UL Standards & Engagement

Disaster Preparedness

Building the resilience of communities

Disaster preparedness

Disaster preparedness is a set of measures implemented in advance of governments, organizations, communities, or individuals to better respond and cope with the immediate aftermath of a disaster. The intent of disaster preparedness is to reduce the loss of life and livelihoods and plays an important role in building the resilience of communities.[1]

As population growth, rapid urbanization, climate change, environmental degradation and widespread poverty continue to increase, large populations become more exposed to disasters. To add, most of these disasters occur in already fragile or conflict-ridden regions of the world, leading to increased complexity of crises and overburdening some countries over others.[1]

Understanding the occurrence and frequency of natural hazards, as well as the risks, vulnerabilities and potential impact on people and assets, helps to improve preparedness.[1]

Initiatives can make an impact, like:

- Training for search and rescue
- Establishing early warning systems
- Developing contingency plans
- Stockpiling equipment and supplies

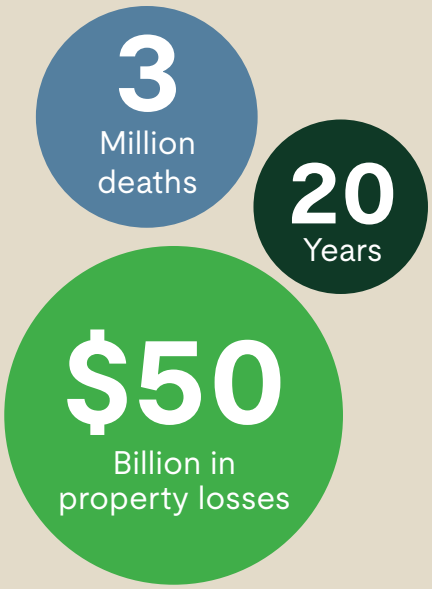
Natural disasters account for earthquakes, volcanoes, hurricanes, floods, and fires. Man-made disasters include war, pollution, nuclear explosions, fires, hazardous materials exposures, explosions, and transportation accidents.[3]

According to NASA and the Intergovernmental Panel on Climate Change (IPCC), climate models have provided evidence that an increase of greenhouse gases in the atmosphere will likely increase temperatures over most land surfaces which could lead to increased risk of drought and increased intensity of storms, including severe cyclones, extreme monsoons, and intense storms. Rising temperatures and warmer seas also means that there is more water vapor evaporating into the atmosphere, providing more "fuel" for hurricanes, typhoons, and torrential rain. These natural disasters can cause other detrimental issues like flooding, displacing millions residing in coastal regions.

"[A] major disaster occurs daily, and natural disasters needing international assistance occur weekly. Over the past 20 years, 3 million deaths and $50 billion in property losses have been attributed to disasters. With more people moving into disaster-prone areas—including earthquake zones, flood plains, and coastal areas in the USA—the risk will increase in years to come."

—Joseph Zibulewsky,

Department of Emergency Medicine, Baylor University Medical Center, Dallas, Texas; and the Division of Emergency Medicine, Department of Surgery, The University of Texas Southwestern Medical Center at Dallas



Climate change

Climate change refers to long-term shifts in the overall temperature of the Earth and its weather patterns through natural variations in the solar cycle and through human activities with massive and permanent ramifications.

What causes climate change?

Factors that cause the climate to change over long periods of time are known as climate drivers. There are three main climate drivers:

Volcanic activities

Large, unpredictable volcanic eruptions emit aerosols into the atmosphere, which cools the Earth's surface.

Solar variability

Changes in the amount of radiation emitted from the sun, or small changes in the Earth's orbit which can influence the amount of energy received from the sun.

Changes in the carbon cycle

Normally, there is a balanced give and take between oxygen produced by plants and consumed by animals and CO_2 released by animals and used by plants. When the amount of CO_2 and other greenhouse gases in the atmosphere increases, it has a direct, causal effect on changes in the climate.

Greenhouse effect

One of the main causes of climate change is called the greenhouse effect. Gases in the atmosphere like water vapor, carbon dioxide, nitrous oxides, methane, and chlorofluorocarbons let the sun's light in but prevents some of the heat from escaping. As we release more greenhouse gases into the atmosphere, more heat gets trapped, strengthening the greenhouse effect and increasing the Earth's temperature.

The main contributors to the greenhouse effect include:

1. **Fossil fuel burning**
   One of the largest pollutants of carbon emissions and contributors to smog (includes coal, oil, natural gas, gasoline)

2. **Animals**
   Excrement from cattle and other animals releases toxic gas like hydrogen sulfide, ammonia, and methane. Methane is 23 times more effective at trapping heat in the atmosphere than carbon dioxide

3. **Agriculture**
   Removal of plants/trees that naturally absorb carbon dioxide from the atmosphere

4. **Waste & recycling Pollution**
   Humans produce 11.6 trillion pounds of trash every year

36.3 billion tons
of carbon dioxide released into the atmosphere in 2021

Volcanoes
are the largest natural pollutant of the Earth

500 million tons
of volcanic carbon dioxide is released into the atmosphere every year

Climate risk and adaptation

Climate risk is made up of 3 components:

Hazard - potential occurrence of climate-related physical events that may cause damage or loss

Exposure - presence of assets, services, resources and infrastructure that could be adversely affected by a hazard

Vulnerabilities - the propensity or predisposition of a population to be adversely affected by a hazard*

Not all risks are the same with respect to the probability of when they will occur, how often they occur, or the severity they pose. Some climate risks have a ***high frequency*** coupled with low losses and other risks are those that are ***not as frequent*** but cause ***medium – high losses***.

Understanding the different levels of risks helps us decide the best approach to be applied for adaptation.

1	2	3
Planned adaptation (risk mitigation) High frequency and low losses	**Contingency adaptation (risk transfer)** Low frequency and medium-high losses	**Loss acceptance (coping)** Low frequency and very high losses (because of the low frequency)

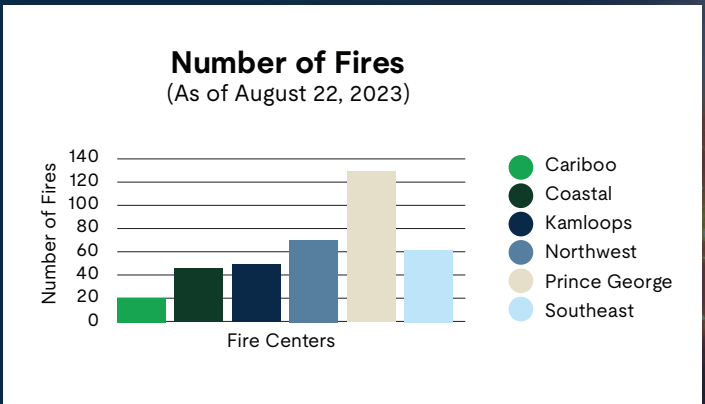
Planned adaptation can include a change in seasonal distribution of rainfall or slight increase in temperatures. Contingency adaptation can include droughts or loss of rain for extended periods of time.

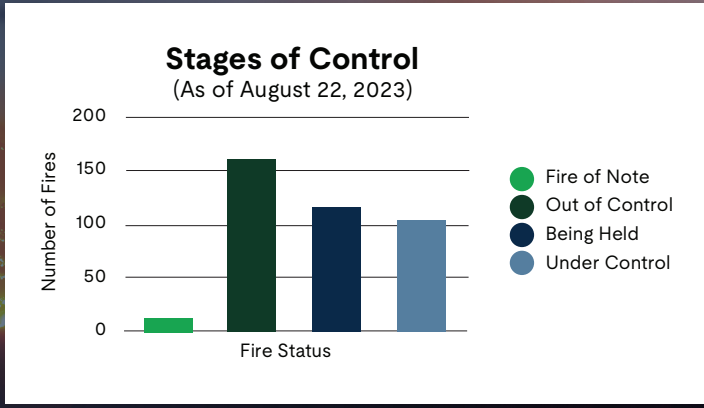
Loss acceptance, such as hurricanes and tornadoes, is the most difficult to invest any measures of protection. Countries can create mandates and regulatory frameworks (e.g., law, act, decree, standard) to guide institutions at the national level on: who is responsible for leading adaptation? What are the responsibilities of the different agencies at the national level? How will the work be funded?

*For example, subsistence farmers do not have enough resources and technology to adapt quickly to droughts or changes in seasonal patterns. They may not be able to quickly respond when there is no rainfall as opposed to farmers with sophisticated technology or irrigation systems. In this case, you can consider subsistence farmers more likely to be impacted by climate change than other types of farmers.

Where are we seeing disasters right now?

Kelowna, British Colombia





Source: British Colombia Wildfire Service (gov.bc.ca)

What causes wildfires in Kelowna?

There are two broad categories of causes:

Lightning

Lightning and other natural phenomenon cause approximately 60% of wildfires. When lightning strikes an object it can release enough heat to ignite a tree or other fuels. Although lightning caused fires cannot be prevented, there are ways of predicting where they might start. The risk from natural fires can also be reduced with fuel management and prescribed burning.

Human activity

Human activity causes approximately 40% of wildfires. The most important aspect about human-caused wildfires is that they are preventable. The easiest way to fight a wildfire is to prevent it from starting. There are several ways, either by accident or intentionally, that humans start wildfires:

- Vehicle and engine use
- Industrial activity
- Fireworks, sky-lanterns, outdoor flame lighting
- Discarding burning items, e.g. cigarettes

Stages of control	
Wildfire of Note	A wildfire that is highly visible or poses a potential threat to public safety.
Out of Control	A wildfire that is continuing to spread and is not responding to suppression efforts.
Being Held	A wildfire that is not likely to spread beyond predetermined boundaries under current conditions.
Under Control	A wildfire that will not spread any further due to suppression efforts.

Resources

- Prepare for Wildfires - Province of BC
- BC Wildfire Preparedness Guide
- BC Wildfire Map
- How to donate to wildfire recovery efforts

Where are we currently seeing disasters?

Hurricane Hilary - Pacific Coast of Mexico, Baja California, Southwestern United States

Hurricane Hilary was a Category 4 Pacific hurricane in August 2023 that brought torrential rainfall and gusty winds to the Pacific Coast of Mexico, Baja California Peninsula, and the southwestern United States, leading to widespread flooding and multiple mudslides.

The National Hurricane Center (NHC) issued unprecedented tropical storm warnings for southern California, extending from the Mexico-United States border to just north of Los Angeles.

Forecasting persistent heavy rainfall, potentially “more than a year’s worth of rain” in some areas, flood watches were issued, affecting about 26 million people in four states (Arizona, California, Nevada, and Utah), and the entire region was placed under a high-risk threat for flash flooding by the Weather Prediction Center (WPC).

Preparedness	Impact
Mexico	
• Storm watches and warnings • Hurricane watches and warnings • Schools/public events/beaches closed/canceled • Schools used as temporary shelters • Flight cancellations • 850 people evacuated	• 2 fatalities • Damage to Angostura, Badiraguato, Elota, and Salvador Alvarado • 1900 people evacuated to shelters
USA	
• Tropical storm watches and warnings • Excessive Rainfall warnings • Flood watches issued for California, Nevada, Utah, Arizona • Beaches and national parks closed • Evacuation warnings issued for municipalities and regions in California	• Flooded roads • Closed highways (Pacific Coast Highway) • State of emergency (Palm Springs) • 5000 residents without electricity

Where are we currently seeing disasters?

Yellowknife, Northwest Territories, Canada

Total active fires	239
New fires in the last 24 hours *(As of August 22, 2023)*	2
Fire receiving response	237
Fires declared out	36
Total fires in 2023	273
Hectares affected	3432616

NWT Guidance for Wildfires

Prepare

- Know the current danger and conditions
- Get permitted for fires not for warmth or food
- Reduce wildfire damage risks ahead of time at your home, cabin, or business
- Get ready to evacuate

Prevent

- Research safety tips on fire danger, campfires, burning brush and debris, cigarettes and smoking materials, vehicles, fireworks, target shooting

Protect

- Report smoke and fire
- Register your home, cabin, camp, or worksite to let local authorities know something you value is on the land

Resources
Wildfire Update | Environment and Climate Change
Yellowknife Live Wildfire Map | Environment and Climate Change
How to donate to wildfire recovery efforts

Where are we currently seeing disasters?

Hawaii – Maui Island

Wildfires on Maui Island, Hawaii were caused by dry, gusty conditions created by a strong, high-pressure area north of Hawaii and Hurricane Dora to the south of Hawaii. It was the fifth deadliest wildfire in U.S. history and most lethal wildfire in the country since 1918.

Resources

- Hawaii wildfire resource guide
- How to donate to wildfire recovery efforts

August 8th

- Emergency declaration (activation of Hawaii Natural Guard)
- Expenditure of general revenue funds for disaster relief
- Maui access blocked off – residents ran low on medicine, fuel, food, etc.

August 9-11

- State of emergency implemented
- ~20 people hospitalized at Maui hospitals
- 6 people transported by air ambulance to hospitals in O'ahu
- Federal Major Disaster declared by U.S. President, Joe Biden
- Unsafe water alerts issued
- 11,000 people evacuated from Maui (flights)

August 12

- 1400 people in Maui remained in shelters
- Warnings of potential for charred soils, toxic contaminated topsoil, and other debris to runoff into shoreline

August 17-18

- 60 survivors found alive sheltered in single home
- 67 people injured from fires
- Fire temperatures reported to have reached 1000° F (538° C) – hot enough to melt granite counters and aluminum

August 21+

- 115 confirmed deaths
- 850 individuals unaccounted for
- 2,200 buildings destroyed (96% residential)
- Loss estimated at $6 million
- Destroyed cell towers – service outages and 911 emergency telephone services unavailable
- Mass evacuations for thousands of residents and visitors

Countries participating in disaster preparedness observations

United States
National Preparedness Month
Ready.gov

Canada
About Emergency Preparedness Week
Getprepared.gc.ca

United Nations
International Day for Disaster Risk Reduction | Oct 13
Un.org/en/observances/disaster-reduction-day

United States

FEMA's Ready Campaign and Ad Council – Produced the first National Preparedness Campaign, was originally targeted towards the Latino community. Released during Hispanic Heritage month, the ads were centered around the Latino community's commitment to personal planning for occasions and family milestones as a bridge to also plan for disasters. This year, the national Preparedness Month campaign will feature a call to action for the Black and African American community. The Ready Campaign's 2023 National Preparedness Month campaign will focus on preparing older adults for disaster, specifically older adults from communities that are disproportionately impacted by all-hazard events which continue to threaten the nation.

Canada

Emergency Preparedness Week (EP Week) is a national event supported by Public Safety Canada, working closely with provincial and territorial emergency management organizations, Indigenous organizations, nongovernmental organizations, and private sector organizations supporting activities at the local level.

EP Week is an opportunity for Canadians to take action to ensure they are prepared to protect themselves, their family and their community during an emergency. This year, the theme is "Be Prepared. Know Your Risks." The intent of the theme is to encourage Canadians to understand the risks in their area and learn what actions they can take to protect themselves and their families.

United Nations

The International Day for Disaster Risk Reduction is an opportunity to acknowledge the progress being made toward preventing and reducing disaster risk and losses in lives, livelihoods, economies and basic infrastructure in line with the international agreement for reducing global disaster risk and losses[2].

Since 1989, this day has promoted a global culture of risk awareness and disaster reduction. It celebrates how people and communities around the world are reducing their exposure to disasters and raising awareness about the importance of reining in the risks that they face. Disasters hit hardest at the local level with the potential to cause loss of life and great social and economic upheaval. Sudden onset disasters displace millions of people every year. Disasters, many of which are exacerbated by climate change, have a negative impact on investment in sustainable development and the desired outcomes[2].

Resources

Below are standards, documents, and other resources to learn more about disaster preparedness, and how ULSE is working to reduce the effects and harm when disasters strike.

- Government of Canada: Get Prepared
- Public Safety Canada Emergency Preparedness
- City of Ottawa Emergency Preparedness

UL 2201, Carbon Monoxide (CO) Emission Rate of Portable Generators
Testing procedures and requirements applicable in determining the CO emission rate of a portable generator and in determining the shutoff capability of a portable extinguisher in elevated CO environments.

UL 2524, In-building 2-Way Emergency Radio Communication Enhancement Systems | Testing procedures and requirements applicable in determining the CO emission rate of a portable generator and in determining the shutoff capability of a portable extinguisher in elevated CO environments.

CAN/ULC S655, Standard for Aboveground Protected Tank Assemblies for Flammable and Combustible Liquids | Covers minimum requirements for shop fabricated aboveground protected tank assemblies that are used for the storage of flammable and combustible liquids with a specific gravity not greater than 1.0, that are compatible with the material of construction.

Other Standards Supporting Preparedness	
UL 1004-4	Standard for Electric Generators
ANSI/UL 1069	Standard for Hospital Signaling and Nurse Call Equipment
ANSI/UL 2560	Standard for Safety For Emergency Call Systems for Assisted Living and Independent Living Facilities

Other Documents Supporting Preparedness
An Emergency Management Framework for Canada
HSO 9002:2020 | Emergency and Disaster Management
NFPA 1600® | Standard on Continuity, Emergency, and Crisis Management

Standards & Engagement

[1] Disaster preparedness (europa.eu)
[2] International Day for Disaster Risk Reduction | United Nations
[3] Defining disaster: the emergency department perspective - PMC (nih.gov)
[4] Is climate change causing more extreme weather? | Zurich Insurance