

CASE STUDY – KENOW FIRE – ALBERTA, 2017

*STRUCTURE PROTECTION IN WATERTON LAKES NATIONAL
PARK*

Ray Ault and Steve Hvenegaard

April 2019

This case study is not restricted.

This case study contributes to the state-of-practice review of water delivery systems (sprinklers) in the wildland-urban interface (WUI). Funding for this review was provided by the Forest Resource Improvement Association of Alberta (FRIAA).

Sprinklers are used to protect structures from wildfire during wildland-urban interface (WUI) events across Canada. Traditionally, standard forestry equipment has been used in conjunction with impact sprinklers. FPIinnovations is reviewing common practices and equipment used during sprinkler deployments, in Canada, to determine if they are the most appropriate for community structure protection, or if alternative approaches should be considered.

This case study documents the complex protection efforts for more than 450 structures during the Kenow wildfire that occurred in Waterton Lakes National Park in September 2017.

301012735: FRIAA SPRINKLER PROJECT

CASE STUDY

ACKNOWLEDGEMENTS

FPIinnovations would like to acknowledge the Forest Resource Improvement Association of Alberta (FRIAA) for funding this project, and the following agencies for their collaboration during the case study:

- Parks Canada
- Alberta Agriculture and Forestry
- RapidFire & Rescue Inc.
- Montane Forest Management Ltd.

PRIMARY AUTHOR CONTACT INFORMATION

Ray Ault

Wilderness Fire Management Inc.

(780) 658-2282

Raymond.ault@gmail.com

Steve Hvenegaard

Researcher

(780) 740-3310

Steven.Hvenegaard@fpinnovations.ca

REVIEWER

Chad Gardeski

Manager – Wildfire Operations

(780) 817-1440

Chad.Gardeski@fpinnovations.ca

Follow us:   

TABLE OF CONTENTS

1. INTRODUCTION	4
2. SITE DESCRIPTION	4
3. WILDFIRE THREAT	5
3.1 Kenow wildfire overview	5
3.2 Kenow wildfire chronology	6
4. DATA COLLECTION	8
5. FINDINGS	8
5.1 Structure protections	8
5.1.1 Akamina Parkway	8
5.1.2 Red Rock Parkway	9
5.1.3 Waterton Valley	10
5.1.3.1 Townsite	10
5.1.3.2 Prince of Wales Hotel and visitor centre	11
5.1.3.3 Parks Canada operations compound	12
6. DISCUSSION	13
7. CONCLUSION	14
APPENDIX 1 – 2017 KENOW WILDFIRE – WATERTON LAKES NATIONAL PARKS VALUES PROTECTION SUMMARY	15

LIST OF FIGURES

Figure 1. A wildland engine applying foam.	9
Figure 2. The perimeter sprinkler lines reinforcing the forest fuel treatment.	9
Figure 3. High-volume pumps supporting the aerial trucks at the Prince of Wales Hotel.	12
Figure 4. Aerial trucks spraying the Prince of Wales Hotel.	12
Figure 5. Relay tanks at the Parks Canada operations compound.	13

1. INTRODUCTION

The use of forestry equipment (hose and pressure pumps) to support sprinkler systems is a common approach to protecting values at risk from wildfire in Canada. This case study is one in a series that explores the viability of various types of sprinkler systems for protecting residential and commercial structures from wildfire.

The extensive structure protection measures used in Waterton Lakes National Park during the Kenow wildfire in 2017 included the deployment of high-volume pumps with large diameter hose and sprinkler systems, in addition to traditional forestry equipment. This case study documents the structure protection efforts of Parks Canada and their partners during the fire.

The objectives of this case study were to:

1. document the structure protection initiatives undertaken for the Waterton townsite during the fire, including timelines, resources, logistics, and operations;
2. examine the efforts taken to protect remote structures within Waterton Lakes National Park; and
3. summarize this information so that other communities can learn from it and use it to develop their own wildfire protection plans.

2. SITE DESCRIPTION

Waterton Lakes National Park is located approximately 45 km south of Pincher Creek, Alberta. This national park is bordered by Glacier National Park in Montana to the south, by British Columbia to the west, the Municipal District of Pincher Creek to the north, and Cardston County to the east and northeast. The Waterton townsite is situated on the north end of Waterton Lake, at the base of the Rocky Mountains.

There were 52 structures that were considered remote values at risk along the Akamina Parkway and the Red Rock Parkway. These structures were considered remote because of poor access with long and exposed evacuation routes that posed safety concerns to firefighting resources. Among these structures were two fly-in backcountry cabins.

Within the Waterton Valley, 421 structures were considered to be at risk from the Kenow wildfire, including 374 structures in the townsite, the Prince of Wales Hotel and visitor centre and their 14 associated buildings, and 31 administrative buildings and support facilities in the Parks Canada operations compound. The townsite's water supply consists of a 378 541-L (100 000 US Gallon) underground reservoir.

3. WILDFIRE THREAT

3.1 Kenow wildfire overview

On August 30, 2017, a lightning strike ignited a fire on Kenow Mountain in southeast British Columbia, approximately 10 km from the western boundary of Waterton Lakes National Park. Exceptionally hot weather, strong winds, and extremely dry conditions fuelled the extreme behaviour of the Kenow wildfire. When Parks Canada wildfire staff discovered the fire on August 30, 2017, they immediately recognized the potential for it to impact the park. Parks Canada requested the aid of an Incident Management Team, a Structure Protection Specialist and additional fire crews on September 2nd. The team and the specialist arrived on September 3rd and began structure protection initiatives with the fire crews. Additional structural firefighting crews arrived on September 8th and a Superintendent's Closure Order was issued. Fire crews held the fire at the park boundary for eight days, but on September 11th, it entered the park and burned across to the eastern boundary (approximately 25 km) in less than six hours. Embers carried by strong winds contributed to the rapid spread of the fire.

The fire crossed Akamina Pass and moved into the Cameron Valley, where prevailing southwest winds caused it to accelerate rapidly, pushing it down the Akamina Parkway toward the Waterton Townsite. On the same day, the fire spotted into the Blakiston Valley, gained intensity and developed into a second fire front that threatened the Red Rock Parkway and rapidly spread to the northeast. Firefighters worked tirelessly throughout the night to protect the Waterton townsite and the Prince of Wales Hotel. As winds funnelled up Waterton Lake from the south, they carried embers to the northeast, ultimately pushing embers and the fire away from the townsite. These winds, however, directed the fire towards the Parks Canada operations compound, which received the full impact of the wildfire. Within hours the Kenow fire burned across the park and into neighbouring Cardston County and the Municipal District of Pincher Creek. The Kenow fire burned 38.6% (19 303 ha) of Waterton Lakes National Park.

Parks Canada worked closely with partner agencies and neighbouring jurisdictions to protect its critical infrastructure and other values at risk within the Waterton Valley and in more remote areas of the park. The complexity of the event required the strategic use of traditional forestry equipment (i.e., pumps, hoses and sprinklers), high-volume pumps and hoses, and structural firefighting apparatus. The existing fuel treatment along the west-perimeter of the townsite had been well maintained and was reinforced with a sprinkler line. Fire crews created fuelbreaks around individual structures by burning off or removing flammable surface fuels. Helicopters dropped water on hotspots while class A foam was sprayed on picnic shelters, washrooms, and other visitor facilities. These tactics, along with other extensive fire protection measures were effective in safeguarding most of the values at risk within the park.

3.2 Kenow wildfire chronology

- Aug. 30 The Kenow wildfire was discovered in British Columbia.
- Sept. 3 The Incident Management Team and Values Protection Branch Director arrived and began risk assessments and planning for the protection of remote values at risk. Wildfire crews began deploying sprinklers, removing brush, and conducting grass burns.
- Sept. 4 A crew from RapidFire & Rescue Inc. (RapidFire) arrived and began installing sprinkler lines around the Waterton townsite and the Parks Canada operations compound.
- Sept. 5 An evacuation alert was issued for the Waterton townsite.
- Sept. 6 A list of required firefighting apparatus (structural and wildland engines, water tenders and aerial trucks) was developed.
- Sept. 7 The list of firefighting apparatus was submitted to the Incident Commander and the Operation Section Chief. Structure protection and site preparation on critical infrastructure within the townsite and Parks operations compound began. A high-volume pump was installed to supply the sprinkler line that was deployed along the west-perimeter of the townsite to reinforce the existing fuel treatment.
- Sept. 8 A Superintendent's Closure order was issued for the Waterton townsite. A closure order for the front-country and the back-country had been issued earlier. The Deputy Fire Chief from Cardston arrived at the incident and was assigned the position of Deputy Values Branch Director. Municipal structural crews arrived and the installation of a high-volume water supply line to the Prince of Wales Hotel began. A flow test of the sprinkler systems along the Red Rock Parkway was conducted and foam was applied to the values at risk in this area.
- Sept. 9 The Values Protection Branch was organized into two divisions:
1. Townsite Division: provided crew orientations and conducted structure and site preparation activities
 2. Prince of Wales Division: provided crew orientations and established the water supply from Emerald Bay to the hotel

Within the Values Protection Branch two groups were established:

1. Remote Values Group: set up sprinklers and applied foam on values along the Red Rock Parkway and the Akamina Parkway, assisted the Townsite and the Prince of Wales Divisions with structure and site preparation activities
2. Water Supply Group: deployed a high-volume water line to the Prince of Wales Hotel, operated the perimeter sprinkler line around the townsite perimeter, and applied foam to values at risk along the Red Rock Parkway

Sept. 10 The Values Protection Branch director ordered and received additional resources to replace Parks Canada wildland crews that were being reassigned to protect remote structures.

The Remote Values Group moved from the Values Protection Branch to the Wildfire Branch for the Sept. 11th operational period. This allowed the Values Protection Branch to focus on protecting values at risk in the Waterton Valley and the Wildfire Branch to focus on protecting remote values at risk, and containing the wildfire.

Sept. 11 Structural protection objectives were achieved. Sprinklers were set up for priority infrastructure, structure and site preparations were complete, and the establishment of the water supply line to the Prince of Wales Hotel was completed.

At 1830 hours, the Operations Section Chief requested that the Values Protection Branch activate the sprinklers in preparation for impingement. By 1915 hours, all sprinklers were active and propane tanks were shut off in the Townsite Division. At 2000 hours, the Operations Section Chief reported that the fire has stalled at Lineham Creek and the high-volume water supply line to the Prince of Wales Hotel was turned off. However, at 2115 hours the fire began to progress again down the Akamina Valley and the high-volume water supply line to the Prince of Wales Hotel was restarted. At 2215 hours, the fire was located just above the townsite and the Townsite Division began to apply foam to combustible roofs.

Sept. 12 Replacement crews were requested for the Values Protection Branch at 0000 hours.

The Prince of Wales Hotel, the Parks Canada operations compound, the golf course, and the stables are surrounded by fire; the visitor centre and the Prince of Wales wood shop were lost at 0100 hours. By 0400 hours, the intensity of the fire behaviour decreased and replacement crews arrived at 0800 hours.

4. DATA COLLECTION

FPIInnovations interviewed members of the Kenow wildfire Incident Management Team as well as the operational personnel who were responsible for developing and implementing the structure protection initiatives. Our interviews focused on:

- processes for dispatching structural protection resources
- strategies and tactics
- prioritization of critical infrastructure
- resource requirements and availability
- deployment timelines and time constraints
- equipment configuration
- types and number of equipment deployed
- results of the protection efforts

5. FINDINGS

5.1 Structure Protection

Within Waterton Lakes National Park there were 473 structures at risk, so structure protection was separated into three main areas: the Akamina Parkway, the Red Rock Parkway, and the Waterton Valley. A values protection summary is included as Appendix 1 that identifies the values at risk, total resources committed over the duration of the incident, number of structures, strategic actions and tactics, as well as the structure protection outcomes.

5.1.1 Akamina Parkway

The strategy for the Akamina Parkway was prep-and-go: prepare structures for wildfire and evacuate the area before the fire arrives. The remoteness of the structures along this parkway, the long, exposed evacuation route, and the potential for reduced visibility from smoke meant that firefighters could not safely stay and defend. No one was in the area when these structures were challenged by wildfire.

The crews that worked on preparations along the Akamina Parkway included two Parks Canada crews (WLNP-4, LMNP-4) and one wildfire crew from Ontario Ministry of Natural Resources (Ontario-4).

There were 14 structures along the Akamina Parkway. This included 10 buildings at Cameron Lake, an Alpine Club of Canada hut and outbuilding, and a ski shelter with an adjacent outbuilding at Little Prairie. Sprinkler systems were installed on all 14 buildings. These systems consisted of Waterax Mark-3 pressure pumps and impact sprinklers. The sprinklers were attached to the gable ends of the structures, and water was pulled from natural sources (creeks and lakes).

When the fire burned into the Akamina Parkway, it flanked the 10 buildings at Cameron Lake. These buildings survived. It is believed that the reduced fire intensity and the fire-resistant cladding used on these newly constructed buildings contributed to their survival.

The fire burned right up to the sprinkler lines at the Alpine Club of Canada hut and outbuilding, and both buildings survived. The ski shelter at Little Prairie received fire damage, and the outbuilding was destroyed.

5.1.2 Red Rock Parkway

The strategy for the Red Rock Parkway was also prep-and-go for the same reasons as the Akamina Parkway. The crews that worked on preparations along the Red Rock Parkway included two Parks Canada crews (WLNP-4, LMNP-4), one crew from Ontario Ministry of Natural Resources (Ontario-4), and eight firefighters from RapidFire.

There were 38 structures at risk along the Red Rock Parkway. Protection preparations were conducted on 29 of these structures. Preparations included the installation of sprinklers, fuel removal with chainsaws and drip torches, and application of Class A foam. Foam was applied using two RapidFire Type 3 wildland engines supported by a water tender (Figure 1).



Figure 1. A wildland engine applying foam.
(Courtesy: RapidFire & Rescue Inc.)



Figure 2. The perimeter sprinkler lines reinforcing the forest fuel treatment.
(Courtesy: RapidFire & Rescue Inc.)

The following five structures at three day-use areas were prepared for wildfire:

- Red Rock Canyon day-use building
- Lost Horse Creek day-use site with two buildings
- Coppermine Creek day-use site with two buildings

Preparations for these structures included fuel removal and application of Class A foam. Two of these structures survived, one received fire damage, and two were destroyed.

There were 12 structures at the Crandell Mountain campground. Sprinklers were installed on 3 of these including the entry kiosk, the generator shed, and the interpretive theater. The sprinkler system for the entry kiosk and the generator shed consisted of one Mark-3 pump

(pulling water from Blakiston Creek) and several impact sprinklers. The sprinkler system for the theatre consisted of three 9463-L (2500 US gal.) relay tanks, three Mark-3 pumps, and several orbital rooftop sprinklers. Two structures survived with no damage and one sustained damage. The nine unprotected structures were destroyed.

West of the Crandell Mountain campground was the Canyon Church Camp. Sprinklers were installed on the main lodge and 14 adjacent cabins. Two Mark-3 pumps ran in parallel to supply a 65-mm (2.5-in.) line to the camp. A 38-mm (1.5-in.) line ran through the camp to several impact and orbital sprinklers. The main lodge and six of the cabins survived; eight were destroyed.

Sprinklers were installed on two fly-in backcountry cabins; Snowshoe Cabin and Lone Lake Cabin, and their associated outbuildings. The fire stopped short of these sites and all six structures survived with no damage.

5.1.3 Waterton Valley

The Waterton Valley included the (1) townsite, (2) Prince of Wales Hotel and visitor centre, and (3) Parks Canada operations compound. The strategy for the Waterton Valley was prep-and-defend, where crews and apparatus remained on-site during impingement.

On September 11th, there were 78 personnel in the Values Protection Branch assigned to protecting values at risk in the Waterton Valley. This included municipal firefighters, the RapidFire crew, the personnel required to attend to the Self Contained Breather Apparatus (SCBA) Cascade trailer and the Alberta First Responders' Radio Communications System (AFRRCS), and two Parks Canada public works staff to monitor the town's water system.

Equipment committed to values protection included four values-protection trailers, eight high-volume pumps and hose, six 9464-L (2500-US gal.) relay tanks, one SCBA trailer and one AFRRCS mobile communications unit. RapidFire provided two Type 4 wildland engines, an 11 356-L (3000-US gal.) tactical tender with BB4 pump and flex tank, and a flat deck rear-mounted crane truck to carry volume pumps.

5.1.3.1 Townsite

The townsite had a community wildfire protection plan¹ that was used to identify values at risk and determine values-protection strategies and tactics. The townsite consisted of 374 commercial and residential buildings. The structural protection tactics used for the townsite included:

- removing combustibles around structures, cleaning roofs and gutters, moving propane tanks and firewood, and blocking openings to flying embers;

¹ Waterton Valley Wildfire Suppression Plan (draft) March 29, 2012. Randall Schwanke, Fire Management Officer. Note: This is a comprehensive suppression plan for the townsite and backcountry.

- installing perimeter sprinkler lines to reinforce forest fuel treatments and protect structures;
- installing sprinklers on critical buildings using portable pumps to draw water from natural sources and from fire hydrants;
- establishing fire engine refill stations for bump-and-run operations; and
- ensuring that fire hydrant reservoir water levels were maintained.

Through mutual-aid and other agreements, a total of 19 firefighting apparatus were on-site when the fire passed through the townsite. This included five structural fire engines, eight wildland fire engines, two municipal aerial trucks, and four water tenders.

Eight members from RapidFire set up the perimeter sprinkler lines. The perimeter sprinkler lines were set up within a forest fuel treatment adjacent to the buildings on the west side of town (Figure 2). There were four lines, each requiring four hours to set up. The entire perimeter sprinkler system took two days to complete. The RapidFire team deployed two high-volume pumps (4543-L/min. (1200 US gal./min.): one at Cameron Bay pumping water north to Cameron Falls and another pumping water south from Emerald Bay to Cameron Falls. The 100-mm (4-in.) main supply line was 1600 m long and was connected to 65-mm (2.5-in.) branch lines that fed 38-mm (1.5-in.) parallel sprinkler lines. The sprinkler lines had approximately 25 sprinklers spaced 30 m (100 ft.) apart. One-inch (2.5-cm) head Rain Bird 70 CH sprinklers were used with various nozzle sizes. The sprinklers were attached to ground-level step spikes or 1 m tall portable stands.

In addition to the perimeter sprinkler lines, sprinklers were installed on six structures. Water for these sprinklers was supplied by Mark-3 pumps pulling water from either Waterton Lake or fire hydrants. A crew from Parks Canada set up these sprinklers. Class A foam was applied, by municipal fire engine crews, to approximately 30 structures that had combustible roofs.

Municipal engine crews patrolled the townsite for spot fires and suppressed any ignitions inside the sprinkler line. Four engine-refill sites were set up throughout the community to facilitate a bump-and-run strategy for the engines, which allowed them to extinguish spot fire ignitions as quickly as possible. The mobility of engines and crews was highlighted as a key component in the structure protection plan. One of these re-fill stations was located at the town boat launch, and included a high-volume pump and 100-mm (4-in.) hose line that was provided by the Lethbridge Fire Department.

The townsite's 378 541-L (100 000 US gal.) underground water reservoir gravity-feeds the fire hydrant system. Two water system attendants remained on-site as the wildfire passed through the townsite to ensure the system continued to provide water to structural crews.

5.1.3.2 Prince of Wales Hotel and visitor centre

The area surrounding the Prince of Wales Hotel and visitor centre included a total of 16 buildings. For the hotel, the RapidFire crew deployed two high-volume pumps (5110 L/min.

[1350 US gal. per min.]) at Emerald Bay (Figure 3) to supply water to two parallel 152-mm (6-in.) main lines to two City of Calgary aerial trucks. Both main supply lines had a boost pump midslope. No inline holding tanks were needed because each line had three inline pumps. Sprinklers were put in place along the main supply lines to prevent embers from igniting the grass and willow. The aerial trucks provided a steady stream of water and foam to the roof, decks, and walls of the hotel as the wildfire passed through the area (Figure 4).



Figure 3. High-volume pumps supporting the aerial trucks at the Prince of Wales Hotel. (Courtesy: RapidFire & Rescue)



Figure 4. Aerial trucks spraying the Prince of Wales Hotel. (Photo: Unknown source)

Impact sprinklers were installed to protect the staff accommodation buildings between the lake and the hotel. A structural engine crew patrolled the staff accommodations and extinguished spot fires.

The visitor centre was assessed as having a non-combustible roof and had a parking lot, green lawns, and a road surrounding it on three sides. No sprinklers were installed on the visitor centre. A patrolling structural engine crew came upon the visitor centre after it had ignited and attempted to suppress the fire from the outside, but the building was soon totally engulfed in flame.

The hotel, the staff accommodations, and many of the ancillary buildings survived the fire, but the hotel wood shop and the visitor centre were both destroyed.

5.1.3.3 Parks Canada operations compound

The operations compound consisted of 31 administrative buildings and support facilities, requiring that 250 m of perimeter sprinkler line be installed to the south. A Waterax BB4 (high-volume) pump supplied water to the sprinkler line from Waterton Lake across the highway from the compound. Eight structures had sprinklers mounted on their roofs. Water for these sprinklers was supplied by fire hydrants, two 9464-L (2500 US gal.) relay tanks (Figure 5), and portable pumps.

A 2460 L/min. (650 US gal./min.) trans-loading pump was also set up on the lake to support bump-and-run operations for water tenders.

The operations compound received the full onslaught of the wildfire, but 29 structures sustained no damage and only 2 outbuildings were destroyed. All wheeled heavy equipment had been removed from this area during the evacuation alert, which limited losses.



Figure 5. Relay tanks at the Parks Canada operations compound (Courtesy: Parks Canada).

6. DISCUSSION

A number of different agencies and resources were required to work together to implement the community wildfire protection plan. Many of the resources that were needed had to be requested through the Alberta Emergency Management Agency and the Office of the Fire Commissioner. It took time to dispatch the various resources and for those resources to travel, receive an orientation and briefing, and commence operations. The structure protection strategies and tactics used in Waterton Lakes National Park were fully implemented in eight days, which may not have been possible without an existing wildfire suppression plan. Without advanced planning, community protection strategies and tactics would have taken longer to develop and implement, and the structure loss may have been significantly higher.

The unified command decision, to implement a prep-and-defend strategy, was made possible by the identification and implementation of critical elements within the Waterton Valley Wildfire Suppression plan. This plan called for the establishment and maintenance of forest fuel treatments around the perimeter of the townsite, identified safety zones, and included protection plans for the numerous values at risk. The prep-and-defend strategy called for firefighters to remain onsite, as the fire impinged the community, to ensure sprinklers and other structure protection measures were not compromised. Without the existing forest fuel treatments, the risk of wildfire breaching the sprinkler lines would have been higher.

Members of the Values Protection Branch indicated that high-volume water delivery contractors were essential in providing an adequate water supply to a significant number of sprinklers, which resulted in the successful protection of many structures. However, a survey of contractors working in the wildland-urban interface, in Alberta, revealed that only a limited number of contractors have experience with both wildfire operations and high-volume pumps with large-diameter hose. The Lethbridge Fire Department provided a mobile high-volume pump with hose; however, few municipal fire departments have this capability. These could be limiting factors for future wildfire events if more than one Alberta community is at risk at a given time.

Tasks were assigned to firefighting crews based on their experience and strengths. Experienced contract structure protection crews were tasked with setting up water delivery equipment including pumps, water distribution lines, and relay tanks. Wildfire crews focused on forest fuel modifications using chainsaws, completing burnout operations and were essential to the rapid implementation of a variety of tactical plans. Municipal structural firefighting crews focused on installing sprinklers on structures.

Trigger points, conditions that would initiate a full evacuation of firefighting personnel, were established and communicated to all resources on the incident. If the water supply failed, if the fire within the wildland-urban interface exceeded the ability of the existing resources to prevent multiple structure ignitions, or if hazardous smoke conditions occurred, firefighting resources would retreat using pre-planned escape routes and safety zones.

Class A foam was applied on a number of remote structures. Research on the properties and operational effectiveness of water-enhancing gels is being undertaken to verify if these products provide longer-lasting protection. Depending on the results of this research, using gel products on structures could be considered where time or water supply is limited.

7. CONCLUSION

Complex wildland-urban interface events require the implementation of carefully designed structure protection strategies and tactics that include the deployment of a variety of different sprinkler systems. Pre-planning and training are critical, and deployment takes time.

The combined effort made in Waterton Lakes National Park during the Kenow fire is an excellent example of the successful execution of a community wildfire protection plan. The plan was executed without injury to the public, firefighters, or support staff. There were 473 structures threatened by the Kenow wildfire and 446 of those were protected because of the efforts of multiple agencies working through a unified command.

APPENDIX 1

2017 Kenow Wildfire – Waterton Lakes National Park values protection summary

Value Name	Resources	No. of Structures	Strategic action	Tactic(s)	Structure protection outcomes		
					No damage	Damaged	Destroyed
Akamina Parkway		14	Prep-and-go				
Cameron Lake Day Use	▪ 2 - PC ^a crews	10		10 structures with sprinkler	10		
ACC Cabin	▪ OMNR ^b crew	2		2 structures with sprinklers	2		
Ski Shelter	▪ OMNR crew	2		2 structures with Sprinklers		1	1
RED ROCK PARKWAY		38	Prep-and-go				
Lone Lake warden cabin	▪ OMNR crew	3		3 structures with sprinklers	3		
Snowshoe warden cabin	▪ OMNR crew	3		3 structures with sprinklers	3		
Red Rock Canyon Day Use	▪ 2 - PC crews ▪ RapidFire crew	1		1- Burnout and apply Foam to structures	1		

Value Name	Resources	No. of Structures	Strategic action	Tactic(s)	Structure protection outcomes		
					No damage	Damaged	Destroyed
Lost Horse Cr Day Use	<ul style="list-style-type: none"> ▪ 2 - PC crews ▪ RapidFire crew 	2		2 – Burnout and apply Foam to structures	1	1	
Coppermine Cr Day Use	<ul style="list-style-type: none"> ▪ 2 - PC crews ▪ RapidFire crew 	2		2 – Burnout and apply Foam to structures			2
Canyon Camp	<ul style="list-style-type: none"> ▪ PC crew ▪ OMNR crew 	15		15 structures with sprinklers	7		8
Crandell Mtn. Campground	<ul style="list-style-type: none"> ▪ PC crew ▪ OMNR crew 	12		3 structures with sprinklers 9 structures received no protection	2	1	9

Value Name	Resources	No. of Structures	Strategic action	Tactic(s)	Structure protection outcomes		
					No damage	Damaged	Destroyed
WATERTON VALLEY		421	Prep-and-defend				
Townsite	<ul style="list-style-type: none"> ▪ RapidFire crew ▪ Municipal fire crews ▪ 2 - PC crews ▪ OMNR crew 	374		1600 m – Perimeter sprinkler line 6 structures with sprinklers Bump & Run with Engines	374		
Prince of Wales Hotel/visitor centre	<ul style="list-style-type: none"> ▪ Municipal fire crews ▪ RapidFire crew ▪ PC crew ▪ OMNR crew 	16		Anchor & Hold with 2 – Aerial Apparatus Bump & Run with Engines	14		2
Parks Canada operations compound	<ul style="list-style-type: none"> ▪ RapidFire crew ▪ PC crew ▪ OMNR crew 	31		250m – Perimeter sprinkler line 8 structures with sprinklers Bump & Run with Engines	29		2
Total:		473			446	3	24

^a PC: Parks Canada

^b OMNR: Ontario Ministry of Natural Resources

Additional tactics conducted in all areas:

- Cut and remove intermediate fuels (e.g., brush, grass etc.) surrounding structures – 10 sites
- Move firewood/deck furniture/propane tanks from structures – 25+ values
- Block openings (e.g., attic vents, eaves etc.) in structures to prevent embers from blowing inside the structure – 4 sites
- Establish five apparatus water- supply stations in the Waterton townsite. Relay tanks and high volume pumps and hose were installed at strategic locations to allow apparatus to refill their booster tanks quickly.

