

# Model Framework and Modules for Co-Developed Hybrid Simulation Model of Windthrow Risk

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Code-Name: CHABLIS (Co-developed Wind Hazard Assessment by Tree List Simulation)

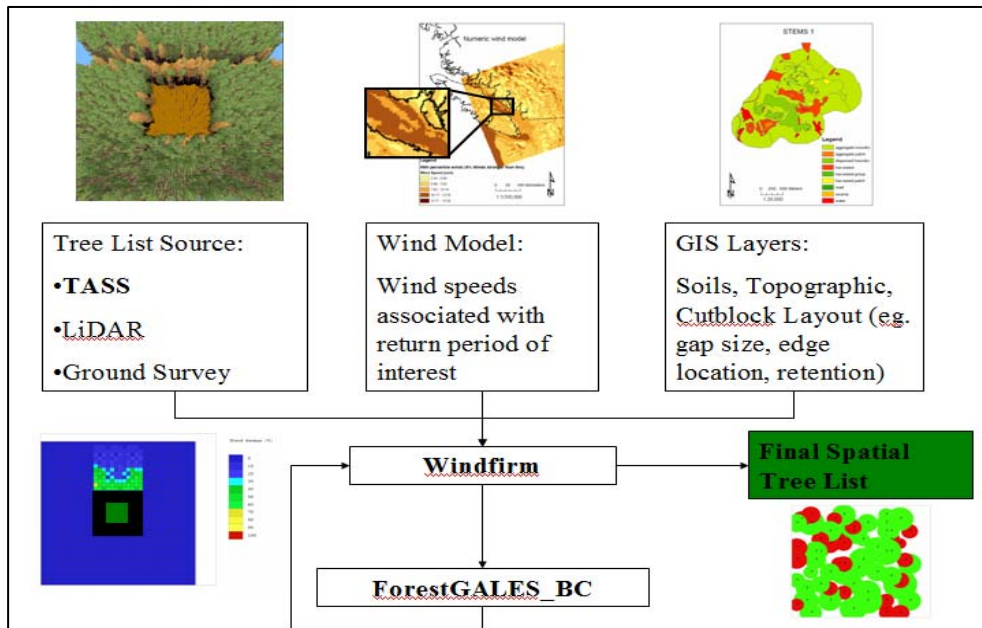
## Purpose of Model

1. To provide forest managers and planners who design harvesting and stand tending treatments with a decision support tool that incorporates the best current knowledge concerning wind loading and tree resistance.
2. To enable researchers to combine the best elements of existing models and use this process to identify knowledge gaps and stimulate further research.

## Features of Model

This model should use spatial tree lists and simulate outcomes of complex partial harvest design scenarios under local weather and soil conditions. It should be linked with stand growth models and visualization tools and be capable of running within a GIS.

Example Schematic of Model Structure (WindFIRM and ForestGALES\_BC; Ken Byrne & Steve Mitchell):



## Modules

- Tree List Input (Spatial Tree List from Growth model, LIDAR, survey)
- Spatial Data Input (soils, harvest design, terrain etc., polygons or grids)
- Above Canopy Wind Specification (Wind-Terrain)
- Initial Tree List Editing/Harvest Implementation
- Input Tree List
  - \*Iterated Tree List
  - Upwind Field Specification (Profile)
  - Neighbourhood Specification
  - Applied Moment
  - Resistive Moment (Overturning)
  - Resistive Moment (Breakage)
  - Collision/Damping (Tree-Tree Interactions)
  - Tree List Modification
  - Iteration (\*continues until no new trees are selected as 'Failed' in Iterated Tree List)
- Output Tree List
- Visualization (Pixel or Tree Level)
- GIS representation

## Model Development Platform

Web-based such as the CAPSIS platform.

Programming language to be decided, but open-source (e.g. Python) preferred.

