# B I O S P A C E

Capture of land cover information is a key requirement for supporting forest monitoring and management. In Canada, provincial and territorial forest stewards use land cover information to aid in management and planning activities. At the federal level, land cover information is required to aid in meeting national and international reporting obligations. To enable improved monitoring of Canada's forests, the Earth Observation for Sustainable Developments of Forests (EOSD) project was initiated. EOSD is a partnership project between the Canadian Forest Service (CFS) and the Canadian Space Agency (CSA), with provincial and territorial participation and support. An element of EOSD is the development of a land cover map of the forested area of Canada reflective of circa 2000 conditions. Including image overlap outside of the forested area of Canada, over 475 Landsat-7 ETM+ images were classified, over 80% of Canada was mapped, and over 600 1:250,000 map sheet products were developed for unfettered sharing.

**Landsat Image Frames**

EOSD Land Cover of Canada
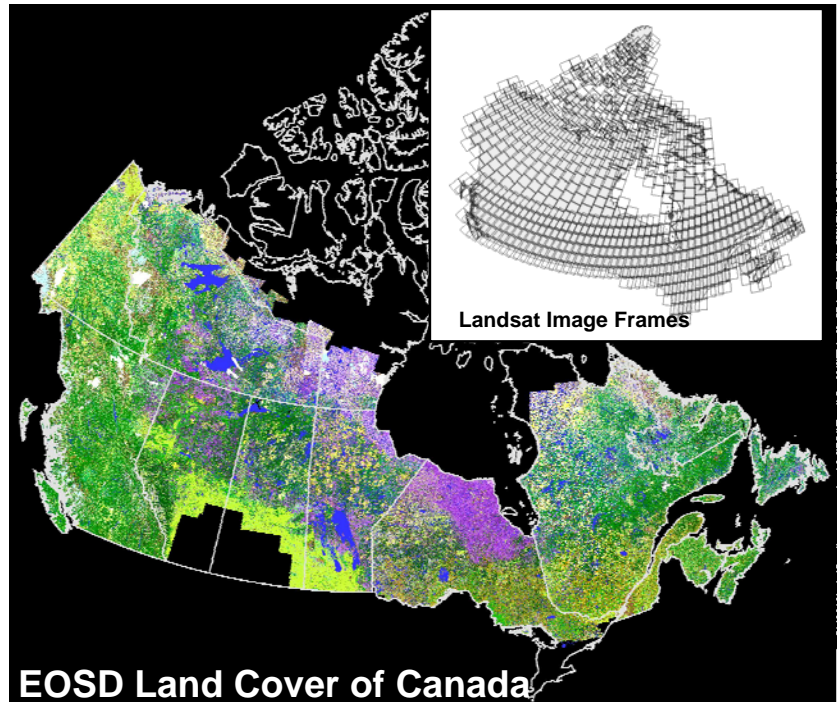
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The estimated area of forest and other wooded land in Canada is 402.1 Mha. Over the long-term, forest fragmentation occurs when large contiguous forest areas are impacted by human activities such as road building, farming, urbanization, and other activities. In the short-term, forest harvesting, fires, and insect infestations may result in forest fragmentation.

Forest fragmentation is characterized by both the amount and spatial configuration of forests. Changes to the extent and pattern of forests may impact some species by altering their habitat and their movements across the landscape.

Land cover products such as that produced by the EOSD project may be used to generate a synoptic assessment of forest fragmentation across Canada's forested lands - at multiple spatial scales.

A number of different metrics may be used to quantify the level of forest fragmentation in a given area. These metrics include: patch size, number of patches, distance between patches, and patch perimeter (edge), among many others. The example to the right represents the distribution of forest (green) and non-forest(red) land cover types from the EOSD product for two 1:50,000 NTS map sheets. 093G15 has 5419 forest patches, while 093G04 has 989 forest patches.
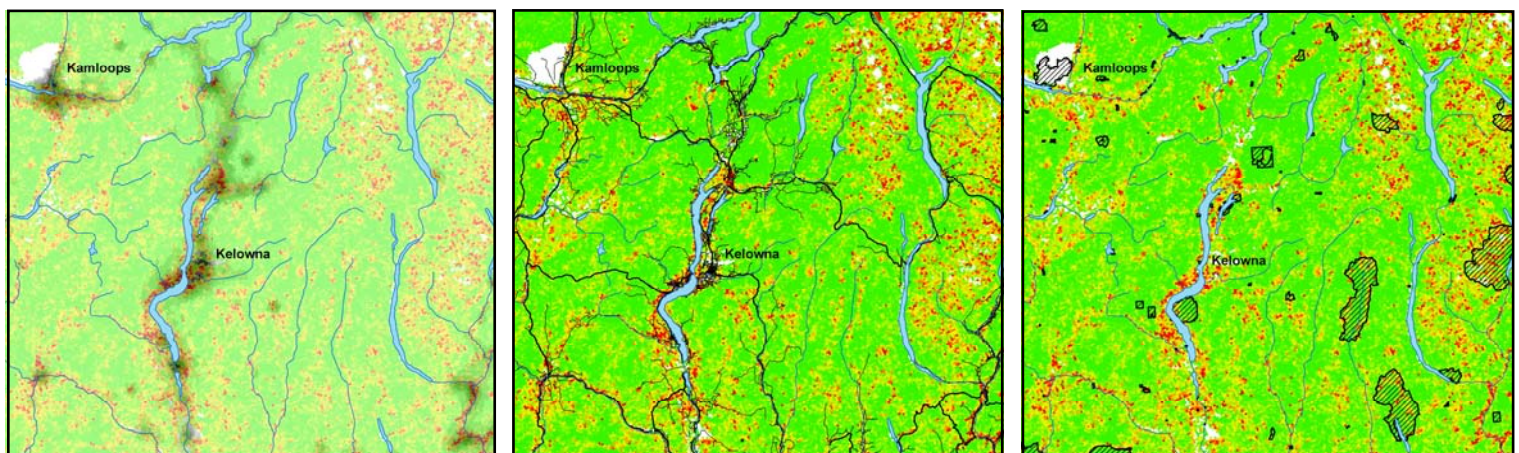

093G15

093G04
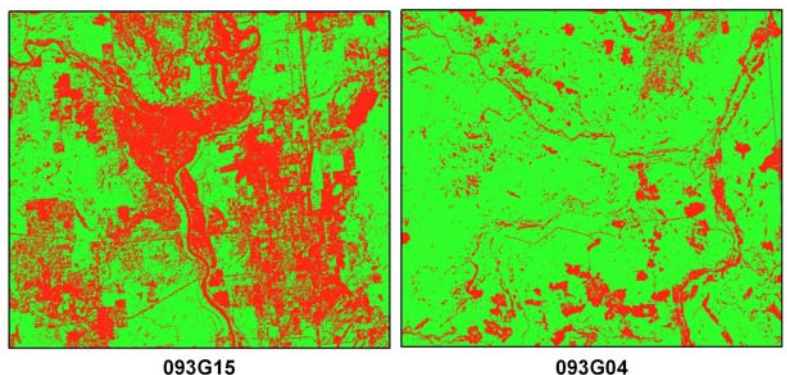
F O R E S T   F R A G M E N T A T I O N
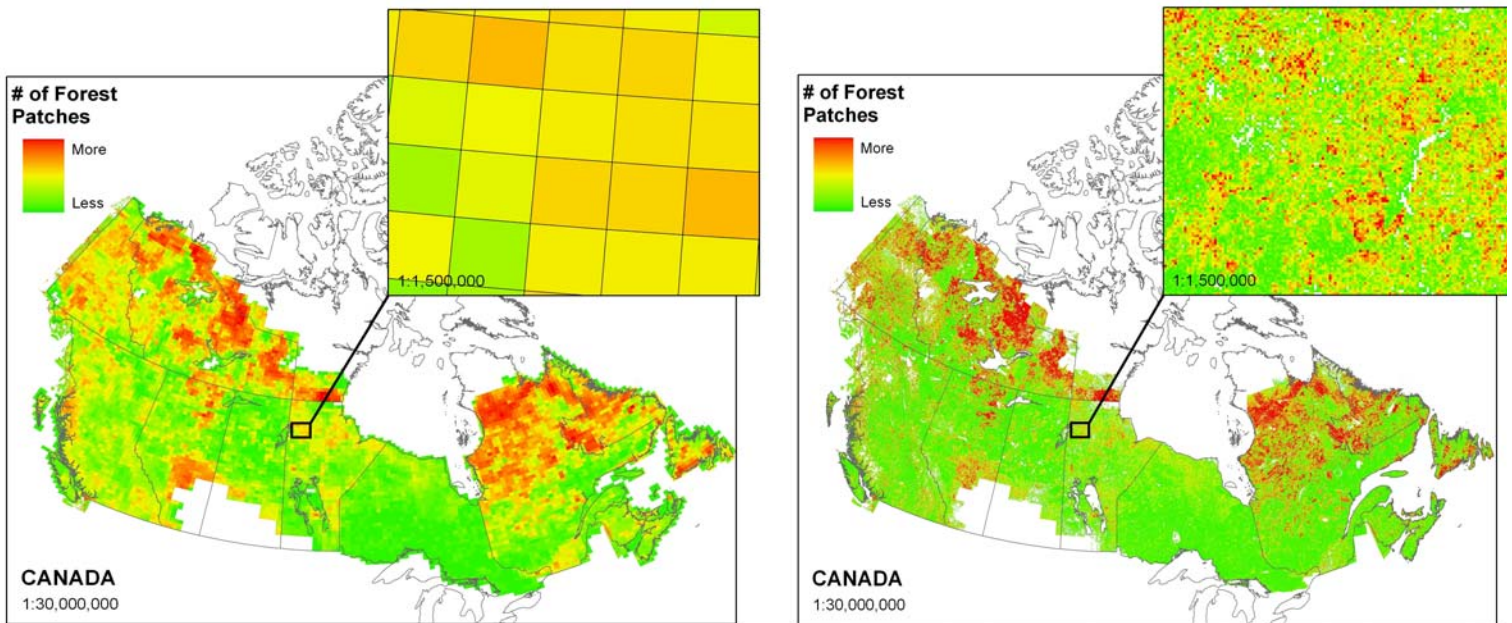
The 25m by 25m resolution of the EOSD land cover product supports a multi-scale analysis of forest fragmentation. Above are examples of a fragmentation metric that enumerates the number of forest patches within a defined area. On the left is counts of the number of forest patches within the area of a 1:50,000 NTS map sheet (36 x 27km), while on the right are counts of the forest patches within a 1 x 1km area. Each of these representations captures different forest patterns and are useful for addressing a range of questions about the fragmentation of Canada's forests. Multi-scale analysis of forest fragmentation is necessary, since no single scale can apply to all of the species and ecosystem functions.

Fragmentation metrics are also being combined with other data in order to better understand the underlying processes driving fragmentation, and to examine how fragmentation varies across the landscape. The number of forest patches (within 1 x 1 km) for the Okanagan Valley in south-eastern British Columbia (below) is combined with data on urbanization (left) and road corridors (middle). This facilitates investigation into the landscape processes that may be causing forest fragmentation in this area. In addition, we can explore the nature of fragmentation inside and outside of designated protected areas (right).