# current conservation

kids

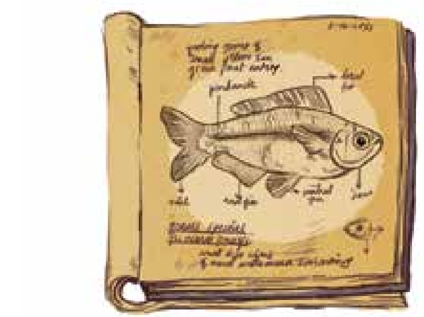
# life ON THE wave OF knowledge:

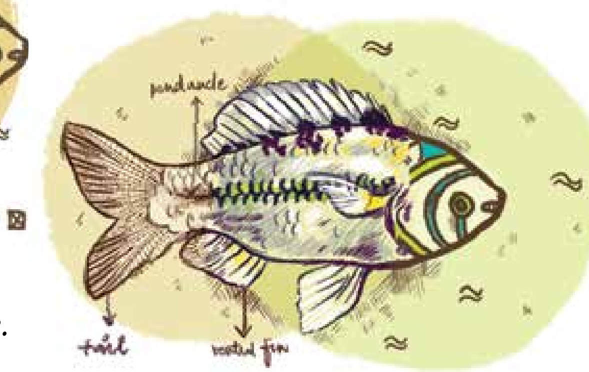
## INTEGRATING FISHERS' LORE AND SCIENTIFIC STUDY

Can you be an ***expert*** in fisheries ***without a degree*** in marine biology? The famous scientist Dr Robert Johannes, a marine biologist, spent much of his working life answering this question with a ***"Hell, yes!"***

Kabini Amin

In the 1970s Johannes spent ***16 months*** living with local people in the ***islands of Palau*** in the Western Pacific Ocean, ***learning about fish*** from them. They taught him about the different types of fish, ***which reefs the fish lived on, what they ate, how they hid from predators.*** They also knew ***when*** different fish would arrive in their fishing grounds and when they would disappear, when they bred and how many of the different types there were. This information he got from the fishers had been built up over generations. ***Later, Johannes said that those fishers taught him more in just over a year than he had learnt in 15 years using research methods he practiced at university.***





***What did Johannes do with this knowledge?*** He wrote it down, and became one of the first researchers of fishers' knowledge. Other people had lived with, and written about similar communities 50 years earlier, but their work had been lost. Johannes and others uncovered their journals and notes. He found an admiration for people in traditional fishing communities, and felt that their knowledge should be shared with the world.

***There was a challenge.*** The scientific way of studying fish was very different to Johannes' approach of spending months with the local fishers, and recording their ocean lore. Scientists believed in their academic methods, where everything could be counted and measured. The types of knowledge possessed by the fishers did not fit easily with this.

***Johannes' challenge was to bring the two approaches together.*** He believed we could get a complete understanding of fisheries by studying the knowledge that local fishers had built over years. This could be combined with modern science to seeing patterns within the broader picture.

Since those early years, experts in both approaches have been busy. Over time, the sea of information they have produced has become murky, and hard to read. In 2014, Dr Edward Hind, a researcher in marine sustainability, embarked on a voyage of discovery, to dredge all this information and summarise its flowing tides. In his review, he describes the ebbs and flows of both research approaches, and asks if they have started to come together. Much like the oceans themselves, Dr Hind finds that the research into fishers' knowledge has come in waves.

# Wave Chart

## A HISTORY OF FISHERIES RESEARCH:

Kabini Amin

### Wave 1

1900 to 1970

Amateur naturalists and tradesman, travelled the seas in search of adventure and riches.

They were some of the first outsiders to recognise and deliberately record the knowledge of local fishers.

Their notes were lost until Johannes and his colleagues re-discovered them.

### Wave 2

1970 to 2000

Scientists inspired by the first wave.

They focused on collecting fishers' knowledge.

Some even felt this knowledge was enough on its own to manage the fisheries.

### Wave 3

2000 to present day

Largely relies on semi-structured interviews, e.g. local fishers are asked to rate fish numbers as 'good', 'average' or 'bad', or to draw information on nautical maps.

They don't think that fishers' knowledge is enough on its own to manage fisheries. Instead, they emphasise that it should be used in combination with conventional scientific methods.

### Wave 4

Marine biologists, practicing 'traditional science'.

They do collect data from fishers,and only things they can count or measure like how many fish were caught, and exactly where and when the fishers caught them.

### Wave 5

This is very new, just a ripple really.

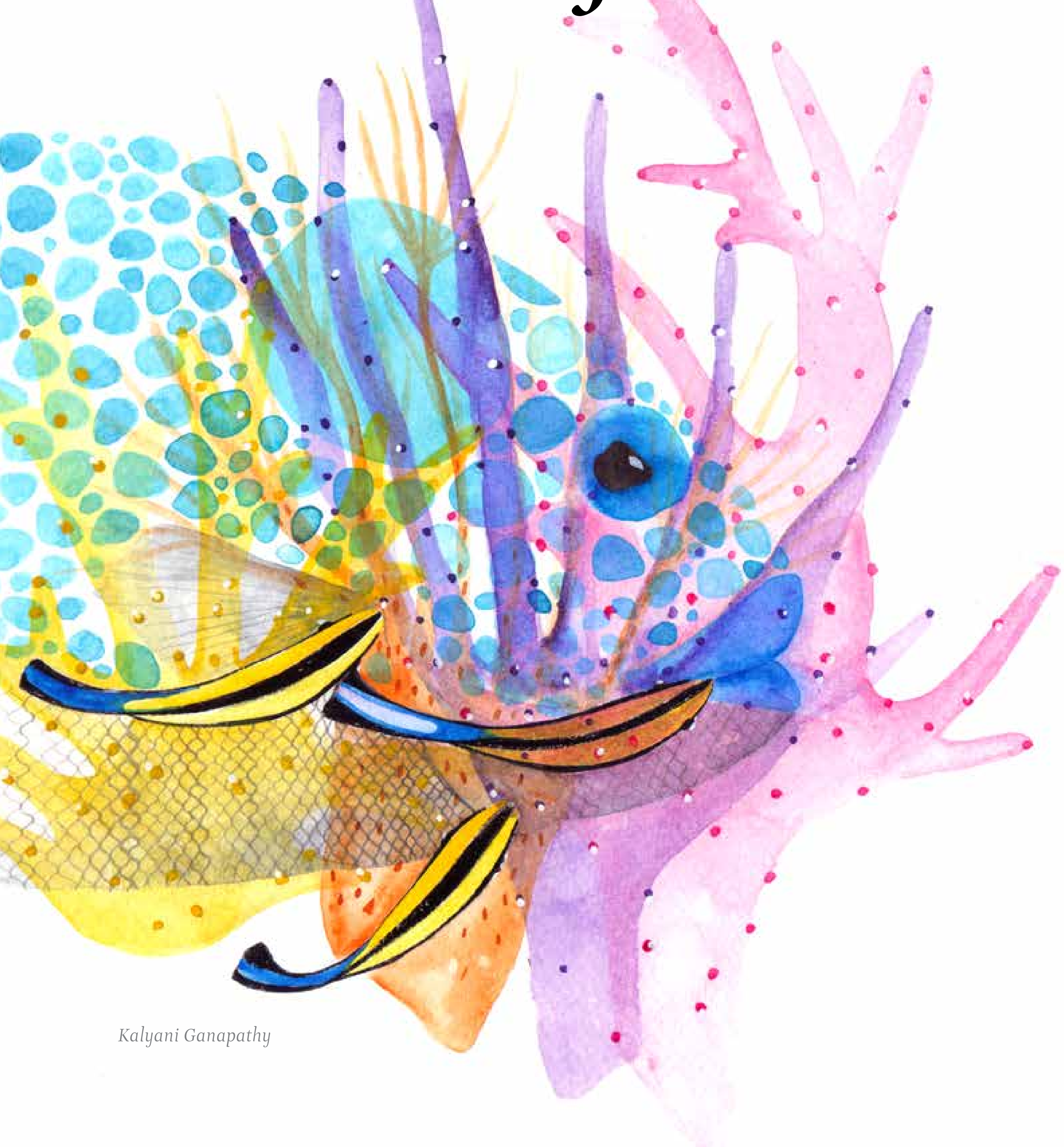
It seems to be trying to bring together waves 3 and 4, for example, interviewing local fisherman, and recording a variety of information from them, including things which the scientists can use like fish numbers.

Question

How can wave 5 link local fishers, fishers' knowledge researchers and fisheries scientists?

So where does this leave us? Is there a calmer ocean ahead for those studying fishers' knowledge and those studying fisheries science to sail forwards together peacefully? Perhaps they could even be in the same boat? Hind thinks that there is still a way to go before the two types of researchers truly work well together. Yes, scientists must drop any negative prejudices against fishers, but fishers' knowledge researchers must collect information useful to the scientists. What happens next is down to the next generation of scientists.

# IT'S *feeding time* AT THE *cleaner-fish* CAFÉ



Kalyani Ganapathy

### common names
Common cleaner-fish
Bridled beauty
Gadfly fish
Janitor fish

### scientific name
*Labroides dimidiatus*

### distribution
Tropical and temperate waters of the Indo-Pacific ocean. A well-known species on the great barrier reef in Australia.

### habitat
Coral reefs

### diet
*L.dimidiatus* feeds on parasites and mucus which it removes from the scales, mouths and gills of other larger species of reef fish, called 'clients'.

### fact file
The relationship between *L.dimidiatus* and its 'clients' is called a mutualism. This means that both the cleaner-fish and client get something from their relationship. The cleaner-fish gets food, and their clients have their parasites removed. This improves their health and increases their chances of survival. The process also appears to feel good, perhaps like gentle tickling.

Cleaner-fish establish territories, called cleaning stations, from which they provide their services. Their clients know where these stations are, and visit them when they need a clean.

Although providing an important service for their clients, *L.dimidiatus* also takes the opportunity to cheat when possible, picking mucus instead of parasites from their client's scales. Scientists think this mucus may provide the cleaner-fish with protection from ultraviolet sun rays, as well as with a nutritious meal. Even fish need to wear sun screen when the sun is fierce. However, removing the mucus doesn't get the client fish much cleaner, so they prefer their cleaners to stick to the parasites.

## client species

Spiny chromis damselfish
*Acanthochromis polyacanthus*
Females lay very large eggs, embryos develop slowly for damselfish, making the young very well-developed when they hatch.

Both parents look after the young for a surprisingly long period once they emerge from the eggs.

Slingjaw wrasse
*Epibulus insidiator*
When males of this species are trying to impress the females and find a mate, they can actually change their colour, becoming brighter. If disturbed from their displays, they can quickly switch back to their usual colour pattern.

Black-backed wrasse
*Anampses neoguinaicus*
This carnivorous fish usually lives in small groups of females, and are accompanied by a single male.

Black-backed wrasse is what scientists call a protogynous hermaphrodite. All individuals start off as females, but when the male in the group dies, one of the females changes her sex, becoming the dominant breeding male.

Epaulette shark
*Hemiscyllium ocellatum*
This shark grows to just over a meter in length, and can be found in waters as shallow as 15cm.

They can survive even when oxygen levels in the water are very low, lowering their blood pressure by 50% to maintain blood-flow to their brains.

Blunt-head parrotfish
*Chlorurus microrhinos*
This large and colourful fish grows up to 80cm in length, forms schools of up to 40 individuals and can live for 15 years.

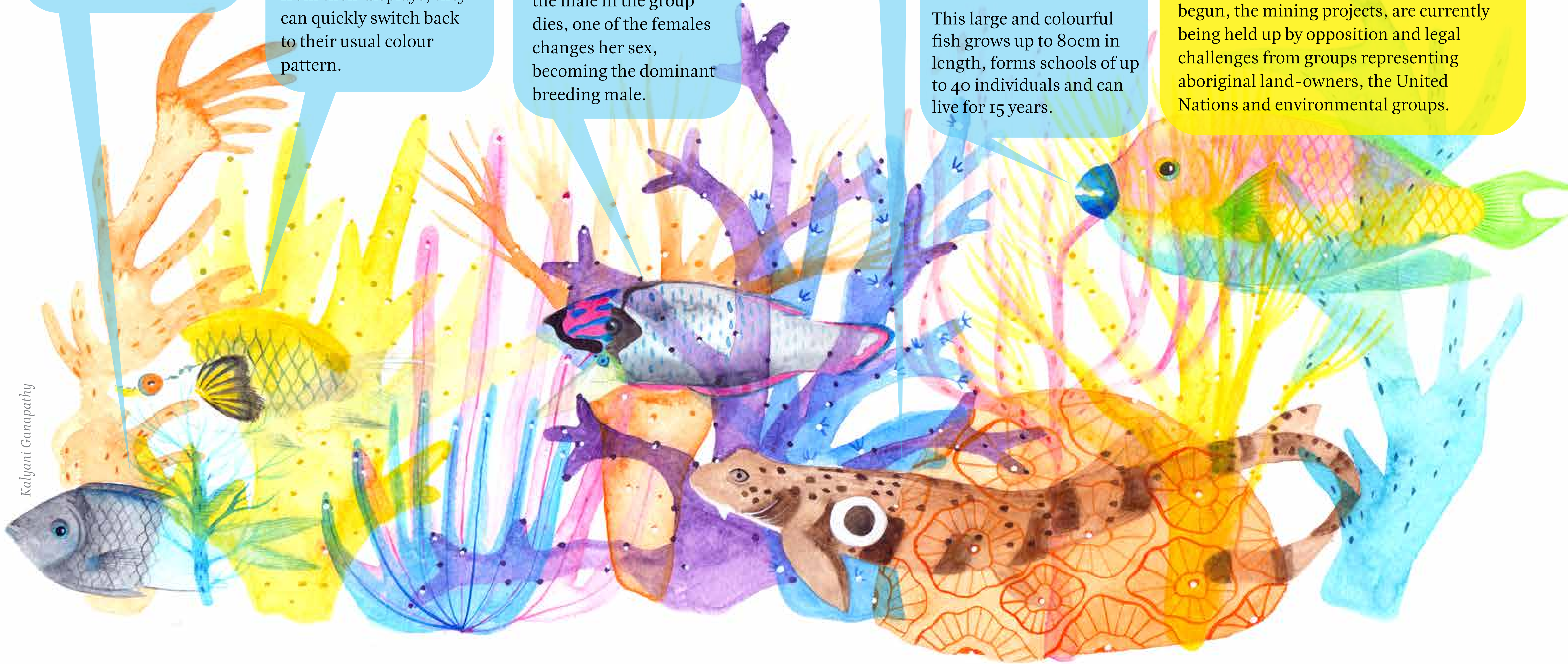
## eviction notice!

In December 2015, the Queensland state government gave the go ahead for the expansion of a coal port at Abbot Point.

Although there are measures in place to protect the coral and the life it supports, these restrictions may not stop the damage.

Adani Mining, argues that the control measures are sufficient and the expansion will create 10,000 jobs and deliver $AUD 22 billion in taxes and royalties.

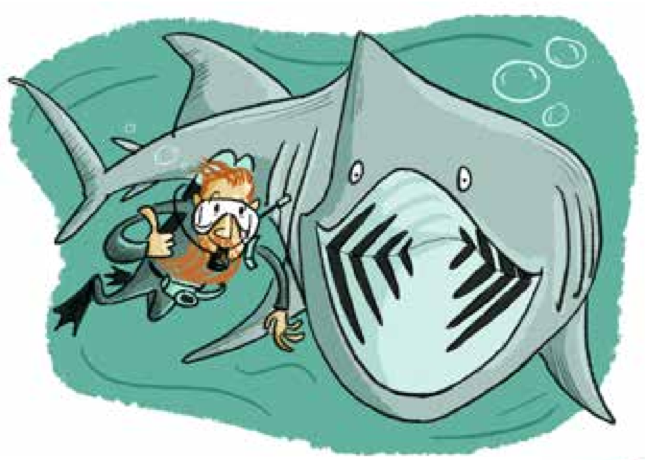
Although some development work has begun, the mining projects, are currently being held up by opposition and legal challenges from groups representing aboriginal land-owners, the United Nations and environmental groups.



*Kalyani Ganapathy*

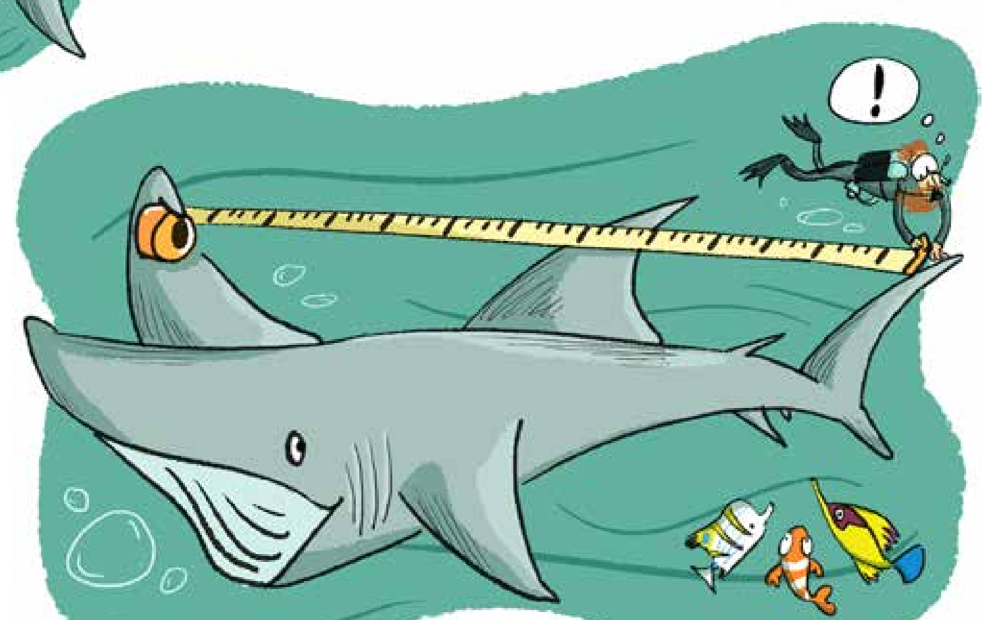
# TRACKING A GENTLE GIANT

The sight of a large dark fin slicing through the water will fill some with dread. For me it's excitement and intrigue. Sharks have been swimming in our oceans for nearly 450 million years, but we know very little about key parts of their lives, such as where they eat, breed and travel to during their annual migrations. This information is critical to help provide protection for sharks, as many species are over-exploited and numbers are dwindling. This is where my research comes in...



I am a PhD student, studying basking sharks *(Cetorhinus maximus)* in UK waters, trying to uncover a little more about where these awesome creatures travel to and what they might be doing when they go there.

*Basking sharks can grow up to 12m in length, making them the 2nd largest species of fish in the world. This poses the question; how can we know so little about something so big?*




*Rohan Chakravarty*

The answer is that even though we often see these sharks feeding at the surface in coastal waters of the UK and Ireland during the summer, from the autumn onwards they move into deeper waters, disappearing from sight, and leaving us unable to follow them. However, we are now able to attach small satellite tags onto the sharks, which take detailed information about how deep the sharks are in the water, and where in the world they are swimming. The tags then fall off the sharks after a set time, and send us all this information via satellites. This allows us to follow them, without being anywhere near them! But first, we need to find the sharks to put the trackers on them. We head out on our boat each summer, searching until we see some sharks (which can take minutes, hours or days). We then approach very slowly so that we don't disturb the sharks from what they were doing. In the summer, this usually means eating. Standing at the very front of the boat, we use a long pole to attach the tag to the base of the shark's fin. The shark, unfazed, continues to swim along, feasting on the tiny zooplankton in the water. The tags then start to collect lots of exciting data for us, so we can try and make sure this enigmatic species is well looked after for the future!

Find out more at *http://www.exeter.ac.uk/esi/people/phd_students/doherty/*

*http://www.exeter.ac.uk/esi/research/baskingsharktracking/*