Redefining Designable Units (DUs): Phase 2, Mountain and Boreal Caribou in Alberta and BC

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Photo credit: Mark Bradley, Parks Canada
Note

• AUPRF project ended in 2017
• This is an update of relevance, but without AUPRF’s funding
• New information on ecological genomics
  – Redefining Designable Units (DUs)
Regional Strategic Assessment (AB) similar to Strategic Environmental Assessment (i.e. SEA, United Nations)

- Existing SEA Procedures
- Incomplete SEA Procedures

Part 1: SEA in Alberta and the Federal SARA
Killer-message

• Government of Alberta developing regulatory framework

• Regional planning:
  – foundation for cumulative effects management into the future.

• Alberta Environment concluded:
  – Regional Strategic Assessment (i.e. SEA)
  – integrated into the planning process also at Federal level (see SARA)
• Alberta's Land-use Framework (Government of Alberta, 2008).
  – Seven regional plans to manage combined impacts of
    • existing and future activities
• EA system focuses on individual project assessment
  – inadequate to support the development of regional plans
Considerations

• Although good data are gathered, project focused EIAs often
  – fail to conclude likelihood of residual cumulative effects
  – yet clearly over time ample evidence

• SEA advantage over project-focused EIA:
  – it can be used to address cumulative effects at their source:
    • (i.e. in the policies and strategies for development)
  • rather than react on a project-by-project basis
  • EAs will continue, but should be integrated
SARA

• Species at Risk Act
  – The Act is a key federal government commitment to prevent wildlife species from becoming extinct and secure the necessary actions for their recovery.
  – It provides for the legal protection of wildlife species and the conservation of their biological diversity.
  – Recovery Strategies focus on habitat in regions, where Feds, Provinces/Territories, Industry and others collaborate.
Caribou in the West-Central Region of Alberta

Part 2: Caribou in the West Central Region of AB
Recovery Strategy for the Woodland Caribou, Southern Mountain population (Rangifer tarandus caribou) in Canada

Part 2: Caribou in the West Central Region of AB

- Recovery Strategy for the Woodland Caribou, Southern...
- https://www.sararegistry.gc.ca › ...
- May 13, 2019 - This recovery strategy is for the Woodland Caribou (Rangifer tarandus caribou), Southern Mountain population herein referred to as “southern mountain caribou” ...
Figure 1. Current distribution of southern mountain caribou subpopulations and local population units.
Part 2: Caribou in the West Central Region of AB
EUs=MUs

E.g. foster connectivity!

Neutral markers data (microsatellites); not accounting for adaptation
We ought to avoid this: Is it acceptable to let mountain caribou go extinct in Banff National Park?

Conservation Biology

Part 3: Caribou Recovery Strategy – Captive Breeding Option
Figure. Time series of population counts for wolves, caribou, and elk in the Bow Valley watershed of Banff National Park from wolf recovery in the mid 1980’s through to the extirpation of the Banff caribou herd in 2009.
Core concept

Small/isolated populations of animals and plants are at higher risk of extinction due to:

- Demographic stochasticity - example, sudden birth of just one sex
- Environmental stochasticity, catastrophes
- Genetic drift (random loss of useful genes)
- Inbreeding, homozygosity, expression of deleterious alleles
- Disease outbreaks

Figure. A mountain caribou from the last remaining Banff herd of 5 animals, which were buried under a snow avalanche on April 30, 2009, Pipestone valley, Banff National Park, Alberta, Canada.
And now?

- **Assessing genetics among caribou in the region to inform source founders for captive breeding**
  - Conduct a genomic study to assess adaptive variation among caribou populations
  - Basically, you do not want to use the wrong caribou: adapted to other environments
Part 3: Caribou Recovery Strategy – Captive Breeding Option
Distinction of Northern vs Southern Caribou (including Boreal vs Southern Mountain)

Part 3: Caribou Recovery Strategy – Captive Breeding Option
• From a genomic perspective, conservation units have 2 levels:
  – Northern vs Southern Caribou
  – Northern vs Southern Caribou (and Boreal vs Southern Mountain)
• Translocations in the Jasper/Banff area to be considered among populations in orange
Thanks

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