# Canada-wide forest cover indicator based on satellite remote sensing.
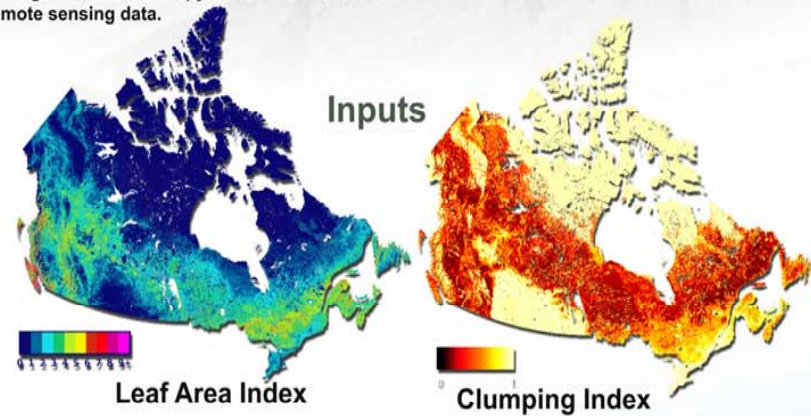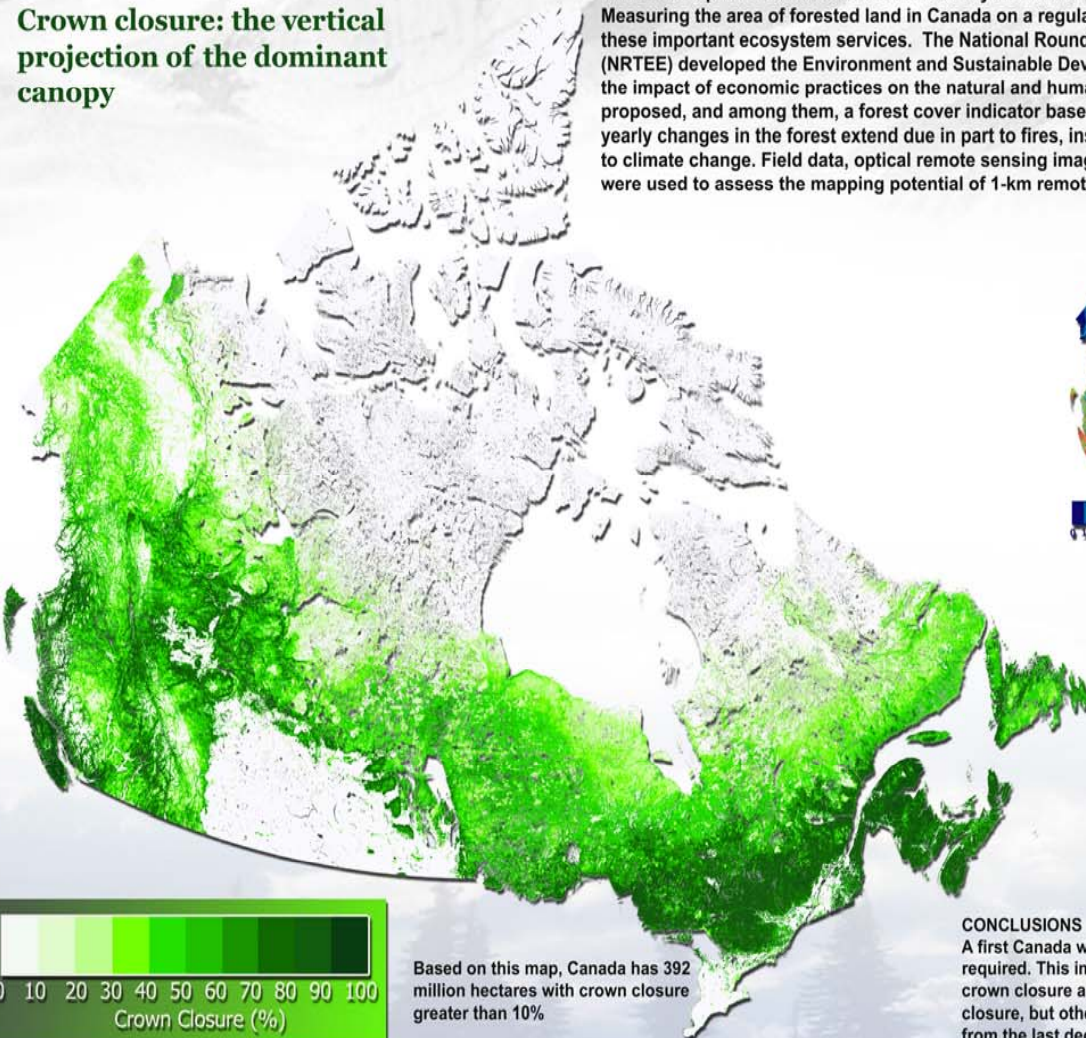
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**Crown closure: the vertical projection of the dominant canopy**

Forests cover nearly half of Canada's landmass. While they are often viewed as areas of wood production, forests also provide wildlife habitat and ecosystem mechanisms to clean air and water, and sequester carbon. Measuring the area of forested land in Canada on a regular basis provides an indicator of the availability of these important ecosystem services. The National Round Table on the Environment and the Economy (NRTEE) developed the Environment and Sustainable Development Indicators (ESDI) initiative to track the impact of economic practices on the natural and human assets of Canada. Six indicators were proposed, and among them, a forest cover indicator based on crown closure estimate for monitoring yearly changes in the forest extend due in part to fires, insect defoliation, regrowth, and changes due to climate change. Field data, optical remote sensing imageries, and a canopy radiative transfer model were used to assess the mapping potential of 1-km remote sensing data.

**Reducing Canada's vulnerability to climate change**

### Inputs

**Leaf Area Index**

**Clumping Index**

**Validation Tools and Software**

Digital Camera with fish-eye lens

Crown Closure (%)
0  10  20  30  40  50  60  70  80  90  100

Based on this map, Canada has 392 million hectares with crown closure greater than 10%

**CONCLUSIONS**

A first Canada wide map of crown closure was produced. To be used in a national forest indicator, yearly maps are required. This implies that more field validation should be carried out every year to improve the retrieval of LAI and crown closure and to increase the number of validation points. Available products were used to calculate the crown closure, but other methods are being tested to improve the production of yearly crown closure map. AVHRR data from the last decades will be used to generate historical crown closure maps to assess the change in forested area in Canada. Although these maps are to be used in the forest cover indicator, they can also be used to follow temporal forest evolution.

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