Prometheus

Canada

Predicting fire perimeters from local conditions

Information current as of April 1, 2026

> Prometheus is a deterministic fire growth simulation model that predicts fire perimeters at one or more times specified by the user. The model uses topography, fuel and weather data to help answer the question: "given the weather forecast and what we know about on-ground conditions, **where is the fire expected to reach?**" Prometheus was developed by the Government of Alberta in collaboration with other Canadian fire management agencies.

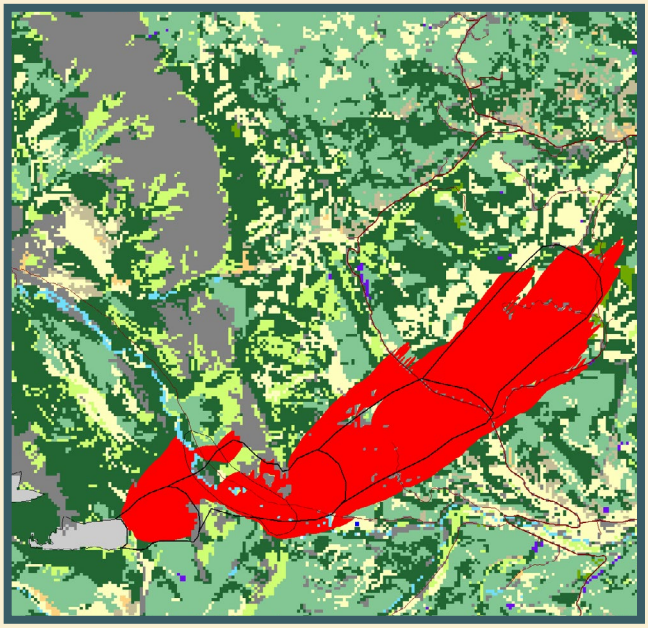
Model Characteristics

User-driven: Users can explore scenarios under different conditions and durations.

Portable: Can "take it to the bush" and run on local hardware.

Easy to use: Has a built-in user interface with dialogue boxes for inputs.

Flexible: Users can customize model settings and override default inputs with more detailed local knowledge (e.g., fuel maps).



Typical Uses

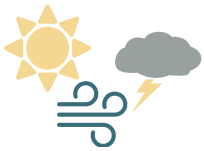
For tactical operational decisions. Supports specialists or modellers looking to:

- Tactically inform fire management at incident scales.
- Assess the possible extent of fires to optimize management resources.
- Explore "what if" scenarios by adjusting input data to reflect different local conditions.

Key Considerations

- Assumes the entire perimeter is burning.
- Does not model spotting, plume dynamics, smoldering, extinguishment or suppression.
- Does not simulate interactions of multiple fires.
- MS Windows-based, therefore dependent on continued compatibility.
- Computationally intense.
- Detailed on-site assessments of fire behaviour are still required for fire operations.

How it Works

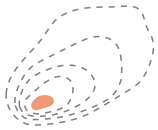


Inputs

- Weather (and FWI)
- Fire Behaviour Prediction (FBP) data
- Optional: Topographic slope, aspect and elevation grids
- Optional: Geographic features (e.g., lakes, communities). These data layers can be assigned to a scenario as fuel breaks.

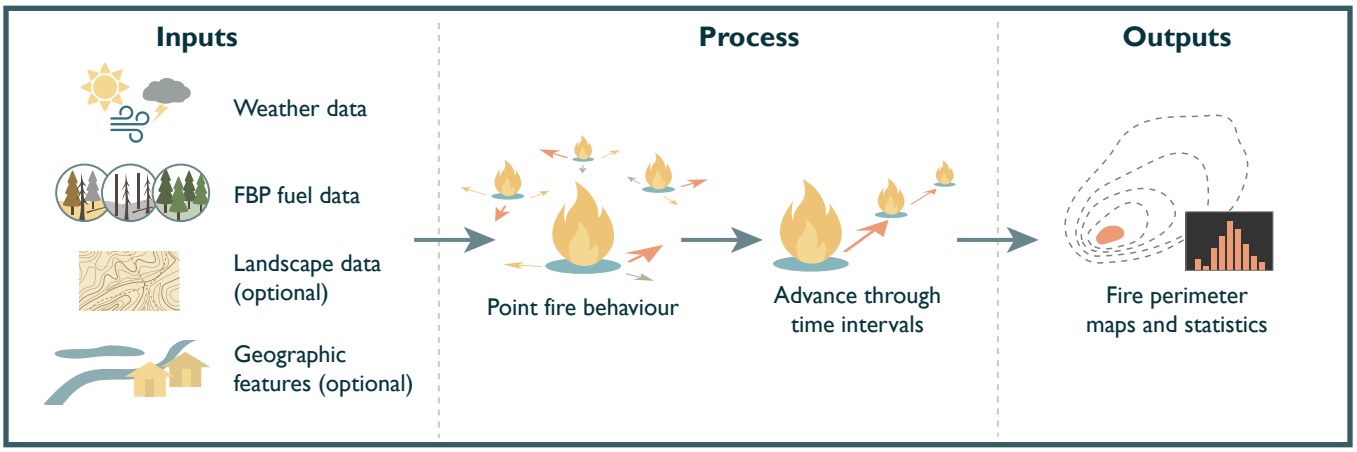
Process

Fire spread rate and direction are computed from the inputs at each point on the fire perimeter. The fire front is represented as multiple vertices, advancing in time intervals.



Outputs

Produces fire perimeters in vector format compatible with GIS, tabular fire statistics and fire behaviour components within the burned area in raster format.



This summary is part of a six-part series introducing Wildfire Intelligence and Predictive Services (WIPS), its suite of data products and three key tools. To learn more about Prometheus, see Tymstra et al. (2010).

We acknowledge the collaboration and data sharing between NRCan, CIFFC and fire management agencies through the Canadian Wildland Fire Information Framework.