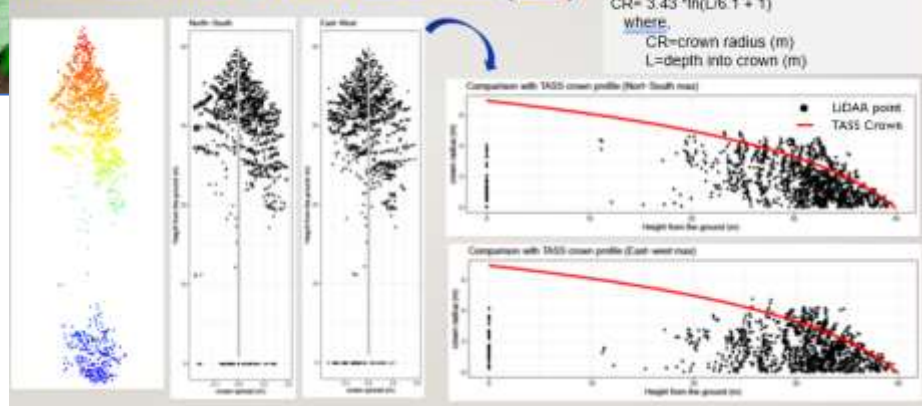
Juan Claudio Suárez-Minguez

Thesis submitted to the University of Sheffield in fulfilment of the requirements for the degree of Doctor of Philosophy

Department of Applied Mathematics



Individual Tree Crown Attributes (Fdc)

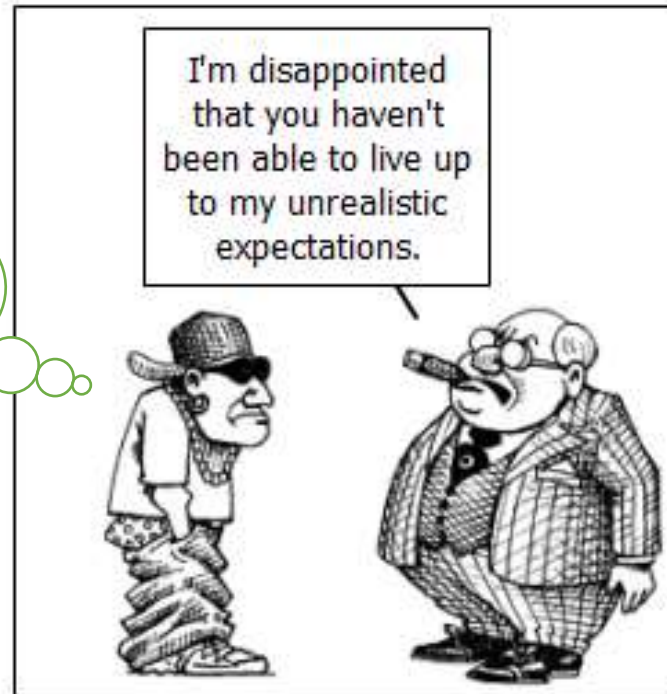


DRIVING ISSUES

- Technology

Models are
simplifications for
understanding

Expectations by john horse



DRIVING ISSUES

- The People



2023-2026 Workforce Plan Summary

"Our workforce plan supports our most important resource: our people. This Plan is our commitment to growing our talent and empowering one another as we deliver government priorities."
- Deputy Minister, Rick Marwaring

Priority 1: Ensuring Manageable Workloads and Adequate Capacity

Desired Outcome: Our workforce is well supported and able to deliver on ministry mandates.

Executive Champion: Rose Ellis, Executive Director and Jillian Roussele, Executive Lead

Objective:

- Ensure adequate resources are in place to accomplish the ministry's deliverables, including capacity to manage people focused components.

Priority 2: Growing and Retaining Talent

Desired Outcome: Employees at all levels have the knowledge and tools to do their jobs well.

Executive Champion: Sarah Fraser, Assistant Deputy Minister

Objectives:

- Ensure new employees have an effective onboarding experience.
- Ensure employees have timely access to learning and development needed for their current and future positions.
- Ensure succession planning for key ministry positions.
- Help employees understand the career paths available to them and how to reach the positions they desire.
- Establish an ongoing culture of retaining and sharing the knowledge most important to the organization.
- Promote a culture of well-being (linked with Priority 1).
- Ensure that the ministry meets its talent needs by offering flexible work options.
- Promote effective employee performance.
- Identify and provide ministry-wide training regarding safety of remote workers.
- Identify and provide job specific equipment safety training.

Workforce Plan Key Components

- Diversity, Inclusion and Accessibility
- Retention and Recruitment
- Learning and Development
- Leadership Development
- Culture and Experience
- Facilities, Management, and Systems

Workforce strategies improve employee performance, engagement, and retention.

4300 Employees
+1,300 more during field season

62 Communities

1100+ Supervisors

Prepared by People and Workplace Strategies supporting FDR / WLR5

Ministry of Forests

FIND OPPORTUNITIES

BC Government Job Postings

<https://www2.gov.bc.ca/gov/content/careers-myhr/job-seekers/current-job-postings>

BE A STEP AHEAD

Professional Designation Requirements

Forest Professionals BC

<https://www.fpbc.ca/>

CONCLUSION

Don't drop
the ball



Acknowledgment



THANKS TO THE MANY WHO HAVE CONTRIBUTED IN LARGE AND SMALL (but important) WAYS TO TASS!!

Andreas Brunner

Jim Goudie

Ken Polsson

Ian Cameron

Azura Formetrics

Aicha Hezit

KEN MITCHELL

Shelly Grout

Current TASS government team

Catherine Bealle Statland — Team Lead

Jeff Stone - Modelling Research Scientist

Ronald Aranha — Modelling Analyst

Mario Di Lucca — A/ Application Specialist

Déa Cameron — A/ Modelling Research Scientist

Catherine Bealle Statland

Mario Di Lucca

Gord Nigh

D.R. Systems

Sharad Baral

CFS Researchers

Derek Sattler

Eleanor McWilliams

Steve Stearns-Smith

Questions/Comments/Lunch



Ministry of
Forests



Extra



Ministry of
Forests

MOVING FORWARD

Catch Up

- TASS III Technical Report
- TASS II re-calibration
- Tree list initiation review

Passing Baton

- Code modernization
- Staffing & Outside Expertise

Moving Ahead

- TASS III species increase
- First Nation values
- Use with LiDAR
- ...

WHILE

- Addressing current operational needs
- Maintaining and initiating research and data collection