Comparative analysis of forest tenure modes with respect to environmental, social and economic factors

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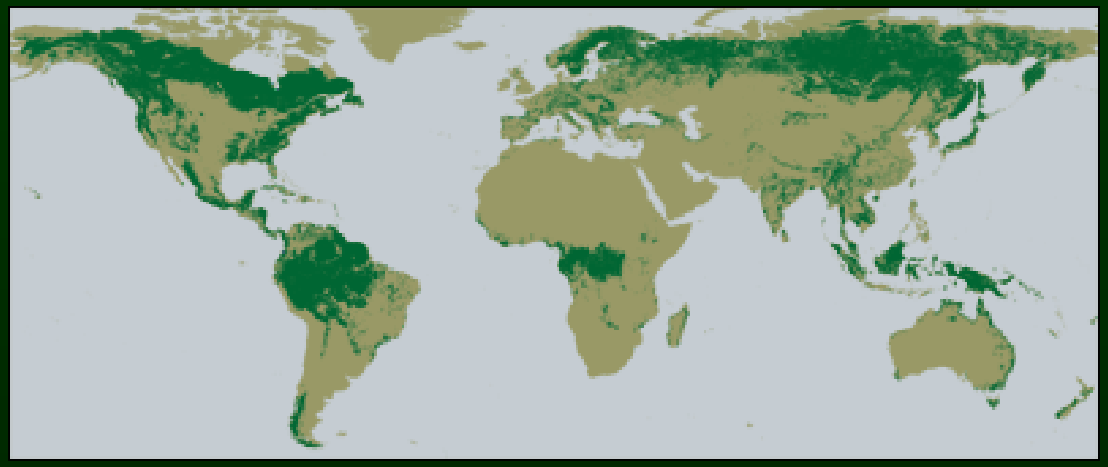
Forests…

- Provide environmental services
  - Regulation of climate, water and carbon cycles…
  - Biodiversity
- Perceived as a common resource by humans
- Timber harvesting
  - Provides leverage for the economy
  - Increasing pressure on forest ecosystems
  - Concerns about its long term sustainability
- Tragedy of the commons (Hardin 1968)
  - Common pool resources overexploited without privatization or government control.
  - Many reactions and critics, but no solution… (Dietz et al. 2003)

Sustainable Forest Management

- Three groups of SFM indicators (Kneeshaw et al. 2000):
  - Environmental:
    - Biodiversity (age structure, composition of stands)
    - Regeneration
    - Spatial distribution and configuration of forest stands
  - Social
    - Values attributed by people (recreation, landscape)
  - Economic
    - Employment
    - Economic fluxes

Forest tenure



- Two main types, according to ownership
  - Private
  - Public
- Distribution
  - Historically almost entirely public
  - Worldwide (81% public, 19% private ↑)
  - Sample of developed countries

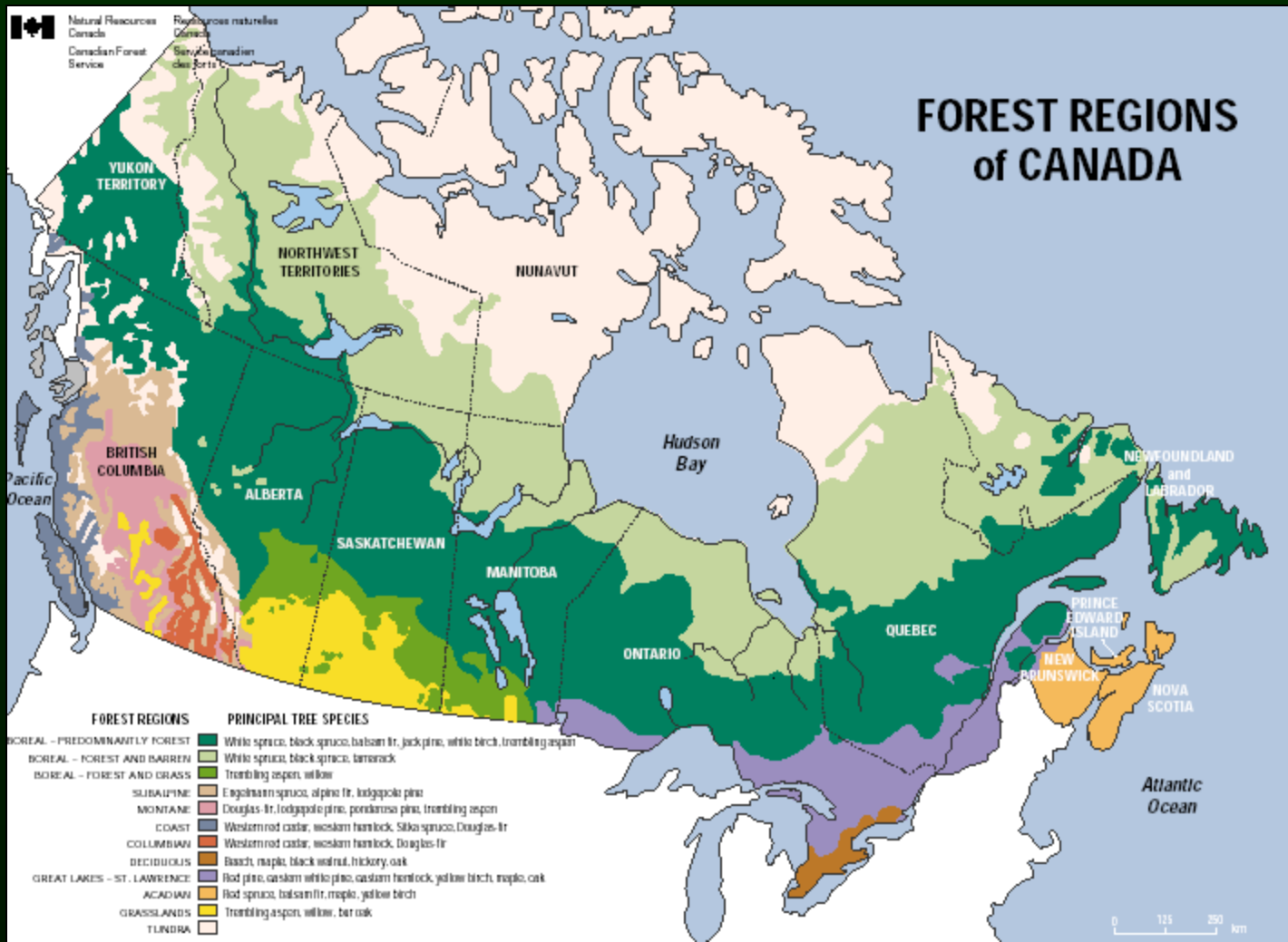
Country	Public	Private	Communal
France	10%	74%	16%
Switzerland	1%	57%	42%
United Kingdom	44%	56%	
Sweden	5%	87%	8%
Finland	34%	61%	5%
United States	45%	55%	

Source: (Angers 2003)

- Economic analysis consider privatisation as the solution to the tragedy of the commons, normal evolution of organisation in forested countries (Desrochers 2002)
- Calls for reflection on the potential effects of tenure change

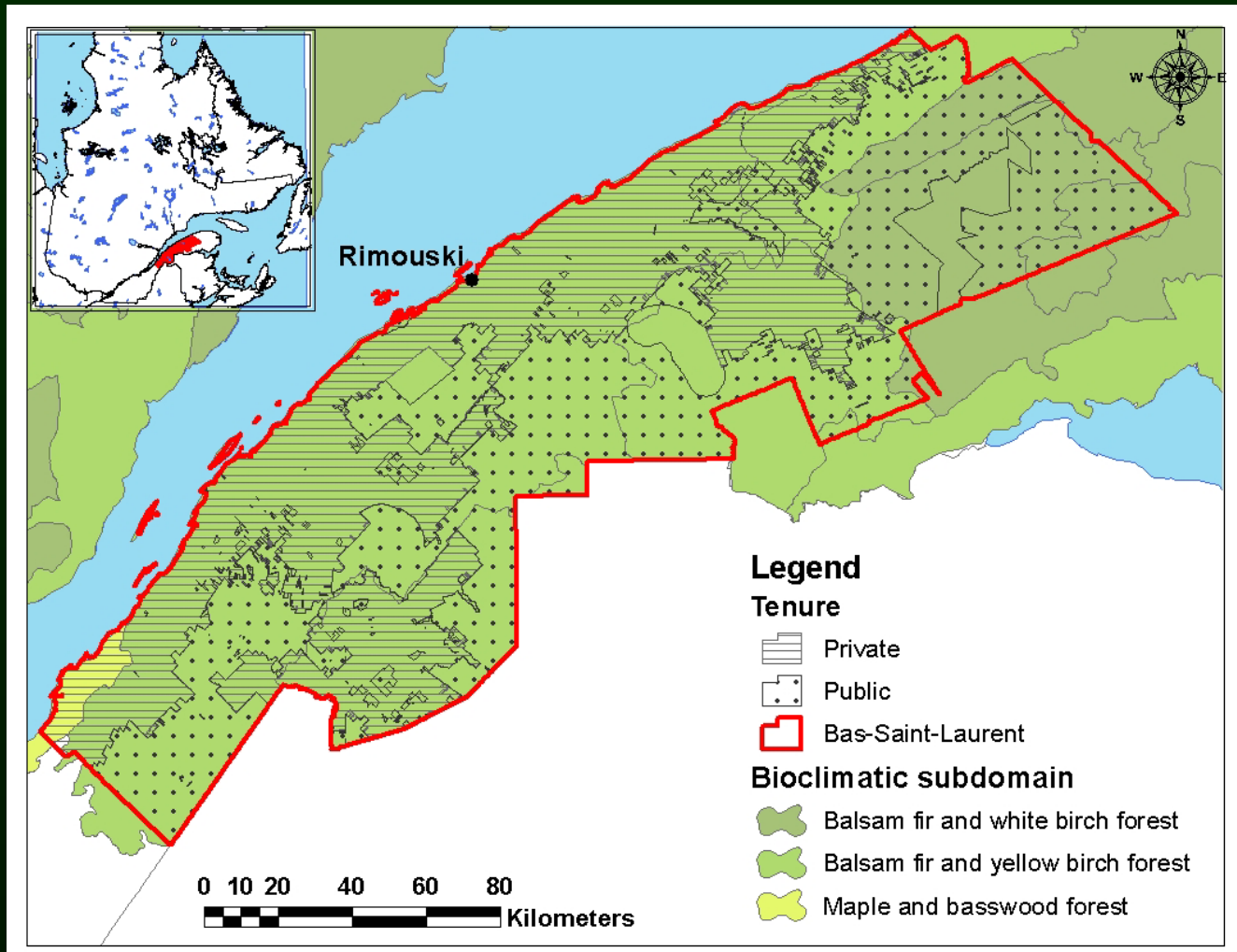
Forest tenure

- Canada:
  - 94% public
- Québec
  - 89% public



Bas-Saint-Laurent

- 51% public, 49% private
- Mostly within the same ecological region
- Allows for a comparison between the two tenures to understand their respective influence on:
  - Environment (forest landscape)
  - Society
  - Economy



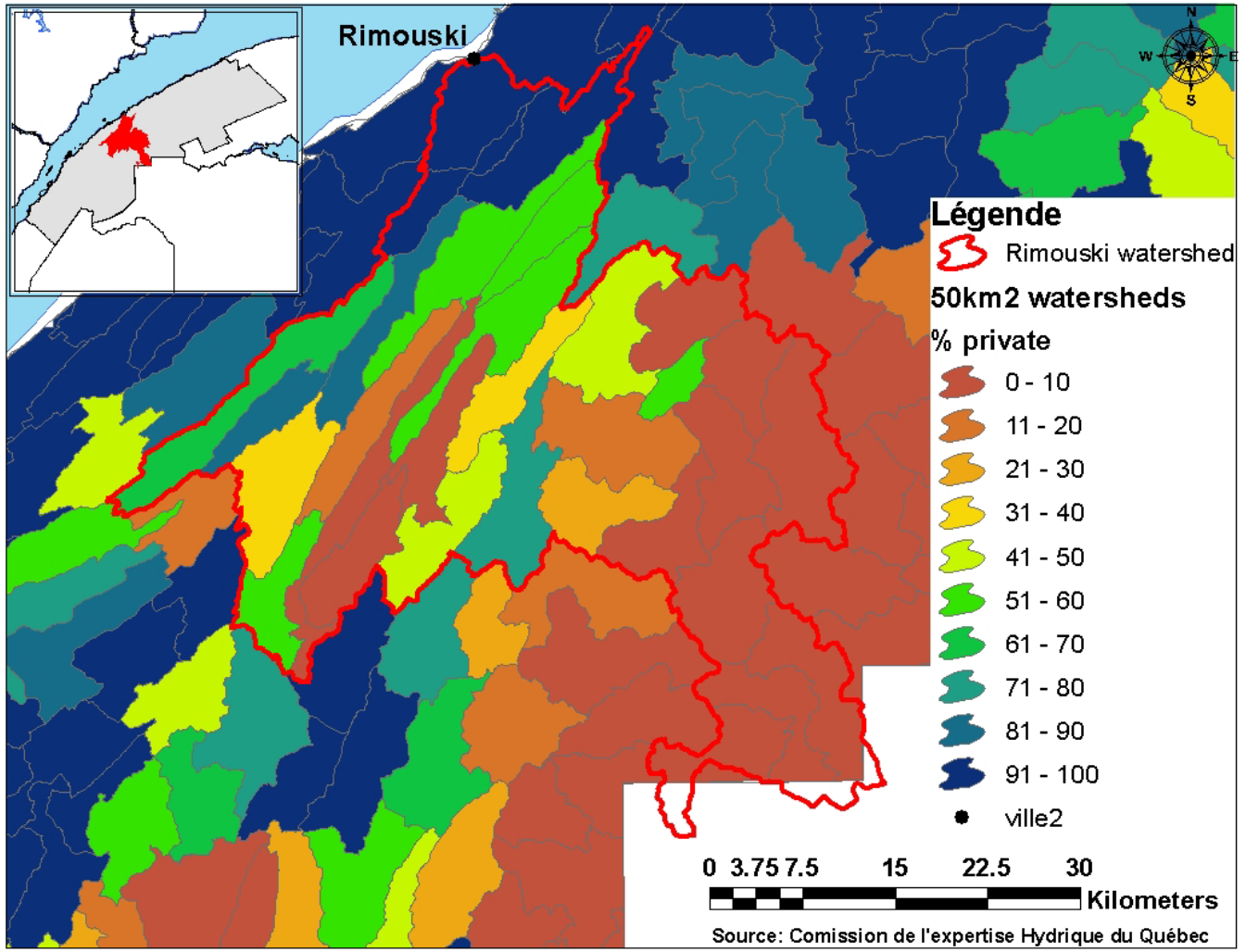
Objectives

Verify if the tenure (private or public) influences environmental variables and the flow of social and economic values.

1. Compare the structure of forest landscapes
2. Compare forest management approaches
3. Compare social and economic indicators
4. Model that system, and simulate alternative tenure scenarios

1. Structure of forest landscapes

- Use watersheds as sampling units



1. Structure of forest landscapes

- Forest structure
  - Stand composition
  - Spatial distribution of stands
  - Stand area and perimeter
  - Stand age
- Biodiversity potential (coarse filter (Hunter 1990))
  - Proportion of clearcuts, plantations
  - Ecotones, forest interior
  - Road density
  - Presence of exceptional forest ecosystems

2. Sylvicultural operations

- Influences on forest structure
- Indicators
  - Sylvicultural treatments
    - Type
    - Size
    - Distribution (space, time, stand type)
  - State of the regeneration
    - Stocking, height, species composition, age)

3. Social and economic indicators

- Assess values attributed to forest with survey (Brunson 1996)
  - Telephone survey
- Groups of benefits to population
  - Social
    - Recreation, landscape
  - Economic
    - Employment, contributions to local/regional economy
  - Environmental
    - Air, water, habitat for wildlife (objective 1)

3. Social and economic indicators

- Social
  - Hunting records (spatially located)
  - Areas sensitive to disturbance of visual landscape
  - Conflicting harvest operations

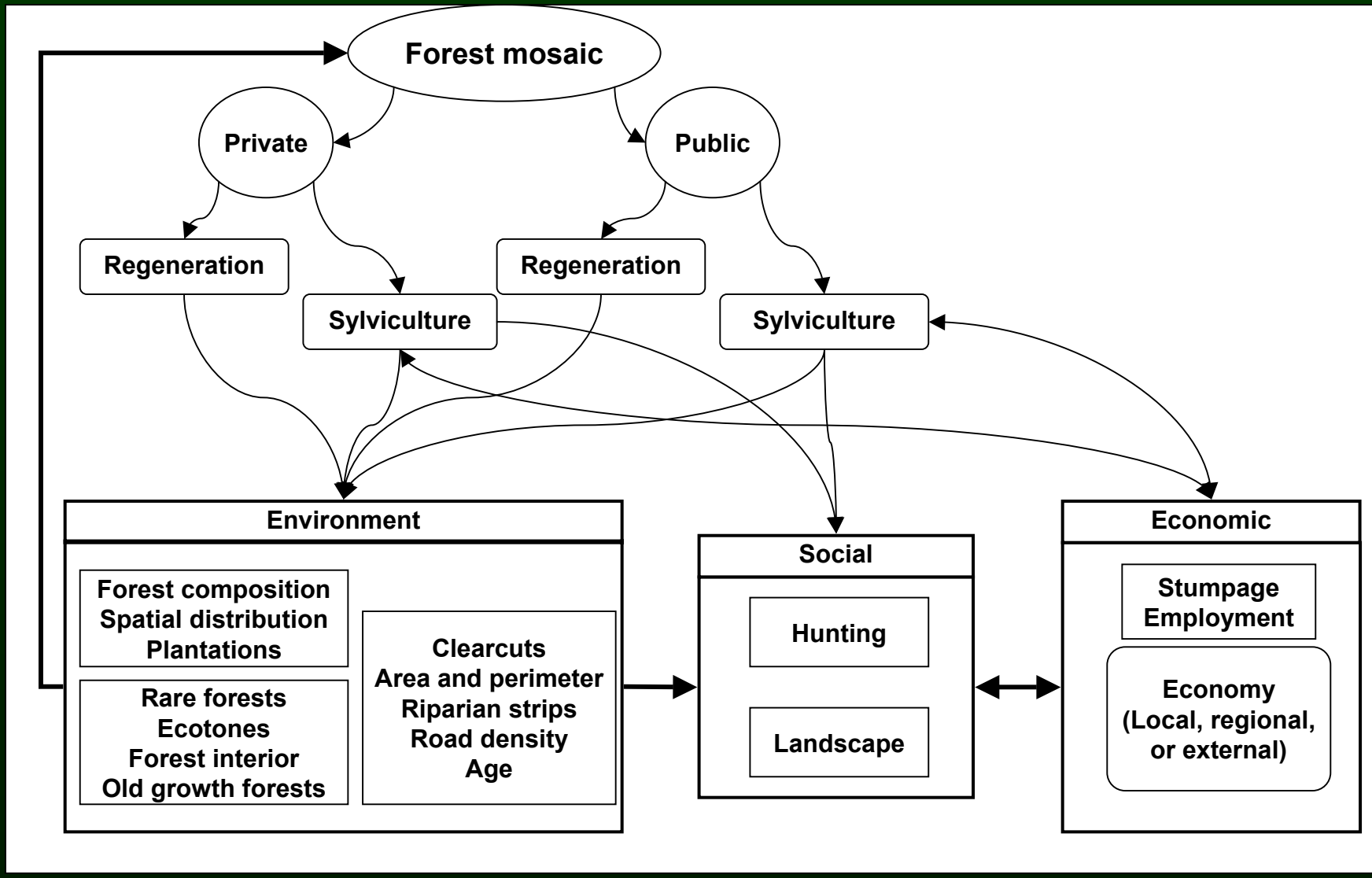
3. Social and economic indicators

- Economic
  - Employment (weeks/person)
    - Volume harvested
    - Area
    - Sylvicultureal treatment
    - Salary
    - Type
  - Contribution to local/regional economy
    - All wood transformed regionally, without respect to origin
    - Pre-harvesting benefits
      - Stumpage (differs with tenure)
      - Provincial value-added multiplicators → total economic benefits

4. Modelling

- Integrate social, environmental and economic influences of tenure in a spatially explicit model
  - Systems approach
    - emergent properties of the whole
- Which model choose?
  - Existing model
    - Can be less time-consuming, if model is already adapted to need,
    - Understanding decisions made by programmer
  - Creating a new one
    - Originality
    - Exportability
      - Widespread programming language (visual basic) and GIS software (ArcGIS)
    - Exactly suits the needs of the study

4. Conceptual model



Conclusion

- Comparing two tenures within the same ecological region allows identification of advantages and disadvantages of each one.
  - Basic modes of tenure found globally
- Conciliation of environmental, social and economic values is the basis of sutainable development
  - Rarely integrated because of the high degree of complexity (Holling 2001) and numerous interactions
- Proposed model will allow this integration
  - simulation of new management hypotheses
- Social and political need for such tools (Coulombe Comission report)

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