

# Flood risk

is increasingly challenging to insure,  
leaving many businesses unprotected



As one of the most frequent and severe natural hazards, floods are among the most challenging risks to insure. The growing accumulation of assets in floodplains and coastal zones, combined with the expected impact from climate change on rainfall patterns and sea levels will increase future losses, imposing greater risk on communities, businesses and infrastructure.

**New insurance solutions, such as parametric insurance, are needed to better protect governments, companies and populations from flood hazards.**

## Flood risk is not monolithic - corporate & public sector exposure depends on a variety of factors

The European Union's Floods Directive defines flood as the covering by water of land not usually submerged by water. Whereas, the US National Flood Insurance Program (NFIP) has established a legal definition for flood as 'a flood is a general and temporary condition where two or more acres of normally dry land or two or more properties are inundated by water or mudflow'.

Natural disaster events have increased by

**151%** in the past two decades,

of which **43%** were categorized as flood events

## Floods can take different forms depending on the cause:

### Coastal Floods

Caused by strong winds or storms. Coastal flooding is most extreme when combined with high tide. This category also includes tidal flooding, a temporary inundation of low-lying areas during exceptionally high tide events, such as full and new moons.

### Flash Floods

Fast-flowing bodies of water that sweep away everything in their path. These floods usually cover a relatively small area and occur within minutes of rainfall but generally last no longer than six hours. They are most commonly the result of heavy rain or rapid snowmelt.

### Fluvial Floods

Characterised by gradual riverbank flooding caused by extensive rainfall over an extended period.

### Groundwater Flood

Occurs when groundwater levels continue to rise above the standard level.

### Pluvial floods

Occur when extreme rainfall saturates drainage systems. As a result, the excess water cannot be absorbed. Urban floods are surface floods that occur when a city's drainage system cannot absorb the heavy rainfall, often causing significant structural damage.

Flood Risk is defined by three components: a source of the flood, a pathway for the flood, and an asset affected by the flood. Without a path connecting the source of the risk to the asset, a flood remains solely a natural hazard. The combination of these three elements can cause severe damages, disrupting an entire supply chain network of manufacturers, distributors, warehouses and retailers for days or even weeks as seen with the Thai Floods in 2011 and Hurricane Katrina in the US in 2005. Climate change and the world's population growth will further exacerbate flood risk and significantly influence future loss trends. This is where alternative risk transfer solutions come into play.



## Climate change will cause a substantial shift in where and how precipitation fall.

According to the United Nations Office for Disaster Risk Reduction (UNISDR), 91% of all natural disasters recorded between 1998 and 2017 were caused by extreme weather events, with reported losses rising by 151% over those two decades. Floods are responsible for 43% of these events, making them the most frequent climate-related and severe disaster events worldwide. The UNISDR estimated that between 1998 to 2017, flooding (storm not included) affected over two billion people globally with associated economic losses of USD 656 billion. According to the Aon Climate Report, in 2020 alone, floods caused a high number of deaths and extensive damages around the world. The most severe was the Yangtze River Basin floods in China, which caused economic damages of USD 35 billion. Climate change will further aggravate and alter the flood patterns around the globe.



**Key trends affecting flood risk also include rapidly increasing urbanization and changes in site hydrology due to increasing impervious cover.**

In 1800, only two percent of the world's population lived in cities, but by 2050 more than two-thirds of the world's population are predicted to live in extensive urban areas. Urbanization reduces the ability of the land to absorb rainfall through the introduction of impermeable surfaces. These surfaces, such as roads, buildings and pavement, cause less rain to be soaked up by vegetation and instead flow straight into rivers. This results in an increase in flood risk at the surface as less water infiltrates into the ground. These significant and often rapid changes in soil properties make it difficult to insure flood risk due to a lack of historical data in newly urbanized areas, which are needed to better model for potential flood risk.

### 2050 Urban vs Rural divide



Based on data collected by the Centre for Research on the Epidemiology of Disasters, there is clear evidence that the number of flood events is increasing. They measured that the average number of reported flood events per year increased from under 30 between 1971-80 to approximately 50 between 1981-1990 to over 140 between 2011 and 2015.

## Average Number of Reported Floods per year:

1971-1980

less than  
**<30**

1981 -1990

**50**

2011 - 2015

More than  
**140**



## ➤ Sample 2020 Nat Cat Loss Events

<u>TIMEFRAME</u>	<u>EVENT</u>	<u>LOCATION</u>	<u>ECONOMIC LOSSES (USD)</u>	<u>INSURED LOSS (USD)</u>
JUNE - SEPTEMBER	Flooding	China	35 billion	2 billion
AUGUST 21 - 19	Hurricane Laura	US Plains	18 billion	10 billion
AUGUST 8 - 12	Severe Convective Storm	Midwest	12.6 billion	8.3 billion
FEBRUARY 9 - 10	Windstorm Ciara	Europe	2.7 billion	2.1 billion
JULY 3 - 15	Flooding	Japan	8.5 billion	2 billion
JUNE - SEPTEMBER	Flooding	India	7.5 billion	0.8 billion

Source: 2020 Aon report on Weather, Climate & Catastrophe Insight

# Meeting flood challenges in critically exposed markets

## United States - Australia - United Kingdom

Australia, the UK & the United States are particularly critical markets for flood risk - each has developed a unique approach combining risk transfer and insurance solutions to tackle the threat of floods.



## Australia

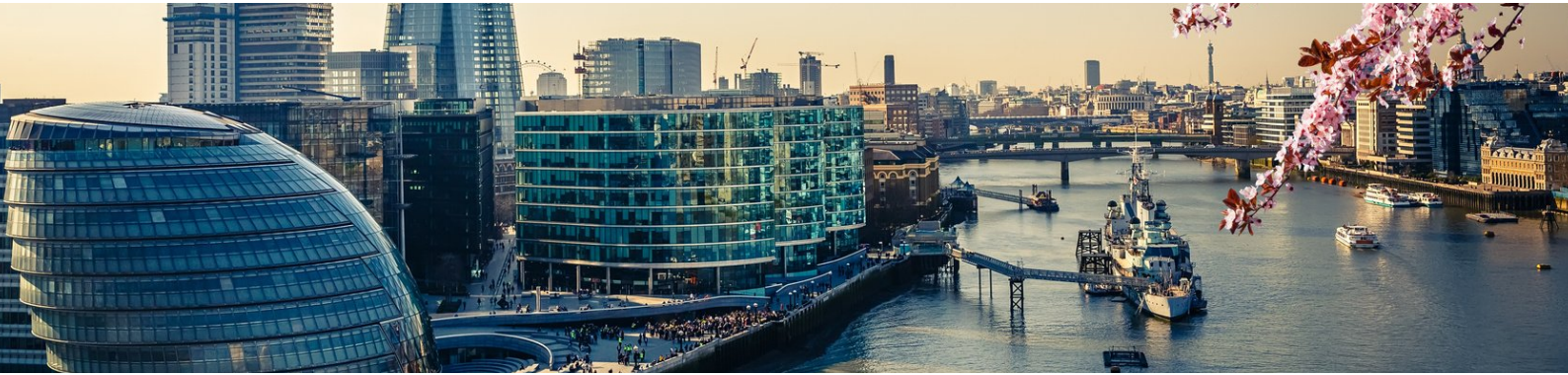
Australia is exposed to coastal, fluvial and pluvial flooding and is particularly vulnerable to coastal flooding from storm surges, tropical cyclones, tsunamis and sea-level rise. When looking at both tangible and intangible losses, flooding is Australia's costliest natural hazard-related disaster. In addition, climate change is predicted to increase the frequency and severity of extreme rainfall events in some parts of Australia.

Flood insurance is available to businesses in all parts of Australia, introduced by the private insurance market in 2007 and standardised by a common definition of flood in 2012. Flood insurance pricing is risk-based. The insurance industry is a strong proponent of land use planning improvements and risk reduction programmes. In addition, the insurance industry, primarily through the Insurance Council of Australia, has been an integral part of a multi-stakeholder engagement that has led to improvements and a better understanding of flood risk in Australia.

In terms of tangible & intangible losses -  
**flooding is Australia's costliest  
natural hazard-related disaster.**

**Businesses that recover quickly are those that have planned in advance. They know what they need to do as soon as a disaster strikes, & most importantly, they have purchased the proper insurance to finance their recovery.**





# United Kingdom

In the United Kingdom

## >300,000

commercial properties

are exposed to flood risk

Flooding has always played an important role in the UK's history.

As an island nation with coastlines, rivers and mountains, it is particularly exposed to fluvial, coastal and pluvial flooding, causing significant damages and losses to communities and businesses. Population growth and economic and urban development on floodplains, driven by a shortage of land, are among the primary risk-enhancing factors. For example, the river Thames is the largest area of undefended, developed floodplain in England. Due to the slow rise and fall of the river's water level, assets can be flooded for days or even weeks. Over the past 100 years, there have been multiple severe floods in this area.

The UK climate change projections estimates that in winter, the country's daily average rainfall could increase by approximately 41% by the year 2050. As a consequence, peak river flows could increase by around 50%. This will increase the severity and intensity of flooding for communities, businesses & infrastructure. According to the UK government, the economic impact of a major flood event is currently estimated around GBP 1 billion. However, due to climate change, the damage could be twice as high by 2055.

By 2050 in the UK,

average daily rainfall  
could increase by **41%**

while peak river flows  
could increase by **50%**

While the UK has Flood Re, a government-sponsored flood reinsurance program for home insurance, companies are excluded from this scheme. With over 300,000 commercial properties estimated at flood risk, corporations need to find a suitable solution in traditional or parametric insurance to protect themselves from flood.



The severe winter floods of 2015/2016 showed what a devastating impact floods can have on businesses & infrastructure in the UK. Most companies can save up to 90% on the cost of lost stock and moveable equipment by taking action to prepare for flooding in advance.

Between 2010 and 2018,  
the annual cost of flood damage was

# United States

# \$17 billion

across the United States



**The US is exposed to many flood hazards, including overflowing rivers, coastal storm surges, storm events that exceed local runoff, flash floods in steep terrain, and flood protection infrastructure failures.**

Historically, American cities have been built near waterways such as coasts and rivers for transportation and power generation, naturally exposing those cities' businesses and infrastructure to flood risk.

Flood risk in the US is projected to grow over the coming decades due to an increasing concentration of people and assets in flood-prone areas, less safe development practices, wildfire events and changes in land use. According to the Federal Emergency Management Agency (FEMA), between 2010 and 2018, the annual cost of flood damage in the US was around USD 17 billion. This number is expected to rise with changing precipitation, storm patterns, climate change driven sea level rise, and ageing infrastructure.

**According to FEMA:**

**40%** of small businesses never reopen their doors after a flood disaster & of those who do

**50%** fail within the next two years

The National Flood Insurance Program (NFIP) is the country's primary source of flood insurance. Flood insurance rate maps are central to NFIP insurance operations, dividing the country into various flood zones, including Special Flood Hazard Area (SFHA) and non-SFHAs. As of May 2020, the NFIP had just above 5 million flood policies in force, with a value of USD 1.33 trillion, a fraction of the total value of properties with flood exposure. A recent First Street study estimates the economic damage caused by flooding will grow by 61 percent over the next 30 years, to an average estimated total loss of USD 32.3 billion.

## Private Insurance -

### Flood Risk is becoming the 'new normal' for corporates

Historically, the number of private insurers offering flood protection has been limited worldwide, but the small private market is growing. This is partly due to recent improvements in modelling and risk analysis, enabling insurers to understand flood risks and loss profiles better. Nevertheless, insurers continue to face three main obstacles in providing flood insurance:

- 1 Flood risk is not perfectly understood due to a lack of reliable historical flood data, meaning insurers are unable to price the risk accurately. As more historical flood data becomes available over time, insurers' risk appetite for flood risk is expected to increase.
- 2 Another challenge for insurers is adverse risk selection, where a disproportionately high percentage of policies are purchased by insureds with the highest exposure.
- 3 Finally, some countries (e.g. France, Belgium, Spain) with monopolistic government-backed flood insurance programs do not permit risk-based premiums, preventing the development of a private insurance market covering flood risk.

**Thankfully, newer risk transfer solutions are on the rise such as parametric flood insurance which address some of these challenges left open by the traditional market.**

# Parametric flood insurance – a risk transfer tool gaining traction for corporate resilience

As flood risk grows and traditional insurance market capacity continues to decrease, parametrics offer corporates risk mitigation options. Parametric insurance policies, as offered by Descartes Underwriting, provide an efficient approach to insuring flood risks. Unlike traditional insurance policies, parametric insurance products do not require loss adjustment after an event because they automatically pay out if a pre-agreed trigger has been met, such as;

● **River Water Height** ● **Amount of Rainfall** ● **Windspeed**

**Immediate pay-out allows the policyholder to recover and rebuild quickly**

Descartes Underwriting uses a new generation of data sources to build advanced hydrologic models to better understand client's flood risks, providing brokers and corporates with precise, customized flood protection.

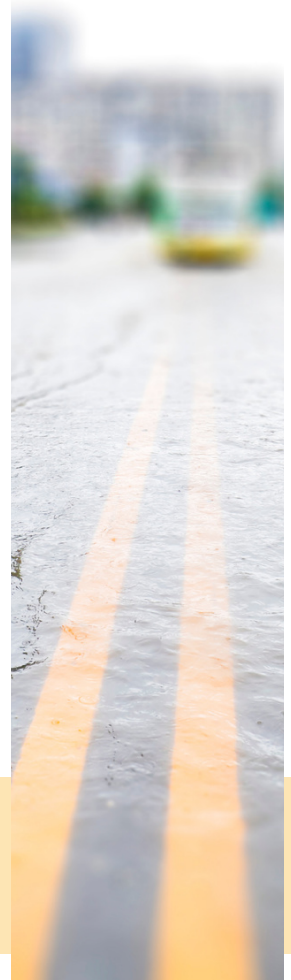
The wide range of parametric solutions allows for a variety of protection measures that can be adapted to the individual needs of a company and the public sector. Parametric solutions can be used as the first line of defense against flood risk or as an additional layer to complement an indemnity based policy already in place, helping to close the protection gap.

Parametric insurance also helps address other flood risk challenges. For example, a parametric solution can adapt to evolving risk in real-time by using river monitoring data, satellite rainfall data & IoT. This provides enhanced risk protection for businesses or public sector clients.

Descartes' solutions are uniquely designed to address the key pain points of a client's locations and exposures around the globe. Suppose a company opts for prevention and damage limitation measures, such as flood protection walls. In that case, parametric solutions are the only tool that can incorporate such measures into the design of the insurance cover, reducing the cost of the company's insurance protection.

Given its advantages over the standard indemnity policies, parametric insurance is becoming more commonplace in protecting industries and businesses from catastrophe and weather-related losses. As a result, there has been a significant increase in the number of clients seeking to supplement or even replace the existing risk-transfer program with parametric structures to improve cash flow following a loss event.

**Parametric solutions are currently the only risk transfer tool that offer a comprehensive approach to risk management by taking into account the complexity of business interruption structures within today's companies, especially when it comes to non-damage business interruptions.**





A photograph of a river that has overflowed its banks, with muddy brown water surrounding a house and trees in a lush green area.

Interested in learning more about  
our parametric flood insurance?

**Contact us!**

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