

# What would it cost?

Wildfire risk is increasing and with it demand for quality catastrophe modelling to enable insurance markets to further develop

The UN predicted that wildfires will increase in number by 14% worldwide by the end of this decade, in a report published to coincide with its meeting in Nairobi in February.

Meanwhile, insured US wildfire losses have topped \$12bn in three of the last four years, according to a report published by brokerage Aon in October 2021.

More encouragingly, in January the American Academy of Actuaries produced a report whose thrust was to encourage wider and more effective use of catastrophe modelling for wildfire risk.

It noted that mitigation and prevention measures can reduce wildfire risk substantially.

## What the modeller says

We asked KCC to model what would happen if a wildfire hit Santa Barbara. KCC principal scientist Dr Chris Burke outlined several factors impacting this specific hotspot of exposure.

Santa Barbara on the Pacific coast has the Santa Ynez mountains directly to the north. Much of the vegetation in the surrounding areas is the shrub chaparral, like many other wildfire-prone areas in southern California.

Similar fuels were prevalent in historical blazes including the nearby Thomas Fire in 2017 and Woolsey Fire in 2018.

Unique to Santa Barbara is a phenomenon known as “sundowner winds”. These are similar to downslope winds like the Santa Ana winds, but they are specific to Santa Barbara’s unique position along an east-west-oriented coastline, and they can greatly accelerate the spread of fire.

On a typical day, offshore draining winds flow down from the Santa

Ynez mountains in the evening when air flows from the north out to sea, and the reverse happens in the morning.

However, when a high-pressure system sets up to the north of the mountains, the onshore flow is suppressed and the downslope winds are enhanced, causing a sundowner event.

Sundowner winds are often warm and dry. They are associated with abnormal drops in relative humidity and rises in temperature. They often begin in late afternoon or early evening, hence the name.

## The loss profile

The KCC US Wildfire Model includes many potential fires impacting Santa Barbara with a wide range of loss estimates. For this analysis, KCC scientists selected a \$20bn loss event, which is around a 50-year return period wildfire loss for California.

The ignition point lies to the north of Santa Barbara in the San Rafael mountains.

Initially driven by downslope winds, the fire spreads quickly to the southwest towards the Santa Ynez valley, where it spreads and elongates to the west. At this point, the fire climbs the northern face of the Santa Ynez mountains and then is driven towards Santa Barbara by a sundowner wind event.

In fact, it is typical for sundowner winds to occur after Santa Ana wind events.

Because of the high wind speeds and the fact that the fire is already surrounding Santa Barbara as it approaches the city, there is less chance of suppression efforts having a significant impact.

Note that while the blaze surrounds the entire city of Santa Barbara, the spread of fire into the city and towards the coastline is limited by the lack of wildland fuels within the city itself.

However, points within the city which are not directly burned can still be affected by branding from embers transported from the fire,

