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Evacuation Project and Public Health – Literature Review and Pilot Study

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Preambule

- The project was initiated by Marie-Audrey Peel, a resident at INSPQ, and completed by Julien Michaud-Tétreault, a fellow at INSPQ, with support from Emmanuelle Bouchard-Bastien and Stéphane Perron.
- It was conducted in response to a collaboration request from the centre régional de santé et de services sociaux de la Baie-James.
- The findings presented reflect the work of the authors and have not yet undergone peer review. They are presented as the wildfire season is about to begin.

Key findings

- Key moments in the evacuation process were identified:
  - Communication and acceptance of the evacuation order
  - Adapted transportation and traffic congestion
  - Temporary accommodation
  - Recovery
- Particularly affected populations include:
  - Elderly living in long-term care facilities or at home with disabilities
  - Essential workers and firefighters facing professional and personal challenges
- Measures at all stages of the evacuation process could mitigate impacts on the population.

Plan

- Context of the 2023 wildfires in Québec
- Methods
- Limitations
- Results and insights from literature review and the pilot study

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Fire season Québec 2023

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Context

- Wildfires are integral to the ecosystems in Québec/Canada, contributing to ecosystem regeneration and biodiversity.
- Forests cover over 1 million km² in Québec, more than 50% of its area,
- Mostly coniferous (boreal forest) species being more flammable.
- Historically, large fires (>200 ha) were rare (3%) but accounted for 97% of the burned area.

Observed changes in weather conditions, spring and summer 2023

- Increase in hot and dry days
- Increase in storm activities
- Precipitation regimes insufficient to offset
- Snow cover disappears earlier and appears later
- Human populations are moving closer to forests
- Since 1959, the average annual burned area has more than doubled

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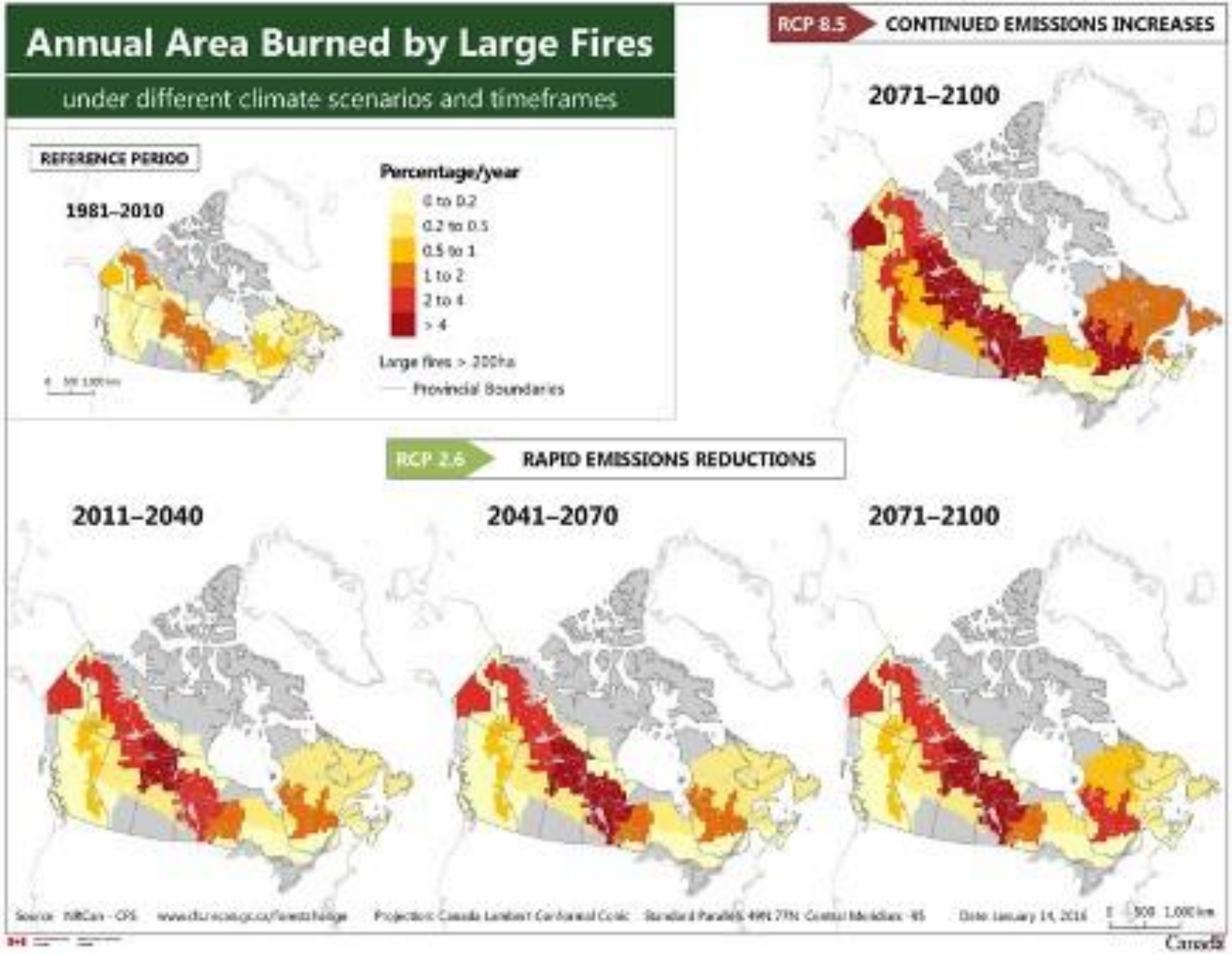

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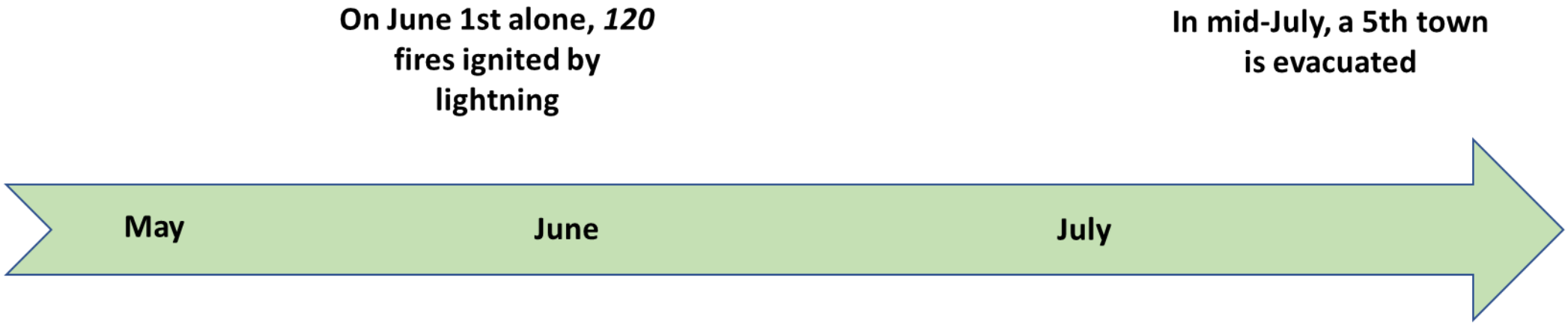
Context

- Summer 2023 : an unprecedented wildfire season



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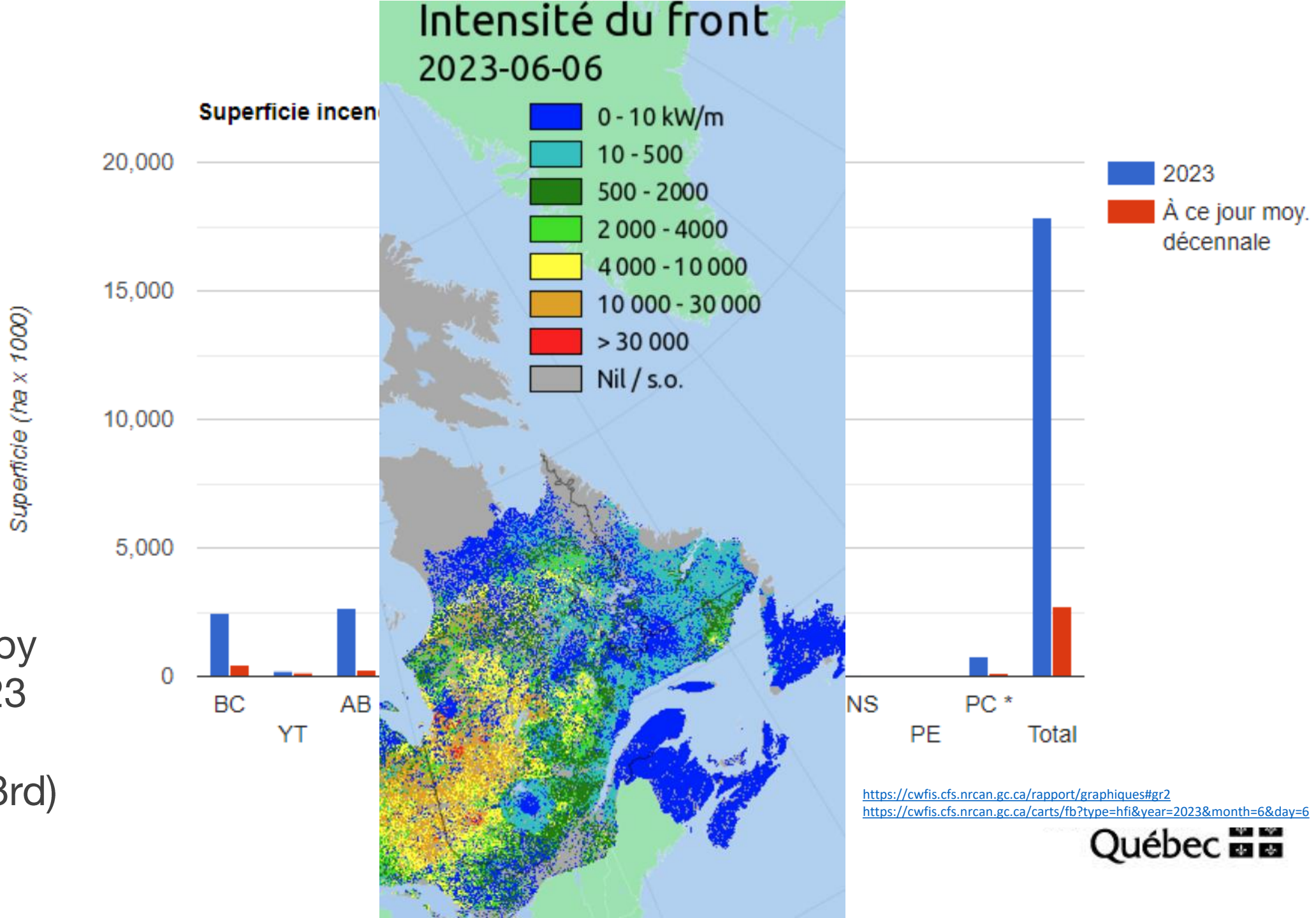
Area burned by province, 2023 season (as of september 23rd)



https://cwfis.cfs.nrcan.gc.ca/rapport/graphiques#gr2
https://cwfis.cfs.nrcan.gc.ca/carts/fb?type=hfi&year=2023&month=6&day=6

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Literature review and preliminary results of a pilot study on the impacts of evacuations

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Methods

- Semi-structured interviews (between August and November 2023)
- Opportunity window
- Closely spaced events – reduced memory bias

Objectives

- Support public health authorities in improving their preparedness and interventions regarding wildfire-related evacuations
  - Describe experiences of stakeholders concerning evacuations
  - Discuss factors influencing stakeholders' experiences
  - Identify the perceived and/or experienced health impacts (physical, psychological, socio-economic) of evacuations related to wildfires

Methods

- Thematic review of the literature
- Evaluation of the intervention through an exploratory project
  - Qualitative approach – semi-structured interviews

Semi-structured interviews– data collection

- Questionnaire's themes:
  - Structures – resources available for evacuation management
  - Processes – services produced during evacuations
  - Outcomes – effects of evacuations on health
- Sample:
  - Recruitment through a public health department + snowball recruiting
  - 12 interviews conducted, each lasting approximately 60 minutes
  - Some participants worked in two organizations:
    - Community organizers: 2
    - Firefighters, civil security officers, municipal employees involved in civil security: 5
    - Health and public health services: 7
    - Representatives from 5 towns (population of 150 to 7500) with mandatory evacuations, none of the interviewees belonged to First Nations.

Semi-structured interviews (ongoing analysis)

- Data analysis conducted in three stages
  - Thematic summary forms completed by a team member during the interview and while re-listening to the recording
  - Thematic coding of the forms
  - Descriptive analysis (ongoing)

Limits

- These results are based on an ongoing analysis of the interviews and therefore may not represent the full range of key findings.
- The results are exploratory. Saturation has not been reached; further research is necessary.
- Wildfires were major events that mobilized numerous organizations: our sample of 12 participants is probably not representative of all stakeholders.
- Despite our efforts, because of ongoing wildfires, it was not possible to recruit participants from First Nations: their experiences, whether common or distinct, are thus missing.
- The interviews do not replace the post-mortem/debriefing sessions that occur within various organizations and in civil security.

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Results of the literature review and pilot study

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Evacuation order

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Evacuation order - context
Literature review

- The decisive factor for evacuations is the physical danger of wildfires
- Unpredictable fire behavior + rapidly changing decision-making parameters =
  - Stress and uncertainty

Evacuation order - context
Literature review

- Wildfire cases studies in California, between 3.2% and 13.0% of people did not follow evacuation orders for various reasons:
  - Did not receive the evacuation order
  - Refusal to leave
  - Desire to protect property
  - Refusal to leave pets or farm animals
  - Fear of traffic
  - Insufficient financial resources for evacuation
  - No acquaintances to stay with
  - Refusal to go to a shelter

Evacuation order
Literature review

- Communication
  - Governmental agencies and local spokespersons is perceived as more reliable
  - Greater mistrust towards social media

Evacuation order
Literature review

- For regions close to or at direct risk from fires, the information usually sought relates to the fires, not the smoke
- Sometimes messages are contradictory
    - For example, stay indoors vs. secure the perimeters of homes

Evacuation order - context
Findings form the pilot study

- Decisive factor for evacuations = Physical danger of wildfires – either direct or due to access routes
- Conflicting professional and personal dimensions in for workers

Evacuation order
Findings form the pilot study

- For workers – workload and the coexistence of professional and personal dimensions
  - *"Because I've experienced it, it's not easy in situations like that when you have 8 people and 3 of them can't cope and decide to go be with their family. Then, the team is already small, and when you cut your workforce almost in half, the challenge becomes even greater. (...)"*
  - *« Parce que moi je l'ai vécu, ce n'est pas évident en situation comme ça quand t'as sur 8 personnes t'en a 3 qui ne sont pas capables puis qui décident d'aller retrouver leur famille, là, déjà l'équipe est petite, puis quand tu coupes ton effectif presque de moitié, le défi est encore plus grand. (...) »*

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Evacuation order
Findings form the pilot study

- The majority of households accept the evacuation order, but not always
  - Challenges regarding the acceptance of the evacuation order:
    - Increased mistrust due to contradictory messages
    - Anxiety and distrust towards authorities (residual effects from the Covid-19 pandemic)

Evacuation order
Findings form the pilot study

- Challenges regarding the acceptance of the evacuation order include:
  - **Resistance among farm animal owners**:
    - Farmers often face difficulties in evacuating due to concerns about leaving livestock behind and the challenges associated with transporting animals.
  - **Demarcation of evacuation zones in rural areas**:
    - Precisely delineating zones for evacuation can be complex due to vast geographical areas and diverse land use, which can lead to issues in effectively communicating the urgency and boundaries of evacuation zones.
  - **Confusion over risk communication (previous experiences, perception of QA vulnerability)**:
    - The messages often emphasized air quality issues, leading individuals without respiratory problems to feel no urgency to evacuate. One quote illustrates this: "*The way the communications were made (...) was always to say that it's the air quality that's the problem. So, those who didn't have respiratory issues did not want to leave.*" *« La façon qu'on a fait les communiqués (...) c'était toujours de dire que c'est la qualité de l'air, le problème. Alors tous ceux qui n'avaient pas de problème pulmonaire ne voulaient pas partir »*

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Evacuation order
Findings form the pilot study

- Psychological impacts include stress and fear related to potential material losses and safety concerns:
  - "*I got chills; it was like the end of the world. (...) The scene was truly apocalyptic, with very dense orange, yellow smoke, and the reflection of orange fires close to the city. People lined up at the gas station to refuel. (...) It didn't just smell like smoke; it smelled like fire.*" *« J'ai des frissons, en fait ça ressemblait à une fin du monde. (...) L'image était vraiment apocalyptique, c'était une fumée orange, jaune très dense, on voyait le reflet des feux orange-là qui étaient à proximité de la ville. On voyait des files de personnes qui allaient à la station-service pour faire le plein. (...) Ça ne sentait pas juste la fumée ça sentait le feu ».*
- These factors collectively highlight the complexities and barriers in emergency response efforts, emphasizing the need for clear, targeted, and effective communication strategies to address the diverse concerns and needs of affected populations.

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Transport

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Transport
Literature review

- Observed risks:
  - Disorientation, medication, etc.
  - Hydration, nutrition, and sleep
  - Importance of caregivers and support networks
  - Road congestion – documented in all studies
    - Importance of considering this congestion in the evacuation of vulnerable individuals
  - Domestic animals

Adapted transport and congestion
Findings form the pilot study

- Congestion and very long travel times sometimes at night.
  - Long waiting times between the time people are ready to leave and their departure
  - Adapted transport for people with disabilities
    - Availability (sometimes 3 hours away)
    - Availability of drivers
    - Multiple destinations for the same transport
  - Lack of access to toilets, food, water
  - Presence of original healthcare personnel and medical support in transportation was perceived as very positive

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Adapted transport and congestion
Findings form the pilot study

- Road transport was associated with various risks
  - Adapted transport for people with disabilities
    - Disorganization among passengers with neurocognitive issues. "*What we observed was disorganization among some passengers during transport because they were confused about what was happening in the middle of the night.*"

    « *Ce qu'on a vu, c'est qu'il y a eu des désorganisations de certains à l'intérieur du transport, parce qu'ils se demandaient ce qui se passait là en pleine nuit* »
  - Populations with varying medical needs
  - Domestic animals

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Temporary accommodation

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Temporary accommodation
Literature review

- Acquaintances
- Family member
- Motel/hotel
- Recreational vehicle
- Public shelter
- Free short term rental
- Importance of the Red Cross

Temporary accommodation
Findings form the pilot study

- Family member and caregiver
  - Second evacuation, some caregivers refused to house their relatives
- Motel/hotel
- Hospitals and long-term care homes
- Arenas and multipurpose facilities
- Free short term rental
- Importance of the Red Cross

Temporary accommodation
Findings form the pilot study

- Social impacts (positive and negative)
  - New bonds formed
  - *"Those who were housed at the hotel, it created a kind of new energy. These people got to know each other, developed connections."*

« Ceux qui ont été hébergés à l'hôtel, ça a créé un genre de nouvelle énergie. Ces gens-là se sont connus, ont développé des liens »

  - Spontaneous acts of solidarity and mutual aid
  - *"Those who had cognitive issues, well, they had visitors, so they took a trip, they saw family they hadn't seen in a long time, so people were [reunited]."*

« Ceux qui avaient des troubles cognitifs, bien ils ont eu de la visite, fait qu'ils ont fait un voyage, ils ont vu de la famille que ça fait longtemps qu'ils n'avaient pas vue, fait que les gens ont été [réunis] »

Minor conflicts and substance abuse

Temporary accommodation
Findings form the pilot study

Negative psychological impacts

- Stress, anxiety, worry, and distress related to the rapid progression of the evacuation and the lack of information about ground information (fears of vandalism, material losses, safety of loved ones, etc.)
- "'Oh my God, it's dangerous', you know, like: 'are we going to be caught in the fire, are we going to lose our town, am I going to lose all my belongings?'"

« "Ah mon Dieu, c'est dangereux ", tu sais fait que : "on vas-tu passer au feu, on vas-tu perdre notre ville, est-ce que je vais perdre toutes mes affaires? "»

- Challenges:
  - Shelters
  - The most vulnerable will also be those who remain in shelters the longest (no family or friends).
  - Increased vulnerability of the most vulnerable

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Temporary accommodation
Findings form the pilot study

- The Red Cross has very clear protocols for hygiene measures.
  - However, there is a gap between theory and practice.
  - 200 to 300 beds in gyms/arenas – adherence to protocols is challenging.
- The response tends to improve when the medical team from the original community is present in the shelters (for neurological disorders and mental health).
  - Trust, knowledge, and needs are well understood.
  - Knowledge of medication, among other things,
  - Decreases anxiety/psychological distress.
- Additionally, the support provided by the Red Cross also offers an advantage for confidentiality.

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Recovery

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Recovery
Literature review

- Increased mortality during the evacuation of highly vulnerable individuals (such as those in residential care homes and long-term care facilities), possibly extending up to four months post-evacuation.
- Psychological impacts and financial instability
- Criteria for return present a challenge.

Recovery (2 to 4 mois after return) Findings form the pilot study

- Perceived impacts on long-term care patients
  - Perceived increase in mortality in the weeks following evacuation
  - Perceived increase in new clients upon return
  - "*We brought back more patients than we evacuated.*"

  « On a ramené plus de patients qu'on en a évacué ».
- Psychological and mental health impacts
  - General population → the duration of evacuations + material losses (hunting camps, chalets) were factors contributing to stress, distress, and the feeling of loss of a lifestyle
  - Fatigue, hypervigilance, and anxiety for the future – including new forest fire events

Recovery (2 to 4 mois after return)
Findings form the pilot study

Short and long-term socio-economic impacts:

- Temporary financial aid ≠ job loss + increased expenses
- Food insecurity and increased demand at food banks
- *"Some, like those in Radisson, rely on their summer job for their annual income, so they find themselves financially destitute for the rest of the year."*

« Il y en a que Radisson, c'est leur emploi d'été qui fait leur année, donc eux autres se retrouvent financièrement démunis pour le reste de l'année »

- Vast area of forest burned
  - Stress from long-term economic impacts (forest industry, jobs, and businesses)
  - Fear of witnessing the future devitalization of the city
  - *"And even I think about it, what will the future hold? We are a forest city and we just lost 2 million hectares [of forest]."*

« Puis même moi tu sais, moi j'y pense, là ça va être quoi le futur ? On est une ville forestière et puis on vient de perdre 2 millions d'hectares [de forêt] »

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Lessons for the future

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Lessons for the future
Literature review

- Evacuation plans with simulations for staff need to be developed, among others, for residential care homes and long-term care facilities.
- Communication
  - Rapid and comprehensive updates about the fires must be available, both during the event and for those evacuated.
  - Importance of simple messages about air quality for vulnerable people.
  - Important to centralize information – reduces the burden of information searching.
  - Important to reduce uncertainties by being transparent and to prevent the spread of false or fake news.
  - All platforms must provide the same information. Technologies such as door-to-door or sirens should be used as supplements.
  - Although not always possible, evacuation orders should allow time for people to prepare.

Lessons for the future
Literature review

- Transportation
  - Promote public transportation to reduce congestion.
  - Plan evacuations to lessen congestion.
  - Plan for transport of pets.

Lessons for the future
Literature review

- Accommodation:
  - Shelters must be well-equipped with social and medical resources
  - Should include spaces for pets.

- Recovery:
  - Medical services, including those for physical and mental health, should be available upon return.

Lessons for the future
Findings form the pilot study

- Emergency Plan and Resource Planning:
  - Clarify in advance roles and responsibilities of multiple actors, especially when multiple jurisdictions are involved
  - Identify vulnerable individuals in the community.
  - Plan the transportation and accommodation of pets.
  - Plan for farm animal.
  - Identify potential conflicts between personal and professional obligations to limit staff shortages and workload.
  - Develop, disseminate, and most importantly, practice evacuation plans for the healthcare network

Lessons for the future
Findings form the pilot study

- Information and communication:
  - Identify community leaders to act as information relays
  - Clarify the underlying reasons for evacuations during communications (unpredictable fire behavior, physical risk from fire and/or smoke risks, trigger line map)
  - Importance of door-to-door
  - Establish clear criteria for evacuation and return
  - Ensure continuous communication throughout the evacuation process
  - Implement multimodal communication

Lessons for the future
Findings form the pilot study

- Transportation
  - Consider preventive evacuations for specific populations (long-term care and home care patients, people with mobility impairments)
  - Limit the number of destinations for adapted transport
  - Carry out evacuations gradually, if possible
  - If possible, prioritize daytime evacuations

Lessons for the future
Findings form the pilot study

- Accommodation:
  - Availability of support staff and health professionals from the original environment
  - Provision of psychosocial support at accommodation sites
  - If possible, provide accommodation on a smaller scale
  - Plan for cohabitation with pets
- Recovery:
  - Emergency food assistance and financial aid
  - Community healing activities
  - Health and psychological support

Key findings

- Key moments in the evacuation process were identified:
  - Communication and acceptance of the evacuation order
  - Adapted transportation and traffic congestion
  - Temporary accommodation
  - Recovery
- Particularly affected populations include:
  - Elderly living in long-term care facilities or at home with disabilities
  - Essential workers and firefighters facing professional and personal challenges
- Measures at all stages of the evacuation process could mitigate impacts on the population

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Questions ?

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