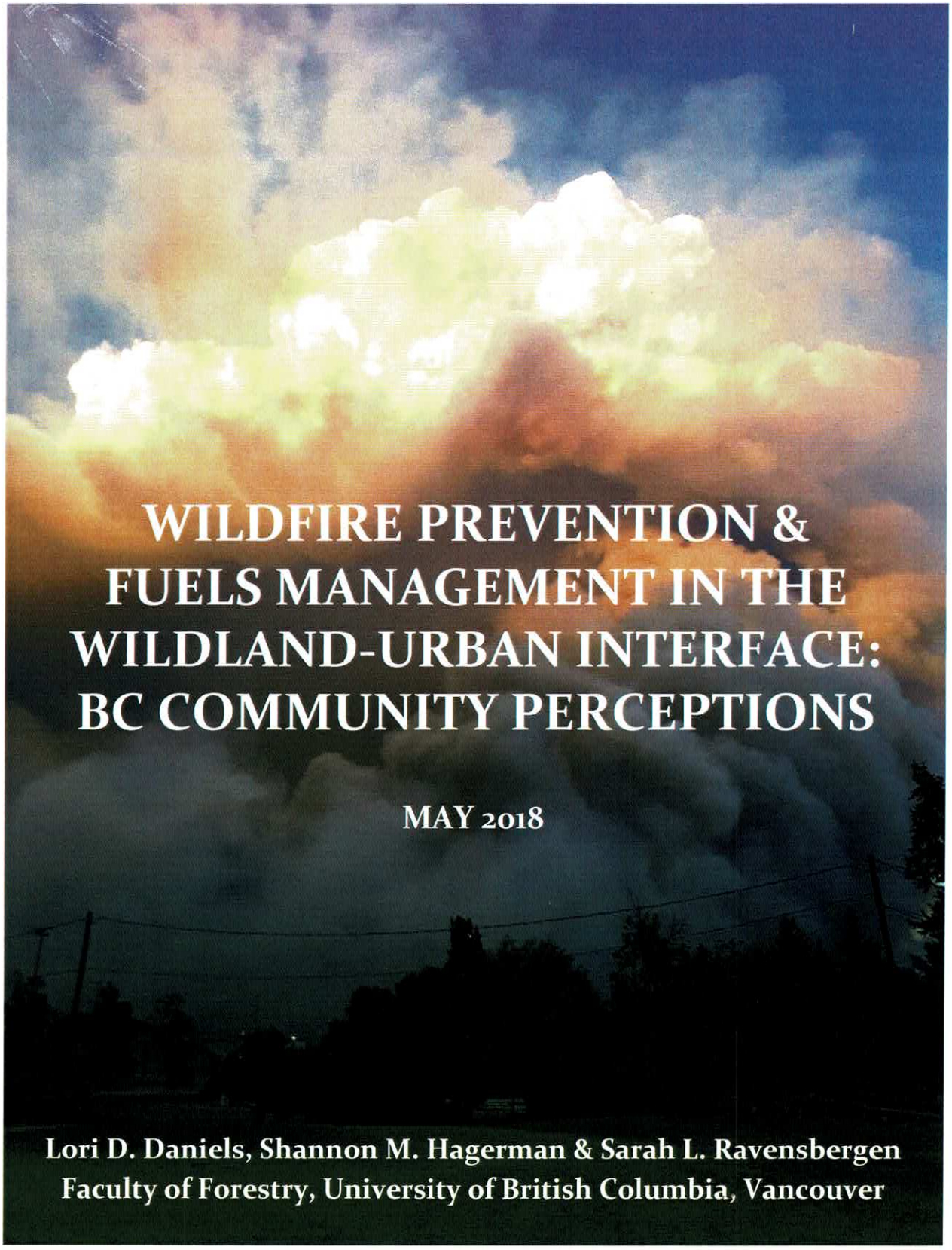

WILDFIRE PREVENTION & FUELS MANAGEMENT IN THE WILDLAND-URBAN INTERFACE: BC COMMUNITY PERCEPTIONS

MAY 2018

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- Greg Anderson, Executive Director (2016-7), Forest Enhancement Society of BC
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Executive Summary

- BC communities are very concerned about current and future threats from wildfire in the wildland-urban-interface (WUI), and wildfire prevention in the WUI is a key priority for communities. Almost all of the 77 respondents perceived a very high level of risk from wildfire; 96% of all respondents felt that wildfire in the WUI will impact their community within the next 10 years, while 97% felt that their region would be moderately or greatly impacted by wildfire within the next 5 years. Almost all respondents felt that improving community preparedness was vital; 96% of all respondents felt that at a personal level it was very or extremely important to be prepared.

- Larger communities (with populations over 5000 residents), and municipalities and regional districts, have higher rates of participation in developing a community wildfire protection plan (CWPP) than First Nations communities and reserves, and communities under 5000 residents. Municipalities and regional districts between 5000 and 50 000 residents had the highest rates of CWPP development.

- Communities with less than 5000 residents, and First Nations communities and reserves, ranked wildfire prevention as a more urgent community priority than did municipalities and regional districts with over 5000 residents.

- Ninety percent of respondents agree or strongly agree that fire is an essential component of forest ecosystem function; at a personal level, 94% support or strongly support tree removal as a method of mitigating wildfire risk, while 93% support or strongly support the use of prescribed fire around their community. However, community-level management actions that include fire were comparatively less popular than other actions. Enforcement of bans, restrictions, and fines, raising awareness of ignition risks, and tree pruning, were the most supported actions for mitigating wildfire risk at the community level.

- Respondents identified a lack of financial resources at the community level (96%), lack of funding from provincial and federal governments (90%), and a lack of time allocated to staff work loads (86%), as the most important factors moderately, or strongly, limiting progress towards reducing wildfire risk in the WUI. One hundred percent of communities that did not have a CWPP, or participate in any management actions at all, ranked lack of financial resources at the community level as strongly limiting.

- Respondents identified a lack of sustained funding from provincial and federal governments (88%), costs of participating (81%), and high administrative burdens (79%) as the most important factors moderately, or strongly, limiting progress towards engaging with BC's Strategic Wildfire Prevention Initiative (SWPI) or Indigenous and Northern Affairs Canada's On-Reserve Forest Fuel Reduction Treatment Funding. Compared to communities with a CWPP, those without felt that a lack of sustained funding from governments was a much more limiting factor. Compared to municipalities and regional districts, respondents from First Nations communities and reserves ranked many factors (e.g., lack of awareness of funding programs, concerns about liability, lack of qualified practitioners to prepare plans and prescriptions and implement fuel management treatments, lack of guidelines on best practices for fuels reduction treatments and appropriate range of treatment costs, and lack of evidence that treatments are effective) to participation as more limiting.

- Sixty-seven percent of respondents were from communities that have completed a CWPP; 89% have participated in one or more management activities (e.g. the FireSmart program, conducting fuel management prescriptions, treatments, or demonstration projects), while 11% have not participated in any.

- Respondents from communities with a CWPP ranked wildfire prevention in the WUI as the most urgent issue facing their community, while respondents from communities without ranked wildfire prevention as a close second (just behind economic development). Therefore, despite variable levels of programmatic or management engagement, the findings clearly indicate that wildfire is viewed as an urgent issue regardless of whether a community has a management plan already or not. Further, 79%, 81% and 89% of surveyed respondents indicated that lack of funding, cost of participating, and high administrative burden respectively were moderately or strongly limiting barriers to participation in wildfire prevention initiatives. Combined, these findings suggest that communities are highly aware of the risk of wildfire and that variable engagement in fire prevention programs might well be enhanced if issues of resources, capacity and support were addressed.

- Almost all respondents felt that all agencies (municipal, regional, provincial, federal, and First Nations governments, industry and business, and individual homeowners) should be doing more to reduce wildfire risk. Compared to other groups, respondents from communities under 5000 residents, and First Nations communities and reserves, felt that the federal government should be doing much more to reduce wildfire risk in the WUI.

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Introduction

This report summarizes results from a web-based survey of communities in British Columbia (BC), conducted in 2016-7 by researchers in the Faculty of Forestry at the University of British Columbia. The survey aimed to better understand the views of municipalities, regional districts, First Nations communities, and reserves, regarding plans and actions toward wildfire prevention. The research was funded by a Community Solutions grant from the Peter Wall Institute for Advanced Studies at the University of British Columbia.

The Strategic Wildfire Prevention Initiative (SWPI) and Indigenous and Northern Affairs Canada's On-Reserve Forest Fuel Reduction Treatment Funding provide funding for communities to mitigate risk from wildfire in the wildland-urban interface (WUI), areas where combustible wildland vegetation grows adjacent to homes, farm structures or other outbuildings. Although many eligible communities have applied for funds to develop and implement community wildfire protection plans (CWPP), only 11,679 hectares of forest have been treated at a cost of $78 million between 2005 and 2017. Most communities in the province remain vulnerable to wildfire despite efforts over the past decade to inform communities and engage them in mitigation. Therefore, the central question motivating this research is:

Why don't vulnerable communities in BC take action to reduce wildfire risk?

To date there has been no systematic assessment of the status of, and social and risk-based factors contributing to, participation in SWPI within BC. This 2016/7 survey is the first step toward addressing this crucial gap. Seventy-seven valid responses to the survey were completed, helping to identify the barriers preventing vulnerable communities from proactive management. Findings from this survey can help guide the co-development of solutions to overcome community-specific barriers, and eliminate universal barriers through policy change, where possible. Our survey covered the following topics:

- Community characteristics
- Community issues and priorities
- Wildfire risk and hazard
- Wildfire prevention and fuels management
- Planning and reducing wildfire risk

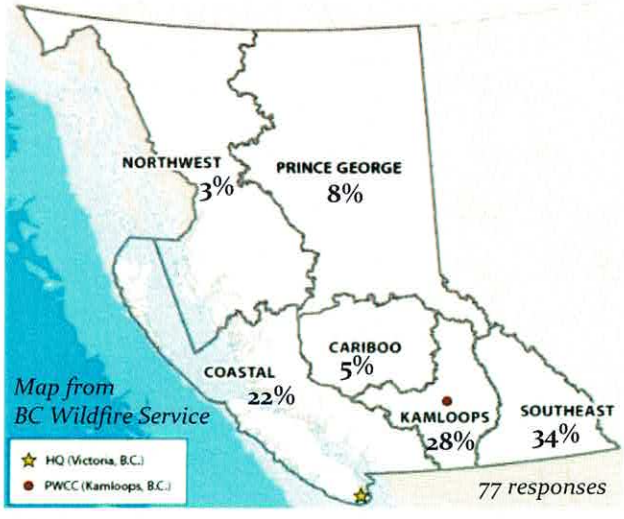
1. Respondent Profile

1.1 Professional Affiliation and Residency of Survey Respondents

Most survey respondents were from the Southeast (34%), Kamloops (28%) and Coastal (22%) regional fire centres; only 16% were from the three northern regions (including the Cariboo). Individuals from municipalities made up over half (52%) of all respondents; 19% were from Regional Districts, 16% First Nations communities, and 13% First Nations Reserves. Over half (51%) of these communities had between 500 and 50 000 residents. Over half (56%) of all communities had population levels which had stayed about the same in the past 10 years; 35% had populations which increased by over 20%, and 3% had populations which decreased by less than 20%.

1.2 Individual Experiences

Most survey respondents were fire chiefs (35%) or public safety or emergency services coordinators (26%). Sixty-nine percent of all respondents have more than four years of experience related to wildfire prevention. More than half (61%) have lived in the community they represent for over 10 years.

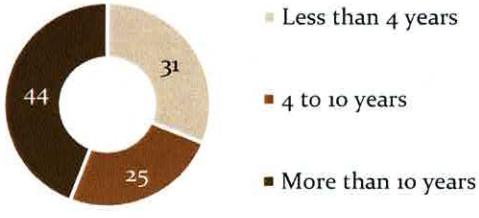


26%	500 residents or less
22%	501 to 2 000 residents
17%	2 001 to 5 000 residents
25%	5 001 to 50 000 residents
10%	50 000 residents or more

35%	Fire Chief
26%	Public safety/emergency services coordinator
19%	Forester or land manager
12%	Chief administrative officer
5%	Elected official
3%	Other

Respondents Experience with Wildfire Prevention

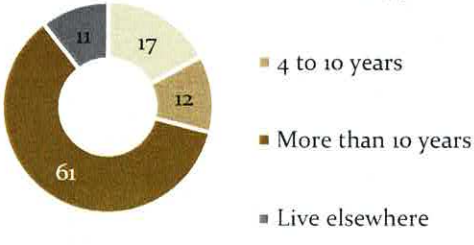
Percent of 77 responses



52%	Municipality	16%	First Nations Community
19%	Regional District	13%	First Nations Reserve

Time Respondents Have Lived in the Community They Represent

Percent of 76 responses



2. Community Priorities

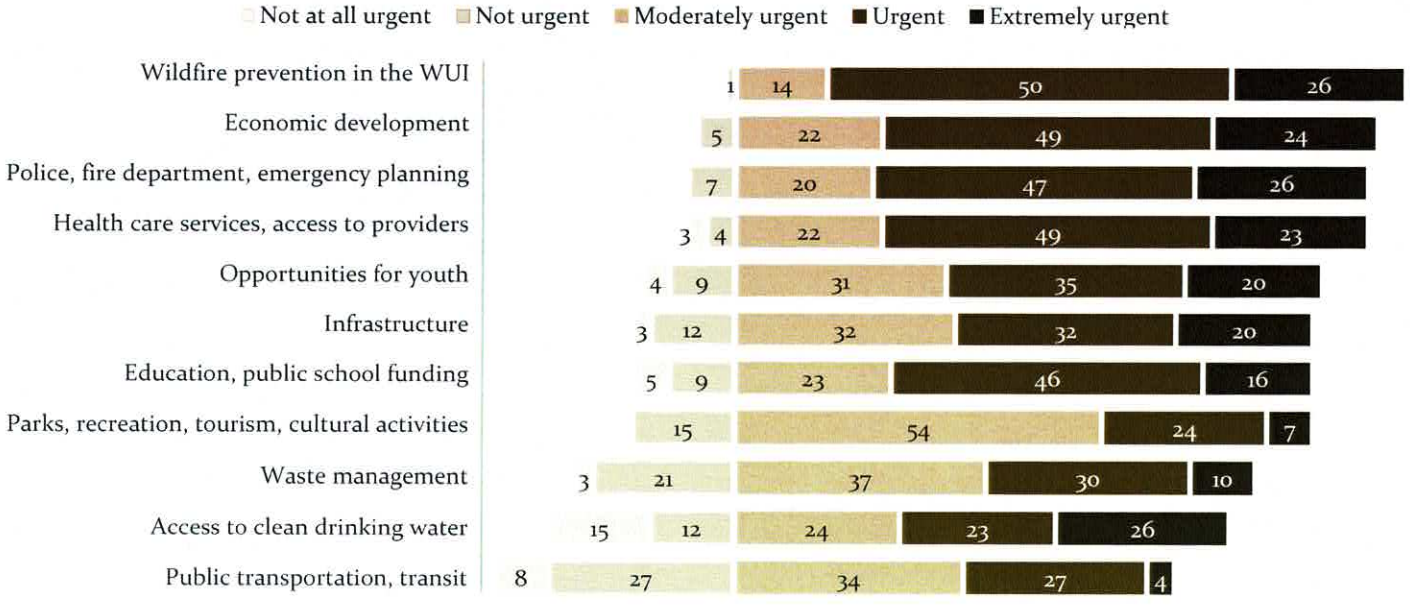
2.1 Issues Facing BC Communities: Wildfire is an urgent community priority

Wildfire prevention in the wildland-urban interface (WUI), economic development, and police, fire department, and emergency planning, are the most urgent issues facing BC communities today[1].

Regardless of whether or not communities have a community wildfire protection plan (CWPP), the majority of respondents still ranked wildfire as urgent or extremely urgent priority. Of the 22 communities who have not developed a CWPP, 73% listed wildfire as an urgent or extremely urgent issue, compared to 89% of the 44 communities who already have a CWPP. For communities with a CWPP, wildfire prevention was ranked as the highest priority issue; for those without, wildfire prevention was ranked as the second highest priority (just after economic development). This suggests that wildfire prevention is an urgent issue for communities regardless of whether a community has a management plan already or not.

Respondents from communities under 5000 residents and First Nations communities and reserves, ranked wildfire prevention more urgently as a community priority than municipalities and regional districts over 5000 residents.

What are your views about the relative urgency of the following issues facing your community today? (Percent of 74 responses)

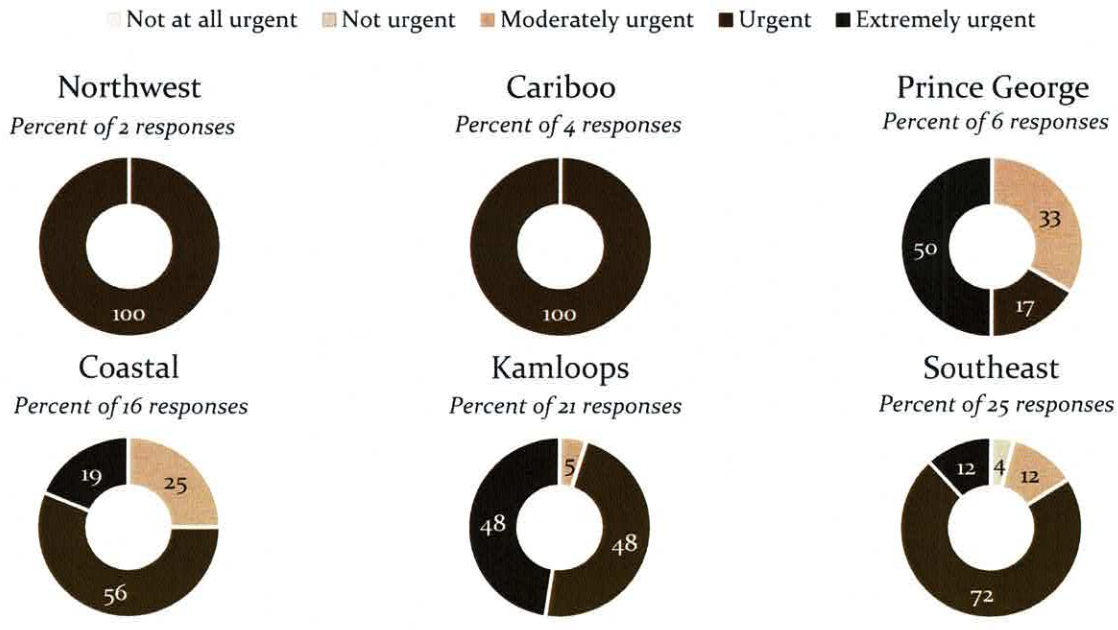


[1] For more information on community priorities, see Appendix I.

2.2 Regional Comparisons: High variation in responses among regions

The number of respondents varied among the six regional fire centres, with the three southern regions (62 responses) better represented in our survey that the northern regions (12 responses)[2]. Among the southern regions, respondents from the Kamloops region ranked wildfire prevention significantly more urgently as a community priority than did the Southeast region, and much more than the Coastal region. Ninety-five percent of respondents in the Kamloops region ranked wildfire as an urgent or extremely urgent issue, compared to 80% in the Southeast region and 75% in the Coastal region. Additional input from communities in the Northwest, Cariboo, and Prince George regions is needed to represent and compare their views; further investigation is needed.

What are your views about the relative urgency of 'wildfire prevention in the WUI'?



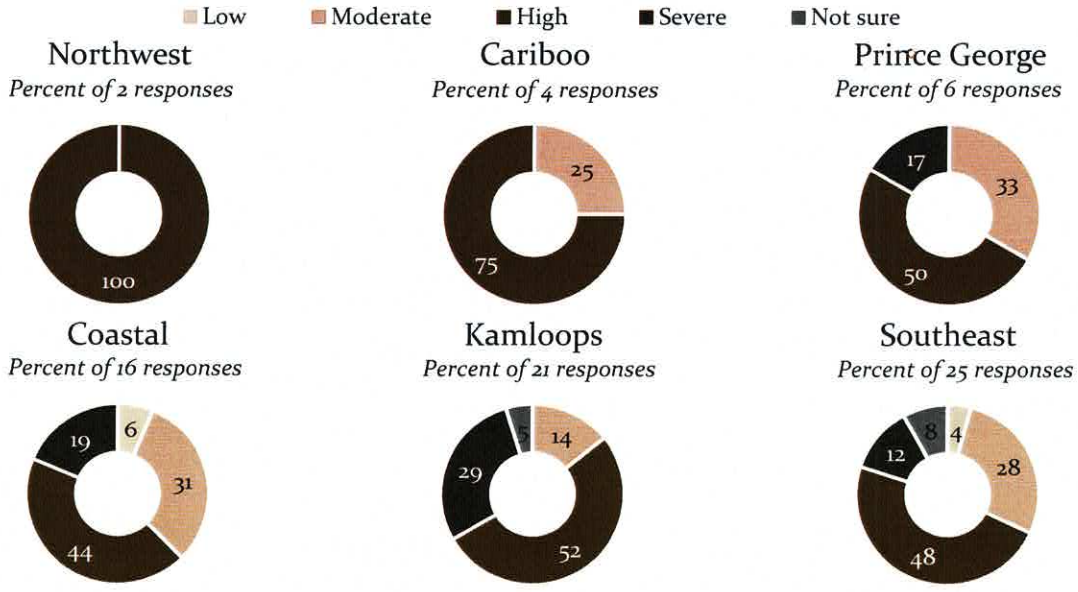
[2] Statistics comparing the Cariboo, Northwest, and Prince George regions could not be calculated, because the numbers of respondents are too small. For more information on all regions, see Appendix II.

3. Wildfire Risk

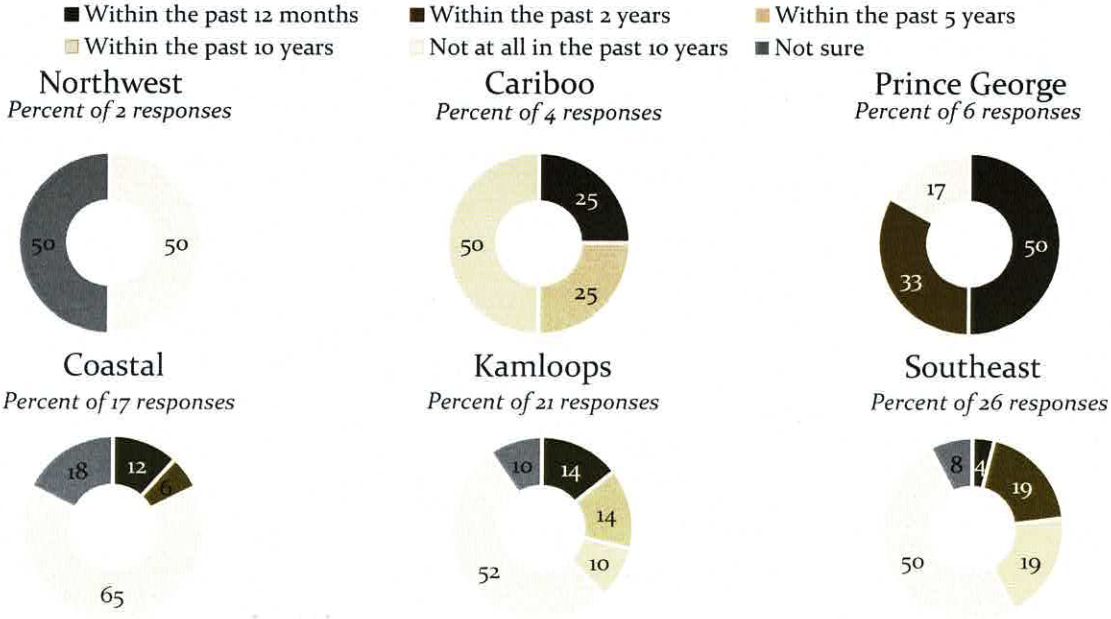
3.1 Community Level Perceptions of Fuel Hazard and Fire Evacuation Experience

Sixty-nine percent of communities rated their fuel hazards and wildfire risk as high or severe. However, only 13% of communities had experienced a wildfire evacuation alert or order in the past year; 11% had an alert or order in the past two years, and 49% had not experienced any alerts or orders in the past 10 years.

What is the overall fuel hazard and wildfire risk rating for your community?



When was your community last on wildfire evacuation alert or order?



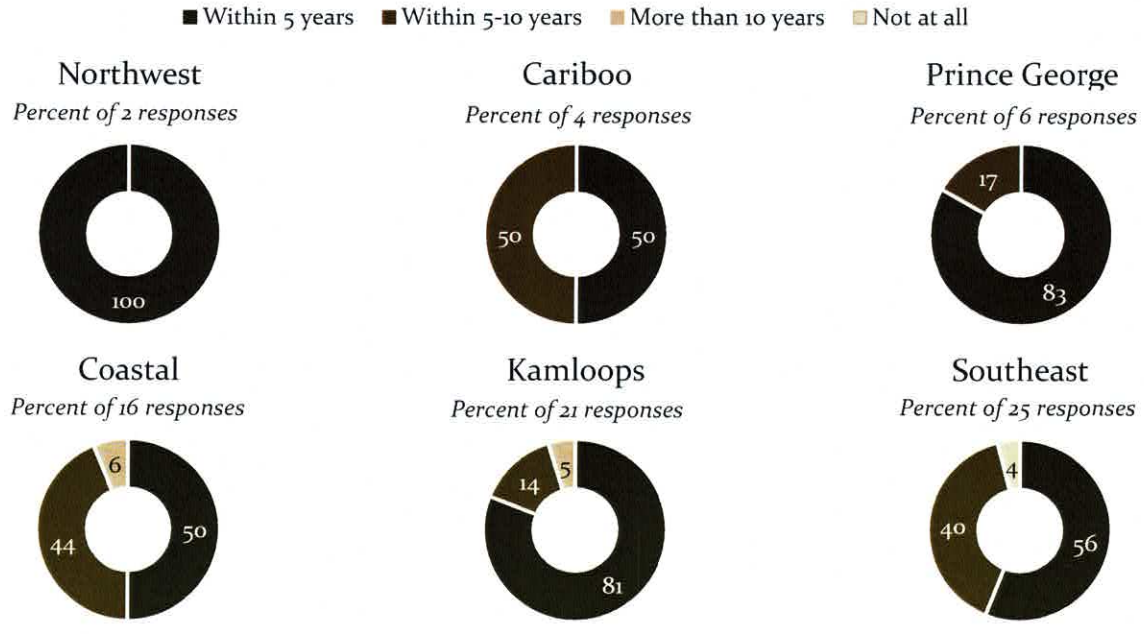
3.2 Perceived Fire Risk: Despite a range of community hazard and wildfire risk ratings, respondents are very concerned about the impacts of wildfire

Ninety-six percent of respondents perceived a very high level of risk from wildfire; 96% of all respondents felt that wildfire in the WUI will impact their community within the next 10 years.

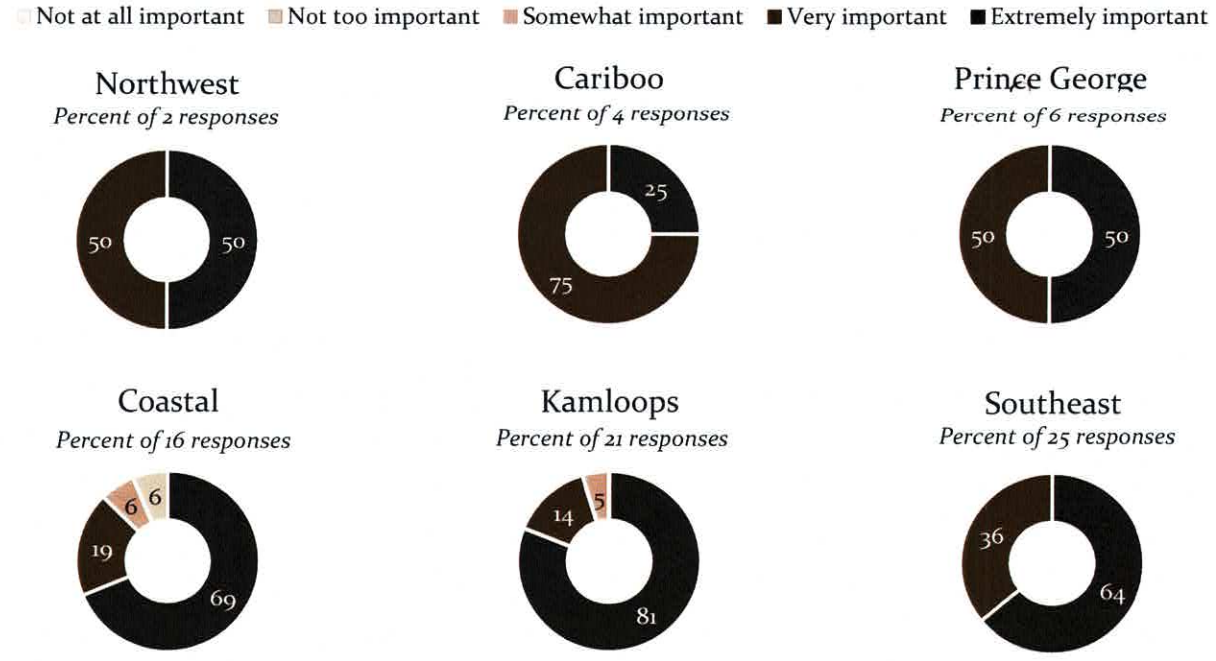
Fifty-three percent of all respondents indicated they had been personally, directly impacted by wildfire. Despite this (and despite a range of community hazard and wildfire risk ratings), almost all respondents felt that improving community preparedness was vital; 96% of all respondents felt that at a personal level it was very or extremely important to be prepared.

No differences in the perceptions of the time frame within which respondents felt their community would be impacted in were found between community types, regions, or those communities with a CWPP relative to those without. This suggests, as with the previous section, that communities are well-aware of the risks that wildfire poses, whether or not they are planning or participating in government programs.

Do you think that wildfire in the WUI will impact your community?



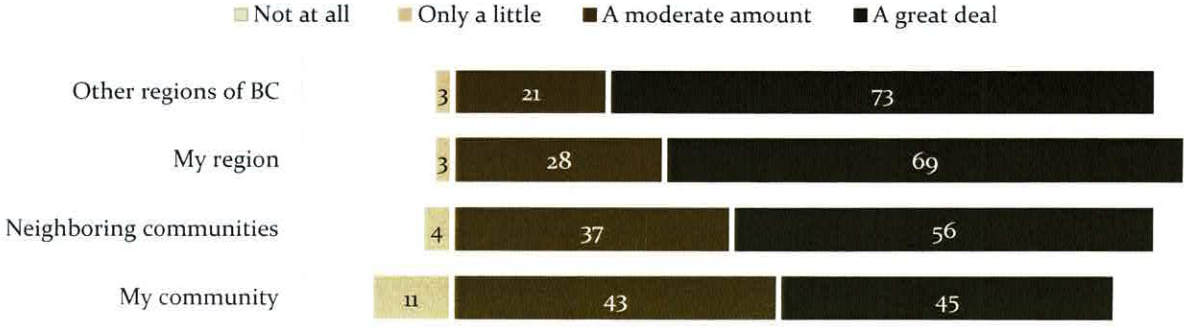
How important to you personally, is improving wildfire-preparedness in your community?



3.3 Who Will Be Affected?

Ninety-seven percent of survey respondents felt that their region would be moderately or greatly impacted by wildfire within the next 5 years; 93% felt this was true of other regions, 93% felt this was true of neighboring communities, and 88% felt this was true of their own community.

To what extent do you think each of the following areas will be affected by wildfire within the next 5 years? (Percent of 73 responses)



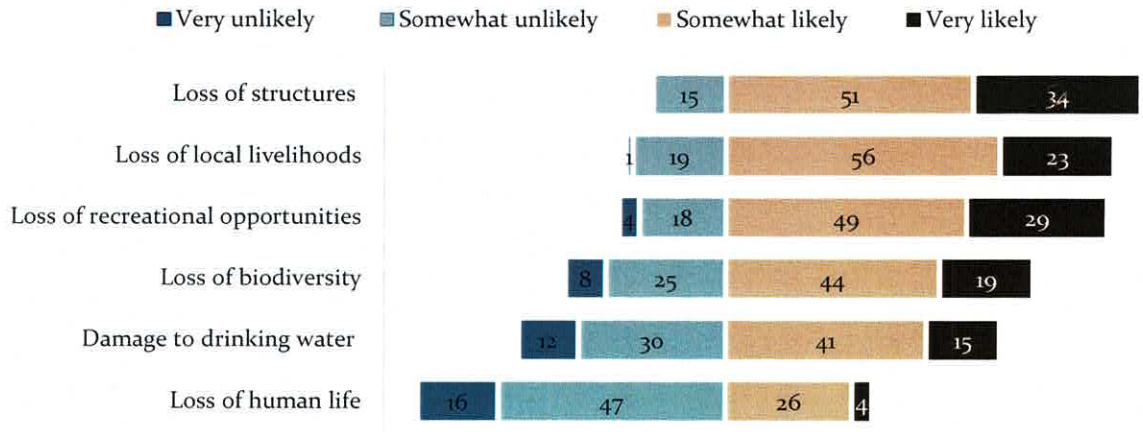
3.4 What Will Be Affected? Communities are most concerned about the loss of structures, local livelihoods, and recreational opportunities due to wildfire

Eight-five percent of survey respondents felt that it was somewhat or very likely that loss of structures due to wildfire would occur in the next five years; 79% felt this to be true of local livelihoods, and 78% felt this to be true of recreational opportunities.

Independent of region, or communities having a CWPP or not, respondents indicated high levels of concern about the potential effects of wildfire on their communities, regions, and assets. This suggests that there are other non-risk based factors that are driving participation in government programs.

Respondents from First Nations communities and reserves felt that the likelihood of damage to drinking water, and loss of biodiversity, were more likely to occur than did municipalities and regional districts.

Over the next 5 years, how likely do you think it is that wildfire will cause the following in your community? (Percent of 73 responses)



Note: Loss of structures refers to homes, community services, infrastructure; loss of livelihoods refers to jobs, businesses, access to resources.

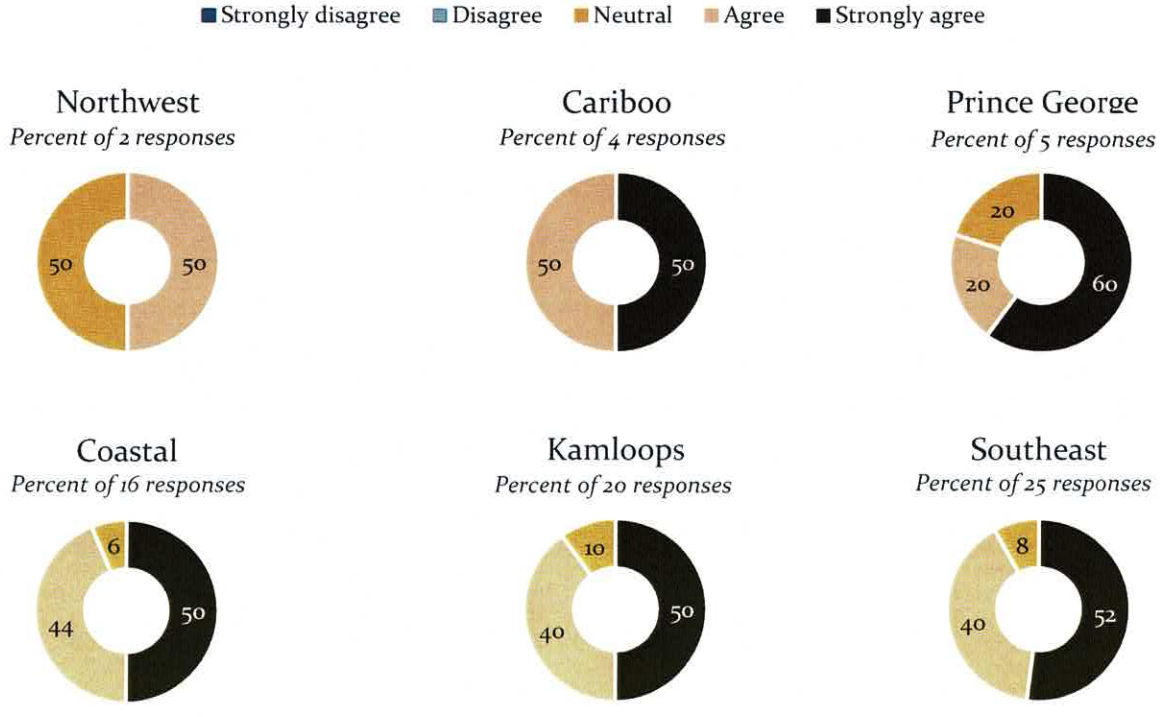
4. Wildfire Prevention and Fuels Management

4.1 The Role of Fire and Ecosystems: Respondents largely agreed that fire is an essential component of forest ecosystem function

Ninety percent of respondents agreed or strongly agreed, and no respondents disagreed, that fire is an essential component of forest ecosystem function.

No significant differences between respondents from First Nations communities/reserves and municipalities/regional districts, communities with or without a CWPP, population sizes, or regions, was found regarding respondent's opinions toward this statement. However, communities with a CWPP had a higher percentage of respondents that strongly agreed with this statement. Fifty-nine percent of communities with a CWPP strongly agreed, and 34% agreed that fire is an essential component, compared to communities without, where 32% strongly agreed and 59% agreed.

To what extent do you agree/disagree with the following statement? "Fire is an essential component of forest ecosystem function."



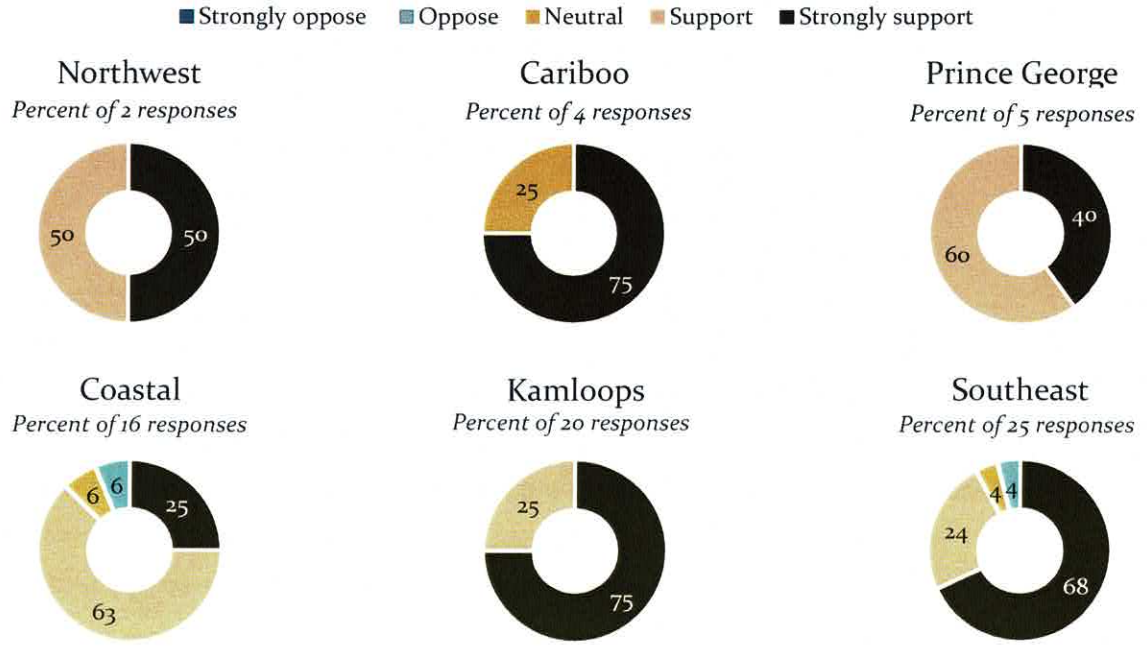
4.2 Prescribed Burning: Highly supported on a personal level, but at community level, other actions preferred

Respondents were largely supportive of using fire as a management tool, with 93% supporting or strongly supporting the use of prescribed fire around their community. At a community level, and compared with other management actions, respondents ranked management actions that include fire as comparatively less effective and felt comparatively less supportive than other actions. In total, 4% were neutral, and 3% opposed, to prescribed burning.

Of those who supported or strongly supported the use of prescribed burning on a personal level, 74% supported or strongly supported its' use at a community level, while 27% opposed or strongly opposed the action. Of the two respondents who opposed or strongly opposed the use of prescribed burning on a personal level, they also opposed or strongly opposed its' use at a community level.

Among the southern regions, and on a personal level, respondents from the Kamloops region were more supportive of the use of prescribed fire; however, all regions analyzed were relatively supportive, and this finding requires further investigation.

Overall, to what extent do you support the use of prescribed fire (e.g., a controlled application of fire) to reduce fuels around your community to mitigate wildfire risk?

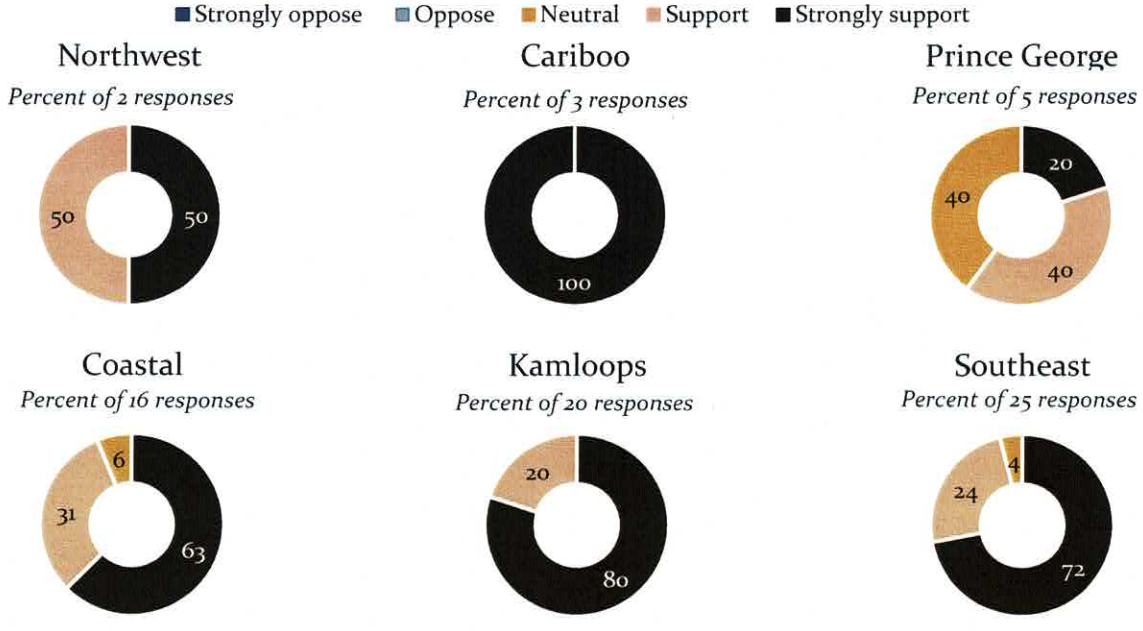


4.3 Tree Removal: The most popular course of action

Support for tree removal was generally very high, with 94% supporting or strongly supporting the action. When compared with other management actions, tree removal was still a very popular option at the community level. No respondents were opposed or strongly opposed to tree removal.

Communities with a CWPP were more supportive of tree removal than those without. Eighty-one percent of communities with a CWPP strongly support tree removal, compared to 55% of those without a CWPP.

Overall, to what extent do you support cutting and removing trees around your community to mitigate wildfire risk?



4.4 The Effectiveness of Management Actions: Tree pruning, enforcement, and selective cutting then wood removal, judged as the most effective actions

At a community level, 94% of respondents felt that tree pruning is effective or very effective; 92% felt this for enforcement of bans, restrictions and fines, and 90% felt this for selective cutting then wood removal. Livestock grazing (18% unsure), prescribed burning of understory vegetation and natural logs on ground (e.g. without tree cutting) (14% unsure) and selective cutting then chipping and spreading wood chips on ground (10%) have the highest rates of uncertainty among all actions.

While some differences in assessed effectiveness between respondents from First Nations and non-First Nations communities, and communities with CWPP vs. those without, were found, regional differences regarding opinions towards management actions effectiveness and support were most commonly found. This finding requires further investigation.

Among the southern regions, respondents from the Kamloops region indicated that selective cutting then wood removal was more effective than other regions. Enforcement of bans, restrictions, and fines, was thought to be more effective by respondents from the Kamloops and Southeast regions than by those from the Coastal region.

In addition, selective cutting, piling the wood, then prescribed burning of wood piles was thought to be more effective by respondents from the Kamloops region, as well as by respondents from First Nations communities and reserves.

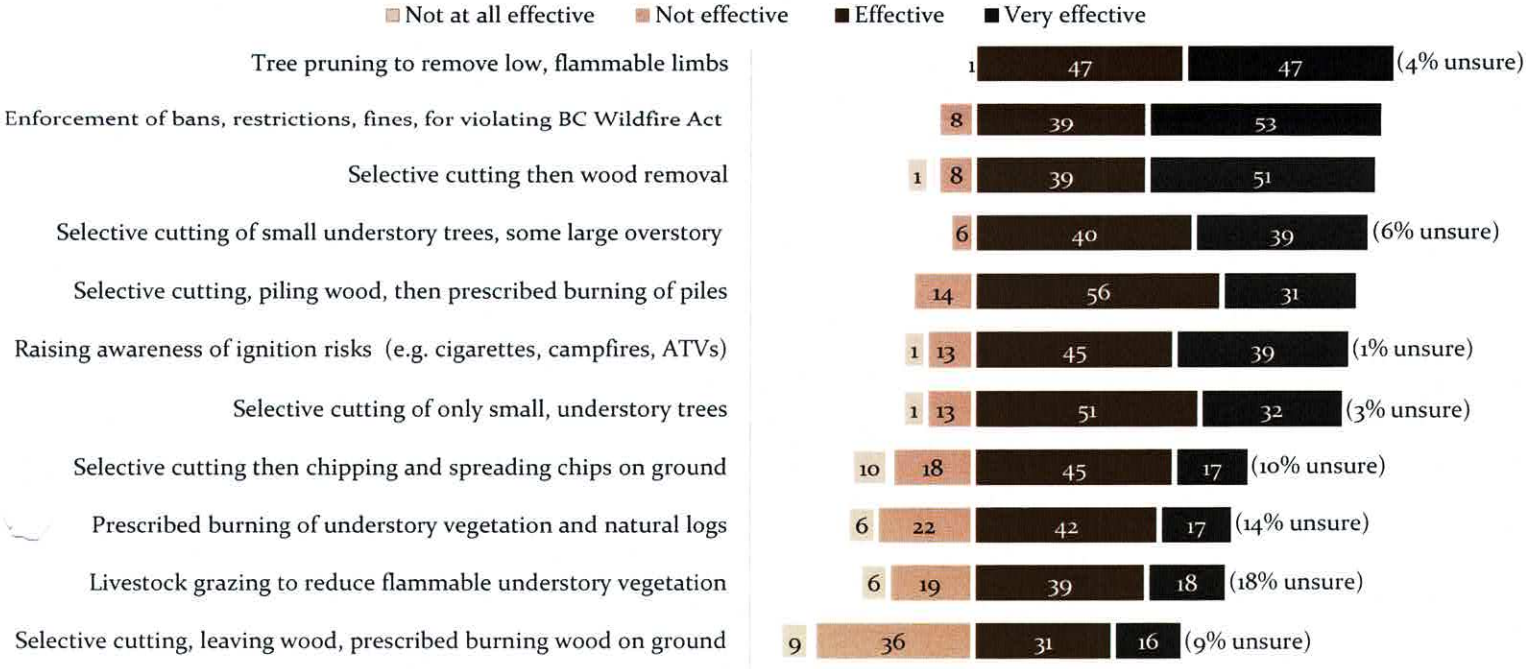
Finally, communities with a CWPP felt that tree pruning was a more effective action than communities without.

4.5 Support for Management Actions: Enforcement, raising awareness of ignition risks, and tree pruning, are the most supported actions

Ninety-five percent of respondents support or strongly support the enforcement of bans, restrictions and fines, 95% support or strongly support raising awareness of ignition risks, and 90% support or strongly support tree pruning. Interestingly, while awareness is one of the most highly supported actions, it did not rank highly in terms of effectiveness.

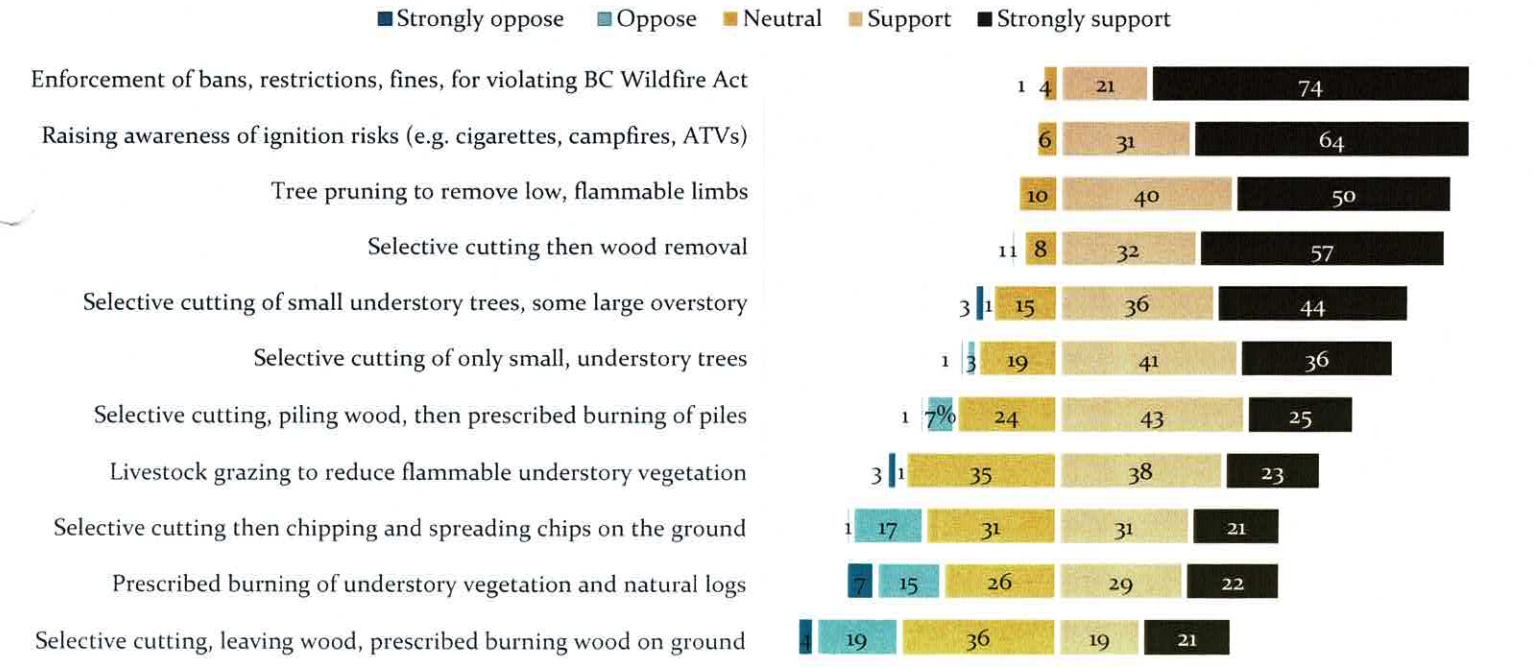
Among the southern regions, respondents from the Kamloops region were more supportive of grazing, pruning, selective cutting of small, understory trees and some large, overstory trees, and selective cutting then wood removal (e.g., use for timber or energy production). In addition, respondents from both the Kamloops and Southeast regions were more supportive of enforcement than the Coastal region.

In general, how effective do you think the following actions are in terms of mitigating wildfire risk? (Percent of 70 responses)



Note: Selective cutting then wood removal refers to use for timber or energy production; prescribed burning of understory vegetation and natural logs of ground refers to burning without tree cutting.

How much do you support/oppose these same actions as ways to mitigate wildfire risk in the WUI surrounding your community? (Percent of 70 responses)



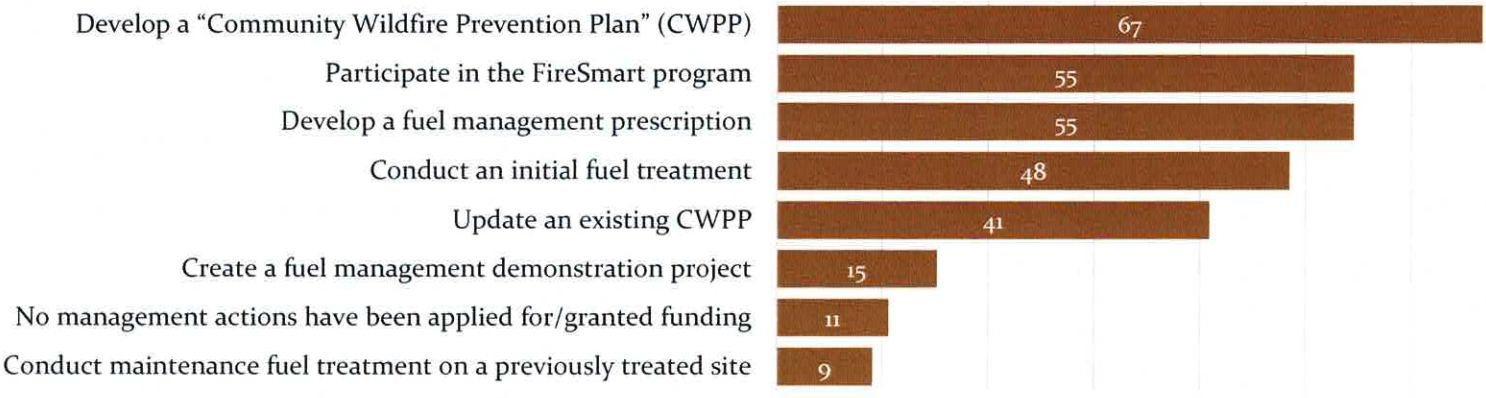
5. Planning and Mitigating Wildfire Risk

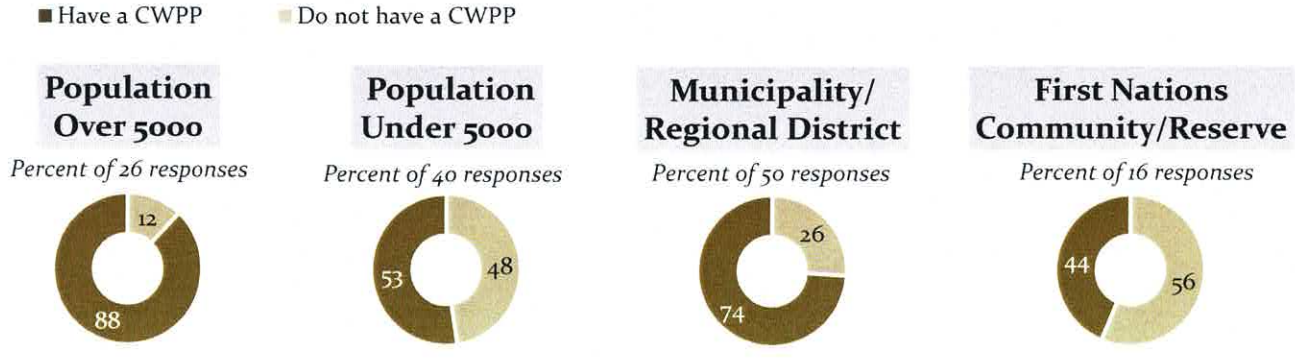
5.1 Engagement with Wildfire Prevention: Participation in Firesmart, developing a CWPP, and fuel management prescriptions, are the most commonly employed activities

Community participation in wildfire prevention management initiatives was relatively high; 67% of communities have already completed a CWPP. Eleven percent of communities had not applied for or received funding for any management actions.

Larger communities (with populations over 5000), and municipalities and regional districts, had higher rates of participation in developing a CWPP than First Nations communities/reserves and communities under 5000 residents. Communities between 5000 and 50 000 residents had the highest rates of CWPP development.

For which management actions has your community applied for/received funding from BC's SWPI or Indigenous and Northern Affairs Canada's On-Reserve Forest Fuel Reduction Treatment Funding? (Percent of 66 responses)





5.2 Factors Limiting Progress Towards Reducing Wildfire Risk in the WUI: Lack of financial resources, lack of provincial and federal funding, staff workloads

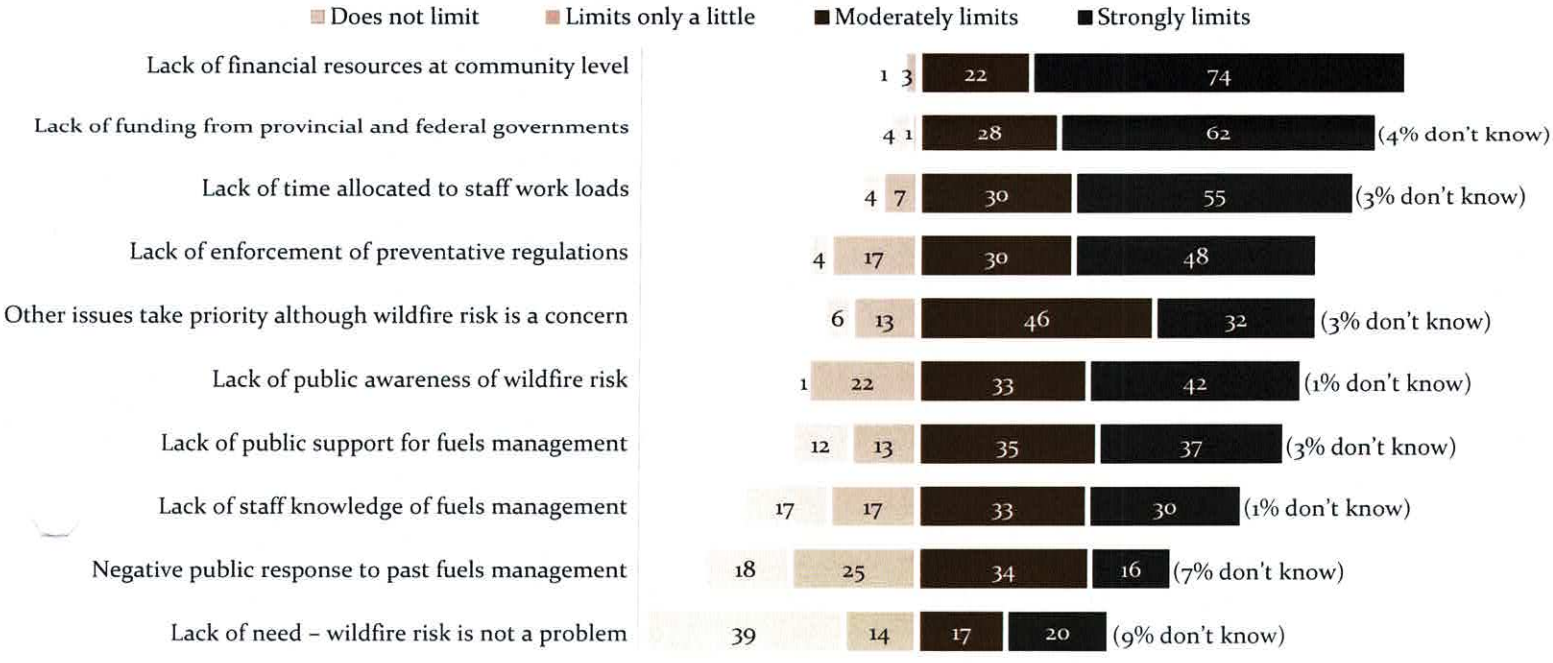
Ninety-six percent of survey respondents felt that the lack of financial resources at the community level moderately or strongly limits progress. Ninety percent of respondents felt that lack of funding from provincial and federal governments was moderately or strongly limiting progress, while 86% felt that this was the case for lack of time allocated to staff work loads. 'Lack of need – wildfire risk is not a problem' was ranked as the least important barrier, providing evidence that awareness/perception of wildfire risk is not a key barrier limiting community participation in prevention programs.

One hundred percent of communities that did not have a CWPP or participate in any management actions at all ranked lack of financial resources at the community level as strongly limiting. Seventy-one percent ranked lack of funding from provincial and federal governments as strongly limiting, while 29% ranked it as moderately limiting. One hundred percent of respondents whose communities had not participated in any management actions rated 'other issues take priority although wildfire risk is a concern' as strongly or moderately limiting (50% strongly limits, 50% moderately limits).

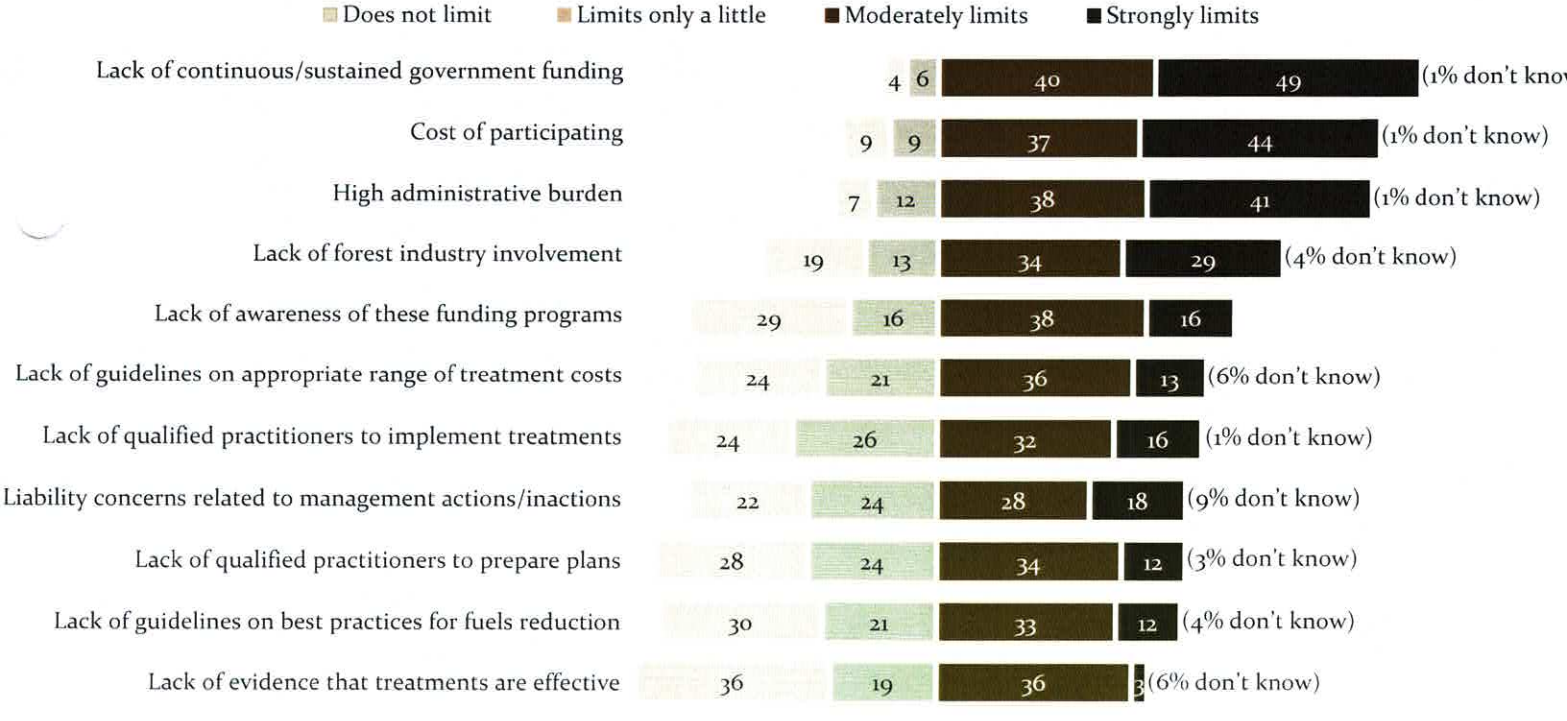
Respondents from municipalities and regional districts felt that 'other issues take priority although wildfire risk is a concern' was a more strongly limiting factor than did those from First Nations communities and reserves. This supports the claim that wildfire risk is a very urgent community priority for many First Nations communities and reserves in BC.

Among the southern regions, respondents from the Kamloops region indicated 'lack of public support' was a more limiting factor than respondents from the Southeast region.

To what extent do the following factors limit progress towards reducing wildfire risk in the WUI in your community? (Percent of 69 responses)



To what extent do the following factors limit your progress towards engaging with BC's SWPI or Indigenous and Northern Affairs Canada's On-Reserve Forest Fuel Reduction Treatment Funding? (Percent of 67 responses)



5.3 Factors Limiting Progress towards engaging with BC's SWPI or Indigenous and Northern Affairs Canadas On-Reserve Forest Fuel Reduction Treatment Funding

Eighty-eight percent of survey respondents felt that a lack of continuous or sustained funding was moderately or strongly limiting community progress towards engagement; 81% felt this was the case for the cost of participating, while 79% felt this was the case for high administrative burdens.

Of the seven communities without a CWPP and who have not participated in any actions, the most limiting factors were lack of continuous or sustained funding from governments (86% strongly limits, 14% moderately limits), and costs of participating (57% strongly limits, 43% moderately limits). Compared to communities with a CWPP, those without felt that a lack of continuous or sustained funding from governments was a much more limiting factor.

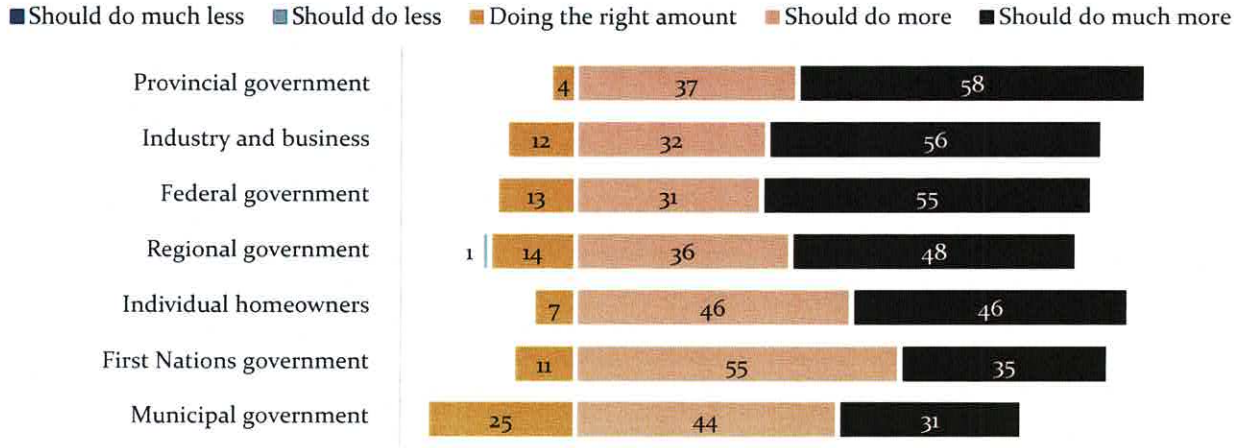
Respondents from First Nations communities/reserves ranked all factors as more limiting than did municipalities/regional districts. In particular, lack of awareness of funding programs, concerns about liability related to management actions or inactions, lack of qualified practitioners to prepare plans and prescriptions, lack of qualified practitioners to implement fuel management treatments, lack of guidelines on best practices for fuels reduction treatments, lack of guidelines on appropriate range of treatment costs, and lack of evidence that treatments are effective, were ranked by First Nations communities as strongly or moderately limiting factors.

5.4 Responsibility for Managing Wildfire Risk: Everyone should be doing more

While respondents indicate that everyone should be doing more, respondents believe that provincial, federal and regional governments, along with individual homeowners, should be doing much more.

Communities under 5000 residents, and First Nations communities and reserves, felt that the federal government should do more, compared to other groups.

Who should be doing more or less to reduce wildfire risk in the WUI? (Percent of 67 responses)



Conclusions and Next Steps

This survey was conducted in the months leading up to the unprecedented 2017 wildfire season. Given the tremendous impacts of those fires on the forests, communities, and citizens of BC, we shared the following key findings of this research with Chief Maureen Chapman and Mr. George Abbott, the commissioners of the BC Flood and Wildfire Review.

Communities throughout BC are aware of and very concerned about current and future threats from wildfire in the wildland-urban interface (WUI). There is consensus that all agencies – municipal, regional, provincial, federal, and First Nations governments, industry and business, and individual homeowners – should be doing more to reduce wildfire risk. Nevertheless, not all communities have developed a wildfire protection plan. Barriers are greatest for communities with fewer than 5000 citizens and many First Nations communities, where engagement may be enhanced if issues of sustained funding, capacity and support are adequately addressed. Solutions to enable community action should prioritize the most vulnerable communities and must account for cultural differences.

We thank the respondents from the 77 communities who participated in this survey. All communities in BC, including those who responded in 2016-17, are invited to participate in a new, updated survey (to be launched summer 2018). The purpose of the second survey is to improve representation of communities across BC, and to gain insights from all communities following the unprecedented wildfires of 2017. Our next steps will include interviews with community leaders to co-develop community-based solutions to overcome the barriers preventing BC communities from undertaking management actions to reduce the impacts of wildfire. To participate, contact Dr. Lori Daniels (lori.daniels@ubc.ca).

Appendix I: Additional Information on Community Priorities

As well as ranking the relative urgency of issues, survey respondents were asked an open-ended question about the top three issues facing their community. Terms, themes and ideas introduced by respondents were grouped into categories. The top four categories with the most responses were:

1) Wildfire in the WUI (lack of resources (funding, training, knowledge, staff, volunteers, general capacity), jurisdictional/collaboration issues (e.g. managing fuel/risks on private land), specifics of fuel load management, and development/urban growth);

2) Emergency services, planning and preparedness for natural hazards, excluding fire (difficulty with only one evacuation route, remote access, flood mitigation, landslides, drought, avalanches, snow, road washouts, rock slides, earthquakes/seismic upgrading, hazardous materials spill, pine beetle, and climate change);

3) Infrastructure/local capacity (local roads, equipment, and power);

4) Economic development (lack of employment opportunities and effective rural-focused development strategies, decreasing industrial presence in rural areas (e.g. closure of sawmills), difficulty attracting business/industry, and resident retention/fluctuation throughout year).

Negative impacts of development and urbanization (including but not limited to perceptions of the erosion of Aboriginal community and cultural wellbeing, issues with infringement of government and industry on traditional territory, and control/communication over resources and development), affordable housing, health care services and access to providers, public transportation and transit, access to clean drinking water, and education and public school funding, were also raised as important issues facing BC communities.

Appendix II: Regional Summaries

Coastal Regional Fire Centre (17 responses)

- Top three most urgent issues facing communities in the Coastal region today: 1) wildfire and associated issues with prevention in the WUI; 2) emergency services, planning and preparedness for natural hazards; 3) public transportation and transit/infrastructure/local capacity (roads, equipment, power)/concerns about impacts of development.
- Top three most urgent issues related to wildfire: 1) lack of resources (funding, training, knowledge, staff, volunteers, general capacity) for fire management and planning; 2) general concern with the risk of wildfire in the WUI; 3) fire safety and awareness of the public.
- 73% of the 17 communities have developed a CWPP; 60% have participated in Firesmart; 33% have conducted initial fuel treatment, developed a fuel management prescription, and updated an existing CWPP; 13% have applied for or been granted funding for no actions, created a fuel management demonstration project, and conducted a maintenance fuel treatment on a previously treated site.
- Rated as the top three most effective actions in the region: 1) selective cutting, piling the wood, then prescribed burning of wood piles; 2) enforcement of bans, restrictions and fines for violating the BC Wildfire Act/tree pruning to remove low, flammable limbs; 3) selective cutting of only small, understory trees.
- Rated as the top three most supported actions in the region: 1) raising awareness of ignition risks; 2) tree pruning to remove low, flammable limbs/enforcement of bans, restrictions and fines for violating the BC Wildfire Act; 3) selective cutting of only small, understory trees.
- Top three factors limiting progress towards reducing wildfire risk in the WUI in the region: 1) lack of financial resources at the community level); 2) lack of funding from provincial and federal governments); 3) lack of public awareness of wildfire risk/lack of time allocated to staff work loads.
- Top three factors limiting progress towards engaging with BC's SWPI or Indigenous and Northern Affairs Canada's On-Reserve Forest Fuel Reduction Treatment Funding in the region: 1) costs of participating/lack of continuous or sustained funding from provincial or federal governments; 2) high administrative burden; 3) lack of awareness of these funding programs/lack of forest industry involvement.

Kamloops Regional Fire Centre (21 responses)

- Top three most urgent issues facing communities in the Kamloops region today: 1) wildfire and associated issues with prevention in the WUI; 2) infrastructure/local capacity (roads, equipment, power), 3) economic development/emergency services, planning and preparedness for natural hazards.
- Top three most urgent issues related to wildfire: 1) lack of resources (funding, training, knowledge, staff, volunteers, general capacity) for fire management and planning; 2) general concern with the risk of wildfire in the WUI; 3) jurisdictional/collaboration issues in the WUI, especially managing fuel/risks on private land.
- 79% of the 21 communities have participated in Firesmart; 68% have developed a fuel management prescription; 63% developed a CWPP and updated an existing CWPP; 47% have conducted initial fuel treatment; 26% have created a fuel management demonstration project; 11% have conducted a maintenance fuel treatment on a previously treated site; 5% have applied for or been granted funding for no actions.
- Rated as the top three most effective actions in the region: 1) tree pruning to remove low, flammable limbs/selective cutting of small, understory trees and some large, overstory trees/selective cutting then wood removal; 2) enforcement of bans, restrictions and fines for violating the BC Wildfire Act/selective cutting, piling the wood, then prescribed burning of wood piles; 3) raising awareness of ignition risks.
- Rated as the top three most supported actions in the region: 1) enforcement of bans, restrictions and fines for violating the BC Wildfire Act; 2) selective cutting then wood removal/tree pruning to remove low, flammable limbs/raising awareness of ignition risks; 3) selective cutting of small, understory trees and some large, overstory trees.
- Top three factors limiting progress towards reducing wildfire risk in the WUI in the region: 1) lack of financial resources at the community level/lack of time allocated to staff work loads/lack of public support for fuels management; 2) lack of public awareness of wildfire risk/other issues take priority although wildfire risk is a concern/lack of funding from provincial and federal governments; 3) lack of enforcement of preventative regulations.
- Top three factors limiting progress towards engaging with BC's SWPI or Indigenous and Northern Affairs Canada's On-Reserve Forest Fuel Reduction Treatment Funding in the region: 1) high administrative burden; 2) costs of participating; 3) lack of continuous or sustained funding from provincial or federal governments.

Southeast Regional Fire Centre (26 responses)

- Top three most urgent issues facing communities in the Southeast region today: 1) wildfire and associated issues with prevention in the WUI; 2) emergency services, planning and preparedness for natural hazards; 3) economic development/infrastructure/local capacity (roads, equipment, power).
- Top three most urgent issues related to wildfire: 1) general concern with the risk of wildfire in the WUI; 2) lack of resources (funding, training, knowledge, staff, volunteers, general capacity) for fire management and planning; 3) jurisdictional/collaboration issues in the WUI, especially managing fuel/risks on private land.
- 65% of the 26 communities have developed a CWPP, conducted initial fuel treatment, and developed a fuel management prescription; 39% have participated in Firesmart; 35% have updated an existing CWPP; 13% have created a fuel management demonstration project; 9% have applied for or been granted funding for no actions
- Rated as the top three most effective actions in the region: 1) tree pruning to remove low, flammable limbs; 2) selective cutting of small, understory trees and some large, overstory trees; 3) enforcement of bans, restrictions and fines for violating the BC Wildfire Act/selective cutting then wood removal.
- Rated as the top three most supported actions in the region: 1) tree pruning to remove low, flammable limbs; 2) selective cutting then wood removal/enforcement of bans, restrictions and fines for violating the BC Wildfire Act/raising awareness of ignition risks/selective cutting of small, understory trees and some large, overstory trees; 3) selective cutting of only small, understory trees.
- Top three factors limiting progress towards reducing wildfire risk in the WUI in the region: 1) lack of funding from provincial and federal governments; 2) lack of financial resources at the community level; 3) lack of enforcement of preventative regulations.
- Top three factors limiting progress towards engaging with BC's SWPI or Indigenous and Northern Affairs Canada's On-Reserve Forest Fuel Reduction Treatment Funding in the region: 1) lack of continuous or sustained funding from provincial or federal governments; 2) cost of participating; 3) high administrative burden.

Northwest Regional Fire Centre (2 responses)

- Top three most urgent issues facing communities in the Northwest region today: 1) wildfire and associated issues with prevention in the WUI; 2) emergency services, planning and preparedness for natural hazards.
- Top three most urgent issues related to wildfire: 1) specifics of fuel load in the WUI; 2) general concern with the risk of wildfire in the WUI; 3) jurisdictional/collaboration issues in the WUI, especially managing fuel/risks on private land.
- Neither community has applied for or been granted funding for actions.
- Rated as the top three most effective actions in the region: 1) raising awareness of ignition risks/enforcement of bans, restrictions and fines for violating the BC Wildfire Act/selective cutting, piling the wood, then prescribed burning of wood piles; 2) prescribed burning of understory vegetation and natural logs on the ground/tree pruning to remove low, flammable limbs/selective cutting of only small, understory trees/selective cutting then wood removal/selective cutting, leaving wood on the ground, then prescribed burning of wood on the ground.
- Rated as the top three most supported actions in the region: 1) selective cutting, piling the wood, then prescribed burning of wood piles/selective cutting then wood removal/selective cutting of small, understory trees and some large, overstory trees/selective cutting of only small, understory trees/tree pruning to remove low, flammable limbs/prescribed burning of understory vegetation and natural logs on the ground/enforcement of bans, restrictions and fines for violating the BC Wildfire Act/raising awareness of ignition risks.
- Top three factors limiting progress towards reducing wildfire risk in the WUI in the region: 1) lack of enforcement of preventative regulations/lack of public support for fuels management/lack of financial resources at the community level/lack of funding from provincial and federal governments/lack of time allocated to staff work loads/other issues take priority although wildfire risk is a concern; 2) lack of public awareness of wildfire risk/negative public response to past fuels management/lack of staff knowledge of fuels management/lack of need – wildfire risk is not a problem.
- Top three factors limiting progress towards engaging with BC's SWPI or Indigenous and Northern Affairs Canada's On-Reserve Forest Fuel Reduction Treatment Funding in the region: 1) lack of awareness of these funding programs/lack of continuous or sustained funding from provincial or federal governments/lack of forest industry involvement/lack of guidelines on appropriate range of treatment costs/lack of guidelines on best practices for fuels reduction treatments/cost of participating/high administrative; 2) lack of qualified practitioners to implement fuel management treatments/lack of qualified practitioners to prepare plans and prescriptions/concerns about liability related to management actions or inactions.

Cariboo Regional Fire Centre (4 responses)

- Top three most urgent issues facing communities in the Cariboo region: 1) economic development; 2) emergency services, planning and preparedness for natural hazards; 3) infrastructure/local capacity (roads, equipment, power).
- Top three most urgent issues related to wildfire: 1) general concern with the risk of wildfire in the WUI (no other issues related to wildfire were listed).
- Three respondents shared details of their engagement in prevention programs. Three respondents were from communities that have developed a CWPP; two have conducted initial fuel treatment and developed a fuel management prescription; one has participated in Firesmart and updated an existing CWPP.
- Rated as the top three most effective actions in the region: 1) selective cutting then wood removal/selective cutting of small, understory trees and some large, overstory trees; 2) raising awareness of ignition risks/enforcement of bans, restrictions and fines for violating the BC Wildfire Act/tree pruning to remove low, flammable limbs; 3) selective cutting then chipping and spreading wood chips on the ground.
- Rated as the top three most supported actions in the region: 1) selective cutting then wood removal/enforcement of bans, restrictions and fines for violating the BC Wildfire Act/raising awareness of ignition risks; 2) livestock grazing to reduce flammable understory vegetation; 3) selective cutting then chipping and spreading wood chips on the ground/selective cutting of small, understory trees and some large, overstory trees/tree pruning to remove low, flammable limbs/prescribed burning of understory vegetation and natural logs on the ground.
- Top three factors limiting progress towards reducing wildfire risk in the WUI in the region: 1) lack of financial resources at the community level; 2) lack of funding from provincial and federal governments/lack of time allocated to staff work loads/other issues take priority although wildfire risk is a concern; 3) lack of staff knowledge of fuels management/lack of public awareness of wildfire risk.
- Top three factors limiting progress towards engaging with BC's SWPI or Indigenous and Northern Affairs Canada's On-Reserve Forest Fuel Reduction Treatment Funding in the region: 1) high administrative burden/costs of participation/lack of continuous or sustained funding from provincial or federal governments; 2) lack of awareness of these funding programs/lack of qualified practitioners to prepare plans and prescriptions/lack of qualified practitioners to implement fuel management treatments; 3) concerns about liability related to management actions or inactions/lack of guidelines on appropriate range of treatment costs/lack of evidence that treatments are effective/lack of forest industry involvement.

Prince George Regional Fire Centre (6 responses)

- Top 3 most urgent issues facing communities in the Prince George region today: 1) wildfire and associated issues with prevention in the WUI; 2) economic development/health care services and access to providers/infrastructure/local capacity (roads, equipment, power); 3) emergency services, planning and preparedness for natural hazards.
- Top three most urgent issues related to wildfire: 1) general concern with the risk of wildfire in the WUI; 2) lack of resources (funding, training, knowledge, staff, volunteers, general capacity) for fire management and planning.
- Four respondents shared details of their engagement in prevention programs. Three respondents were from communities that have developed a CWPP; two have participated in Firesmart; one has conducted initial fuel treatment, developed a fuel management prescription, and updated an existing CWPP.
- Rated as the top three most effective actions in the region: 1) enforcement of bans, restrictions and fines for violating the BC Wildfire Act/selective cutting then wood removal; 2) raising awareness of ignition risks/livestock grazing to reduce flammable understory vegetation/tree pruning to remove low, flammable limbs/selective cutting of only small, understory trees/selective cutting, piling the wood, then prescribed burning of wood piles; 3) selective cutting of small, understory trees and some large, overstory trees.
- Rated as the top three most supported actions in the region: 1) selective cutting then wood removal/enforcement of bans, restrictions and fines for violating the BC Wildfire Act/raising awareness of ignition risks; 2) selective cutting of only small, understory trees/tree pruning to remove low, flammable limbs/livestock grazing to reduce flammable understory vegetation; 3) selective cutting of small, understory trees and some large, overstory trees.
- Top three factors limiting progress towards reducing wildfire risk in the WUI in the region: 1) lack of financial resources at the community level/lack of funding from provincial and federal governments/other issues take priority although wildfire risk is a concern; 2) lack of enforcement of preventative regulations/lack of time allocated to staff work loads; 3) lack of public awareness of wildfire risk/lack of public support for fuels management/lack of staff knowledge of fuels management.
- Top three factors limiting progress towards engaging with BC's SWPI or Indigenous and Northern Affairs Canada's On-Reserve Forest Fuel Reduction Treatment Funding in the region: 1) lack of continuous or sustained funding from provincial or federal governments; 2) high administrative burden/cost of participating; 3) lack of awareness of these funding programs/concerns about liability related to management actions or inactions/lack of qualified practitioners to prepare plans and prescriptions/lack of qualified practitioners to implement fuel management treatments/lack of guidelines on appropriate range of treatment costs/lack of forest industry involvement.

Appendix III: Survey Methods

This survey was conducted between September 2016 and 2017, using the online Fluid Survey platform. The objective of the survey was to better understand the views of decision makers, planners or managers (e.g., Chief Administrative Officers, public safety or emergency services coordinators, foresters, land managers etc.) working at the level of individual communities. Accordingly, our sample was drawn from members of Union of BC Municipalities, First Nations' Emergency Services Society of BC, and the BC Community Forest Association, whose monthly newsletters provided reminders to maximize response rate.

Earlier drafts of this survey were reviewed and revised in response to feedback from an expert advisory panel including leaders of key agencies involved in all aspects of preventative wildfire management in BC.

To protect individual's privacy, the survey was anonymous. The completion rate[3] was 69%. Seventy-seven valid responses to the survey were completed; valid surveys are defined as ones where the respondent completed at least the first five questions. Where percentages are displayed, values may not sum to 100% due to rounding.

Microsoft Excel and SPSS Statistics software were used to analyze data. No additional statistics were done for the Cariboo, Northwest, or Prince George regions, because there was not enough data.

The survey is approved by UBC's Behavioural Research Ethics Board.

[3] Completion rate was calculated as the number of completed surveys divided by the number of respondents who entered the online survey.