Meeting Aichi Biodiversity Target 11:

The Role of Connectivity Conservation in Canada in a Context of Climate Change

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Connectivity conservation framework

- Seeks to address the issue of habitat fragmentation through collaborative conservation
- Defined using biodiversity conservation criteria
  - Includes social and institutional dimensions
- Mandate taps into the science of ecological processes
  - Places connectivity conservation within a social and normative context
- Increasing connectivity through the unification of stakeholders to facilitate collaboration and produce site-specific decisions

Areas of connectivity conservation (ACCs)

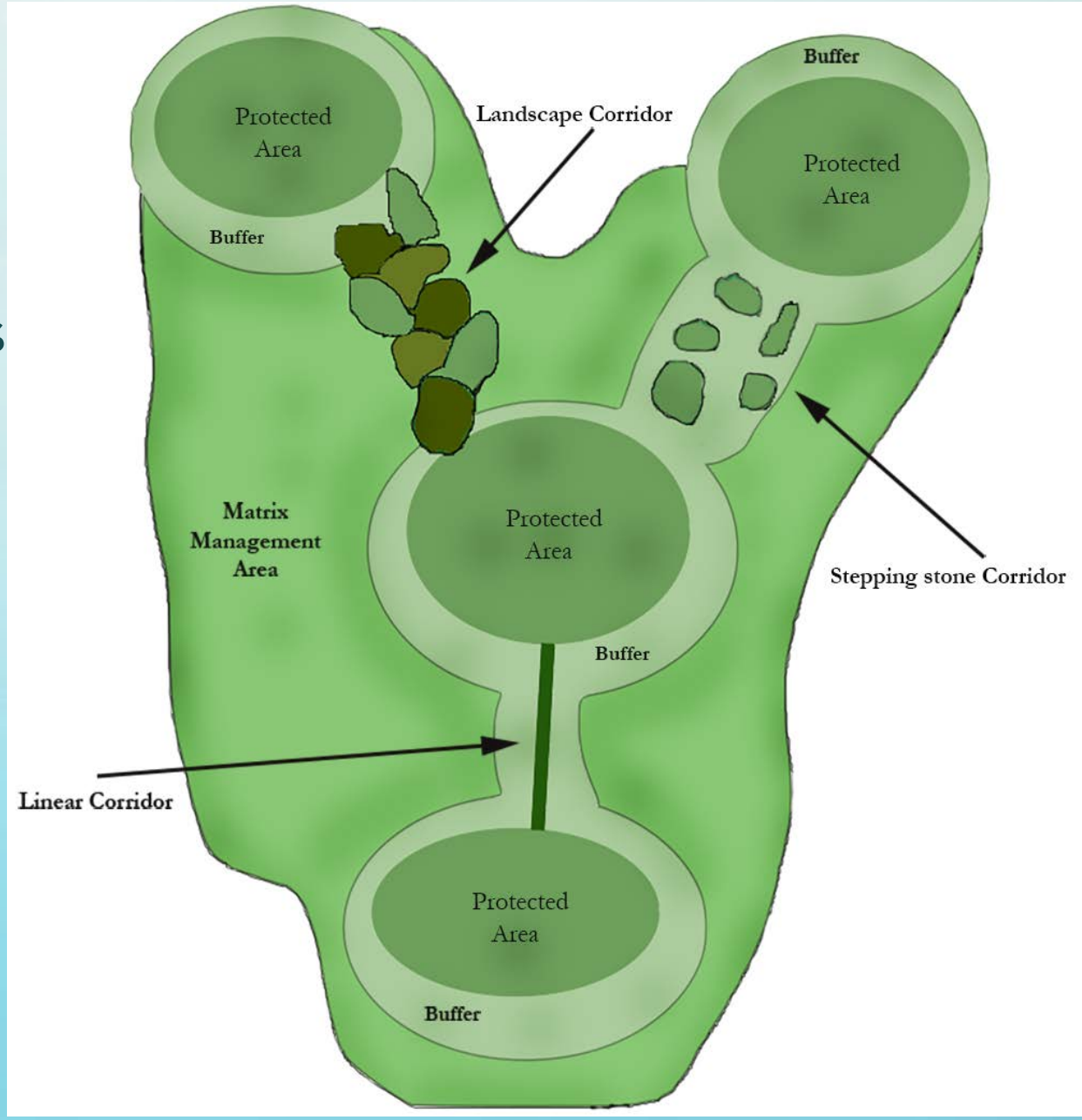
- Are not intended to be protected areas (PAs), nor would qualify as other effective area-based conservation measures (OECBMs)
- Are ancillary and complementary to PAs and OECBMs
- Interconnecting and integrating PAs and OECBMs to the wider landscapes, freshwater systems and seascapes

Science of connectivity conservation

- Built around the concept of ecological connectivity
  - Measure of the extent to which plants and animals can move between habitat patches
  - Measure of the extent to which non-local ecosystem functions, such as those associated with soil and water processes, are maintained
- Emanated from three fields:
  - Island biogeography
  - Metapopulation theory
  - Landscape ecology

Landscape ecology

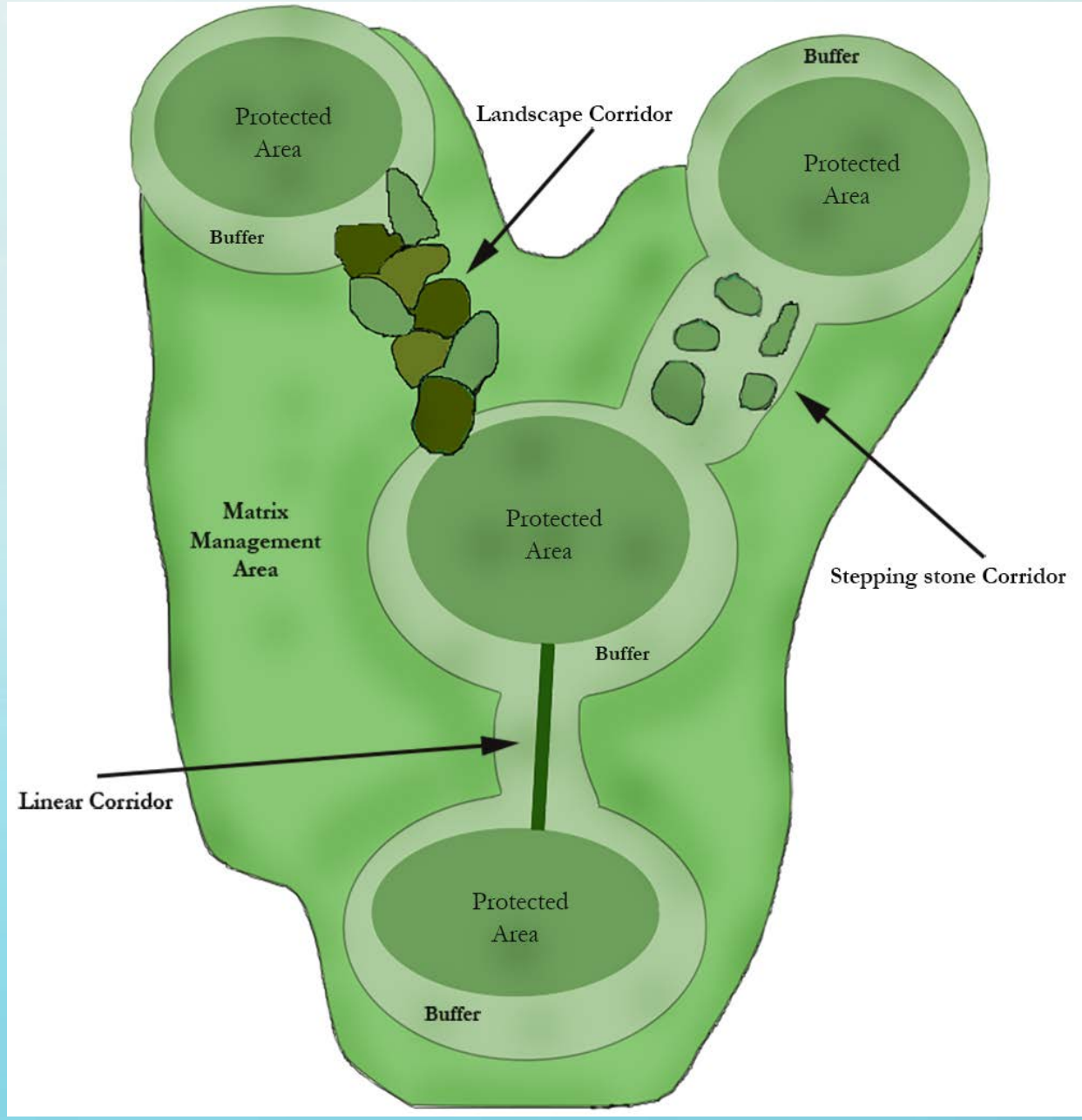
- Introduced three important terms
  - Matrix
  - Patch
  - Corridor
- Corridors
  - Linear
  - Landscape
  - Stepping stone



Schematic representation of how a connectivity conservation area could be structured
Adapted from Bennett, 2004

Areas of connectivity conservation

- The matrix around designated PAs
  - interconnects to the wider semi-natural and natural landscape
  - Buffers around PAs
  - Corridors between PAs



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Connectivity to maintain and conserve biodiversity

- Increase the survival rate of dispersing individuals
  - Preserving genetic diversity
  - Increase genetic variability and therefore resilience to environmental change
  - Reestablish populations
  - Avoid predation or human-caused death
- Facilitate safe migration of certain species
- Increase in habitat area

Connectivity

- Scale, process, and species dependent
  - presents challenges in developing a rigid scientific definition
- Structural vs. functional
  - Landscape connectivity
  - Habitat connectivity
  - Ecological connectivity
  - Evolutionary process connectivity
- Planning must be based on the needs of the species and processes in a particular landscape
  - Relevant spatial and temporal scales

Connectivity and climate change

- Synergistic effects of climate change and human activity are increasing habitat fragmentation
- Species are shifting their geographic ranges to adapt
  - Moving upward in elevation as well as poleward in latitude
- Despite this, we are experiencing the sixth mass extinction event
- Increasing connectivity can aid in species dispersal and increase resilience, preventing further extinction events

Governance models for connectivity conservation

- Should be dynamic and specific to areas of connectivity conservation
- Flexibility to evolve over time in response to events such as
  - Changes in partnerships,
  - Biophysical conditions including climate change, and
  - Management needs
- Financially sustainable and able to endure changes among connectivity champions and components over time
- Governance approaches depend on factors such as
  - Spatial scale;
  - Levels of government involve and their capacity for management;
  - Roles of NGOs; and
  - Who holds land ownership or use rights

Policy, planning and management in Canada

- A lack of political and financial support is a major obstacle
- Often inferred as an aspect of “ecological integrity” or “maintenance of ecological processes”
- Translating the science/management practices into effective policy and law is a challenge
- National level – connectivity conservation defined by the nation’s biodiversity conservation needs
- Subnational and local levels – linked to the needs of the particular PA
- Legislation should define and classify PAs according to different conservation objectives

The Nature Conservancy of Canada – Chignecto Isthmus & Rocky Mountains case study

- Natural Area Conservation Plan
  - Identifies conservation priorities based on the state of biodiversity, threats and opportunities of specific areas
- Both areas contain wide-ranging mammals, and face fragmentation
- Actions for connectivity are primarily based on needs of specific species
  - Endgame is modified based on socio-economic factors
- Strive for balance of existing land use and settlement patterns while maintaining connectivity

The Nature Conservancy of Canada – Chignecto Isthmus & Rocky Mountains case study

- Best practices
  - GIS tools to determine high priority lands for connectivity
  - Secured properties, identified using radio-telemetry
  - Partnering with wildlife researchers for information on target species
  - Partnering with researchers to collected detailed information on key areas
- Marketing can be key
  - Moose Sex Project
  - “Poster” species
- Obstacles
  - Previously obtaining information
  - Climate change

Conclusion

- Connectivity conservation requires apposite legislation and governance regimes
  - Ensure effective management
  - Uniting stakeholders to find equitable solutions
- Connectivity conservation can help Canada meet the goals of Aichi Target 11
- Next step: how to measure ‘well-connected’

- What does Canada want to achieve? Structural or functional connectivity? Can functional connectivity even be readily measured?
- Is Canada measuring whether or not a network is well connected today (or 2020)? Or is Canada measuring whether or not a network is well connected under climate change scenarios? Or both?
- When looking at the current state of connectedness in Canada, does it look like Canada's network is connected? Under the lens of reviewing Canada's and jurisdiction's protected area network designs, is connectivity being incorporated? Or is it just being achieved *de facto* (is connectivity a by-product or a goal)?
- In Canada, there are fundamental differences in the need to develop connectivity conservation areas in highly fragmented areas and highly un-fragmented areas. In areas where connectivity already exists as highly contiguous matrices of natural ecosystems and habitats for species, how is it measured? Should Canada have a 'one-size fits all' approach to measuring connectivity, and applying its principles in network designs, or should there be different ways to measure connectivity in different parts of the country?
- If connectivity areas are not intended to be protected areas or OEABCMS, by what mechanisms will connectivity be conserved or maintained over time?