It will cost billions of dollars to save all the world's threatened species. What's in it for us?

By Michael Marshall

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In 1981, mountain gorillas were at rock-bottom. Confined to a small mountain range in central Africa, with humans encroaching on their habitat bringing poaching and civil war, **their population was estimated at just 254** . They would all have fitted into a single Boeing 747.

Today things look a little better. A survey in 2012 reported that **the population was up to 880** . That is a big improvement, but it's still only two Boeing 747s of

mountain gorillas. They remain **critically endangered**.

We hear similar tales of woe all the time, from all around the world. Whether it's tigers, pandas, California condors or coral reefs, much of the world's wildlife is under threat. It's initially upsetting, and eventually just numbing.

Is it worth worrying about it all? Sure, it will be sad if there aren't any more cute pandas on the planet, but it's not like we depend on them. Besides, surely it's more important to take care of humans – who, let's face it, have their own problems to worry about – than to spend millions of dollars preserving animals. What, in short, is the point of conservation?

Top predators like wolves make ecosystems more diverse (Credit: Eric Baccega/NPL)

On the face of it, there are plenty of reasons why we shouldn't bother to save endangered species. The most obvious is the staggering cost involved.

One study in 2012 estimated that **it would cost $76 billion (£49 billion) a year to preserve threatened land animals** . Saving all the endangered marine species might well cost far more. Why should we spend all that money on wildlife when we could spend it to stop people dying of starvation or disease?

It can be particularly hard to understand why anyone would want to preserve animals like **wolves**, which pose a threat both to people and livestock. Surely there are some species we would be better off without.

The beauty of nature is a good in itself (Credit: Steve Bloom Images/Alamy)

Species go extinct all the time anyway. As well as individual species dying out, there have been five mass extinctions that obliterated swathes of species. The most recent one, 65 million years ago, took out the dinosaurs.

The extinction rate has increased a hundredfold over the last century

If extinction is a natural process that goes on even in the absence of humans, why should we stop it?

One answer is that species are now going extinct far faster than they used to. A recent study estimated that **the extinction rate has increased a hundredfold over the last century**, and we seem to be to blame.

But beyond that, there's a simple reason to save species: because we want to.

Coral reefs support a rich variety of beautiful organisms (Credit: Brandon Cole/NPL)

Many of us love the natural world. We think animals are cute, majestic, or just plain fascinating. We love walking in the dappled sunlight of an old forest, or scuba-diving over a coral reef. Who doesn't think mountain gorillas are awesome?

The fact that some of us find nature beautiful, by itself, won't do

Nature is beautiful, and that aesthetic value is a reason to keep it, just as we preserve artistic masterpieces like the Mona Lisa or Angkor Wat.

The first problem with this argument is that it spells doom for all those animals and plants that people are less fond of: the ugly, the smelly and the just plain obscure. If we don't find them appealing, they're out.

More fundamentally, it comes from a position of luxury and privilege. It's all very well for a moneyed person in the western world to want to preserve tigers because they're nice to look at, but that doesn't cut much ice with a villager in rural India whose family is in danger from one.

So the fact that some of us find nature beautiful, by itself, won't do. There needs to be a more practical reason to keep species around.

Neem trees produce a valuable antifungal chemical (Credit: Dinodia Photos/Alamy)

You often hear it said that we should keep ecosystems like rainforests because they probably contain useful things, in particular medicines. The classic challenge is "what if a plant goes extinct that could be the cure for cancer?"

What happens to all the species that don't make useful things like medicines?

The practice of exploring nature to find commercially useful products is called bioprospecting. It does sometimes lead to useful new things, but it comes with a host of problems.

The first is that we have plenty of ways to find new medicines, which don't involve trekking through thousands of miles of dangerous jungle in the faint hope of finding a miracle plant.

There is also the matter of who controls the knowledge. Often, local people are already aware of the medicinal uses of plants, and object to outsiders trying to co-opt them. **Legal battles have been fought over this** .

And again, what happens to all the species that don't make useful things like medicines? The blood of mountain gorillas is unlikely to contain a cure for cancer. So this argument, while it has some force, doesn't get us very far.

Bumblebees play a big role in pollinating plants (Credit: Russell Cooper/NPL)

The big leap forward came in the 1990s, when biologists started outlining all the ways animals and plants benefit us just by being there. These benefits, which most of us take for granted, are called "ecosystem services".

Many of our crop plants rely on these insects to produce seeds

Some of these services are obvious. For instance, there are plants and animals that we eat. Meanwhile, photosynthetic plankton in the sea, and green plants, provide us with the oxygen we breathe.

These are quite direct, but sometimes the services provided can be more subtle. Pollinating insects like bumblebees are an obvious example.

Many of our crop plants rely on these insects to produce seeds, and would not survive – let alone provide us with food – without them. This is why the decline in pollinating insects has provoked so much concern.

Nature provides us with a host of essential "services" (Credit: MELBA PHOTO AGENCY/Alamy)

To understand how much we rely on ecosystem services, imagine a world where humans are the only species – perhaps in a spaceship far from Earth.

It is far easier to let the existing wildlife do them for us

There are no plants releasing oxygen, so you have to engineer a way to make it yourself. So straight away you need a chemical processing plant on board your ship. That same plant will have to make water too.

There is also nothing to eat, so you must artificially make food. You could synthesise chemicals like sugars and fats, but making it appetising would be extremely hard. As of 2015, **we can't even make an artificial burger that everyone finds convincing** .

Let's not even get started on the microorganisms living in your gut, many of which are beneficial. The point is that, while we could in theory do all these things artificially, it would be very difficult. It is far easier to let the existing wildlife do them for us.

The scale of these ecosystem services, when you add them up, turns out to be extraordinarily large.

How much is all the life on Earth worth? (Credit: NASA)

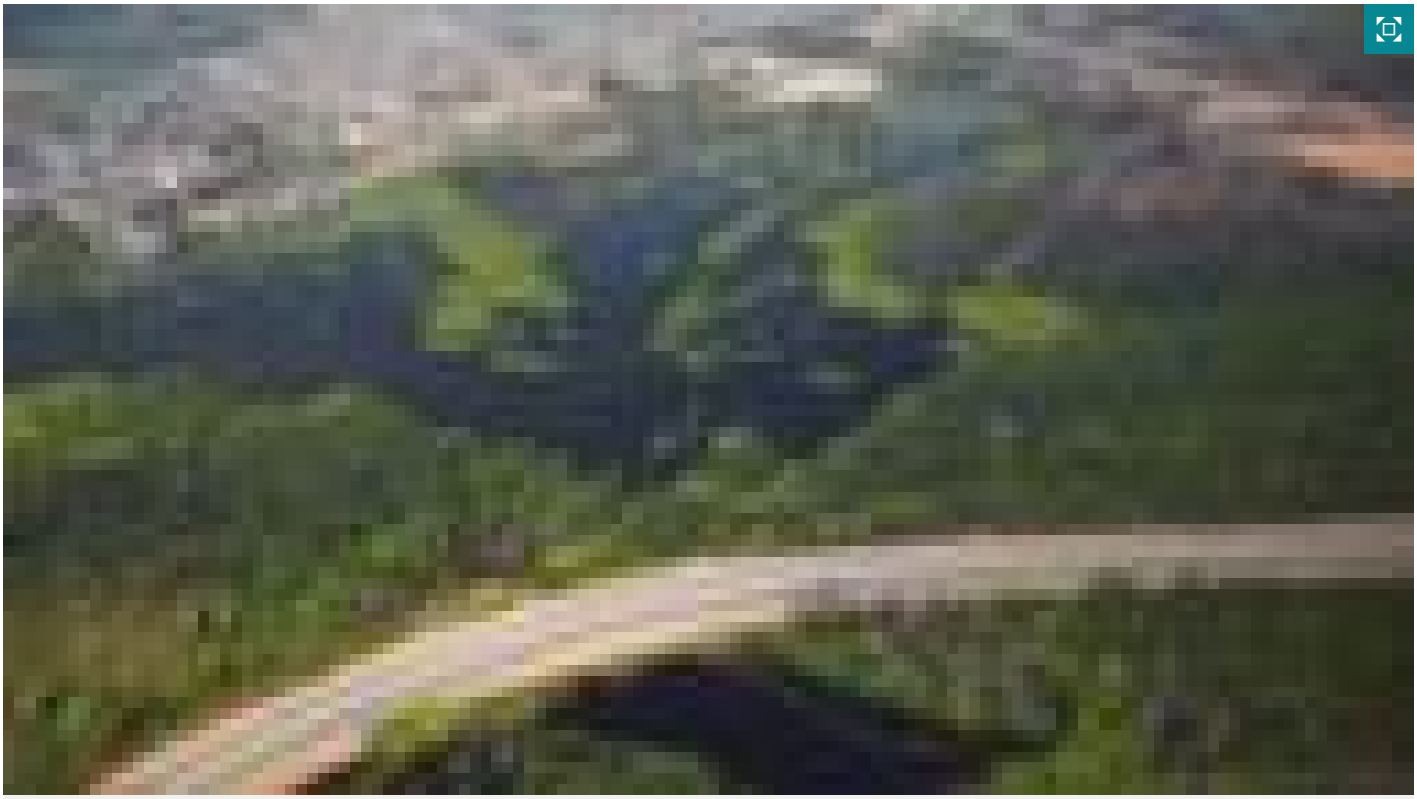
In 1997, ecologist **Robert Costanza** and his colleagues estimated that **the biosphere provides services worth around $33 trillion a year** . For comparison, they noted that the entire global economy at the time produced around $18 trillion a year.

Unchecked species loss would wipe 18% off global economic output by 2050

Five years later, the team took the argument a step further by asking how much we would gain by conserving biodiversity. They concluded that **the benefits would outweigh the costs by a factor of 100**. In other words, conserving nature is a staggeringly good investment.

By contrast, letting species decline and go extinct looks like a bad move. A 2010 study concluded that **unchecked species loss would wipe 18% off global economic output by 2050**.

You may perhaps be feeling that all this talk of economics and growth is strange. It's all rather cold and heartless, without any of the love for the natural world that we were talking about earlier. Well, many environmentalists feel the same way.



Humans are encroaching on the wild areas (Credit: Robert Harding World Imagery/Alamy)

The environmentalist journalist George Monbiot has been a particularly vocal critic.

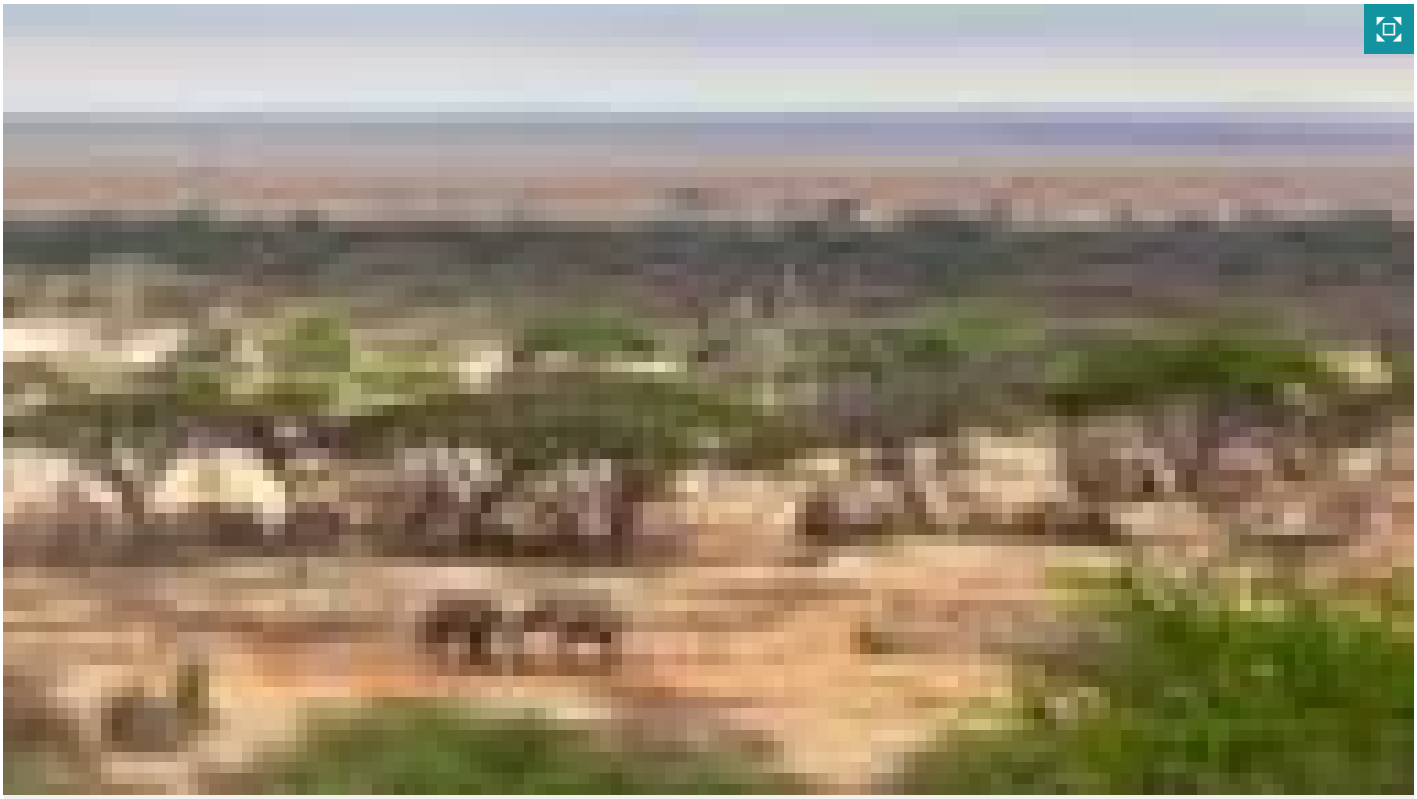
Monbiot argues that the valuations are unreliable, which allows those in power to rig the accounting however they see fit. If someone wants to build a road through an important habitat, they can simply overestimate the benefits of the road and downplay those from the wildlife.

Many conservation groups now support putting a value on ecosystems

"**Forests, fish stocks, biodiversity, hydrological cycles become owned, in effect, by the very interests – corporations, landlords, banks – whose excessive power is most threatening to them**," Monbiot wrote in 2013.

He may well be right that any such system would be open to abuse. The counter-argument is that without such a system, the abuse happens anyway – which is why many conservation groups now support putting a value on ecosystems.

In fact, one of the good things about the idea of ecosystem services is that it is all-encompassing. As a result, the weaker arguments we mentioned before now start to make some sense.



Wild nature is staggeringly beautiful (Credit: Ann & Steve Toon/NPL)

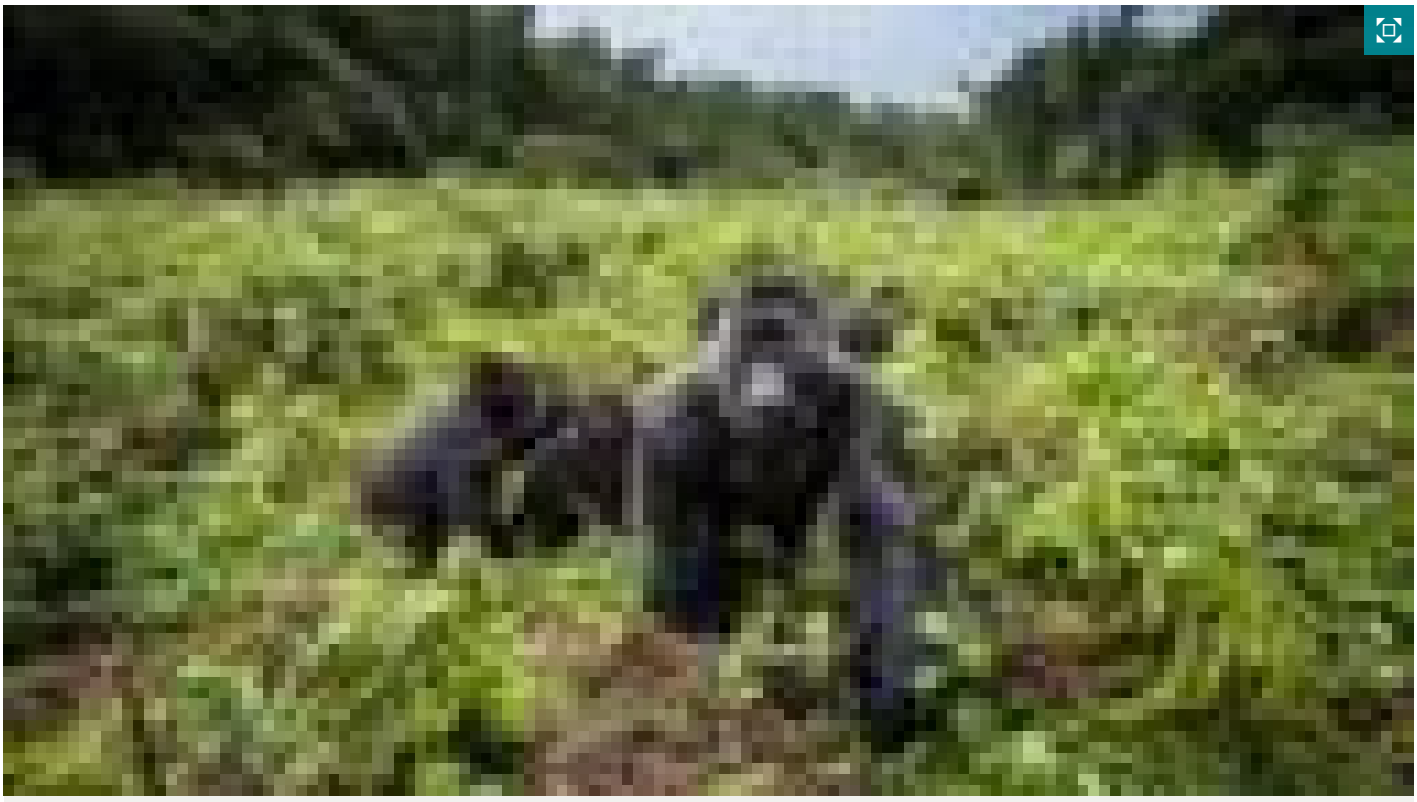
Take the idea that nature is beautiful and we should preserve it for its aesthetics and wonder. Our pleasure at the beauty of nature can now be thought of as an ecosystem service. Nature provides us with beauty.

If we value something and are prepared to pay to have it, then it has value

You may well ask how we can put a price on that. How do you objectively measure beauty?

Well, you can't, but that doesn't stop us deciding what it's worth. We do it all the time with paintings, music and other forms of art. If we value something and are prepared to pay to have it, then it has value.

To do the same thing with nature, we just need a system that allows us to pay to experience it.



Mountain gorillas are almost vanishingly rare (Credit: Christophe Courteau/NPL)

One simple example is safari holidays that take tourists to see mountain gorillas. This is called ecotourism.

Ecotourism offers a way to make the beauty of nature pay for itself

The people running those holidays have a clear incentive to keep the animals safe. The gorillas are their livelihood, and **running these tours may well pay better than other occupations like farming**.

Of course, this idea has its difficulties. Tourists bring unfamiliar diseases with them, **which can pose a threat to the gorillas** – although facemasks can help. Too many visitors can also disrupt gorilla societies.

But in principle, ecotourism offers a way to make the beauty of nature pay for itself.

Humans aren't going to stop building cities anytime soon (Credit: SuperStock/Alamy)

This sort of thinking turns our ideas about conservation on their heads, according to the conservation biologist **Georgina Mace** of University College London in the UK.

You don't have to care about mountain gorillas

Go back to the 1960s, and we were being told to preserve wildlife simply for its own sake. Mace calls this line of thinking "**nature for itself**".

Fast forward to the 2000s and we are now talking about "nature for people", thanks to the idea of ecosystem services. Even if you don't buy the moral argument that "**wild things and places have incalculable intrinsic value**", there are hard-nosed practical reasons to save them. You don't have to care about mountain gorillas to appreciate the value of a strong ecotourism industry.

Still, at first glance it does seem like the idea of ecosystem services should push us towards a rather selective approach to conservation. "Let's keep the things the tourists will go and see, and the things that pollinate our crops or otherwise make themselves useful, and the rest can go hang."

But there is another way of looking at it.

Gorilla habitat is home to all sorts of species (Credit: Jabruson/NPL)

Let's consider the mountain gorillas. They live in a mountain range where the trees are covered with thick forests. If we want to preserve the gorillas, we also have to preserve the ecosystem they live in.

Some of this is obvious. The gorillas need plants to eat, so we must ensure those are there.

But we also can't let the area be overrun by inedible weeds. That in turn means keeping most of the other animals, as they will shape the plant community.

Maybe those gorillas aren't such a good investment after all

The mountain gorillas are part of a wider network of species, and it's difficult to separate them from it. Wiping out one of these species might not make much difference, or then again it might cause a chain reaction that alters the entire ecosystem. It's hard to predict the effect of killing off a species unless you go ahead and kill it – and then it's too late to reverse it.

So if we decide to save the mountain gorillas, by extension we are also choosing to preserve the particular habitat they live in and the majority of the species that live alongside them.

At this point many people balk. It's one thing to pay to save awesome mountain gorillas, they say, but now we have to pay out to save a bunch of trees, shrubs and insects too? Maybe those gorillas aren't such a good investment after all.

However, there are good reasons to keep the forests, and not just because they support the mountain gorillas.

To save mountain gorillas, we must conserve their habitat (Credit: Ingo Arndt/NPL)

Forests on hillsides provide a number of useful services that we don't always appreciate. In particular, they help ensure a regular water supply.

A tiny, obscure worm may not be doing anything that's obviously useful to humans

Everyone knows that the weather is changeable. Sometimes you get too much rain, which means floods. At other times there isn't enough, which means drought. Both are dangerous.

Trees on the hills help smooth this out, ensuring a more reliable supply of fresh water. This is good news for people living on the lowlands.

For this to really work, the forest needs to be reasonably stable. It's no use if it sometimes dies back suddenly just when really heavy rains come. It needs to be resilient.

Ecologists have amassed evidence that **ecosystems with a wider range of species are more stable and resilient** , and less prone to sudden die-backs. This has a startling implication. A tiny, obscure worm may not be doing anything that's obviously useful to humans, but it is probably supporting the ecosystem it lives in – and that ecosystem will be providing services.

Pollinating insects come in all shapes and sizes (Credit: Paul Harcourt Davies/NPL)

Whether you put it in economic terms or not, science is telling us that ecosystems provide us with a host of things we can't do without, and that the more diverse each ecosystem is, the better.

We can't preserve nature without first figuring out how doing so will be good for humans

So for our own good – both in terms of practical things like food and water, and less physical needs like beauty – we should protect them.

Of course, **human society is part of the ecosystem too** , and you won't find many people willing to get rid of us. As a result, many conservationists now say that we can't preserve nature **without first figuring out how doing so will be good for humans** , because any conservation scheme needs popular support.

Equally, **we can't take care of ourselves without also preserving nature** , because we need it for so many things. In specific situations we might choose to favour one or the other, but overall we have to do both.

We have no choice but to live alongside nature (Credit: Staffan Widstrand/NPL)

This is a new way of thinking about conservation. It's not "nature for itself", because it's explicitly about helping people. It's also not quite "nature for people", because it's not just a matter of the direct goods that ecosystems offer us.

> *It does mean ensuring that ecosystems are as rich and diverse as possible*

Instead it's about seeing human society and wild ecosystems as one inseparable whole. Mace has called this perspective "nature and people".

This doesn't mean preserving every last species, which we couldn't do even if we tried. It's also not about keeping things exactly the same, because that's impossible too.

But it does mean ensuring that ecosystems are as rich and diverse as possible. That will be good for them, and good for us.

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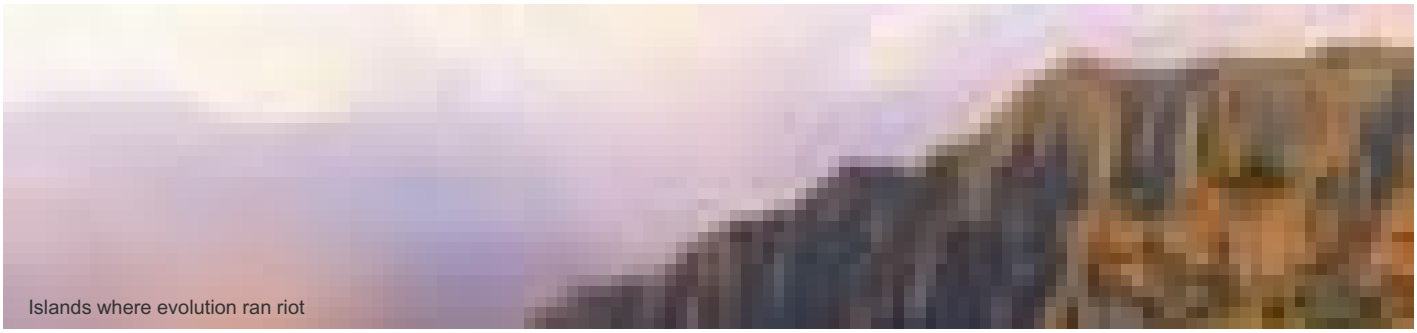

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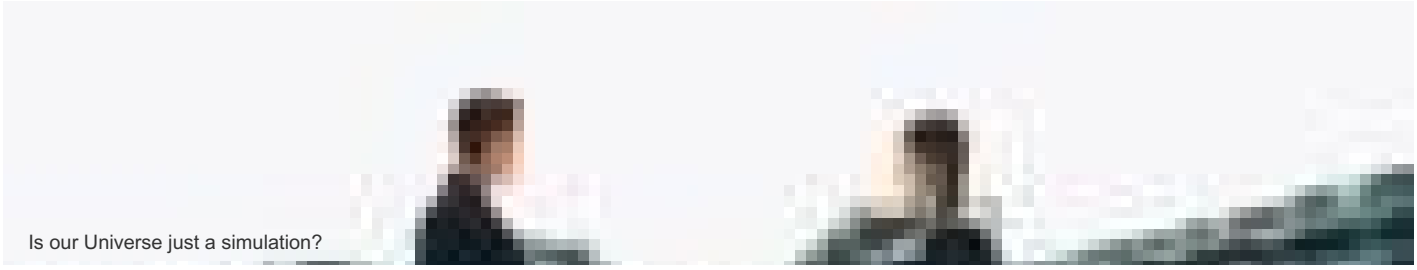

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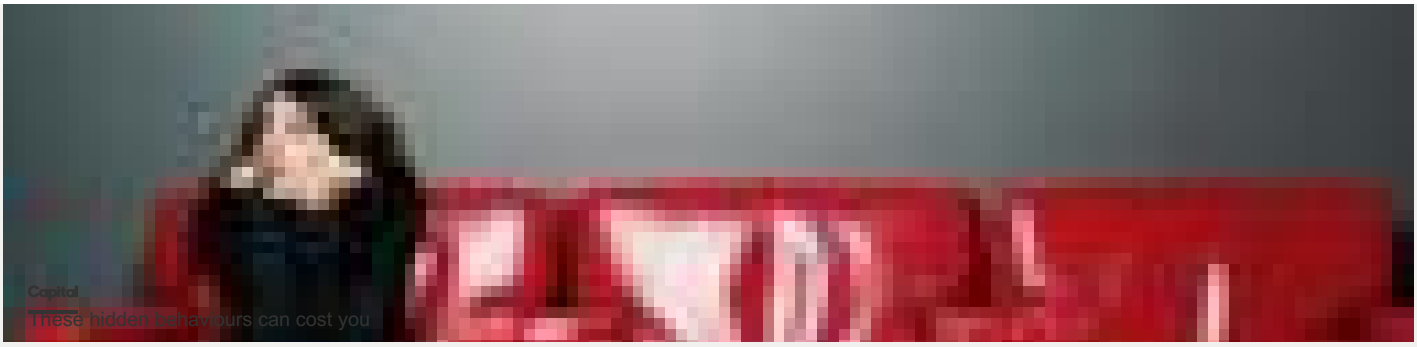

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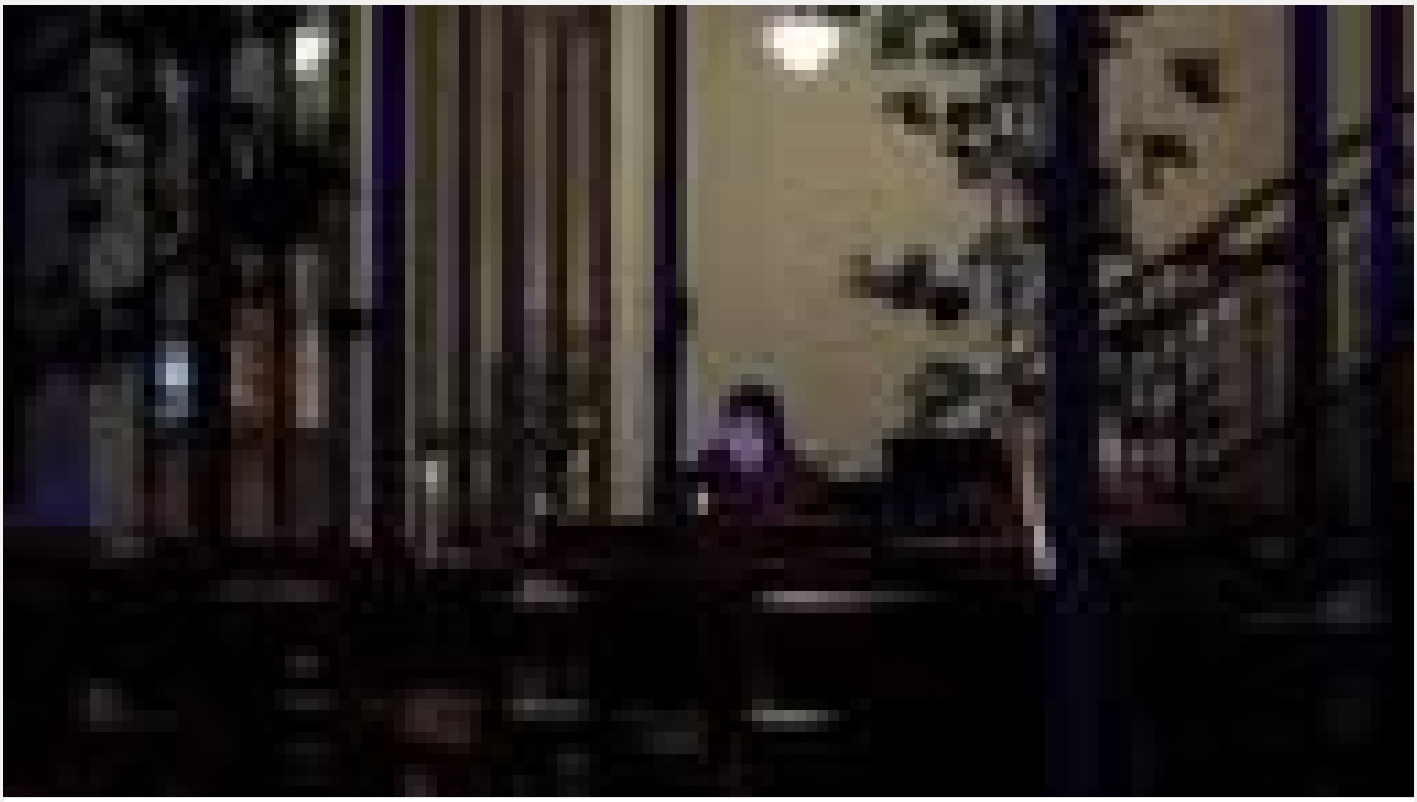

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