4. High Water High Cost

25 February 2026, 11:59am

46m 20s

Stuart Whitfield 0:10
Oh.
Yep.
Mm.

Brown, Ella 2:33
Okay, good afternoon, everyone. Let's make a start. So welcome everyone to our High Water, High Cost webinar event, which is the final in our four part Flood Resilience webinar series. I'm Ella Brown and I'm an Environmental Resilience Officer at the City of London Corporation. We are recording today's session and we've muted all mics and the cameras have been turned off. But if you do experience any technical issues,

Stuart Whitfield 2:51
Yeah.

Brown, Ella 2:58
just let us know using in the chat. We're going to have time for questions at the end of both presentations and please use the Q&A function which is at the top of your window to send in questions for our presenters. Today I am joined by Stuart Whitfield from Fathom and Marcus Cree from FIS. Stuart will be presenting first.

Stuart Whitfield 3:16
Yeah.

Brown, Ella 3:17
and he is the CEO of Fathom who deliver water and climate risk intelligence all over the world. As their CEO, Stuart is responsible for the overall direction and performance of the business. And since 2023, its integration within the broader Swiss Re group. I was really interested to hear that Stuart became involved with Fathom when he met the co-founders at a startup speed dating event.

Stuart Whitfield 3:29
Okay.
I.

Brown, Ella 3:40
And today Stuart will be presenting on global Flood Risk and fathoms modelling. So I will share your slides and you can get started, Stuart. Just give me one second.
Beth.

Stuart Whitfield 3:56
Thank you, Ella, and hello, good afternoon, everyone. Next slide, please. As Ella mentioned, I'm Stuart Whitfield. I'm Chief Executive of Fallum. What I'm going to talk about today really is just, I think we probably all know the problem that's globally caused by flooding. I mean, it's the most prevalent natural disaster. And even anecdotally, extreme floods across the world are increasing both in
severity and infrequency. And there's a few images there you can you can see which are you can pick them from anywhere, including including obviously the UK. Next slide, please. What's interesting is the risk is growing. It is now 1/3 of the world's population is exposed to flooding. Insured losses from flooding have increased 30%. in the last decade. It used to be called the insurance industry, what was known as a secondary peril. It's no longer secondary in terms of a whole range of things, not least financial impact. And in the last 30 years, you know, 1.2 trillion you can see in terms of global economic losses caused just from flooding and the insurance gap, in other words, the gap between the actual losses caused and the amount.

Brown, Ella 4:57
Okay.

Stuart Whitfield 5:04
for which those losses are insured increases year on year. Fathom was set up in order to help produce models and data to enable better resilience globally for these things. It came out of, next slide please, a research group at the University of Bristol, Professor Paul Bates.
who's a world authority on that and some of his PhD students founded the business.

And what we try and do, as you'll come on to, is produce useful information and models to deal with this problem globally. We were acquired in December 2023 by Swiss Re, which is one of the world's largest reinsurers.
And part of the motivation for that was to use the models and data that Fathom creates within Swiss Re's own internal ecosystem. They're rare amongst reinsurers and insurers for creating their own models of these things. Most of them, most competitor entities buy from some of the main model vendors out there.
Next slide, please.
I won't dwell on this. We're very science based, as you can imagine, from an organisation coming out of the university, publish a lot of papers, have a lot of citations around that. That's all very interesting, I'm sure. One of the things to bear in mind is that we've understood as an industry how to model floods from a physics equation.
perspective for quite some time now, well, well over 20 years. Next slide, please. And an animation. If you click on that, this is an animation of some modelling that we did here probably a decade ago now in Carlisle, just showing propagation of both river and rainfall.
So fluvial and pluvial flooding over Carlisle. And this isn't anything really new. As I said, this is 10 years old. Lots of modelling companies do this and it's really useful on a very localised scale. Next slide, please. The problem we set out to address is how do you scale?
that capability to model on a wider regional, national and then global scale. And the two founder geeks here, Chris and Andy, who won't mind me calling them that, basically boiled it down to a few fairly fundamental things that need to be solved at a global level, because there isn't
Sadly enough, compute to do the kind of things we wanted to do.
in the way we were doing it. So first of all, you need a pretty good terrain map. We produced peer reviewed the best global terrain map that exists, and that actually shows you where the height of terrain is, you know, with buildings and trees stripped out, which is pretty much essential. You then need to model the river channels, the size,
depth of those, where they actually are. We model every river channel globally, again, using a combination of algorithmic modelling and observation based. We then need decent models for what's actually happening in terms of rainfall and other events. You then need to

build your physics models so that they are capable of running without needing, you know, exascale computing. And you've got to put all of this into a workflow that means that the whole thing can work. So next slide, please.
What?
What's been created now from an Alp?
come to this in a little more detail later on. What's been created in terms of our global models are models which compare incredibly well with national scale models, whether that's those created here in the UK by the Environment Agency or in this example here, the US government
create their own models. They've spent over $10 billion so far, partially modelling the US and with partial success. And you'll have seen in the press the last year there were some notable issues where FEMA maps had been deficient and warnings weren't given, although this is a common thing.
Next slide, please. We also obviously model not just in the US, not just everywhere else in the world, but here in the UK, you know, the Monmouth floods late last year were pretty accurately modelled and can be represented. Next slide, please. And the same.
in terms of anywhere in the world. So that's a really quick whistle stop through the kind of stuff that we do, how it's useful. I think what's...
What's probably more interesting potentially is what about the future? All of these models are based on historic observations and events and modelled the world as it is based on those broadly in 2020 or 2022, depending on the specific model you're talking about.
But as we all know, we're living in a changing world. Next slide, please. We published this paper in, I can't quite read it, it's so small on my screen, 2022. And specifically, we were looking at the effects of climate change in the US and its effect on different populations. And
What one typically sees is that lower socioeconomic groups suffer worse from the effects of flooding. There's a whole host of reasons for that, which I can come on to if people are interested. But this is a good example. I mean, what we see with climate change is increased risk.
Flood risk in the US increasing 97% by 2050. I think in the UK, we're likely to see by the same date, one in six houses being at risk of flooding increasing to one in four. We'll come back to that a little bit later on.
But what's particularly interesting is that of that, you know, 97% increase in risk for

property across the US, that's both commercial and residential. The biggest driver of that is not climate change in itself, only 19% is due to climate change.
The biggest driver is what human beings do. A combination of population growth and also where we decide to build homes, factories, hospitals, schools, all the rest of it. And then there's a smaller compound effect between the two things. So
When you read about, you know, the increased flood risk owing to climate change, whether it's sea level rise or rivers or rainfall, just bear in mind that quite a lot of that effect is something that we're able to control should we decide we want to control it. And it's not quite as straightforward as that. Just an interesting stat for those of you Many will know this already, but for every one degree rise, one degree centigrade rise in.
in average air temperature, the atmosphere is able to hold 7% more moisture, which is one of the reasons that we see we're getting wetter winters and when we do get rain, we're getting more severe rain, but in this country and across the world. Next slide, please. Similar drivers as to in the US, we have increased urbanization, changing land use. We also have an ageing infrastructure, which isn't particularly helping. We've got increasing summer downpours, intensity increasing by 25% across the UK, some sea level rise still, and wetter winters and more saturated ground, which we've seen certainly over the last
sort of five weeks, which has been pretty grim. I mentioned the Environment Agency says that by 2050, one in four properties in England are going to be at risk, up from one in six. And the Environment Agency's own flood maps, which were updated not that long ago, now do take into account
the effects of climate change in terms of analysing flood risk. They've made a pretty conservative assumption in the sense that it's conservative once planning in accordance with it, whereby they've used the higher climate change assumption of a four
4 degree centigrade rise by 2100. I think most scientists think that's an outlier, but for the purposes of planning, it obviously doesn't do any harm. So there's an updated national planning framework in the UK in 2025 and the flood risk requirements of developers.
and others constructing were made more explicit then. So things like introduction of mandatory drainage systems, tighter need for more formal flood risk assessments were introduced. But despite all of that, you'll see the headlines here. You know, the recent Aviva report showing that of all

the new builds due to be built in the UK, one in nine are still likely to be in areas of flood risk. And of those, one in nine, I think something like 32 percent of them are due to be built in London, so Greater London and Essex.
The other thing worth bearing in mind is that despite all of the planning guidance and the mandatory drainage systems and formal flood risk assessments, is that, you know, flood risk in relation to individual buildings is not something that's easily obtained from
public data sets. The UK is one of the best in the world, but it's by no means perfect. So, you know, asset level analyses are often required either using products such as the ones that we have or that FIS Global can talk about in a few minutes time.
And even then, these are only best guesses, state-of-the-art models. And there's a well known saying, all models are wrong, some models are useful. You know, we continue to evolve those models, but they are only inevitably as good as the input data that exists. And even in the most well mapped countries across the world, Information about flood defences is incomplete. River gauges are not are not by any means ubiquitous, so a lot of that information has to be inferred using latest machine learning and other and other techniques. You can see here the headline around in around Flood Re.
There is going to be a limit here. We will at some point reach a stage where properties genuinely become uninsurable and as we saw in Wales recently, it's cheaper simply to.
evacuate those properties and go elsewhere. And what we're also seeing, we're seeing this more globally, is that long-term investors are starting to apply some of the tools that you would previously only use in the insurance industry, things called catastrophe models, which look not only at
individual flood risk at a particular point on a map, but they'll look at what are called event sets, so plausible things that could happen across a broader geographic area. So you can start to see spatial correlations and you can start to analyse more accurately what portfolio risk is across either an investment portfolio
Or your own.
your own portfolio. And we do a lot of work with data centres and solar power and these kind of tools are getting quite useful and helpful now. And all of a sudden, the sort of 25, 30 year time limits that many, particularly in the insurance industry, weren't particularly interested in are now
Particularly in a very germane.

What else to say? There's new legislation coming all along. Next slide, please. We are working closely in Australia at the moment with the government there and with Suncorp and we've been informing the changes to the legislation around climate resilient planning. This is happening everywhere. There's no global standard. Everything is piecemeal.
Lots of things are inconsistent, as one would expect. And in exactly the same way as when we're looking at physical planning, environmental, social and governance data providers, ESG data providers that provide data to enterprises and governments.
are also on top of this issue. FIS will explain some of the work that they do and some of the information that their platform can serve up in that respect. Final slide for me, really, and this really is a whistle stop. So, you know, if anyone wants to delve more deeply into anything I've touched on
or in fact anything I haven't touched on, apart from speed dating at startup events in Bristol. Then obviously put a question in the questions. Just an example here. I mean, what we do isn't limited to any particular vertical. We pride ourselves on
providing the best data that's available, how that data is used, how it's ingested into platforms, what analytics and sort of decision grade outputs derived from that is then in the hands of our partners and our clients. And we, you know, we work very closely with all of the entities.
on the screen as well as FIS to make sure that the end clients of those entities can plan to be more resilient. So I think that's probably my 15 minutes slightly overrun. So thanks for your attention. Hope some of that resonated and as I say, happy to answer some questions later.

Brown, Ella 19:02
Thank you, Stuart. You already pointed the global picture of Fathom's work all over the world. Yeah, please do use it. I can see some Q&A's already coming in, but we will come back to that at the end of our next presentation. Our second speaker is Marcus Cree, who is a risk specialist at the financial technology company FIS Global. Marcus is going to be presenting on the practical use of mitigation and also reporting of climate related flood losses. So in Marcus's role, he leads on designing and implementing practical climate risk management solutions and uses his expertise in financial modelling and technology and also risk optimization. Also alongside his role at FIS,

Stuart Whitfield 19:28
Me.

Brown, Ella 19:42
Marcus teaches a climate-related financial risk management course that he designed himself at NYU's Tandon School of Engineering. Over to you to share your slides, Marcus.

Cree, Marcus 19:54
Thank you. Let me just get going.
Okay.
Hi, everybody. Pleasure to be here, and, like Stuart, I will.
take you on a little bit of a whistle-stop tour of what we do at FIS with regards to the climate and the flood information. To explain a little about the relationship we have with Fathom,

Cree, Marcus 20:29
We will see as we go through this that we cover a range of climate related risks. And when it comes to flooding, we will have base flooding data that we use, we offer Fathom and we work with them within the sort of premium.

Cree, Marcus 20:49
version of what we do for the enhanced Flood model.
Thanks.
Yeah.
Okay, so why do we do anything at all? The key thing is, and Stuart quite nicely touched on a few of these things, it is becoming increasingly important for corporations to understand for their own needs

Cree, Marcus 21:21
what risks they face and how those will increase specifically due to climate. Some of

this is for reporting purposes. There's quite onerous reporting in some places, quite light reporting in others.

Cree, Marcus 21:37
As you just mentioned, I live in New York. We have quite light requirements in the US in general at the moment. Other places more strenuous.
But it's not just the reporting. And I think sometimes we sort of forget this, that actually investors care. And, you know, Stuart just mentioned that portfolios of assets needs to be assessed.
The we can potentially.
We can look at transitional risk as one thing when it comes to climate change, but physical risk isn't going to go anywhere.
And so investors need to know particularly where those, where things like supply chains are, what can get impacted. And that can be anything from, you know, that can be ports, it can be warehouses, it can be distribution centres.

Cree, Marcus 22:31
But to model all of that, we obviously have to look forward multiple years over the investment horizons that are being used. And we have to look at different types of projections, the different outcomes, typically the different countries that get used.

Stuart Whitfield 22:33
Yeah.

Cree, Marcus 22:50
To give you an idea of what our, the way we approach this with our climate, our climate risk modelling.

Stuart Whitfield 22:51
Yeah.

Cree, Marcus 23:00
You can see a little on the step in green is what we model.
The stuff in red here are really the questions that we would expect any given corporation to ask.

how climate may or may not play into their forward-looking strategy. If you have a very short-term strategy in four or five years, then it's not very much. But quite often, the return on investments of new assets can go much further than that.
and it becomes quite crucial to understand what these risks are.
Now, one of the things that we are most focused on is the insurance cost.
The reason for that is, there's choices. You can, if you have an asset at risk, you can move it, you can harden that asset, you can insure it, or you can ignore it. But every one of those things is an active choice that you're making.
And if we distil that down into the increase in insurance costs due to those perils, it gives us a kind of a level playing field that we can then use for reporting purposes.
And who's interested in this in any of the corporations we deal with? And by the way, when I say corporations, that can be banks, financing, real estate companies, as well as corporations with quite advanced, you know, quite complicated supply chains.
Well, it's literally almost everybody that gets impacted. We find in general, it's going to be the supply chain and the risk and resilience teams who are most consciously aware of the need to be looking at this. But then once we are working with a company,
that very quickly spreads to insurance facilities and sustainability. Funnily enough, sustainability will tend to be the sort of almost the least.

Stuart Whitfield 24:52
Yeah.

Cree, Marcus 25:05
I'll do the reporting, but the risk and resilience in supply chain and increasingly the logistics are the most impacted as business units.
And again, Stuart mentioned there are data available. And there is a source set of data. So when we model these, we have to use teams of climate scientists to actually model these out. At the base, though, when we look at the different pathways, we can use information.

Stuart Whitfield 25:26
Thank you.
Thanks.

Cree, Marcus 25:37
and that comes out of places like the NDFS as the start point for that. And that tells us, well, we can see, you can see from these maps here, there is expected to be both quite a dramatic increase in these weather events, particularly these wet weather events,
and the estimates of the costs due to those physical changes is really quite extensive. But it's difficult because when we start thinking about how we model this, we have to we have to think about.
more than just where our assets are. We have to think where our suppliers' assets are. Where do we move things through? Sports in particular are an area of concern when it comes to damage, because there's been quite a lot of reporting over the last few years, but they are
quite under-invested when it comes to Harding the asset supports, but they are truly crucial. You couldn't really be any more crucial when it comes to the global supply chain.
The reporting equally, that will, I mentioned earlier, that that can be quite built out in certain places, less so here in the US, but you know, it can get quite complicated. But one thing that they always want you to do is to break down these things in their kind of likelihood, their probabilities.
So we have to have a way of mapping around that, and that's where the complexity comes in.
And this is where tools like ours.
This is this is where we come in. So, if someone's using the founder model here, they'll have the advanced Flood data in, as well as the as well as the other perils. And what we will then aim to do is map every asset, every physical asset,

Stuart Whitfield 27:24
Play.

Cree, Marcus 27:41
that our clients put into the system. And we will break that down into its insurable and uninsurable losses.

Stuart Whitfield 27:48
It.

Cree, Marcus 27:51
We'll order that by the financial impact of the business, as well as the probability of something happening. We will do that against three different pathways. There'll be the low pathway, which equates to, broadly speaking, about 3 degrees heating by the end of the century, as the 2.6.
then it'll be the 4.5, it's about 3 1/2 and then there's the hothouse world then in the 8.5 and that that gets much hotter so 60 degrees plus by the end of the center.

Stuart Whitfield 28:22
I.

Cree, Marcus 28:25
That will give us, that will contribute to us then being able to project out along each one of those pathways, how those losses are likely to increase. And we will do this in five year increments. So as we go forward, we'll be able to tell our customers what those said, we'll break this down into insurance costs.
Um...

Stuart Whitfield 28:48
Yeah.

Cree, Marcus 28:48
is built on quite an advanced actuarial platform that FIS have had for a long time. So we can metricize that data in terms of the costs incurred by the clients just to ensure.

Stuart Whitfield 28:58
Yeah.

Cree, Marcus 29:06
It being an actuarial platform, where it's important that we actually give the details, you know, you've got to put the receipt thing as it were, so we will put the whole

distribution in. This becomes useful because clients will think about whether they insure or whether they self-insure.

Stuart Whitfield 29:11
Okay.

Cree, Marcus 29:25
What that means in simple terms is if you self-insure, you start looking at the 90th to the 95th percentile of the loss distribution. Whereas if you're part of the bigger pool and you're on insurance, that's much more likely to be around the 60 to 70th percentile.

Stuart Whitfield 29:27
Ihsan.
Yeah.
Yeah.

Cree, Marcus 29:46
So that's a consideration that more and more organisations are thinking of. And interestingly, if we look in, actually particularly in sort of high blood zones,
you are getting into a position where some insurance companies are actually considering whether or not they'll remain offering that coverage in those areas. So self-insurance starts to become the only option if those areas are needed. So those costs are quite material.

Stuart Whitfield 30:01
Play.
Yeah.

Cree, Marcus 30:20
We also.
Allow.
What if type analysis, and this includes Harding of assets, so putting in Flood defenses.
This probably is the main use case for many of our companies. If they want to see

what the ROI is, you want to see, is it worth it? They know what the cost to begin with of putting as Harding certain key assets or assets at risk is. But then looking forward, we can show them what
what that would save in terms of insurance costs. That's losses, deductibles, premiums.
going forward. So it just enables those strategic decisions to have the financial analysis added to them that we need.
And obviously, everything has to be reported. If we can't report it, we have to report it these days in a 10K, often for ESG type reporting, but you know, investor relations is increasingly demanding.
Like I said, that was, I tried to kind of follow Stuart lead and be as, just to give you a rapid overview of the way we look at the problem, a little bit of how we work with talent. And, you know, that is the key. We can move it, ensure it, harm it or ignore it. But whatever we do,
It's an actual decision that we're making in terms of that particular risk management.
And I will stop there, and we can move to...
Q&A.

Brown, Ella 32:06
Yeah, thank you, Marcus. So I'll dive straight in. I can see you replied to this, Stuart, but I'm going to read out for the purposes of everyone else who might not have seen it. So we've got a question about which software stack do you use with, which, sorry, which software stack do you work with and also what data infrastructure Assuming many models require a lot of computational power.

Stuart Whitfield 32:31
Yeah, I put a very brief thing in there in terms of software stack. Let's not get into too much of technical detail, partly because I can't, I'm not, I'm a simple lawyer by background as opposed to a computer scientist. Most of the models now, originally everything was coded in MATLAB many years ago. That's been migrated across mainly to Python, not exclusively.

Cree, Marcus 32:41
Yeah.

Stuart Whitfield 32:52
And we have an on-prem compute facility here in Bristol. We're based in the Gherkin and also in Bristol. We have an on-prem facility here, which we then use when we do a new model run. If we do a new global run, that will take us some months to do. And then once that's that date, those data outputs have been generated.
We'll store them both on-prem here and then also in the cloud with Amazon and Google, and then make them available either on-prem for customers. So FIS, for instance, will have all of our global data sets, both current and future, stored on their own servers, which they can then
used to serve up the results into their platform, or you can get it via API. So you can ping the API either with a point or series of points in a line. So for a railway or a polygon, you can define a shape and then get a return based on that.
Kind of answers that.

Brown, Ella 33:51
Yes, thank you. The next one is, I think, aimed at Marcus. So they are asking how are insurance companies reacting to the outputs of flood risk analysis? So how much are they increasing their premiums for coverage? And the question asker has given an example, for instance, in the Carlisle area, has it become insurable as it's been flooded in 2005 and 2015 and will continue to do so in the future?

Stuart Whitfield 34:10
Yeah.

Cree, Marcus 34:17
Sam.
Good question. And it can be a little more, it's a little more nuanced with the way the insurance companies are actually going. I've certainly spoken to
some insurers who are actively looking to exit areas and that becomes a sort of strategic decision that they make.
It's interesting if you, I know the UK works a little differently. It's interesting in the US how you see certain states and insurers not wanting to be in those states.

Stuart Whitfield 34:48
You.

Cree, Marcus 34:59
It actually has gone quite dramatically up. Sometimes they will explicitly exclude certain risks, you know, such as flooding.

Stuart Whitfield 35:00
Yeah.

Cree, Marcus 35:11
But it's not as pronounced as you might have thought.
The for the insurance companies, they're aware they will be looking one year forward, and they'll reassess the premium as you go. So, yes, it will increase, but what we find is our corporate customers, their most concern is that the insurance companies will exit those areas.

Stuart Whitfield 35:17
Play.
It.
Yeah.

Cree, Marcus 35:36
within the lifetime of that asset. So whilst they can get the insurance now, they may not be able to get it in four or five years. So most of the conversations that certainly I have with either the people providing or analysing that insurance is that, yes, you've got increases

Stuart Whitfield 35:45
Yes.

Cree, Marcus 35:56
in the short term, it's difficult to quantify exactly how much, but some of them are quite steep in high risk areas. But really the conversation is about whether there will

be insurance in those areas at all later on. So if you, that's sort of it's difficult to put a high level of

Brown, Ella 36:03
Mm.

Cree, Marcus 36:17
Quantification on it now.

Brown, Ella 36:23
So, I guess it's interesting to think on this call, we've probably got people who might be residents of the square mile, business owners, other local authority workers. So, I think for Stuart, with your with your models and mapping, what can these what these what can these models help your typical person who might live in a flood area?

Brown, Ella 36:41
Flood Risk area, just kind of bringing it back down to that kind of, yeah, their daily experience, how can your models help them?

Stuart Whitfield 36:50
Well, a lot of it will, and I'm sorry to caveat it in a legalist way, a lot of it will be kind of it depends, it depends where those people are living, it depends whether you're talking about their residential lives in terms of where they live in their houses or where they work. If you're looking at London,
The centre of London is built to pretty high Flood standards. I think you know most of the City is designed to is designed to, you know, withstand one in 5000 return year return periods, including surface water as well. So, it's reasonably well protected. It's not perfect, and obviously there's...
I won't talk about Thames Barriers. Thames Barrier is really important to London. As you move out of that, you move towards more residential areas. Then I'd encourage people to use within the UK, you know, all the tools that are available to understand individual flood risk. The UK has some of the best data available on this, both open source data via Environment Agency and other sources.
and via commercial providers. Some other, you know, there are some really good flood modelling businesses based out of the UK. No surprise there, given how wet it

is. And, you know, pitching those things together, so finding those things together is important. We fortunately have not.
Suffered in the U.K. from.
I don't know how delicately to put it, some of the sort of over claiming for the accuracy of flood models that you have in some other countries. There's been some challenges in the US where some of the, you know, the equivalents of Rightmove and Zoopla over there have been providing
flood scores and that has effectively made some properties devalued or difficult to ensure and particularly where those flood scores have purported to look into the future and give incredibly accurate property level quantification of the effects of future climate change and the actual cost of remedying that.
all of that needs to be taken with a very high pinch of salt. Many of these models were never designed to operate at that level of granularity. So, you know, a word of warning there is, yeah, models are really useful, but they're really useful only when used within the context for which the model was designed.
We've got better models than that in the UK that are more granular. And I just encourage people to, you know, whenever looking at flood reports, when they buy houses, for instance, just read the small print on them, understand what they can be used for, but also, as importantly, what they can't be used for.

Brown, Ella 39:22
Mm.

Stuart Whitfield 39:38
We, you know, fortunately, lenders in this country have a more, well, a more, that's the wrong way of putting it, have an educated approach around this still. So it's less of an issue than it has become in, say, the US and some other parts of the world.

Brown, Ella 39:55
Thanks, Stuart. Yeah, I think it's really important to think about. There's a whole other area in terms of being able to understand that small print, even as someone who works in the flood risk industry, I think there's, yeah, way more education or skills to be improved on that. Mark, has a question for you. So on your slide where you spoke through the kind of what if,

Stuart Whitfield 40:06
You.

Brown, Ella 40:16
situation where you can almost incorporate different types of flood defenses. I was wondering, has there been any progress or maybe within your model of say, I'm assuming here that you are just including those kind of hard concrete flood defenses. But I was wondering whether there's possibility or potential to include

Stuart Whitfield 40:24
Yeah.
Um...

Brown, Ella 40:35
things such as nature-based solutions or the kind of more social adaptation things that we can do in terms of education or community responses or whether, yeah, your model is just those hard flood defences.

Stuart Whitfield 40:38
Yeah.

Cree, Marcus 40:50
The the the kind of less so on the the the kind of.
educational side. When it comes to any kind of defence against the climate peril, we will look at multiple ones. The question is, can we can we actively quantify what is what is the impact for them? If there's enough

Stuart Whitfield 40:58
Yeah.

Brown, Ella 40:59
Mhm.

Stuart Whitfield 41:00

The.
Yeah.

Cree, Marcus 41:16
If there's enough evidence for us to back that up, if we can, you know, if we can, if we have the documentation to show that that will be like a nature-based solution, for instance, that's something that we would be able to look at, as long as we can actually put in the, you know, we can

Brown, Ella 41:18
Mhm.

Cree, Marcus 41:37
back into how that mitigation effect will actually work.
Um, we won't just put it in and...

Stuart Whitfield 41:44
And.

Cree, Marcus 41:45
You can't just put something into any kind of a risk model and say that is mitigated to X degree and nothing. There has to be something behind it, because in the end, we're looking for, you know, decisions to be made on. I'll give you briefly a sort of like a non-flood, a non-flood example, which I think is illustrative.

Stuart Whitfield 41:45
Oh

Brown, Ella 41:57
Mhm.

Cree, Marcus 42:05
There's clearance for wildfire. So if you have clearance of of the floors, you clear the debris away, then that in and of itself is a reasonably effective mitigation against those things from occurring.

You can also, and that same thing, have sort of exit and escape routes that changes things. So there are, there are, as long as it's been studied, looked at, and we can look at what that mitigation effect is, then it can be included. And to be fair, it's an evolving.

Stuart Whitfield 42:30
Mm.

Cree, Marcus 42:45
It's an evolving science. So we are constantly looking at adding new mitigations in, you know, as well as new perils. You know, climate's a big thing. You've got heating costs, cooling costs, flooding, different types of flooding. So it's all of the both the perils and the mitigations evolve.
reasonably, reasonably rapidly as we go through.

Brown, Ella 43:09
Mhm.
Thank you. And then I think one question, time for one more question, and this is around the use of kind of local gauges to provide accurate warnings. And so I guess the Environment Agency have only got so many that they use for their own kind of models and reporting. So this is just asking whether
investment in local monitoring gauges is an area that, an investment area. I don't know if you have any thoughts on this, Stuart.

Stuart Whitfield 43:38
Yeah.
Absolutely. It's an area that's needed, you know, the better the data, the better the modelling that can be done and the better the real, the near real time response that can take place. There's a business based here in the UK called Provisico, I think that's spun out of
Loughborough University that focuses on just that, on pluvial flooding, rainfall flooding, what sometimes called flash flooding, surface water flooding. And, you know, they use a whole bunch of data inputs into their models to provide really good, I don't have any...
any relationship with them, by the way, before I'm plugging them. But they provide

really good real time forecasting of what's happening on the literally on the ground. And part of their solution is involves installing sensors. So they'll set up a whole bunch of IoT sensors that can monitor in real time and
you know, provide these warnings. And it doesn't actually take, you know, if you are sufficiently precise and timely in this, it's surprising, you know, how good the mitigation effects can be. It doesn't solve necessarily the problem longer term if it's only been designed for that. But yeah, absolutely investment in sensors.

Brown, Ella 44:55
Mm.

Stuart Whitfield 45:02
You know, it does help massively.

Brown, Ella 45:06
Great. So thank you so much for everyone's questions. That was really interesting. Before everyone leaves, I just want to take a moment to share our final toolkit takeaways, which I've just posted in the chat. So the first one is a really useful flood insurance directory that I found on the Flood Hub, which lists all the kind of specialist companies and brokers.
This links nicely to our next takeaway, which is whether if you do live in a flood risk area, you own property or you operate a business, I would really recommend checking out that you do have flood insurance cover. And then also finally, making sure that you have paper and digital copies of key documents saved in a safe location for when you might need to easily access them if an incident were to occur. I'm going to post a link to our feedback survey in the chat in just a second, as we really hope to be back with more events, as this is the last one in our series, but it would be great to have events that are shaped and improved by your feedback. And yeah, thank you again for attending our series, and thanks especially to Marcus and Stuart for taking the time to present today.

Stuart Whitfield 45:54
Yeah.

Brown, Ella 46:08
be part of our event and yeah I wish you all a good day. Thank you very much.

Stuart Whitfield 46:12
Thanks, Ella.

Brown, Ella 46:13
Bye.
Cree, Marcus 46:14
Thank you.

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