

**Saving the Ocean  
SCOURGE OF THE LIONFISH**

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TEASE

**Carl Safina**

On this edition of Saving the Ocean, we're face to face with the world's worst marine alien species.

**Carl Safina (narration)**

Lionfish belong in the Pacific, but now they're in the Atlantic, threatening sea life on thousands of miles of coasts and coral reefs.

People are fighting back.

Divers compete to spear them...

Fisherman catch them...

And chefs are figuring out how to eat them.

**Carl Safina**

Fantastic!

I'm Carl Safina. Join me now for Scourge of the Lionfish.

## FUNDER CREDITS

### **Announcer**

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## INTRO

### **Carl Safina**

Hi, I'm Carl Safina. No matter where I travel I always return here, to walk, feel the seasons change... I've been coming here since I was a kid.

Now I'm a marine biologist and I write books about the ocean -- that magic, majestic, two thirds of the planet that starts right there in the surf.

In my travels I see pollution, overfishing, coral reefs in trouble. But I also meet inspiring people, working to solve problems.

In this series, we visit people with solutions, and places getting better. So I hope you'll join me on these journeys. It's all about Saving the Ocean.

## **SCOURGE OF THE LIONFISH**

### **Carl Safina (narration)**

A pedicab ride for a load of fish -- it's a first for me.

We're at the Cape Eleuthera Institute in the Bahamas and I'm helping out Mark Hixon, one of the world's top coral reef experts, as he confronts these...

#### **Carl Safina**

Quite the haul.

### **Carl Safina (narration)**

All over the Caribbean, and up and down the Atlantic coasts of North and South America, these strikingly beautiful fish are despised. They are the world's worst marine alien invasion.

Mark takes us down to see the fish that don't belong here.

#### **Mark Hixon**

Look here over here to the right, you can start seeing the number of lionfish that live on this reef.

#### **Carl Safina**

I see them here immediately.

#### **Mark Hixon**

One is here, there's a couple under that ridge; now one's coming out; there's another one going down; further back I see two more...

#### **Carl Safina**

They're in every little nook and cranny.

#### **Mark Hixon**

None of these fish were here five years, ten years ago, and now they're everywhere.

### **Carl Safina (narration)**

The dark patches you can see through the clear blue Bahamas waters are all coral reefs. Across the Caribbean, from Florida to South America, they add up to thousands of square miles, and lionfish are in every patch.

Lionfish are native to the Pacific and Indian oceans, but here they're causing havoc on the reefs as we'll see. And they're only the latest in a succession of assaults that Caribbean reefs have had to deal with.

At first sight, the typical 21st century Caribbean reef doesn't look too bad. There are plenty of fish, plenty of these beautiful fan-like soft corals.

But everywhere the rocks are covered in a blanket of green algae. And these rocks are actually dead coral, the hard corals that once built this reef.

Here and there you can see a head of hard coral like this -- not yet dead, but clearly diseased.

**Carl Safina**

Yeah so, we're still witnessing the dying of these reefs, it's so sad.

**Mark Hixon**

Yeah, I've been brought to tears more than once witnessing beautiful reefs die.

**Carl Safina (narration)**

Coral's problems, like algae, have many causes -- polluted runoff from land, or sudden warming events that stop coral growth.

Mark Hixon believes lionfish could be the last straw, because they attack a vital reef component -- its fish.

**Mark Hixon**

See these beautiful little purple and yellow fish that are up on the top of this ledge?

**Carl Safina**

Yeah.

**Mark Hixon**

Those are called Fairy Basslets. And we know that lionfish are eating these things very rapidly, so even though we see them here, there would be many more here if the lionfish weren't here.

**Carl Safina (narration)**

Right in front of us, a lionfish demonstrated why they're such a threat.

**Mark Hixon**

It's slowly moving in on that little goby. It's getting ready to strike. It's slowly stalking its prey, very much like a real lion.

**Carl Safina (narration)**

The goby just doesn't recognize this alien fish as a danger.

**Mark Hixon**

Got it!

**Carl Safina**

That was incredibly fast! Wow!

**Mark Hixon**

That's one of the fastest strikes known in nature.

**Carl Safina (narration)**

You can see just how fast from this super slow motion video. It takes only three hundredths of a second from the start of the strike to the capture of the prey.

The numbers of this amazingly effective predator have skyrocketed in the Caribbean and Atlantic, where they have no natural enemies -- they left those on the other side of the globe.

Lionfish are a classic invasive alien species.

Invasives crop up all the time, because -- to the dismay of biologists -- people are constantly moving plants, insects and other animals around the world constantly.

**Carl Safina**

Where do you think the lionfish came from to begin with? How did they get here to begin with? They're native to the Indian Ocean and the West Pacific and how did they get here?

**Mark Hixon**

Lionfish are very popular aquarium fish. So they're captured in the Philippines and Indonesia and sold in the United States and what often happens is people will move and they don't want to kill their fish so they go to the ocean and let it go. And that happened enough times in the area of Florida so that eventually there was a breeding population, and they're just going like gangbusters now.

**Carl Safina**

So there were just chronic little releases from individual people.

**Carl Safina (narration)**

The first lionfish sighting was in a crab trap off Fort Lauderdale in 1985. From there they spread rapidly. They're amazing reproducers -- a single female produces a million eggs a year. And they'll live anywhere, from shallow reefs to thousand-foot depths. They're as far north as New York, and they're still spreading down the East coast of South America. Only cold water holds them back.

They are the perfect invasive storm.

So what can we do about them? That's what Mark and many other scientists and ocean lovers are trying to figure out.

The simplest approach is just to remove them.

**Mark Hixon**

There's four on this row so let's try those first.

**Carl Safina**

Okay.

**Carl Safina (narration)**

Lionfish won't take a lure on a fishing line, but they're not hard to net.

**Mark Hixon**

See it's simple.

Way to go! You caught your first lionfish!



**Carl Safina (narration)**

Mark is running experiments to see the effects of keeping specific patches of reef lionfish-free.

With lionfish now literally countless along thousands of miles of coastline and reefs, it's too late to eradicate them.

Hand clearing is a lot of work, but the hope is that at least in a few cleared areas native fishes and corals can thrive, and bounce back from the many other onslaughts they've suffered from in recent times. Then these once-magnificent reefs can still be here for future generations to enjoy.

**Mark Hixon**

Whoaa!

**Carl Safina**

My first lionfish double-header. Double-header! I'm sure you didn't expect that one day your reefs would be overrun with a fish from a different ocean.

**Mark Hixon**

The first time I saw a lionfish on a Caribbean coral reef, I was absolutely stunned. It would be like going for a walk in your neighborhood forest in the United States and coming upon a tiger. It was just unbelievable. And the first one was just amazing, we thought how interesting. And then they just kept coming and coming and coming. So it's just a population explosion, and I don't know where it's going to end.

**Carl Safina**

So if a community wants to keep its reef clear of lionfish, what do they have to do?

**Mark Hixon**

So it'd be something like forming a dive club and people volunteering to periodically go out to their reef and scoop up the lionfish with nets, which is pretty simple to do. There's places in the Bahamas where we've found that we can remove the lionfish once every three months and that's enough to keep the populations low.

**Carl Safina (narration)**

Now that's what's beginning to happen. I'm on a team that's taking part in a lionfish derby.

**Carl Safina**

We're about to go down on this reef. It's the day of the derby and we're going to see what we can find as far as lionfish and when we find them, we're gonna spear them.

**Carl Safina (narration)**

We're drift diving in the current off Fort Lauderdale.

Our boat has to keep track of the flag that's attached to one of us. We all hope they have sharp eyes so they'll be there when we surface.

Fittingly, the derby is being held in the waters where the lionfish invasion began. It's a competition, with cash prizes for the biggest catch, but I'm happy to say there don't seem to be any lionfish.

**Boat crew**

Oh there it goes, starboard side... diver up... two divers...

**Carl Safina**

No lionfish. Nice dive, no lionfish. So the lionfish basically evaded us.

**Carl Safina (narration)**

We try again in another spot.

There's lots of great sea life, and the reefs are generally in better shape than in much of the Bahamas.

Then we see our first lionfish, and I've got the spear. That's a camera attached to it, by the way.

Oh no! Try again. The lionfish takes cover and we lose it.

Soon there's another. One of my team mates goes for it -- probably just as well.

Our second catch.

**Carl Safina**

Success! We got a couple.

**Carl Safina (narration)**

Well it wasn't much for a day's work. Let's hope the other teams did better.

Time to report our catch at derby headquarters.

Oh yes -- other teams did a lot better.

**Carl Safina**

One boat got a hundred and twelve.

How many fish did you guys get?

**Derby participant**

83 is what I got.

**Carl Safina**

83! Wow!

**Team member**

We present you with our catch.

**Stephanie Green**

Congratulations!

**Carl Safina**

Don't say we didn't help

**Stephanie Green**

Every lionfish counts.

2-4...

**Carl Safina (narration)**

The good news is that derbies do seem to be having an impact.

**Stephanie Green**

From the derby that we did in the Bahamas two months ago, we found that there was over a 60% decline in the population on the reef after the derby. So really dramatic decline...

**Carl Safina**

You're seeing a change in the size of the fish afterwards?

**Stephanie Green**

Yeah. We decreased the size by 50%, we decreased the abundance by 60% so it's a pretty significant affect of the derby. Just really exciting for everyone. I'm pretty stoked by it.

**Carl Safina (narration)**

The derby is run by a divers' conservation organization called REEF.

**Carl Safina**

So do you think this means that they can be controlled or do you think this means that the problem is overwhelming?

**Lad Akins**

348. We don't expect that once a year, that's going to solve the problem but this is a great way to remove a lot of fish, reduce the population and increase awareness. Regular control efforts on a regular basis, the same sites, can have a very positive effect on reducing the population and impacts.

384.

**REEF volunteer**

That is the largest one I've recorded today, 384.

**Carl Safina**

Look at that one.

**Lad Akins**

Yeah, that's a nice one.

**Carl Safina**

Wow! After 20 years of fighting overfishing, I know the power of people to deplete the fish they're targeting and this is the only overfishing that I support.

**Carl Safina (narration)**

We're back in the Bahamas, with Mark Hixon.

**Mark Hixon**

This is a reef that we're keeping the lionfish away.

**Carl Safina (narration)**

Can reefs recover from all their other problems if lionfish are removed?

As on so many reefs, coral here is being smothered by algae. There's so much algae here because parrot fish -- the reef's own algae-eaters -- have been overfished, and also because fertilizer runoff from the land has stimulated algal growth.

**Mark Hixon**

You can see the parrotfish actually grazing on the reef surfaces.

**Carl Safina (narration)**

If lionfish eat the baby parrotfish, the coral will die and eventually the reef will become a pile of rocks. But here Mark is seeing encouraging signs.

**Mark Hixon**

So you can see these small baby corals growing on different places in this area where there's been a lot of grazing. And that's the future of the reef.

**Carl Safina**

This looks really good. The reef needs more grazers like we see here.

**Mark Hixon**

If we can keep the lionfish from eating all the baby parrotfish, that will help the grazers the reef needs to thrive.

**Carl Safina (narration)**

Here in the lionfish-free reef they're seeing more baby fish.

In the short term we need to keep lionfish off at least the best reefs, so they can stay alive.

We'll be buying time: both to tackle long-term problems like overfishing and polluted runoff, but also in the hope that something -- like a disease or a predator -- will emerge that can control lionfish without our help.

The strategy depends on people continuing to take part in derbies, or volunteer for diver groups.

But there may be another way to go.

I'm with Dave Johnson, and we're in Mexico's Yucatan peninsula. Dave traveled in Mexico for years before marrying into a local fishing family.

We're taking the ferry over to the island of Cozumel. Tourism and fishing are the big industries here, and lionfish threaten both.

Dave's idea is to transform lionfish from a scourge into a delicacy. In the last couple of years he's developed relationships with local fishing co-ops. This is one of them.

**Carl Safina**

So this looks like a nice place.

**Dave Johnson**

It's a very nice place. Really well kept

**Carl Safina (narration)**

The co-op processes its own locally-caught lionfish. One problem -- 18 poisonous spines that the workers really have to watch out for. But the meat itself they say makes excellent eating.

For the co-op, lionfish are actually becoming an asset -- they're making lemonade out of lemons.

**Carl Safina**

Would you prefer that the fishermen wipe them out completely or would you prefer that this is a new kind of fish that stays here forever?

**Eduardo Katzin**

*Spanish*

**Dave Johnson**

We have to be realists. This fish has arrived and it's going to stay.

**Carl Safina (narration)**

The fishermen are well aware of the extreme risks that lionfish pose to life here.

**Carl Safina**

If you were not catching any lionfish at all, what would the fishing be like three years, five years from now for the other fish on the reef?

**Eduardo Katzin (subtitles)**

What will happen if nobody did anything?

**Dave Johnson**

If nobody does anything...

**Eduardo Katzin (subtitles)**

The species would collapse the reefs...

**Dave Johnson**

...it can collapse the reef...

**Eduardo Katzin (subtitles)**

...the fishing communities.

**Dave Johnson**

It can collapse all of the fishing communities.

**Eduardo Katzin (subtitles)**

It would harm hundreds of fishermen...

**Dave Johnson**

Hundreds of fishermen would lose their jobs.

**Eduardo Katzin (subtitles)**

...hundreds of people who live from tourism...

**Dave Johnson**

Many people that live on tourism would lose their jobs.

**Eduardo Katzin (subtitles)**

...because by affecting the food chain it puts at risk all the coral and life on the reefs.

**Carl Safina (narration)**

Dave Johnson now ships lionfish to specialty restaurants in a dozen US cities. His only problem -- the fish is becoming popular with locals, so the price he pays the co-ops is going up.

Demand for seafood is rising everywhere, so what Dave and the Yucatan co-ops are doing could mean bad news for lionfish -- and good news for the reefs.

We're back on the Yucatan mainland, in the resort town of Puerto Morelos. Tourists come here to snorkel and dive on the reefs, alongside spear fishermen from the local co-op.

Spear fishing is a highly effective way to catch fish, and the sad fact is that reefs here and all over the Caribbean have been badly overfished. Now lionfish are a new target for which overfishing is just fine.

**Dave Johnson (subtitles)**

Forcio, this is my friend Carl or Carlos.

**Carl Safina**

How many years have you been doing this lionfish exporting?

**Dave Johnson**

A little more than two years

**Carl Safina (narration)**

We're going lionfishing with the Puerto Morelos co-op.

Remember how in Fort Lauderdale one diver had to tow a flag for our boat to follow? Here they use lookouts.

**Carl Safina**

They put two snorkelers in the water and the snorkelers watch where the divers are. Now the snorkelers are constantly swimming to keep up with them, and we're constantly drifting away. So we're always moving back up to the snorkelers and the snorkelers are keeping their eyes on where the divers are. Without that the divers would be lost right away.

**Carl Safina (narration)**

90 feet below us, the diver concentrates on getting as many lionfish as he can in the shortest time. A tank of air costs money.

It may not seem like it, but with someone as skilled as Forcio, using a spear gun is one of the most humane ways to fish. Every shot is placed accurately in the head, so the fish is killed instantly. None of the valuable meat is spoiled either.



Forcio is ruthlessly efficient. You can see how easy it would be to overfish this way. In many parts of the Caribbean spear fishing has been banned, but exceptions are being made for lionfish.

In one 30-minute dive, Forcio's done pretty well.

**Carl Safina**

Wow look at those! That's really quite a catch. They've got, I don't know, maybe a dozen, dozen and a half lionfish; couple of them are really quite chunky too. Pretty big. Look at how big this one is, look at how big this one is.

Quantos pesos para estes?

**Fisherman**

Dos ciento pesos.

**Carl Safina**

The catch is worth about 200 pesos so roughly in US, 20 bucks.

**Carl Safina (narration)**

It's enough to cover the crew, the air tank, the boat and the gas, and make a little profit. And things can only get better as people develop a liking for lionfish.

So using Forcio's catch, we're going to do our bit to promote a new seafood sensation.

Chef Renato Espinoza has eaten lionfish, and knows it's good. But he's never cooked with it. Dave and I are anxious for him to know exactly where the poisonous spines are. One poke is not fatal, but it can be extremely painful.

**Carl Safina (subtitles)**

Cut from the head to the tail.

**Renato Espinoza (subtitles)**

From the head to the tail?

**Dave Johnson (subtitles)**

...to the tail. It's less dangerous I think.

**Carl Safina (narration)**

Lionfish may be a novelty now, but if Dave has his way they'll become a routine part of restaurant menus.

The poison is only in the ends of the spines, by the way, not in the meat.

**Dave Johnson (subtitles)**

You can't be too careful. Sometimes I'm working here and... Careful, careful, careful.

They're sneaky fish even when they're dead.

**Carl Safina (narration)**

Here's what Renato came up with. Cooking destroys the poison, so whole fish are quite safe.

**Carl Safina**

Great job! You're an artist.

**Renato Espinoza**

You like?

**Carl Safina**

Yes, terrific!

That's fantastic, fantastic!

**Dave Johnson**

Guilt-free. And *sabroso*, very tasty.

**Carl Safina**

Flavor is nice, mild but very flavorful, very delicious.

**Carl Safina (narration)**

If every beachfront restaurant on this coast put lionfish on the menu -- watch out lionfish. Let's see if we can convince the tourists.

**Carl Safina**

So this is a new kind of fish called lionfish. It's from the Pacific and the Indian Ocean. What do you think?

Did you like it?

**Tourist 1**

I really liked it.

**Carl Safina (narration)**

We might have a hit on our hands.

**Carl Safina**

What do you think?

**Tourist 2**

I really liked it.

**Carl Safina (narration)**

I think I'm going into business with Dave.

For Saving the Ocean, I'm Carl Safina.

**Tourist 3**

Nice!

**Carl Safina**

Nice?

**Tourist 3**

Very good!

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### **Announcer**

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### **Announcer**

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## **PRODUCTION CREDITS**

Host:  
Carl Safina

Written, Produced & Directed by:  
John Angier

Edited by:  
David Berenson

Camera:  
Dan Lyons

Underwater Camera:  
Valentina Cucchiara

Divemaster:  
Nick Poole

Slow motion video:  
Tom Fitz/Schoolyard Films

Helicopter Pilot:  
Dave Harmon

Location Sound:  
Tim Wessel

Narration recording:  
Bob Schott

Sound Mix:  
Richard Bock

Online Editors:  
Bill Kenney

Kenton VanNatten

Maps & Title Animation:  
Jeremy Angier

Music:  
Randy Roos

Associate Producers:  
Mike Olcott  
Anne-Marie Boyer

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Executive Producers: Carl Safina, John Angier

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