

Nate Hegyi: This is Outside/In. I'm Nate Hegyi.

[ambi: wave sounds]

Kim Cobb: it was just raining nonstop. It was constantly torrentially raining.

In 1997, Kim Cobb set sail from Honolulu into the vast Pacific Ocean.

It was VERY choppy.

Kim Cobb: So you'd have these squall lines sweeping through these thunderstorm systems that would be dumping extreme amounts of rainfall, kicking up quite a wind, which would in turn kick up waves in the ocean.

Maybe you've heard of storm chasers. These are the folks you see driving *towards* extreme weather... while the rest of us are busy evacuating.

That's Kim Cobb. Only she isn't chasing hurricanes or tornadoes... She chases... El Nino.

Kim Cobb: and to be at the equator during the largest El Nino event on record is kind of a gift to somebody who would later call themselves an El Nino chaser.

[ocean AMBI out, MUX in and under]

<<NUTGRAF >>

In case you hadn't heard, El Nino is back in the news in a BIG way.

https://www.youtube.com/watch?v=sPQka_dIZ2k

News anchor: Well after months of anticipation, the world meteorological organization has made the call...El Nino...is back.

Nate Hegyi: and this time, it's supposed to be...A BIG ONE. A sneak preview of a world scorched by global warming.

<https://www.youtube.com/watch?v=lx68okMe2fo&t=4s>

We will see more storms, we will see more droughts. It could even get close to the 1.5C temperature threshold and would give us a glimpse perhaps of the climate in the future.

Given how intense climate news has been lately, that sounds really scary. And yet, whenever El Nino is in the news, the first question on a lot of people's lips is... Wait. What's El Nino again?

Nate Hegyi: Well – you're about to find out.

This is Outside/In.

I'm Nate Hegyi.

Stay tuned.

<<FIRST HALF>>

So there have been three BIG El Nino events in the past forty years or so...

In the early 1980s...

Then again in the late nineties...

And finally, in 2015 / 2016.

But the only thing some folks remember from all those years is a single Saturday Night Live skit featuring Chris Farley.

<https://youtu.be/H0-pHnykC9s?t=11>

Chris Farley: I am El Nino. All other tropical storms must bow before El Nino. For those of you who don't habla espanol, El Nino is Spanish for...the Nino.

Emily Becker: The number one misconception of El Nino is that it's a storm, I think we have Chris Farley to thank for this.

So that's Emily Becker. She's a climate scientist at NOAA, the National Oceanic and Atmospheric Administration, and she's one of three experts today.

We're also speaking with—

Kim Cobb: Kim Cobb.

Professor in environmental and planetary studies at Brown University.

Kim Cobb: An El Nino chaser

And

Ángel Muñoz: Can you hear me?

Climate scientist, Ángel Muñoz [ahn-HEHL moon-YOHZ],

Ángel Muñoz: and I'm a senior researcher at the Barcelona Supercomputer center.

Nate Hegyi: So here's my theory on why El Nino is so hard to grasp.

[MUX IN]

First of all, it's not just a weather event – it's a global shift in weather *patterns*.

Second, El Nino tends to show up when it wants to. It doesn't have a predictable season, or cycle.

But one mystery I can answer is why it's called El Nino.

It started Centuries ago. Every year off the coast of northern Peru, fishermen noticed the ocean waters warmed up....

And that used to coincide with with, you know, December and actually with Christmas time.

And those warmer waters would bring different tropical fish species and crabs, instead of the usual anchovies.

They viewed this as a blessing, as a gift, and so they named it after the arrival of baby Jesus

So in the Spanish, the the Christmas child, we call it El Nino.

Eventually the term El Nino changed.

Now it refers to this much bigger climate trend – one that spans the entire Pacific Ocean, and increases temperatures around the globe. And that bigger phenomenon? It begins with a change in the wind.

Emily Becker: the trade winds are steady winds that blow across the equator.

Kim Cobb: They're very strong.

Emily Becker: Tradesmen would sail with those winds. That's why they called the trade winds.

Kim Cobb: and they pretty much never change.

Even though the weather on Earth can seem all over the place, most of it, including the trade winds, can be chalked up to the same basic physics.

Warm air rises. Cold air sinks.

Combine those two things with the spinning of the planet, and the movement of all that air and a whole lot of moisture across oceans and mountains...

And what you get is a somewhat predictable set of weather patterns.

It rains a lot in Seattle. Indonesia has a monsoon season. The Sahara desert is dry as a bone. All part of the same sets of patterns.

The Trade Winds are supposed to be like that. Normally, they blow warm water from the Americas Westward, towards Asia and Australia.

[ocean wind ambi: pan right to left]

That causes cold water from deep in the ocean to come up, cooling the coastal waters of places like Mexico and Peru.

But during an El Nino, those winds mysteriously slow down

[ocean wind ambi stops]

Sometimes....they even reverse directions

[ocean wind ambi: pan left to right]

and then the ocean temperatures kind of flip sides.

Kim Cobb: it's like Freaky Friday.

where we have some of the most lush vegetation, we have droughts and wildfires

Countries like Indonesia, their monsoon season practically disappears.

But then in parts of Peru, and the American southwest, which are normally really dry, it's like someone turns on the faucets.

Kim Cobb: The desert western United States becomes a flood plain.

- <https://youtu.be/1pQAEiLZOnc>
parts of northern California looked like the middle of the ocean, they called it the 100 year storm.

- <https://www.youtube.com/watch?v=Lcbqu0G2T3U>
Thousands of homes in jeopardy from mudslides after days of rain. The downpours causing major flooding. ABC's Matt...

Nate Hegyi: This Freaky Friday flip in weather patterns?

It can have some serious ripple effects across the globe, like disease outbreaks of [Cholera in East Africa where flooding led to sewage contamination of drinking water in 2015 and 2016](#).

And then places like Brazil and [Venezuela](#), more rain meant [more mosquitoes...and more mosquito-born virus infections](#) ... diseases like Dengue (DEN-gay) fever and Malaria.

It's hard to quantify the havoc that El Nino brings worldwide. But [One estimate I saw puts the economic damage linked to the 1997-98 El Nino at 5.7 Trillion dollars](#).

And tens of thousands of lives lost.

El Nino is SO powerful, it might even be influencing global migration patterns.

Ángel Muñoz: For example Guatemala Honduras El Salvador

Nate Hegyi: Here's Ángel Muñoz again. Ángel says lots of farmers in these countries are subsistence farmers.

So if you don't have enough rainfall, so you you go to bed with an empty stomach and you cannot feed your your family.

[MUX IN]

At some point, it's so bad that you actually start asking for money to your family or friends or you go to the banks and you ask for for a loan waiting for or hoping for a good year next year.

The following year you expect to have a good a good yield for your crops so you can make some money with your crops to pay the bank back.

But that doesn't happen.

Here's another weird thing about El Nino. It can last anywhere from 9 months - to a couple of years.

So then you have nothing, you know, you literally have nothing.

[MUX BEAT]

Nate Hegyi: Ángel says this can drive people to the cities to look for work. But instead of finding jobs, many find social unrest. gang violence, and more.

Violence is a common thing, So your family is in danger. And at some point you just really, really think about migrate, for example, to the US.

[LONG MUX SWELL AND OUT – SIGNAL NEW SECTION]

El Nino is, of course, just one of MANY factors that might influence why people choose to pack up their lives and move to another country.

But one thing we can say for sure, is that El Nino is part of the equation, and...that it's getting stronger....

We only started getting good scientific measurements in 1982-83, during a REALLY strong El Nino.

And then the 1997-98 El Nino was even bigger.

And then came 2015.

<https://www.youtube.com/watch?v=2DyrMqjg-4g&t=52s>

Forecasters now say a so-called godzilla El Nino....

<https://youtu.be/1ipFyV6rduE?t=12>

A Godzilla El Nino

<https://youtu.be/-yXw8Hwla8w?t=8>

A Godzilla El Nino, it could bring once in a generation storms to the west this winter.

Once in a generation? Try...once every handful of years.

Kim Cobb: eight years between the 2015 2016 event and the 2023, 2024 event, the shortest recurrence interval ever in the history of instrumental records.

And this El Nino? ... It's projected to be the ***biggest*** one yet.

Which would make this...I don't know, the mecha-Godzilla El Nino? The Super-Godzilla El Nino?

In fact, climate scientists warned that this year's El Nino could push global temperatures close to that 1.5 degrees celsius threshold the world agreed we don't wanna exceed if we wanna avoid the worst impacts of global warming.

Thing is...we're already there. July was the *hottest... month...on record...* officially 1.5 degrees warmer than the pre-industrial era. And those deadly wildfires in Maui? Some [experts are chalking it up to climate change and El Nino](#).

So...welcome to the year 2050?

What does this El Nino-fueled preview tell us? And how can you tell what's climate change and what's El Nino?

Those questions and more, right after the break.

<<MIDROLL - SECOND HALF>>

Welcome back to Outside/In, I'm Nate Hegyi.

[Ship on the oceans ambi]

So we've told you what El Nino is, and why it causes so much havoc for people.

Now, I want to try and explain why climate scientists and El Nino experts focus so much on a very particular underwater habitat.

Kim Cobb: you set sail from Honolulu in my case, and it's really like weeks to get to the Central Pacific.

So in 1997, self-described El Nino chaser Kim Cobb, was on her first of many trips to a string of tropical atolls (AT-tahls) and lagoons south of Hawaii, called the Line Islands.

Kim Cobb: all of a sudden the reef comes into vision from below...

[MUX IN – evoke magical awe & wonder]

Nate Hegyi: It was a coral reef.

it looks a bit like, lava lamps like lay them all out in a massive art installation, And it's all kinds of shades of purple and tans

and every shade of blue and it's just undulating under you in the waves, and all of the light that's shimmering off of it.

[MUX SWELL THEN FADE UNDER AND OUT]

Nate Hegyi: Now, if polar bears are the poster child for climate impacts in the Arctic....corals do the same thing under the sea. But what exactly are they? Are they plants? Are they animals?

Kim Cobb: well corals are animals, but they have algal symbionts inside their tissues. And so that that's what gives them their beautiful colors.

And these microscopic algae embedded in their tissues convert sunlight into food for the coral. In exchange, the of course, the the algal symbionts get a great home in a very competitive real estate landscape.

Nate Hegyi: But when the water around a coral reef gets too hot – like it can during Freaky Friday El Nino, these corals lose their algal buddies.

Kim Cobb: We refer to that as bleaching. The coral is still alive. It's transparent tissue is basically showing just white because of the underlying white skeleton.

And if those coral symbionts don't return, [in a matter of weeks or several months](#), the coral will die from starvation.

Nate Hegyi: Now here's why so much climate coverage seems to revolve around corals.

Corals are an integral part of ocean ecosystems – they act as little nurseries for baby fish, which, in turn, are food for bigger organisms in the food chain.

But also...the decline of ocean health would be a lot harder to notice without them. Kim says that when it comes to other sea creatures...

Kim Cobb: Dolphin populations, whale populations, tuna populations, crab and other crustacea.

It's hard to measure the health of their overall populations. Not so with corals.

Kim Cobb: they are stationary. You can see them by satellite and we can watch them slip through our fingers because they're sitting there for everybody to see.

It kind of reminds me of video games that show a health bar for your life. When the color drains down to nothing...it's game over.

Kim Cobb: coral reefs are a frontline indicator of marine health.

And right now, the frontline indicators are NOT looking so good. When Kim last dove on the Line Island corals, just after the godzilla 2015-16 El Nino, she says they were almost all dead.

Kim Cobb: they succumbed wholesale, every single one of them, to this ocean temperature extreme.

Kim Cobb: When all of this comes together in this kind of perfect storm, year 2023, people have to really be mindful and make sure that they're understanding the climate risks and take them seriously, not just for the six months to come, but for the decades of warming that are already baked in.

[LONG MUX SWELL]

Ok, but here's one more confusing thing to add to my list of why El Nino is such a mystery.

El Nino is a natural type of climate change that goes back way before burning fossil fuels was even a thing...

So then how do we know what's climate change, and what's El Nino? And how are the two interacting with each other?

Short answer is... it's complicated.

But I do have a metaphor.

Ángel Muñoz: you know, I imagine that climate is like a symphony, like an orchestra.

[symphony warming up:

<https://freesound.org/people/dorhel/sounds/162765/>

Alt: <https://www.youtube.com/watch?v=KfSH1ezevjM>

]

This is Ángel Muñoz again. He says to imagine each part of our global weather system as an instrument.

[symphony warm up fade out]

Temperatures, humidity, wind patterns...All of those are working in concert:

Ángel Muñoz: So sometimes you can hear an instrument more clearly.

[ES_Inconvenient Truths - Birghtarm Orchestra: fade in]

Ángel Muñoz: Imagine that this instrument is playing a solo in the symphony

[ES_Inconvenient Truths - Birghtarm Orchestra: clarinet solo]

Climate change, Ángel says, influences the CONDUCTOR of the WHOLE orchestra.

Ángel Muñoz: So in some cases, actually climate change is helping the solo to be louder

[ES_Inconvenient Truths - Birghtarm Orchestra: clarinet soloist only]

Ángel Muñoz: and in some other cases it's diluting it

[ES_Inconvenient Truths - Brightarm Orchestra: clarinet soloist fades out]

Ángel Muñoz: because it's also making louder a few other instruments at the same time.

[ES_Inconvenient Truths - Brightarm Orchestra: fade under and out]

There's actually a great example of this happening right now. Normally El Nino has this effect where it suppresses hurricanes from forming in the Atlantic. It does this by changing the way the winds blow there...

[wind ambi + violin]

which in turn messes up the storm formation process.

So if we were only dealing with El Nino... We could be sure of a quiet hurricane season this year.

But...there's this other thing happening in the Atlantic right now...

[bass drum: BUM BOM BUM BOM BUM BOM]

Super warm water.

[bass drum: BUM BOM]

Climate change is warming Ocean temperatures BIG time. There are coastal waters in Florida that literally topped 100 degrees – the same temperature as a hot tub. A HOT TUB!

And hot ocean temperatures usually supercharge hurricanes.

[bass drum faster tempo: BUMBOMBUMBOMBUMBOM]

So, who's going to win out...El Nino's hurricane dampener?

[wind ambi + violin]

Or the Atlantic ocean's record high temperatures?

[bass drum faster tempo: BUMBOMBUMBOMBUMBOM]

[wind and timpany swell together]

[NOAA just updated their prediction](#), saying the record-high ocean temperatures are probably going to win, and we're gonna have a big hurricane season.

But the only thing we know for sure... is that we are in uncharted territory.

It's a brave new climate world out there.

[ES_Inconvenient Truths - Birghtarm Orchestra]

Kim Cobb: We, we really do have to rise to the challenge of our species and bend our emissions curves as fast as possible so that we can limit the damages. the impacts of global warming on urban heat islands, the impacts of global warming on food production, water resources, infrastructure, extreme rainfall. Flooding. Droughts. Wildfires. Dot, dot, dot.

Maybe this is another reason it's so hard to remember El Nino. That feeling of powerlessness.

Climate change and El Nino – they're too big, too complicated to do anything about.

Well... it's true that we can't stop this year's mega-El Nino.

But we still have time to stop this climate preview from becoming our climate reality.

All this wild weather news – it doesn't have... to become... permanent.

Kim Cobb: it's really important to remember that we're still in driver's seat of our climate future and we have choices to make. They're very important ones. They're going to have a very lasting legacy stretching into the centuries and millennia of our planet's future. And they'll be decided this decade and possibly the next.

<<CREDITS>>

This episode was reported and produced by Felix Poon, and edited by Taylor Quimby, with additional editing by Justine Paradis, and me, Nate Hegyi.

Our team also includes Jeongyoon Han.

Rebecca Lavoie is our Executive Producer.

Special thanks to Jeongyoon Han for playing the violin, and Michael Prentky for the timpani recording. Thanks also to El Nino experts George Adamson and Kevin Trenberth.

Music for this episode is by Blue Dot Sessions, Walt Adams, and Brightarm Orchestra.

Our theme music is by Breakmaster Cylinder.

Outside/In is a production of New Hampshire Public Radio