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# What economics can tell us about insect pests disturbances in forest

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# Introduction

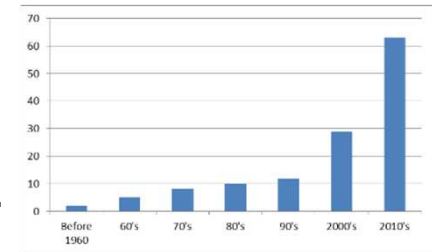


- ❖ **Existing literature** on the economics of natural disturbances in forest:
  - Montagné-Huck C., Brunette M. (2018). Economic Analysis of Natural Forest Disturbances : A Century of Research. *Journal of Forest Economics*, 32:42-71.
  - Montagné-Huck C., Brunette M. (2018). A Bibliographical Database on Economic Analysis of Natural Forest Disturbances. *Data In Brief*, 20:662-666.
  - Hlásny et al. (2019). Living with bark beetles: impacts, outlook and management options. *EFI Science to Policy Report*.
- ❖ **Objective:** to focus on « Economics of insect pests disturbances ».
- ❖ **Method:** literature review based on 130 articles about forest pests economics.
- ❖ **What do we learn** from this literature review ?
  1. Economic theory of forest pests
  2. Economic impact of forest pests
  3. Economic analysis of forest pest management
  4. Policy implications



## Some descriptive statistics

**60 years of research:** from 1960 to 2018 with an increasing trend.



**58 scientific journals:** Canadian Journal of Forest Research (12%), Forest Ecology & Management (6%), Forest Policy & Economics (6%), Forest Science (5%)...

**Type of research:** Empirical (57%), Theoretical (15%), Both (28%).



**Geographical area covered:** 75% North America, 10% Europe...

**Type of pest:** Pine Beetle (39% of case studies), other Beetles (12%), multiple or unspecified pest (12%), Spruce/Pine Budworm (10%), Hemlock Woolly Adelgid (7%), Gypsy Moth (6%), Emerald Ash Borer (6%)...





# 1. Economic theory of forest pests

## Main research questions

- ❖ Quantifying the comprehensive changes due to forest disturbance all along the forest industry chain and other forest related sectors.  
⇒ **Valuating the economic impact of pest disturbances.**
- ❖ Choosing the “optimal” management alternative (cost / benefit analysis or cost effectiveness analysis).  
⇒ **Decision making in response to pest disturbances.**

Valuing the economic impacts of forest pest disturbances (38%)

Decision making in response to forest pest disturbances (62%)



## 2. Economic impact of forest pests

### Timber market

- ❖ **Short term**: timber supply  $\nearrow$ ; forest activity, employment and exports will  $\nearrow$ ; timber price  $\searrow$  => **Net global short term effect is unambiguously negative.**
- ❖ **Long term**: forest regenerates; timber supply, exports, employment and global activity  $\searrow$ ; timber price  $\nearrow$  (but not compensate short term effects) => **In the long run economy will not return to the pre pest-attack situation.**

### Living and leisure conditions

Healthy forest landscapes = good living and leisure conditions => pest outbreaks are expected to negatively impact residential markets and outdoor activities.

- ❖ **Housing**: effects vary with distance from property and over time.
- ❖ **Recreation**: wide range of damages estimates varying with recreation site, severity of attacks...

**Other ecosystem services ?** => Economic analysis is infrequent.

**CCL**: non-timber values changes can (should) be integrated into global assessments of pest economic damages and policy analysis.

### 3. Economic analysis of forest pest management

**Multifunctional and productive forests** (some general conclusions of the literature)

#### ❖ General aspects

- **Centralized outbreak** management : efficient to engage in participation the relevant stakeholders in a given area.
- **Costs sharing** (subsidizing owners) = impact + on willingness to act for pest control.
- Mainly ex-post assessment => **prevention and detection ?**

#### ❖ Forest management

- Forest **thinning** treatments could play a useful economic role: as thinned stands generally present higher real rates of return on investment than other stands.
- Net loss to society is greater under cut-and-leave than under **cut-and-remove** progmm.

#### ❖ International trade

- **Phytosanitary regulations and trade bans** (quarantine or preventive fumigation of timber, treatment of wood packaging) may affect international trade: revenues  $\searrow$  for exporters and value added  $\searrow$  for importers, but local owner's revenues  $\nearrow$ .
- Benefits from **trade limitation** may outweigh the cost of programs.



## 4. Policy implications

**Most of the policy implications encountered in the literature deal with a better organization of salvage programs:**

- ❖ Policy efforts to encourage expanded market opportunities
- ❖ Measures to enhance market liquidity
- ❖ Reciprocal wood flow arrangement
- ❖ Early detection
- ❖ Combining management and control approaches
- ❖ Insurance of forest property
- ❖ Need for regional specific policy on pests (most of the results demonstrate regional differences)

**CCL:** Policy/decision making needs to take into account all impacts of pest outbreaks and management, and explicitly accounts for the possibility that management practices (salvage harvesting or trade limitations for ex) can be more costly and more damaging than the pests themselves or can ↗ the severity of insect cycles.



# Thank you

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