What is fragmentation?

- Habitat fragmentation describes the emergence of discontinuities in an organism’s preferred environment.
- Habitat fragmentation can include any of the following:
  1. Reduction in the total area of habitat
  2. Increase in the amount of edge
  3. Decrease in the amount of interior habitat
  4. Break up of habitat patch into smaller patches
  5. Isolation of one habitat patch from other areas of habitat
Population declines due to fragmentation

Tai National Park
- 17 frog species recorded
- Higher species richness
- Higher total amphibian population (Hillers et al. 2002)

Forest fragments between TNP and Cavally River
- 11 frog species recorded
- Lower species richness
- Lower total amphibian population (Hillers et al. 2002)

Population declines due to fragmentation

- Study conducted in southern Sweden compared fitness of Rana temporaria larvae from fragmented habitat versus larvae from continuous habitat.
- Results:
  - Larvae from fragmented habitats were smaller and survived at a lower rate than did larvae from continuous habitats (Johansson et al. 2000).

How fragmentation affects populations

- Reduces genetic variability among populations when they become isolated from other habitat patches.
- Study conducted in Canada showed that isolated populations of eastern red-backed salamanders at fragmented habitat locations had lower allelic richness and heterozygosity when compared to red-backed salamanders living in unfragmented habitat in southern Quebec (Noel et al. 2004).
How fragmentation affects populations

- Isolated populations prone to overexploit the resources of their patch of habitat.
- Local extinctions occur due to small disturbances in the patch.

How fragmentation affects individuals

- Increased vulnerability to predation and desiccation when attempting to cross the matrix between patches.
- Individuals with aquatic larvae especially vulnerable if water not located in their patch of habitat.

How fragmentation affects individuals

- Edge effects which include:
  1. Changes in microclimate
  2. Vulnerability to external competition and predation
  3. More habitat becomes adjacent to a different type of habitat
Why this is the most important factor of amphibian declines

- Factors of habitat fragmentation already discussed make amphibian populations that much more susceptible to any other form of disturbance in their environment.
  - Lack of genetic diversity
  - Edge effects
  - Increased risk of desiccation and predation when migrating between patches