Pre-Incident Wildfire Plan Proposal

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Introduction

In the midst of escalating wildfire risks fueled by climate change, the City of Camrose stands at a critical juncture. With a population of approximately 20,000 residents, Camrose embodies the typical blend of residential, commercial, and institutional properties. Despite the absence of a notable rise in risk potential according to environmental scans and community profiles, several factors heighten the city's vulnerability to wildfires. The urgency for updated and comprehensive pre-incident planning is underscored by the province's declaration of a state of emergency in 2023, with record-breaking hectares burned. As Canada grapples with longer and more severe wildfire seasons, the imperative for proactive measures to safeguard lives, property, and vital infrastructure becomes increasingly evident. Neglecting to adequately address these factors can expose both communities and responders to vulnerabilities, resulting in unfavorable outcomes. Communities need to thoroughly evaluate the risks and develop plans that account for future requirements, a necessity that is especially pronounced in municipalities such as the City of Camrose.

Pre-incident planning emerges as a pivotal strategy in mitigating the impact of wildfires, particularly in industrial and manufacturing settings. Collaboration with local fire departments facilitates the exchange of crucial information, empowering first responders to enhance their response capabilities. By conducting risk assessments, municipalities can identify the information necessary to make informed decisions and develop effective fire prevention programs tailored to local needs and circumstances. However, the challenges posed by wildfires

extend beyond economic and environmental impacts to encompass significant health repercussions, particularly for vulnerable populations.

In response to these multifaceted challenges, our project seeks to develop an effective pre-incident plan specifically tailored to the wildfire risks in the vicinity of Camrose. By formulating strategic plans for various fire scenarios and devising evacuation and risk management strategies, our goal is to raise awareness about vulnerable infrastructure and populations in the city. Through targeted measures such as landscape vulnerability assessments and community engagement, we aim to enhance Camrose's resilience to wildfires, ensuring the safety and well-being of its residents while fostering sustainable development practices.

Our project aligns with Camrose's vision for sustainable growth and environmental stewardship, emphasizing the integration of adaptive strategies and community resilience-building initiatives. By addressing immediate concerns and positioning Camrose as a model for climate-resilient communities, our efforts extend beyond risk reduction to encompass the promotion of overall well-being and economic stability. In the face of evolving climate conditions, our proactive approach to pre-incident planning for wildfires serves as a testament to Camrose's commitment to safeguarding its future and thriving amidst uncertainty.

Fire Anatomy

To understand how a fire can start due to human carelessness, climate change, lightning, and others we need to understand what fire is and the components of it. Fire is a chemical reaction and is a component of the ecosystem. How fire fits and reacts with the ecosystem requires understanding of fire anatomy and the components of the ecosystem which is what this section of the pre-incident plan is going to explain.

To characterize fire we use two terms:

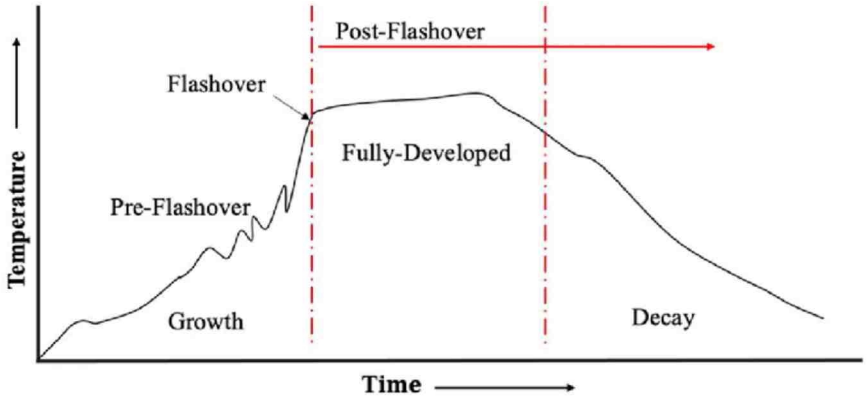
- Fire Intensity- "…is the amount of heat (energy given off by a forest or structure fire at a pacific point in time" (Oregon State University, 2017a, p. 12).
- Fire Severity- "...is a product of fire intensity and residence time, and refers to the effects of a fire on the environment typically focusing on the loss of vegetation both aboveground and belowground but also including soil impact" (Oregon State University, 2017a, p. 12)

The intensity and severity of wildfires depend on the fire tetrahedron. The fire tetrahedron has three components that are essential for fires to exist and continue burning (Oregon State University, 2017a, p. 10):

1.) Oxygen- at least 16% oxygen to continue to burn
2.) Fuel
3.) Heat/ ignition- initial and continuous heat source

A wildfire goes through numerous stages of growth and combustion when it first starts. The longer the fire is exposed to the fire tetrahedron the more advanced the fire developmental stages will get.

1.) Incipient Stage- “As an ember lands within a load of flammable material, a fuel source, such as pine needles and leaves left in rain gutters, it is setting the stage for ignition to occur” (Frontline Wildfire Defense, n.d.).
2.) Flashover Stage- “The combination of heat, oxygen, and fuel increase the odds of the fire growing to the next stage. This is when the structure becomes the next available fuel source, the fire begins to spread beyond the initial ignition point. Flames are visible and gaining ground” (Frontline Wildfire Defense, n.d.).
3.) Fully Developed Stage- “As more fuel becomes consumed, the fire moves into a fully developed state. This is the most dangerous phase of a fire, and the hottest. At the peak of combustion, once all the material has been ignited, the fire begins its downward spiral” (Frontline Wildfire Defense, n.d.).
4.) Decay Stage- “With a decrease in fuel or oxygen, the fire reduces down to embers and ash. This is a dangerous phase because any introduction of new fuel loads or increase in oxygen could reinvigorate the fire. This is the longest stage of a fire; in fact, it often takes weeks to fully extinguish all embers and firebrands from a large fire” (Frontline Wildfire Defense, n.d.).



https://www.researchgate.net/figure/Stages-of-fire-in-a-compartment_fig1_351434250.

Four Types of Ignition:

1.) Chemical- "...caused by exothermic reactions, such as exothermic polymerisation or a reaction between sodium metals and air" (*4 MOST COMMON SOURCES OF IGNITION AT WORK & HOW TO IDENTIFY THEM*, 2022). Examples include:
    - Oxidizing reactions
    - Exothermic polymerisation
    - When pyrophoric substances get exposed to air
2.) Electrical- "...caused by electrical devices ignite via sparks from power outlets or exposed cables or an excessive buildup of electrostatic current" (*4 MOST COMMON SOURCES OF IGNITION AT WORK & HOW TO IDENTIFY THEM*, 2022). Examples include:
    - Sparks
    - Electrical faults
    - Electrical cooking equipment

- Static electricity
- Overloaded electrical circuits
- Electric heaters
- Overclocked electrical equipment
- Lightning

3.) Mechanical- caused by excessive heat. Examples include:

- Excessive friction
- Sparks
- Overheating machinery or peripheral equipment
- Radiated heat

4.) Thermal- "…sources of ignition can vary in size and scope: any item that gives off heat via a flame or directly hot surface can fall under this category" (*4 MOST COMMON SOURCES OF IGNITION AT WORK & HOW TO IDENTIFY THEM*, 2022). Examples include:

- Blowtorches
- Cigarettes
- Cigarette lighters
- Gas/electrical hobs/stoves
- Glowing embers
- Electric lamps
- Soldering irons

Fuel Sources:

- Grass
- Shrubs
- Trees
- Houses
- Propane Tanks
- Cardboard
- Fabrics
- Wood Piles
- Metal
- Decks
- Paper
- Solvents
- Cleaning Agents

Components of fire behavior:

1.) Fuel

2.) Weather

3.) Topography

Parts of a Fire:

1.) Ignition Point- "…located where the ignition first occurred and combustion was sustained" (*What Are? PARTS OF A WILDFIRE*, n.d., p. 1).

2.) Perimeter- "…the entire outside edge or boundary of a fire or burned area" (*What Are? PARTS OF A WILDFIRE*, n.d., p. 1).

3.) Head- "…the fastest moving portion of a fire which is normally bruning with the wind and/or slope. Depending on the fuel and its arrangement, the head typically has the greatest flame length, flame depth, and rate of spread" (*What Are? PARTS OF A WILDFIRE*, n.d., p. 1).

4.) Heading Fire- "…fire spreading, or igniting to spread, with the wind" (*What Are? PARTS OF A WILDFIRE*, n.d., p.1)

5.) Back- "...portion opposite to the head and is the slowest moving part of the fire with the shortest flame lengths" (*What Are? PARTS OF A WILDFIRE*, n.d., p.1).

6.) Backing Fire- "...is fire spread, or ignited to spread, into (against) the wind of downslope" (*What Are? PARTS OF A WILDFIRE*, n.d., p.1)

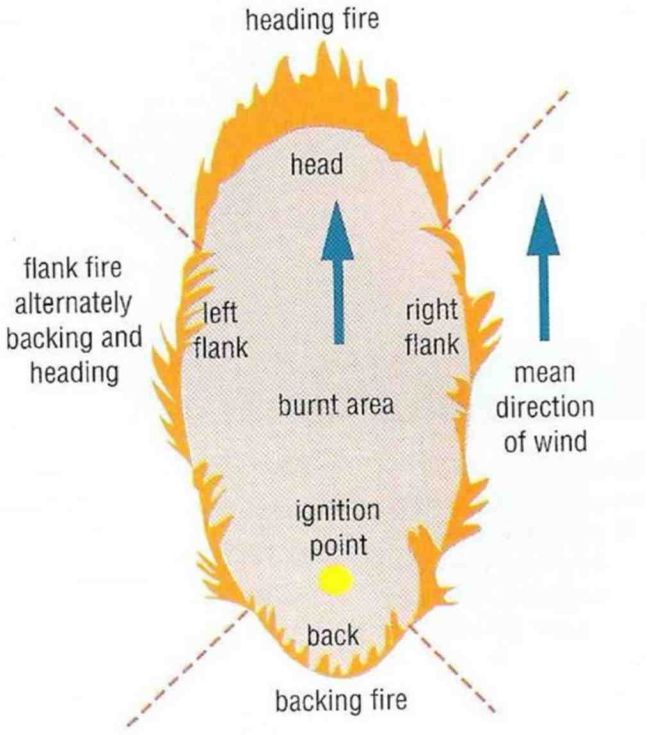
7.) Flanks- "…are roughly parallel to the main direction of spread. Flanks have less alignment with the wind than the head thereby reducing the intensity and rate of spread of those parts" (*What Are? PARTS OF A WILDFIRE*, n.d., p. 2).

8.) Finger(s)- "…are long narrow extensions of a fire that project from the main body of the fire" (*What Are? PARTS OF A WILDFIRE*, n.d., p. 2).

9.) Pocket(s)- "...are unburned indentations in the fire edge formed by fingers or slow burning areas" (*What Are? PARTS OF A WILDFIRE*, n.d., p. 2).

10.) Unburned island(s)- "...are areas where fuels were not combusted within the fire perimeter" (*What Are? PARTS OF A WILDFIRE*, n.d., p. 2).

11.) Spot Fire(s)- "...are ignited outside the perimeter of the main fire by lofted embers. Firefighters often refer to this as spotting and may occur miles in advance of the flaming front" (*What Are? PARTS OF A WILDFIRE*, n.d., p. 2).



The-parts-of-a-moving-fire-flames-of-a-heading-fire-lean-over-the-unburnt-fuel-flames_fig1_359650950.

Wildland fires are classified into ground, surface and crown fires, based on the fuel strata where burning occurs.

1.) Passive Crown Fires- "…when a fire torches out one tree or a small group of trees but the solid flame is not consistently maintained in the canopy…" (Alvarez et al., 2012, p. 463)
2.) Active Crown Fires- "when fire can spread continuously through the entire surface/canopy fuel complex (Scott & Reinhardt, 2001)" (Alvarez et al., 2012, 463).

3.) Ground Fires- one that burns in ground fuels such as duff, organic soils, roots, rotten buried logs." They are considered to be high density but they have a low spread rate.
4.) Surface Fires- burns in the surface layer, and fuel sources include needles, leaves, grass, dead branches and logs, shrubs, low brush, short trees (Scott & Reinhardt, 2001). They are considered to be moderate density but they have a fast spread rate.

Fire behavior has many components which will either help a fire burn faster or slower due to the environmental gradient this includes:

1.) Uphill and downhill slopes (Oregon State University, 2017b).
    - Uphill slopes, a fire will burn faster and spread further, especially on steeper slopes, especially when there are forest biomasses with plenty of fuel (Oregon State University, 2017b).
    - Downhill slopes, fires don't spread as fast as uphill slopes (Oregon State University, 2017b).
2.) Saddles which are "low areas between two higher ridges" (Oregon State University, 2017b, p. 9).
    - Chimney effect that acts on preheated fuel at higher elevation and upslope winds causes fire to spread rapidly up the slope (Oregon State University, 2017b). Within confined canyons, the sun's radiant heat can shape the environment of fuels on an opposite slope, hence its propensity for ignition increases (Oregon State University, 2017b). This creates an ability for spot fires and causes fire to spread faster, also providing fire centers for multiple ignitions distributed throughout the canyon (Oregon State University, 2017b). At nighttime, the

horizontally-moving downdrafts make the temperature drop and the humidity rise, resulting in the gradual progression of the fire down the slope gradually (Oregon State University, 2017b).

3.) "Fuel load and depth can help determine whether a fire ignites, its rate of spread, and its intensity" (Oregon State University, 2017b, p. 9).

- Vegetation mix and structure are directly correlated with fuel load and depth. Vegetation that is acclimated to soil types, slopes, elevations, precipitation, and disturbance succession produces structures and compositions (Oregon State University, 2017b).
- As the vegetation adapts to the alteration. Land management might result in fuel loadings that are larger or lower than they would have been in the past (Oregon State University, 2017b).

4.) "Environmental gradients affect structure fires" (Oregon State University, 2017b, p. 10).

- Houses situated in box canyons, along downwind ravines, on steep slopes (particularly those facing south), and in areas with strong winds are significantly more vulnerable to wildland fires or fires that originate inside the building (Oregon State University, 2017b).

Extreme fire behavior occurs when "wind speed is greater than 20 miles per hour at slightly above ground level, temperatures read 80°F or above; and relative humidity is less than 20 percent" (Oregon State University, 2017c, p. 7).

Fire spread is “measured or estimated in feet per minute or chains (1 chain = 66 ft) per hour” (Oregon State University, 2017c, p. 9). In which it spreads through convection, radiation, or conduction (Oregon State University, 2017c).

- Conduction- “…is the transfer of heat from a flame directly to a fuel source through direct contact” (Oregon State University, 2017c, p. 10).
- Convection- “...the transfer of heat from a flame indirectly to a fuel source in the path of the flame front through the heating of gases or air or both” (Oregon State University, 2017c, p. 10).
- Radiation- “...is the transfer of heat from a flame indirectly to a fuel source via electromagnetic waves” (Oregon State University, 2017c, p. 10).

Fire spread is increased by:

- It starting in standing grass
- Ratio of heat source
- Organization of fuels
- Organization of wind
- Organization of weather
- Organization of topography
- Greenhouse gas emissions are causing more and more climate change. It is anticipated to lengthen the seasons that fires spread and increase fire weather conditions.

Wildfire exposure and wildfire vulnerability are two important characteristics when identifying areas for risk assessment. Wildfire exposure is “the situation of people, infrastructure,

housing, production capacities and other tangible human assets located in wildfire prone areas" (Goldammer et al., 2017, p. 5). Wildfire vulnerability is "the potential damage from wildfires and it may be defined as: The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging impacts of a hazard" (Goldammer et al., 2017, p. 5). The evaluation of susceptibility to wildfire should take into account the projected damage produced by wildfire, which is an important component of an integrated wildfire risk assessment.

Considering all this information we gave you there are only four ways to put out a fire: Cooling the burning material, excluding the oxygen, removing the fuel, and breaking the chemical reaction (Oregon State University, 2017a).

Natural Fire Regime

The natural fire regime “describes the patterns of fire seasonality, frequency, size, spatial continuity, intensity, type (e.g., crown or surface fire) and severity in a particular area or ecosystem” (Government of Canada, n.d.). An area's indicators are the annual areas burned, the number of large fires, and fire seasonality. With annual areas burned, it is important to note that using that zonal approach, where splitting up areas into zones helps identify areas with “...unusual fire regimes that would have been overlooked if fires had been aggregated according to administrative and/or ecological classifications” (Government of Canada, n.d.). Understanding changes in the fire regime can lead to better forest resource management and wildfire evacuation preparation.

Forest types that are linked to a high to extreme danger of wildland fire are considered hazardous forest types. To successfully limit the hazards that wildland fires pose to values, it is vital to understand the variables that contribute to the hazards of these forest types. High hazardous wildfire risk levels include:

- Vegetation composed of “immature jack pine; boreal spruce; black or white spruce; balsam fir; immature red, white pine High: Mature jack pine; mixed-wood with >50% conifer species.
- Forest condition in which “large amounts of woody debris /slash build-up and branches on the ground, large build-up of flammable surface materials: cured grasses, needle litter or forest debris (i.e., branches, fallen trees, etc.), forest fuels from thinning or logging

operations lying horizontally on the ground with accumulation of fine fuels from conifer tree tops and branches, and conifer trees have ladder branches (<2 m from ground)".

- Forest health which "storm-damaged, insect-damaged or diseased fuels indicated by: forest fuels lying horizontally on the ground full conifer trees lying on ground or tops of conifer trees broken off and lying on the ground dead standing conifer trees with red or brown needles intermixed with immature conifer trees".

Camrose Alberta resides in an aspen parkland region which is a transitory zone in between a boreal forest and the prairie. Our risk assessment would be concerned with zones of the boreal forest if a fire were to start there and the prairies which have a lot of wild grasses that easily catch fire.

Wildland Urban Interface

The wildfire impacts have become economically and socially more significant in recent years, raising a worldwide issue. With climate-change-induced wildfires, human-suppression efforts, and wildland-urban interface areas increasing because of urban growth, it is expected that the occurrence and severity rates of wildfires will rise. Therefore, hazardous fires will continue to be a threat with communities becoming focused on the dangers, especially those situated in the wildland-urban interface. There are three different ways to categorize the risks of wildfire on buildings/houses in the WUI: direct flame contact, radiant heat, firebrand attack, and a mix of two or all of these. Therefore it is pivotal to identify WUI areas for risk assessment in Camrose to help develop fire prevention and management measures.

Wildland-urban interface (WUI) has many meanings but when it is “for those challenged with fire prevention responsibilities, the wildland-urban interface occurs where human-built structures are adjacent to or surrounded by areas prone to wildfire” (Vince et al., 2005, p. 5). Ultimately it is a transition zone between unoccupied vegetated land and human development (Gonzalez & Ghermandi, 2024). There are two types of wildland-urban interfaces, intermix and interface areas. Intermix are “...areas where housing (more than one per 40 acres) intermingles with wildland (nonagricultural) vegetation” (Vince et al., 2005, p. 5). Interfaces are “...areas with housing and a low density of vegetation that are within fire’s reach (1.5 mil) of a large contiguous block of wildland vegetation” (Vince et al., 2005, p. 5). Both areas include the “edges of cities, areas where houses and structures intermix with vegetation, and green islands within urban zones” (Gonzalez & Ghermandi, 2024, p. 2). Camrose, Alberta, is considered to be a

wildland-urban interface area because there are multiple forested areas around Camrose, where houses meet wildland vegetation.

Climate change is a major contributor to the wildfire risk increasing especially along the wildland-urban interface areas. As our climate warms, droughts happen more often, high winds are more regular, and fire season lengths are increasing. The WUI's development is characterized by a demand for housing in which people migrate in and out of cities/towns. Each building that is in that transitory area has a different risk scale depending on the owner's preference for aesthetics versus wildfire prevention. Risk mitigation is up to the owners, in people who prioritize the aesthetics of the building over prevention are more likely to increase their risk of fire and fire spread.

Command Considerations

City of Camrose will maintain all control over incidents that happen within the jurisdiction

- Fire chief shall establish roles in an emergency
- All resources should be accounted for during the emergency
- City establishes evacuation centre
- Heavy smoke in the city may require evacuation for special populations
- All fire trucks are located at the Fire Hall (201 Mt. Pleasant Drive)

Tactical Considerations

General Tactical Considerations for the City of Camrose:

- Some neighborhoods are vulnerable to structure-to-structure ignition because of the close proximity of homes
- Most high-risk areas have combustible attachments and will require attention before and after the head fire passes
- Neighborhoods that have dead-end streets and cul-de-sacs that make escape difficult during structure triage
- The valley is high-risk in the case of trains producing sparks as they pass through is very risky given the upcoming drought but also unavoidable, consider preventative measures along the railway in town, especially near the Valleyview community
- The valley igniting is the highest risk of creating a state of emergency for Camrose
- Responders should attempt to protect the ignition point to allow the Camrose Fire Department to investigate (if applicable)
- Naturalization in town and along the urban-wildland interface can lead to higher risk of wildfires
- In the case of a wildfire reaching town, lawns that haven't had their leaves raked or grass mown will expedite the fire, more trees will have the same affect
- The upcoming drought will make most of Alberta incredibly dry and vulnerable to wildfire, however use of water lines should be done carefully and minimally
- Continuing with the drought situation, pipes can break when the ground is hard and dry, valves on hydrants and trucks should be opened and closed slowly

- The weather station, which can observe potential wildfire conditions, is housed at the Camrose Airport
- In the case of Camrose being in need of air resources, water can be drawn from Driedmeat Lake for water bombing

The fuel model acts as a guide for which areas of Camrose are at a higher/lower risk in the event of fire spreading within the town, (Bryan Fire Department, 2013).

Fuel Model	Description	Rate of Spread	Flame Length
NB 91	Urban/Developed Land	N/A	N/A
GR 1	Short, Patchy Grass	Moderate	Low
FM 9 HWD	Hardwood Timber Litter, Fluffy Duff Layer	Low	Low
GR 2	Moderately Coarse Continuous Grass	High	Moderate
FM 8	Closed Timber Litter	Low	Low

Vulnerable Structures

Wildfires are costly disasters that require a lot of financial investment to safeguard the public from. But, important infrastructure such as transportation and utilities require the most investment (Codes, standards, and guidance for climate resilience, 2023) as they are among the most valuable assets in the city. The costs of repairing or replacing them is significantly higher than most other assets, which is why it is imperative to develop methods of protecting vital facilities and structures. Not only are these commodities important for everyday life, but are essential in preserving lives and coordination in the event of a wildfire.

According to the Camrose CVRA in 2023, environment and parks are the most vulnerable assets when compared to built infrastructure. The loss of these assets, while not critical to the functionality of the city, would result in the loss of recreational opportunities such as golfing, soccer, or the use of trails within the valley. Rudy Swanson Recreation Park has a multitude of recreational services and facilities within its boundaries, and the golf course northwest of Mirror Lake is the largest recreational space in Camrose. Firefighters should have easy access to bodies of water within the golf course that lead into Mirror Lake, and hydrants are located in the vicinity of most other parks. However, for the trails in areas such as Stoney Creek, other actions should be considered due to limited access to water sources and roads that vehicles can traverse.

Buildings and utilities that are along the wildland-urban interface are at the highest risk of damage, and will be at greater risk as wildfire activity increases throughout the next century

(Prokopchuk, 2019). Some of these include the Bulk Water Station on the south end of 50th street and the Wastewater Treatment Facility farther south. These facilities allow for used water to be purified and have waste products removed for safe consumption and use in everyday life. Research from the Camrose CVRA shows that these two services have the highest risk scores, and thus have the highest priority. The pump house connected to the wastewater treatment plant is the most important and most vulnerable asset Camrose has. In the event this were to be damaged by a potential wildfire, the consequences would be drastic and very costly. One possible consequence could be placing orders for residents to limit their water usage since the ability to clean used water would be severely limited.

FACILITY	**LOCATION**	**COMMENTS**
Golf Course	5106 66 St, Camrose	This is the largest environment/parks asset in Camrose, possesses highest risk score
Stoney Creek Valley Trail	5320 39 Ave, Camrose	Extends into the WUI, this is more vulnerable due to its position and the amount of foliage in the area
Rudy Swanson Recreational Park	53rd St and 44 Ave, Camrose	Possesses multisport field, ball diamonds, and

		recreational center with indoor facilities
Bulk Water Station	3701 50 St, Camrose	Total cost is $12.2 million
Wastewater Treatment Plant	46318 50 St, Camrose	Total cost is $51.4 million
Eastlink	4910 46 St	Telecommunications provider
Telus - Electro Tel	3720 B 48 Ave	A Telecommunications provider that is more vulnerable due to its position
Elite Mobility	6032 48 Ave	Telecommunications provider located near a park

Having to fix these services would be very pricey for the city of Camrose. Therefore, it is vital that appropriate measures are taken to protect these high priority assets, whether it be through creating buffer zones or other man-made barriers to slow the progress of a potential wildfire.

Roads are ranked 4th on the priority graph in the CVRA, but are an indispensable part of public infrastructure and extends into the WUI. This includes bridges such as the one on Highway 13A and, to a lesser extent, the 48 Avenue bridge that crosses Mirror Lake. Highway 13A provides a shortcut around urban traffic to numerous locations in Camrose. Due to increasingly volatile wildfire conditions as a result of climate change, the city cannot afford to

have this vital route cut if the bridge crossing the valley were damaged or destroyed if a fire were to occur in the valley below. During the valley fire in 1988, the Fire Department was able to request the use of a Water Bomber through the provincial government, which was used to save the wooden trestle in the valley. These planes could be requested for future wildfire events where road-based vehicles cannot reach certain areas or if there is limited access to sufficient water sources like hydrants and lakes.

Railroads extend further into the WUI than conventional roads and pass through forested areas of town, which are at a higher risk of fire activity (Prokopchuk, 2019). Trains passing through these areas often carry dangerous goods with them such as chemicals, fuel, or other potentially flammable goods. The Canadian National railway that runs from the north to the south on the east side of the city passes through the Stoney Creek valley and trail, where some forest is present. Both the CN and Canadian Pacific Kansas City railways pass through the industrial sector of town, the facilities in which have their own pre-incident plans for fires.

Emergency services (Police, Fire, Medical) need to be considered in the pre-incident plan as well. If St Mary's hospital were to be overwhelmed as a result of mass injuries from a wildfire, secondary locations such as the Recreation Center and adequately-equipped hospitals in neighboring cities like Wetaskiwin and Daysland could be used to treat the injured. Therefore, there should be plans made in advance so nearby hospitals and potential triage centers will be prepared should the need arise. Police should be adequately briefed and trained to handle these scenarios, as they will be needed to safely coordinate the public and maintain law and order in an emergency.

Land Resources

The Camrose Fire Department utilizes various types of trucks and engines depending on the nature and location of a fire. These vehicles fall under the category of fire apparatuses, each with standardized names and features. It enables strategic resource allocation based on the incident's specifics, allowing for efficient use of resources.

Fire Apparatus	Functionalities
2019 Pierce Custom 6000 Litre/Minute Pumper (# 219)	City Engine, has a water tank, pump, and hoses
2010 Rosenbauer Custom 6000 Litre/Min Pumper (# 200)	City Engine, Has a water tank, pump, and hoses
1999 GMC Superior 6000 Litre/min Pumper (# 205)	First truck to go
2013 Rosenbauer Custom Rescue Truck (# 209)	Jaws of life, vehicle accidents, special ops
2006 International 6000 Litre/min Pumper (# 215)	Owned by Camrose County, Portable Pump Out of Country
2003 Ford one-ton 4x4 Bush Truck-1350 Litre water/foam tank (# 204)	Bush Truck, designed to traverse rough terrain and transport more water relative to their size

The Camrose Fire Department (CFD) has received supplemental support from the City of Wetaskiwin fire services during various significant events. This assistance has been provided through mutual assistance programs, occurring intermittently over recent years. Mutual aid agreements are primarily intended for major emergencies and infrequent requests for assistance.

If the CFD intends to depend on services from other municipalities for all major fires or emergencies, establishing a formal contract for services is advisable to ensure fair compensation for the associated risks borne by these municipalities.

Air Resources

Camrose Fire Department does not have immediate access to helicopters that would be used in firefighting, as indicated by Deputy Fire Chief Joe Mah. However, air resources are available in an emergency situation when the call is made and the permissions have been given. Now unto a brief overview of the air operations that the province of Alberta has at its disposal for firefighting (Government of Alberta, 2024).

- Air Tankers- used for aerial firefighting, objective is to keep a wildfire from spreading until ground forces are brought in to extinguish it
- Helicopters- used for aerial firefighting, transporting personnel and equipment to and from forest fires, and dropping water/retardants to aid in extinguishing fire
- Aerial Patrol- supplement fire lookouts by covering gaps within the detection network and work with lookouts to monitor areas
- Water Bombing- water is drawn from a suitable reservoir and taken to the site of the fire where the water is then dropped
- Fire Retardant- air tankers/helicopters are used to drop foam and other fire retardants (designed to reduce or inhibit combustion)

Special Populations

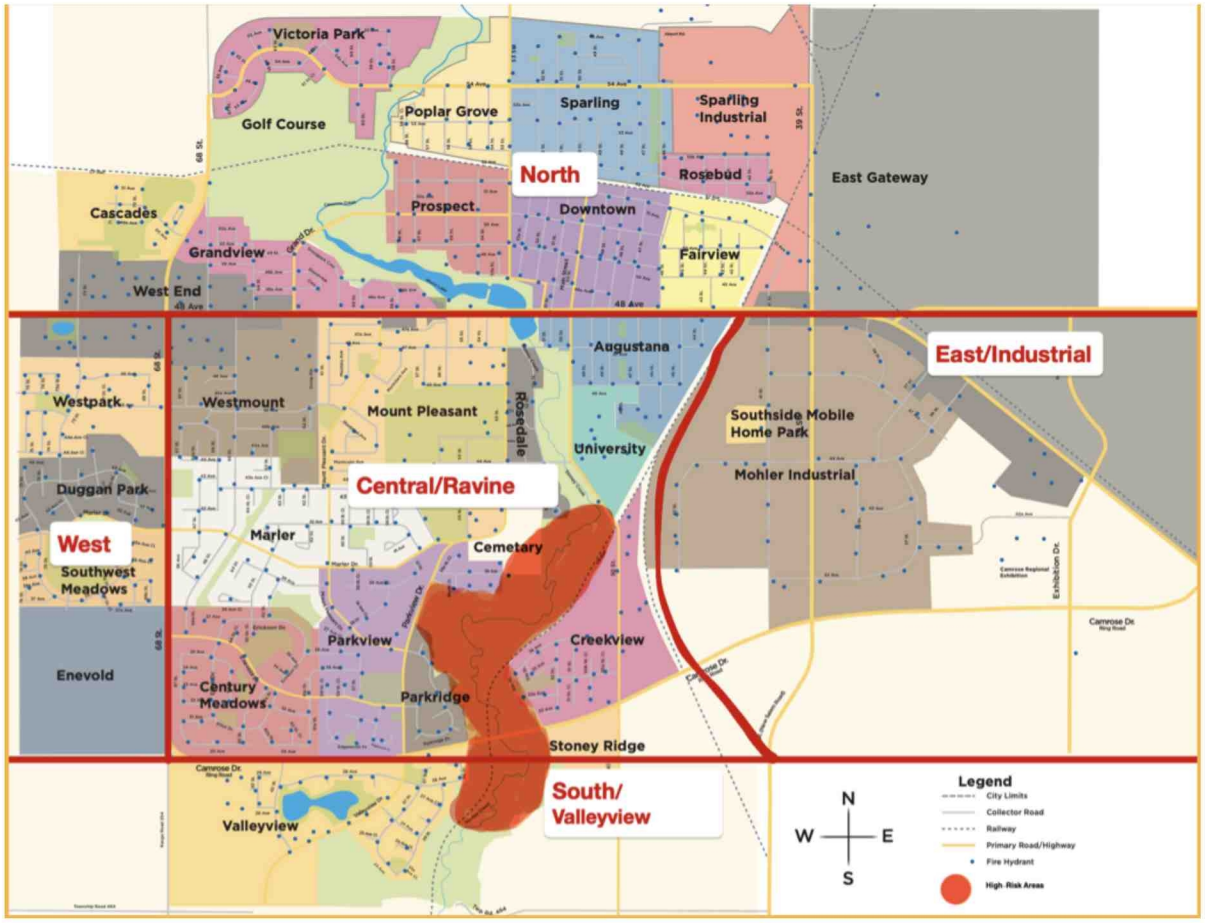
Special populations in a wildfire situation are regarded as people particularly vulnerable to smoke and other complications that happen in emergency situations (Public Health Agency of Canada, 2023). These people should be a priority and contacted in the case of evacuation first. This contact list of special populations for Camrose includes: schools, nursing homes, hospitals, and shelters. Evacuations will require coordination with: EMC, Fire Department, Police Department, Mayor's Office, City/Incident Public Information Officers, Dispatch, and Public Works (Bryan Fire Department, 2013).

- **St. Patrick Catholic School:** (780) 672-2177, 4816 53 Ave, Camrose, AB T4V 0Y2
- **Our Lady of Mount Pleasant Catholic School:** (780) 672-2975, 39 Mt Pleasant Dr, Camrose, AB T4V 2M3
- **Chester Ronning School:** (780) 672-5588, 6206 43 Ave, Camrose, AB T4V 0A7
- **Ecole Camrose Composite High School:** (780) 672-4416, 6205 48 Ave, Camrose, AB T4V 0K4
- **Ecole Charlie Killam School:** (780) 672-7785, 4809 46 St, Camrose, AB T4V 1G8
- **Ecole Sifton School:** (780) 672-2980, 4807 43 St, Camrose, AB T4V 1A9
- **Jack Staurt School:** (780) 672-0880, 200 Mt Pleasant Dr, Camrose, AB T4V 4X6
- **École Des Fondateurs:** (587) 769-0144, 4707 56 St, Camrose, AB T4V 2C4
- **Sparling School:** (780) 672-0106, 5216 52 Ave, Camrose, AB T4V 0X4
- **Bethany Nursing Home of Camrose:** (780) 672-0640, 4832 54 St, Camrose, AB T4V 2A4

- **Bethany Group:** (780) 679-2000, 4612 53 St, Camrose, AB T4V 1Y6
- **Louise Jensen Care Centre:** (780) 679-3097, 5400 46 Ave, Camrose, AB T4V 4P8
- **Seasons Retirement Community in Camrose:** (780) 672-2746, 6821 50 Ave, Camrose, AB T4V 5G5
- **Bethany Viewpoint:** (780) 672-1146, 4503 48 St, Camrose, AB T4V 4Z7
- **Bethany Memory Lane:** 5303 47 Ave, Camrose, AB T4V 1Y8
- **Rosealta Lodge:** (780) 679-0851, 4318 53 St, Camrose, AB T4V 4G3
- **Heritage Manor:** 1(800) 311-2273, 4912 56 St, Camrose, AB T4V 2E1
- **Brookside:** (780) 679-5464, 4501 47 St, Camrose, AB T4V 5G8
- **Bethany Meadows:** (780) 679-1000, 4209 55 St, Camrose, AB T4V 4Y6
- **Deer Meadows:** (780) 679-5464, 4215 55 St, Camrose, AB T4V 4S9
- **AHS Camrose Homecare:** (780) 679-2900, 4615 56 St, Camrose, AB T4V 4M5
- **St. Mary's Hospital:** (780) 679-6100, 4607 53 St, Camrose, AB T4V 1Y5
- **Butterfly Kisses Early Learning Centre:** (780) 673-0726, 5019 53 St, Camrose, AB T4V 1Z2
- **First Steps Learning Centre:** (780) 672-4691, 4920 48 St, Camrose, AB T4V 4L5
- **Creative Crayons Montessori Preschool:** (780) 679-4722, 6406 44b Ave, Camrose, AB T4V 0B6
- **Kids Campus:** (780) 672-0152, 5604 47 Ave, Camrose, AB T4V 2P3
- **Camrose Children Centre:** (780) 672-0131, 4304 53 St, Camrose, AB T4V 1Y2
- **Camrose Little Angels Daycare Society:** (780) 678-0701, 4610 49 Ave, Camrose, AB T4V 0M6
- **Purgatory:** 5210 45 St, Camrose, AB T4V 1E9

Contingency Planning

Contingency planning involves identifying high-risk areas within the city, grouped by neighborhoods. This section outlines the exact locations of these zones and highlights significant buildings and landmarks crucial in the event of a wildfire. It is important to note that if the fire spreads beyond a single designated zone, a combination of multiple sections of this contingency plan must be implemented. The provided map labels the zones and more accurate areas will be provided in the description along with all dots being locations of fire hydrants.



Zone 1 (North) Contingency Plan

Area includes everything located within the city limits of Camrose that lies North of highway 13.

Main objective: The railroad tracks through this zone run from (53.0249891, -112.8678961) to (53.0223493, -112.8087853). If the fire breaks out and is heading Southbound towards the tracks, it is vital to attempt to keep the fire on the North side of the tracks. Complications begin to arise if the fire jumps the tracks, and the railroad company needs to get involved. In the case of a fire South of the tracks, the goal is to contain the fire while protecting houses and city hall (5204, 50 Avenue).

Evacuation possibilities: North on highway 833 towards Barlee Junction, North on Range Road 201, West/East on highway 13

Estimated value at risk (2024 property values – City of Camrose): **$1, 049, 431, 120**

Vegetation: Trees and grass all over the zone, golf course is a hotspot for trees

Fire risk: Low; The area posing the highest risk is adjacent to the train tracks, where loose sparks from passing trains can ignite fires, particularly during dry seasons. Additionally, the golf course presents another significant risk due to its dense tree cover and extensive land coverage on this side of town.

Zone 2 (East/Industrial) Contingency Plan

Area includes everything located within the city limits of Camrose that lies East of the train tracks that run from (53.01793, -112.81215) to (53.00049, -112.81697)

Main objective: The main priority in the East zone is keeping the fire away from any buildings that could be seen as extremely dangerous if burnt to the ground. Any buildings that can release harmful gasses should be treated as a priority. Otherwise, there is the risk of the fire becoming even more dangerous if it moves West and into the ravine, allowing it to spread much easier.

Evacuation possibilities: West on highway 13, highway 13A, South on Range Road 202

Estimated value at risk (2024 property values – City of Camrose): **$303,004,540**

Vegetation: Primarily grasses

Fire risk: Low

Zone 3 (South/Valleyview) Contingency Plan

Area includes everything located within the city limits of Camrose that lies South of highway 13A (Camrose Drive).

Main objective: Keeping the fire away from the ravine. The tracks run along the East side of the zone and so keeping the fire away from the tracks is also a priority. Any fire that begins moving Northbound must try to be kept south below highway 13A

Evacuation possibilities: North on highway 833 towards Barlee Junction, West/East on highway 13

Estimated value at risk (2024 property values – City of Camrose): **$211,435,440**

Vegetation: Trees and grass, farmland to the South

Fire risk: Medium; it was where the last wildfire in Camrose occurred, anywhere by train tracks in dry weather will be at risk

Zone 4 (West) Contingency Plan

Area includes everything located within the city limits of Camrose that lies South of highway 13 and West of highway 13A.

Main objective: Although the West zone is likely the least at risk zone, it is still important as it is surrounded by farmland to the West. If the fire is moving East towards Camrose it is important to try and contain it to the farmland

Evacuation possibilities: East on highway 13, South on Range Road 204, North on Range Road 203

Estimated value at risk (2024 property values – City of Camrose): **$340,062,950**

Vegetation: Many trees and grasses throughout the parks

Fire risk: Low

Zone 5 (Central/Ravine) Contingency Plan

Area includes everything located within the city limits of Camrose that lies North of highway 13.

Main objective: The recreation center is likely to serve as the designated evacuation point in the event of a wildfire, underscoring the critical importance of ensuring its safety. However, the presence of a ravine in this area presents a significant challenge, given the abundance of trees and grass that are highly susceptible to fire. If a wildfire were to ignite outside the ravine, the primary concern would be preventing its spread into the ravine, as containment would become considerably more difficult once it enters. However, if the fire originates within the ravine, efforts must focus on preventing the fire from moving Westbound, as a substantial number of houses lie in that direction.

Evacuation possibilities: East/West on Highway 13, South on Range Road 204, North on Highway 833 towards Barlee junction

Estimated value at risk (2024 property values – City of Camrose): **$1,406,420,500**

Vegetation: Trees and thick grasses, especially throughout the ravine. In dry seasons these tall grasses will be a risk

Fire risk: Medium; The ravine plays a large part and is what we have identified as the biggest risk of wildfire in the City of Camrose. There are also many parks throughout this area

Glossary

Air Resources- Machines and equipment used for aerial firefighting, there are different types of aerial firefighting, all of which is gone into more detail under the Air Resources subheading.

Climate Change- caused by human activities, rising greenhouse gas emissions and jet stream changes are some examples of the effects of climate change, occurring at rates much faster than anticipated; its impacts can be devastating and include extreme and changing weather patterns and rising sea levels.

Contingency Planning- helps an organization recover from an unexpected event, often seen as "Plan B" in a situation.

CVRA (Climate Vulnerability & Risk Assessment)- A comprehensive document made by the City Council of Camrose that focuses on the risks and vulnerabilities Camrose may face in the future due to climate change, and measures the probability of all those risks.

Fire Risk- a relative guide of how easy it is to ignite vegetation, how difficult a fire may be to control, and how much damage a fire may do in a given place.

Natural Fire Regime- is the pattern, frequency, and severity of bushfires and wildfires that occur in a given area over lengthy periods of time. It is an essential component of fire ecology and rejuvenation in particular types of ecosystems. It explains the geographical and temporal patterns, as well as the ecological consequences, of fire on the landscape, and it offers an integrated way to determine fire's effects at the ecosystem or landscape level.

Pre-Incident Plan- a document developed by compiling data used to determine the resources and actions necessary to mitigate anticipated emergencies.

Risk Assessment- the process of identifying hazards that could negatively affect an agency's ability to govern normally.

Telecommunications- the means of electronic transmission of information over distances, can appear in the form of voice telephone calls, data, text, images, or video.

Topography- the study of the surface of the land.

Vulnerable Structures- architecture that is critical to conducting usual affairs, damage to vulnerable structures will result in worse conditions for the agency that uses them.

Wildfire- a large, destructive fire that spreads over woodland or brush, may go through human-occupied places.

WUI (Wildland-Urban Interface)- zone of transition between unoccupied land and human development.

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