ROBB CONSULTING
SERVICES INC.

2024

WILDFIRE
EXPOSURE ASSESSMENT
THE CITY OF COLD LAKE, ALBERTA

SUBMITTED TO

THE CITY OF COLD LAKE
FIRE CHIEF JEFF FALLOW
DEPUTY FIRE CHIEF HUGH MCKAY

SUBMITTED BY

ROBB CONSULTING SERVICES INC.
ROBBCONSULTINGSERVICES@OUTLOOK.COM
780-721-9518

DATE :
23 MAY 2024

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Authors Note

Due to the expansive study area and the challenges in effectively presenting spatial data, and the diverse metrics involved in this exposure assessment, a web application has been developed. This tool allows users to dynamically explore the insights found in this assessment.

The online mapping application can be found at the following web address:

https://arcgis.com/apps/webappviewer/index.html?id=20fd4b33fd9e4b54819674e74b8978ef

Written by: Robb Consulting Services Inc.
Date: May 23rd, 2024

Key Messages

1. The wildland urban interface (WUI) encompassing the City of Cold Lake spans approximately 117 km^2, with constituent portions of about 21.6%, 21.7%, and 35.7% attributed to coniferous, deciduous, and grassland/cropland, respectively. Within the assessment area 14 323 pieces of infrastructure (residential and commercial) were identified and analyzed for their exposure to hazardous wildland fuels.

2. The wildfire behaviour potential within the WUI for the City of Cold Lake (Page 12) is comprised of 21.6% high hazard, 35.7% moderate hazard, 21.7% low hazard, and 20.9% no hazard. Regions responsible for producing more significant wildfire behaviour are concentrated in the south, and south-western parts of the assessment area. This region contains higher proportions of coniferous forest but also has a lower concentration of both commercial and residential infrastructure. Proper vegetation management, as outlined through FireSmart practices, can help reduce hazard of both coniferous fuels and unmanicured grasslands.

3. A landscape fire exposure metric was used to provide a numeric rating of the potential for fire transmission to a location given surrounding fuel composition (Beverly, McLoughlin, Chapman, 2021). Areas with exposure ratings between 40% and 60% should be assessed to reduce the prevalence of hazardous fuels within 100 meters of the structure. Areas with exposure ratings greater than 60% require fuel reduction treatments to mitigate wildfire threat. Failure to apply vegetation management not only poses a threat to the individual structure but also provides a gateway for wildfire to propagate to within the community. This metric was calculated for each of the wildfire exposure zones: Radiant Heat (0m-30m), Short-Range Ember Transport (0m-100m), and Long-Range Ember Transport (100m-500m). Analysis found that 86.7% of structures had low exposure to ignition by radiant heat. Whereas 12.1% of structures had extreme exposure to ignition by radiant heat. For exposure to ignition by short-range ember transport, 65.3% had low exposure, and 28.1% had extreme exposure. Lastly, for exposure to ignition by long-range ember transport, 22.6% had low exposure, and 60.3% had extreme exposure. More detailed information on infrastructure exposure to ignition can be found on page 18.

INTRODUCTION

The City of Cold Lake is situated in east-central Alberta, nestled within the expansive boreal forest. This picturesque location is renowned for its natural beauty, characterized by dense woodlands, pristine lakes, and abundant wildlife. Adding to its significance, Cold Lake is also home to the prominent Canadian Forces Base Cold Lake (CFB Cold Lake).

Historically, Cold Lake was not a single entity but comprised of three distinct communities. These were the Town of Grand Centre, the Town of Cold Lake, and the community of Medley, which primarily encompassed the Canadian Forces Base. Each of these areas had its unique identity and local government. However, in a bid to streamline administration and foster a unified community, these three municipalities were amalgamated. This merger resulted in the formation of the City of Cold Lake, creating a cohesive urban area that blends residential, commercial, and military zones seamlessly. Today, Cold Lake thrives as a vibrant city, offering a blend of natural splendor and modern amenities, while playing a crucial role in Canada's defense infrastructure. Home to approximately 14 000 commercial and residential structures, in 2021 census Canada reported that Cold Lake had a population of 15 661 individuals. Cold Lake covers a municipal land area of 66.61 km^2; however, this exposure assessment focuses on the greater Cold Lake region of approximately 117 km^2. The greater area allows this report to specifically address the Wildland Urban Interface (WUI) within and around the boundaries of the greater Cold Lake region.

The term "Wildland Urban Interface" (WUI) refers to areas where flammable wildland fuels are near human development. Where this is present, the inevitability of wildfires impacting the economy, community, and recreational areas is a certainty. To effectively address the concerns and dangers associated with wildfires, it is crucial to adopt appropriate management strategies.

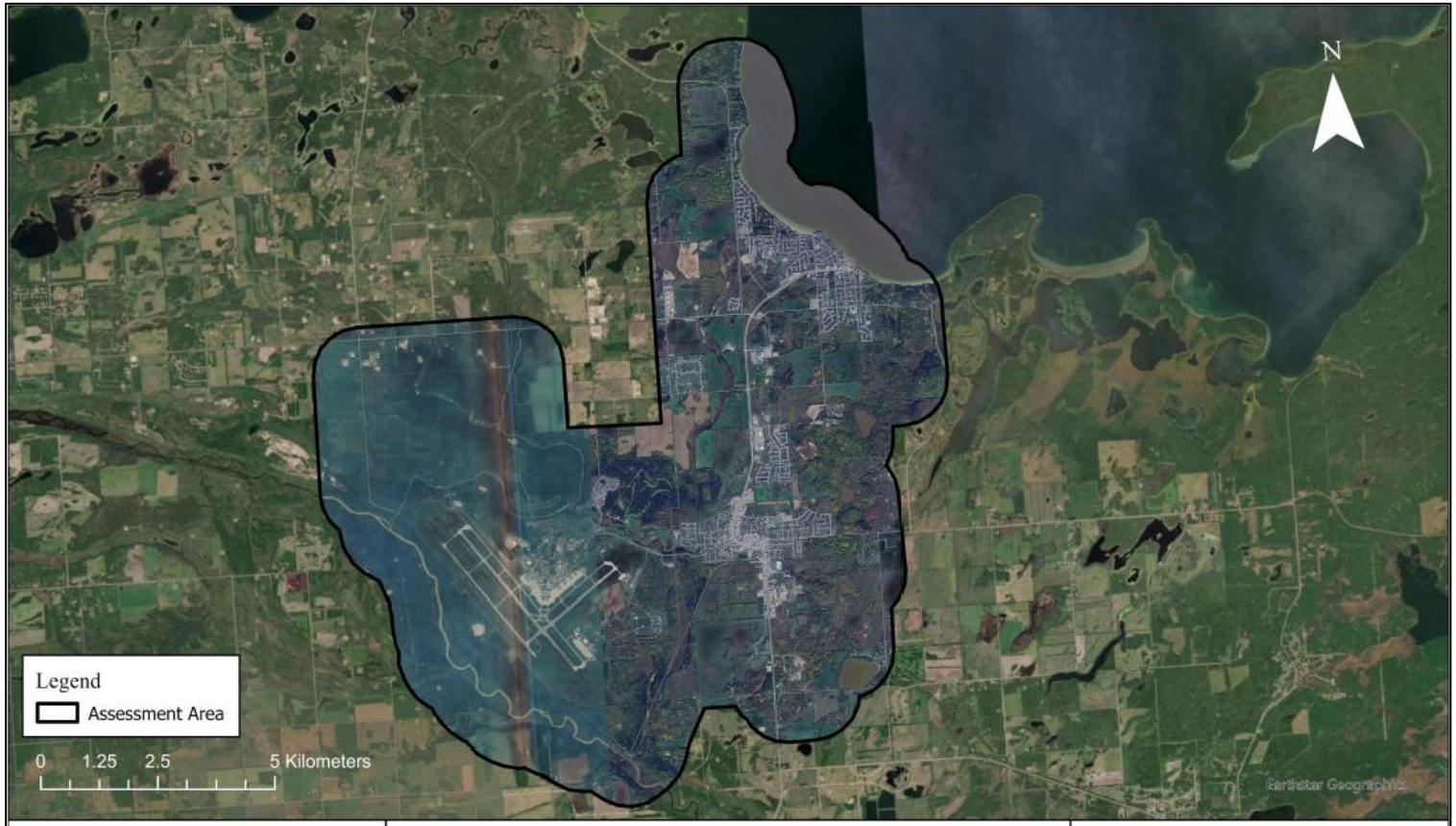
This wildfire exposure assessment delves into various methodologies that can provide valuable insights for making informed decisions regarding vegetation management. Through this approach, specific FireSmart practices can be targeted to areas of concern, minimizing unnecessary and unsightly reduction of wildland fuel.

While the implementation of mitigation strategies recommended in this report will aid in reducing wildfire exposure, it is important to note that such measures cannot eliminate the risk or guarantee the prevention of wildfire encroachment on human development.

PLANNING AREA

The assessment area for this report includes the main body of Cold Lake, Alberta; however, the area has been expanded to include as many outlying structures as possible. As previously mentioned, the total assessment area for this report was 117 km^2, which represents a 500-meter buffer from each piece of infrastructure found within the planning area at the time of satellite image capture. Imagery for this report was collected during September 2023 from the WorldView-3 sensor at a resolution of 0.3m. WorldView-3 is a commercial Earth observation satellite renowned for its high-resolution imaging capabilities. It excels in capturing panchromatic images with an impressive resolution of 31 centimeters, making it one of the most advanced satellites for detailed Earth observation. Satellite image recency, clarity, resolution, nadir, and percent cloud-free were all considerations when selecting appropriate granules for this report.

See page 5 for the geographical extent of this assessment area.



WILDFIRE IGNITIONS

Through the examination of data provided by Alberta Wildfire, it was found that there have been 136 documented wildfires within a 10-kilometer radius of the City of Cold Lake from 1961 to 2023. An overwhelming majority, comprising 95.5% of these incidents, is attributed to human activities, illustrating the profound impact of industry, recreation, and leisure. In contrast, lightning only accounts for a modest 4.5% of recorded wildfire ignitions. Despite outliers, this region faces an annual average of 2 to 3 wildfire ignitions per year. The persistence of wildfire on the landscape surrounding the City of Cold Lake emphasizes the importance of scientifically informed wildfire mitigation strategies and community involvement.

Note: Alberta Wildfire does not have information on all Wildland-Urban Interface (WUI) fires in the Cold Lake area. As a result, local records of these fires are not included in figure 1.

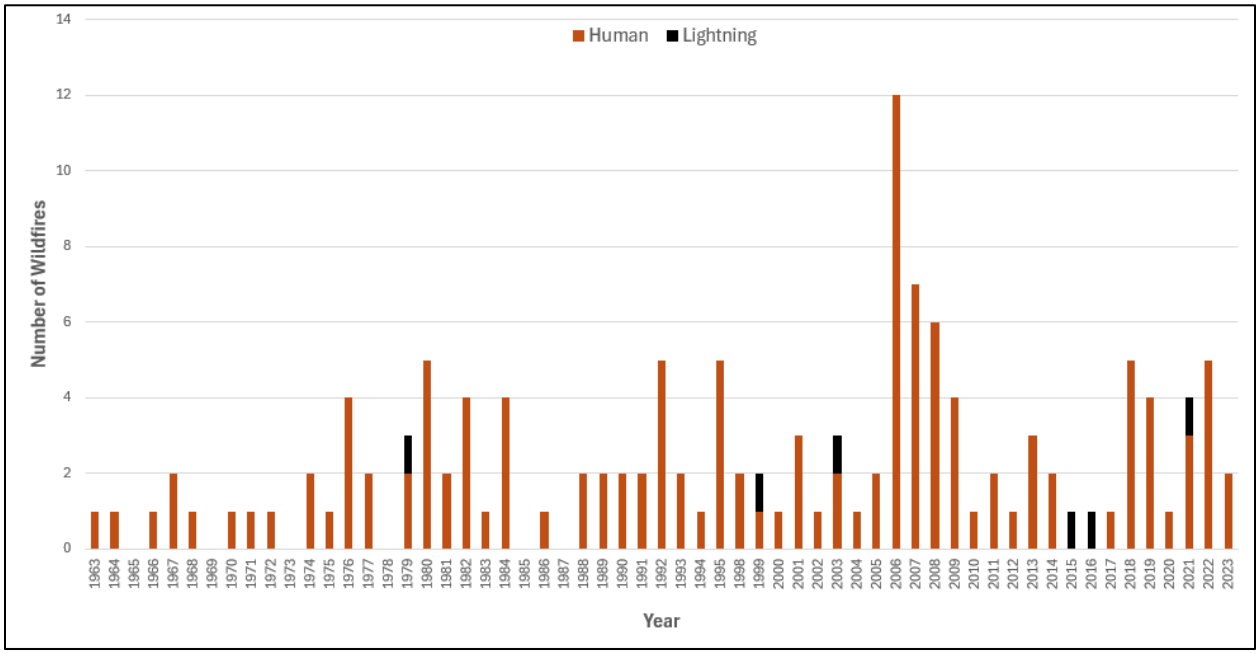


Figure 1. Wildfire Ignitions by both humans and lightning from 1961 to 2023 within 10-kilometers of the City of Cold Lake.
Data obtained from Alberta Wildfire: https://www.alberta.ca/wildfire-maps-and-data

HAZARD ASSESSMENT

Utilizing state-of-the-art technologies in remote sensing and current high-resolution satellite imagery, this wildfire exposure assessment has been developed. Through the application of various machine learning techniques, the report has achieved precise classification of wildland fuels at a resolution of 0.3 meters. This level of detail was attained by mosaicking current WorldView-3 satellite images (September 2023), strategically chosen to optimize spatial and temporal resolution. Notably, the time the WorldView-3 image captures were obtained were to optimize the clear differentiation between deciduous and coniferous fuels during the fall season.

The objectives of the wildfire hazard assessment are to:

- **Define** a suitable assessment area to capture the wildland urban interface (WUI) surrounding the infrastructure within the City of Cold Lake (Page 5).
- **Classify** the wildland landcover types that are present within the immediate WUI region around the Cold Lake, Alberta according to their landcover type (Page 9).
- **Produce** a Wildfire Behaviour Potential map to identify regions that can produce extreme wildfire behaviour (Page 12).
- **Locate** the fuels within the WUI that are responsible for radiant heat exposure and short/long-range spotting near human development (Page 15, 16, 17).
- **Identify** structures that are most exposed to the various sources of ignition by wildland fire (Page 20, 21, 22, 23, 24, 25).
- **Determine** the regions within the assessment area that have the highest burn probability potential as determined by the fuels, and their proximity to each other, within the WUI (Page 27).

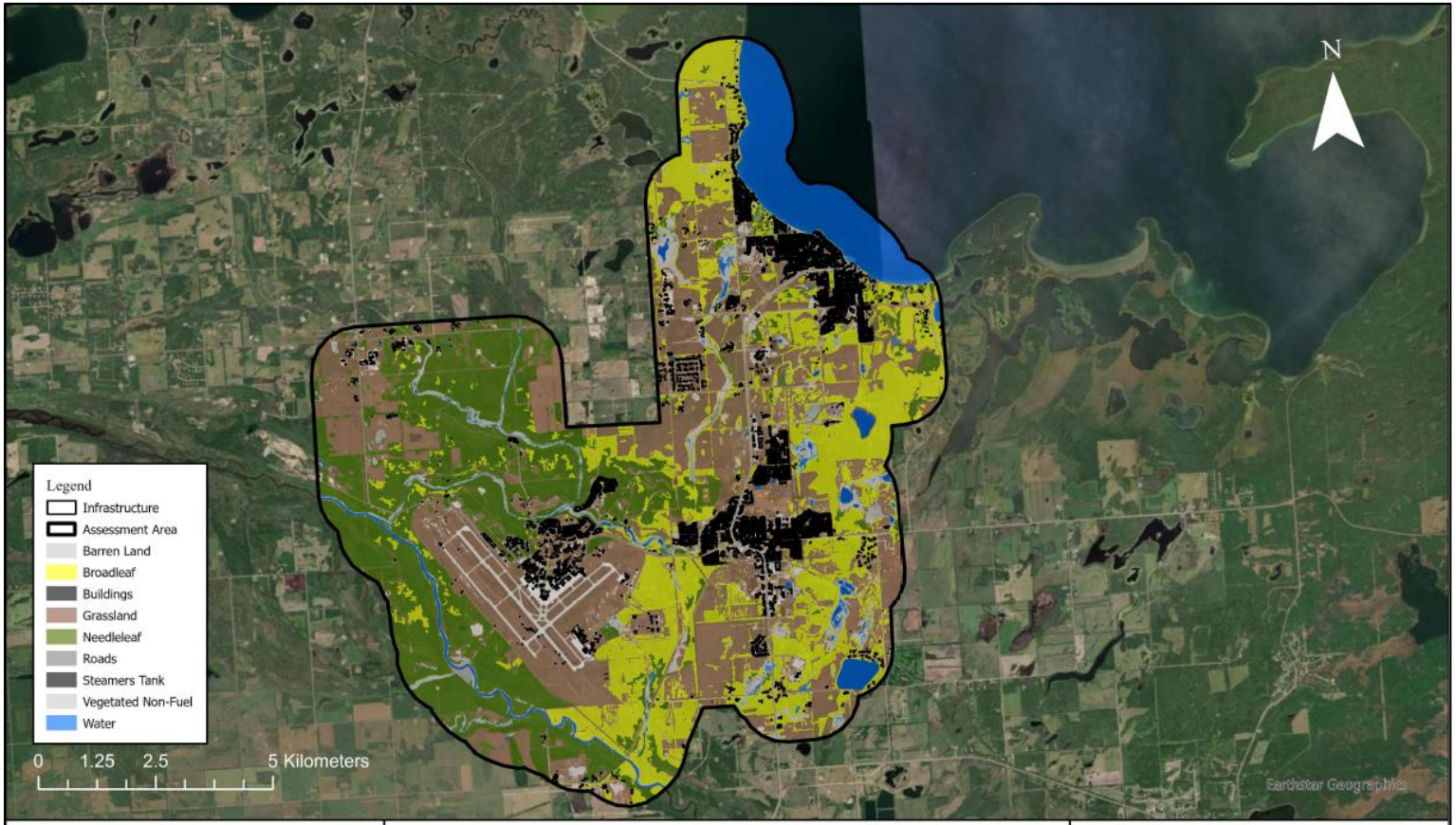
Wildland Landcover Assessment

Wildland landcover, within the area of interest, was broken down into landcover classes as they relate to the projected wildfire behaviour potential. Using high resolution multi-spectral satellite imagery, the classification technique was able to separate wildland landcover into coniferous fuels, deciduous fuels, grassland, water, and non-fuels. Non-fuel landcover refers to land types that do not contribute to wildfire spread and ignition. These include urban areas (commercial & residential infrastructure), barren land, and vegetated non-fuel.

Table 1 indicates the relative proportions of wildland fuels found within the WUI of the Cold Lake, AB. The WUI zone was established 500-meters out from any infrastructure. The map on page 9 shows the visual breakdown of the various fuel types that are within the 500-metre WUI region surrounding Cold Lake, AB.

Table 1. *Proportions of wildland fuels within the 500-meter wildland urban interface of Cold Lake, AB.*

Fuel Description	Area (Km^2)	Proportion of Area (%)
Coniferous Forest	25.36	21.64
Deciduous Forest	25.48	21.74
Grassland/Cropland	41.87	35.72
Water	8.57	7.31
Infrastructure	1.73	1.47
Non-Combustible Fuel	14.20	12.12
Totals	117.21	100



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Cold Lake Wildfire Exposure Assessment
Landcover Classification

WorldView-3 0.3m Resolution Multispectral Imagery Mosaic
Imagery: September 2023
Map Produced: June 4th, 2024

Cartographer: Robb Consulting Services Inc.
Email: RobbConsultingServices@Outlook.com

Wildfire Behaviour Potential

Fire behaviour is “The manner in which fuel ignites, flame develops, fire spreads and exhibits other related phenomena as determined by the interaction of fuels weather and topography” (Merrill and Alexander 1987). Fundamentally there are three basic types of wildland fires: crown, surface, and ground fires. Crown fires are the most intense and dangerous wildland fires; whereas surface fires are the easiest fires to extinguish and cause the least damage to the forest. Alternatively, ground fires are notoriously difficult to extinguish and can burn deep into the humus, peat, and similar dead vegetation.

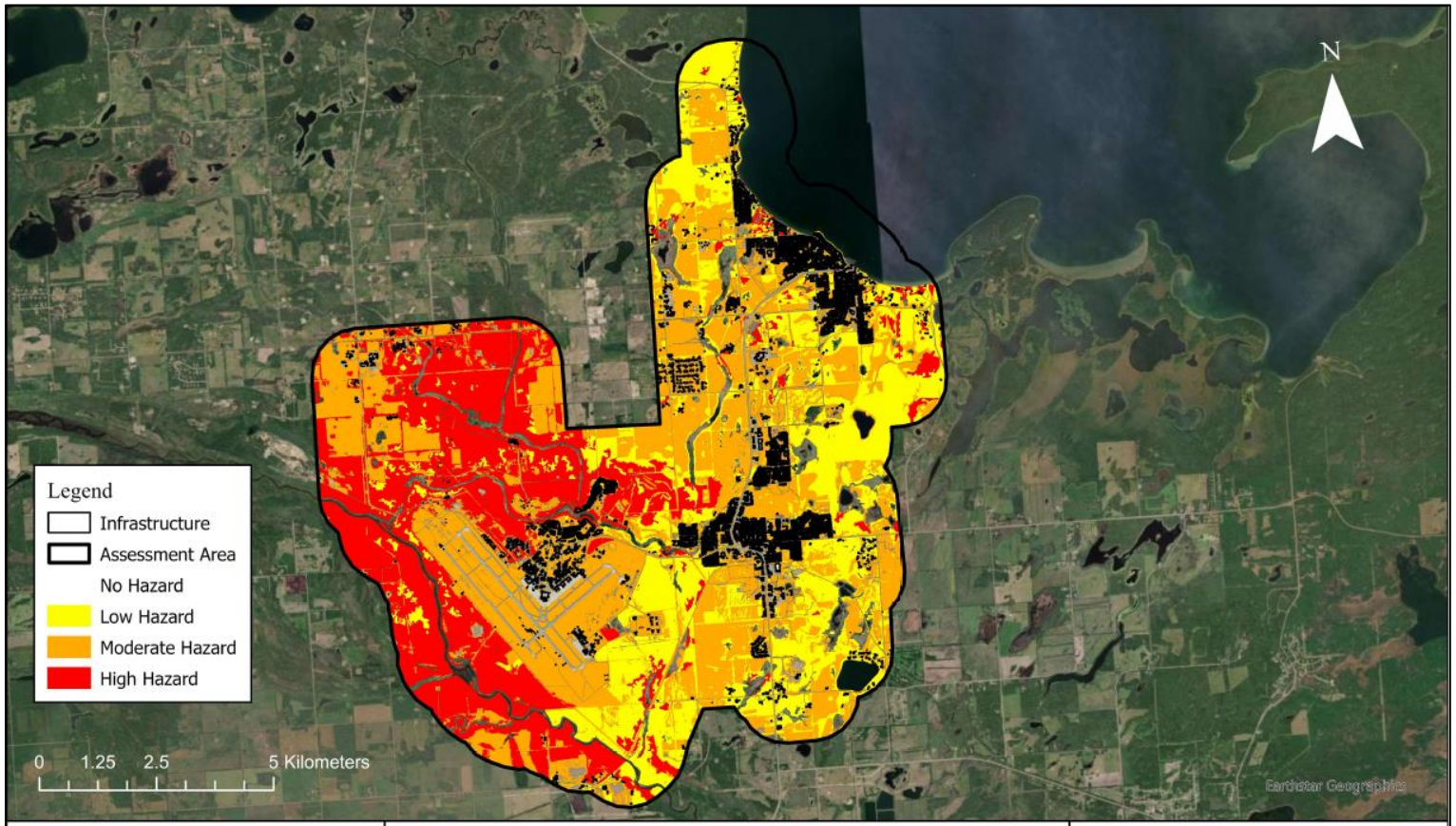
The goal of fire behaviour research is to provide fire managers with simple and timely answers. Therefore, areas of greatest concern will be the areas where wildland fuels burn with such intensity that ground suppression will be ineffective and/or considerably dangerous. Regions of greatest concern will be those that contain large amounts of coniferous fuels, followed by unmanaged grasslands, and deciduous forests with considerable understory fuel load.

Table 2 describes the wildfire behaviour potential for all fuels found within the WUI surrounding Cold Lake, AB.

Table 2. *Wildfire Behaviour Potential for wildland fuels within the WUI region of the Cold Lake, AB*

Wildfire Behaviour Potential	Proportion of Area (%)
High Hazard	21.63
Moderate Hazard	35.72
Low Hazard	21.74
No Hazard	20.91

**Note. Although infrastructure does pose a hazard to wildfire transmission within a community, this structure-to-structure fire propagation is not considered in this report.*



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Cold Lake Wildfire Exposure Assessment

Wildfire Behaviour Potential

WorldView-3 0.3m Resolution Multispectral Imagery Mosaic
Imagery: September 2023
Map Produced: June 4th, 2024

Cartographer: Robb Consulting Services Inc.
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Ignition Class Exposure Assessments

Wildfire Ignition Class Exposure Assessments are evaluations designed to determine the risk and potential impact of wildfires igniting in a specific area. These assessments classify regions based on their unique susceptibility to wildfire ignition and the potential exposure to resulting damage or harm.

Once wildfire behaviour potential has been calculated and mapped (page 12) the next step is to determine the regions of the municipality that are most exposed to these hazardous fuels. Determining what regions of the community are at greatest risk provides insight as to where fuel modification should take place in-order to best mitigate catastrophic wildfire threat. Carefully considering each of the three ignition sources can both create a cost-effective fuel treatment and save the greatest amount of infrastructure should wildfire threaten the municipality.

Wildfire Exposure Due to Radiant Heat (0 Metres-30 Metres)

Radiant heat is the transfer of heat energy through electromagnetic waves, mainly infrared radiation. During a wildfire, flames and hot surfaces emit radiant energy, heating objects from a distance. Understanding wildfire exposure to radiant heat is crucial for assessing the impact of structures and humans. Radiant heat from wildfires can damage or ignite materials without direct flame contact.

Across the entire region, 66 (0.46%) structures face moderate exposure to ignition by radiant heat. Additionally, 45 (0.32%) structures experience high exposure, 56 (0.39%) are very highly exposed, and 1728 (12.11%) are extremely exposed to ignition by radiant heat. 1895 structures falling into these categories are near coniferous fuel types prevalent in the regions surrounding infrastructure.

Wildfire Exposure Due to Short Range Spotting (0 Metres-100 Metres)

Short-range spotting occurs when embers or firebrands are carried by the fire plume or wind to areas near the main fire perimeter. Wildfire exposure from short-range spotting (0 to 100 meters) is a major concern in fire behavior and management.

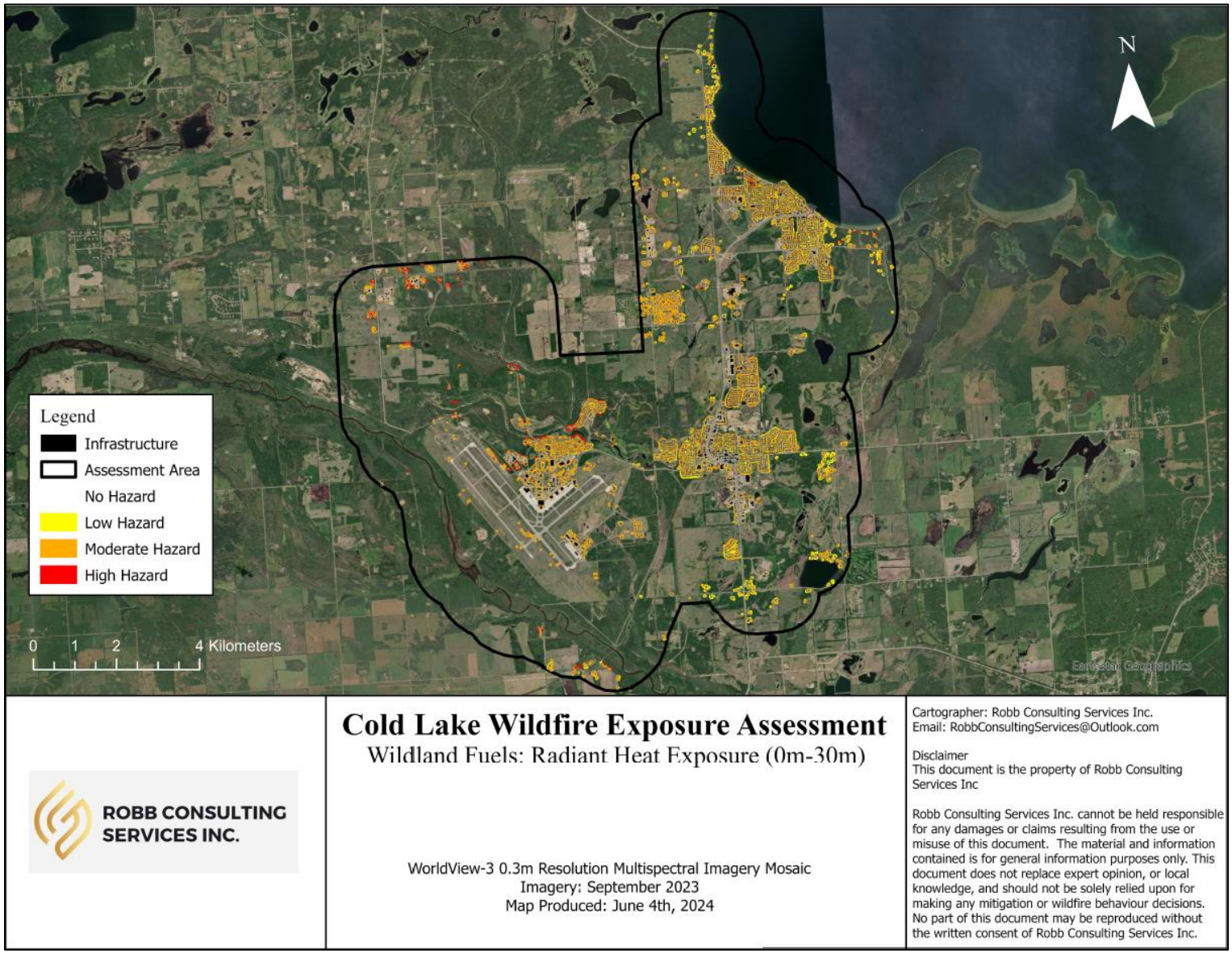
Within the assessment area, 322 (2.26%) structures exhibit moderate exposure due to short-range ember transport. Furthermore, 275 (1.93%) structures have high exposure, and 338 (2.37%) are very highly exposed, and 4015 (28.13%) are extremely exposed to ignition by short-range ember transport. These structures are situated within 100 meters of dense stands of coniferous forest.

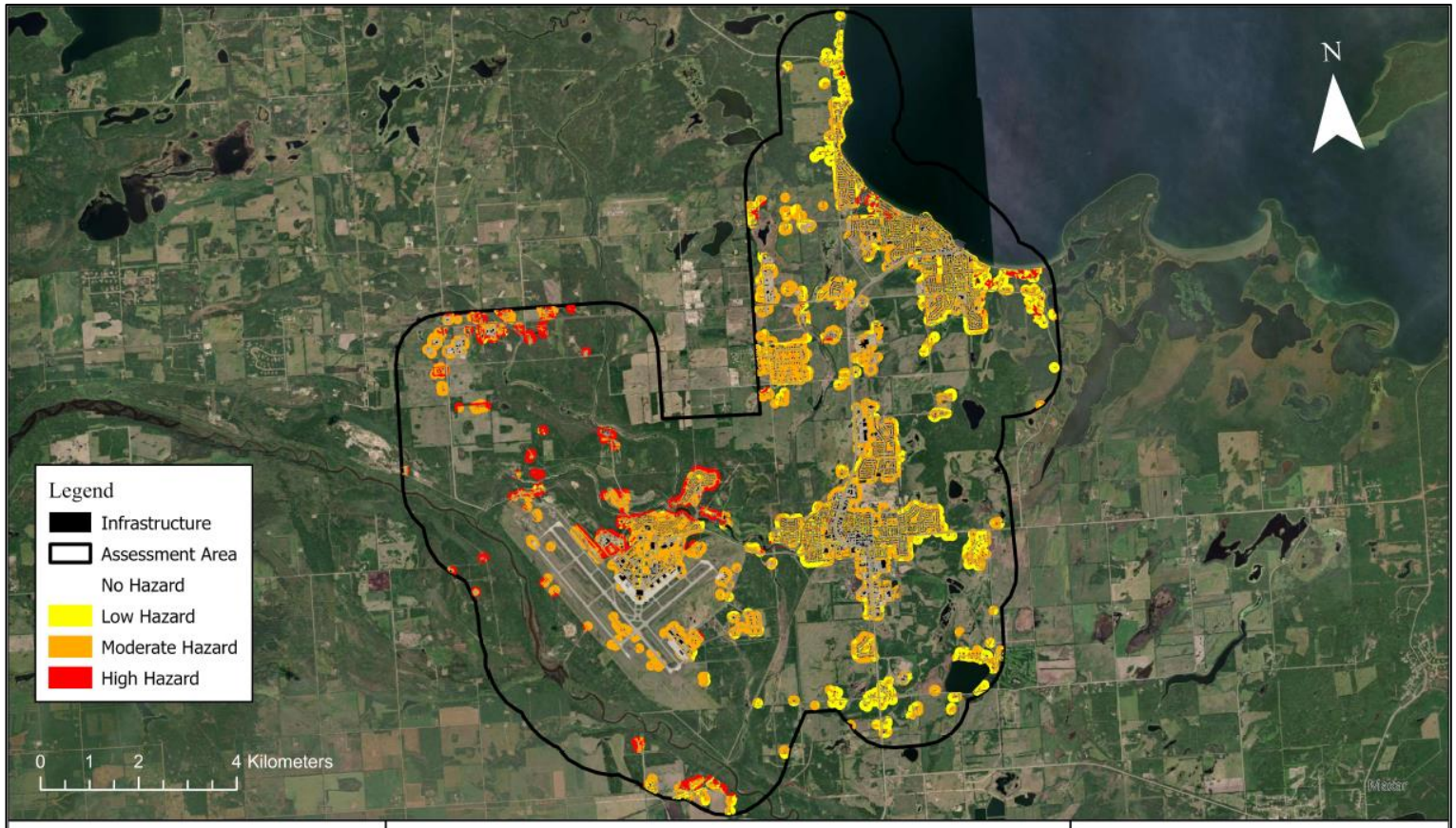
Wildfire Exposure Due to Long Range Spotting (100 Metres-500 Metres)

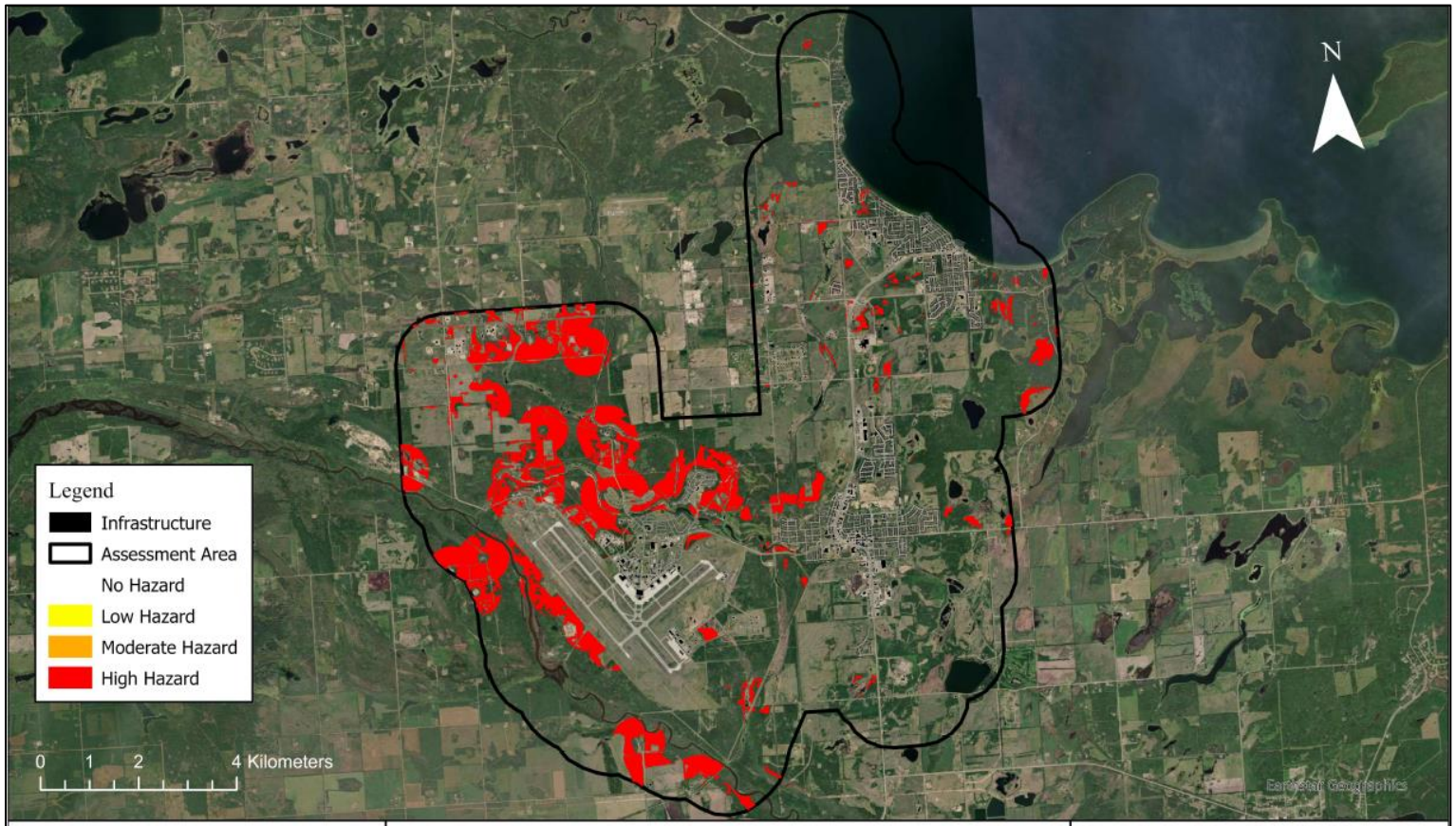
Long-range spotting occurs when burning embers or firebrands are carried by the wind, potentially igniting new fires far beyond the main fire perimeter.

Understanding the distance embers can travel and the factors influencing spotting is crucial for developing effective firefighting and prevention strategies.

Within the assessment area, 978 (6.83%) structures exhibit moderate exposure due to short-range ember transport. Furthermore, 737 (5.15%) structures have high exposure, and 732 (5.11%) are very highly exposed, and 8628 (60.25%) are extremely exposed to ignition by long-range ember transport. 11 075 structures are situated between 100 meters and 500 meters of dense stands of coniferous forest.







Infrastructure Exposure

This portion of the wildfire exposure assessment uses current peer reviewed research. Published in early 2021, the goal of this assessment is to provide a simple metric for infrastructure ignition based on the relative exposure to hazardous wildland fuels. This metric is based solely on the location of infrastructure in proximity to nearby hazardous fuels capable of transmitting fire to its location. Given in terms of percentage, this fire exposure metric is a numeric rating of the potential for fire transmission to a location given surrounding fuel composition and configuration (Beverly & McLoughlin & Chapman, 2021).

Structures with wildfire exposure percentages between 40% and 60% should be assessed to reduce the prevalence of hazardous fuels near the structure (100 meters). Areas with exposure ratings greater than 60% require fuel reduction treatments to mitigate wildfire threat. Failure to apply vegetation management not only poses a threat to the individual structure but also provides a gateway for wildfire to propagate to within the community.

Table 3. *Infrastructure exposure classification within the WUI of City of Cold Lake, AB.*

Wildfire Exposure Category	Number of Structures	Proportion of Structures (%)
a) Exposure to Radiant Heat due to Wildland Fuels (within 30 metres)		
Low (>0-0.20)	12 372	86.72
Moderate (0.20-0.40)	66	0.46
High (0.40-0.60)	45	0.32
Very High (0.60-0.80)	56	0.39
Extreme (>0.80)	1 728	12.11
b) Exposure to Short Range Ember Transport due to Wildland Fuels (within 100 metres)		
Low (>0-0.20)	9 321	65.31
Moderate (0.20-0.40)	322	2.26
High (0.40-0.60)	275	1.93
Very High (0.60-0.80)	338	2.37
Extreme (>0.80)	4 015	28.13
Exposure to Long Range Ember Transport due to Wildland Fuels (100-500 metres))		
Low (>0-0.20)	3 246	22.67
Moderate (0.20-0.40)	978	6.83
High (0.40-0.60)	737	5.15
Very High (0.60-0.80)	732	5.11
Extreme (>0.80)	8 628	60.25

As per table 3, radiant heat exposure, 0.46% of structures are moderately exposed to ignition by radiant heat, while 0.32%, 0.39% and 12.1% are highly, very highly, and extremely exposed to ignition by radiant heat, respectively. For short-range ember transport, 2.26% of structures are moderately exposed, with 1.93%, 2.37%, and 28.13% being highly, very highly, and extremely exposed to ignition by short-range ember transport, respectively. Regarding long-range ember

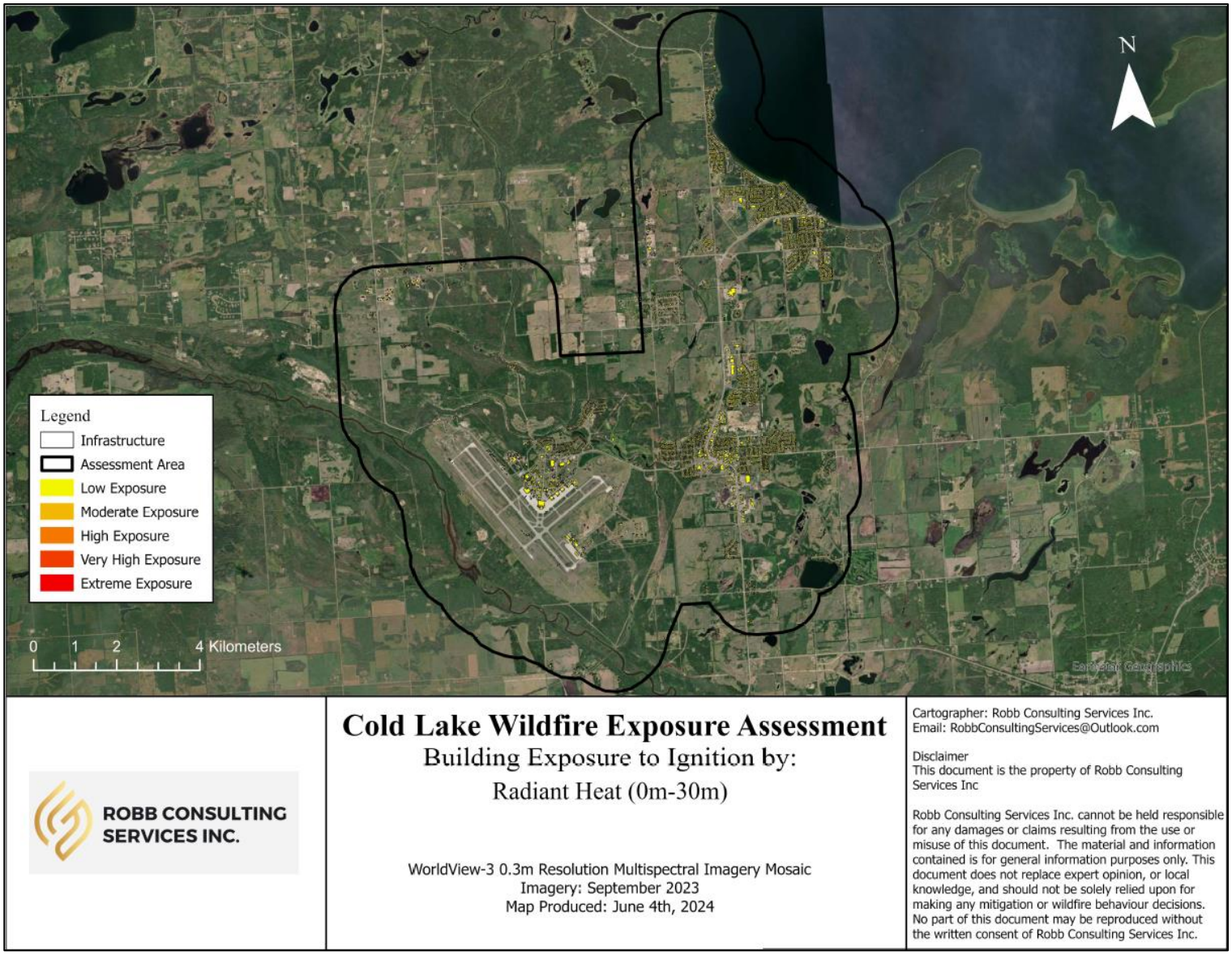
transport, 6.83% of structures are moderately exposed, while 5.15%, 5.11%, and 60.25% are highly, very highly, and extremely exposed to ignition by long-range ember transport.

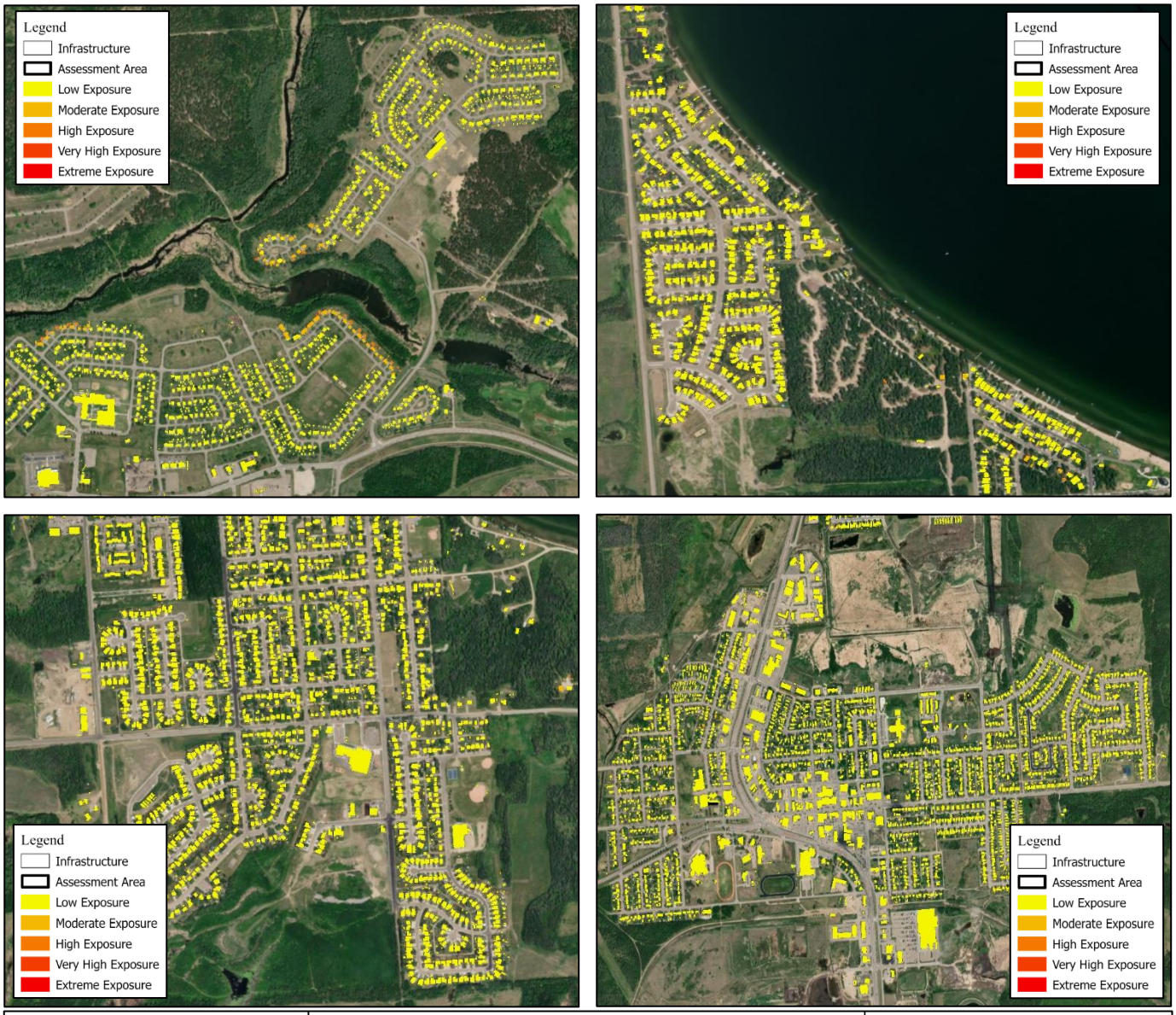
While it may seem that many structures in the assessment region face unacceptably high exposure to the various ignition sources, it's crucial to apply experienced judgement to these quantitative measures. Exploring the data will reveal that many of these structures may be remote commercial sites, and or very small pieces of infrastructure. In addition, consider that the seasonality of grassland, cropland, and deciduous fuels significantly influences the associated fire behaviour. Proper FireSmart practices can positively impact the fire behaviour of grassland, cropland, and deciduous fuel types, leading to a reduction in the hazard.

Maps on pages 20-25 illustrate how infrastructure is exposed to the three wildfire ignition sources (radiant heat, short-range ember transport, and long-range ember transport). The measurement of exposure in each of these maps aligns with the research conducted in 2021 (Beverly & McLoughlin & Chapman, 2021), as previously mentioned. These maps serve as a visual representation of the information presented in table 3, aiding readers in identifying regions that necessitate wildfire mitigation strategies.

By integrating the landscape wildfire exposure metric from pages 20-25 with information about the fuels contributing to radiant heat exposure (page 15), Short-Range Ember Transport (page 16), and Long-Range Ember Transport (page 17), a compelling case can be made for the strategic implementation of fuel modification treatments in specific areas.

Wildfire fuel modification treatments aim to reduce wildfire intensity and spread by altering vegetation and combustible materials. Common treatments include thinning, prescribed burns, fuel breaks, fuel reduction zones, vegetation management, defensible space creation, and community education. These strategies help manage fuel loads, create fire barriers, and educate communities to enhance wildfire resilience and protect lives and property.





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Cold Lake Wildfire Exposure Assessment

Building Exposure to Ignition by:

Radiant Heat (0m-30m)

WorldView-3 0.3m Resolution Multispectral Imagery Mosaic
Imagery: September 2023
Map Produced: June 4th, 2024

Cartographer: Robb Consulting Services Inc.
Email: RobbConsultingServices@Outlook.com

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Cold Lake Wildfire Exposure Assessment
Building Exposure to Ignition by:
Short Range Ember Transport (0m-100m)

WorldView-3 0.3m Resolution Multispectral Imagery Mosaic
Imagery: September 2023
Map Produced: June 4th, 2024

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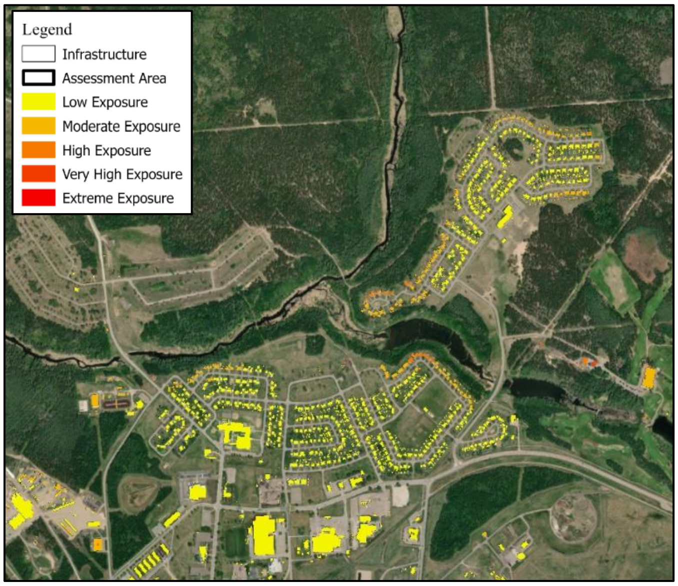

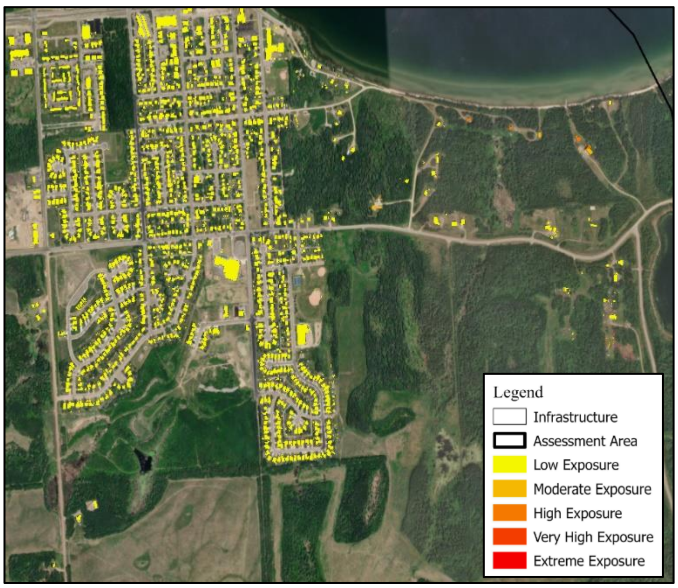

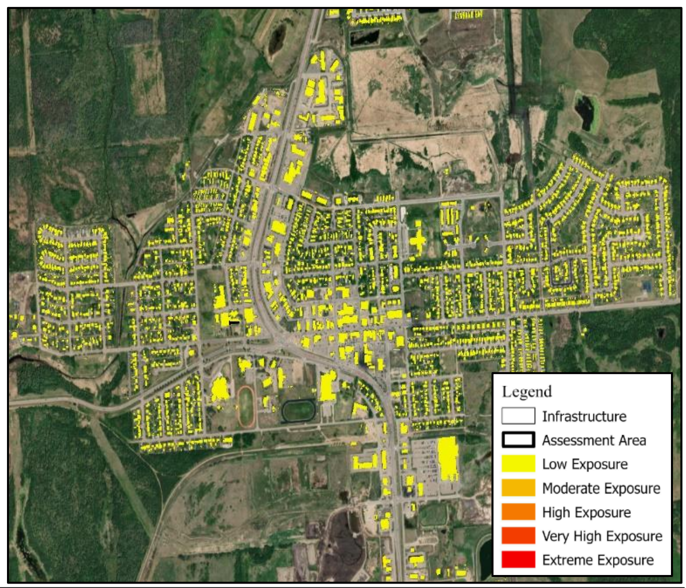

Cold Lake Wildfire Exposure Assessment

Building Exposure to Ignition by:

Short Range Ember Transport (0m-100m)

WorldView-3 0.3m Resolution Multispectral Imagery Mosaic
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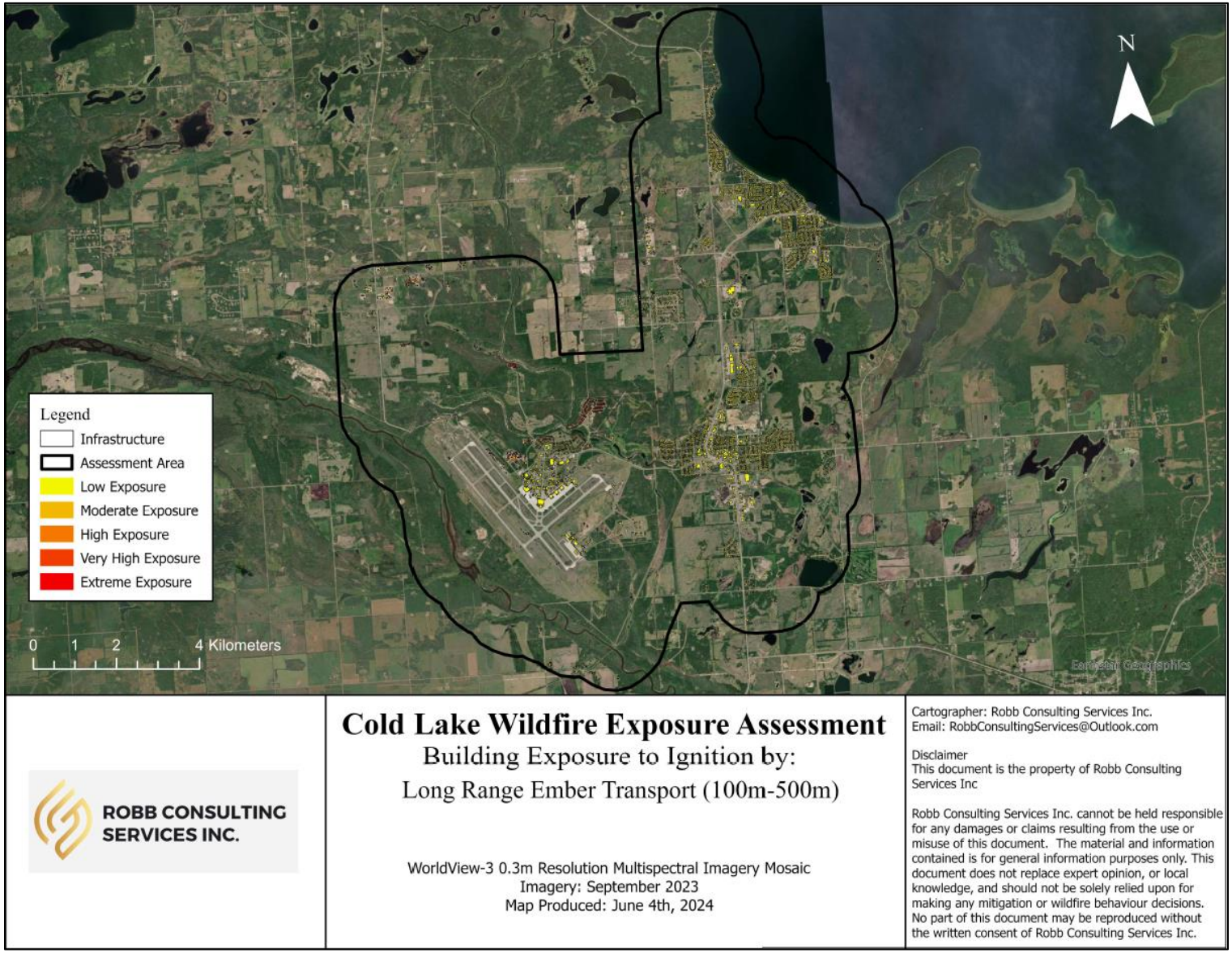

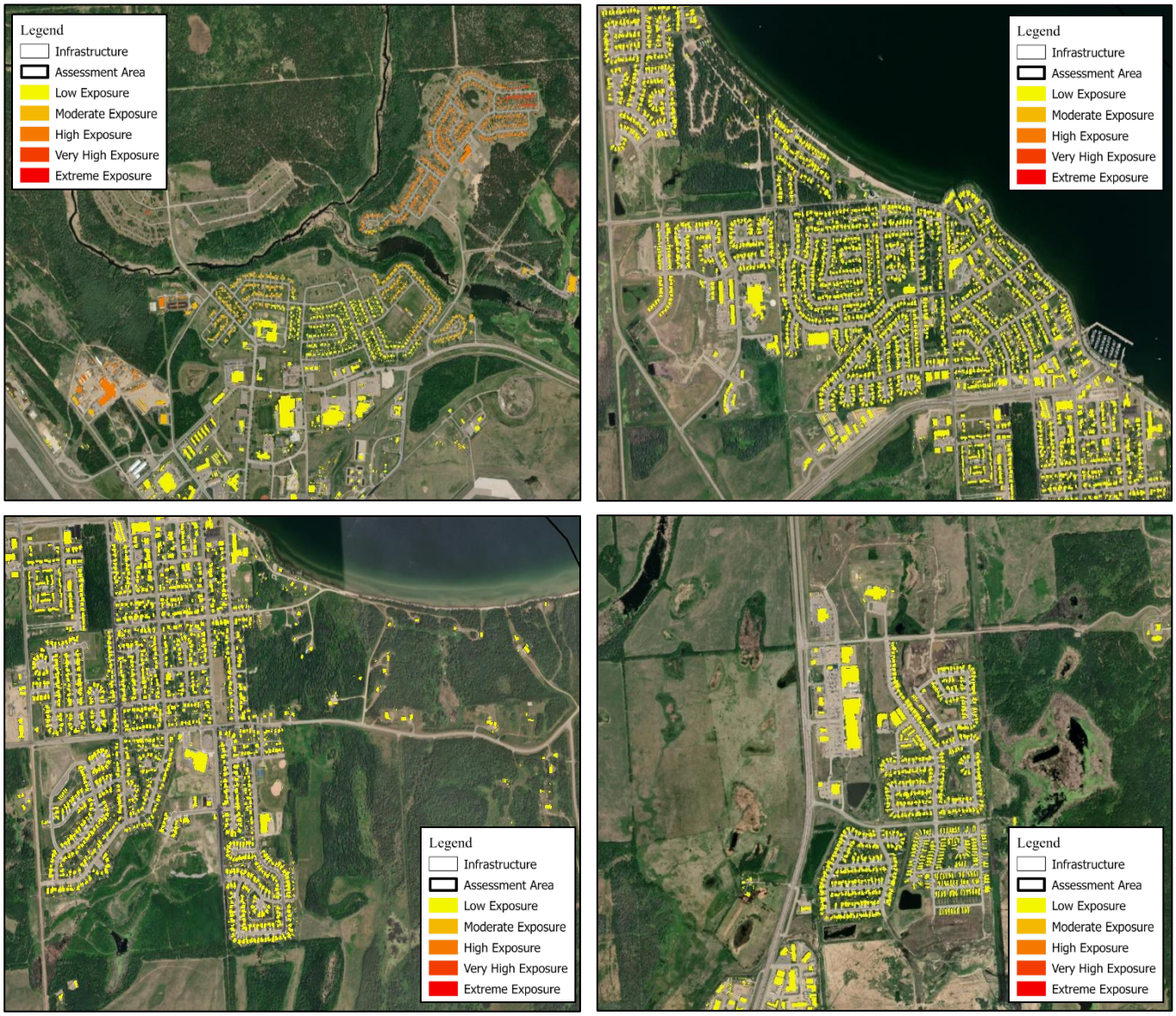

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Cold Lake Wildfire Exposure Assessment

Building Exposure to Ignition by:

Long Range Ember Transport (100m-500m)

WorldView-3 0.3m Resolution Multispectral Imagery Mosaic
Imagery: September 2023
Map Produced: June 4th, 2024

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Landscape Wildfire Exposure

Landscape wildfire exposure refers to the assessment and evaluation of the potential risk and impact of wildfires on a particular landscape. This includes understanding factors such as the likelihood of wildfires occurring in each area, the intensity and frequency of these fires, and the potential effects on the landscape itself, as well as on human communities and infrastructure

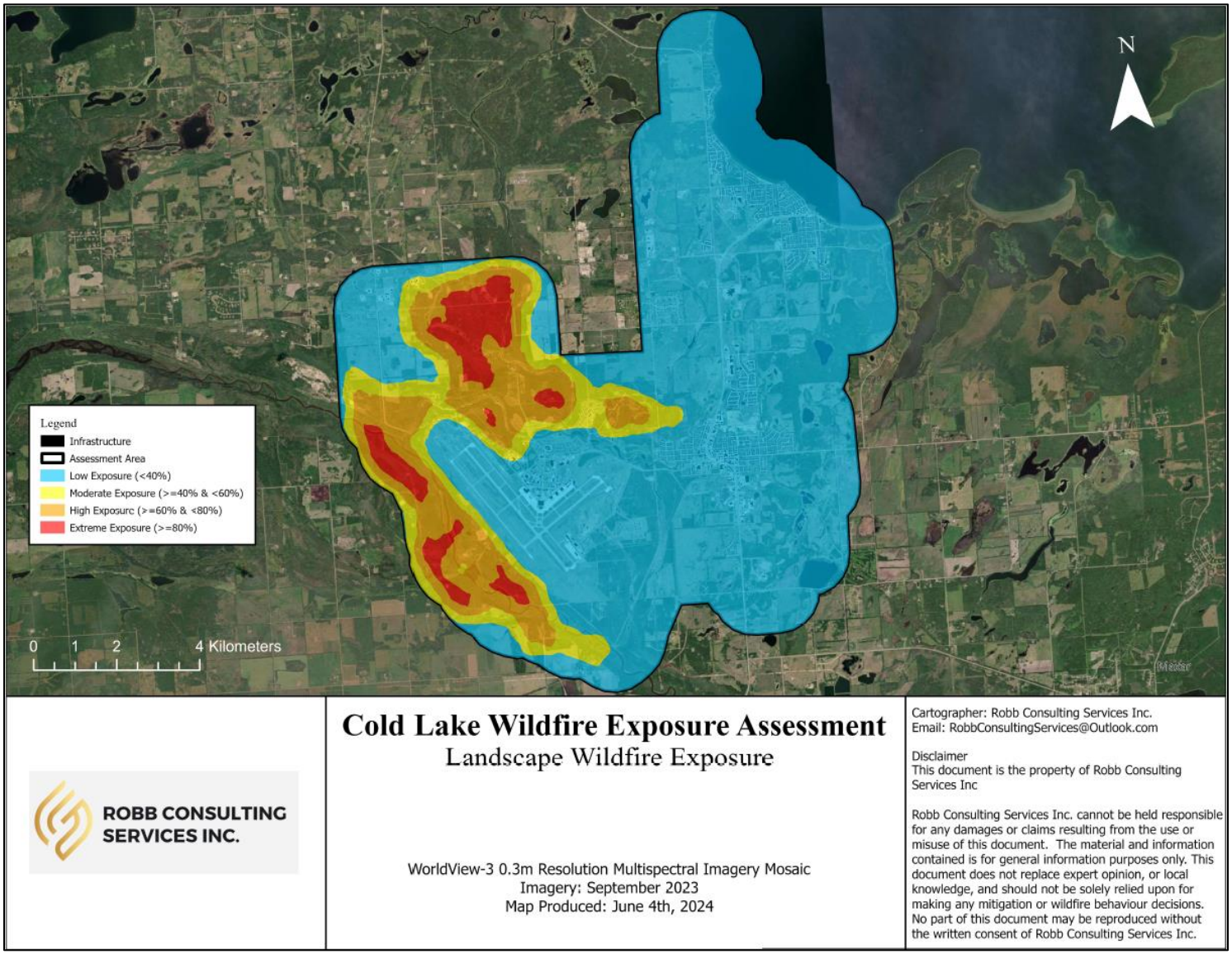
Exposure assessments are typically characterised by values, such as built structures, with geographic locations where burning is possible (e.g., Beverly et al. 2010) or probable (e.g., Haas et al. 2013; Whiteman et al. 2013); however, the concept is equally relevant to the transmission of fire from hazardous fuel to nearby flammable vegetation. The former relationship between hazardous fuel and exposed infrastructure was demonstrated in the previous section entitled Infrastructure Exposure. Landscape wildfire exposure describes the extent to which land cover type in the vicinity of a location will either contribute to or resist fire transmission to that location. This approach explicitly accounts for the contagious nature of combustion without the need for intensive simulations of fire growth. The resulting fire exposure metric is a numeric rating of the potential for fire transmission to a location given surrounding fuel composition and configuration, irrespective of weather or other fire controls. Exposure can then be used in conjunction with other metrics of fire controls to inform the study of landscape fire and aid in the development of mitigation strategies.

(Mcloughlin & Beverly, 2010)

The metric of landscape fire exposure can be interpreted according to table 4.

Table 4. *Landscape Wildfire Exposure categories for the assessment area representing the WUI of Cold Lake, AB.*

Landscape Wildfire Exposure	Percent Exposure
Extreme Exposure	>=80%
High Exposure	>=60% & <80%
Moderate Exposure	>=40% & <60%
Low Exposure	<40%

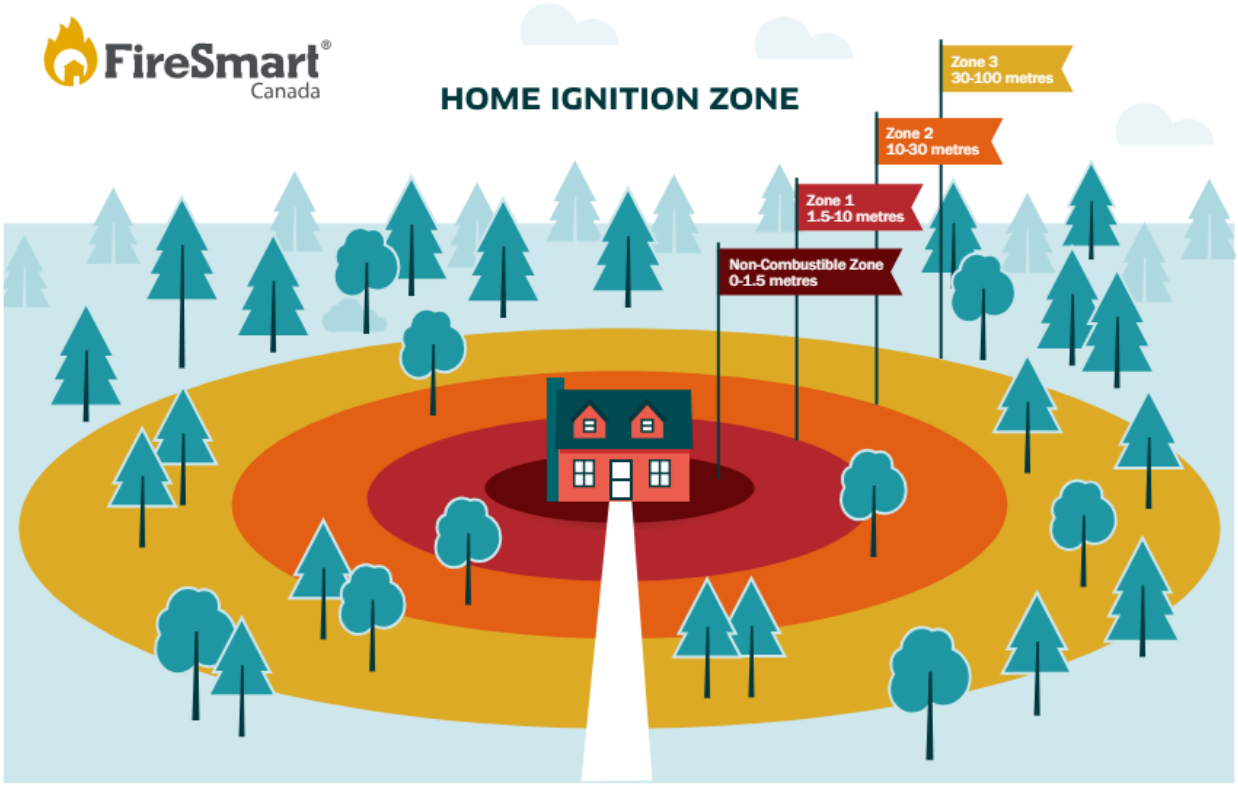


VEGETATION MANAGEMENT

One of the ultimate goals of vegetation management is to create a buffered region between human development (residential, commercial) and flammable wildland vegetation. The creation of a buffer will reduce the intensity and rate of spread of wildfire within the WUI. This reduction in intensity will allow structures to be more resilient to radiant heat and ember transport.

It should be noted that vegetation management will reduce the threat of wildfire; however, these fuel reduction techniques do not ensure structure survival under all weather conditions. There is no fuel modification technique that will guarantee residential or commercial survival by wildfire under extreme conditions.

FireSmart Canada recommends breaking the WUI into three interface priority zones.



FireSmart Canada, digital image, accessed 24 June 2024, <https://firesmartcanada.ca/wp-content/uploads/2022/01/FS_Home-Ignition-Zone-Poster.pdf>.

Priority Zone 1 and 2

This is the most critical region surrounding the structure. Extending up to 30 meters, the main objective of vegetation management should be fuel removal and reduction. Mitigation strategies should focus on ensuring that high-intensity fire will not be supported within this region.

This report focused on identifying coniferous fuels that are responsible for high intensity class wildfires. The implementation of FireSmart guidelines in the regions identified will be the most efficient and productive use of funding.

Treatment options for Zone 1 and 2

- **Removal** of all flammable forest vegetation in the area immediately adjacent to human development
- **Pruning** the lower limbs of all trees to a minimum height of 2 meters. This will increase canopy base height of the trees and reduce the ability for wildfire to move into the canopy.
- **Thinning** the coniferous forests to reduce the amount of available fuel.

Priority Zone 3

The area within this priority zone extends from 30 meters to 100 meters. Fuel modification within this region should be attempted whenever there is steep topography or dense coniferous forests.

This report attributes this priority zone to ember transport. Past 30 meters radiant heat is no longer the primary concern; rather it is the fire brands that are blown into the community by prevailing winds. Fuel modification or conversion is most beneficial to this priority zone. Reducing the proportion of coniferous fuel types and/or replacing them with deciduous fuel types will dramatically reduce ember transport.

Treatment options for Zone 3

- **Species conversion** to replace coniferous fuel types to deciduous fuel types. This will reduce the amount of wind-driven ember transport that impinges on the community.
- **Fire guards** through clearcutting will slow the wildfire down and allow fire suppression to extinguish or control the wildfire.

No matter what mitigation strategy is selected, there will always be the potential for high intensity wildfires to move through the WUI and into the community.

CONCLUSION

The map on page 15 delineates areas within FireSmart priority zones 1 and 2 (0-30 meters) that require wildland fuel reduction treatments. These fuel sources contribute to the potential ignition from radiant heat for homes and infrastructure identified in page 20 and 21. Upon analyzing both sets of figures, it becomes apparent that focusing on hazard reduction treatments for coniferous fuels as it aligns with FireSmart principles will aid in reducing infrastructure exposure to ignition by radiant heat.

To identify regions needing fuel reduction treatments for mitigating ignition through short-range ember transport (0-100 meters), consult page 16. Fuels within these areas contribute to exposure of ignition through ember transport for homes and infrastructure identified on page 22 and 23. Examination of pages 15, 22, and 23 indicates that treating coniferous forests effectively can mitigate ignition from both radiant heat and short-range ember transport.

Lastly, page 17 identifies the fuels that are responsible for infrastructure exposure to ignition by long-range ember transport. Categorized infrastructure exposure can be viewed on pages 24 and 25.

As a final note, it is important to remember that this report is a quantitative guide developed through research on the fuels responsible for infrastructure exposure to ignition by hazardous wildland fuels. Data is produced through various mathematical and statistical models and cannot be relied upon to give a correct answer every time. Every model has limitations, and every statistic is subject to bias and errors. The successes of mitigation and suppression strategies developed as a byproduct of this report will depend to a large extend on local knowledge and practitioner skill. The most accurate strategies will be created by individuals that combine this quantitative guide with their own fire experiences and on-the-ground knowledge.

APPENDIX

A. Glossary of Terms

Canadian Forest Fire Danger Rating System:

A national system for rating the risk of forest fires in Canada. Capable of producing qualitative and/or numeric indices of fire potential, which are used as guides in a wide variety of fire management activities.

Buildup Index (BUI):

A numeric rating of the total amount of fuel available for combustion. It is based on the duff moisture code (DMC) and drought code (DC).

Digital Elevation Model: (DEM)

A digital elevation model (DEM) is a computer graphic representation of elevation data to represent terrain.

Fire Behaviour Prediction System (FBP):

Is a system that provides quantitative estimates of potential head fire spread rate, fuel consumption, and fire intensity, and well as fire descriptions.

Fire Weather Index (FWI):

A numeric rating of fire intensity. It is based on the initial spread index and the build-up index and is used as a general index of fire danger throughout the forested areas of Canada.

Head Fire Intensity (HFI):

Is the predicted intensity, or energy output, of the fire at the front or head of the fire. It has become one of the standard gauges fire managers estimate the difficulty of controlling a fire and select appropriate suppression methods.

Initial Spread Index:

A numeric rating of the expected rate of fire spread. It is based on wind speed and fine fuel moisture.

Landscape Fire Exposure:

A metric that is used to assess a cells proximity to nearby hazardous fuel capable of transmitting fire to its location

Wildfire Behaviour Potential:

Quantifies wildfire hazard for wildland fuels. Can be used to identify relative wildfire threat to prioritize areas for vegetation management.

Wildfire Intensity Class:

Fire intensity classes, rated from 1 to 6, are each assigned to a range of fire intensity values in kilowatts per meter. Relating to head fire intensity, wildfire intensity class can also support wildfire management decisions and suppression efforts.

Wildland Urban Interface (WUI):

The zone of transition between wildland and human development. Communities within the wildland urban interface are at a greater risk of catastrophic wildfire.

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