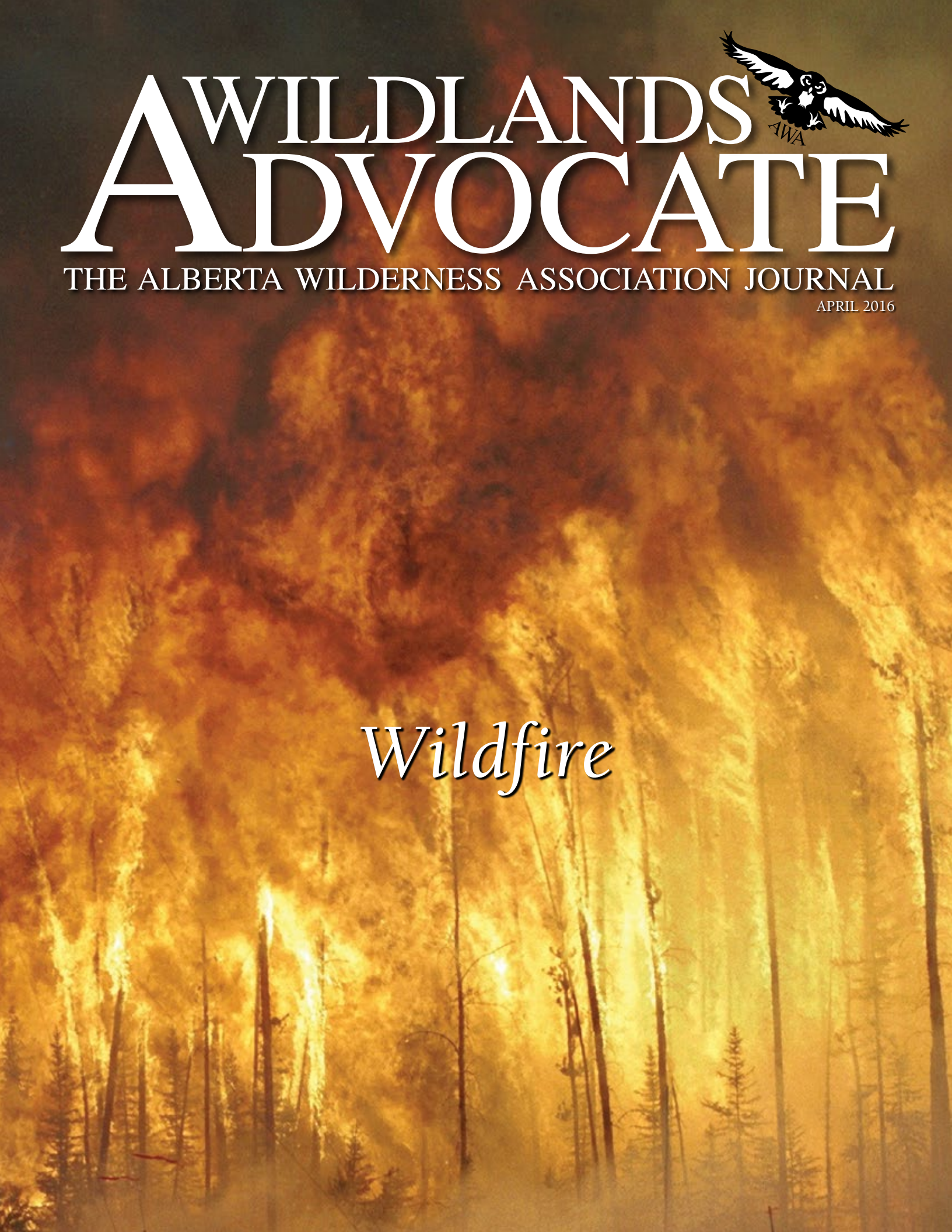
Wildlands Advocate

THE ALBERTA WILDERNESS ASSOCIATION JOURNAL

APRIL 2016



Wildfire

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Crown Fire in the Boreal Forest
PHOTO: "Northwest Crown Fire Experiment, Northwest Territories" by USDA Forest Service is licensed under CC Attribution 2.5 Generic.

Featured Artist:

In this issue we feature public art, specifically the murals painted in the stairwell of the Calgary Tower to mark this year's Run and Climb for Wilderness. The Association for Public Art calls public art "a reflection of how we see the world – the artist's response to our time and place combined with our own sense of who we are." The examples from this year's mural competition speak well to the accuracy of that statement. All of the mural photos appearing here are courtesy of K. Mihalcheon

Editor:
Ian Urquhart

Graphic Design:
Doug Wournell *B Des, ANSCAD*

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Please direct questions and comments to:
403-283-2025 • wla@abwild.ca

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Alberta Wilderness Association

455-12 ST NW, Calgary, AB T2N 1Y9
403-283-2025
Toll-free 1-866-313-0713
www.AlbertaWilderness.ca
awa@abwild.ca

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The Times They Are A-Changin'

Smoke. I can never remember so much of it hanging in the air for so long. The curtain hid nearby landmarks; you tasted it during every waking moment; air quality alerts, alerts we normally seldom – if ever – received, became fixtures of daily life.

No, these aren't reflections about the Horse Lake/Fort McMurray wildfire. Thankfully I've been far away from that tragedy. My memories are of last summer in southeastern B.C. Last year was the worst fire season in Washington State history; the previous worst season had been 2014. The Okanogan Complex and Stickpin fires were primarily responsible for those circumstances.

So too was the Rock Creek wildfire that erupted along the banks of the Kettle River, normally a 90-minute drive from Kelowna. That fire engulfed dozens of homes and closed Highway 3, the only southern route to the coast.

This issue's features are a product of what last summer underlined emphatically for me. Wildfire is elbowing its way to a prominence on the landscape we haven't seen for generations. My money says it's going to be the most immediate and pressing example of the adaptive challenges climate change presents to Alberta.

My article offers you some details about wildfire's presence on the landscape, explanations for that pattern, government's response, and some of the hard choices we need to debate.

Todd Kristensen and Ashley Reid take an important look into one aspect of the history of fire in Alberta – its use by First Nations. The peoples of the plains and the boreal made fire an important tool in their efforts to secure good livelihoods and Todd and Ashley will help to familiarize many of us with that aspect of our history.

FireSmart represents one response of non-profits and governments to wildfire's emergence as an issue they should take seriously and address. Joanna Skrajny offers you the first of two critical, constructive appraisals of what FireSmart has delivered. Joanna doesn't dispute the value of efforts to make communities located in the midst of our forests more resilient and resistant to wildfire. She suggests though that commercial forestry interests have coopted FireSmart as part of their efforts to improve their bottom lines. Clearcuts and FireSmart don't go together in her assessment.

Jane Drummond focuses your attention on what she believes FireSmart has delivered to the community of Nordegg. Again, there's no dispute with what FireSmart should do – strengthen the protection of communities from wildfire. Again though, there's considerable room to improve the on-the-ground implementation of the FireSmart program. It's a very valuable reminder of the need to better ensure that public lands designations and policies are coherent and that they respect the ambitions of residents.

Our penultimate fire feature comes courtesy of Andrea Johancsik. Our national parks are protected areas where a history of fire suppression has changed profoundly the ecological constitution of those lands. Andrea's article examines the need for and the challenges accompanying efforts to use fire in national parks as a tool to restore the natural processes we've suppressed for more than a century.

Our last fire article is by Esther Bogorov. Esther advocates the embrace of a wider, more ecologically-sensitive understanding of wildfire damage.

Finally, on behalf of the Board and staff of AWA, I'd like to extend AWA's heartfelt support to our fellow citizens from Fort McMurray. No one should have to experience what they have endured. May the future treat them well.

-Ian Urquhart, Editor

PHOTO CREDIT: DarrenRD - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=48553129

Wildfire:

Nature, Government, Choice

By Ian Urquhart

Slave Lake, Kelowna, Barriere, La Loche, now Fort McMurray. The wildfires that devastated lives in these communities testify to the likelihood, if not certainty, that we've crossed a threshold. The world of wildfire in twenty-first century Canada promises to be a very different and more challenging world than it was a generation ago. Here's a look at the presence of wildfire on the Canadian/Albertan landscapes, explanations for this pattern, how government is addressing wildfire, and the hard choices we need to debate.

Wildfire on the Landscape: More Now Than We Have Ever Seen Before

Wildfires burn, on average, much more of Canada's forests today than they did 40 to 60 years ago. In 2012 the 10-year running average of land burned by wildfires stood at just over two million hectares. As the University of Alberta's Dr. Mike Flannigan told the CBC program *Sunday Edition* in 2013, this was twice the average amount of territory wildfires consumed in the early 1970s. Flannigan's observation affirmed and extended the conclusion from research from the mid-1990s indicating that wildfire in the boreal forest in the 1980s and early 1990s burned significantly more of the land than was the case in the 1950s, 1960s, and early 1970s.

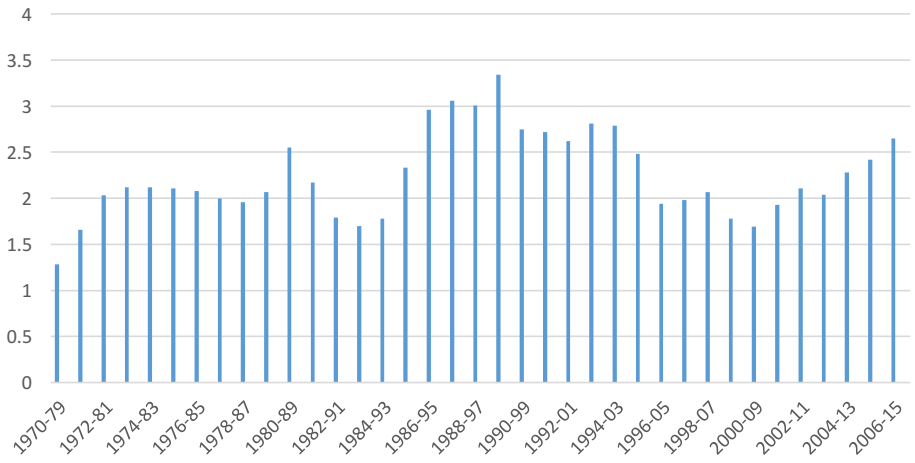
Chart 1 illustrates this moving average is again on the upswing. Now at 2.65 million hectares this moving average has increased since 2012 due to the very active fire years we experienced in 2013, 2014, and 2015. In 2013, 1.87 million hectares of forests burned in Québec; in 2014, wildfire spread over 3.4 million hectares of the Northwest Territories; in 2015, 1.78 million hectares of Saskatchewan's boreal forest went up in flames.

Wildfire in Alberta is an important contributor to this story. The May 2016 Horse River/Fort McMurray Wildfire and very high to extreme fire danger forecasts across most of Alberta's boreal forest in early to mid-May suggest that Alberta could lead Canada into its fourth active fire year in a row. "To have four in a row," as Professor Flannigan told me, "there is no historical analogue that we have."

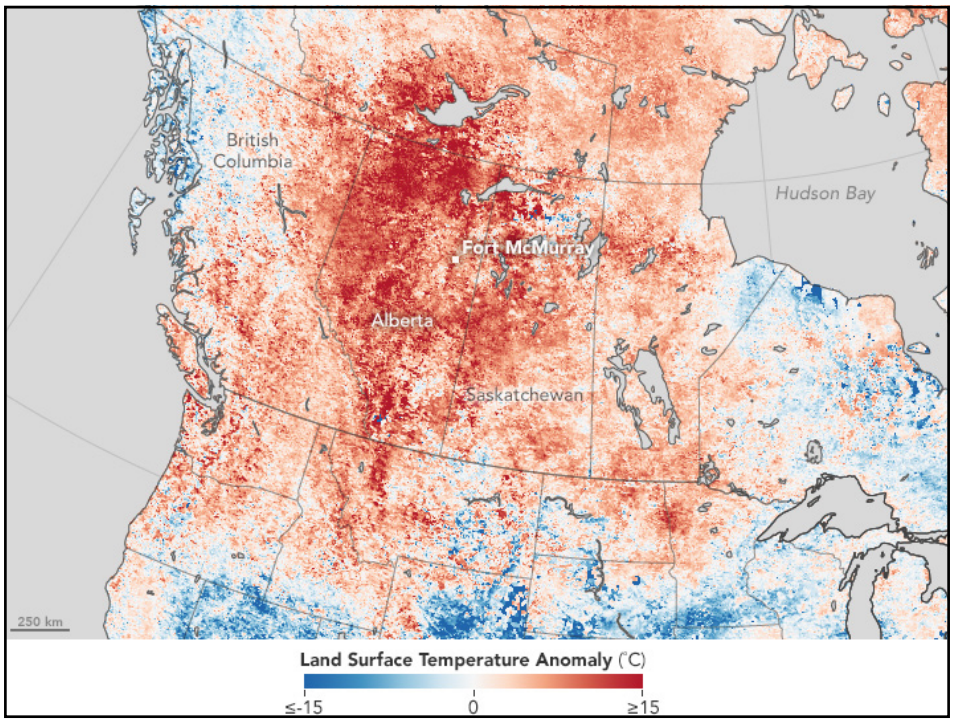
The recent history of forest land burned in Alberta generally mimics the Canadian pattern. A 1999 study prepared for Daishowa-Marubeni observed that, in northwest Alberta, large fires already occurred more frequently and burned more territory there in the 1980-1995 period than they did in the 1960s and 1970s. Chart 2 presents a provincial overview of the average territorial scope of wildfires over time. On average, three times as much of the land was burned by wildfire in the first decade of this century than was burned in the 1970s; in the first six years of the current decade the annual average of area burned stands at 301,331 hectares – nearly seven times the decadal average for the 1970s.

What the decadal averages hide is the fact that annual area burned totals over the medium to long term generally resemble a roller coaster ride. There may be tremendous variation in area burned from year to year. Reviewing the past 45 years of Alberta's fire history you will find years when hundreds of thousands of hectares burned; you will find other years which saw little wildfire on

Chart 1: Canada, Total Forest Land Burned, in Millions of Hectares, 10-year averages from 1970-79 to 2006-15



Source: Averages calculated from Canada, Natural Resources Canada, *National Forestry Database*



The Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Terra satellite recorded these temperature anomalies for the week of April 26 to May 3, 2016. Red areas were hotter than the 2000-2010 averages for this same one-week period. CREDIT: National Aeronautics and Space Administration (NASA)

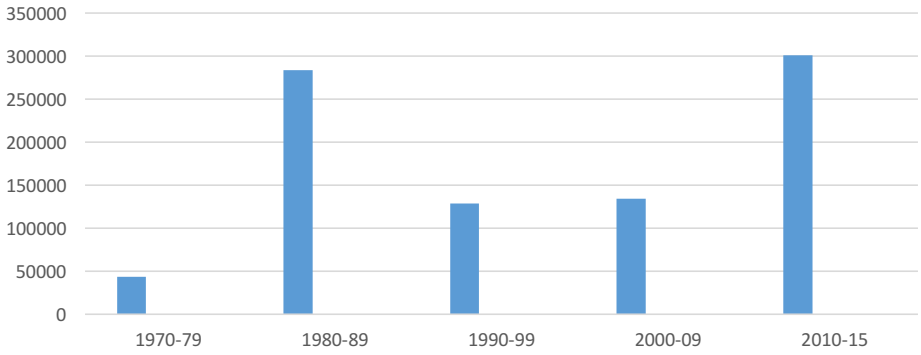
the landscape. In 1995 Alberta experienced an active fire year when more than 336,000 hectares of the province burned; but in 1996 wildfire consumed less than 2,000 hectares. In 1981 two fires, over a period of just eight days, set ablaze nearly one million hectares of the boreal forest. They were the major contributors to making 1981 the worst year for area burned in Alberta (1.37 million hectares). One analysis of the 1980 and 1981 fire seasons called August 27, 1981 "Black Thursday" – in less than seven hours on that day roughly 376,000 hectares, more than one-quarter of the total territory burned in Alberta in 1981, went up in smoke.

These variations continue to mark Alberta's annual wildfire pattern in this decade. However, this decade already can be distinguished from its predecessors by the frequency of years where very large amounts of territory burn. Three of the first six years of this decade recorded annual area burned totals of more than 300,000 hectares. This year will make it four years of the first seven since, as of the Victoria Day weekend, the Horse River/Fort McMurray wildfire was estimated to be more than 500,000 hectares in size. By the time you read this it will be larger than that. No previous decade has seen wildfire burn as much of the province as the decade we are in now.

Ironically, past successes in putting out fires makes today's challenges for wildfire managers more daunting.; they've increased the risks of catastrophic wildfires. The Flat Top Complex Wildfire Review Committee (2012), struck after the May 2011 Slave Lake fire, made this point. Successful fire suppression turns a forest inventory's age structure on its head over time. This is emphatically the case for Alberta's boreal forest. In 2011, mature and overmature trees in the boreal constituted more than 60 percent of the forest inventory. In the late 1950s and early 1970s they constituted less than 10 percent of that inventory. Wildfire suppression in the boreal, the Committee concluded, was "beginning to increase the risk of large and potentially costly catastrophic wildfires."

The recent fire record is a humbling one. Canada is a global leader on the wildfire fighting front. Moreover, our fire suppression capabilities have become more impressive over time. When ignitions are detected initial attack crews are sent, usually by helicopter, to extinguish or control the blaze before it starts to grow. Fire managers now have a variety of sophisticated predictive models and indices they can use to try to anticipate where wildfires may start. This allows them to place initial attack crews, helicopters, water bombers, and heavy machinery in close proximity to areas where they believe the chances of wildfire ignition and spread are greatest. This is especially important when, as was the case in mid-May, firefighters had less than 15 minutes to prevent a wildfire in the northeastern boreal from growing to two hectares in size after ignition. But, wildfire trends don't suggest that our impressive capabilities are reducing wildfire's impact on the landscape. Fire suppression may be successful in reducing the amount of our forests that taste wildfires but that doesn't necessari-

Chart 2: Alberta, Total Forest Land Burned, in Hectares, selected averages



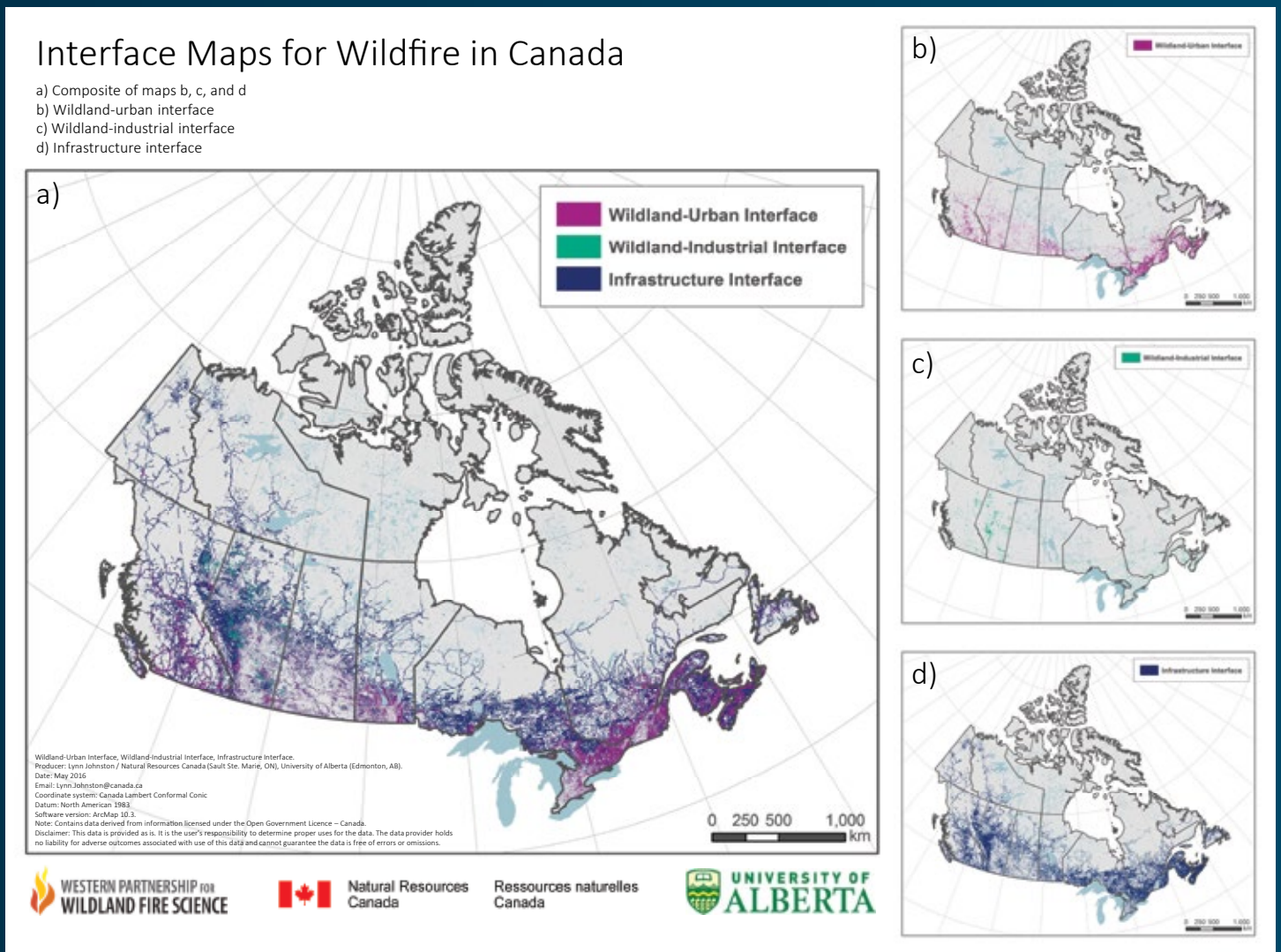
Source: Averages calculated from Canada, Natural Resources Canada, *National Forestry Database*

ly mean we will see reductions in the total areas burned over time. If you want to view fighting wildfires as a war, wildfire is a powerful adversary that is in no danger of surrendering.

Wildfire on the Landscape: Likely Even More in the Future

In Alberta our future is very likely one where the risks of wildfires starting are greater than recently. Also, the potential for wildfires to grow quickly and dramatically likely is greater as well. For Mike Flannigan our escalating needs and desires to work, live, and play in the forests well-away from large urban centres is important to understanding increased wildfire risks. "You look at Alberta," he says, "and…other than National Parks, there's a lot of activity on the landscape and where you have people you have fire." Lynn Johnston, one of Flannigan's graduate students, studies wildlands/human interfaces. Her interface maps for wildfire may be used to support Flannigan's observation and make important distinctions between types of interfaces and their prevalence. People who want to live in the forests, some of whom live in communities such as Bragg Creek or Nordegg, are part of the wildland-urban interface detailed in map b. Alberta stands out as a western Canadian province characterized by many wildlands/industrial and wildlands/infrastructure interfaces. Johnston wouldn't suggest that such extensive interfaces automatically translate into greater risks but I think it's fair to suggest they may increase the potential for greater human-caused wildfire risks.

Climate change, in addition to fire weather (precipitation, relative humidity, temperature, and wind direction/speed), also increases the probabilities of wildfire ignition, growth, and speed of growth. For a quarter-century now Mike Flannigan has been studying what effects climate change are likely to have on wildfire. His research and that of his collaborators has long argued that climate change will increase both the severity of wildfires and the amount of area burned. In a 2004 paper Flannigan and his three co-authors explicitly demonstrated that ***human*** emissions of green-



CREDIT: Johnston, Lynn M. (in preparation). Mapping and analysis of Canadian wildland fire interface areas (Master's thesis). University of Alberta, Department of Renewable Resources.

house gases and sulfate contributed to the warming in wildfire-prone areas of Canada; moreover, they demonstrated that the human contribution to climate change had a significant impact on the area burned in Canada. Three years later another of Flannigan's co-authored contributions to understanding wildfire looked ahead, instead of to the recent past. That research suggested that doubling carbon dioxide levels in the atmosphere from pre-industrial levels (roughly from 280 parts per million to 560 ppm) would increase the amount of Alberta's boreal forest burned by wildfire by 12.9 percent (the carbon dioxide concentration recorded at the Mauna Loa Observatory on May 19, 2016 was 407.82 ppm). Triple the carbon dioxide concentration and that paper predicted that wildfires will burn an additional 29.4 percent of Alberta's boreal. As greenhouse gas emissions and temperatures rise we can expect to see more wildfires and larger hectares-burned totals on those areas of the boreal that do not receive significant increases in precipitation due to climate change.

Positive feedbacks are one of the most haunting or unnerving possibilities associated with climate change. These feedbacks occur when the consequences of a warming global climate amplify, in turn, the processes that generate warming. The catastrophic fires that ravaged Indonesia last year generated such feedback. The vast majority of those fires were set deliberately, often as part of deforestation plans designed to replace rainforest with palm oil plantations. These fires released tremendous amounts of carbon into the atmosphere. The World Resources Institute reported that on many days last fall the greenhouse gas emissions from these fires were greater than the average daily emissions of the total US economy. By last December the cumulative emissions from just the Indonesian fires were greater than the annual emissions of the United Kingdom, or Canada, or Germany, or Japan. Not only do these fires release carbon into the atmosphere but, by destroying the rainforest, they also destroy carbon sinks. Forests that absorbed atmospheric carbon dioxide were obliterated.

This year's Horse River/Fort McMurray fire, although minuscule when compared to what regularly takes place in Indonesia, has journalists asking fire and climate change experts about the global warming contributions of fires in the boreal. While the experts don't agree yet on how much carbon this Alberta fire has sent into the atmosphere no one disputes that it's millions and millions of tons; it's a significant percentage of Canada's "normal" annual GHG emissions. And, as in Indonesia, every hectare of forest burned in northern Alberta is one less hectare of forest able to sequester carbon.

Another similarity between the Indonesian fires and boreal forest fires such as the Horse River/Fort McMurray fire warrants mention and consideration. Both areas are rich in peat, partially decomposed plant matter. So when Indonesian forests are set ablaze this organic, very rich in carbon, material burns as well. The amount of peat in our northern forests, as Mike Flannigan points out, "dwarfs" the amount of peat found in tropical forests. Preventing peat fires, fires that are very hard to distinguish and may burn or smolder for months, then becomes a more pressing policy concern in a warmer future.

Does Ottawa Care Enough?

Governments face a range of hard choices when it comes to the subject of wildfire. These choices will require resources, both financial and human, and the federal and Alberta governments' actions on this front in recent years don't inspire a great deal of confidence that they are taking the challenges of wildfire seriously enough. In the 2013 *Sunday Edition* program mentioned above Brian Stocks, a retired research scientist from the Canadian Forest Service who continues to specialize in wildfire behaviour today from the University of Toronto, noted that governments weren't doing enough to try to understand wildfire and mitigate the risks it poses to Canadians. The federal government, although a signatory to the *Canadian Wildland Fire Strategy (2005)*, essentially hadn't put any money into the strategy. This comment confirmed what an update on the strategy for 2008/2009 suggested: the actual federal commitment for 2005-2008 was $4.8 million, a light year away from the $328.9 million federal proposed funding requirement for those years.

> "The federal government would rather spend millions of dollars on evacuating communities and recovery after the fire than spending a few dollars up front to reduce the risk and help mitigate the results of a disaster."
>
> *Kelly O'Shea, Executive Director, FireSmart Canada (2013)*

FireSmart Canada, in the aftermath of the Flat Top Complex/Slave Lake fire, requested one million dollars from Public Safety Canada to help the non-profit organization develop a national standard for wildfire prevention planning for municipalities and rural homeowners. The federal government rejected the request. The organization then lobbied Conservative MPs and asked Minister Toews to reconsider shutting the door on this preventative proposal. Ottawa still refused. You can taste the frustration in FireSmart Canada's Kelly O'Shea's words from several years ago about federal government priorities. "The federal government would rather spend millions of dollars on evacuating communities and recovery after the fire than spending a few dollars up front to reduce the risk and help mitigate the results of a disaster." Tom Burton, Secretary of Partners in Protection (the creator of the FireSmart brand) and a member of the Flat Top Complex Wildfire

The Western Partnership for Wildland Fire Science: Understanding and Improving Wildfire Management

Canada's fire management agencies long have been among the world's leaders when it comes to managing wildfire. But, as Professor Mike Flannigan, the Director of the Western Partnership for Wildland Fire Science, told me recently: "it's a challenging job and it's becoming more challenging in Alberta." In other words, there's an ongoing need to understand wildfire better and to improve our efforts to manage wildfire appropriately. This need is at the core of the mandate of the Western Partnership for Wildland Fire Science.

Centred at the University of Alberta, the Partnership established a collaborative network in 2009 between three institutions: the university's Department of Renewable Resources, Alberta's Department of Agriculture and Forestry, and the Canadian Forest Service. Dedicated to research and education it's not surprising to hear Professor Flannigan point to more than 20 graduate students who have developed an expertise in wildfire through the training they've received through faculty involved in the Partnership. The university registration system suggests that Renewable Resources plans to offer one undergraduate and three graduate courses explicitly focused on wildfire in the 2016-17 year. The Partnership is making an important contribution to training the next generation of scientists and practitioners who will wrestle with the challenges of managing wildfire in Canada and abroad.

The original science plan for the Partnership established three research priorities: fire resilient landscapes, fire danger rating systems, and fire weather and climate change. Here Flannigan sees research such as that on rating systems and fire weather as work building on an already impressive Canadian pedigree. The Canadian Fire Weather Index, for example, is the de facto global standard when it comes to estimating the effects fuel moisture and wind will have on the behaviour of fire. The new modeling that researchers are developing, and students/future forestry managers are learning about, refines and improves on the insights of past generations. The prize here is greater predictability, less uncertainty. But make no mistake when it comes to prediction and uncertainty - there's no hubris in the orientation of Flannigan and his research colleagues. Uncertainty will always be a part of wildfire management. The goal of the Partnership's research and education program is to reduce that uncertainty and better prepare the current and future generations of wildfire managers to face the challenges a warming world presents.

Review Committee, noted in an interview that, before the Horse River/Fort McMurray fire, the federal government had increased the importance of wildfire in its rankings of disasters. His initial sense of Public Safety Canada Minister Ralph Goodale's position, in the aftermath of the tragic Fort McMurray fire, was that Ottawa now may take a more serious view of the need for the federal government to increase its commitment to managing wildfire.

With respect to wildfire research, the story Stocks told to the CBC about the history of federal cuts to basic science in Natural Resources Canada painted the federal government with the brush of neglect. Stocks claimed that, when he started his fire research work with the federal government roughly forty years ago, the federal research capacity in terms of personnel was at its peak. About 50 staff, with adequate budgets, were engaged in basic scientific research on fire. This research capacity suffered debilitating cuts over the subsequent forty years. By 2013, the federal fire research capabilities were less than half of what they had been. He asserted that fewer than 24 people, with "a hugely inadequate budget," were engaged in fire research in 2013. He went on to say that so many of the wildfire challenges we face require basic scientific research to underpin policy and this research suffered from cuts to government laboratories. The path we've been on for forty years, one where we've moved away from government-based basic scientific research, seriously hinders our chances of adapting to a world with more wildfires on most landscapes.

And What About Alberta?

The provincial government owns the vast majority of Alberta's natural resources and arguably has the primary responsibility for responding to wildfire. What does Alberta's recent wildfire management record look like? One place to begin is with the annual base amounts budgeted for managing wild-

fire. As a base budget, this total generally will be less and sometimes far less than what the province actually spends on fighting wildfires. Supplementary estimates will be relied on in active or bad fire years to ensure the province fights all dangerous fires.

For example, Alberta Sustainable Resource Development's 2011/2012 budget dedicated $107.4 million "to cover wildfire prevention and detection and to retain (on-call) the necessary manpower, equipment and aircraft for immediate mobilization." The Flat Top Complex/Slave Lake and Richardson Backcountry wildfires were largely responsible for Alberta spending an additional $250 million in wildfire emergency funding during that fiscal year. The lower figure, $107.4 million, is a better estimate of the permanent resources Alberta devoted that year to managing wildfire.

From the 2004/2005 fiscal year to the 2014/2015 fiscal year there was very slim growth in this measure of Alberta's commitment to managing wildfire. Two percent annually, that's how little the base or pre-season Alberta wildfire management budget grew in constant, inflation-adjusted dollars. The Flat Top Complex Wildfire Review Committee noted that the increasing costs of a wide range of firefighting resources was a "key pressure" on the government's ability to prepare for wildfires. I'm skeptical that such a slim real increase in the base budget has been able to keep pace with the current costs and needs of wildfire management.

In November 2015, at the end of an active fire year where wildfires burned nearly 500,000 hectares of Alberta, Agriculture and Forestry Minister Oneil Carlier told members of a legislative committee that a review had started of the personnel and equipment his department would need to be prepared well for the 2016 fire season. Apparently that review didn't convince the provincial government to increase markedly Alberta's base wildfire management budget. In April 2016 Deputy Minister Bev Yee told the Standing Committee on Alberta's Economic Future that the wildfire base budget was slightly less than the previous year. Still, she suggested, her department was ready for the 2016 season. Premier Notley defended her government's approach to wildfire by saying that, if the fire season warranted it, Alberta would "add if necessary" to the base budget. This philosophy is no different from that taken by the Progressive Conservative governments she succeeded.

Performance Measures and Priorities: Do They Need to Change?

Do climatological and weather circumstances justify this continuation in wildfire management policy? If Alberta truly wants to take the "proactive approach to controlling wildfires" that Minister Carlier subscribed to in his November 2015 committee testimony then perhaps Alberta should be investing in more wildfire research, knowledge, equipment, and personnel.

This suspicion arises from the belief that the challenges and risks associated with wildfire today are more serious than they were one or two generations ago. One of the first things these challenges demand is a serious reconsideration of how government measures and reports wildfire management success. Containment and suppression is a longstanding measure of how well Alberta is performing its wildfire management role; what percentage of wildfires are contained by 10am of the day following their discovery? Alberta's performance is stellar according to this measure. In 2011, the government could report that 96.1 percent of all wildfires were contained within this timeframe. But…this was the year Slave Lake burned; this also was the year of the Richardson backcountry fire – a mammoth 600,000 hectares fire that burned for months. And, to return to an observation from the Flat Top Complex Review Committee report, successful suppression actually is beginning to increase the risks of catastrophic wildfires.

Hypothetically, would we be comfortable in arguing at the end of the current fire year that it was a success because we met a containment target of 97.8 percent? I wouldn't think so. Slave Lake in 2011 and Fort McMurray in 2016 should make it clear that this measure for protecting the public and environment is flawed. The government needs to reconsider how it measures wildfire management performance.

"Alberta Agriculture and Forestry," according to the department, "responds to every wildfire reported in the Forest Protection Area (approximately 60% of the province's landbase)." The province's five priorities in deciding how to allocate wildfire fighting resources are: human life, communities, watershed and sensitive soils, natural resources, and infrastructure. With respect to these priorities, should the province devote resources to protect commercial timber values at the same time as it tries to subdue a fire on the doorstep of a community?

In the aftermath of the Horse Lake/Fort McMurray fire this is a hard question our political leaders should be asked to wrestle with. On April 30, 2016, one day before the Horse Lake/Fort McMurray fire was discovered, a wildfire erupted approximately 45 kilometres northwest of Red Earth on a landscape marked by clearcuts, well sites, and merchantable timber. Communities were not threatened by this rapidly growing, out of control wildfire. But the Otter Lakes wildfire did threaten timber values. So, helicopters, airtankers, and dozens of firefighters attacked the wildfire. Thanks to the hard work of the firefighters and the use of aircraft and heavy equipment they were able to slow the growth of this fire in an unpopulated area. By Saturday May 7th the fire had grown to nearly 2,000 hectares but it was 50 percent contained. The next day the province announced that the fire was held – it was not expected to grow any larger.

With no communities at risk should the province have hit the Otter Lakes wildfire as hard as it did? Might not some of the aircraft and firefighters used there to defend timber values, perhaps even all of those resources, have been better deployed on the next day or on May 2nd 200 kilometres to the east fighting the fire that engulfed the

southern section of Fort McMurray? Surely the province must convene a review of how the Horse River/Fort McMurray fire was tackled. I hope such a committee will take a hard look at what sort of balance is being struck between priorities when it comes to allocating wildfire management and fighting resources.

It All Comes Down to Hard Choices

Challenges, risks, hard choices between values, and shared responsibilities are among the constants I see when it comes to efforts to manage wildfire. Since I started to consider the subject of wildfire last year I've come to appreciate the range of hard choices that lie ahead of us. Governments need to decide if, given our need to adapt on a landscape being shaped by climate change and a history of wildfire suppression, they have treated wildfire seriously enough.

If they decide they haven't then what should they do? Some options strike me as easier than others. An easy option, in my mind, would be to invest much more in understanding, preventing, and fighting catastrophic wildfire.

More difficult, more controversial, options revolve around the importance we give to different values. They are suggested above in thinking about the balance between community protection and commercial interests when it comes to fighting wildfire. Here you could add forest health to the mix of values. The boreal is a disturbance forest and wildfire is vital to its renewal. Should fires in the boreal that threaten forestry tenures or petroleum well sites but don't threaten communities be allowed to burn in order to restore health and ecological balance to the boreal? If you want to say yes to this question – what about the contributions that wildfires in the boreal and its peatlands may make to climate change?

And, finally, what responsibilities do we have as individuals? I've heard one respected voice suggest that perhaps governments should limit the ability of individuals to live as they please in those lovely, forested locales far from the city many people dream about. If we choose to live with others in nature then do we have a duty to sacrifice some of our aesthetic wants for the safety of others. When I return to the legacy my parents left me on Kootenay Lake later this year should I be thinking of defensible space as I sit under the pines, of what I should do to make our structures, as well as my neighbours', more resilient to wildfire. Hard choices, but ones we need to debate and make.

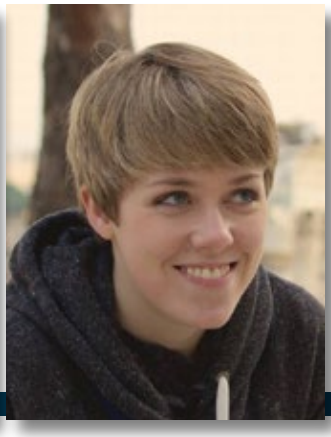
"Girl Pondering/Calgary Tower" by Elizabeth and Alexandra Jeffries

"The Song is Over, But the Melody Lingers On" by Thanks for all the Fish (Creed, Zane McKechern Hunt and mother Laura)

Alberta on Fire:

A History of Cultural Burning

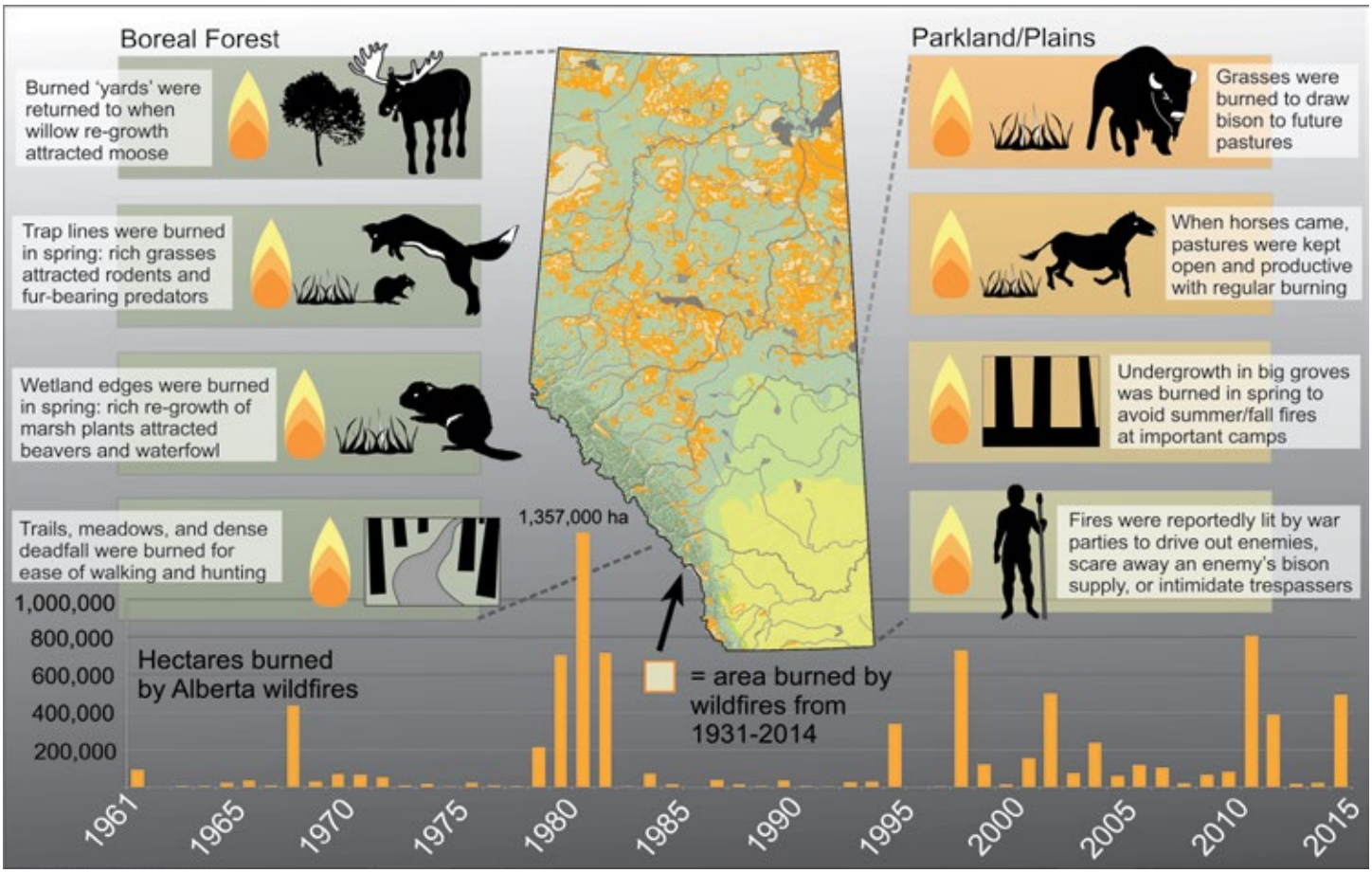
By Todd Kristensen ***(Archaeological Survey of Alberta) and***
Ashley Reid ***(University of Alberta)***



Fire science in Alberta has come a long way but the growing practice of prescribed burning is actually a step back to the past. Archaeologists and palaeoecologists are discovering that Western Canada has burned at the hands of people for thousands of years. Henry Lewis, a founding father of First Nations fire research, stated that much of what was thought to be wilderness in Alberta when Europeans arrived was likely a mosaic of manipulated landscapes influenced by controlled burns. Cultural or anthropogenic burning refers to human creation of fires to maintain preferred stages of ecological succession. These types of controlled burns began in the province millennia ago and continue in our modern forests and grasslands. Alberta has a rich history of fire use – the recognition of it has implications for modern conservation and land management.

Ancient Fires

Distinguishing cultural from natural burning patterns over the past thousand years is challenging but new techniques and novel data sources are helping to untangle Canada's fire history. The prairie provinces have a number of stable sand dune fields that were more active in the past. Sediment cores and a technique called optically stimulated luminescence (which dates the time that has elapsed since sand grains were exposed to sunlight) have revealed that fires periodically wiped out dune vegetation, which activated the migration of entire dune fields. Periods of particularly high dune mobility over



The various purposes of First Nations' burning practices in Alberta (by Todd Kristensen). The map and graph at the bottom depict the number of hectares that have been consumed by wildfires across Alberta since these statistics were recorded.
CREDIT: statistics and spatial data are provided by Alberta Agriculture and Forestry's Wildfire website).

the last 4000 years are linked to the arrival of pre-contact cultures and their presumed burning practices.

Researchers are also tabulating fire history patterns in the Rocky Mountains using repeat photography and the analysis of tree rings dating back to the 1700s while others are detecting burnt carbon from fires in the phytoliths of prairie grasses preserved in sediment profiles. International teams are teasing out global fire patterns by analysing 'pyro-proxies' in Greenland ice cores like microscopic coal or levels of atmospheric substances related to fires (e.g., levoglucosan and ammonium).

Cores are also being excavated for pyro-proxies in Alberta's lakes and bogs. Christina Poletto is a Master's student at the University of Alberta who will soon extract long tubes of lake mud from Clear Lake near Fort McMurray to analyse changing layers of charcoal and pollen deposited over thousands of years. This information provides a baseline of natural fire history that she hopes to compare to cultural landscapes surrounding archaeological sites. "I want to learn how First Nations used their knowledge of forest succession, not only to respond to fires but to know how and when to light them to encourage the return of berries, other plants, and game animals."

Airborne pollen settles into lake muds and serves as a proxy indicator of burning, vegetation change, and forest succession. Other researchers have applied this approach to understand long term changes through the Holocene but a very high resolution record is needed to understand how Alberta's forests have responded to fires on the scale of decades and centuries. Poletto is hoping that her cores will offer centimetre by centimetre glimpses of changing conditions.

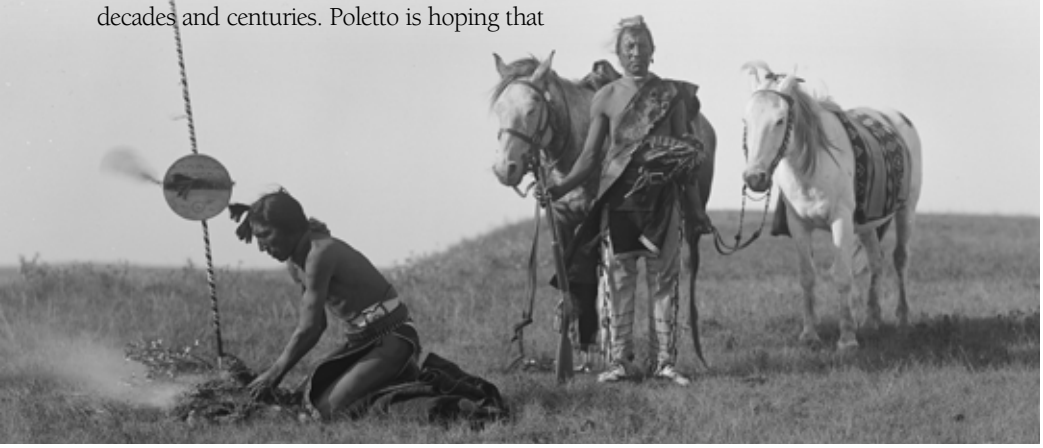
Why Did First Nations Burn?

Based on oral history and early observations, fires were frequently lit by First Nations for many reasons. On the prairies, fires ignited in spring, fall, or early winter encouraged quicker re-growth of lush grass that attracted bison. Fires were lit months in advance around major communal bison hunting areas, like southern Alberta's Head-Smashed-In Buffalo Jump, to attract big herds.

Early Europeans recorded traditional uses of fire by the Blackfoot to drive bison and flush out game. A medicine dance described in the 1830s mimicked bison drives: women played the role of bison and danced until the scent of smoke from a ceremonial fire sent them rushing to a lodge pursued by male dancers. The Blackfoot and other First Nations lit fires to control herd movement, which likely became more important as bison numbers dwindled in the 1800s. According to legend, the Blackfoot were first introduced to fire as a hunting tool by culture hero Napi who wore a pair of flaming leggings to ignite bushes and drive out game such as antelope, elk, and deer.

Plains First Nations also burned the understory of large groves in spring to protect them from dangerous summer fires. Patches of mature trees on the prairies were significant resources and became favoured camp sites that could be protected from dangerous fires through the use of controlled burns, not unlike the intent of modern FireSmart programs in Alberta communities.

When horses were introduced, First Nations burned grasslands in spring and fall to maintain pastures. Fire on the prairies was also used as a warfare tactic: in several battle accounts, war parties employed fire to drive out enemies or drive bison herds away from enemy territory.



A grassland fire being lit by members of the Blackfoot in 1918. The Blackfoot have legends and special ceremonies associated with cultural burning. PHOTO CREDIT: Image P138 courtesy of the Provincial Archives of Alberta

Anthropogenic burning played a different role in northern forests. The Dene and Cree burned forest meadows to maintain grazing areas for bison and elk. Surveyors and traders like George Dawson and Henry Moberly in the late 1800s were convinced that Alberta's First Nations were responsible for large swathes of grass otherwise surrounded by forests like Grande Prairie, High Prairie, and Fort Vermilion. These prairies were particularly rich hunting grounds and would require maintenance to prevent encroaching forests.

Some of the most influential research on First Nations fire use is that of the late Lewis Henry with Alberta's Dene. According to Henry, Dene bands used fire to "establish and maintain plant communities, and the animals found there, at preferred stages of ecological succession." Small patches or 'yards' were burned in spring and visited over several years when berries and medicinal plants were ripe. Hunters would later return to harvest moose that targeted burns for willow re-growth.

Spring fires along wetlands, rivers, and meadow fringes maintained trails in places like Fort McMurray, Lac La Biche, and Lesser Slave Lake. So important were fires for human movement that, when burning was outlawed, many bands could no longer access traditional territories. Robert Campbell, the Federal Director of Forestry, felt it so important to prohibit First Nation burning that he translated fire notices (which outlined the $200 fine for burning outside of one's property) into Cree and Chipewyan syllabics in 1908. Traditional trails and small waterways became choked with vegetation. Anthropologist Marc Stevenson suggests that fire suppression pushed several Alberta Dene groups from semi-nomadic to sedentary lifestyles, which significantly changed their economies, social structure, and health.

Like the Blackfoot, the Dene and Cree adapted fire use into historic times. When the fur trade swept west, trap lines and trails were regularly burned in spring for ease of access and to encourage grasses that attract-

ed rodents and, eventually, their fur-bearing predators. Wetland meadows were burned to provide food for beaver and muskrat.

The key elements of Indigenous fire use across Alberta, regardless of purpose, included monitoring conditions like snow cover, ground moisture, and fuel loads to keep fires manageable. The high frequency of fires, both natural and cultural, decreased fire loads and maintained fire barriers, which likely decreased the overall severity and extent of burns.

Modern Burning and Fire Landscapes

Fires were once common and small but have since become less frequent and large. Fire suppression in the early 1900s resulted in the replacement of many patchwork landscapes with dense forests. In mountain parks, land managers have re-introduced prescribed burning to help re-establish mosaic landscapes and the diverse animal/plant communities that they support. Prescribing burning is balanced with the need to maintain areas with mature forest cover that are favoured by species like woodland caribou. Fire is more commonly being used across Alberta during certain seasons to decrease the risk of large, out-of-control fires that threaten infrastructure and consume merchantable timber.

Larger scale prescribed burns tend to occur in Alberta's national and provincial parks. A combination of torches and air drop combustibles are used to create different fire types that mimic natural burns. Years of planning and months of waiting are often necessary until the right moisture and weather regimes are conducive to safe burning.

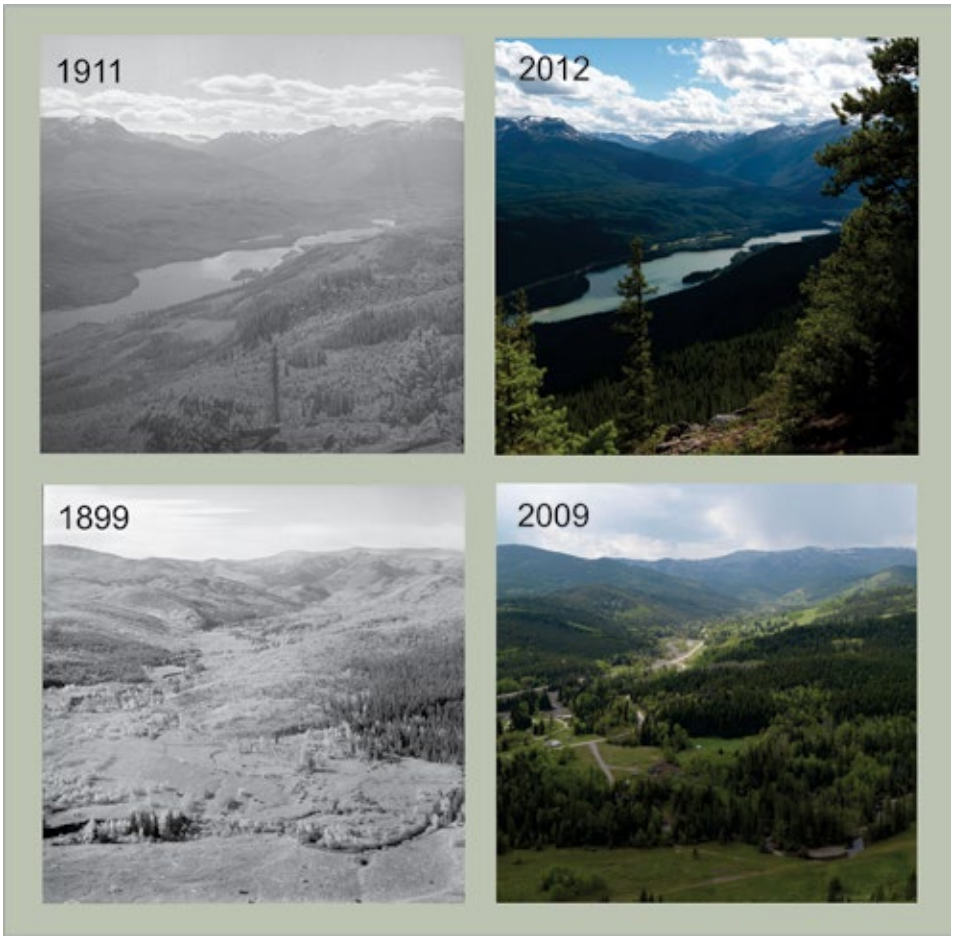
Colton Reilly with Alberta Agriculture and Forestry has been fighting wildfires in Western Canada for over three years and he specializes in prescribed, preventative burns. "We have to try to burn everything deep in the soil, but it's hard to find a good time to do that. We have to worry about finding the right drought codes (a numbered scale to assess dryness of surface fuels and litter layers to about 10 cm deep), and once we have those, we have to worry about fires starting close to people's homes." Burning deeply into the soil reduces fuel that can be used by future wildfires, but due to the historical build-up of litter layers, prescribed burns run a high risk of spreading outside anticipated areas if not managed properly. Land planners are re-learning a complex knowledge base required for controlled burns.

The Value of Fire Paleoecology and History

Ecologists are no strangers to the danger of public misconceptions: effective programs can be marred if significant gaps exist between science and public understanding. Dr. Jeanine Rhemtulla, who studies the historical ecology of forests at the University of British Columbia, stresses that there are often misunderstandings of landscape stability: "We tend not to manage for change, we manage for consistency, but landscapes are so dynamic - we need to acknowledge that landscapes change and then manage for resiliency." Historical research reminds us of the positive and dynamic roles of fire in the province.

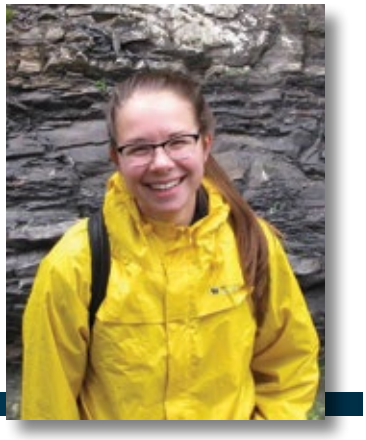
Anthropological work on cultural burning also corrects a mistaken notion that First Nations were passive ecological agents. Anthropogenic burning involved a library of information to apply fire in different contexts and then adapt fire to suit historical needs, like to maintain horse pastures and support trapping. People have been successfully manipulating landscapes across Alberta for thousands of years: fire can continue to play a positive role in Alberta's ecosystems.

Todd Kristensen is a PhD student in the Department of Anthropology at the University of Alberta and a Regional Archaeologist with the Historic Resources Management Branch of Alberta Culture and Tourism. Ashley Reid currently attends the University of Alberta and is working on a Bachelor of Arts degree in Anthropology.



The canopies of many river valleys in mountain parks have closed in due to fire suppression. In some instances, this has decreased floral and faunal diversity while creating problematic fire loads adjacent to infrastructure.
PHOTO CREDIT: Images courtesy of the Mountain Legacy Project, 2016. Image identification numbers listed clockwise from top left are d20c0d6c-7116-11e2-a556-c82a14fffed2; cd99b202-7116-11e2-a556-c82a14fffed2; 50e1ebac-7059-11e2-a556-c82a14fffed2; 54e49646-7059-11e2-a556-c82a14fffed.

What is FireSmart?



By Joanna Skrajny, *AWA Conservation Specialist*

Fires are smart.

In the beginning, Alberta's forests grew in harmony with fire. Fires were wild and unpredictable, equally likely to burn in forests of all ages. Caused by lightning, often these fires were small and inconsequential. Drier conditions would result in large and irregular fires that significantly impacted the landscape. Fire was a natural and essential disturbance to the landscape that recycled nutrients, regulated succession of plants, maintained diversity, and controlled insects and disease.

Over the course of a hundred years, we have ransacked and pillaged our forests. We have sliced up the forest with cut lines, seismic lines, roads, trails, pipelines, and homes, carving a once unimaginable expanse of forest into smaller and smaller portions. At the same time, we have expected the forest to provide us with its goods and services: unlimited sustained timber yield, clean water, clean air, wildlife. How can we expect the forest to continuously supply us with resources and ecosystem services when we have altered it to such a degree that it struggles to regenerate itself?

What is the problem?

The crux of our problem lies in the fact that our society wants all activities and amenities to be easily available, everywhere, all the time. We want to live in adorable homes nestled within the beautiful forests beyond our urban centres. Alberta's incredible urban sprawl is testament to this. Rather than question if we should build in the forest and who should bear the risk *if* we build there, we try to engineer a solution to the problem. We have tolerated, if not promoted, more and more human settlement in forests over the past 50 years, at greater risk to the people in those communities.

Alberta's FireSmart Program was introduced in 1999 by Partners in Production, an Alberta-based non-profit dedicated to providing information to reduce the risk of wildfire losses. It was later adopted by the Alberta Government. The Forest Resource Improvement Association of Alberta (FRIAA) is responsible for administering and delivering the FireSmart Initiative Program. The FireSmart program historically received $2 million annually until funding ended in 2010. After the catastrophic Slave Lake fire in 2011 resulted in over $700 million in damages and $290 million spent on the disaster, the Alberta government renewed its support of the Firesmart program, allocating $20 million. This amount was cut to $7 million in 2013, increased to $10 million in 2014, and cut again to $3.5 million for the 2015 season. Alberta has funneled a sizeable amount of money into the FireSmart Program.

The original intent of the FireSmart Program was to address research findings regarding home ignitability, namely that home ignitability rather than wildland fuels is the principal cause of home losses during fire events. The 2003 FireSmart manual highlights this with a focus on removing fuel from the urban-wildland interface. But, over the years, the meaning of "FireSmart" and the allocation of funds have been co-opted by the Forest Service. The original intent of making a community's buildings more fire resistant has changed into extending the program into the surrounding forests. The effectiveness of this change is dubious and it possibly may have benefited industry operators. A quick look at FRIAA's membership leads to questions about who Firesmart really benefits. Spray Lake Sawmills, Sundre Forest Products, and Weyerhauser Company Ltd. are listed as members in FRIAA's 2015 Annual Report. As the focus of the FireSmart Program moved away from reducing home ignitability to managing forest vegetation, some Albertans began to voice their concerns that clearcut logging was occurring and being justified under the auspices of FireSmarting.

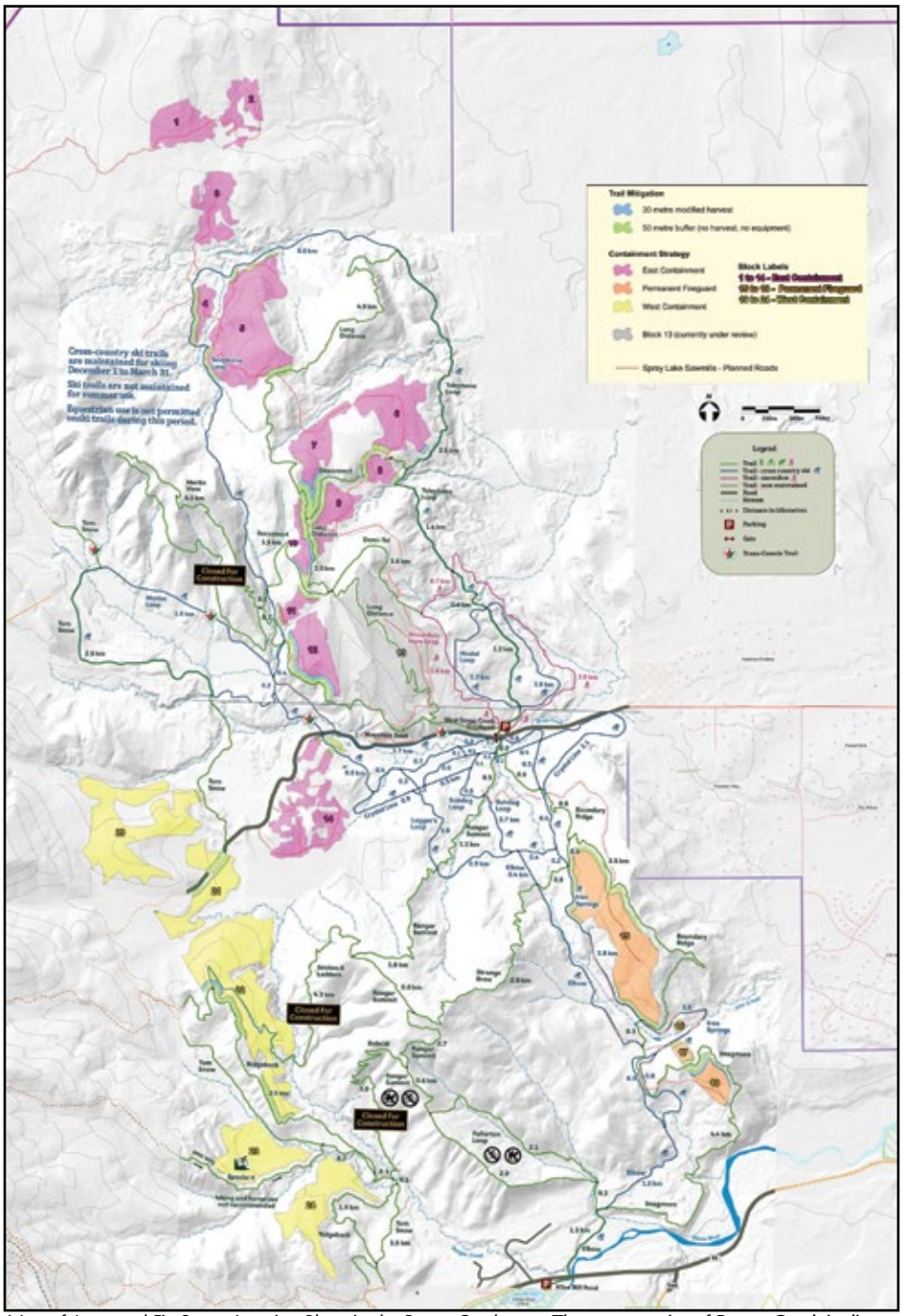
Case studies

Problems surfaced in the community of Bragg Creek in 2012 when FireSmart activities were announced in order to create a "fuel break" for the community. Just a year after the Slave Lake fire the possibility of catastrophic fire was still fresh in the minds of residents. However, there was a massive public outcry when it was discovered that the logging would occur on an extensive patch of trail networks and forests that many Bragg Creek and Calgary residents hold dear. Throughout a heated public consultation process, many participants opposed the plan since the proposed logging would not retain any trees around recreational trails and only adhered slightly to true FireSmart practices. Although visual buffers were eventually

added around recreational trails, logging plans were approved and went ahead in October 2012.

The Minister of Environment and Sustainable Resources at the time issued a public release stating that the "FireSmart Plan will create a series of firebreaks on forested Crown land west of Bragg Creek by harvesting timber" and that the plan "respects government's obligation to manage the costs all Alberta taxpayers would have to bear to fight an extreme wildfire in the area."

Dr. Ralph Cartar, ecologist and member of the Bragg Creek Environmental Coalition, had serious reservations about the touted ability of these clearcuts to provide a fire break to the residents of Bragg Creek. "The way in which the logging would reduce fire risk was never explained," he told me. Turning to the research that has been done on fire behaviour, he examined the proposed logging plans from a FireSmart perspective.



Map of Approved FireSmart Logging Plans in the Bragg Creek area. The community of Bragg Creek is directly east, flanking either side of the road (cut off in map). SOURCE: Government of Alberta (SRD, now AEP).

The approved plan, outlined in the map of approved FireSmart logging plans, had three logging phases: the purple and yellow areas designated blocks planned to be cut in consecutive years and then replanted, the orange area was a permanent fire break. What is not seen on this map are the plethora of past clearcuts interspersed between each of these proposed cuts. The young forests will effectively transmit any fire and reduce the value of any short-term (10 year) reduction in fire risk that results from logging the discontinuous patches of old growth forest shown.

It's clear from the maps that these purported "fire breaks" are patchy and do not provide a solid line of defence to the residents. Why is this the case? Half of the forests surrounding Bragg Creek have already been logged and therefore are composed of immature lodgepole pine. Does that mean that the remaining immature lodgepole pine stands are less of a fire risk? The answer is a resounding no. A study done in Kananaskis determined that young forests have the same fire risk and are as susceptible to burning as old forests (Johnson & Larsen, Ecology 1991). The forest patches that were left are as prone to fire as regenerating clearcuts for which no logging is planned. The myth of increased fire risk with forest age is deep-rooted though and appears often in justifications of logging by the Forest Service, politicians, and logging companies.

So the Bragg Creek community now has a patchy network of clearcuts, the majority of which will be replanted. For how long will these clearcuts provide a fire break? Since forests are returning to these stands, the benefits that the logging will provide is at best a temporary firebreak for 10-15 years, until the young forests – as prone to burning as older-aged forests – are re-established. Dr. Cartar concluded "the proposed 'FireSmart' logging was simply not scientifically supportable." He added: "They only harvested mature stands of pine, and left immature pine simply be-

cause it was non-merchantable timber."

In addition to questions raised about the 'science' and the effectiveness of the Bragg Creek FireSmart activities, questions have been raised about the reality that Spray Lake Sawmills was to carry out the FireSmart logging. An online map of Spray Lake Sawmills' 2012 Bragg Creek planned timber harvest mirrors the SRD FireSmarting map almost perfectly. Many residents of Bragg Creek who question the purposes of FireSmart believe this was an attempt to fulfill a contractual obligation made under the local Forest Management Agreement, even though it was presented to the community as a FireSmart Plan. The FireSmart solution that some residents of Bragg Creek actually wanted was this: a permanent fire break which would be wide enough to slow down a fire, allow for access by fire-fighting crews, and allow time for the community to evacuate. Nonetheless, the logging plans proposed by SRD and industry were approved and went ahead, without explanation or justification.

Unfortunately, this problem is not confined to one region of Alberta. The Nordegg Community Association (NCA) has had serious concerns with the failures of FireSmart logging in the R11 Forest Management Unit (FMU) located in Bighorn Backcountry (see Jane Drummond's article in this issue of *WLA*). The community cites a failure to follow R11 ground rules that require consideration of aesthetic values and mitigation of visual impacts of Firesmart logging on tourism values.

In a recent letter to the Government of Alberta, the Nordegg Community Association stated:

> *"The Bighorn Backcountry includes no commercial forestry tenure, but government FireSmart logging has been conducted in a manner that is indistinguishable from commercial clearcutting that is completely inappropriate for a tourism and recreation area. In particular, visual assessments have not been conducted, and screening buffers, topography and residual material have not been used to address visual concerns, as is required by the R11 plan."*

Regardless of the effectiveness of FireSmart logging, the NCA says it's frustrating that important recreational trails could not have at least had visual buffers. What is especially frustrating for Jane Drummond, a member of the NCA, is that "the North Saskatchewan Regional Plan is an excellent opportunity to designate the Bighorn as a Wildland Provincial Park, yet the ongoing and unnecessary FireSmart logging is undermining the region's stated tourism and economic development goals."

Thankfully, it seems that the Alberta government is becoming more responsive. Commitments have been made to include the NCA in future activities, to reclaim roads that were used in FireSmart activities, and to reduce motorized access

Black Canyon trail west of Fish Lake after FireSmart logging, once a popular biking and hiking trail. CREDIT: Nordegg Community Association

into treated areas. An important next step will be to ensure that future FireSmart decisions are based on peer-reviewed science and public input. The need to apply FireSmart clearcut logging treatments must be re-evaluated entirely, particularly in view of their lack of support in the scientific literature.

Looking into the future

The battle with FireSmart logging is far from over. In the Ghost Valley, residents remain concerned about the FireSmart plans for the Summer Village of Waiparous which still show up in timber harvest documents for the area. Many residents have voiced their belief that the plan as drawn would mostly serve to protect the forest from fires escaping the village, rather than serving FireSmart's original intention – making residential areas more resistant to fire dangers.

Meanwhile, huge swaths of timber are being clearcut from three adjacent compartments in Spray Lake Sawmills' north Forest Management Agreement area. As the foothills are cleared, residents wonder about the fire risks that go along with forestry. The Ghost Valley is increasingly characterized by clearcuts littered with woody debris, dried through exposure to sunlight and wind, then frequented by weekend recreationalists who enjoy campfires and setting off the occasional explosive. And, as Ghost Valley community member Gord MacMahon says, "We've seen that industrial scale forestry opens up new areas to OHV traffic. Reclamation of logging roads does little to keep OHVs out once clearcut forestry opens up an area." Gord notes that the hot metal and sparks emitted from the vehicles may be a source of human caused fires. "It's important," he says, "that we look at the big picture and ask whether our activities are really reducing wildfire risks, rather than increasing them."

Fortunately, solutions are within reach. Large intact forested areas that don't pose dangers to communities in the event of wildfire must be left free to burn in order that natural checks and balances might take place. Where that is not possible, forest communities must focus on making their buildings, yards, fire pits and community green spaces fire resistant: choosing building materials carefully, remaining vigilant to cut new growth back from homes and outbuildings, committing to safe practices for homeowner fire pits, and implementing annual plans for reducing fuel loads within residential green spaces. In conjunction with these activities, the Alberta government might consider permanent and well-maintained fire breaks in close proximity to the communities at risk. This solution promises to be more effective than clearcut logging in patches and then replanting fuel.

Above all, FireSmart activities must be truly fire smart. These activities must be done using the best available science and must be shaped by meaningful and timely public input. After all, FireSmart was developed with the goal of protecting the property of individual Albertans, rather than as a strategy for finding additional areas for timber harvest. Returning FireSmart to its original intent offers a promising path forward for Albertans seeking sustainability in our land use practices.

Thanks to the people cited in this article for providing me with on-the-ground knowledge and for guiding me through the complexities of this issue.

"Alberta Bound" by Jessica and Angela Hauser

Nordegg's FireSmart Experience:

A Commentary

By Professor Jane Drummond, ***Facilitator, Nordegg Environment and Recreation Working Group***

The residents and homeowners in Nordegg are aware that the policy, regulations and practices of FireSmart are in place to protect us and our homes in the case of wildfire.

We live in Nordegg in order to create businesses, homes, education, and leisure for our families. Our vision for Nordegg, supported by Clearwater County, is that it will become the tourism hub for the region. To that end, we are supporting the Bighorn Backcountry official designation as a Wildland Park managed by Alberta Parks. We also think that such a designation will support more responsible FireSmart practices by Alberta Agriculture and Forestry.

We would first comment that the ongoing, and in some cases unnecessary, FireSmart logging in the Bighorn Backcountry close to the community of Nordegg is not meeting best practices that are acceptable in an area identified for tourism and is undermining the stated tourism and economic development goals of the region. Second, we are concerned that lack of FireSmart in public green spaces immediate to our residences poses a real threat to their ignition should a fire close in on the community. We are concerned that indiscriminate clearcutting where the logs are then sold to commercial operators is being used instead of proper FireSmarting – using single tree and deadfall removal. The former is a cost recovery practice and the latter practice requires investment by Alberta Agriculture and Forestry.

Regarding FireSmart Logging in Nordegg

Nordegg community members participated in the R11 Charette – a weekend planning exercise to develop objectives, indicators and targets for the R11 (Bighorn Backcountry) over a decade ago. The plan recognized that limited mechanical treatments would be allowed to reduce fire risk in areas not amenable to prescribed burning.

The Government of Alberta clearly committed that treatments would include residual material, be designed to minimize visual and tourism impacts, protect existing trails and that treatment activities would not create any new trails. There was also a commitment to report back on the achievement of these goals. Due to a lack of resources, this has not happened.

The Bighorn Backcountry includes no commercial forestry tenure, but past government FireSmart logging has been conducted in a manner that is indistinguishable from commercial clearcutting. In addition there appears to have been a lack of supervision of logging contractors or recognition that special rules and commitments were supposed to be met. In particular, there have been no visual assessments of mechanical treatments and screening buffers; topography and residual material have not been used to address visual concerns, as is required by the R11 plan (*http://aep.alberta.ca/lands-forests/forest-management/forest-management-plans/documents/ForestManagementUnitR11/R11_part1.pdf*). Another breach of the plan concerns the leaving of inappropriate linear access to areas close to the community. These errors are inconsistent with the mandates of other government departments to promote and maintain tourism and recreation values.

We also firmly believe that the current Public Land Use Zone (PLUZ) designation of the Nordegg region is a deterrent to two key outcomes. It does not encourage tourism and sustainable growth of Nordegg as a gateway community to the Bighorn. It also seems it has not supported the implementation of quality government FireSmart practices.

Over the past 18 months we alerted local Alberta Agriculture and Forestry personnel to our concerns. We met with Rocky Mountain House management staff in February 2016. This somewhat contentious meeting was followed up with a March 2016 tour of the FireSmart logging areas around Nordegg. The response from the frontline Agriculture and Forestry personnel leading that tour was constructive. Promises were made: to pull back roads that were built during previous FireSmart logging exercises; to place barriers and signage to stop access to FireSmart logged areas; and to selectively reforest with poplar varieties for visual reasons and protection of wetlands that have been disturbed. Promises were made to contact the community at least annually to review concerns and to contact the community before any more FireSmart logging is planned.

Regarding FireSmart in public spaces close to residences

To its credit, Clearwater County development regulations in Nordegg are FireSmart. As such these regulations put the county ahead of other jurisdictions. The residents of Nordegg are very aware of their responsibility to reduce the wildland fire fuel on their property. As with human nature there is variation in compliance on this responsibility. The county has twice used the long weekend in August to provide help transporting material to the local burn pile. The community responded well to these efforts but the service has been discontinued for financial considerations.

A major FireSmart issue within Nordegg is the need to reduce fuel on public, mostly county, spaces close to homes. This lack of action reduces homeowners' enthusiasm for clearing fuel from their own property, as they rightly believe that lack of FireSmart public lands adjacent to their homes is a peril equal to the fire risk on their own property.

There are Alberta Agriculture and Forestry grants that could address this issue. We feel there is lack of logic involved in having residents write grants to get funds from Alberta Agriculture and Forestry to give to the county to carry out fuel reduction on public land close to homes when excessive FireSmart logging is being carried out just down the road. Notwithstanding we will engage in the established process and see where it goes.

In summary the Nordegg Environment and Recreation Working Group has concerns that past FireSmart logging has not met the intent and commitments of the R11 plan and has created both poor esthetics in the area and unnecessary linear access to the treated areas. Because of the advocacy of the Nordegg Environment and Recreation Working Group, promises have been made to mitigate the worst outcomes of these poor FireSmart practices. Finally, the lack of jurisdiction, by Alberta Agriculture and Forestry, over the public lands close to Nordegg homes has created poor FireSmart conditions within the community. The route to dealing with that inconsistency seems convoluted and illogically involves community members writing grants to have work carried out on public land.

"Nâtamâkêwin Pakwâci - Help The Wild – Caribou" by Tarana Sharma

"Bees and Wildflowers" by Thomas and Dominique Jeffries

National Parks:

Time to Burn (for Ecological Integrity's Sake)

By Andrea Johancsik, *AWA Conservation Specialist*

Standing at the peak of the east end of Rundle last month, my friends and I marveled at the sunny, spring day we were fortunate enough to witness from 2,530m high. The hike gives vistas of remote mountain peaks and forested slopes, as well as the highly visible town of Canmore and the Spray Lakes dam. However, arguably one of the biggest human-caused changes in the mountain national parks is much less obvious. Decades of fire suppression have changed the landscape in a dramatic way; had we been at the summit 80 years ago our view likely would have been very different.

History

Banff National Park was the first national park designated in Canada in 1885. Other parks sprung up across Canada in the following decades to preserve natural resources and wildlife and provide tourism opportunities. In Alberta we saw the subsequent creation of Waterton Lakes National Park in 1895, Elk Island National Park in 1906, Jasper National Park in 1907, and Wood Buffalo National Park in 1922. The highly popular and newly accessible mountain parks became dominated by tourism and commercial development, roads, and removal of keystone species like the plains bison. Many of the 3.6 million visitors who passed through Banff National Park last year probably didn't realize they were looking at a drastically different landscape from the one of a century ago.

It's been decades, but fortunately we know from photographs what the mountain national parks looked like from the early days. Morrison Parsons Bridgland was a surveyor and alpinist in the early 20th century and used photogrammetry to systematically map much of the central Canadian Rocky Mountains by hand. He mapped Jasper National Park this way in 1915. Eight decades later, then- graduate student Jeanine Rhemtulla, Dr. Eric Higgs, and other members of the Mountain Legacy project painstakingly retook all 735 of Bridgland's Jasper photos. They wanted to compare how the vegetation on the landscape had changed, if it had changed at all, over nearly a century. Their study found that vegetation has become less diverse and is now dominated by closed-canopy coniferous forests; in 1915 the landscape consisted of open coniferous forest, grasslands, young forests and some deciduous stands. Their work quantified the impacts of fire suppression in their study area of Jasper National Park, but it's obvious just from a look at the photos the dramatic change in vegetation that has occurred.

Early attitudes towards fire

Fire was seen as an enemy by the Parks agency in the early 20th Century. The Cana-

Looking north from Tunnel Mountain, 1888 and 2008. The conifer forest has spread extensively since James Joseph McArthur took his photo in 1888.

dian Pacific Railway was a rolling fire-starter, every spark a potential cause of wildfire through the forested mountains. Fire threatened life, property, expensive infrastructure, and the "pristine" landscape that railway tourism depended on. In 1909, just 14 years after the inception of Banff National Park, the primary management objectives of the Park Warden service were to protect forest and game. Fire wardens were employed to enforce the laws and regulations which authorized control and suppression of fires. The agency's early language about fire illustrates the mentality of fire as an enemy: fire was always "disastrous," "dangerous," and "devastating;" the fire warden engaged in a battle to "fight," "combat," and "resist" fire. This language appears too in news headlines and everyday language, and accounts. You find it too in a Parks Canada 1987 publication, *A History of Canada's National Parks Vol.4,* where author W.F. Lothian wrote that all fire was bad:

> *"An ever-present threat to our national parks is forest fires, which, from the earliest days of exploration, have ravaged these areas. Conflagrations which marred the landscape and despoiled the habitat of native wildlife have been attributed to various causes... whatever their origin, all fires in national parks are of particular concern to the warden service."*

Attitudes towards fire, as Todd Kristensen and Ashley Reid point out elsewhere in this issue, were very different for indigenous peoples. Long before the arrival of European settlers, some First Nations of the prairies and mountains knew fire could not be extinguished in the long term, and instead used fire to their advantage to improve forage opportunities. Just how much of an influence indigenous peoples had on the fire regime is up for debate in anthropological research. However, we do know that the First Nations deliberately used fire to change the ecology and recognized that fire is an inevitable and even beneficial process.

The ecosystems react

The fire suppression policy was very effective and burned areas in the major, tourism-oriented national parks were virtually eliminated. For example, in Banff National Park, the area burned per decade decreased from 400 square kilometres down to five by the 1950s. However, while there are fewer fires now, they burn more intensely. This is because without fire, potential fuel builds up. When a fire finally occurs, it may be much larger and hotter than a fire which may start in a more recently fire-disturbed area. That's what studies in the U.S. ponderosa pine forests show. The *WLA*'s editor recalls helicopter pilots who were fighting the Lost Creek fire in the Crowsnest in 2003 telling him that they had never seen a fire that burned as hot as that one. The research on fire in pine forests doesn't mean, of course, that this is necessarily the case in all forests in all regions.

Ecological interactions are complicated; it wasn't until the 1970s and 1980s that more sustained attention started to be paid to the detrimental effects of fire suppression. Today we are still learning about fire disturbance and recovery in our forests. For instance, fire has had a role in the complex interactions between trembling aspens, humans, wolves, and elk. A 1998 paper by White et al. told this story: aspen has existed throughout all Rocky Mountain national parks in Canada and the U.S. and its presence indicates biodiversity. Elk browsing keeps aspen from dominating the forest, and wolves keep the elk population in check. Fire kills aspen too, but it's also one of the first plants to regenerate after a fire. This has been the historical balance until increased human land use displaced wolves, leading to higher elk populations and fewer aspen stands. As Bridgland's photos show clearly, open areas would have provided a more diverse choice of meadows for aspen to grow and for elk to browse. Knowing this, prescribed fire can be a management tool that has cascading influences. It's not the only piece of the puzzle, but it can assist in solving problems like an overabundance of elk.

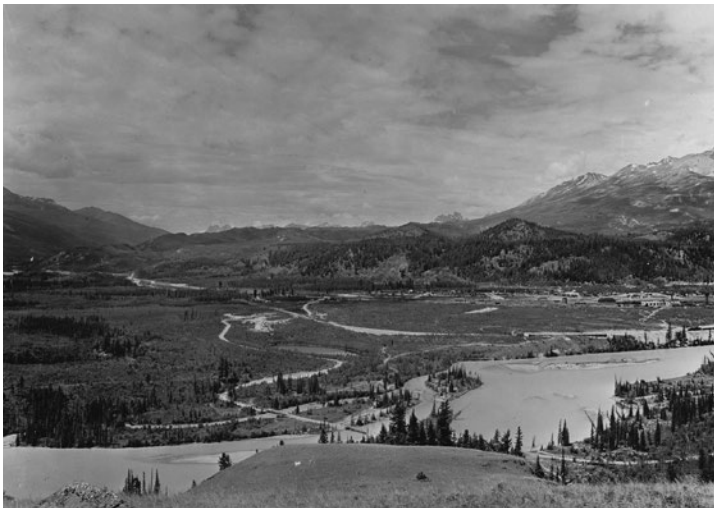
Whitebark pine and ponderosa pine are also species that thrive after a good scorching and are not currently represented at historical levels. The impacts of fire suppression are hurting the whitebark pine at the same time as the white pine blister rust fungus, climate change, and an over-abundance of mountain pine beetle are threatening the pine's presence on the landscape. The species is now endangered and this promises to harm the 110 species that (used to) consume whitebark pine seeds in high-elevation ecosystems. It's burning the candle at both ends, if you will – without the burning. Climate change, too, will add another element of risk. All of Alberta's five national parks are predicted to experience an increased frequency and intensity of fire, because of drier summer conditions, and, in the mountain parks, increased fuel from stands infested by mountain pine beetle.

Prescribed burns as restoration

Fortunately, prescribed fire is bringing back some of the natural processes caused by fire. These projects can thank the *Canada National Parks* Act which now directs Parks Canada to maintain and restore natural processes, to value ecological integrity. In the *Act*, ecological integrity means "a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes."

Ecological integrity wasn't always the first official priority of national parks. Stephen Woodley, a leading expert in protected area management, writes of four eras of management in the Canadian Parks Service: protection, preservation, management, and ecosystem management. Management approaches have changed through the decades with the realization that national parks were no longer "natural" areas untouched and unregulated by the (European settler) human hand.

One of the biggest risks to ecological integrity in national parks is historical fire exclusion. To counter this, the national target for Parks Canada is to burn 20 percent of the historic fire cycle within an area. In



Looking west from Old Fort Point in Jasper National Park in 1998 a sea of conifer forest has transformed the landscape photographed by Morrison Bridgland in 1915. CREDIT: These photos are courtesy of the Mountain Legacy Project (mountainlegacy.ca) and their use is governed according to Creative Commons Attribution-NonCommercial 4.0 International License.

the mountain national parks, this target is 50 percent. Jane Park, a fire and vegetation management specialist for Parks Canada in Banff National Park, explains that prescribed fires are conducted to fulfill high-level directives and policies, as well as site-specific ecological integrity objectives.

The planning process for a prescribed fire might take one to two years from start to finish and actual implementation depends on conditions such as wind speed and fuel moisture. The target is close to being met in Banff; despite being behind on the long term goal, Park says Banff National Park has reached 45 percent burned of historic fire cycle through wildfire and prescribed fires. Banff has the added advantage of having implemented prescribed fires since the 1980s, with areas even being able to be re-burned. These former mature lodgepole pine forests have reverted to the grassland habitat ungulates love.

Ecological integrity is the objective, but fire teams in mountain parks must also delicately balance public safety, restoration of species like whitebark pine, and protection of species like endangered woodland caribou. This is a very complex task. For instance, last spring staff at Jasper National Park burned five square kilometres of forest in the Vine Creek fire unit after eight years of preparation and waiting for the right conditions.

It's somewhat ironic that to get back to ecological integrity we need to manage and manage some more. Ecological integrity may be the official management priority, but the unwritten and no-brainer first priority is protecting human life and property. Park describes how socio-economic and political factors also influence deciding where and when a prescribed fire will take place. You won't find many prescribed burns taking place during long weekends and peak summer visitation times! A prescribed fire near the Rocky Mountain House National Historic Site conducted in early April, 2016 could be seen as a management tool used to reduce wildfire risk to the historic site. Bonuses from such a prescribed burn listed on the Parks Canada website include "improving the quality of forage for bison, and the removal of non-native vegetation."

Reaching the goal

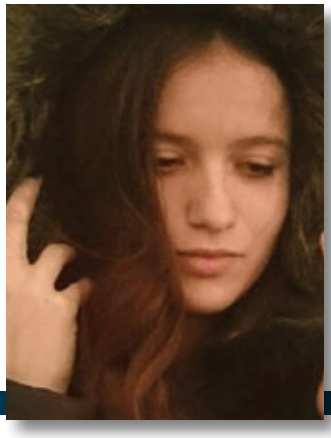
Ecological integrity is an important goal, but there's a long way to go before fire is "a condition that is determined to be characteristic of its natural region and likely to persist." Prescribed fires are only conducted in ways that are safe for people and that gain public acceptance, and the 5,777,108 visitors to Banff and Jasper National Parks combined during the 2015-16 season is a huge audience to educate. Landscapes and ecosystems seldom fit well with the jurisdictional boundaries of governments. So, while Parks Canada only conducts prescribed fire operations within park boundaries the Agency works closely with the Alberta government. In one case, Alberta had done prescribed fires outside of Banff National Park so that when a wildfire occurred in the Clearwater Valley, the Banff fire team could allow the fire to grow and monitor conditions, rather than extinguishing it. Collaboration that results in successful prescribed burns and wildfire management can be a model for what happens throughout Alberta, resulting in representative and healthy ecosystems.

Fires are inevitable. There is no stopping fire in the long-term. The best we can do is to try to manage the conditions in which it will occur. A survey of residents in Banff in 2008 suggests that the public can be brought on board to using fire as a management tool. Although it found some gaps in the knowledge of residents it identified general support and acceptance for fire in the park and general knowledge about fire ecology.

Even if the best available science informs vegetation specialists about fire management, the public's acceptance can still have a big influence on how policy is interpreted and implemented. Despite success and improvements in fire management, our fire debt still holds. How and when that debt will be repaid is shaped to a large part by how we choose to try to manage fire in our parks. Success hinges on understanding fire as an integral part of the ecosystem, an unavoidable process that yes, may inconvenience us or worse, but is also necessary for life.

Wildfire Damage:

Towards a Broader Definition



By Esther Bogorov, *AWA Conservation Specialist*

Our wilderness is where we play, heal, and thrive. Over the last few centuries, our urban spaces have been coming closer and closer to the wild spaces, increasing the wildland-urban interface. We have seen how this development can come with tremendous danger and significant cost. We have policies and procedures that try to keep us safe, including active fire suppression, in hopes of decreasing damage and reducing the total cost. There is ample evidence that countless lives and property have been saved through the hard work of firefighters and the forestry services in this way.

In 2006, Mariam Lankoande and Jonathan Yoder released a paper at Washington State University titled "An Econometric Model of Wildfire Suppression Productivity." For nearly a century, wildfire studies have looked at the total cost of wildfire as being the sum of cost and damage. If we minimize the cost of fire suppression and minimize the cost of damage, the total amount we spend financing wildfire suppression should, in this outdated theory, decrease.

The report came to more nuanced conclusions by looking at data around the return on investment (ROI) for different stages of fire suppression. The researchers concluded that the government was focusing too heavily on suppression activities compared with pre-suppression initiatives. The ROI in preparedness created a more substantial dent in the overall cost of wildfire management. Hypothetically, the cost of preparedness can eventually approach zero, with the aid of effective fireproofing education and bylaws, knowledge of fire-watch tools that are publically available, and quick and efficient distribution of event-specific information.

The other factor of total wildfire cost is damage, which the authors of this study identified as a vague variable without a clear definition. "Damage" typically includes, but is not limited to, perceived negative effects on timber, recreation, and improvements (e.g. irrigation and roads). For the total cost of wildfires to decrease, the cost of this direct damage must decrease as well. But a broader definition of damage would also include the damage caused by suppression, starting with the increased intensity of wildfire in forests that amassed excess fuel after years of fighting. From the perspective of direct damage, the potential for the destruction of property in our communities is only increasing.

Fire as an Ecological Process

Fires can destroy livelihoods, property, and at worst, lives, which is all very real, tangible damage. Damage also includes the psychological toll of fire, taking forms of apprehension and fear— natural reactions to the potential uncontrollable nature of wildfire. Together, these issues have led us to avoid fire, seemingly at all costs. But some of the perceived damage is simply based on the historic misunderstanding of the land we live on. Green forests and mature grasslands are beautiful, but burned forests and charred grasslands offend our some of our aesthetic sensibilities. We may even conclude that such lands are *dead*.

We increasingly appreciate this isn't the case. Soon after fire the land begins to revive, part of the cycle of rejuvenation. This is true both in grassland and forest. In the latter, when conifers are hit by fire, their needles and cones burn, the bark tears up, but the roots stay. As a carbon sink, these trees are still functional, locking whatever didn't escape into the atmosphere in place. Fungus and insects, important biodiversity representatives, eat up the carbon stores, from the inside out and outside in. Meanwhile, the grass grows, deciduous plants shoot up, and conifer seedlings slowly and confidently start building their forest story.

Grassland fires burn along the ground at low intensity, lower than most fires in forests. They prevent tree encroachment and maintain the characteristic openness of the land. Grasslands also burn more readily, where a single spark can spread from blade to blade in an instance.

With this quick-to-burn tendency comes a quick natural recovery strategy. A study published in the *Rangeland Ecology & Management* journal in 2011 concluded that the effect of fire on total biomass of grasses on site was minimal in the growing season following a burn. The authors explained that resources are taken up by surviving plants, many of which have specific resilience traits, such as the production of a below-ground store of buds and roots. Grasslands, after fire, are ready to grow back.

The "what" and "where" of forest and

What really meets the eye is life in the understory: the plants on the ground are finally getting a taste of the sun. PHOTO: © C. WEARMOUTH

grassland plants post-fire is dependent on highly variable pre-fire conditions and unpredictable subsequent events. If it rains, different plants will emerge and dominate than if it stays dry. If the fire was severe, much more of the carbon stored in the plant matter will have escaped into the atmosphere, and nutrient availability for plant recovery will decrease. If the slope is steep, the fire might lead to more runoff immediately and over a longer period of time than if the fire passes through a flat valley. This complexity of causes and effects has resulted in variable study approaches and results. But in general, when we zoom out to study a fire event from the habitat and landscape scale, we see that the systems are not fighting off change, as suppression forces them to, but are instead highly resilient.

Last Word: The Need for Resilience

Policies and practices in Alberta do not yet reflect an intuitive understanding that works as well as it could with the complexity of the land. Historically, we have favoured a "one size fits all" approach to dealing with wildfire, one we increasingly recognize as not fitting a highly variable and inevitably uncertain ecosystem well. Gradually, we are compiling our knowledge by piecing together information across the region and starting to understand what the ecological cycle looks like on the ground.

Based on our studies and observations, we have learned what ecological succession means in the forests and across the prairies. By shifting our own perspectives as recreationists, homeowners, and decision-makers, we can encourage resilience in our communities, our forests, and our grasslands. By working with the natural processes that surround us, we can redesign, retrofit, and rebuild the environment we inhabit to react appropriately.

So, let's pick our battles, knowing we can't win the war on fire. The land we live on is dynamic — it grows, "dies," and grows again. Understanding the system and preparing for change might end up being the best and cheapest solution to the challenge of wildfire.

Bob Blaxley – Great Gray Owl Award Winner 2015

Like great gray owls, AWA's great gray owl award winners work wisely and quietly to conserve wilderness habitat and wild creatures. AWA's successes reflect their enduring commitments to your conservation organization and our goals. The award is presented annually to those who meet the highest standards of volunteerism, dedication, and commitment. AWA awarded this honour to Bob Blaxley last fall. Bob is quite simply an icon for the Whaleback. He studied the Whaleback as a Master's student in the University of Calgary's Faculty of Environmental Design. His passion for the Whaleback's rare montane landscape didn't stop when he completed that degree. Instead, it led him to write *The Whaleback: A Walking Guide*, a marvelous introduction to the special features found there. Every year Bob leads two, if not more, groups into that enchanted landscape. As the *Advocate's* editor knows first hand those excursions are a treasure trove of information and insights. There you'll walk among the ancients, the limber pines, that stand like sentinels along Little Whaleback Ridge. You'll learn why the western sides of exposed Douglas firs are so much smoother than their eastern sides. And, you'll learn something of the history of activism when Bob stops to point out where AMOCO Petroleum proposed to drill an exploratory well in 1994. Government refused – a very rare victory that may only have been secured because, in Bob's words, the Whaleback is "a sacred place." AWA and our members have been blessed by Bob's passion, knowledge, and commitment to the Whaleback and Alberta's other wild spaces.

Previous winners of the Great Gray Owl Award include: Anne Fabris, Margaret Main, Linda Javeri, Ed Hergott, Paul Sutherland, Nuno Fragoso, and Heather Crone.

On the Nature-Mindedness of Children

As much as our children have to learn from us, we have much to learn from them. Eight-year old Sebastian Brennan (shown here) and seven-year old Abigail Hadden donated their birthday money this year to help AWA take care of and speak out on behalf of wild animals. The care these two youngsters, and many others of their generation, show for the bees, the birds, and the bears is inspiring. If you think your child would like to learn more about Alberta's wildlands this summer be sure to check out the announcement about AWA's August kids' camp in the Events section of this issue.

Updates

Wolves

Alberta's management of wolves has been a contentious issue for many years. In 2013, AWA published a news release revealing from FOIPed documents that some bounty programs in the province came from the US-based Wild Sheep Foundation. Bounties by some municipalities and private organizations provide incentives for wolf kills up to $500.

The International Union for the Conservation of Nature (IUCN) wrote a letter to the Alberta government to urge a change in management to correspond with global best practices. At the time, the government responded by saying the issue should be taken up with municipalities, not the province.

Because wolves are not provincially managed, there is no provincial oversight into how many wolves are killed. There is also no knowing how the wolves are killed. Too often we believe wolves are taken through snaring, which can be inhumane and have unintended by-catch.

The FOIPed documents also revealed that Alberta government staff was aware untargeted wolf bounties were not effective at reducing livestock predation, an issue discussed in the *WLA* article by Carolyn Campbell in the summer of 2015.

A wolf management plan regulated by the ministry of Alberta Environment and Parks, using the best available scientific principles, and carried out with an open and transparent public consultation, would be a great addition to wildlife planning in the province. We're sure the wolves would thank us, too.

- Andrea Johancsik

White-nose Syndrome Is Killing Bats Closer to Home

When bats are infected with white-nose syndrome, they fly during winter and in daylight. This unnatural behaviour leads to their death. Entire bat colonies have been wiped out as a result of this infection. Individuals often die with a white ring of fungus on their faces. We know too little about where this fungus came from and why this is happening.

The fungus was first recorded on the east coast of the United States in a cave in the state of New York. Once an individual is infected, the mortality rate of the entire colony nears 100 percent. Reports put the death toll of bats due to this syndrome at at least seven million.

This winter the fungus was discovered in the western U.S. Hikers near Seattle, Washington found an individual on a trail and brought it in for rehabilitation. It died from the effects of starvation soon after.

The disease has spread rapidly and scientists think humans may play a role in transmitting it. Most likely, a caver visited an infected site out east and brought fungus spores on clothes and gear to sites out west. Once there is sufficient buildup of the fungus in the environment, the animals become vulnerable.

The Alberta Bat Action Team (ABAT) is working with researchers, the government, and caving associations to monitor the situation and raise awareness. It is crucial for people to know this is happening if we are to protect a species that plays a vital role in our ecosystems by controlling insect populations and pollinating plants.

ABAT is a member of the Western Bat Working Group. If you see a dead bat or bat flying around during the daytime, please contact the group at wbwb.org/contact as well as Alberta Environment and Parks.

- Esther Bogorov

For Bison: A Pretty Good Year

The bison, North America's largest land mammal, has made headlines in the conservation world this year. Across the prairies of North America, "rewilding" efforts aim to restore this charismatic keystone species. The Blackfoot Reservation in northern Montana just two hours from Lethbridge recently received 88 bison. Their bison are coming from Elk Island National Park; today's Elk Island bison are descendants of herds originating from Montana. It's a true homecoming story.

Our neighbours to the south also signed the *Bison Legacy Act*, designating the bison as America's new National Mammal. The bison now joins the bald eagle as a U.S. symbol. Advocates of the Act say it will be an important step to increase bison restoration efforts and include the animal in classroom education.

In Canada, Banff National Park will welcome a herd of 30 to 50 plains bison by January 2017 to the Panther and Dormer rivers areas north of Banff. Fencing has been undergoing field testing, to ensure natural movements of other animals are not impacted. During the consultation process, participants voiced concern over bison moving onto adjacent ranchland. How Parks Canada will manage potential escapees remains to be disclosed to the public.

Lu Carbyn, a research biologist, suggested the following in a *WLA* article last year about the Banff reintroduction project: "initial introduction of 40 animals will, therefore, result in the population of over 80,000 animals or so over a 50-year period." He predicts wolf predation will not be enough to keep the population in check and that human intervention (likely by culling) will be necessary. A scientific paper released in February 2016 estimates that Banff National Park has enough habitat area to support 600-1,000 bison – this would easily make the Banff herd the largest plains bison herd in southern Alberta.

Bison reintroduction is happening outside of North America too. The European bison, also known as the wisent, was reintroduced to the Maashorst in the Nether-

lands in March 2016. The wisent has also been reintroduced into Poland, Belarus, Romania, Germany, and Spain.

Here's the last good news story about bison: the first bison calves born in Alaska in more than a century were spotted in late April. These births represent a huge conservation win and deserve celebration.

For more information about the biology, distribution, and issues relating to bison in Alberta, visit *https://albertawilderness.ca/issues/wildlife/bison/*

- Andrea Johancsik

New Year, New Start for Grassy Mountain

On March 21, 2016 the Alberta Energy Regulator (AER) sent an email to Benga Mining Limited about their proposed coal mining project on Grassy Mountain in the Crowsnest Pass. The subject was "AER Environmental Assessment Major Deficiency Report" and requested that Benga provide a work plan and commitment to address all the deficiencies found in the Environmental Impact Assessment (EIA). The letter then details, in 20 pages, why the company's EIA was incomplete.

The first issue is broad, where the methodology for the EIA is unclear and the word "significant" is used without a clear definition (the word "significant" is associated with a metric when used in an EIA, and it cannot be used without the proper calculations that are attached to it). Then, the AER goes on to pick apart the assessment in many sub-categories. They include conservation and reclamation, biodiversity, air, water, land, vegetation, wildlife, land-use, history, and socio-economic. In summary, the letter states the EIA was insufficient in every category imaginable.

To understand a bit more about what local residents had reported to the AER, AWA requested to see the letters of support and letters of concern that citizens sent in. These letters are officially a part of the public domain and can be accessed by submitting an information request to the AER.

Several letters of support for the mine were sent in. Small business owners are concerned understandably that the area population is declining and that there are not enough good-paying, year-long jobs. They want to attract people to help their businesses thrive so their families too can thrive. Various drilling company representatives believe this project will provide work for their employees and fill much needed gaps in the province for employment. As one drill company representative explained, when the old mine companies left there was an employment vacuum. These concerned citizens hope the mine will bring in the type of jobs people can and want to do.

There were nearly twice as many letters of concern than there were letters of support. Some came from those who have lived in the area long enough to remember the experience of having an active coal mine nearby. These residents recount poor air quality, loud operations, and bright lights at night as just some of the acute damage and disturbance brought into their lives. For some of the families who have been in the Pass for nearly a century more damage to area waterways might threaten an entire way of life. Other residents cited the cumulative effects on the landscape and, given the extensive coal mining that has taken place throughout the region already, how this mine will add to those effects. Some wrote that this project will further add to the damaged critical habitat of westslope cutthroat trout. What is good for this fish is good for other mountain fish, the raptors

Some of the scars on Grassy Mountain PHOTO: © B. VERBEEK

that eat them, and humans, especially those of us who enjoy hunting, fishing, and gathering on the land.

One letter of support stood out from the rest, as the author spoke of the prospect of successful remediation that is promised by the company. It's overly optimistic to support a mining project based on the hope the company will carry out the proper remediation the site has needed for decades. Taking something that is broken, breaking it even more, and then promising to fix it all twenty-five years later doesn't feel right. With the concerns of the supporters in mind, it's useful to step back and take a look at the larger context of this project. The boom and bust nature of the resource extraction sector seems to be ineffective in long-term, stable job creation—the Crowsnest Pass knows from the past, as the drill company representatives described, that the jobs are actually temporary. Given the nature of this type of economic enterprise we should expect it to happen again: people will move to the town and work while they can and move on when it's over.

We do not need the coking coal that will be extracted, not here in Alberta nor anywhere in Canada, and the market for the material across the ocean in Asia is uncertain. The appetite for healthy living, however, has only increased. As more people come to terms with the negative side-effects of living in cities, towns such as Blairmore become appealing to visitors from near and far who are seeking fresh air, clean water, good fishing, and a taste of a nature-oriented version of the good life. People will fall in love with the wilderness that still exists throughout the Crowsnest Pass and it will empower them to take the chance to live there. The history of coal mining can fade into the past as we move forward, together, away from failed models of economic development towards more sustainable, stable communities. There is a lot of work that can be done to restore ecosystems to the point where the land itself can once again support us.

Perhaps the government would take a step back and consider the letters received as a plea for help and as a challenge to respect their ideas of what "livelihood" means – a healthy landscape and fulfilling employment. It's imperative for government to give as much attention to long-term, small-town economic development as they do to urban centres such as Calgary or Edmonton. It's reasonable for the people of the Crowsnest Pass to ask the government to help them find ways to remediate and restore the old mine sites and to try to build a local economy less dependent on resource extraction. The residents of the Crowsnest Pass deserve a government that will work proactively to deliver this vision.

- Esther Bogorov

"Argia Vivida: Vivid dancer damselfly" by Susann and Michael Lagore

Reader's Corner

Lorne Fitch, Caring for the Green Zone: Beaver – *Our Watershed Partner,* (Lethbridge; Cows and Fish – Alberta Riparian Habitat Management Society, 2016)

By Esther Bogorov

Do you love beavers? If you don't, then you might just hate them. As Lorne Fitch writes in the most recent Cows and Fish publication, *Caring for the Green Zone: Beaver – Our Watershed Partner*, it's not easy to be ambivalent about the big-toothed, tree-chopping rodents. Fitch's work is worth a read for anyone with strong feelings about Canada's national symbol – especially if you are a landowner or watershed manager.

The booklet is very well layered, serving as an effective introduction, good reference, and quick review guide. Skimming the illustrative photos and their captions is eye-opening and the cute cartoons add a lightness and accessibility to the text. Fitch has done a fine job of squeezing a great deal of useful information into only forty pages. Readers from all backgrounds will find answers to their beaver questions: *How important were the beavers to the Hudson's Bay Company that once owned most of what is now Canada?* Very – as soon as you open the book, black and white photos of drying beaver pelts greet you. *How can a small furry family alter an entire ecosystem?* Aerial photographs, like what page 14 offers, will help you to understand their far-reaching effect on the landscape. *What do I do about the beaver that's eating all my trees?* Almost any solution you can think of is displayed on page thirty, from habitat management strategies to a recipe for painting tree bark with latex and sand repellent.

Beavers are fascinating. They are a critical part of our environment; by building and rebuilding their structures they help maintain the very things we need: clean water, flood resilience, and healthy wildlife habitat. But beavers are also incredibly interesting for their own unique characteristics: they mate for life and are extremely territorial; they build mounds of sticks in the middle of a pond and call it home, and have two sets of specialized paws, the front pair for dexterity and the back pair for swimming. They only build when they need to— some live in and near water bodies that are calm enough that they do not feel the urge to slow down the flow. Of all the fun facts I learned from this booklet, my favourite was about a system of complex dams in California. Radiocarbon dating revealed that some beaver hit a gold mine of water and found the perfect site for a dam in year 580. Beavers used it for 1,200 years until they finally abandoned it in 1850.

The most striking section for me was "Beaver – A Restoration Tool." It asks us to shift our attitudes to see beavers as a useful tool for restoring waterways that we didn't even recognize as damaged. The excessive use and abuse of our streams and rivers has led to eroded and degraded banks that cannot support healthy vegetation and no longer function ecologically-well during flood events. Beavers are quick and effective at restoring what has been lost through human activity: wide floodplains, mineral-rich sediment, and high water tables. Bringing the beaver in brings back biodiversity, health, and stability. It leads to a resilient valley ecosystem.

As much as that restoration process is important for wild land, it is important to consider how we can use these positive effects on the watershed to benefit ranchers and farmers throughout our water networks. Making a living off the land while collaborating with beavers is a challenge that more and more brave landowners are taking on. A healthy and well-managed ecosystem can create strong and sustainable businesses. The techniques and tricks that Fitch offers at the end of the booklet will help lead to successful cohabitation, where woody debris is seen as a small price to pay for the benefits of having beavers on the land.

Spring/Summer Events

Upcoming Summer Hikes

- The cost of most hikes is $20 for members/$25 for non-members
- You can register for upcoming hikes on albertawildernes.ca/events
- Our hikes program is extremely popular so reserve a spot while you can!

June 12, 2016

Black Duck Lake Hike – Lakeland Hike

This hike is a 14 km round trip hike near Lac La Biche.
Hikers will travel through mixed wood aspen forest to Black Duck Lake. Join Aaron Davies and Carolyn Campbell for some excellent birding opportunities and a chance to learn more about the natural history and conservation issues of the region as you stroll through this southern boreal region.

July 29, 2016

Hussey's Loop Hike

Hussey's Loop

The Hussey's Loop Hike will lead hikers into the middle South Ghost River area. During this hike, participants will enjoy wildflower meadows and have spectacular views while cresting Hussey's Hill. With the close proximity to Calgary, hikers will, in addition to enjoying spectacular views, witness the effects of clear cut logging, OHV use, and watershed protection concerns. Join Heinz Unger on this spectacular and informative hike located on Calgary's doorstep.

August 4, 2016

Wainwright Dunes Ecological Reserve Hike

Wainwright Dunes Ecological Reserve, Wainwright, AB

The Wainwright Dunes Ecological Reserve is part of a large and diverse area of sandy glacial deposits. Located 33 km southeast of Wainwright, AB this reserve is famous for its sand dunes that can reach heights of 30 meters. Hikers will be walking through mature balsam poplar, stunted aspen groves, shrub-grasslands and shrubby fen wetlands.

August 13, 2016

The Beehive Natural Area Hike

Beehive Natural Area,

Located in the Upper Oldman Valley in southwestern Alberta, the Beehive presents a stunning mix of cool dark sub-alpine forests and broad alpine meadows against a dramatic backdrop of rugged rocks and scree. The area boasts over 2,000 acres of old-growth forests, with individual trees up to 300 years old, and provides habitat for Grizzlies, as well as summer range for Elk and Bighorn Sheep.

For a complete list of AWA hikes and tours go to: Albertawilderness.ca/events

Spring/Summer Events

August 27, 2016

Hand Hills Ecological Reserve Hike

Hand Hills Ecological Reserve, Drumheller

Hikers will be visiting Thumb Hill that is located within the Hand Hills Ecological Reserve. Located 35 km southeast of Drumheller, this area provides sweeping views and well preserved native prairie landscapes.

Thumb Hill is also rich in both geological and aboriginal history. Consequenetly hikers will have the opportunity to discover teepee rings, bison rubbing stones and fossils throughout the hike.

September 17, 2016

Autumn in the Whaleback Hike

Whaleback Ridge

Located in southwestern Alberta, the Whaleback Ridge is a 30 km ridge that rolls along its eastern edge. Known for its diversity of birdlife, the Whaleback is home to grizzly and black bears, wolves, cougars, deer, and elk. Experience fall colours and vistas in this classic montane landscape, one of the largest remaining examples of this fascinating ecosystem. Wander the trails, ridges and valleys and visit ancient pines clinging precariously to the slopes.

Summer Kids' Camp!!

Wilderness Defenders Kids Day Camp

Pick up and drop off location at AWA's Hillhurst Cottage School
(455 12 Street NW Calgary, AB)

August 8 to Friday, August 12, 2016

OR

Monday, August 15 to Friday, August 19, 2016.

Age Group: 6 -11 years old Join our - day eco-adventure camp filled with friends, laughter, fun and nature! Action packed days will include fun activities, games, crafts, special guests, field trips and more

Week 1 August 8-12, 2016

Week 2 August 15-19, 2016

$150.00/child/week for AWA members, $180.00/child/week for non-members

For a complete list of AWA hikes and tours go to: Albertawilderness.ca/events

Life returns: two years after the Lost Creek/Crowsnest wildfire **PHOTO: © J. TWEEDIE**

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Alberta Wilderness Association
455-12 ST NW
Calgary, Alberta T2N 1Y9
awa@abwild.ca

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