

Forest Fragmentation and Ecological Connectivity on the Chignecto Isthmus

What is Forest Fragmentation?

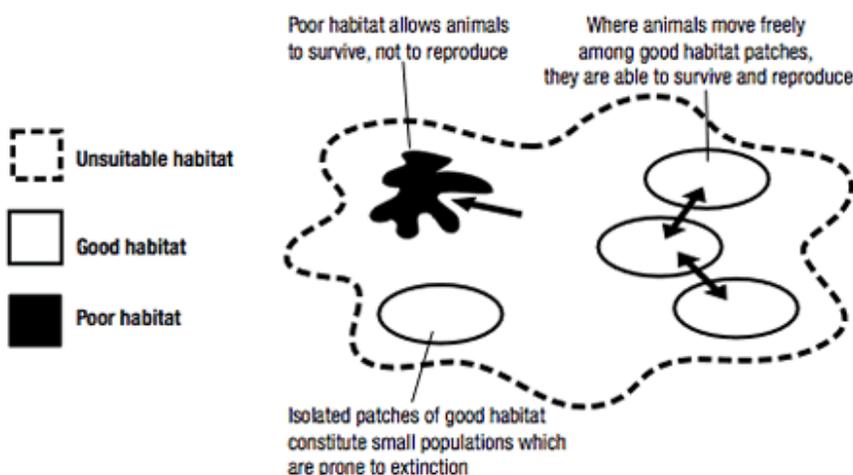
Fragmentation refers to the division and separation of large blocks of habitat (in this case, forests) into smaller isolated habitats. Prior to European settlement, the Acadian Forest stretched across the Maritimes, interrupted only by rivers, lakes and wetlands. While the forest itself was a patchwork of different stands, reflecting the climate and soils of a particular site, most stands were quite large and contained ample habitat for a wide range of wildlife - from cougar to flying squirrel, from pileated woodpeckers to ovenbirds. While much of our region remains forested, there are relatively few areas that have blocks of habitat that are not divided and separated by roads, recent areas of cut forest, plantations, or other land uses.

What is Ecological Connectivity?

The ability of individuals and populations of plants and animals to move about and to find useful habitats is called “ecological connectivity” – the “connectedness” of habitats and populations on the landscape. Ecological connectivity is important at a variety of geographic scales and time periods (see sidebar). As a forest landscape becomes fragmented, patches of habitat useful to a particular plant or animal become further and further apart.

Depending on the distance between the remaining habitat patches, and the nature of the land between the patches, a particular species may not be able to successfully move between the habitats. The result is a loss of ecological connectivity.

How sensitive a species is to the loss of ecological connectivity depends a lot on the characteristics of the species. Highly mobile species such as most birds and wind-dispersed plants with light seeds are not as sensitive as species that don't get around so easily or are fussy about the type of terrain they travel through. Painted trillium, yellow ladies slipper, red-spotted newt, pine marten and flying squirrel are examples of species that are sensitive to the loss of ecological connectivity.



The effects of fragmentation on a landscape (courtesy of Parks Canada)

Four reasons why plants and animals need to move across the landscape

1. Seasonal habitat use - For example spring breeding ponds for amphibians and wintering areas for deer and moose.

2. Dispersal of young - In good years, plants and animals produce more offspring than can be supported in the immediate area. The excess individuals must disperse to other areas if they are to survive. These “excess” young can help to establish new populations or supplement existing, but low, populations.

3. Mixing the gene pool - To maintain a healthy population, most species need to reproduce with non-related individuals.

4. Adaptation and evolution of species and communities - Over time, populations and communities need to be able to change with a changing environment. This requires inputs of new genetic material to a population and new species to a community.



The red spotted newt must move from forested habitats to wetlands to reproduce. (photo courtesy Nova Scotia Department of Natural Resources)

Other Impacts of Fragmentation

In addition to the loss of connectivity, forest fragmentation also reduces the size of habitat patches, increases the amount of “edge” habitat, and decreases the amount of “interior” habitat. Size is an issue because some species require a substantial area of a particular forest habitat to meet their needs. Size-sensitive species include: northern goshawk, blackburnian warbler, and pine marten.

Edge habitat is created whenever a sharp division between habitats occurs (for example the edge of a clear cut or field with a remaining forest stand). While some species may do well in edge habitat (for example, mountain ash, ring-necked pheasant, blue jay, racoon and white-tailed deer) there are often serious impacts for other forest species, including increased predation and changes in the temperature, wind and moisture of the site. Edge effects may extend 50 to 200 metres into the remaining forest. Because of the altered conditions at the edge, some species are more successful in the forest “interior”. Interior species include: hemlock, ovenbird and flying squirrel. In short, fragmentation increases the available habitat of edge species, many of which are common and not of conservation concern, while decreasing the habitat of area sensitive and interior species, many of which are relatively rare and are greater concerns for conservation.

Reducing Fragmentation and Promoting Connectivity in your Woodlot

Woodlot owners interested in decreasing fragmentation and promoting ecological connectivity can apply a variety of management practices to help them achieve these goals....

Manage for mature forest

Much of the fragmentation in the Isthmus is due to clear cutting. Managing for mature forests, using individual and group selection cuts, greatly reduces fragmentation.

Minimize road construction

Even woods roads can cause fragmentation. Minimize construction of new roads, rehabilitate roads that are no longer needed, and build new roads only as wide as necessary, to reduce fragmentation effects.

Reforest Clearings and Openings Within a Woodlot

Clearings and pastures within a woodlot greatly reduce the interior habitat while increasing the edge habitat in a woodlot. If you are considering planting new land, interior openings should be a priority.

Establish or Maintain Corridors

Maintaining corridors (especially of mature forest) between forest patches will improve ecological connectivity. For interior species, corridors should be at least 200m wide.

Cooperate with Neighbours

Talk to your neighbours and explain your interest in reducing fragmentation and improving ecological connectivity. Perhaps you can work together to maintain larger areas of mature forest patches and corridors.



Satellite image of the core of the Chignecto Isthmus showing fragmentation of forest by roads. The patches (transparent, but outlined in yellow) are the forest that remains after a 200m buffer around roads was applied.

CPAWS New Brunswick and CPAWS Nova Scotia greatly appreciate the financial support of The EJLB Foundation for this project.



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