Getting Climate Ready: In the North Okanagan

Creating Wildfire Resilient Communities

“Learning from WUI Disasters of the Past”

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What is a “wildfire resilient” community?

“A community that bounces back more quickly following a potentially disastrous situation.”

Why?

Because the magnitude of economic and social impacts are less... there is less to recover from.

4 Pillars of Emergency Management

1. Planning/Preparedness: being ready
2. Response: limiting direct effects during an event
3. Recovery: restoring conditions after an event
4. Prevention/Mitigation:
   - Avoiding an event
   - Proactive measures to reduce losses
“How’s it going, EH?”

A lot has changed in 108 years... but the outcomes are strikingly similar!

- Technology ➔ Fire fighting capability
- Equipment ➔ Response times
- Construction ➔ Building codes and materials
- Science ➔ Knowledge of fire behavior
Situation Report: We are at the confluence of 3 converging trends.

- **Climate Warming**
  - Increased wildfire activity

- **Development in wildland areas**
  - (60,000 WUI communities)

- **Forest Health Issues**
  - (rising fuel loads)

**Rising Wildfire Threat and # of WUI Disasters**
Fundamental changes are required in our approach to wildfire loss reduction.

Insanity:
“Expecting different results, when you do the same thing over and again”

“We’ve been over-reliant on wildfire response as the primary means of loss reduction.” (AW)

“We can’t just keep adding zeros to recovery costs.”
(Retired Commander – Cal-Fire)
1. Recognize and accept the impacts of climate change are already underway.

2. Frame the problem accurately.

3. Mitigate risks most effectively.

4. Actively restore historic fire regimes.

North Okanagan: an excellent candidate for success!

Yes, we CAN!
Implications of climate warming on wildland fire

- Longer fire seasons
- Dryer fuels, more frequent periods of extreme fire danger
- More lightning = more fires
- Annual area burned has doubled in past 20 years
- Weather patterns favor large fire growth
  - Drought, radical winds
Extreme fire behaviour is common denominator in WUI fire disasters

Top 3 - 5% of fires burn ~97% of the area.

Crown Fire → Convection Column → Spot Fires

Extreme Fire Intensity, Rate of Spread, Embers

No time for last minute risk mitigations now!
“The presence of structures in locations where conditions result in the potential for ignition from flames, radiant heat or the firebrands/embers of a wildland fire.”

WUI is a set of conditions
Framing: Scope of the WUI problem is immense

Lynn Johnston Research (U. of A./ Can. For. Serv.)
- Wildland/urban interface
- Wildland/industry interface
- Infrastructure interface

3 types of interface

- **60,000** Canadian communities
- **36,000,000** hectares of forest fuel within 0.5 km of these WUI communities
Framing: Sound understanding is clouded by myths and misconceptions

For example:

- Wildfire is an irresistible tsunami
- Homes burst into flames - randomly
- Risk mitigation is too expensive, too difficult; it does not work
- If only insurance companies could do something about this
Another Myth: Bigger – Faster - Tougher... is the solution. Nope!

- No fire suppression system in the world can stop losses from large conflagrations.
- RESPONSE is not enough!
- The outcome depends on risk mitigations taken before the fire, on our property!
- More fire trucks are not the answer....

**this is**!

TEAM WORK
Effective communication means outreach:
1. Must evolve past “telling + informing”
2. Engaged home owners roll up their sleeves
3. They understand the problem, what they need to do, how and why
4. Brings residents on-board, they take responsibility

Just telling people is not enough, fire experts must engage with the public
Framing: How do these disasters evolve?  
... the WUI disaster sequence!

Breaking the ‘disaster sequence’ by addressing home vulnerability to ember ignition is the most effective solution.
Embers ignite more than 50% (even 80–90%) of homes destroyed by wildfires. Most of the time...

It’s not the BIG flames, or radiant heat that trigger home ignition

Burn Holes in Canopy of Porch Glider – Ft. McMurray
Why some homes survived: Learning from the Fort McMurray wildfire disaster

Alan Westhaver, M.Sc.
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Study area and methods

- Homes subject to flames, radiant heat, and embers
- Studied areas where wildland fire transitioned from forest to urban fuel
- Avoided structure-to-structure fire zone
- Applied FireSmart® hazard assessment system
  - 20 recognized hazard factors
  - Structural, vegetation, ignition sites
- Used retrospectively on homes destroyed by fire
Home loss “Study Cases” (urban and rural)

- Side-by-side (unburned, burned)
- Isolated burned homes
- Isolated survivor homes
- Unburned neighbourhoods – with extreme exposure

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Conclusion: Home survival and vulnerability

1. Hazard assessments showed that surviving home ignition zones were significantly less vulnerable to ember ignition than homes that were destroyed; rated hazard factors were low.
   - In all Study Cases
   - Across all types of analysis
   - In urban and country residential areas

- Adoption of FireSmart practices by homeowners was strongly correlated to home survival.
Conclusion: Home survival and vulnerability

1a. Anomalies mostly explained by peculiarities in hazard assessment system:

- Overestimates hazard – vegetation > 30m from home
- Not all critical weaknesses are rated (i.e. Achilles Heel)
2. Beyond doubt, Recommended FireSmart Guidelines demonstrated their effectiveness; survival is not random.

- 81% of all surviving homes assessed were rated as ‘FireSmart’; ¾ of them in the ‘Low’ hazard category.
- Matched pairs: 94% of the time, the surviving home was rated with lower hazard than burned home
- Point spread significant (i.e. 30+°)
Conclusion: Cause of home ignitions

3. At the urban margins, embers ignited the vast majority of homes destroyed in Fort McMurray neighbourhoods during early stages of the disaster.

- With few exceptions, clearances were adequate* to prevent home ignition from radiant heat.

- In almost all cases, non-fuel buffers were adequate* to protect homes from ignition by direct contact with flames.

- Unburned fuel left between homes and forest.

* Clearances set by experimental crown fire studies (Canada/USA).
Conclusion: The WUI disaster sequence

4. The Fort McMurray disaster followed the well-known pattern.

4a. Pattern replicated in several neighbourhoods:
   - Beacon Hill
   - Abasand Heights
   - Wood Buffalo
5. No single risk mitigation can guarantee survival; overall compliance with guidelines is required.

6. ‘Achilles Heel’ hazards can supersede FireSmart status; almost guarantee home ignition.

“Jackpot”
junipers and cedars.

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Conclusion: Vegetation is the major contributor to hazard

7. Untreated vegetation contributed 1/2 to 2/3 of all hazard within 30m of burned homes.

- Every “rule of thumb/guideline” is being broken
- The majority of non-conforming vegetation is planted
- Vegetation hazards are within control of property owners
Conclusions: Survival and vulnerability of homes

8. Many homes are placed at risk due to substantial hazards on adjacent properties.
   - Overlapping Priority Zone 1’s and 2’s
   - Smaller urban lots
   - Another case for working at “neighbourhood” scale
Conclusion:

9a. New homes inherently more FireSmart!

Building Materials:
- Virtually no combustible roofs (untreated wooden shakes)
- Popularity of fire resistant siding; brick, stone, masonry, stucco feature walls, cement composition siding
- Double-pane+ windows, well-built vinyl or metal clad

Building Features:
- Very few exterior openings and vents
- Fire-resistant deck supports
- High proportion of stone, concrete, closed-in front entrances
Study limitations

- Sample size limited to ~85 detailed home evaluations
- Post-fire observations only
- What did not burn – and where; clues in the ashes
- Inability to view some risk factors
- (e.g. roof cleanliness)
9. Results of the Fort McMurray investigation echo results of many previous U.S. case studies and wildfire research across North America.
Other lessons we should & could learn

... to encourage fire resilient neighbourhoods, and whole communities.
American insurance study shows lower losses in Firewise (a.k.a. FireSmart) neighbourhoods.
Apply risk mitigations that address the root issues:

1. Homes that are highly susceptible to ignition by wind-driven embers.

2. Combustible materials within 30m of the home that carry surface flames to the home.

“If homes do not ignite, they cannot burn..... If homes do not burn, then disaster is avoided”
- Jack Cohen
  US Forest Service Scientist
Aim for the “Bulls eye” : homes ... and back yards!

**Home Ignition Zone**
Structure + Priority Zones 1 - 2 - 3

17 of 20 hazard factors located within 20m of home
Know that FireSmart risk mitigations DO work

**We know this because of:**
- Incidental observations – dating back decades
- Ignition modelling and fire engineering experiments
- Experimental high intensity forest fires (NWT, AB)
- IBHS “Fire Dragon” & NIST testing facilities (USA)
Small actions, make a BIG difference

- Most risk mitigations around homes are:
  - Inexpensive
  - Easily accomplished
  - Not very time consuming
  - More like, “organized puttering”

- We WUI residents are not helpless victims!

Residents are able to find and eliminate **Fire Pathways**
The community can be the “fire guard”

2. Evidence of this effect observed at Fort McMurray
3. Provides hope for the future
There is no “Silver Bullet”

Mitigating wildfire risk is a “Team Sport”

Solving complexities of the WUI fire problem requires all hands on deck!

Remember the 4 Pillars!

We must work together, closely and pro-actively!

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What’s our best answer?

FireSmart: “Principles, practices and programs to reduce interface fire losses”*

More specifically, FireSmart programs promoting risk reduction within the Home Ignition Zone.

* Based on NFPA standards.
What’s the best, most comprehensive tool available?

**FS Canada Community Recognition Program***

- A major FS Canada initiative – well supported in BC!
- Beta version of FCCRP released in 2013
- Based on the proven US Firewise program (NFPA)
- Important progress made; great potential demonstrated
- Successful pilot programs in Alberta and BC
  - Dozens of recognized BC neighbourhoods and communities
- Basis for UMBC/ CRI Program grants (2016-2018)

*FCCR Program
How does the 8 – step Community Recognition Program work?

- Citizen led, grassroots program to reduce risk of wildfire losses
- Empowers residents with information + organizational framework
- Residents develop + implement FireSmart plan/FireSmart events
- Facilitated by trained fire personnel (LFR’s)
- Leads to National recognition
Breaks down key barriers that block risk mitigation

- **Responsive to resident values**: “the forest is more than just fuel”
- **Engages AND informs**: effective in changing human behavior
- **Defeats hopelessness**: proves residents CAN make a difference
- **It is “Doable”**: Simple, inexpensive, incremental benefits
- **Builds trust + confidence**: Positive interactions with fire agencies
The FCCR Program builds an army!

- 900+ Residents
- 450+ Homes
- 9 Neighbourhoods
- 9 Local FireSmart Representatives

Highly Effective + Cost-efficient

- Fire Personnel

Resident Led

1. Community Contacts FireSmart
2. Site Visit by Local FireSmart Representative
3. Hazard Assessment
4. Champion Forms FireSmart Board
5. Create FireSmart Plan
6. Implement Solutions
7. Apply for Recognition
8. Renew Recognition
How can the FS Community Recognition Program be operationalized?

Municipal fire departments provide program facilitators – “FireSmart Coaches”

• Requires 1-2 members in every fire hall to be trained as *Local FireSmart Representatives* and function part-time as catalysts and facilitators to residents in fire-prone communities.

• Structural fire fighters have inherent advantages:
  o Embedded in the community, rapport, 24-7
  o Fire expertise, skilled educators, local knowledge
  o Community trust and credibility
  o Have “skin in the game” - WUI Fire Officer
Solve the investment “disconnect”

Landscape + Regional District Scale
(Public Land)

Neighbourhood Scale
(Private Land)

Home Scale
(Private Land)

Community - MITIGATION INVESTMENT
Forest

Value of Losses - Forest

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Target investment on the root causes of WUI fire losses

MOVE AWAY FROM:

Agencies fighting fire and fuel outside communities and developments - on public land.

SHIFT TOWARD:

Enabling property owners to take actions that reduce vulnerability of neighbourhoods and homes - on private land (i.e. root causes of loss).

ForestWise Environmental Consulting Ltd.
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Creating Many Wildfire Resilient Communities – Let's get Going!

Thank You!
Discussion and questions ...

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