



THE INTERFACE OF WILDFIRES AND ELECTRICAL UTILITIES IN WESTERN CANADA

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“This is a very difficult thing for me to say: we haven’t had a large loss of life but it’s coming. If we continue this path, it’s coming ... and we have the ability to change that!”
- Sr. Wildfire Consultant

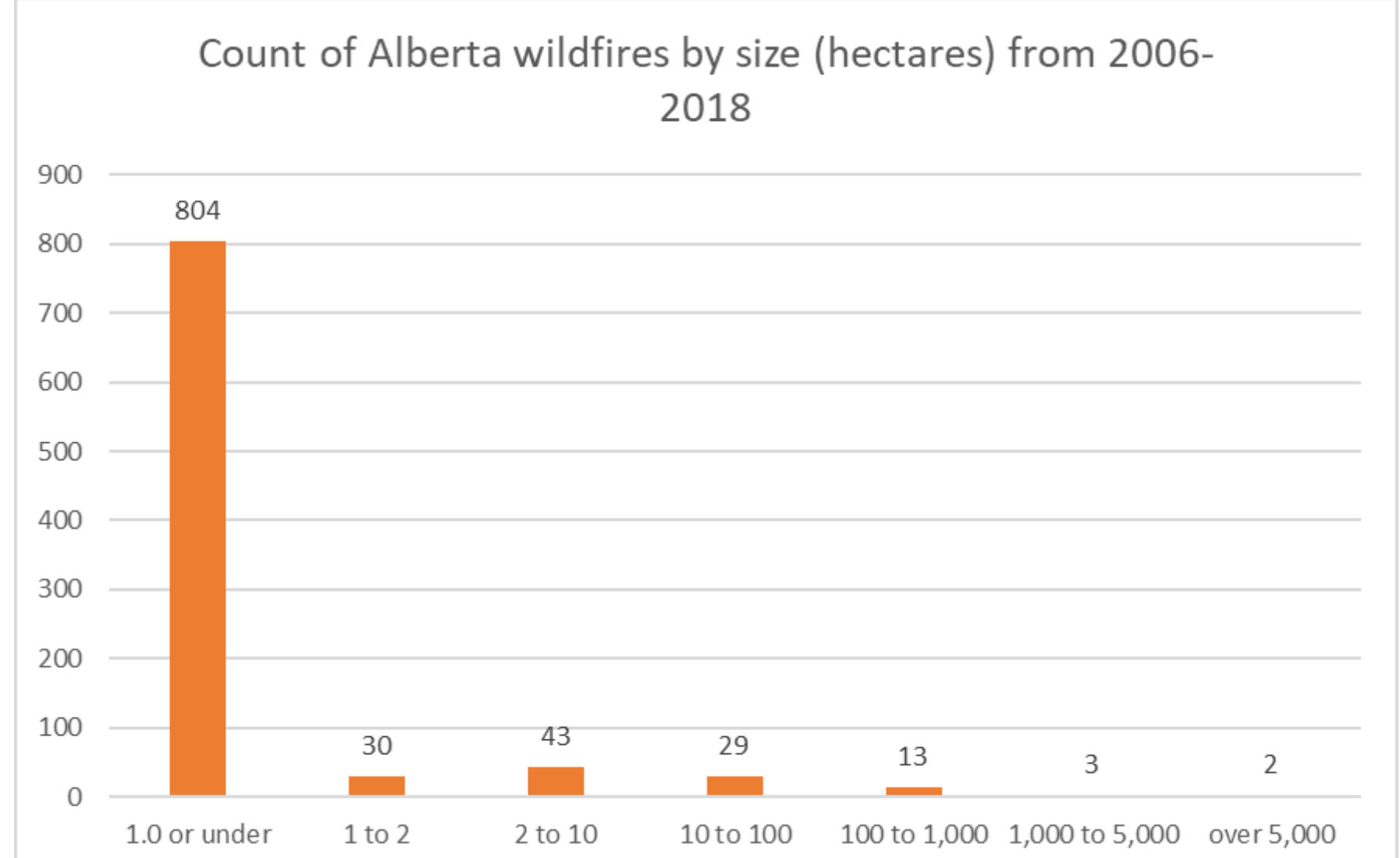
QUESTION:	What are the major concerns and preventative measures at the interface of wildfires and electrical utilities in Western Canada?
BACKGROUND:	<ul style="list-style-type: none"> Global Warming and Climate Change are making Canada hotter and dryer, and that means wildfires are going to be more frequent and more severe (Jain, et al. 2022) In Canada, the most impactful fires happen in Alberta and BC. 2023 is the worst year on record in terms of area burned During a climate disaster like a wildfire, keeping the power on and protecting electrical infrastructure is a crucial pillar of emergency response and recovery. However, electrical infrastructure igniting wildfires is a well-documented problem in the United States and Australia. This project researched this relationship in Western Canada (Alberta and BC)
METHODOLOGY:	3 Case Studies, literature review, geospatial data analysis, interviews with relevant actors

Case Study I: Australia’s Black Saturday		Case Study II: California’s Camp Fire	
<ul style="list-style-type: none"> February 7, 2009, in the State of Victoria, Australia 216 bushfires led to 173 human deaths, Royal Commission investigation 5 major fires were ignited by electrical utilities, including the Kilmore East Fire, which caused 119 deaths and 232 casualties Cause determined to be a termination which was incorrectly installed and compromised the electrical line integrity 		<ul style="list-style-type: none"> December 8, 2018, near Paradise California 85 deaths, 18,000 buildings destroyed, 150,000 acres burned PG&E eventually filed for Chapter 11 Bankruptcy, liable for over USD \$30B Ignition was from a transmission line conductor component failing, contacting the tower and repeatedly spraying molten metal below 	
<p>The investigation concluded:</p> <ul style="list-style-type: none"> Asset Management Program was inadequate Condition-based replacement used for assets nearing or already past their engineering life estimate 	<ul style="list-style-type: none"> Asset and vegetation inspections rare on private land No systematic method for identifying hazardous trees Regulation only focused on vegetation within the Right-of-Way, not trees which could fall onto lines 	<p>The investigation concluded:</p> <ul style="list-style-type: none"> Asset Management and Maintenance programs were inadequate Vegetation Management was inadequate Inspections were behind on privately-owned land 	<ul style="list-style-type: none"> Lack of hardware and software to detect faults High Risk Fire Areas (HRFAs) did not have enhanced mitigation measures despite the risk classification Reliant on pre-emptive Public Safety Power Shutoffs during extreme weather conditions

CONCLUSIONS

<ul style="list-style-type: none"> Fires occurred during periods of extreme heat and drought, made worse by high winds Companies involved had inadequate Asset Management and Vegetation Management Programs 	<ul style="list-style-type: none"> Assets beyond end-of-life due to maintenance backlog Afterwards, companies implemented strict asset replacement, maintenance, and vegetation management programs 	<ul style="list-style-type: none"> Changes to laws, responsibilities of utilities, municipalities, and oversight by the Regulator Use of drones and satellite imagery for infrastructure inspection and vegetation models 	<ul style="list-style-type: none"> Both companies began installing hardware and software safety settings for electric circuits in High Fire Risk Areas <ul style="list-style-type: none"> Reduced Victorian ignitions by 80% Reduced PG&E ignitions by 74%
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Case Study III: Western Canada

<p>The Big Picture</p> <ul style="list-style-type: none"> Alberta records fires ignited by the “powerline industry”: 924 between 2006-2018, 87% under 1 hectare but 2 were over 5,000 hectares BC doesn’t categorize wildfires except for “lightning”; “person”; or “unknown” 2011 Utikuma Fire Complex (AB) ignited by transmission line burned Whitefish First Nation 459 Lack of data in BC to determine ignition from infrastructure 2023 St. Mary’s River Fire (BC) likely started by transmission line and burned <i>?aq’am</i> Community 		<p>Mitigation and Prevention</p> <ul style="list-style-type: none"> Companies are committing enormous resources to M&P Mitigation both protects infrastructure and prevents ignitions by removing fuel sources Infrastructure maintenance is a gap in this research Vegetation management is the most common practice for M&P but is not where it needs to be for 2023 Long line distances and infrastructure remoteness is problematic Vegetation in some regions can grow faster than companies are able to manage it due to limited resources Right of Ways are very limited in National Parks
<p>Wildfire Modelling</p> <ul style="list-style-type: none"> Wildfire patterns are becoming extremely difficult to predict and wildfire behaviour is becoming hard to anticipate Climate change is leading to vegetation changes which models do not incorporate The Federal Gov. modelling suite <i>Prometheus</i> is at end-of life and there is no replacement. Trials of new ones are underway in 2023 	<p>Policy and Regulation</p> <ul style="list-style-type: none"> Government policy is not aligned, whether federal, provincial, or municipal Wildfire prevention and mitigation usually does not always get priority over environmental and social issues Utility Commissions not approving wildfire programs for individual companies as they are capital projects and paid for by the rate payer 	<p>Insurance</p> <ul style="list-style-type: none"> Insurance companies are worried about the impacts of climate change and are committing enormous resources to this issue Strong wildfire mitigation programs lead to policy savings Companies found liable for igniting wildfires may be pursued for recovery costs and may never get wildfire insurance again May soon be impossible to buy insurance in some high-risk areas

<h2>CONCLUSIONS</h2> <ul style="list-style-type: none"> Wildfires are a major threat to electrical infrastructure There is a lack of data to determine ignition risk from the infrastructure Companies are committing enormous resources to the wildfire threat Mitigation programs work both ways for prevention and protection Vegetation management is difficult due to infrastructure remoteness There is an urgent need for up-to-date data for wildfire modelling Government policy is not aligned and hindering preparedness activities 	<h2>RECOMMENDATIONS</h2> <ul style="list-style-type: none"> Asset and Vegetation Management Programs should be expanded Infrastructure Replacement should depend on both age and condition and be comprehensive of all components Infrastructure materials need to change, transmission lines should only be metal Government policies need to be aligned at all levels Provincial Utility Commissions should work with companies to ensure Wildfire Mitigation Programs are approved 	<h2>REFERENCES</h2> <p>Alberta Utilities Commission. (2021). ATCO Electric 2020-2022 Transmission General Tariff Application: Decision 24964-D02-2021. https://efiling-wsbapi.auc.ab.ca/Document/Get/696462</p> <p>California Public Utilities Commission. (2019). SED Camp Fire Investigation Report for 2018 Camp Fire with attachments. https://www.cpuc.ca.gov/media/cpuc-website/investigations-and-topics/documents/wildfires/efiling-investigations1906015-attachments-a-sed-com-1906015-investigation-report-released-office_investigation-F04045973268495C4BE040275A72A4584</p> <p>Eddy, J. (2023). The interface of wildfires and electrical utilities in Western Canada (unpublished masters research). University of Calgary.</p> <p>Filinger Energy Partners. (2023). PG&E Independent Safety Monitor Status Update Report. https://www.cpuc.ca.gov/media/cpuc-website/investigations-and-topics/documents/oversight-and-enforcement/ism-status-update-report-1-2023.pdf</p> <p>FireGrowthModel.ca. (2023, January 20). Prometheus overview. https://firegrowthmodel.ca/pages/index.html</p> <p>Forest fires. (2021). National Forestry Database. http://info.ccfm.org/en/data/fires.php</p> <p>Government of Alberta. (2020). Historical wildfire data: 2006 to 2018 [data set]. https://open.alberta.ca/open-data/wildfire-data-2006-2018</p> <p>Government of British Columbia. (2023). Wildfire averages [data set]. https://alpha.gov.bc.ca/gov/content/safety/wildfire-status/about-bcws/wildfire-statistics/wildfire-averages</p> <p>Intergovernmental Panel on Climate Change. (2023). Synthesis Report of the IPCC Sixth Assessment Report (AR6) Longer Report. https://www.ipcc.ch/report/ar6/syr/downloads/report/AR6_Syr_LongerReport.pdf</p> <p>Jain, P., Castellanos-Acuña, D., Coogan, S. C. P., Abatzoglou, J. T., & Flannigan, M. D. (2022). Observed increases in extreme fire weather driven by atmospheric humidity and temperature. Nature Climate Change, 12(1), 63–70. https://doi.org/10.1038/s41558-021-01224-1</p> <p>National Institute of Building Sciences. (2020). Mitigation saves: Mitigation saves up to \$13 per \$1 Invested. https://www.nibs.org/files/press-releases_v4_coversize.pdf</p> <p>Parliament of Victoria. (2010). 2009 Victoria Bushfires Royal Commission Final Report. http://royalcommission.vic.gov.au/Commission-Reports/Final-Report/Summary.html</p>
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