**Taming the Lionfish: Florida fights back against invasive species.**

By Phillippe Cousteau and Matthew Knight

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**(CNN)** -- Four years ago, lobster fisherman Gary Nichols had never laid eyes on a lionfish, but today his traps are full of them.

"You'll get two or three decent traps with lobster, but if you get four or five lionfish, the lobster don't like it," Nichols said.

He says he catches so many lionfish now (up to 200 pounds every day) that he's started to sell them. But where his lobsters sell for $16 per kilogram, lionfish only make him $12.

Lionfish are causing a huge strain *(pressure or demand)* on his business and the wider commercial fishing industry in Florida, devouring other fish populations -- in some cases reducing them by up to 90%.

According to the [Florida's Department for Environmental Protection](http://www.dep.state.fl.us/%22%20%5Ct%20%22_blank), lionfish are native to the Indian and Pacific Oceans, but were accidentally introduced into Atlantic and Caribbean waters during the 1990s.

With no natural predators in the Atlantic and an ability to reproduce year-round, their numbers have risen unabated *(continuing at full strength)* in recent years.

1. What makes the lionfish a successful invasive species?

Not only are lionfish causing grief for lobster fishermen like Nichols, they are also threatening to upset the balance of the fragile reef ecosystem.

"What we've found through stomach analysis and working with fish that have been collected is that they are consuming a wide variety of prey," said Lad Akins, [director of special projects for REEF](http://www.reef.org/%22%20%5Ct%20%22_blank), a marine conservation group."They are eating almost anything that fits in their mouth. The lionfish can probably consume in excess of half of its own body size. They can take quite large prey," he added.

Some of what they eat are commercially valuable species, says Akins, like juvenile grouper and snapper that the fishermen depend on.

Ecologically important species like mudfish which graze on algae, stopping it growing over the reefs, are also being impacted, he says. "I'm an optimist but potential impacts of lionfish could result in major shifts in the ecology of our Caribbean and West Atlantic reef barriers," Akins said. "It could result in the extinction of some fish species."

1. How are the lionfish negatively affecting the economy and the ecosystem?

In an effort to minimize their impact, [REEF](http://www.reef.org/lionfish%22%20%5Ct%20%22_blank) runs a monthly contest, open to both businesses and individuals, awarding prizes to those who catch the most lionfish. It also runs workshops educating divers about safe collection and removal techniques.

The U.S.'s [National Oceanic and Atmospheric Administration](http://www.noaa.gov/%22%20%5Ct%20%22_blank) has also joined the fight with a campaign that encourages people to eat lionfish.

Its "If we can't beat them, let's eat them!" slogan has been taken up by restaurants like the [Fish House Encore](http://www.fishhouse.com/%22%20%5Ct%20%22_blank) in Key Largo.

General manager Michelle Kosiek has been serving lionfish for the past 18 months.

"We're putting it on the menu to try to get them off the reef and try to get people to actually like them and enjoy them," Kosiek said.

"There is a little bit of fear factor eating them. But once they know that the flesh has no poison, they're ok with it and want to try it."

By encouraging more people to eat lionfish, Kosiek hopes to entice fishermen to get them out of the ocean.

Once cooked, the venomous spines are harmless and Peter Tselikis, chef at Field House Encore, says the response from customers has been very encouraging.

"In the beginning it was sort of more like a novelty *(new, original, or unusual)*. But those who tried it have spoken well of it," Tselikis said.

1. What is the U.S.'s [National Oceanic and Atmospheric Administration](http://www.noaa.gov/%22%20%5Ct%20%22_blank) ‘s plan to control the lionfish population? What method of control is this?

**Eat lionfish? Sure, but beware of the nasty toxins**

**By Jonel Aleccia NBC News**

A federal plan to battle invasive lionfish by dishing them up on America’s dinner plates may have backfired with the news that the flamboyantly-finned creatures can harbor a potentially dangerous neurotoxin.

Two years ago, officials with NOAA, the National Oceanic and Atmospheric Administration, launched a well-publicized [campaign](http://www.msnbc.msn.com/id/38632799/ns/us_news-environment/t/do-your-civic-duty-eat-fish/%22%20%5Cl%20%22.T-pOArWe7EY%22%20%5Ct%20%22_blank), complete with flashy pull-cards, a lionfish cookbook and a catchy slogan. As one newsletter put it, “If we can’t beat them, let’s eat them."

The effort was aimed at harnessing the power of the U.S. appetite to help battle the voracious *(having or showing a tendency to eat very large amounts of food)* fish that has spread far from its native Pacific waters to ravage the reef ecosystems of the U.S. Southeast and the Caribbean.

“Once stripped of its venomous spines, cleaned and filleted like any other fish, the lionfish becomes delectable *highly pleasing)* seafood fare,” NOAA officials enthused.

But another government agency, the Food and Drug Administration, now frowns on the “Eat Lionfish” campaign after tests of nearly 200 lionfish show that more than a quarter exceed federal levels for a toxin that can cause ciguatera, a potentially dangerous fish food poisoning.

1. Why doesn’t the FDA want people to eat lionfish?

Robertson said she and other FDA scientists decided to test the lionfish in the summer of 2010 after hearing about NOAA’s gustatory *(relating to eating)* effort.

Of 194 fish tested, 42 percent showed detectable levels of ciguatoxin and 26 percent were above the FDA’s illness threshold of 0.1 parts per billion.

That’s enough to potentially sicken a diner with the illness that causes not only typical food poisoning symptoms – diarrhea, vomiting and fatigue – but also neurological problems such as painfully tingling hands and feet, a feeling of having loose teeth, and, oddest of all, a reversed sense of temperature.

“Whatever I touched, if it was hot, it would feel cold. If it was cold, it felt hot,” ciguatera victim Pat Schroeder of Beaumont, Texas, told msnbc.com three years ago. “I couldn’t walk on the tile floor. It felt like it was burning me.”

1. Why is ciguatera dangerous?

“The idea of trying to control the lionfish problem by eating them is a great one, and whatever small risk there, is outweighed by the benefit,” says Dimin, whose group co-sponsored the “Eat Lionfish” campaign. Chef Barton Seaver, who has been described as an evangelist for sustainable seafood, says legitimate concerns about ciguatera should be balanced by responsible sourcing. “Nobody wants to serve neurotoxins for dinner,” he said. “I would trust the supply chain.”

The volume of lionfish used in the U.S. totals hundreds, not thousands of pounds, and it’s expensive -- about $16 a pound compared with snapper, which is going for about $8.45. Seaver says he likes to prepare lionfish in a nice ceviche, as part of a robust romesco sauce or stewed into a tasty curry. Those dishes may sound delicious, but Robertson, the scientist at the FDA, isn’t convinced.

“Particularly in areas where we know ciguatoxin is present, people should not be eating lionfish," she said. "Just like they shouldn’t be eating grouper or other reef predators.”

3) Do you believe we should encourage people should eat lionfish as way to control their population? Why or why not?

**Invasive lionfish likely safe to eat after all, scientists find**

Christie L. Wilcox and Mark A. Hixon

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Scientists have learned that recent fears of invasive lionfish causing fish poisoning may be unfounded *(having no basis in fact)*. If so, current efforts to control lionfish by fishing derbies and targeted fisheries may remain the best way to control the invasion. And there’s a simple way to know for sure whether a lionfish is toxic:  test it after it’s been cooked.

Pacific lionfish were first reported off the coast of Florida in the 1980's, and have been gaining swiftly in number ever since. They’re now found in marine habitats throughout the tropical and subtropical Western Atlantic, Caribbean and Gulf of Mexico, threatening native fishes with their voracious appetites and unchecked population growth. Targeted removal is the only management strategy that seems to help, and many hope to establish a food fishery to increase the fishing pressure on these ravenous *(extremely hungry)* predators. Such a strategy is in jeopardy *(danger of failure)*, though, because the FDA added the lionfishes *Pterois volitans* and *Pterois miles* to their ciguatera watch list, a catalog of species that may contain the potentially fatal foodborne toxin, citing evidence that lionfish have positively tested for ciguatera. As of July 2014, though, there are no known cases of ciguatera from eating lionfish.

1. What is one strong piece of evidence **for** eating lionfish?

A new study published in *Environmental Biology of Fishes* may have an explanation for that. Lead author Christie Wilcox of the University of Hawaiʻi at Mānoa thinks there may be a different reason that so many lionfish are coming up positive on ciguatoxin tests: venom proteins might act as ciguatoxin mimics.

“We already know lionfish produce bioactive compounds *(compound that has an effect on a living organism, tissue or cell)*—just ask anyone who has ever been stung,” she said. “We just don’t know a whole lot about what those compounds are or whether they occur outside of the venomous spines.”

It struck Wilcox that, at the cellular level, lionfish venom might be difficult to distinguish from ciguatoxins because they have similar activities. She took muscle, skin, spine and liver tissue from invasive lionfish and used antibodies against stonefish venom to detect the presence of venom proteins—and found them. “Lionfish express venom-like proteins throughout their bodies,” she said. “We don’t know exactly what these proteins are or what they’re doing, but we know they’re there.”

"The presence of these proteins in your fillets is nothing to worry about, though," added Wilcox. “Unlike ciguatoxin, lionfish venom degrades at room temperature, let alone with heat, so you have nothing to fear from a lionfish dinner.”

1. How is lionfish venom different from ciguatoxins?

Wilcox is quick to note that the work does not prove that lionfish are perfectly safe. “No one is debating that lionfish could be ciguatoxic,” says Wilcox. “But there’s no reason to think they’re any more ciguatoxic that groupers or other smaller predators in an area. If they’re popping positive more often than species with the same diet, that indicates there’s something fishy going on.”

Wilcox hopes that the research will urge researchers to carefully examine their testing protocols to ensure that the proteins she discovered in lionfish tissues don’t lead to unwarranted fear of lionfish consumption. “The first, easy step is to cook or boil lionfish samples prior to ciguatoxin testing. Heat degrades the venom proteins, ensuring they don’t cause any problems.”