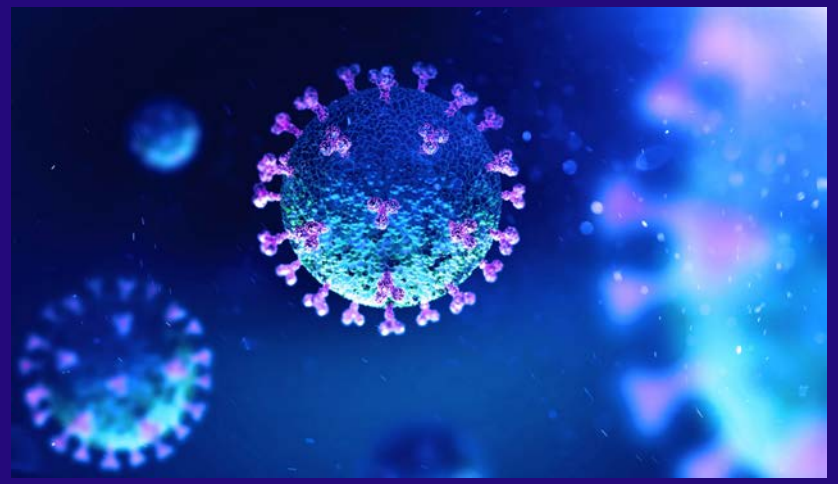
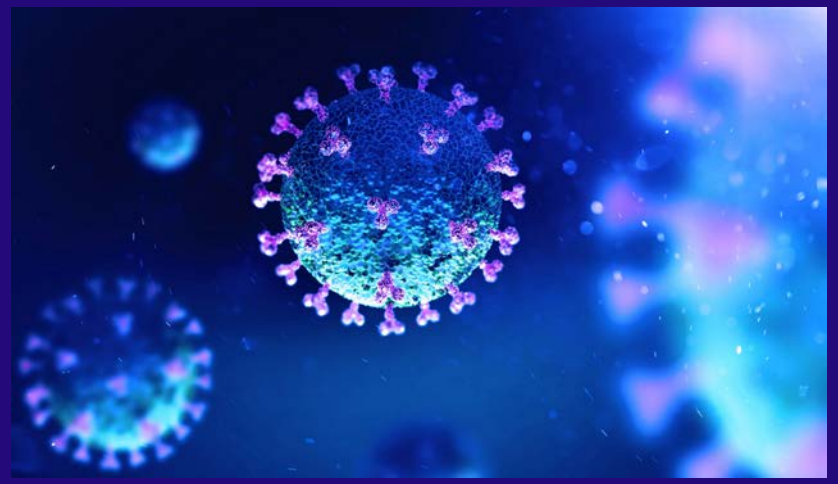


CRHNet
CANADIAN RISK & HAZARDS NETWORK

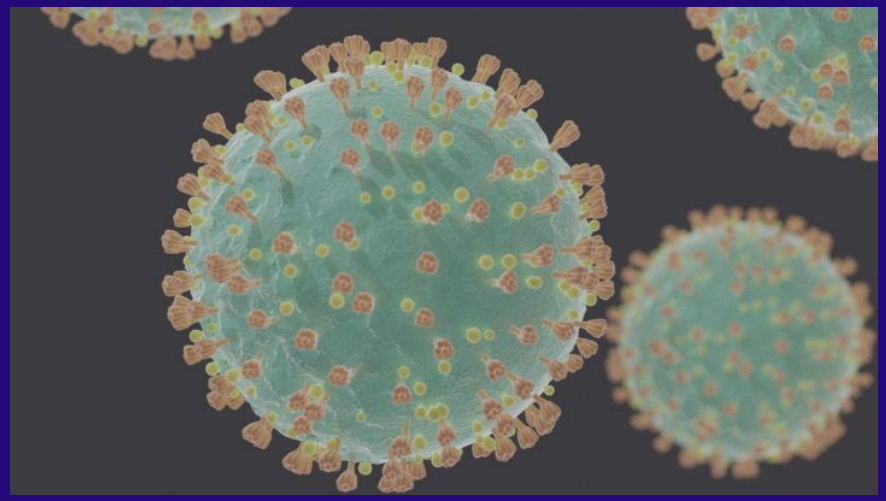
Why We Fail to Plan for the Foreseeable

Laurie Pearce
October 2020



What I'm going to talk about…

- Events
- Human Realities
- Reality of Emergency Management
- A Way Forward



Pandemics

- 1889 Russian Flu killed over 350,000 people.
- 1918/19 Spanish Flu killed 50 million.
- 1957 Asian Flu killed 1.1 million.
- 1968 Hong Kong Flu killed 1 million.
- 2003 SARS killed 774.
- 2009 H1N1 killed up to 500,000

Earthquakes

- 873 Cascadia Subduction 8.3M
- 1152 Cascadia Subduction 8.8M
- 1400 Cascadia Subduction 8.1M
- 1468 Cascadia Subduction 8.7M
- 1700 Cascadia Subduction 9M
- 1946 Cumberland Vancouver Island 7.3M
- 1949 Haida Gwaii 8.1M
- 1964 Alaska 9.2M
- 1972 Sitka Alaska 7.6M
- 2012 Prince Rupert 7.8M
- 2018 Tofino 6.8M

Flood Warnings and Advisories

High Streamflow Advisory – Fraser River (NEW)
ISSUED: 12:30 PM June 26th, 2020

Floods

- 1894 Fraser River flooded Lower Mainland

- 1948 Fraser River 11m
- 1972 Fraser River 10.1m
- 1999 Fraser River 9.4m
- 2007 Fraser River 9.3m
- 2012 Fraser River 6.7m
- 2018 Fraser River 6.7 m
- 2020 Fraser River 6.5 m

Gauge reading at 6m involves low-level flooding

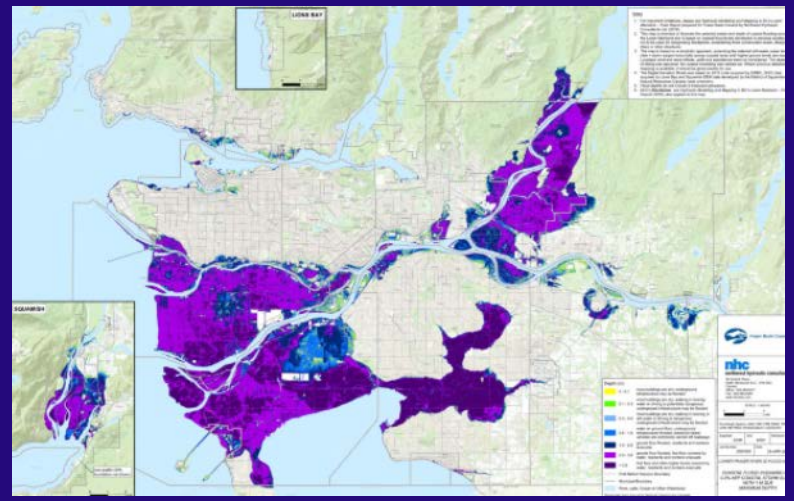
Canada cases

Updated Oct 27 at 11:43 AM local

Confirmed	Deaths	Recovered
222,004	9,996	185,961
+4,239	+34	+2,850

An Earthquake Wake-Up Call for Canadians

IBC's commissioned earthquake study estimates the overall costs … at almost $75 billion.



Are We Prepared?

I don't think so…

What do you think?

Why not?

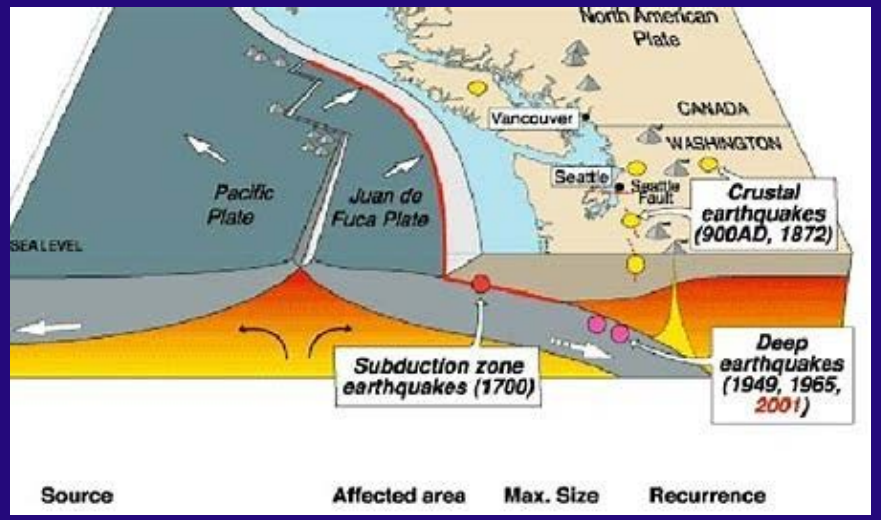
We have been warned, both by the experts and by reality. Yet on most fronts, we were, and will be caught unprepared

"If anything kills over 10 million people in the next few decades, it's most likely to be a highly infectious virus rather than a war — not missiles but microbes…We have invested a huge amount in nuclear deterrents, but we've actually invested very little in a system to stop an epidemic. We're not ready for the next epidemic." 2015

Risk Acceptance

Risk acceptance based on:

- **familiarity,**
- **control,**
- **catastrophic potential,**
- **equity, &**
- **knowledge**



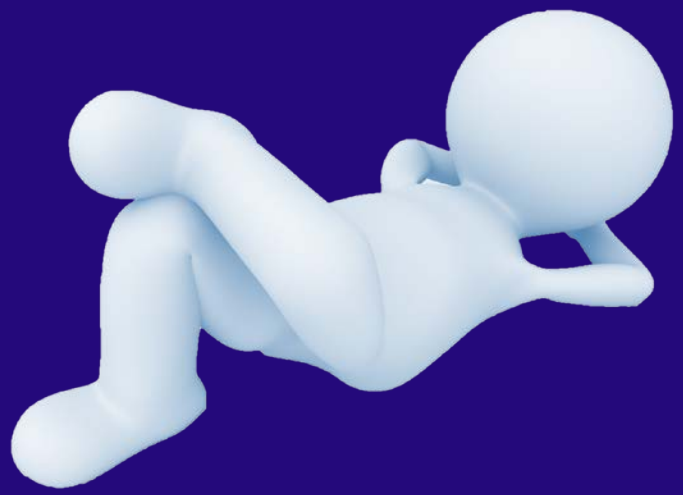
Risk Perception

"We say that there's approximately a 14 percent chance of another approximately magnitude-9 earthquake occurring in the next 50 years." USGS & U of Washington

"100-year flood" is an extreme hydrologic event as a flood having a 100-year recurrence interval - a flood that statistically has a 1-percent chance of occurring in any given year"

Risk Perception

Category	% from Actual
All cancers	-26%
Drowning	749%
Drug Overdoses	459%
Falls	79%
Fires	1010%
Heart disease & strokes	10%
Homicide	516%
Lightning	3579%
Motor vehicle crash	923%
Plane crash	618%
Suicide	122%
Train derailment	81%



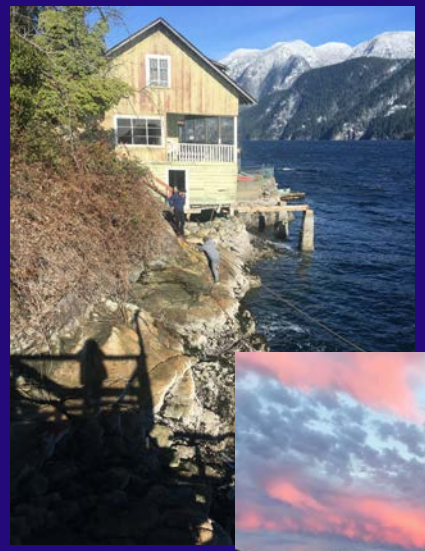
Risk Perception

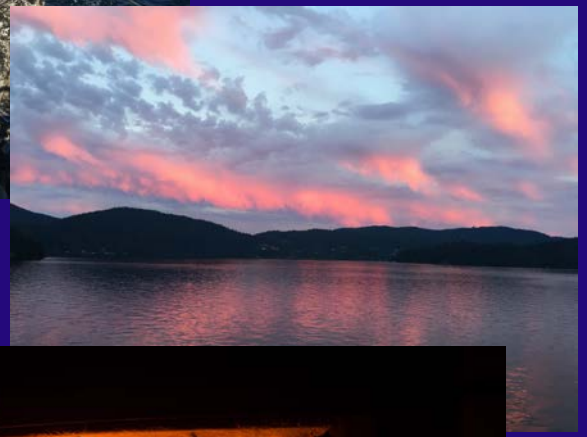
- inaction in the face of danger as normalcy bias
- people have often been slow to recognize the danger and confused about how to respond - so they do nothing, until it is too late

- part of the problem - we get our cues from others.

Risk Perception

- people tend to be unreasonably optimistic
- but have an egotistical optimism: a sense that while bad things happen, “they don’t happen to me”
- survival instinct doesn’t kick in unless you experience suffering

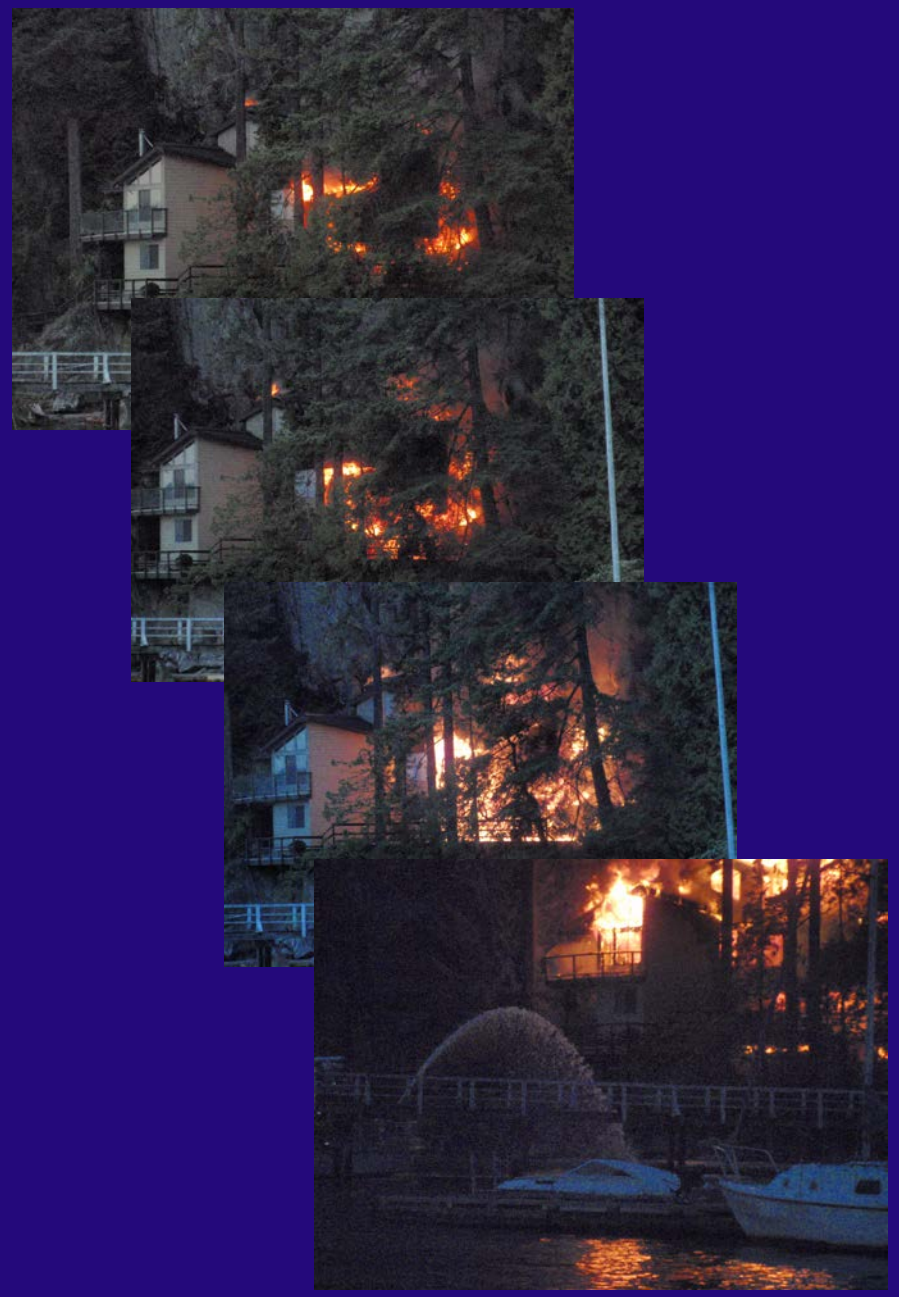




Sunshine Falls, North Vancouver, BC

- 1987
- Boat Access
- House surrounded by trees
- Ogalbe's home
- Caught fire at night
- Burned to the ground
- Nothing saved

What changed?

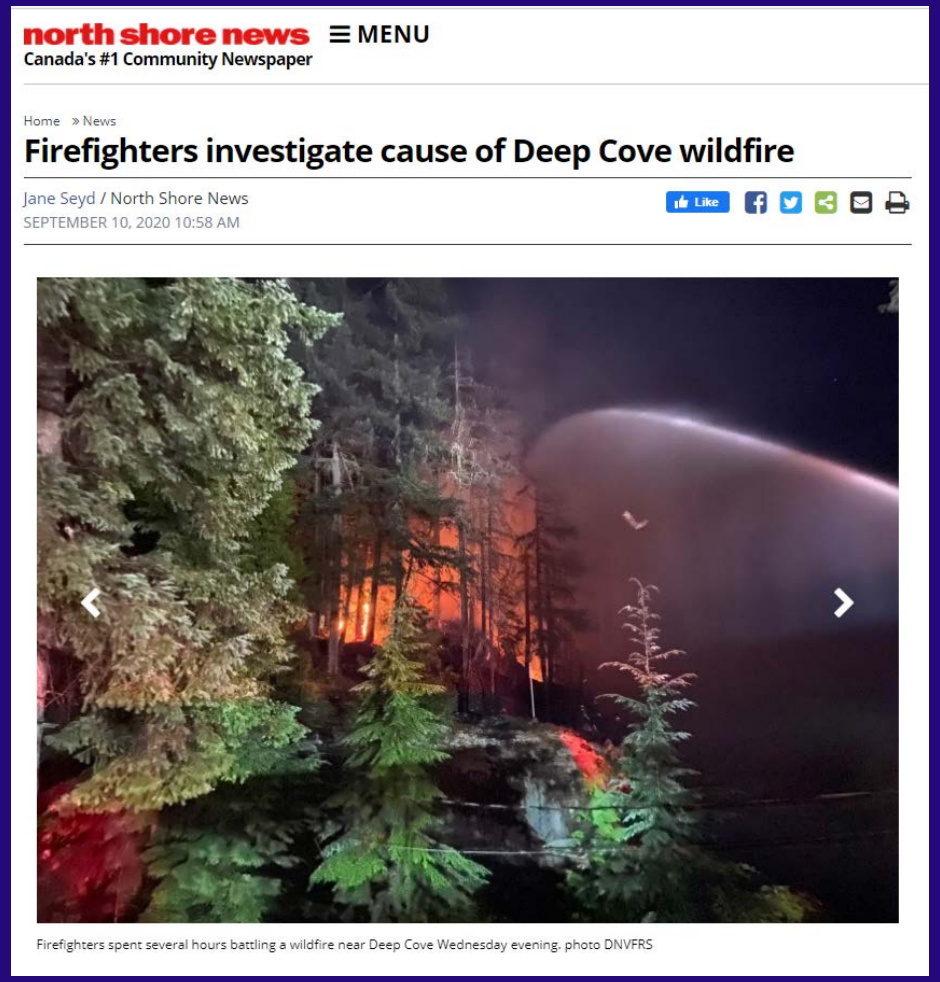


Sunshine Falls, North Vancouver, BC

- 2009

- Owners away on holidays
- Fire started from the beach
- House fully engulfed in 4 minutes
- High tide & No wind
- 1,000 m of hose laid

What changed?



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Canada's #1 Community Newspaper

Home » News

Firefighters investigate cause of Deep Cove wildfire

Jane Seyd / North Shore News
SEPTEMBER 10, 2020 10:58 AM

Like

Firefighters spent several hours battling a wildfire near Deep Cove Wednesday evening. photo DNVFRS

Sunshine Falls, North Vancouver, BC

- September 2020
- Fire started from beach area
- Spread between two homes
- No wind
- Took District of North Vancouver Fire Department & BC Wildfire to put it out

What changed?

Risk Reality

We were warned, both by the experts and by reality. Yet on most fronts, we were still caught unprepared

Disaster & Emergency Managers

1. are supposed to help us stay safe
2. conduct hazard, risk & vulnerability analyses
3. to inform the community
4. set priorities
5. implement mitigation strategies and plans

Hazard Likelihood

Measure of likelihood	Return period in years
Frequent or very likely	Every 1 – 3 years
Moderate or likely	Every 3 – 10 years
Occasional, slight chance	Every 10 – 30 years
Unlikely, improbable	Every 30 – 100 years
Highly unlikely, rare event	Every 100 – 200 years
Very rare event	Every 200 – 300 years

Likelihood Score		
Score	Probability	Description
5	Almost Certain	Will undoubtedly happen or recur, possibly frequently
4	Likely	Will probably happen or recur, but it is not a persisting issue or circumstance
3	Possible	Might happen or recur occasionally
2	Unlikely	Do not expect it to happen or occur but it is possible it may do so
1	Rare	This will probably never happen or occur

Frequency	Category	Return Period
1	Rare	>201 years
2	Very Unlikely	101-200 years
3	Unlikely	31-100 years
4	Probable	11-30 years
5	Likely	4-10 years
6	Almost Certain	1-3 years

Likelihood

Score	Category	Description	Percent Change
1	Rare	Occurs every 100 years or more	Less than 1% chance of occurrence in any year
2	Very Unlikely	Occurs every 50-99 years	Between a 1-2% chance of occurrence in any year
3	Unlikely	Occurs every 20-49 years	Between a 2-5% chance of occurrence in any year
4	Probable	Occurs every 5 – 19 years	Between a 5-20% chance of occurrence in any year
5	Likely	Occurs < 5 years	Over 20% chance of occurrence in any year
6	Certain	The hazard will occur annually	100% 5chance of occurrence in any year

Likelihood

Niveau	Probabilités d'occurrence	Description
A	Presque certain	On s'attend à ce que l'aléa se produise dans la plupart des circonstances; et/ou nombre élevé d'incidents enregistrés et/ou nombreux signes de manifestation possible; et/ou forte probabilité que l'événement se reproduise; et/ou très nombreuses occasions, raisons, ou façons pouvant conduire à l'événement; peut survenir en moyenne tous les ans ou plus fréquemment.
B	Probable	Surviendra probablement dans la plupart des circonstances; et/ou incidents enregistrés régulièrement et nombreux signes de manifestation possible; et/ou nombreuses occasions, raisons ou façons pouvant conduire à l'événement; peut survenir en moyenne une fois tous les 5 ans.
C	Possible	Devrait survenir à un moment donné; et/ou incidents peu fréquents, observés de façon occasionnelle ou peu de signes de manifestation possible; et/ou très peu d'incidents à l'intérieur d'organisations, d'installations ou de communautés associées ou comparables; et/ou quelques occasions, raisons ou façons pouvant conduire à l'événement; peut survenir en moyenne une fois tous les 20 ans.
D	Peu probable	Ne devrait pas survenir; et/ou pas d'incident enregistré ni de signes de manifestation possible; et/ou pas d'incident récent dans des organisations, installations ou communautés associées; et/ou peu d'occasions, de raisons ou de façons pouvant conduire à l'événement; peut survenir en moyenne une fois tous les 100 ans.
E	Rare	Peut survenir seulement dans des circonstances exceptionnelles; peut survenir en moyenne tous les 500 ans ou moins fréquemment.

Extent of Death	Extent of Injury
1 (0-4 people) 2 (5-10 people) 3 (11-25 people) 4 (26 + people)	1 (0-4 people) 2 (5-25 people) 3 (25-50 people) 4 (51 + people)
Evacuation	**Damages to Property**
1 (>10 people) 2 (10-50 people) 3 (51-100 people) 4 (100+ people)	1 (Minimal Damage) 2 (Local Damage) 3 (Local/Severe) 4 (Widespread/Severe)

Damage to Critical Facilities	Damage to Lifelines
1 (Temp Relocation) 2 (Closure few days) 3 (Loss 50% Capability) 4 (Permanent Loss)	1 (Temp Interruption) 2 (Interruption days) 3 (Interruption 1 week) 4 (Interruption greater than 1 week)
Damages to Environment	**Business Impact**
1 (Minimal Damage) 2 (Local Damage) 3 (Local/Severe) 4 (Widespread/Severe)	1 (Temp Impact) 2 (Temp/ Widespread) 3 (Extended/Widespread)

Consequences

Rank	FATALITIES	INJURY/ILLNESS	PSYCHOSOCIAL	SOCIAL CONNECTIONS	EVACUATION or SHELTER-IN-PLACE
None	Not likely to result in fatalities.	Not likely to result in injuries or illness.	Not likely to result in significant impacts to individuals' mental and emotional wellbeing.	Not likely to impact access to supports and networks. Trust and cooperation are unaffected.	Not likely to result in an evacuation shelter-in-place orders, or people stranded.
Low	Causes loss of life within the scope of normal operational capacity.	Causes injury/illness within the scope of normal operational capacity.	Localized, moderate and/or generally short-term impacts to individuals' mental and emotional wellbeing.	Likely to result in some localized reduced access to supports and networks. Trust and cooperation are affected.	A small or localized portion of the population is evacuated, sheltered-in-place, or stranded.
Med	Causes loss of life requiring extra emergency operations support.	Causes injury/illness requiring extra emergency operations support.	Significant but generally localized impacts to individuals' mental and emotional wellbeing, including long-term impacts.	Likely to result in reduced access to supports and networks. Trust and cooperation are affected.	A moderate and generally localized portion of the population evacuated, sheltered-in-place, or stranded.
High	Loss of life severe enough for mass fatality procedures to be activated.	Injury/illness requiring mass-casualty or other highly specialized plans and supports.	Widespread impacts to individuals' mental and emotional wellbeing, including long-term impacts.	Likely to result in significantly reduced access to supports and networks. Trust and cooperation are severely affected.	A large or widespread portion of the population is evacuated, sheltered-in-place, or stranded.
Circle:	None/Low/Med/High	None/Low/Med/High	None/Low/Med/High	None/Low/Med/High	None/Low/Med/High

CONSEQUENCE:
IMPACT AND VULNERABILITY

4: Very High
3: High
2: Low
1: Very Low

Consequence Score		
Score	Severity	Description
5	Catastrophic	Wide spread death and/or illness; Facilities permanently destroyed or disabled; Critical systems unavailable for extended periods; overwhelming financial implications; Other disastrous impact
4	Major	Some loss of life and/or illness reported; infrastructure impacted; Critical systems interrupted; significant financial impact; other major impact
3	Moderate	Hospitalization or injuries; localized damage to infrastructure; short term system interruption; moderate financial impact; other localized impacts
2	Minor	Medical treatments and minor injury; minor damages only; inconvenient system interruptions; some financial implications; other quickly resolved impacts
1	Negligible	Minor first ait incidents; no appreciable infrastructure impacts; negligible systems issues, resolved in day-to-day management; minimal financial loss;

Consequences

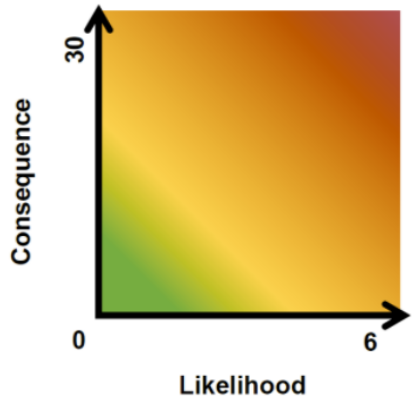
Rank	PROPERTY DAMAGE	CRITICAL INFRASTRUCTURE	ENVIRONMENTAL	ECONOMIC	REPUTATIONAL
None	Not likely to result in property damage.	Not likely to disrupt assets or services.	Not likely to result in environmental damage.	Not likely to disrupt business/financial activities.	Not likely to result in significant political or reputational impacts.
Low	Could cause minor, mostly cosmetic damage.	Could cause minor disruption of assets or services.	Could cause localized and reversible damage. Quick clean up possible.	Disruption of business/financial activities or the economy of the local area.	Likely to result in limited or short-term political or reputational impacts.
Med	Localized severe damage.	Could cause major but localized or short-term disruptions to critical infrastructure services.	Could cause major but reversible damage. Clean up difficult.	Could result in losses for a few businesses, some negative consequences for the economy of the region.	Likely to result in some significant or long-term political or reputational impacts.
High	Widespread severe damage.	Could cause widespread, severe, ongoing disruption of assets or services.	Could cause severe, irreversible damage. Clean up not possible.	Could result in losses for an industry, or severe economic impact in the region or province.	Likely to result in significant and/or lasting political or reputational impacts.
Circle:	None/Low/Med/High	None/Low/Med/High	None/Low/Med/High	None/Low/Med/High	None/Low/Med/High

Risk = Likelihood x Consequences

Likelihood: Low 1, High 6

Consequence: Low 1, High 30

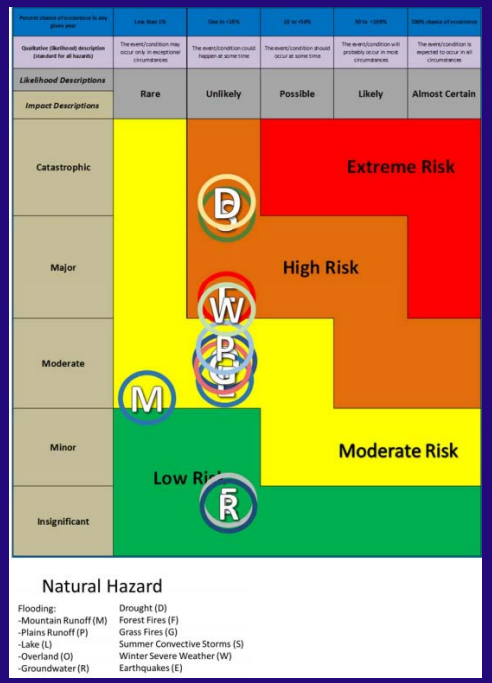
Ideally, final scores should be plotted on a simple graph, as shown below:



Likelihood	Consequence	Rating
1	1	1
3	15	45
5	30	150
1	30	30
6	5	30

PROBABILITÉS D'OCCURRENCE	CONSÉQUENCES				
	1 Négligeables	2 Mineures	3 Modérées	4 Majeures	5 Catastrophiques
A Presque certain	M	É	EX	EX	EX
B Probable	M	É	É	EX	EX
C Possible	F	M	É	EX	EX
D Peu probable	F	F	M	É	EX
E Rare	F	F	M	É	É

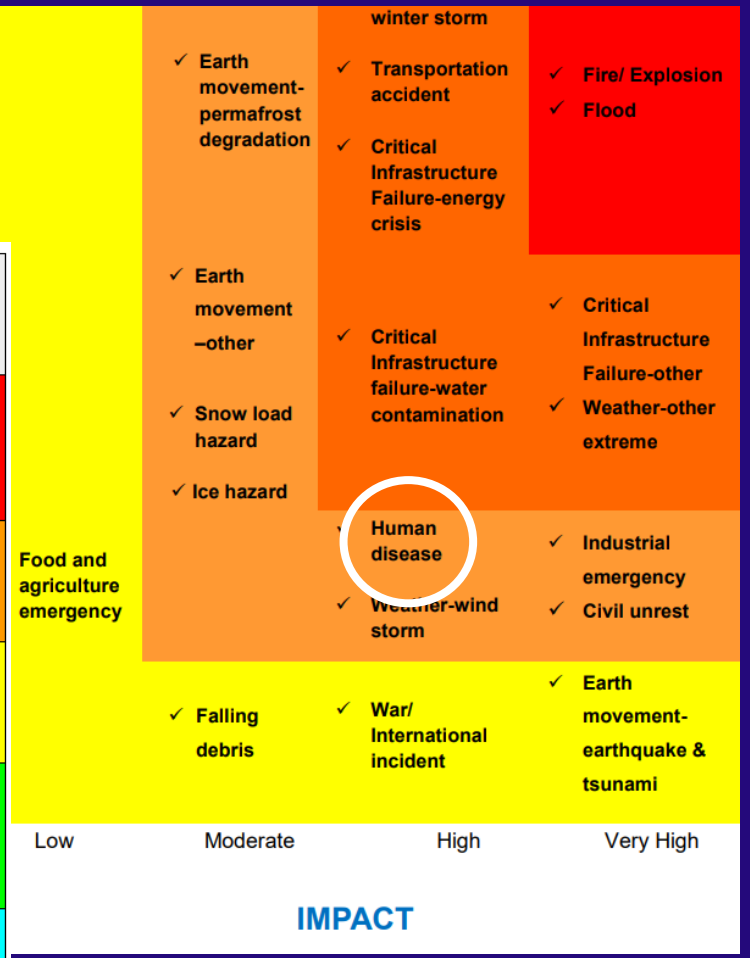
Findings

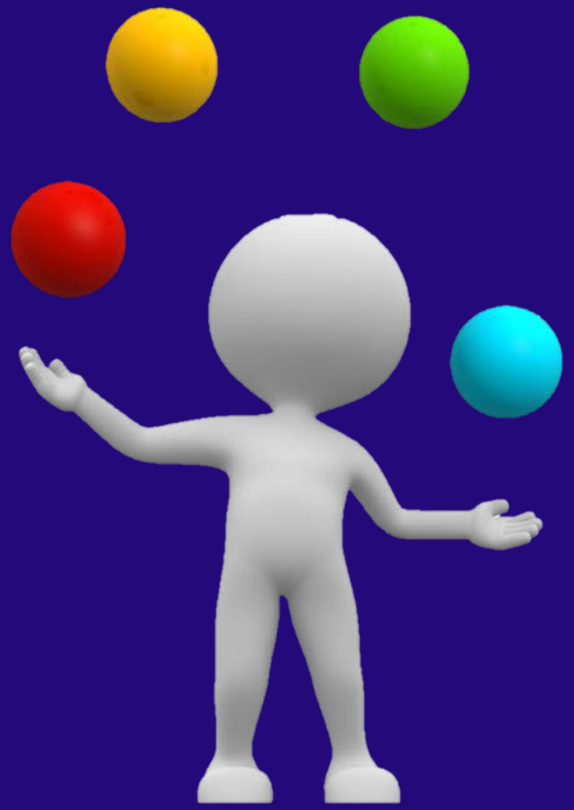


Natural Hazard Landscape Table			
Hazard	Likelihood	Consequence	Risk
Urban Interface Fire	4	5	20
Extreme Cold	5	3	15
Earthquake - Major	3	5	15
Snow/Blizzard	4	3	12
Drought	4	3	12
Earthquake - Minor	4	3	12
Wind Events	3	3	9
Lightning	3	3	9
Freezing Rain - Major	2	4	8
Smoke	4	2	8
Flood/Rain	3	2	6
Erosion	3	2	6
Hail	2	2	4
Freezing Rain - Minor	2	2	4

Level of Risk	Description	Hazards
>50	Extreme	Flood, Forest/Wildland Fire, Freezing Rain, Hazardous Materials Incident, Human Health Emergency, Snowstorm/Blizzard, Tornado
41 – 50	Very High	Drinking Water Emergency, Geomagnetic Storm, Oil/Natural Gas Emergency, Terrorism/CBRNE
31 – 40	High	Agricultural and Food Emergency, Critical Infrastructure Failure, Drought/Low Water, Nuclear Facility Emergency
21 – 30	Moderate	Civil Disorder, Cyber Attack, Earthquake, Human-Made Space Object Crash, Landslide, Transportation Emergency, Windstorm
11 – 20	Low	Building/Structural Collapse, Dam Failure, Explosion/Fire, Extreme Temperatures, Hurricane, Natural Space Object Crash, Radiological Emergency
<10	Very Low	Energy Emergency (Supply), Erosion, Fog, Hail, Land Subsidence, Lightning, Mine Emergency, Sabotage, Special Event, War and International Emergency

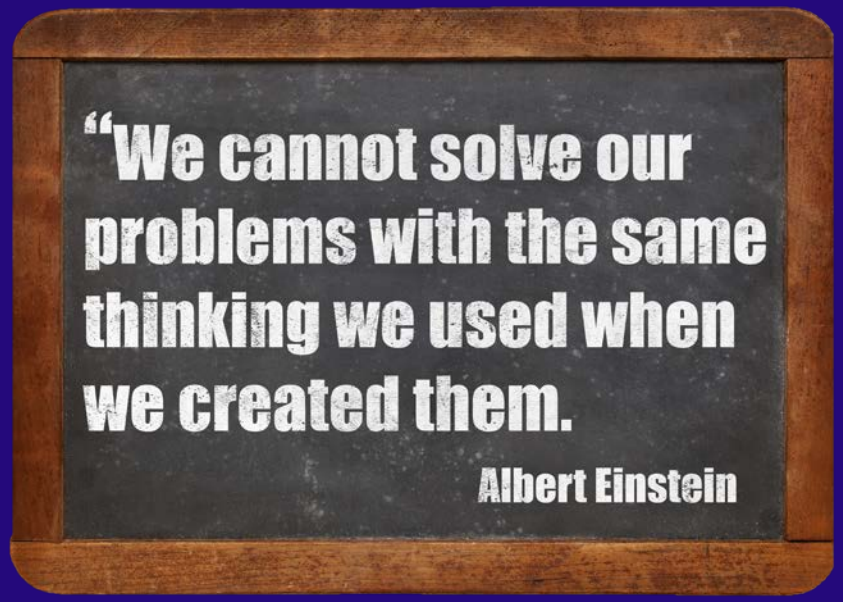
Risk Level of Hazard Using Frequency*Consequence*Changing Risk





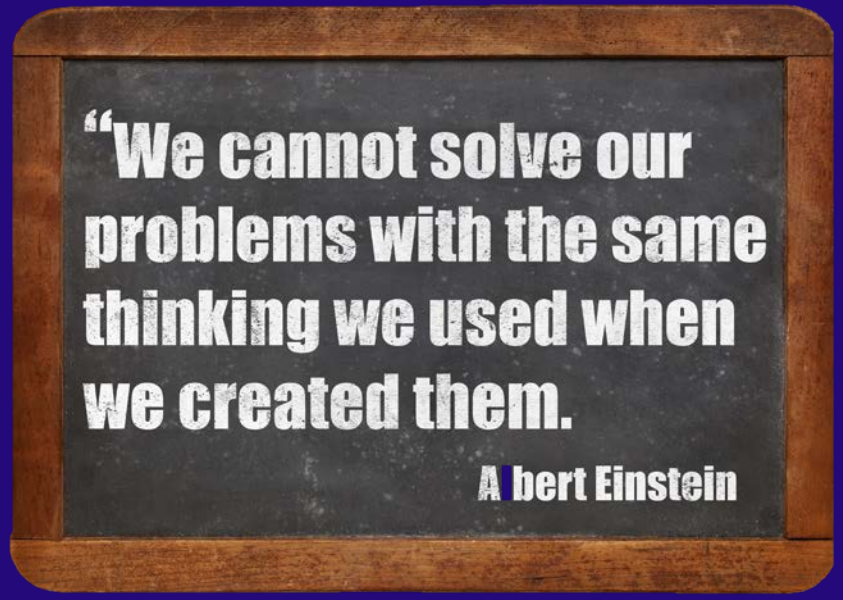
Risk Reality

“Someday it’s going to happen. And that could be 15 minutes from now or that could be years down the road.”



Risk Reality

- **Knowledge & Familiarity** - Here's what it is & let's talk about it
- **Control** – Here's what **YOU** can do; Here's what **We** can do
- **Catastrophic Potential** – Here's what can happen
- **Equity** – here's how we'll suffer



Risk Reality

""Access to accurate risk information, through an open and inclusive dialogue, is critical to informed decision-making.

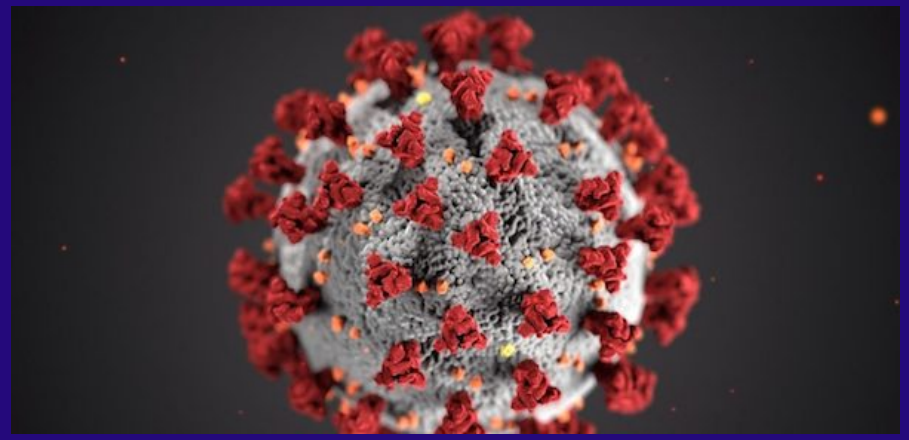
Information-sharing is essential to keep the population safe and enhance resilience. Robust, scientific risk assessments that incorporate the impacts of climate change and that take into consideration data on hazards, vulnerabilities, exposures, cultural differences, impacts and resilience factors, are crucial." PSC (2018)

The clock is ticking

YOU can do something about it

Reality

We can do something about it




Q&A


Thanks!

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