ICEYE

THE MOST IMPACTFUL FLOODS OF 2022

Based on our internal analysis criteria and our current customer base's interest until 30 November 2022.

www.ICEYE.com

CONTENT

INTRODUCTION

Floods are one of the most frequent and costly natural disasters. According to the SwissRe Institute[1], natural catastrophes caused an estimated USD 115 billion of insured losses in 2022 to date, which is well above the 10-year average of USD 81 billion. Even in the United States or Europe, where insurance penetration is typically high, flood risk is seriously underinsured. To put this into context, it is estimated that Hurricane Ian alone caused insured losses of USD 50–65 billion, making it the single largest loss-causing event of 2022.

Multiple factors drive this steep increase in losses, including urbanisation and climate change. The earth's lower atmosphere is becoming warmer and moister, which increases the severity of storms and floods. We see heavier rainfalls, rivers overflow, and flash flooding affecting areas where there isn't generally a water body. Alongside these climate-related challenges, we've got aspects that relate to the world we live in - where we build and house people.

As these factors increase society's vulnerability to floods, ICEYE's observation data became essential for improving resilience, disaster response, and better flood risk management in 2022.

The ability of our synthetic aperture radar (SAR) technology to pick up the tiniest of changes on the ground - and to gather detailed and dynamic information through cloud, smoke and at night - opens up many compelling use cases for emergency management and the P&C insurance industry.

With our in-house team of meteorologists and forecasters, ICEYE constantly monitored the atmospheric conditions likely to give rise to flood events throughout the year. Combining this with high-resolution SAR imagery, third-party data, algorithms and machine learning, we can provide a view of what is likely to happen two or three days before an event.

Then, when the waters do rise, our near real-time insights assist public sector organisations in targeting their response and allocating resources effectively, as well as help insurance carriers communicate with their customers and understand where payments should go. This eBook looks at the 9 most impactful floods of 2022, based on our internal analysis criteria and our customer base's interest until 30 November 2022.

IN 2022...

48 ANALYSES PERFORMED IN 12 DIFFERENT COUNTRIES

463 POTENTIAL FLOOD EVENTS MONITORED

7533 SATELLITE IMAGES OF POTENTIAL FLOODING CAPTURED

[1] *Source: https://www.swissre.com/press-release/Hurricane-Ian-drives-natural-catastrophe-year-to-date-insured-losses-to-USD-115-billion-Swiss-Re-Institute-estimates/2ab3a681-6817-4862-8411-94f4b8385cee*

NORTH AMERICA

"ICEYE'S DATA SIGNIFICANTLY IMPROVES THE ABILITY TO MONITOR WEATHER EVENTS AND THEIR IMPACTS ON COMMUNITIES WHILE SERVING AS A KEY INPUT TO NLT'S DISASTER RESPONSE MODELS, REVOLUTIONIZING THE SPEED AND ACCURACY OF THE ANALYTICS WE SUPPLY TO OUR CUSTOMERS"

DR. RAN GOLDBLATT
CHIEF SCIENTIST
NEW LIGHT TECHNOLOGIES

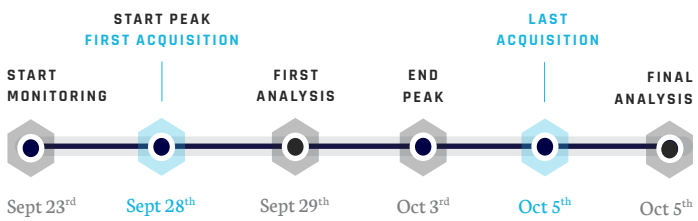
TALK TO OUR SALES TEAM ABOUT OUR FULL NORTH AMERICAN FLOOD ANALYSES

- Hurricane Ian in Florida, US - (Sep)
- Hurricane Fiona in Puerto Rico - (Sep)
- Flash Flooding in Kentucky, US - (Jul)
- Flooding in the Red River Basin, US & Canada - (Apr)
- Flooding in Washington State, US - (Jan)

FLOODING FROM HURRICANE IAN IN FLORIDA, US

SEPTEMBER 2022

FLOOD BRIEFING SERIES POWERED BY MULTISOURCE DATA ANALYSIS LEVERAGING ICEYE SATELLITE IMAGERY

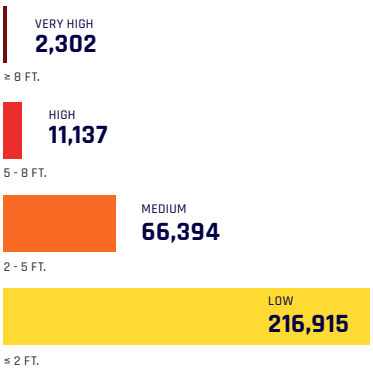


1,937 SQ MI (6,499 KM²)
total flood extent across Florida

1.32 FT (0.40 M)
average depth at building level

TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

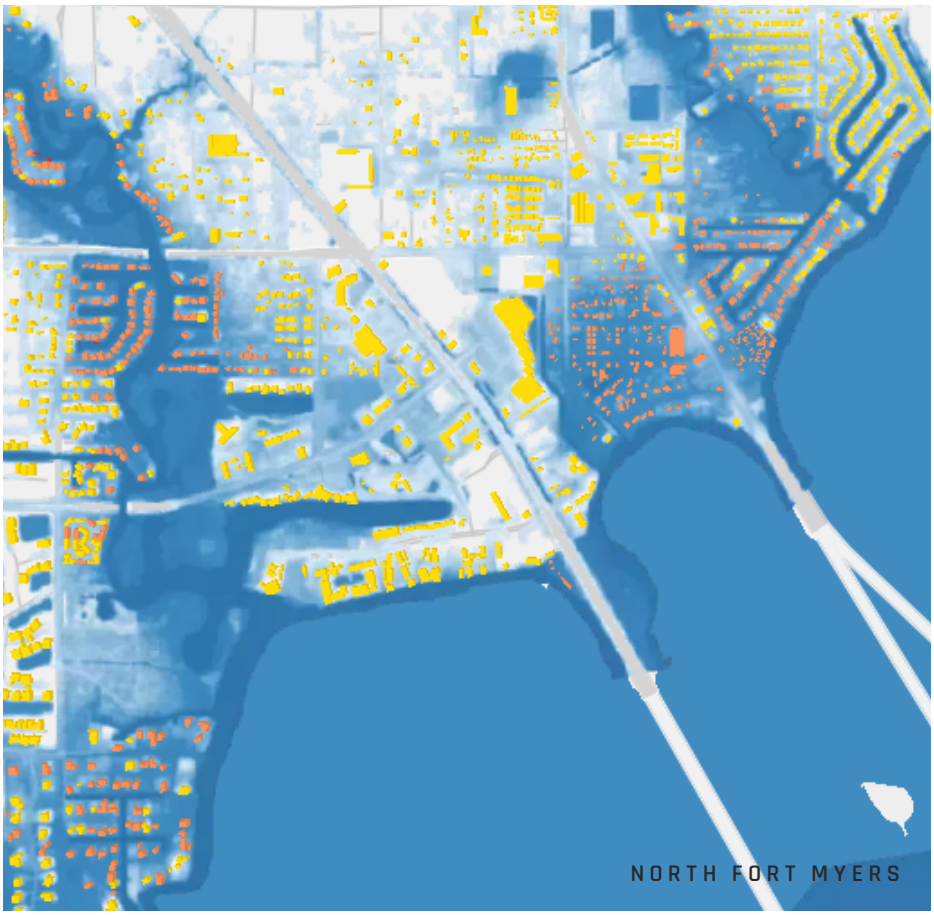
FLORIDA: **296,748**



Hurricane Ian moved across Cuba on September 27th as a strengthening hurricane, and became a powerful Category 4 hurricane on September 28th. As the storm moved toward the US's third most-populous state, Florida, millions were urged to evacuate[1]. In Key West, nearly 2.5 feet of storm surge flooding was observed as Ian passed by to the west. Catastrophic storm surge impacts were observed in Southwest Florida as Ian made landfall. As part of that, at least 6 feet of storm surge flooding has been observed from Naples to Fort Myers.

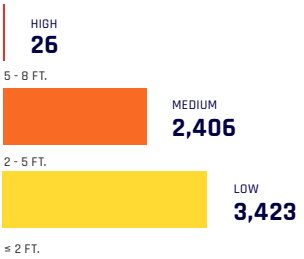
As Ian moved inland, it caused significant freshwater flooding with 10-20 inches of rainfall across central Florida. The flooding on some of the rivers in central and northeast Florida continued for several days, while the storm made a second landfall in South and North Carolina.

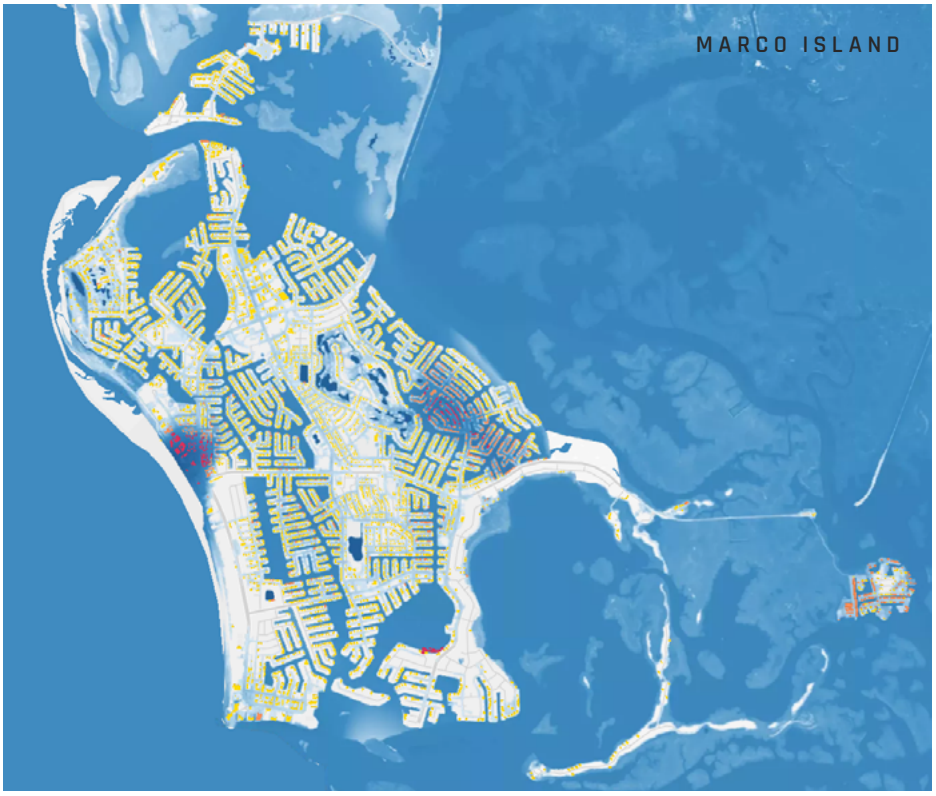
[1] *Source:: https://www.washingtonpost.com/nation/2022/09/28/hurricane-ian-florida-evacuations/*



TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

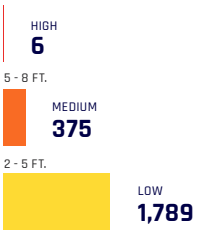
NAPLES: 5,855





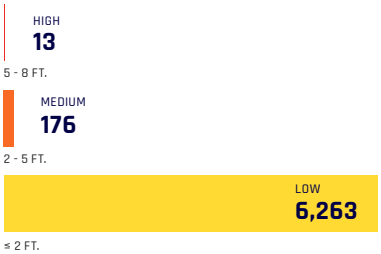
TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

NORTH FORT MYERS: 2,170



TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

MARCO ISLAND: 6,452



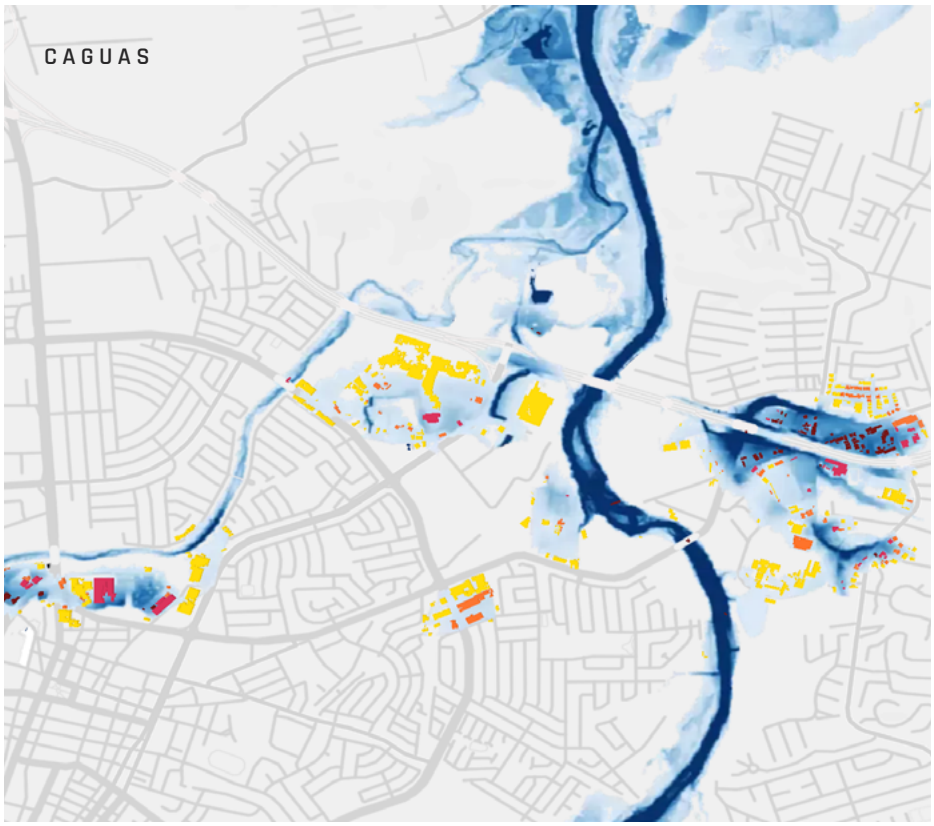
Building footprint credit for FEMA USA Structures database

Disclaimer: The impact numbers are subject to change as ICEYE continues to analyze the flood and extend the analysis area. The current data is based on ICEYE's analysis with information collected until 10.00 UTC on October 5th 2022. Some areas which have been impacted by the flooding may not be represented in this initial data.

FLOODING FROM HURRICANE FIONA IN PUERTO RICO

SEPTEMBER 2022

DATA RELEASE 5: FLOOD BRIEFING SERIES POWERED BY MULTISOURCE DATA ANALYSIS LEVERAGING ICEYE SATELLITE IMAGERY



53.2 SQ MI (137.8 KM²)
total flood extent

5.87 FT (1.79 M)
average depth at building level

AFFECTED LOCATIONS
Arecibo, Florida, Imbéry, Barceloneta, Guayama, Juana Díaz, Ponce, San Juan, Coco, Salinas

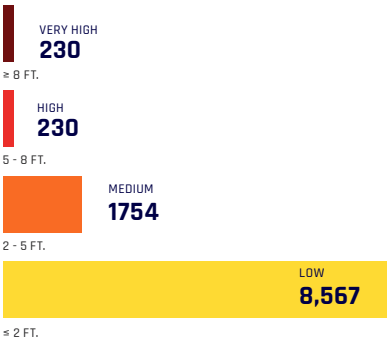
Impact numbers based on initial release of ICEYE's Flood Insights

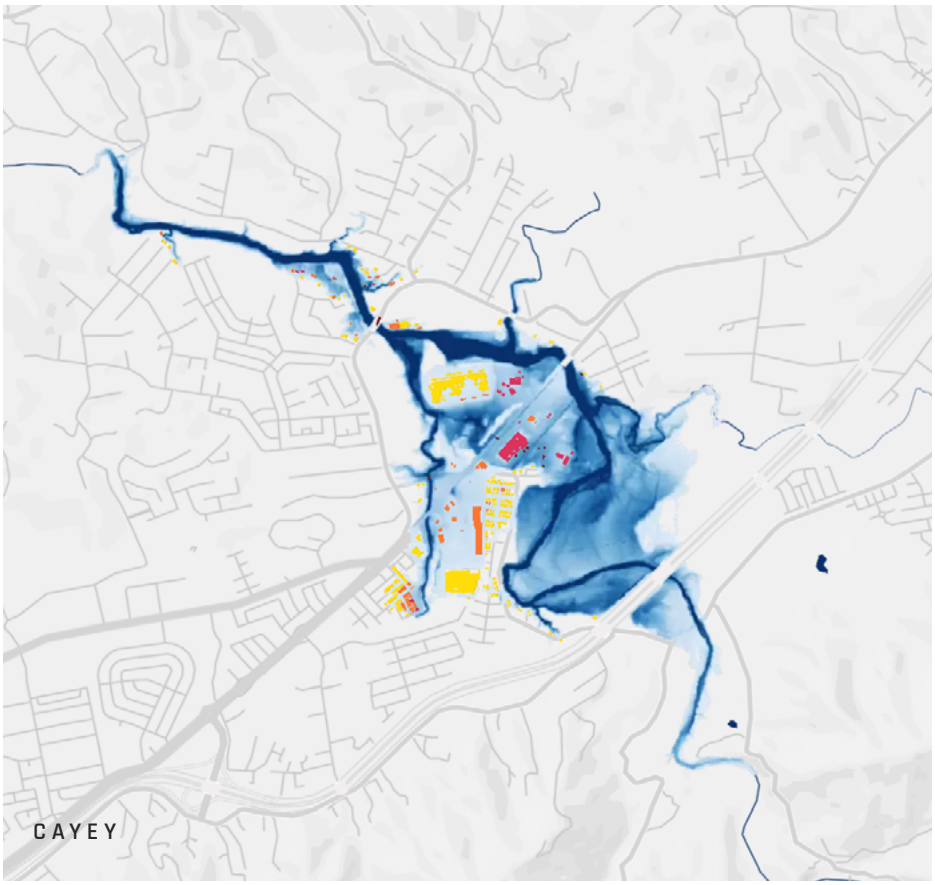
Initially a tropical depression before entering the Caribbean Sea, Fiona strengthened into a hurricane as it moved toward Puerto Rico on September 18th. Over the next 2 days, it brought torrential rains to the island with a widespread 10-20 inches observed and even a couple spots above 30 inches. This led to significant flash flooding and mudslide issues, accentuated by the hilly and mountainous terrain of the island. At least 2 people have died and some 1.000 had to be rescued, while the flooding also caused a complete power outage for the 3.3 million people living on the island. The storm also brought significant impacts to the U.S. Virgin Islands, Dominican Republic, and Turks & Caicos -- and eventually even Atlantic Canada, devastating parts of Nova Scotia and Prince Edward Island.[1]

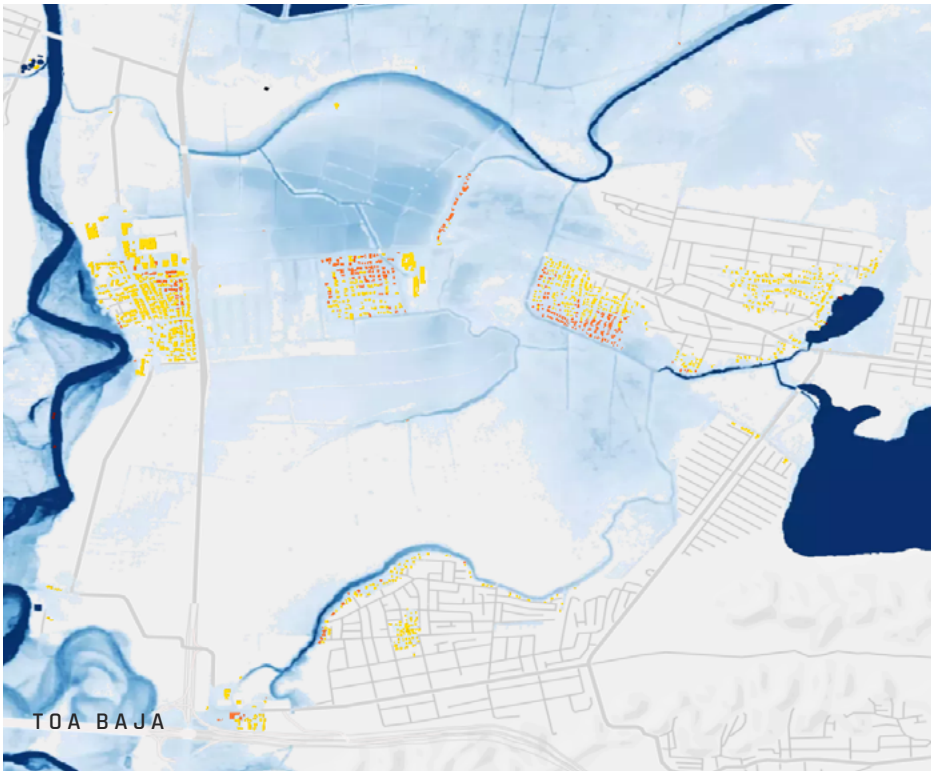
[1] *Source: https://www.bbc.co.uk/news/world-us-canada-62947900*

TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

EASTERN PUERTO RICO: 10,781



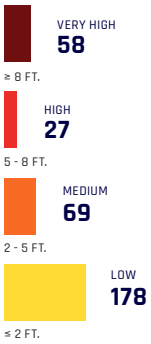




Disclaimer: The current analysis is focused on data specific to the regions most affected by the floods. Some areas which have been impacted by the flooding may not be represented in the data.

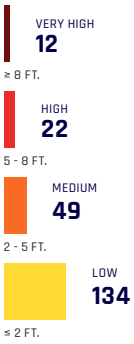
TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

CAGUAS: 332



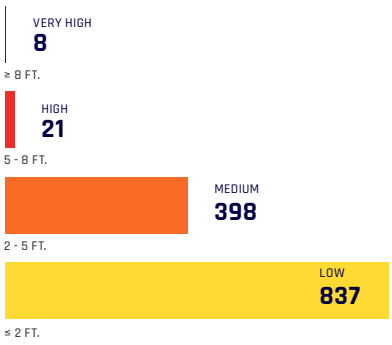
TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

CAYEY: 217



TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

TOA BAJA: 1,264

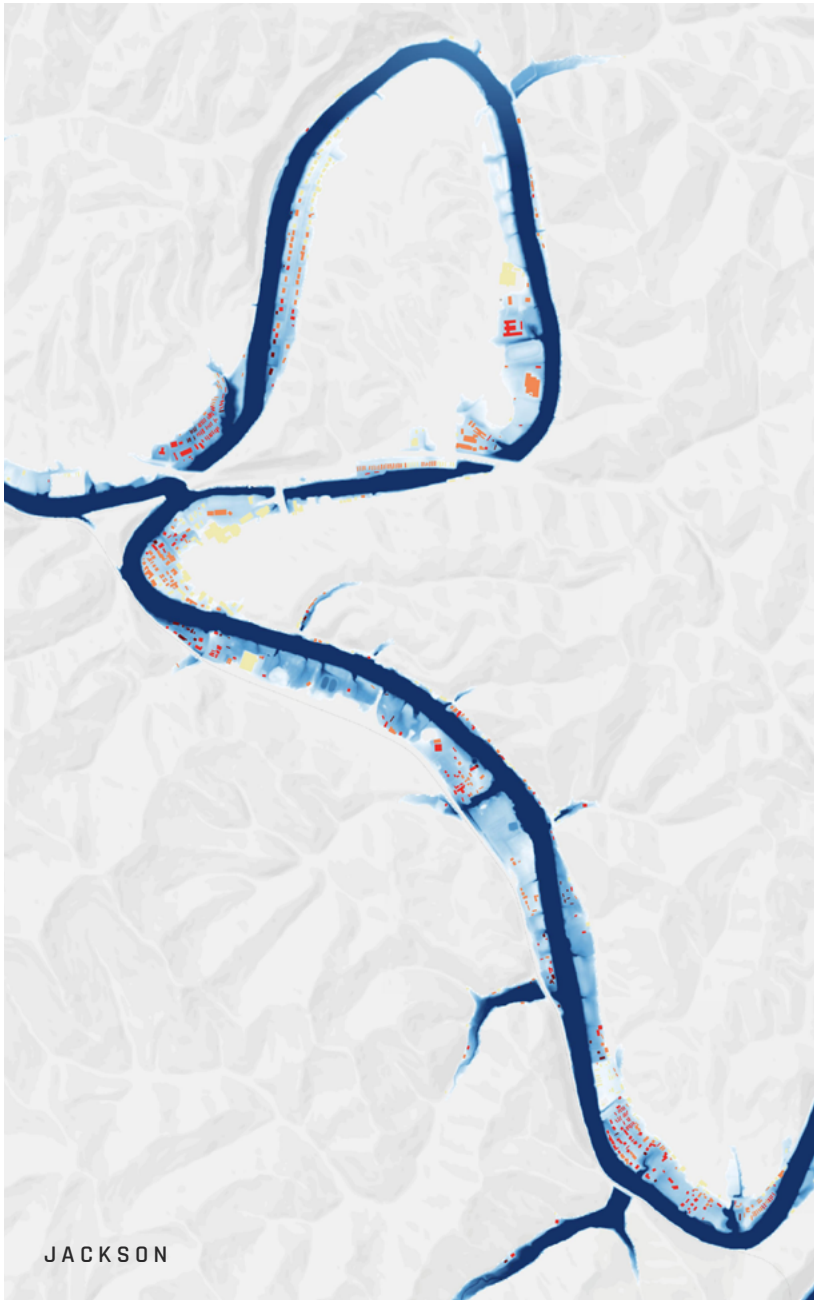


Building footprint credit for FEMA's US Structures dataset

FLASH FLOODING IN KENTUCKY, US

JULY 2022

FLOOD BRIEFING SERIES POWERED BY MULTISOURCE DATA ANALYSIS LEVERAGING ICEYE SATELLITE IMAGERY



START MONITORING FIRST ACQUISITION — Jul 25th
START PEAK — Jul 27th
FIRST ANALYSIS — Jul 28th
END PEAK LAST ACQUISITION — Jul 30th
FINAL ANALYSIS — Ongoing

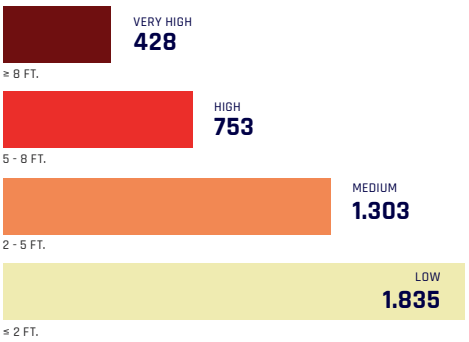
~3 FT (1 M)
average inundation at building level

30 SQ MI (77 KM²)
total flood extent

Throughout the week of 25 July, a stalled frontal boundary was the focus for rounds of heavy rain across the central Appalachians in the eastern United States. Some of the most flash flood-prone areas in the country can be found in this area, including eastern Kentucky and most of West Virginia. On 27 July, 7-10" of rain fell in eastern Kentucky[1], which caused significant flash flooding in the narrow valleys of the area. Creeks and rivers rose as much as 10 feet in a matter of hours, and numerous homes and cars were swept away. The death toll from the floods rose to at least 25 people, according to figures released by the governor's office and the local authorities.[2]

[1] Source: https://twitter.com/kymesonet/status/1552631486246952960?s=20&t=gIxWxxHekM-bijmamRWM11Q
[2] Source: https://www.nytimes.com/live/2022/07/29/us/kentucky-flooding-west-virginia

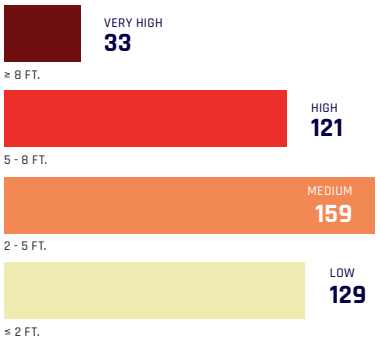
TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY IN SOUTH EAST KENTUCKY: 4.319



Disclaimer: The analysis is focused on data specific to the regions most affected by the floods. Some areas which have been impacted by the flooding may not be represented in the data.

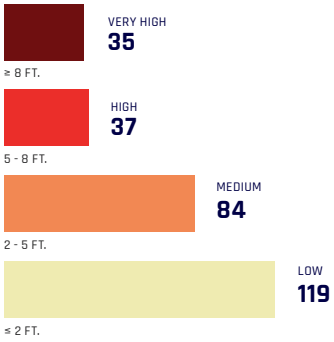
TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

JACKSON: 442



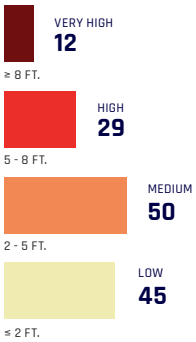
TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

WHITESBURG: 275



TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

GARRETT: 136

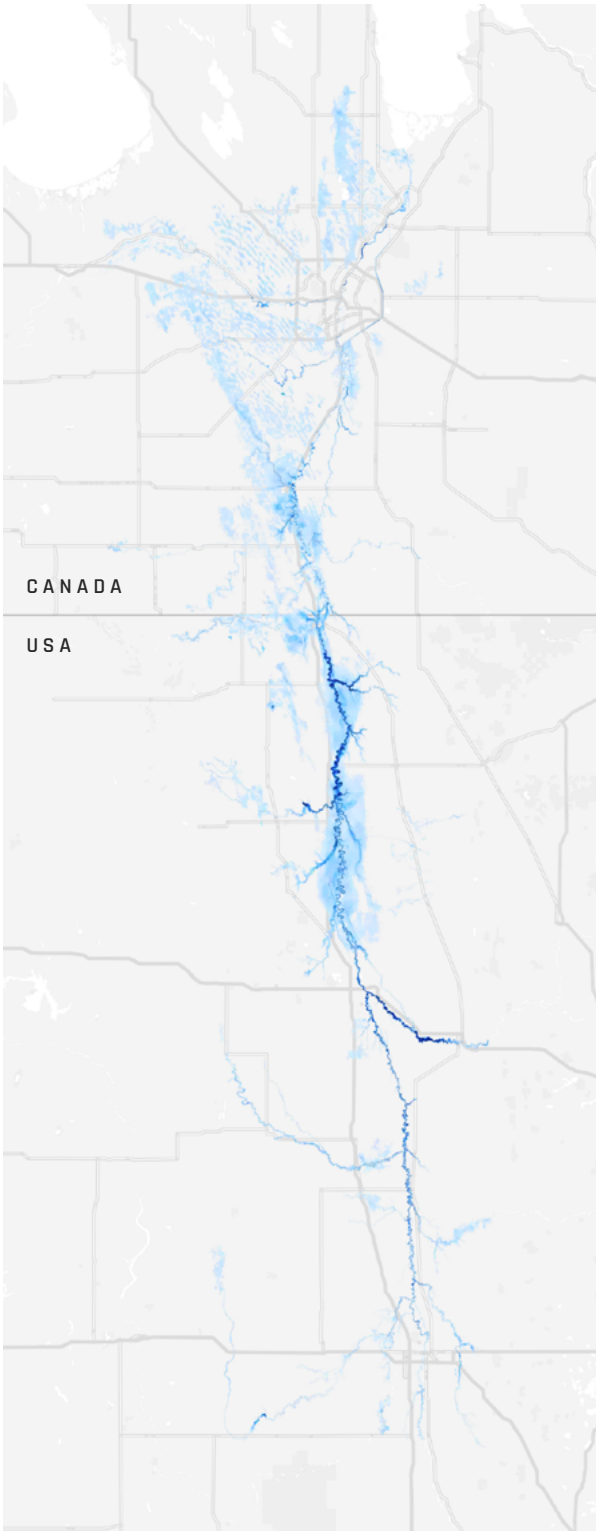


Building footprint credit for FEMA

FLOODING IN THE RED RIVER BASIN, US & CANADA

APRIL 2022

FLOOD BRIEFING SERIES POWERED BY MULTISOURCE DATA ANALYSIS LEVERAGING ICEYE SATELLITE IMAGERY



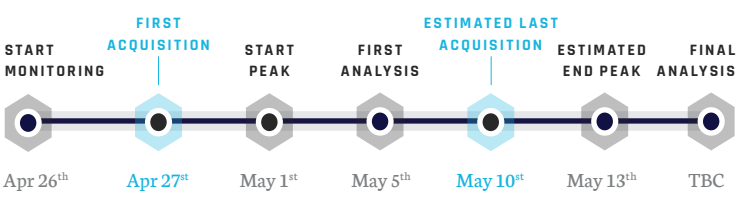
1.544 SQ MI (3,998 KM²)
total flood extent

MEAN 13 IN (33 CM)
MEDIAN 7 IN (18 CM)
average inundation at building level

Spring snowmelt, along with multiple rounds of heavy rainfall from passing storm systems, caused a rise in river levels within the basin of the Red River of the North. Numerous gauges reached major flood stage, with widespread agricultural flooding and some flooding of unprotected populated areas. Rivers in the United States peaked around the end of April, while gauges in Canada peaked in early May. Even after the peak, many of the rivers will see elevated levels into the second week of May.

High water levels represent a genuine concern for officials in Manitoba's Peguis First Nation, where more than a thousand people are evacuated from their homes[1]. Many of these areas have experienced significant flooding in the past, and have constructed levee and flood wall systems to prevent further flood loss. Therefore, most urban areas (especially the larger cities of Fargo, Grand Forks, and Winnipeg) saw little impact from the flooding. However, populated areas without flood protection likely saw impacts from the floodwaters, and many farmland areas have been inundated.

[1] *Source: https://www.cbc.ca/news/canada/manitoba/manitoba-flood-forecast-red-river-fisher-river-1.6442912*



TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

TOTAL IMPACTED BUILDINGS IN USA: 1.722

HIGH
134
≥ 3 FT.

MEDIUM
453
1 - 3 FT.

LOW
1.144
≤ 1 FT.

FARGO, ND, USA
TOTAL IMPACTED BUILDINGS: 139

35
> 1 FT.

104
< 1 FT.

DRAYTON, ND, USA
TOTAL IMPACTED BUILDINGS: 115

48
> 1 FT.

67
< 1 FT.

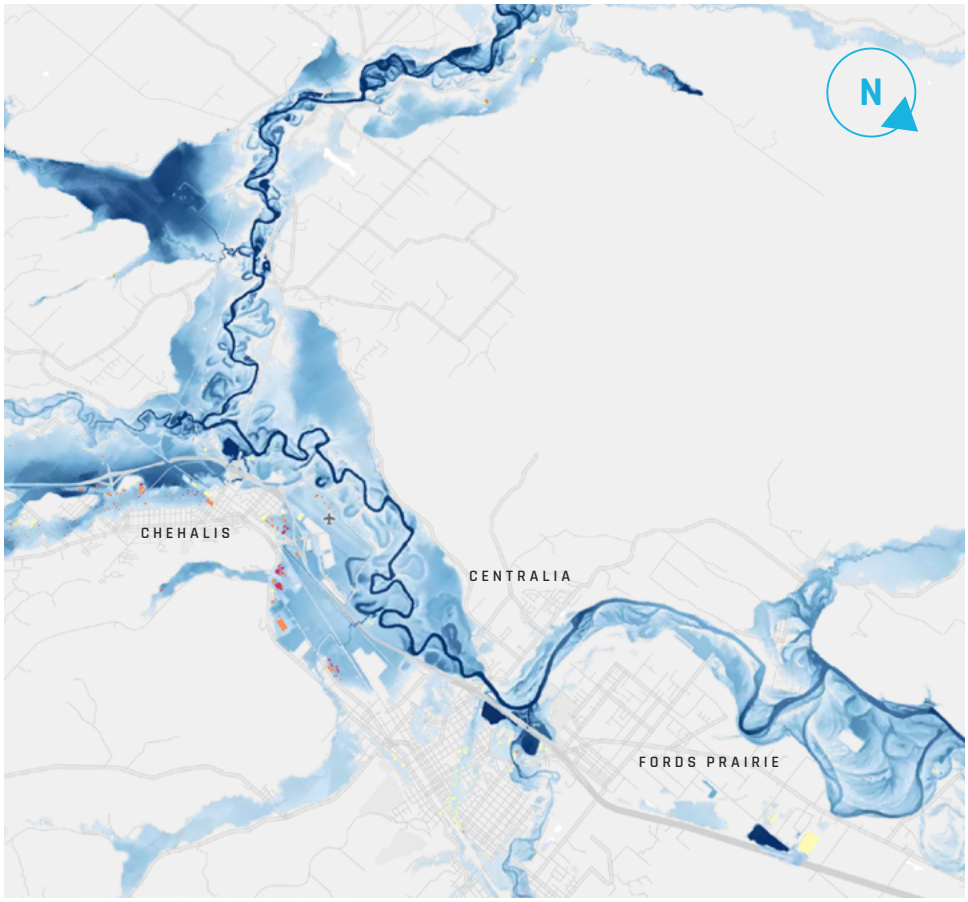
Disclaimer: Please note that this Briefing describes an ongoing event across the USA-Canada border, however, the reported building numbers are for the USA only.

Building footprint credit for FEMA

FLOODING IN WASHINGTON STATE, US

JANUARY 2022

FLOOD BRIEFING SERIES POWERED BY MULTISOURCE DATA ANALYSIS LEVERAGING ICEYE SATELLITE IMAGERY



125 SQ MI (323 KM²)

total flood extent

AFFECTED LOCATIONS

Aberdeen, Centralia, Chehalis, Napavine, Rochester, Westport

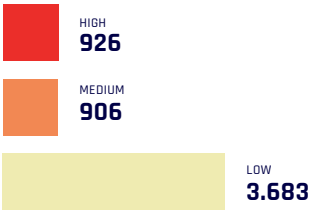
1.8 FT (0,54 M)

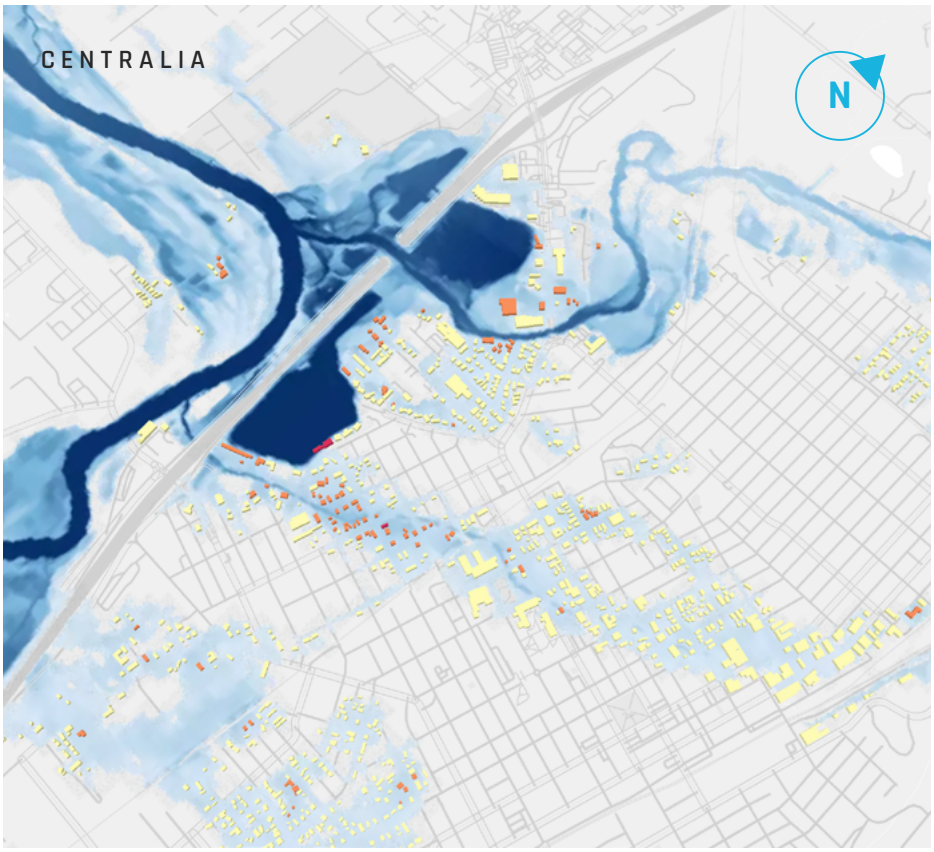
average inundation at building level

A series of storms impacted the Pacific Northwest to start the first week of 2022, each with heavy rainfall. Totals by 7 January were 3-5in (75-125mm) across much of Southwest Washington, with locally up to 8in (200mm) in the foothills of the Cascades. This in turn caused the Newaukum, Skookumchuck, and Chehalis Rivers to flood, inundating areas around the cities of Chehalis and Centralia, and leading to at least two fatalities. At one point, a 20-mile (32km) stretch of Interstate 5 between Seattle and Portland, OR was closed due to flooding[1] from the Chehalis River. This, along with closures of other highways in Washington due to snow, briefly isolated Seattle from the rest of the USA highway network.

[1] *Source: https://twitter.com/wsdot_sw/status/1479556538435969024*

TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY





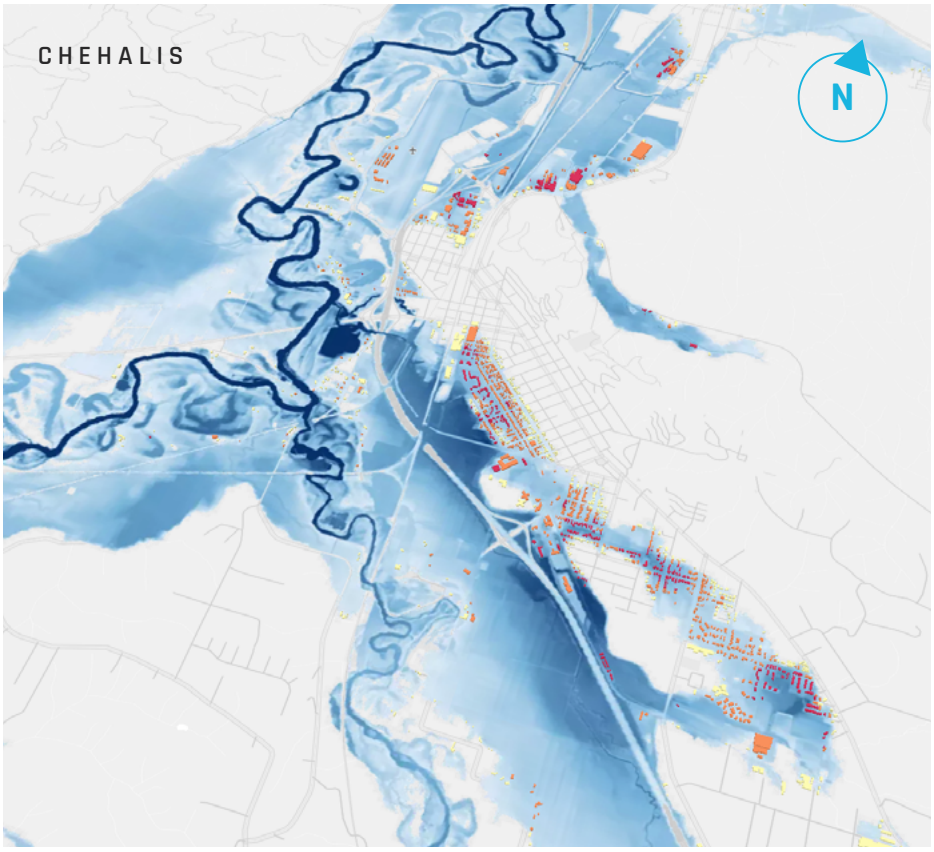
TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

CENTRALIA
TOTAL BUILDINGS: 1.442

HIGH
41

MEDIUM
131

LOW
1.270



TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

CHEHALIS
TOTAL BUILDINGS: 1.452

HIGH
600

MEDIUM
342

LOW
510

The analysis is focused on data specific to the regions most affected by the floods. Some areas which have been impacted by the flooding may not be represented in the data.

EUROPE

"ONE OF THE KNOWN MEGATRENDS IS GLOBAL CLIMATE CHANGE. WE AT IF WANT TO SEEK NEW INNOVATIVE WAYS TO BE ON TOP OF THIS DEVELOPMENT AND INCREASE OUR ABILITY TO BE BY OUR CUSTOMERS' SIDE. ICEYE PROVIDES A GREAT EXAMPLE OF TECHNOLOGY-ENABLED AND DATA-DRIVEN SERVICES THAT CAN BE EMBEDDED INTO THE MORE TRADITIONAL CLAIMS-HANDLING SERVICES."

TUOMAS RÄIKKÖNEN
HEAD OF LARGE & INTERNATIONAL CLAIMS
IF P&C INSURANCE

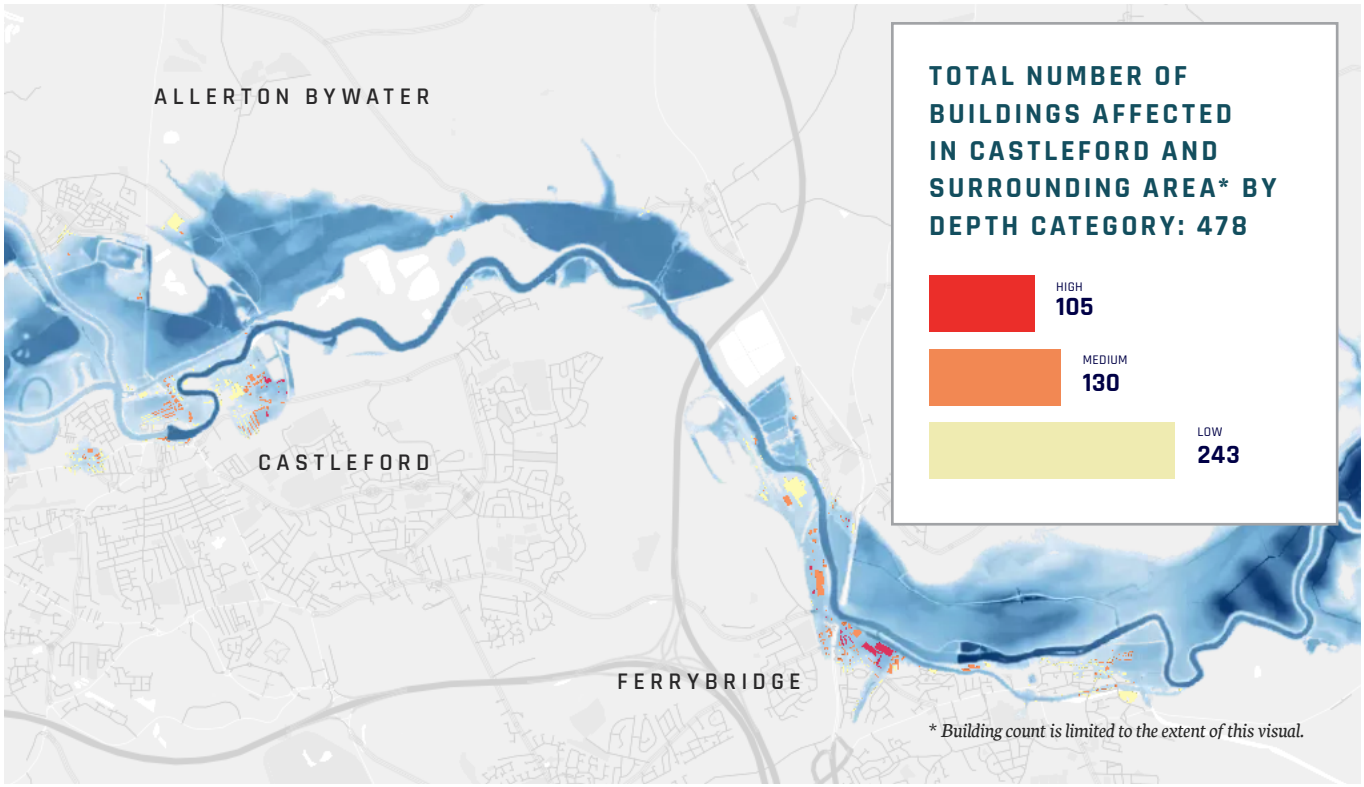
TALK TO OUR SALES TEAM ABOUT OUR FULL EUROPEAN FLOOD ANALYSES

▶ Storm Franklin in the UK - (Feb)

FLOODING IN THE UK AFTER STORM FRANKLIN

FEBRUARY 2022

FLOOD BRIEFING SERIES POWERED BY MULTISOURCE DATA ANALYSIS LEVERAGING ICEYE SATELLITE IMAGERY



Storm Franklin, the third in a series of potent storm systems to move through Europe, brought another round of heavy rain that resulted in moderate to severe flooding in central England. Since the passage of Storms Dudley and Eunice, which killed three people and left 1.4 million homes without power[1] in the week prior, Storm Franklin mainly hit locations in the north and west of England. Rivers around Manchester, Leeds, and York, including the Mersey, Aire, and Ouse, caused significant flooding to numerous homes and businesses. Along the River Aire, bridges were closed due to concerns of floating debris damaging the structures[2]. Farther to the south, more than 75 miles of the River Severn near Birmingham were under Flood Warnings. In some locations the river was more than 2m above normal values, approaching the record levels from November 2002[3].

[1] https://www.bbc.com/news/uk-60452334
[2] https://www.bbc.com/news/uk-england-60452542
[3] https://www.bbc.com/news/uk-england-shropshire-60475077

START MONITORING Feb 18th

START PEAK ONGOING ACQUISITIONS Feb 21st - 23rd

FIRST ANALYSIS Feb 24th

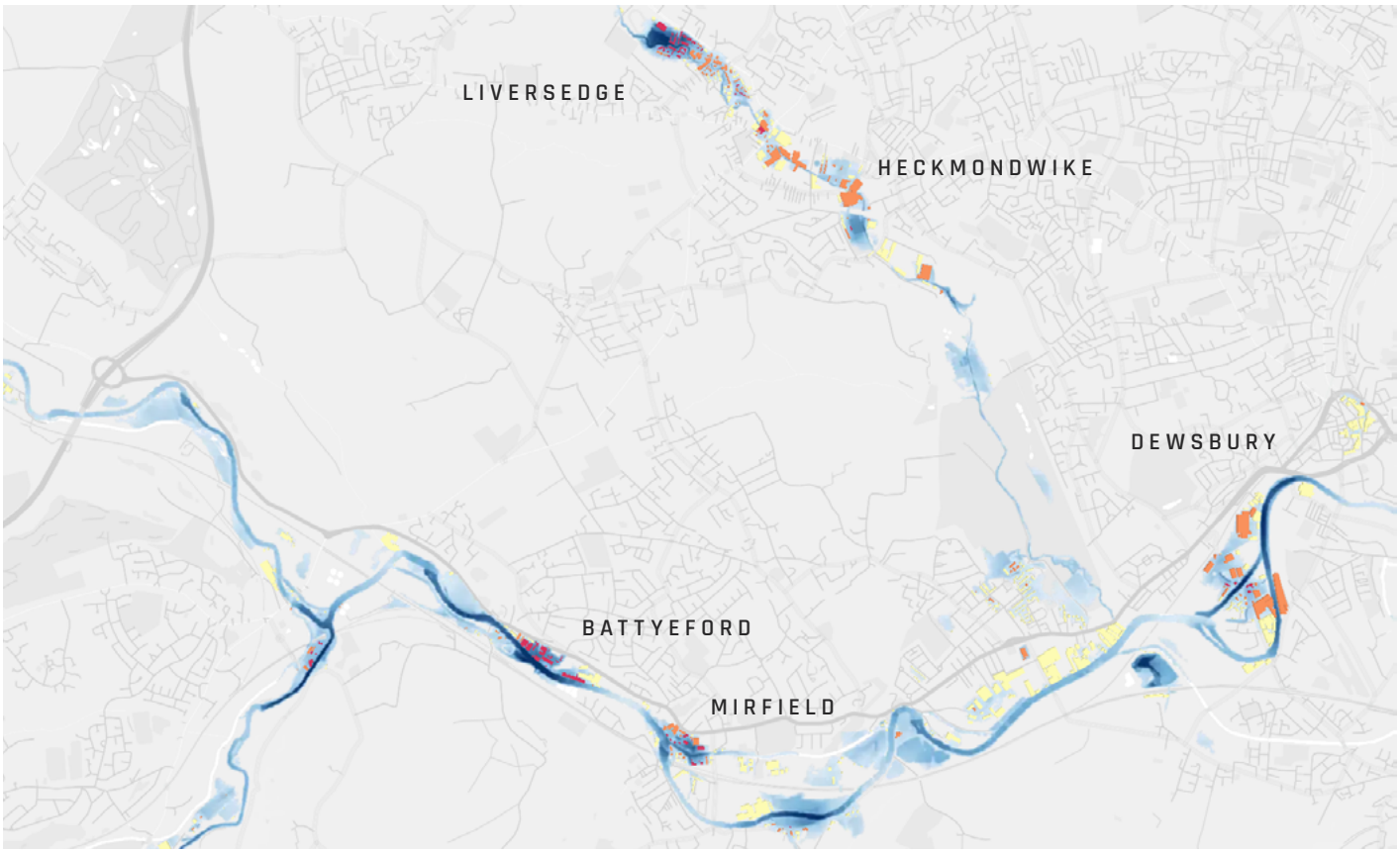
END PEAK LAST ACQUISITION FINAL ANALYSIS Feb 25th

AFFECTED URBAN AREAS

Derby, Leeds, Shrewsbury, Tadcaster, Tewksbury, Wakefield, Worcester, York

492 KM²

total flood extent



TOTAL NUMBER OF BUILDINGS AFFECTED IN MIRFIELD AND SURROUNDING AREA* BY DEPTH CATEGORY: 717

HIGH
139

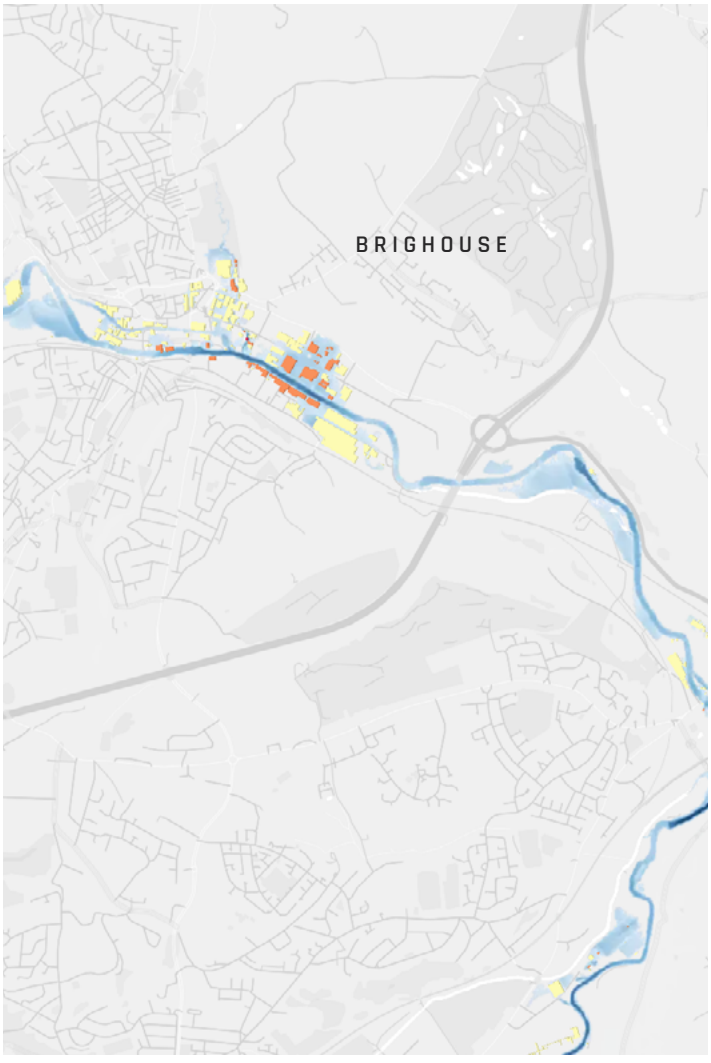
MEDIUM
127

LOW
451

** Building count is limited to the extent of these visuals.*

Building footprint credit for OS UK.

Disclaimer: The analysis is focused on data specific to the regions most affected by the floods. Some areas which have been impacted by the flooding are not be represented in the data.



AUSTRALIA

"DELIVERING OUR FLOOD INSIGHTS TO SOVEREIGN AND LOCAL AGENCIES HELPS US IMPROVE RECOVERY FOR AUSTRALIANS AFFECTED BY UNPRECEDENTED FLOODING. WE'RE PROUD TO WORK WITH GEOSCIENCE AUSTRALIA, THE NATIONAL EMERGENCY MANAGEMENT AGENCY, AND LOCAL EMERGENCY MANAGEMENT AGENCIES DURING THIS CRITICAL TIME."

ANDY READ
GLOBAL HEAD OF GOVERNMENT SOLUTIONS
ICEYE

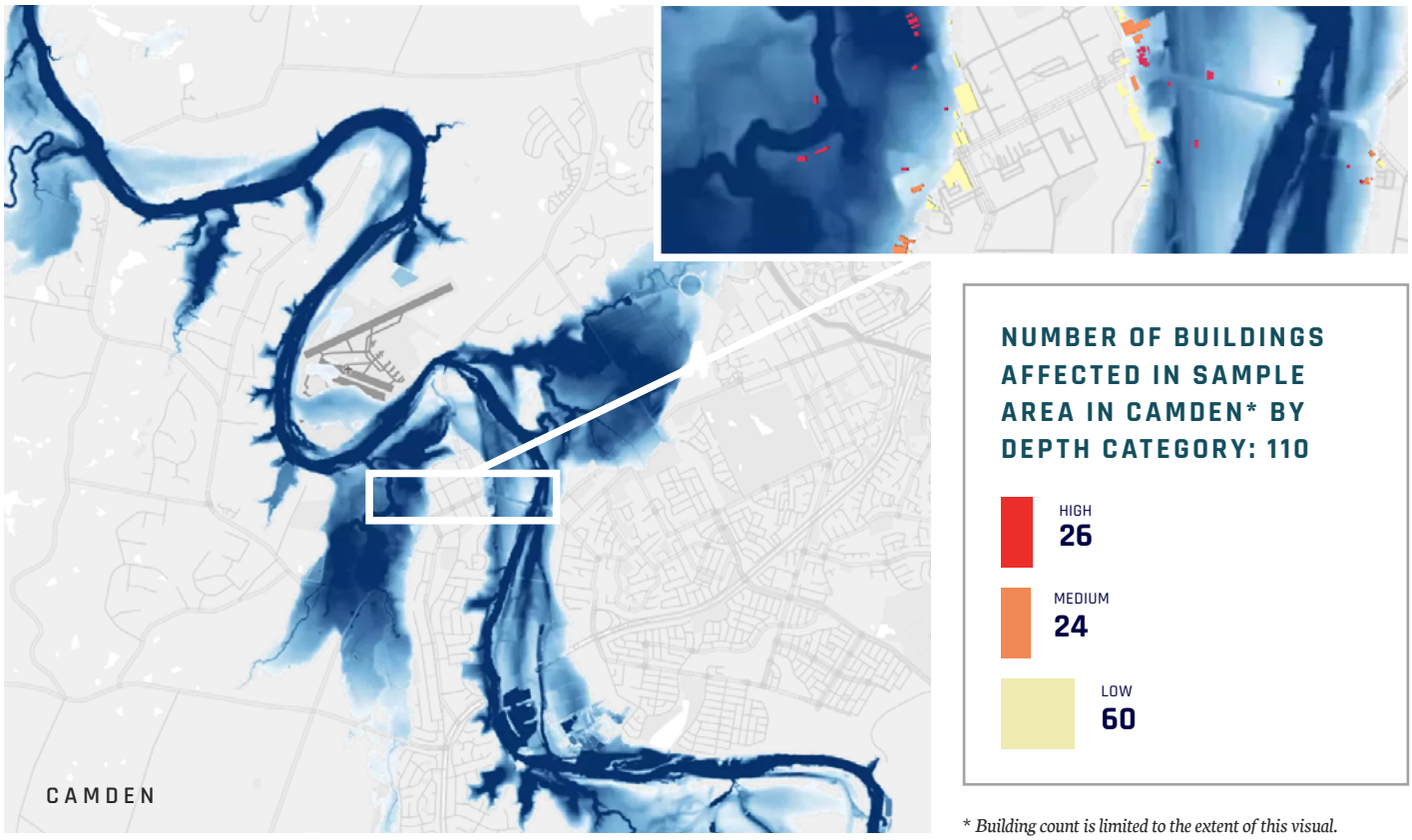
TALK TO OUR SALES TEAM ABOUT OUR FULL AUSTRALIAN FLOOD ANALYSES

- Flooding in New South Wales, Australia - (Jun)
- Flooding in Queensland & New South Wales, Australia - (Feb)

FLOODING IN NEW SOUTH WALES, AUSTRALIA

JUNE 2022

FLOOD BRIEFING SERIES POWERED BY MULTISOURCE DATA ANALYSIS LEVERAGING ICEYE SATELLITE IMAGERY



NUMBER OF BUILDINGS AFFECTED IN SAMPLE AREA IN CAMDEN* BY DEPTH CATEGORY: 110

HIGH **26**

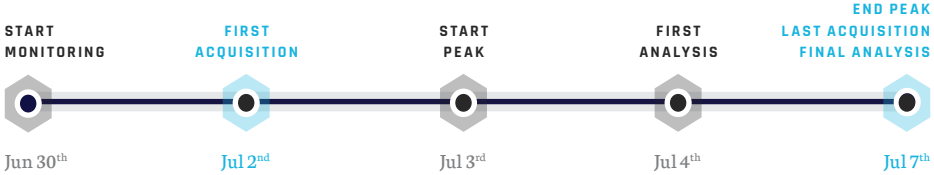
MEDIUM **24**

LOW **60**

** Building count is limited to the extent of this visual.*

A low pressure area drifted slowly into the New South Wales coast of Australia to start the month of July. The heaviest rainfall occurred from 2-5 July, with widespread totals of 200-300 mm for much of the Sydney, Newcastle, and Wollongong regions. The highest totals were south of Sydney, including in Beaumont where more than 650 mm of rainfall was recorded, and in Darkes Forest where more than 725 mm was reported[1]. Rivers in the Nepean / Hawkesbury basin began to flood on 3 July, and major flooding was observed on numerous rivers within the basin through 5 July. Several water rescues have occurred, and many Australians are experiencing their fourth or fifth flood in the past year[2].

[1] *Source: http://www.bom.gov.au/climate/rainfall/*
[2] *Source: https://www.abc.net.au/news/2022-07-04/communities-grapple-with-repeated-flooding/13958108*

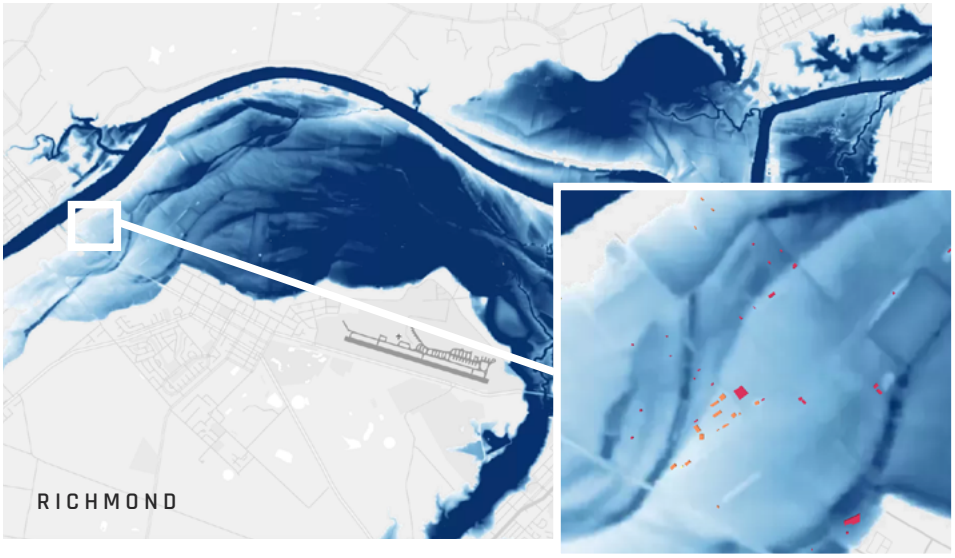


THE WASHINGTON POST

Read The Washington Post's coverage of the flooding in New South Wales, where ICEYE's flood imagery of Camden, NSW, was included.

https://www.washingtonpost.com/climate-environment/2022/07/05/australia-flooding-sydney-record-rainfall/

READ ARTICLE ▶

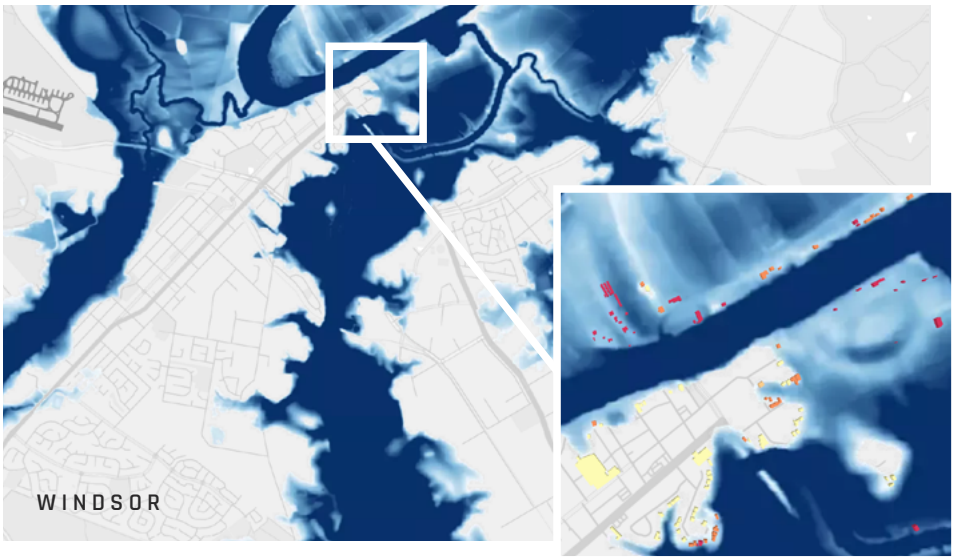


NUMBER OF BUILDINGS AFFECTED IN SAMPLE AREA IN RICHMOND* BY DEPTH CATEGORY: 110

HIGH 51

MEDIUM 39

LOW 20

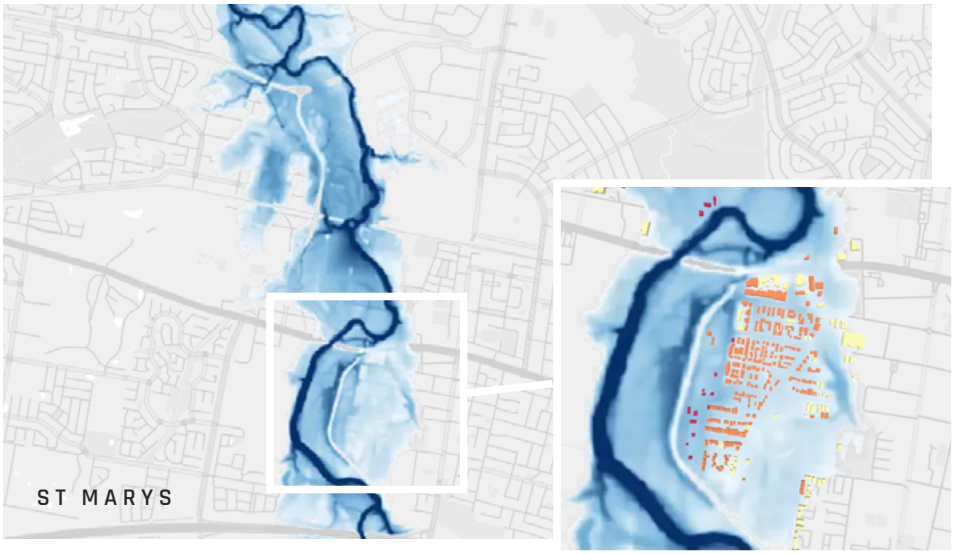


NUMBER OF BUILDINGS AFFECTED IN SAMPLE AREA IN WINDSOR* BY DEPTH CATEGORY: 148

HIGH 48

MEDIUM 34

LOW 66



NUMBER OF BUILDINGS AFFECTED IN SAMPLE AREA IN ST MARYS* BY DEPTH CATEGORY: 303

HIGH 15

MEDIUM 224

LOW 64

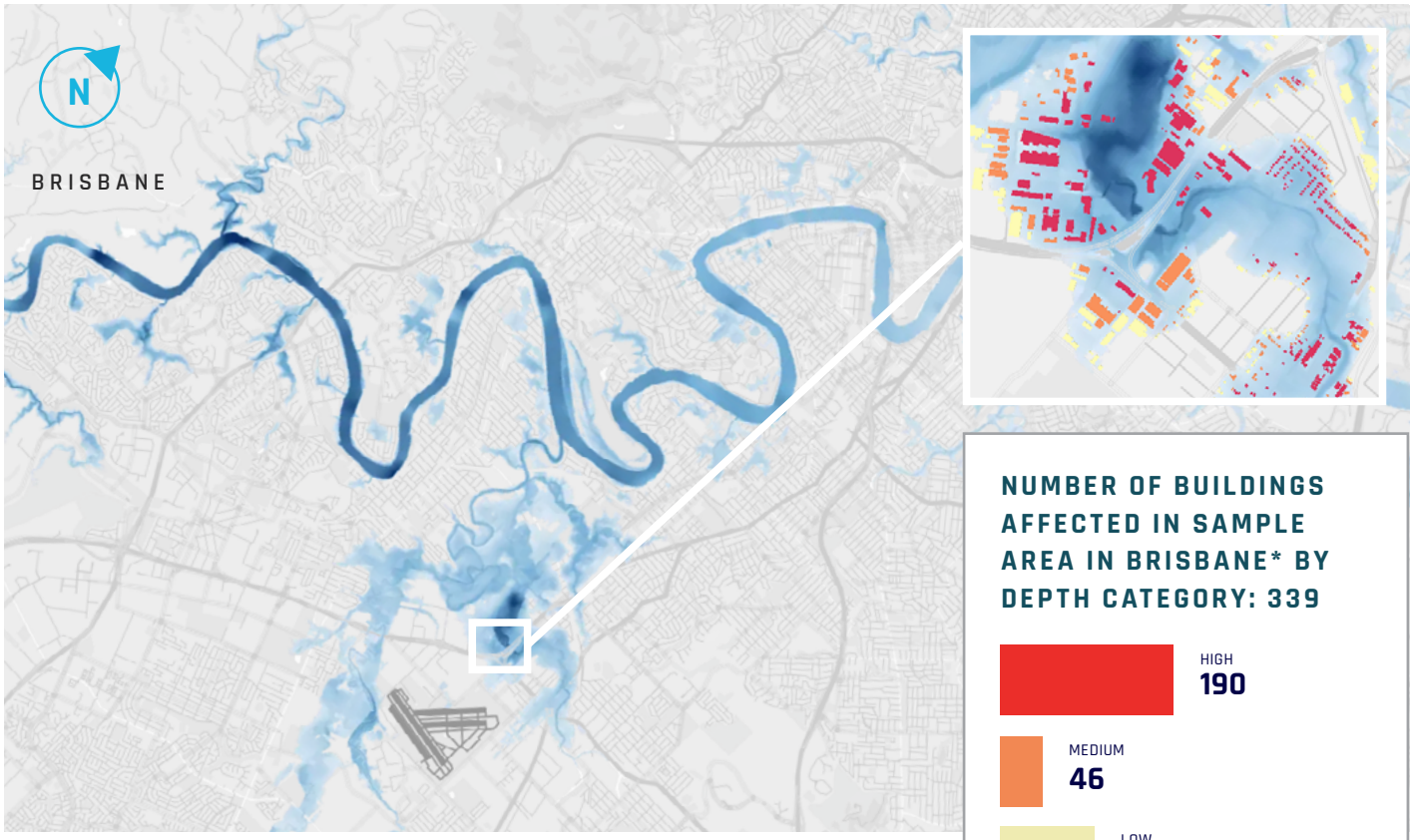
** Building count is limited to the extent of these visuals.*

Disclaimer: Please note that this Briefing contains information from the AustraliaBuildingFootprint database, which was made available under the Open Database License (ODbL). Therefore, the analysis is focused on data specific to the regions most affected by the floods, and the reported building numbers are focusing on a selection of subset areas. Some areas which have been impacted by the flooding are not represented in the data. Please note that the building impact numbers are subject to change as ICEYE continues to analyse the flood.

FLOODING IN QUEENSLAND AND NEW SOUTH WALES, AUSTRALIA

FEBURARY 2022

FLOOD BRIEFING SERIES POWERED BY MULTISOURCE DATA ANALYSIS LEVERAGING ICEYE SATELLITE IMAGERY



NUMBER OF BUILDINGS AFFECTED IN SAMPLE AREA IN BRISBANE* BY DEPTH CATEGORY: 339

HIGH **190**

MEDIUM **46**

LOW **103**

Parts of Australia experienced a persistent heavy rain event, locally focused along the border of Queensland and New South Wales, which led to repeated rounds of rain and storms over four days. Widespread rainfall totals of over 400mm were reported[1], and a maximum of 1.4m of rainfall was measured at Mt. Glorious, northwest of Brisbane[2]. Over the weekend of 26-27 February, severe river flooding spread across more than 400 kilometers in both Queensland and New South Wales. Lismore, NSW experienced its worst flooding on record, and at least nine deaths have been reported[3]. Additionally, farmers are expecting millions of dollars of losses from flooded crops, including soybeans, rice, and cane[4]. The weather system is now shifting south, bringing heavy rains and flooding to areas in and around Sydney.

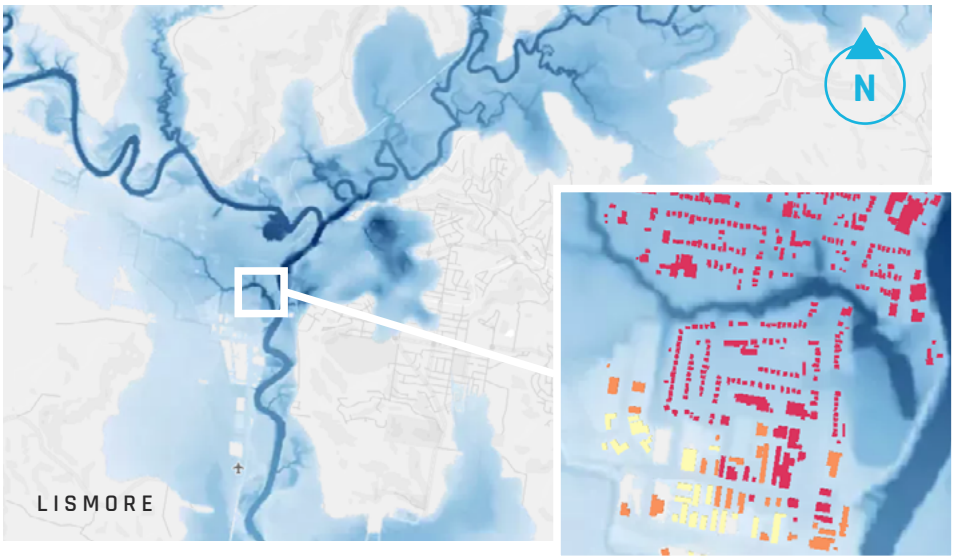
** Building count is limited to the extent of this visual.*

AFFECTED URBAN AREAS

Maryborough, Brisbane, Gympie, Grafton, Lismore

START MONITORING	FIRST ACQUISITION	START PEAK FIRST ANALYSIS	ONGOING ACQUISITIONS AND ANALYSES	FINAL ANALYSIS
Feb 22nd	Feb 23rd	Feb 26th	Mar 1st-3rd	Mar 3rd

[1] *Source: http://www.bom.gov.au/web03/ncc/www/awap/rainfall/totals/week/colour/history/nat/20220223202203O1.hres.gif*
[2] *Source: https://twitter.com/BOM_au/status/1497697793376407563*
[3] *Source: https://www.nytimes.com/2022/02/27/world/australia/australia-flood-queensland.html*
[4] *Source: https://www.abc.net.au/news/2022-03-03/queensland-nsw-weather-rain-flooding-live-warnings-updates/100876892*

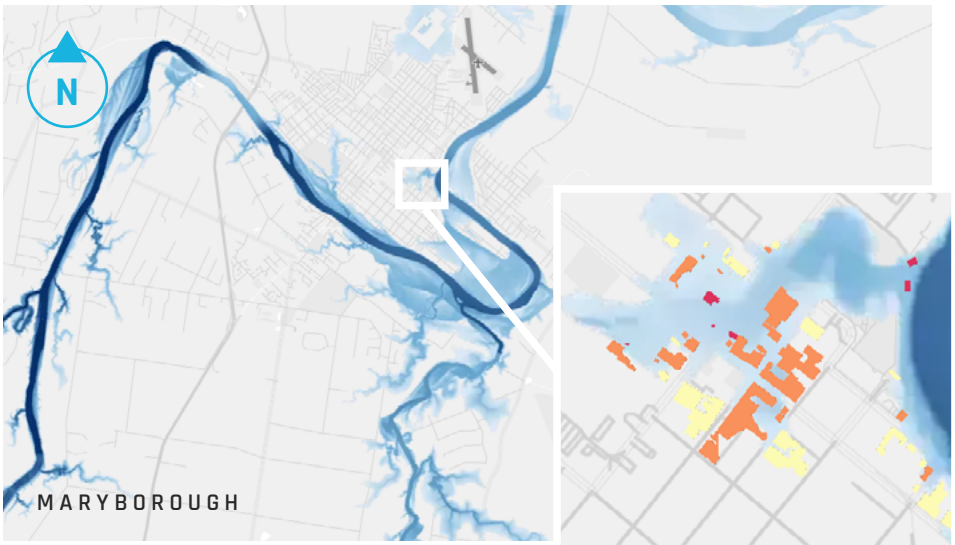


NUMBER OF BUILDINGS AFFECTED IN SAMPLE AREA IN LISMORE* BY DEPTH CATEGORY: 435

HIGH 388

MEDIUM 19

LOW 28

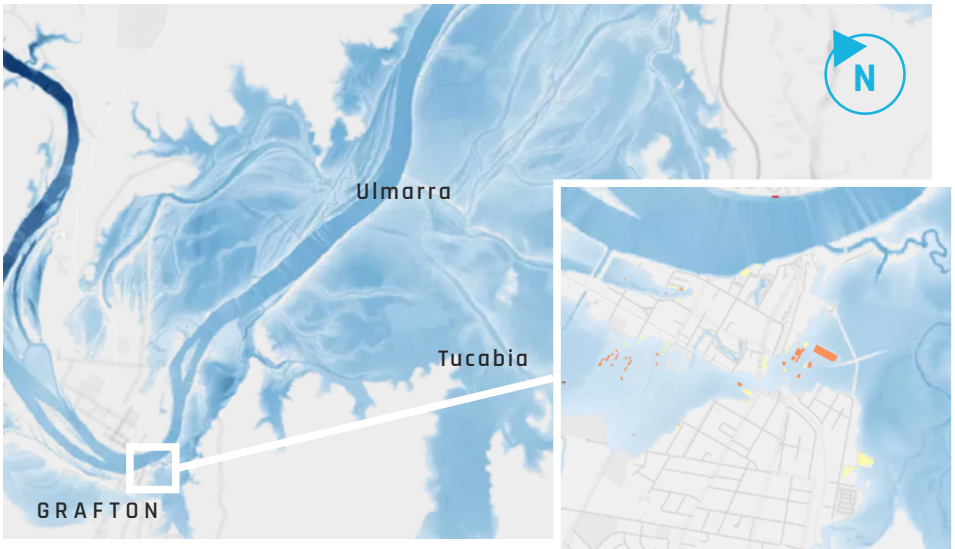


NUMBER OF BUILDINGS AFFECTED IN SAMPLE AREA IN MARYBOROUGH* BY DEPTH CATEGORY: 49

HIGH 16

MEDIUM 14

LOW 19



NUMBER OF BUILDINGS AFFECTED IN SAMPLE AREA IN GRAFTON* BY DEPTH CATEGORY: 99

HIGH 4

MEDIUM 43

LOW 52

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JAPAN

"WE HAVE BEEN WORKING WITH ICEYE SINCE 2020 AND JOINTLY DEVELOPED AN INSURANCE CLAIMS PROCESSING SOLUTION FOR FLOODS THAT STREAMLINES AND ENABLES QUICKER DELIVERY OF CLAIM PAYMENTS. THIS COLLABORATION REPRESENTS BOTH ICEYE AND TOKIO MARINE'S STRONG COMMITMENT TO TAKE POSITIVE ACTION AND INITIATIVE AGAINST ADDITIONAL RISKS. BY COMBINING ICEYE'S VERTICALLY INTEGRATED SATELLITE SOLUTIONS AND TOKIO MARINE'S HISTORICAL DATA, WE STRONGLY BELIEVE THAT WE CAN DEVELOP MULTIPLE SOLUTIONS TO ADDRESS SERIOUS NATURAL CATASTROPHE RISKS AND SUPPORT OUR CUSTOMERS AND SOCIETY THROUGHOUT THE WORLD IN THEIR TIME OF NEED."

MASASHI NAMATAME
GROUP CHIEF DIGITAL OFFICER
TOKIO MARINE HOLDINGS

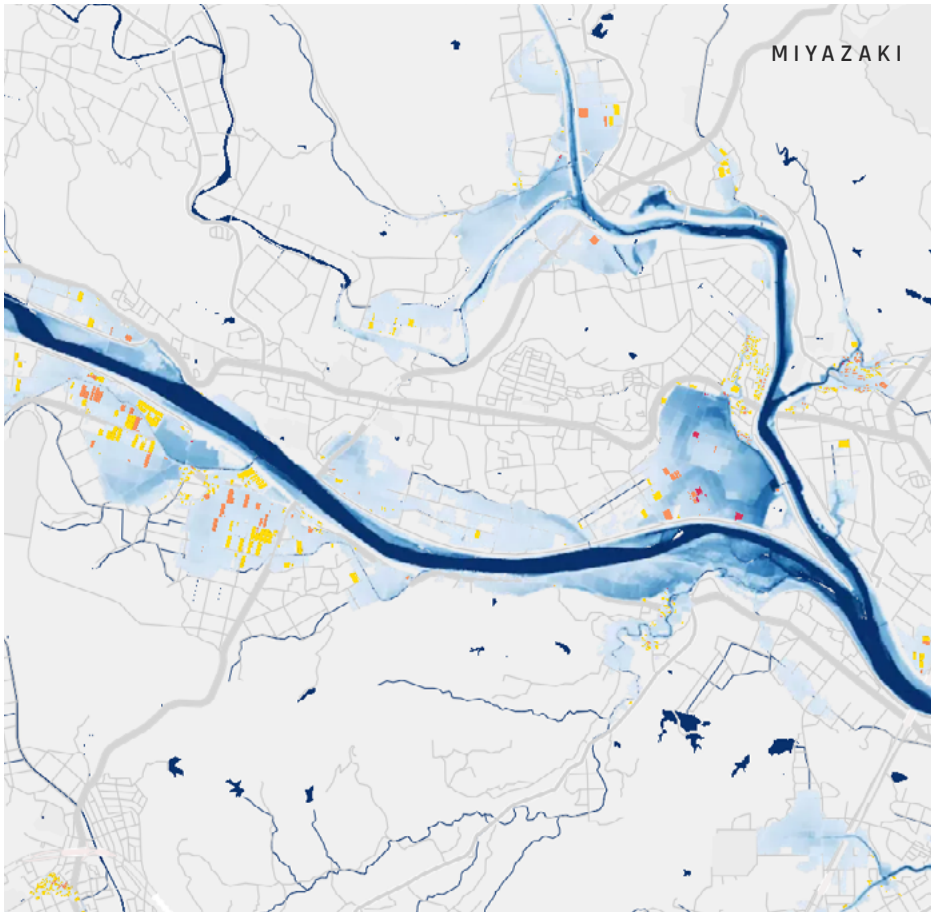
TALK TO OUR SALES TEAM ABOUT OUR FULL JAPANESE FLOOD ANALYSES

▶ Typhoon Nanmadol in Japan - (Sep)

FLOODING AFTER TYPHOON NANMADOL IN KYUSHU, JAPAN

SEPTEMBER 2022

FLOOD BRIEFING SERIES POWERED BY MULTISOURCE DATA ANALYSIS LEVERAGING ICEYE SATELLITE IMAGERY



165,8 KM²
total flood extent

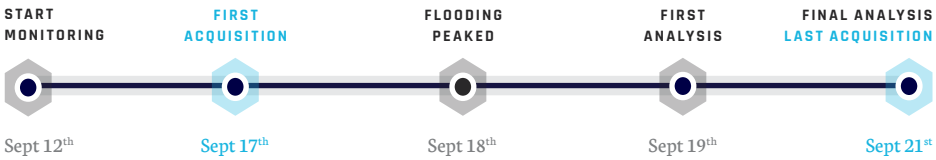
0,41 M
average inundation at building level

OTHER AFFECTED LOCATIONS
Hiroshima, Oita, Nobeoka, Kumamoto, Kitatakanabe, Saito

Impact numbers based on initial release of ICEYE's Flood Insights

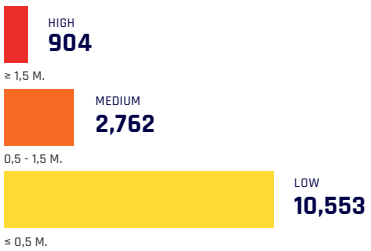
Typhoon Nanmadol brought significant rainfall to southern Japan between the 17-20th of September. The heaviest rainfall was seen on the main southwest island of Kyushu, as it moved northeastward along the west coast of Japan. Although the storm weakened as it moved northeastward along the spine of Japan, it killed at least 2 people, triggered landslides, and caused thousands to evacuate to safety in Kyushu.[1]

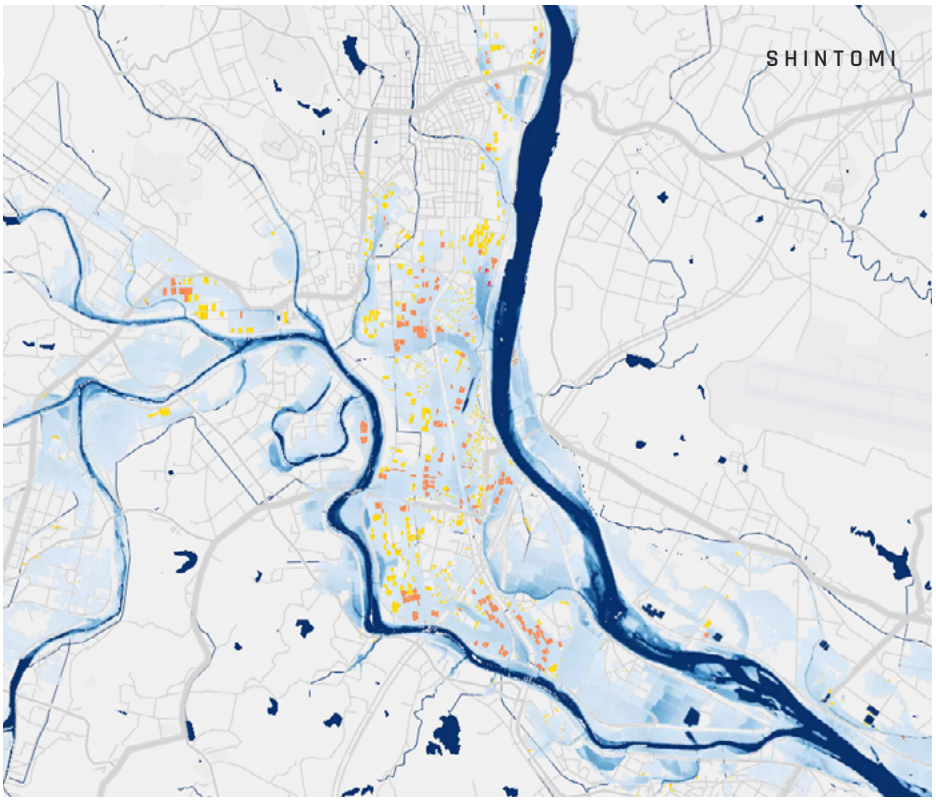
[1] *Source: https://www.bloomberg.com/news/articles/2022-09-19/powerful-typhoon-pelts-japan-tokyo-under-flood-advisory*

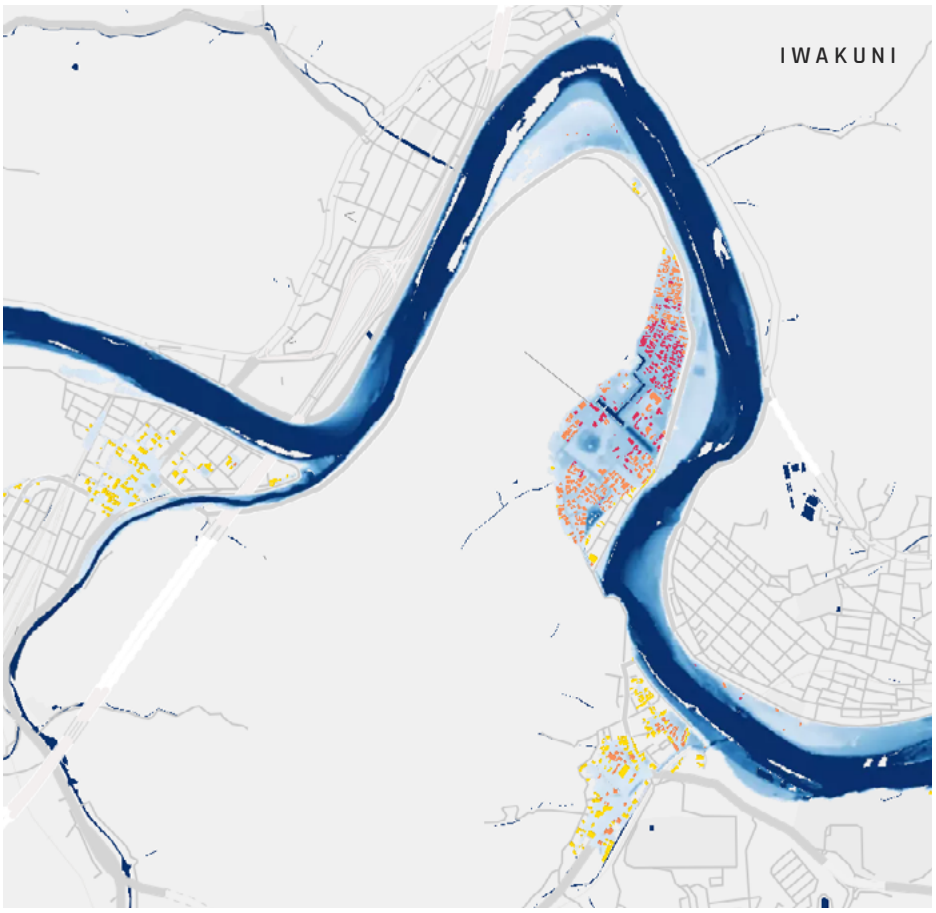


TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

EAST KYUSHU: 14,219







TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

MIYAZAKI: 1,127

HIGH **45**
≥ 1,5 M.

MEDIUM **269**
0,5 - 1,5 M.

LOW **830**
≤ 0,5 M.

TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

SHINTOMI: 1,838

HIGH **10**
≥ 1,5 M.

MEDIUM **387**
0,5 - 1,5 M.

LOW **1,441**
≤ 0,5 M.

TOTAL NUMBER OF BUILDINGS AFFECTED BY FLOOD WATER DEPTH CATEGORY

IWAKUNI: 1,451

HIGH **362**
≥ 1,5 M.

MEDIUM **640**
0,5 - 1,5 M.

LOW **457**
≤ 0,5 M.

Building footprint credit for The Geospatial Information Authority of Japan (GSI)

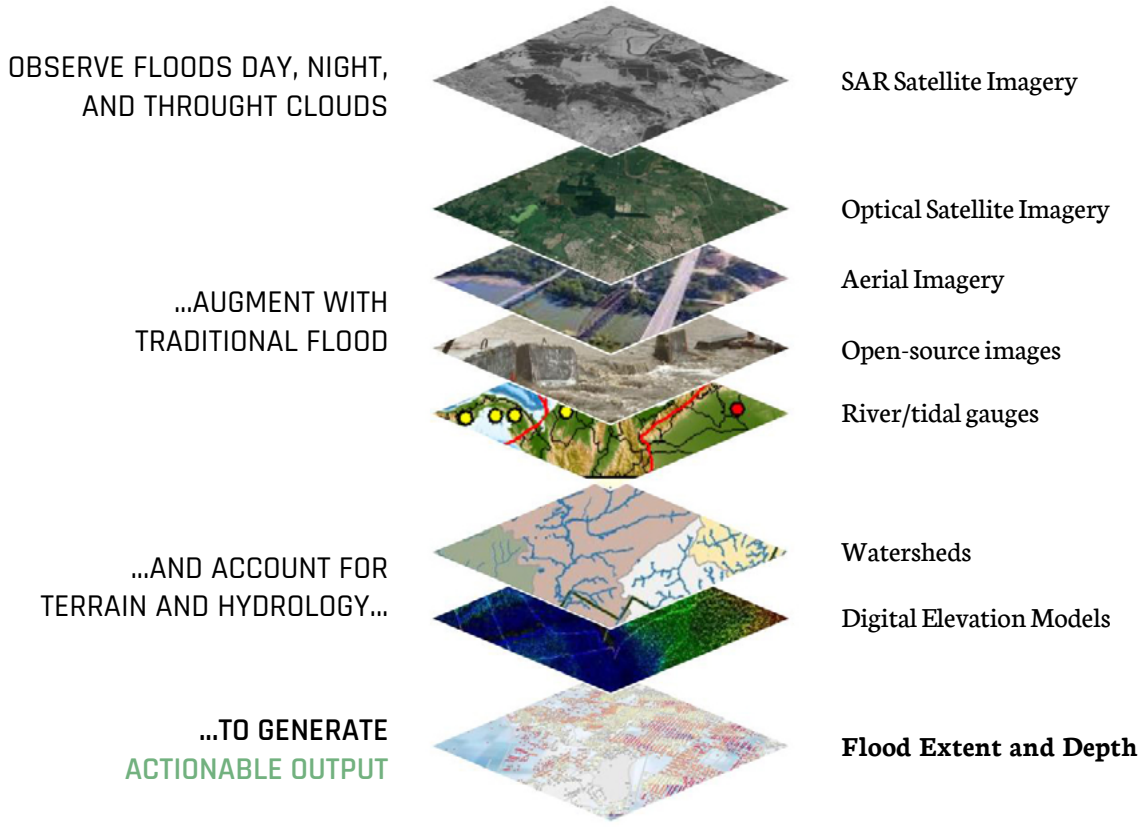
Disclaimer:
The impact numbers are subject to change as ICEYE continues to analyze the flood. The current analysis is focused on data specific to the regions most affected by the floods. Some areas which have been impacted by the flooding may not be represented in the data.

CONCLUSION

By combining SAR imagery with multiple auxiliary information sources, ICEYE is able to deliver high-resolution data sets within 24 hours of a given flood peak. With a team of dedicated experts, ICEYE has built a platform that provides reliable data for flood depth, extent, and duration, empowering insurers and emergency management organizations to assess losses quickly and carry out disaster response efforts in a more effective and targeted manner.

We are still in the early days of applying ICEYE's radar satellites and earth observation insights, but the potential is enormous. Overall, SAR technology can help improve disaster risk management and foster more resilience in a world that is becoming more uncertain and exposed to weather extremes. More than anything, it is about being prepared and responding proactively when the worst happens.

HOW DO WE BUILD OUR AI POWERED, MULTI-SOURCE INSIGHTS?



HOW DO ICEYE FLOOD INSIGHTS WORK IN ACTION?

7-4 DAYS BEFORE A FLOOD

- Our precipitation forecasts and global deterministic models begin to pick up on signals for flood potential

3-1 DAYS PRE-FLOOD

- Flood Early Warning system hones in on areas of concern, allowing for ICEYE SAR satellites the targeting of acquisition swaths to begin
- ICEYE notifies Customer(s) of flood potential - including areas of concern, acquisition plans where necessary, activation likelihood, etc

1-0 DAYS PRE-FLOOD

- Continued communication between ICEYE and our customers
- Our satellite image acquisitions are adjusted to line up with latest forecasts
- Auxiliary data is prepared

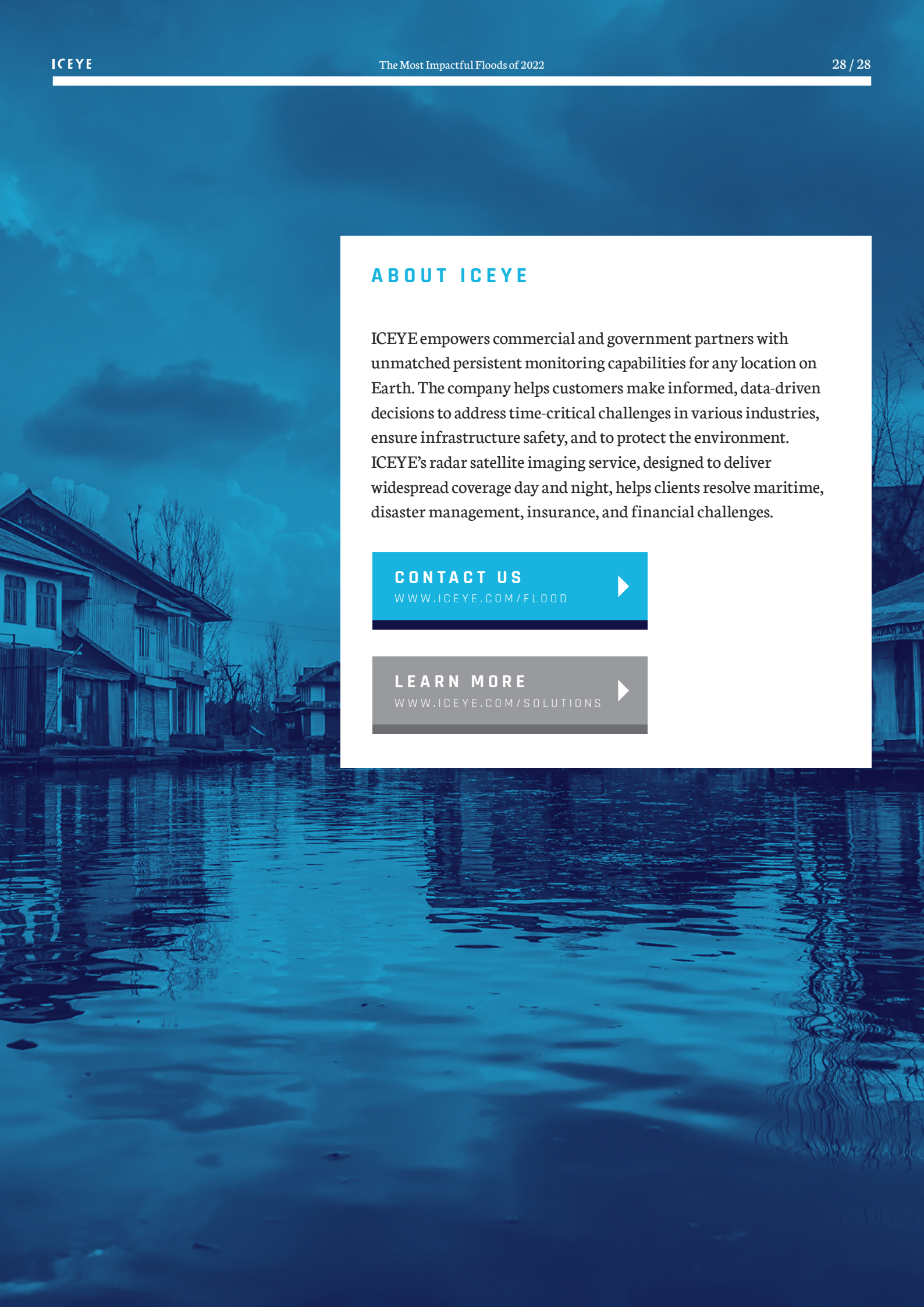
FLOOD PEAK

0-1 DAYS POST-FLOOD

- We communicate with our customers on decision to initiate analysis (>100 buildings impacted w/ >30cm of water)
- We gather auxiliary data
- Our team sends an observed flood report within a few hours of decision to initiate analysis
- The first release (flood depth, extent, and release notes) is delivered within 24 hours of decision to initiate analysis

>1 DAYS POST-FLOOD

- ICEYE continues to communicate any and all changes to our analysis through additional releases and plans
- As flood evolves and/or more data becomes available, ICEYE will update the data release every 24 hours



ABOUT ICEYE

ICEYE empowers commercial and government partners with unmatched persistent monitoring capabilities for any location on Earth. The company helps customers make informed, data-driven decisions to address time-critical challenges in various industries, ensure infrastructure safety, and to protect the environment. ICEYE's radar satellite imaging service, designed to deliver widespread coverage day and night, helps clients resolve maritime, disaster management, insurance, and financial challenges.

CONTACT US
WWW.ICEYE.COM/FLOOD

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