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Nature

How to catch an environmental criminal

Source: scenta

The legacy left by industrial polluters comes back to haunt us all. But, for far too long, we haven't been able to do a lot about it. Now, thanks to procedures developed in DNA fingerprinting, there's a whole new way to fight the bad guys. Welcome to the world of environmental forensics.

We spoke to Clare Perry, Cetaceans campaigner for The Environmental Investigation Agency (EIA), to find out more.

Can you tell us a little about the work that the EIA does?

We're an international NGO that focuses on environmental crime and have pioneered the use of undercover investigations to uncover environmental crime. We have a number of campaigns focusing on [issues like] illegal logging, illegal trade in ozone-depleting substances and species-based campaigns, like the whale campaign that I'm working on.

When it comes to an issue like maritime pollution, how do you go about finding a culprit?

It's very difficult. Even if you can get it down to a causal link between – for example – cancer and a certain chemical, it is extremely tricky to pinpoint a company that's dumping that chemical.

One of the most studied populations is the Beluga Whale, which have a very high incidence of cancer. [For this] you need a long-time series of data and a lot of samples. Because there were a lot of casualties they could do a lot of autopsies and get a good data set. But pollution is a problem for all cetaceans and it's much harder when they're out in the open ocean and tougher to locate.

What kind of people work in your organisation?

My background is in biology and a lot of our campaigners have some sort of scientific background. But we don't have lab facilities so we tend to contract out the studies that we've done. It makes sense to do it like that. Apart from anything, you can't export the products because it's illegal under CITES [an international treaty drawn up in 1973 to protect wildlife against over-exploitation].

For the pollution [studies] we've used two Japanese scientists that are based in university labs, one in Hokkaido and one in Fukuoka, which is right on the other side of Japan. For the DNA analysis we've worked with a professor in San Francisco called Frank Cipriano. These people are vital to the work we've done on whales and with pollution in particular.

We've been trying to persuade people through supermarkets or directly with the consumers that they shouldn't be eating whale meat. The fact that it can be very highly polluted is a very good argument... and you really need to show them the proof.

That's why we've had these studies commissioned. The DNA work has been very interesting. Because of the problem of exporting the samples, the professor we've been working with developed his own mini-portable lab so he could go to Japan, replicate the DNA from the samples, purify it, and then take that DNA back which gets around the regulations for exporting whale meat.

So he's developed a kind of 'environmental field lab'?

It's a cunning little thing. He can sit in a hotel room and work on the samples and then take them back to his lab in San Francisco, which is where he has his database to identify the species.

Is that a technique you've pioneered yourself?

It's been pioneered by Professor Frank Cipriano. We've been working with him for many years. There are few scientists that are expert in cetaceans and he's one of them.

Has the amount of attention given to organic food – and the fact that people now think more about the provenance of their food – helped your cause?

I think there is a greater concern for the people eating the fish. If we have indications that these levels are too high for us then it's going to be affecting the whales and dolphins in a similar way. These Belugas have a higher rate of cancer than any animal ever documented. That's reflected in the strengthening of regulation in terms of – for example – the level of mercury that's allowed in fish.



Testing for mercury - image courtesy of EIA

"The whole genetics field is expanding so rapidly that one minute you think that one cetacean species is just one species, then you find out that it's two species" Clare Perry

One of the reasons we work in Japan is that there is legislation that says that certain levels of mercury are not advisable for seafood products. Dolphins and a lot of the whales exceed these levels the whole time. This is why we keep giving them this data, so even if the Government doesn't want to take note of it then the supermarkets do.

Do you think that environmental forensics and DNA surveillance are expanding as a field?

Absolutely. The whole genetics field is expanding so rapidly that one minute you think that one cetacean species is just one species, then you find out that it's two species. That has a lot of implications for conservation. If you suddenly identify that that a small remnant population is actually a species – and close to extinction – it suddenly becomes a lot more serious.

There's been very interesting work done on elephants recently. Through the DNA of ivory you can track the ivory back to the area that the elephant came from.

There a guy called Sam Wasser who did some studies on a big seizure of illegal ivory that happened in Singapore. He then did other studies on elephant dung in Namibia and could prove pretty conclusively that the ivory seized in Singapore came from illegally killed elephants on Namibia.

So, for people qualified in DNA fingerprinting and biology, there's a whole world in environmental protection where they can find themselves very useful?

Absolutely. Anybody with these kinds of qualification is in demand.

Has database technology helped in the same way that it has helped the police solve crimes across international borders?

There's a technology called i2 [an intelligence-gathering database] that we use. Because we focus a lot on environmental crime, we find that it's often trans-national crime syndicates [responsible]. There's very good money involved, so it's not much good just catching poachers who are killing tigers; you need to get the network of criminals who are organising it. For that, technology such as i2 is incredibly important.

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Date Published: August 01, 2007