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# CORAL REEFS IN THE WORLD'S OCEANS

By Shawn Peabody

AUDIENCE: CONSERVATION FIELD AGENTS, STUDENTS

6

INDIAN OCEAN COMMUNITY CONSERVATION HANDBOOKS

MacArthur Foundation

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WIOMSA

Velondriake

**Coral reefs play a crucial role in the world environment. They cover less than 1% of the surface of the earth, but are home to 25% of all the marine species and provide food directly or indirectly to 85% of the animals in the ocean. Coral reefs make up the most biodiverse ecosystem on Earth with 30 of the 34 known animal groups (*phyla*) present. In short, without a healthy system of coral reefs around the world, the oceans would be empty of fish and other species important to humans. If the present rate of destruction continues, 70% of the world's coral reefs will be destroyed by the year 2050.**

Five hundred million people rely on coral reefs for their food and livelihoods. Where will these people find food if the oceans become scarce of fish? Already, the world's forests and wild places are becoming rare as they are converted into farms and cities. Very simply, without the food from the oceans, which is so dependent on coral reefs, millions of people would go hungry, causing widespread famine and war.

This handbook aims to allow field workers to explain the interconnection of the coral reefs of the world and the people who use them. It is important to distinguish between resident fish, which spend their entire lives in a small area, and pelagic fish, which roam throughout large regions or around the world. This knowledge leads to the understanding of the non-renewability of their resources because when resident fish are over-exploited locally, they will not return, even if they still exist in other places. Additionally, when coral reefs are damaged locally, passing fish will spend less time in them, making it even more difficult for local fishers to make a living. Many fishers currently believe that fish and other marine animals are an inexhaustible resource because of the great size of the ocean. They think that if you catch all the fish in one place today, they will quickly be replaced by fish from other places tomorrow. While this may be true to a limited extent with pelagic fish, it is not true with resident fish (which are a more important source of income for many fishing communities).

Furthermore, by distinguishing between resident and pelagic fish one can see that protecting resources locally also has an impact globally. If a reef dies, it will not come back for hundreds of years. If many reefs die in a region, fish that live in that region may face the threat of extinction. If many reef systems die around the world, pelagic fish may also die out. Already, many species of shark, turtle, and large fish are in rapid decline. The Angel shark (*Squatina squatina*), the Leatherback turtle (*Dermochelys coriacea*), and the Atlantic goliath grouper (*Epinephelus itajara*) are all listed as critically endangered. The Southern bluefin tuna (*Thunnus maccoyii*) has declined so far in the last 20 years that the fishery is finished. A few individuals still remain, but it is thought that the population numbers will never recover to previous levels. Already many marine species have already

gone extinct, with one estimate that more than 830 species have disappeared in the last 300 years.

The world's population is interconnected through shared resources such as air and water. The destruction of marine resources in one area produces effects felt all over the world. Currently, the world's oceans are being destroyed by overfishing, pollution, oil and gas exploration, and other threats. If the people of the world do not work together in order to protect the remaining resources, these resources may disappear forever causing worldwide suffering.

Luckily, there is hope for the oceans and the coral reefs of the world. In some places where coral destruction and overfishing were common, they are now minimal. Governments and fishers in places as diverse as Fiji, Australia, the United States and Norway are finding ways to stop the destruction of marine resources. Marine reserves, limits on size and number of fish landed, gear restrictions, aquaculture, and pollution control are some of the ways that this has been accomplished. Some of these methods are described in other handbooks (see handbooks 1, 5, 6 and 7).

However, it is not enough for only some of the oceans to be protected from destruction while other areas continue to be damaged by human activities. Due to the interconnectedness of marine habitats, especially coral reefs, protecting a single portion of the oceans will not save the whole ocean. Many marine animals move from region to region across the world. If many of the reefs in the world are destroyed, these animals will not be able to survive. As in the example given in the associated comic, coral reefs are like restaurants along the marine highways of ocean currents that circle the world. If several nearby restaurants are closed, the animals won't be able to make it past the dead zone to the next feeding place.

In order to ensure the true protection of the world's oceans, not just in a few places, but around the world, people from around the world must work together. Organisations of marine science experts, fishers, and ordinary citizens are working around the globe to help people everywhere to protect their natural resources. Blue Ventures, World Wildlife Foundation, Wildlife Conservation Society, and the Western Indian Ocean Marine Science Association (WIOMSA) are examples of these organisations.

In places such as the Velondriake Locally-Managed Marine Area (Madagascar), Salary (Madagascar) and Rodrigues (Mauritius), these organisations have begun working closely with local communities in order to protect marine resources for the benefit of all. When local communities protect their marine resources from continual degradation, they are protecting themselves from future disaster, but they are also protecting the world's marine resources for generations of fishers everywhere for years to come.

## How to use this handbook

Teachers can use this handbook and associated comic in biology, geography and environmental science classes to explain the basic functioning of the marine ecosystem. Additionally, this handbook can be used to explain the interconnectedness of human communities around the world through shared global resources such as oceans.

NGO field workers can use this handbook to teach communities about the non-renewability of marine resources and the importance of conservation. This handbook also explains the motives and objectives of international NGOs that work on marine issues with local people.

As with the other handbooks, it can be presented to groups or individuals or used in the classroom. The attached appendix provides resources for teachers in order to help integrate this handbook into their curriculum.

## Resources for teachers

### Quiz questions

1. Name three resident fish and three pelagic fish.
2. What is the difference between resident and pelagic fish?
3. Are resident or pelagic fish most important to your community? Why?
4. Do you think the coral reefs in your community will be destroyed by 2050? Why or why not?
5. Would it matter to your community if coral reefs in Australia and Mauritius were destroyed? Why or why not?
6. What will happen to your community if the pelagic fish of the world go extinct?
7. What can you do to protect pelagic fish?

### Mathematics exercises

1. If there are 1.4 million marine species in the world, how many of them depend directly or indirectly coral reefs?
2. If a certain fish species is declining by 5% a year, how many years will it take before it becomes extinct?
3. If 3% more people in a country are born every year than die, how many years will it take for the population to double?
4. Approximately, how many babies were born in your village last year? Approximately, how many people died? What is the growth rate of your village? When will it double?

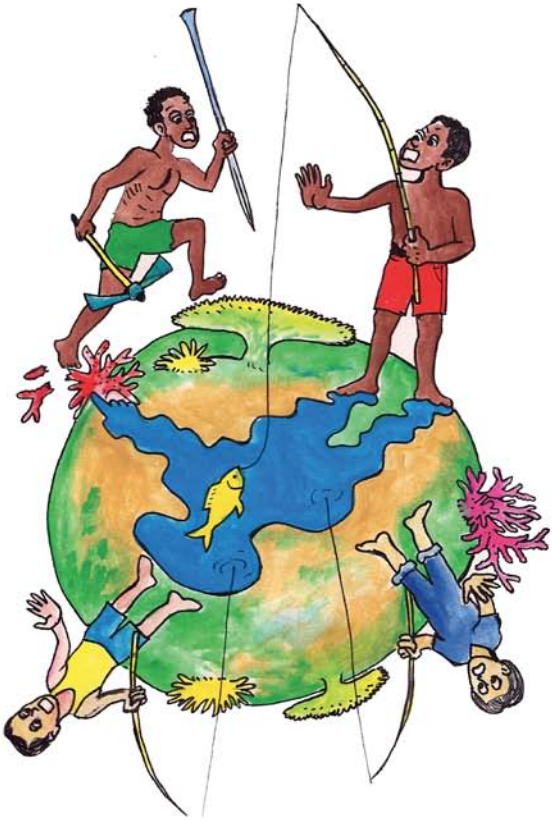
# REEFS AND OCEANS

INDIAN OCEAN COMMUNITY CONSERVATION HANDBOOK 6

## CORAL REEFS IN THE WORLD'S OCEANS

BY SHAWN PEABODY

AUDIENCE: COMMUNITY MEMBERS, STUDENTS
ARTWORK: NADY RATSIMBAZAFY



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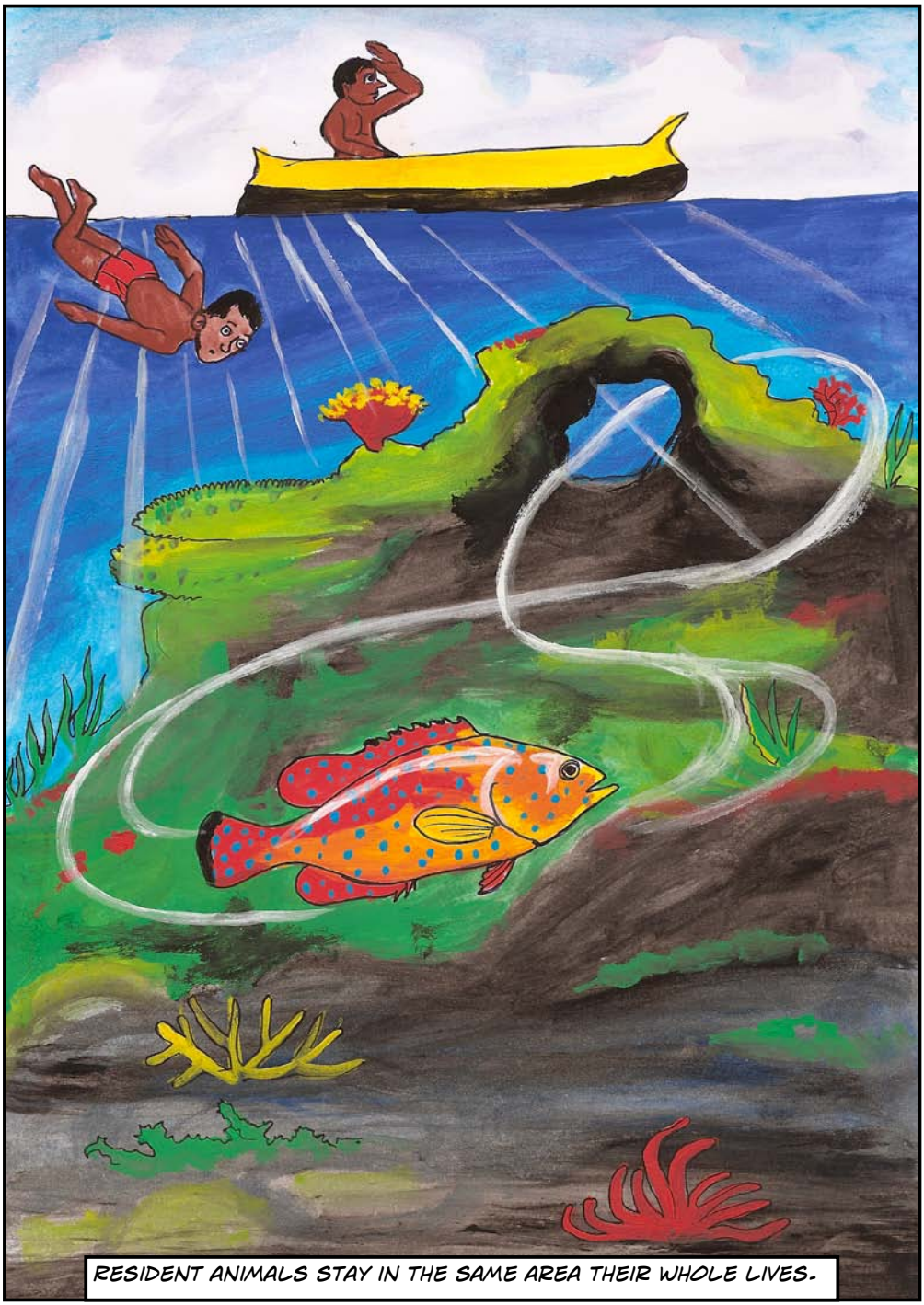
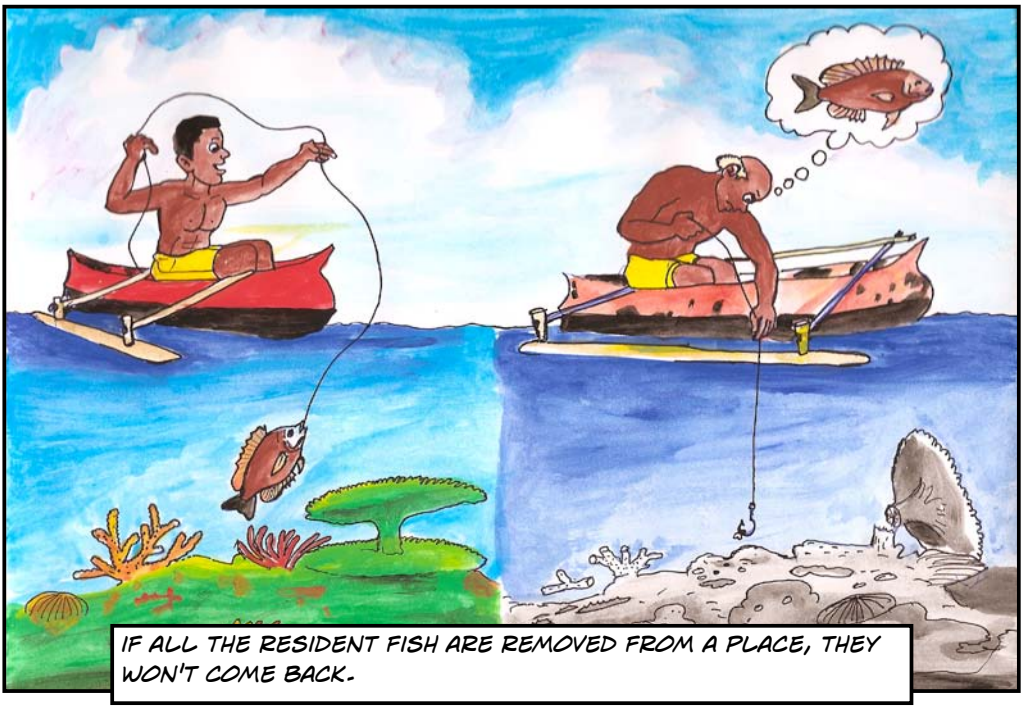
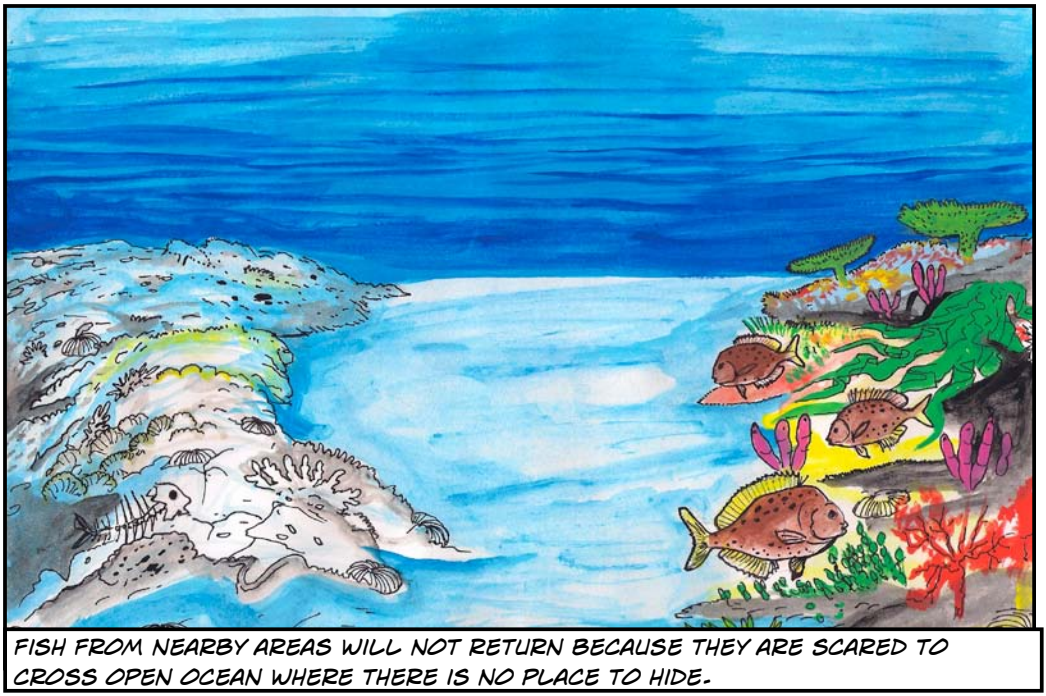
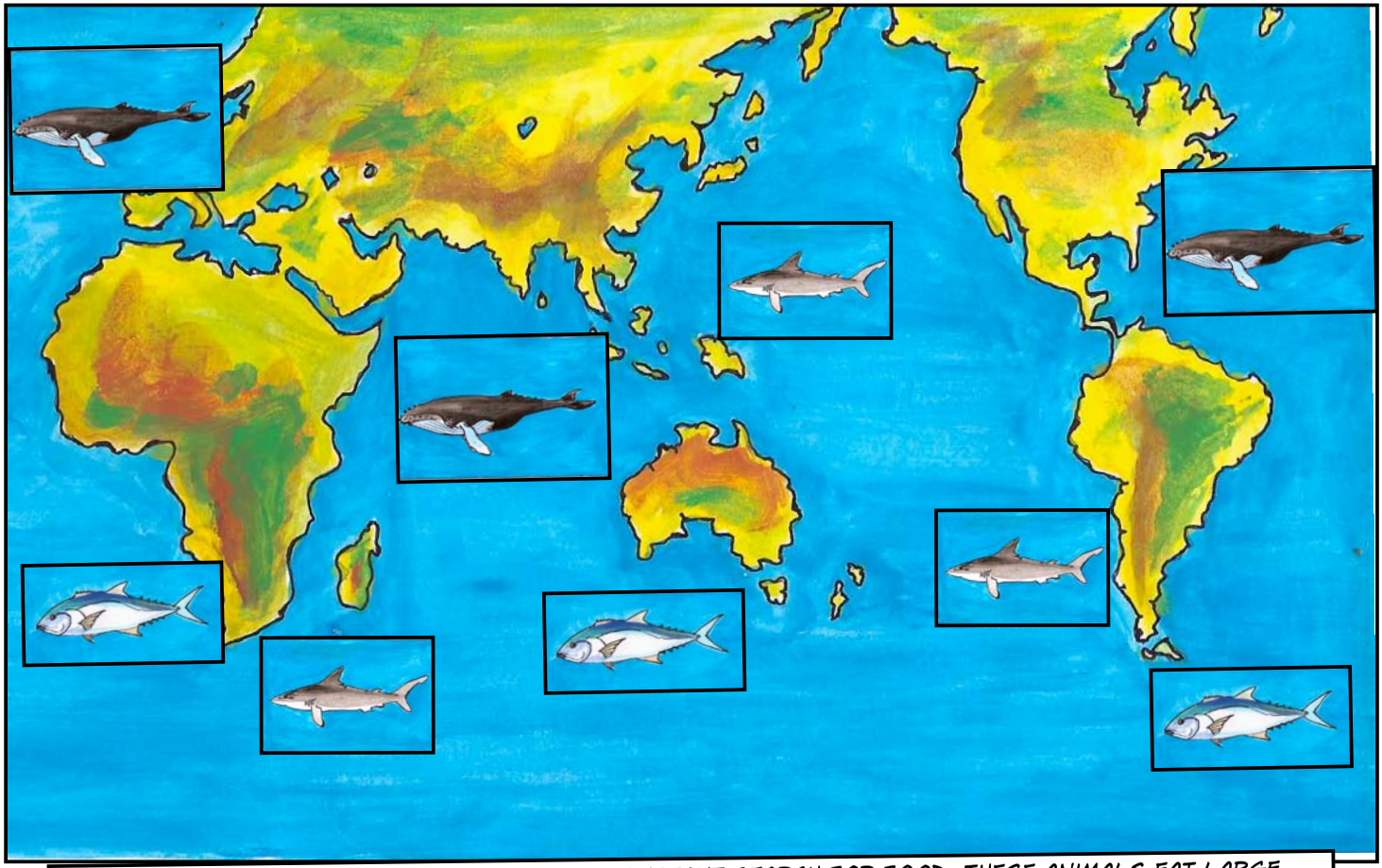
ONE CAN GROUP ALL THE ANIMALS IN THE OCEAN INTO TWO GROUPS.
ANIMALS THAT SPEND THEIR ENTIRE LIVES NEAR WHERE THEY WERE BORN AND WHO DON'T USUALLY GO VERY FAR- RESIDENT ANIMALS.

AND PELAGIC ANIMALS THAT ROAM THE OCEANS TRAVELLING GREAT DISTANCES. THESE ANIMALS ARE ALWAYS TRAVELLING TO GET THEIR FOOD AND RARELY STAY IN THE SAME PLACE FOR MORE THAN A FEW DAYS.


RESIDENT ANIMALS STAY IN THE SAME AREA THEIR WHOLE LIVES.

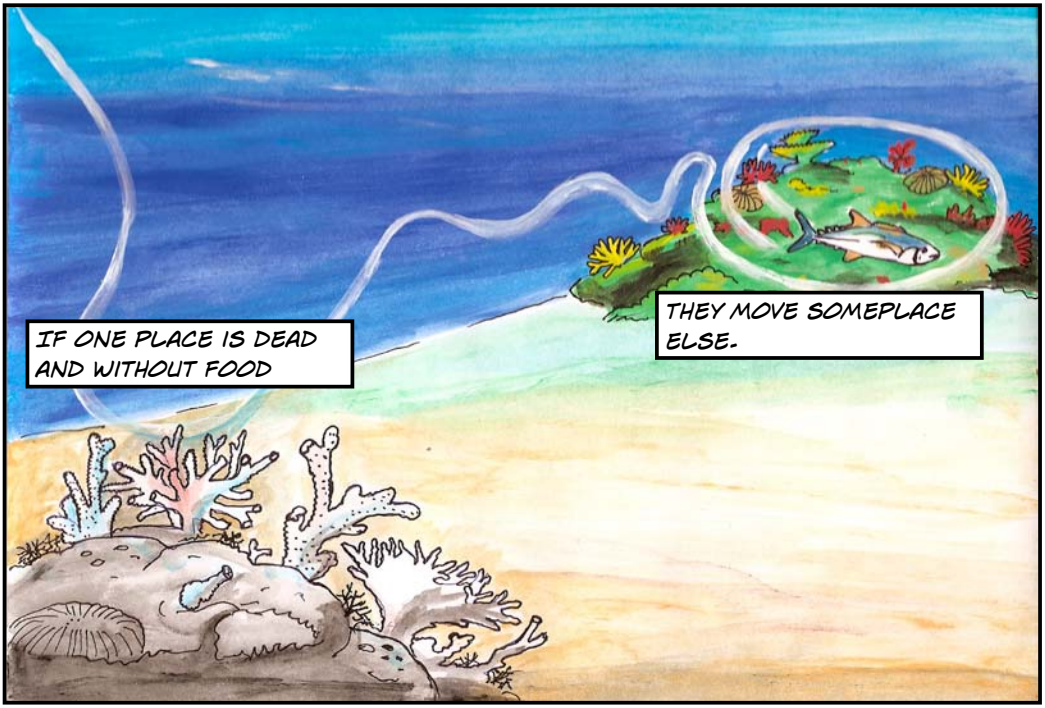

IF ALL THE RESIDENT FISH ARE REMOVED FROM A PLACE, THEY WON'T COME BACK.


FISH FROM NEARBY AREAS WILL NOT RETURN BECAUSE THEY ARE SCARED TO CROSS OPEN OCEAN WHERE THERE IS NO PLACE TO HIDE.

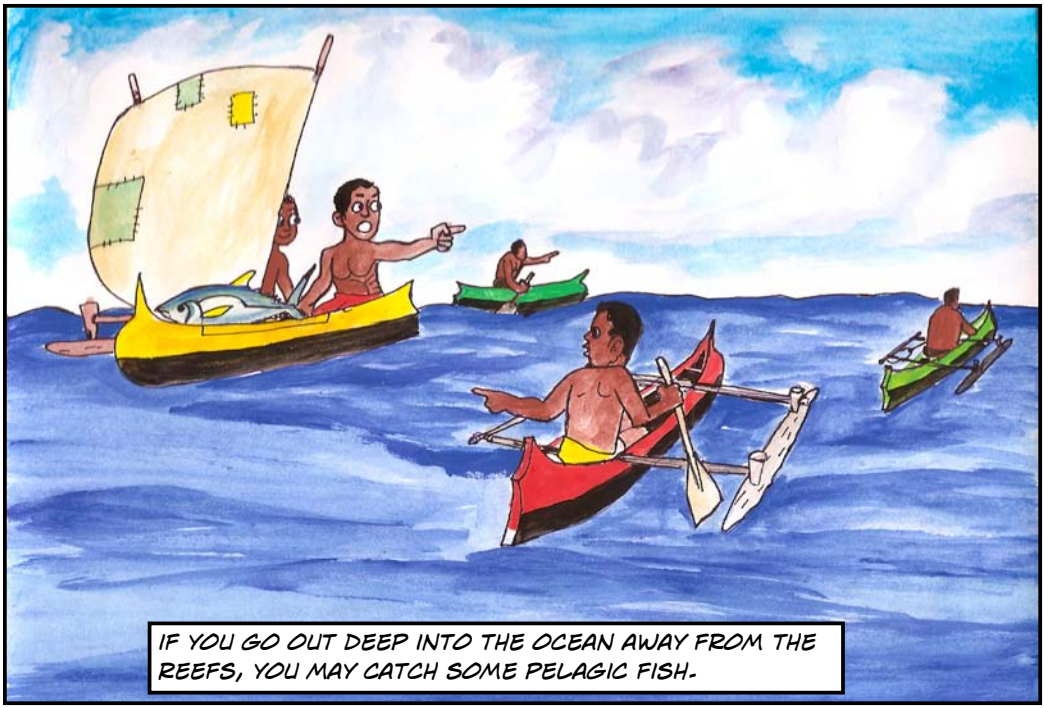


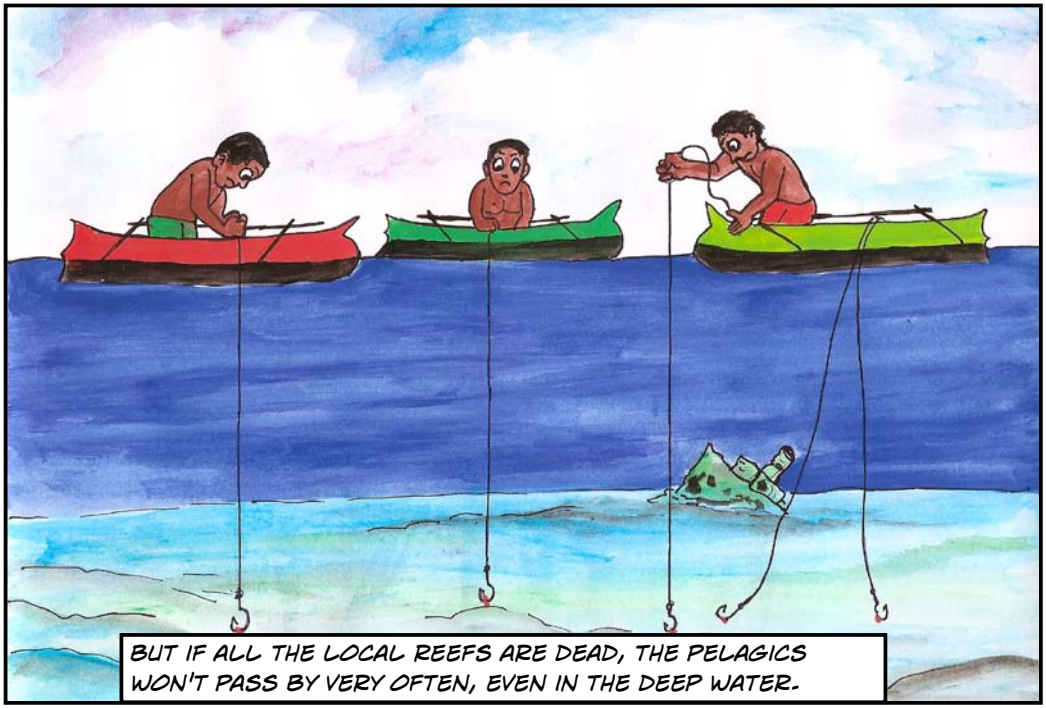
PELLAGIC FISH MOVE AROUND THE WORLD IN A CONSTANT SEARCH FOR FOOD. THESE ANIMALS EAT LARGE AMOUNTS OF FOOD IN A SHORT PERIOD OF TIME. IF THEY STAYED IN JUST ONE PLACE, THEY WOULD QUICKLY EAT EVERYTHING AND RUN OUT OF FOOD.

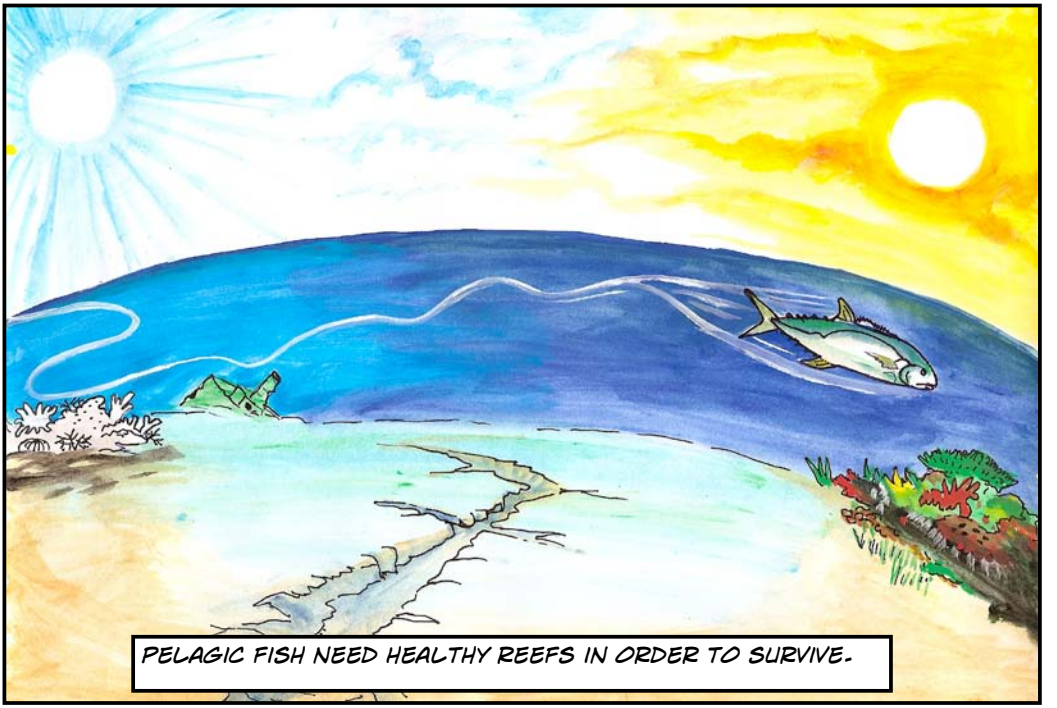

PELAGIC FISH FIND FOOD IN MANY PLACES AROUND THE WORLD.
IN VERY COLD WATER
NEAR CORAL REEFS
AND IN UNDERWATER ALGAE FORESTS

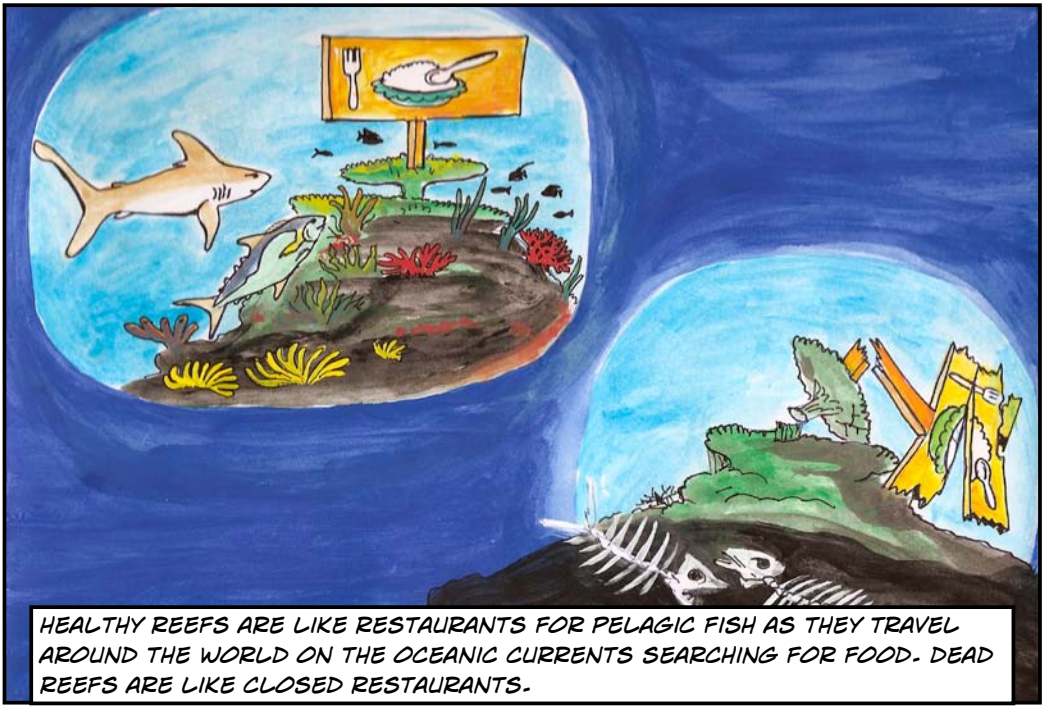

IF ONE PLACE IS DEAD AND WITHOUT FOOD
THEY MOVE SOMEPLACE ELSE.

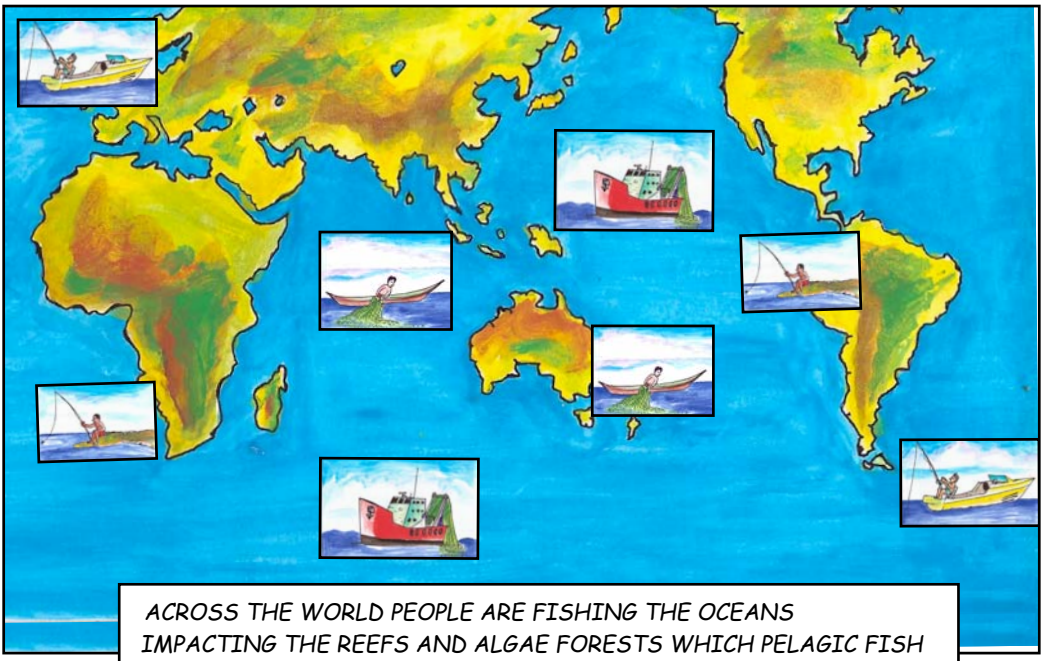

IN A DEAD PLACE, THE RESIDENT FISH ARE GONE
AND PELAGIC FISH WON'T STAY AROUND FOR LONG, MAKING IT HARD TO CATCH THEM THERE.


IF YOU GO OUT DEEP INTO THE OCEAN AWAY FROM THE REEFS, YOU MAY CATCH SOME PELAGIC FISH.

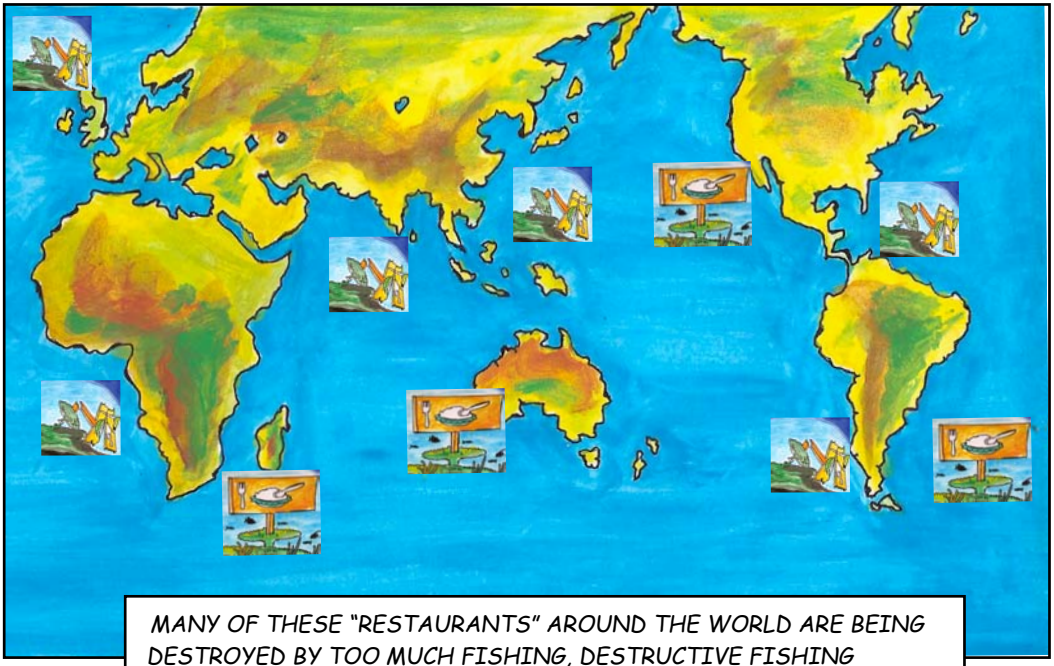

BUT IF ALL THE LOCAL REEFS ARE DEAD, THE PELAGICS WON'T PASS BY VERY OFTEN, EVEN IN THE DEEP WATER.


PELAGIC FISH NEED HEALTHY REEFS IN ORDER TO SURVIVE.


HEALTHY REEFS ARE LIKE RESTAURANTS FOR PELAGIC FISH AS THEY TRAVEL AROUND THE WORLD ON THE OCEANIC CURRENTS SEARCHING FOR FOOD. DEAD REEFS ARE LIKE CLOSED RESTAURANTS.



ACROSS THE WORLD PEOPLE ARE FISHING THE OCEANS IMPACTING THE REEFS AND ALGAE FORESTS WHICH PELAGIC FISH RELY ON FOR FOOD.

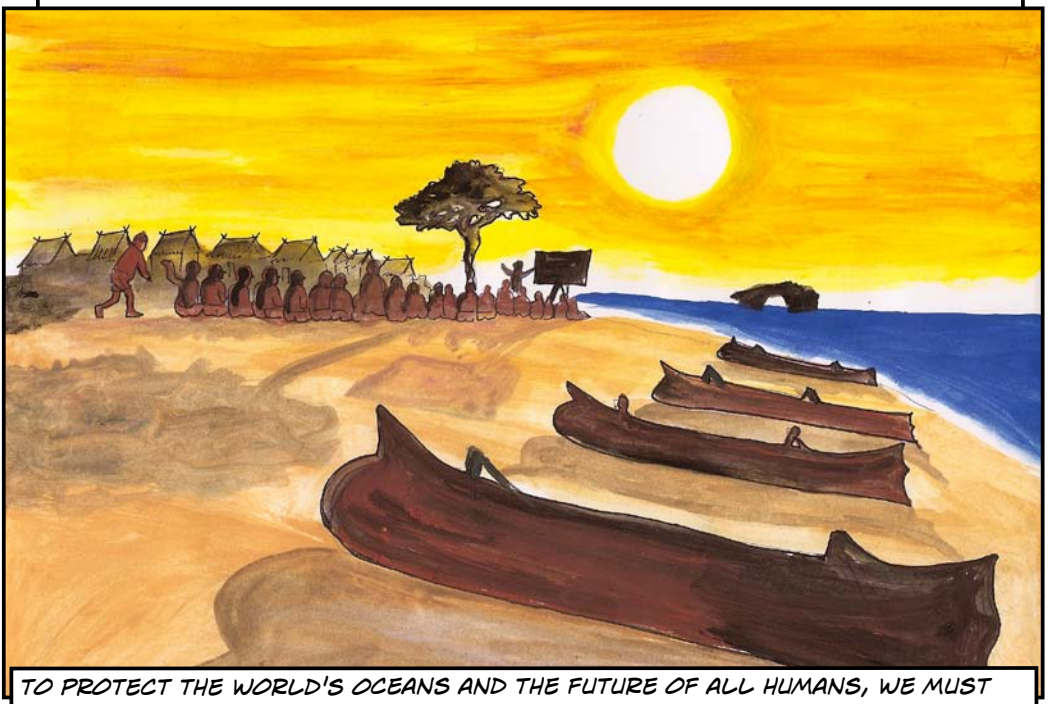


MANY OF THESE "RESTAURANTS" AROUND THE WORLD ARE BEING DESTROYED BY TOO MUCH FISHING, DESTRUCTIVE FISHING METHODS AND POLLUTION.

FISHERS AROUND THE WORLD ARE CONNECTED BY THE WORLD'S REEFS AND OCEANS.

IF MORE OF THESE RESTAURANTS CLOSE, THERE WILL BE NO MORE FISH. PEOPLE WILL STARVE ALL OVE RTHE WORLD AND WARS WILL BREAK OUT OVER THE REMAINING FOOD.

BUT IF PEOPLE AROUND THE WORLD PROTECT THEIR MARINE RESOURCES WITH RESERVES AND BY ELIMINATING DESTRUCTIVE FISHING METHODS, WE CAN PREVENT THIS TERRIBLE ENDING.



TO PROTECT THE WORLD'S OCEANS AND THE FUTURE OF ALL HUMANS, WE MUST WORK TOGETHER. IF EVERYONE PROTECTS THE REEFS NEAR THEM FROM DAMAGING FISHING METHODS AND OVERFISHING, WE WILL ALL SUCCEED.

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**Level 2 Annex, Omnibus Business Centre**
**39 - 41 North Road, London N7 9DP, UK**
**Tel: +44 (0)20 7697 8598**
**Fax: +44 (0)800 066 4032**
**Email: info@blueventures.org**
**www.blueventures.org**