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Fuelbreak effectiveness in boreal forests: *a synthesis of current knowledge*

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Objectives

- Assemble current knowledge concerning characteristics that make a fuelbreak effective
- Document best practices for fuelbreak design in Canada.

Terminology

Fuelbreak:

- a distinct area outside a community (or other value at risk) of any size and shape where anthropogenic modifications of forest fuels (i.e. fuel treatments) have been conducted to aid in the protection of that community from future wildfires.

- includes any combination of a reduction or removal of canopy fuels, surface fuels, and/or ladder fuels through any method.

Methods

Six components to data collection:

1. Literature review
2. Agency practice review
3. Agency fuelbreak characteristic data collection
4. Challenged fuelbreak data collection
5. Expert opinion survey
6. Workshop

Project relied heavily on the ability and willingness of folks to provide information.

Findings

1. Literature Review

- Most studies focused on fuel types in western United States.
- Most studies used models to predict fire behaviour.
- Factors related to effectiveness not scientifically proven.
- Only Canadian empirical studies at ICFME site in Fort Providence, NWT.

Findings

2. Agency Practices

- FireSmart principles guide provincial fuel management programs.
- BC, AB, YK, NWT, ON rely heavily on professional consultants for design and planning.
- In SK, Ministry personnel design and plan.
- In Parks Canada, park fire management staff design and plan.
- In all cases, agencies rely on the experience-based knowledge of, and colleague collaboration between, its staff and consultants.
- Decision-making processes are informal, take place project by project, and are typically not documented.

Findings

3. Agency Fuelbreak Characteristics

- Fuelbreaks were all shapes and sizes – not just linear.
- Crown spacing was commonly between 3-5m, regardless of fuel type or ecosystem (federal and provincial parks were the exception).
- Crown base height increased to 1.5-3m, regardless of fuel type or ecosystem.
- Extent of surface fuel removal could not be determined with available data.
- Maintenance schedules could not be determined with available data.

Findings

3. Agency Fuelbreak Characteristics - continued

- Agency documentation standards and capacities did not facilitate data collection.
- Sample size was only 26 fuelbreak examples, with incomplete information on most.
- Existing fuelbreak documentation may not adequately describe actual characteristics.
- Agencies only provided information on existing fuelbreaks, thus our sample did not include fuelbreaks under construction or planned.

Findings

4. Challenged Fuelbreak Characteristics

- 11 documented case studies found for incidents in the United States.
- 5 incidents identified in Canada – anecdotal information only.
- Common themes:
  - crown thinning does not reliably modify fire behaviour
  - surface and ladder fuels may play a more crucial role than canopy fuels
  - illustrated the interdependent relationship between fuelbreak and suppression action – success of one relies on the presence of the other.

Findings

4. Challenged Fuelbreak Characteristics - continued

- Illustrated the need for increased documentation on Canadian wildfires
  - challenged fuelbreak incidents offer us our greatest opportunity to observe **actual** fire behaviour in fuel treatments – not predicted from models – in Canadian fuel types.
  - expected increases in wildfire activity coupled with increased fuel treatment projects will likely result in more challenged incidents – is in our best interest to organize data collection processes now.

Findings

5. Expert Opinion Survey

- Emphasized a strong link between successful fuelbreaks and successful suppression actions.
- Wind, fuel type, lack of timely suppression action primary causes of fuelbreak failures.
- Fuelbreaks do not need to be excessively wide if suppression action present:
  - 80% of successful fuelbreak examples were <100m wide
  - 43% of failed fuelbreak examples were >100m wide

Findings

6. Workshop

- Panel of 10 included agency experts from British Columbia, Alberta, Saskatchewan, Parks Canada, the CFS; and two consultants.
- Experts validated findings.
- Decided that best practices must be developed by consensus through a national working group or committee of Canadian fire experts.

Conclusions

1. The FireSmart manual by Partners in Protection is the only formal document outlining fuelbreak standards for Canada and is used by most provincial agencies.

2. The FireSmart standards regarding stem spacing have been found to be inappropriate for creating effective fuelbreaks in some Canadian ecosystems.

3. Canadian fire agencies rely on the experience-based knowledge of their personnel and hired consultants for fuelbreak design.

4. Provincial finance and accounting requirements drive the type of data collected from fuelbreak projects.

Conclusions

5. No conduit exists to facilitate the sharing of fuelbreak information within or between Canadian agencies and fuel management experts.

6. There are no formally documented incidents of challenged fuelbreaks in Canada.

7. A critical component of an effective fuelbreak is the use of suppression action during a wildfire event.

8. Lack of research and lack of shared information limits our understanding of the factors that contribute to effective fuelbreaks.

Questions…?

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