Reef Check
MALAYSIA

#KnowingYourReefs

CORAL REEFS 101: BIOLOGY, THREATS & CONSERVATION MEASURES

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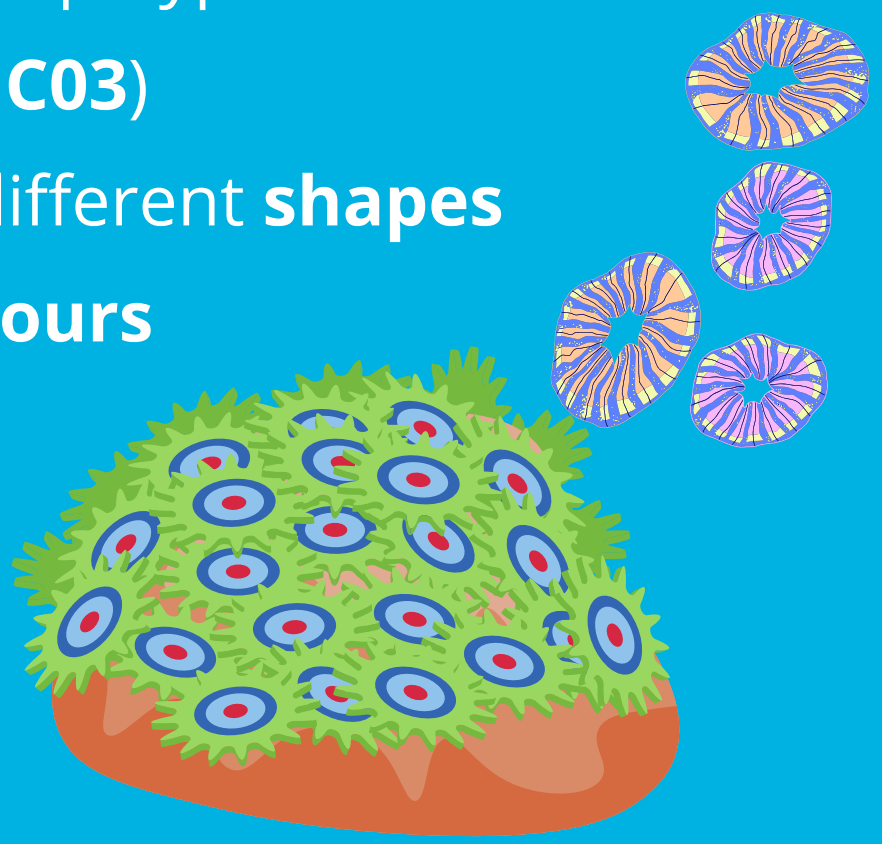
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1. CORAL REEFS

WHAT IS A CORAL?

- It is an **animal**
- It is built by thousands of **coral polyps**
- Its size increases as the polyps secrete calcium carbonate (**CaC03**)
- Corals can grow into different **shapes** and have different **colours**



healthy corals
happy corals

- They grow in warm, clear seawater
- A healthy coral reef contributes to our tourism industry as it attracts tourists from all over the world



WHAT DO CORALS EAT?

- Corals have polyps to catch food from the water surrounding them
- Corals have a **symbiotic** relationship with algae (called zooxanthellae, or zooks for short) that live inside them
- These algae provide food, oxygen, and give **colour** to corals
- Corals provide **shelter** to algae





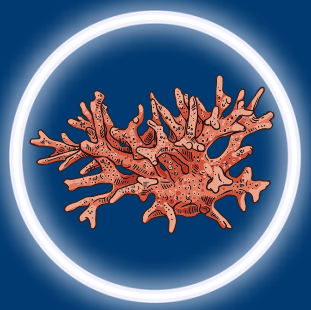
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2. CORAL REEF HABITATS

WHERE ARE CORALS FOUND?

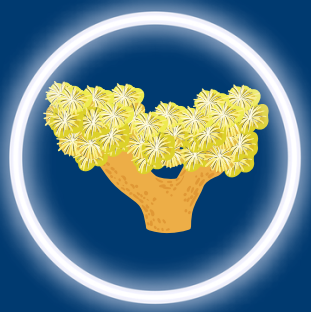
- Corals can grow pretty much in any ocean all over the world
- Predominantly found in tropical and subtropical waters
- Reef-building corals typically grow in shallow waters where there is sunlight

DIFFERENT FORMS



HARD CORALS

- Strong, reef-building calcium carbonate skeleton
- Each polyp has six tentacles



SOFT CORALS

- Flexible sclerites structures
- Each polyp has eight tentacles

LOCAL CONTEXT

- Coral reefs cover an estimated area of 3,600 km^2 in Malaysia
- East Malaysia is home to some 550 species of corals
- Malaysia, along with 5 other countries make up the Coral Triangle, which harbours 76% of the world's corals species

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3. CORAL REEF CONSERVATION

WHY PROTECT CORAL REEFS?

- We have lost 50% of the initial coral cover over the past 30 years
- This is very concerning as coral reefs provide a wide range of ecosystem services (provision, regulation, cultural & support)



IMPORTANCE OF CORAL REEFS



Provision: Food and medicine



Regulation: Coastal protection



Cultural: Tourism and education



Support: Important ecosystem that harbors 25% of all marine life

WHAT CAN I DO?

- **Reduce** carbon footprint by minimizing electricity consumption
- **Choose** products/services that puts effort in reducing environmental impacts
- **Educate** yourself with marine conservation issues and spread awareness



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4. LOCAL VS GLOBAL THREATS

Here's a few things you should know :

- Coral reefs play an integral role in the marine ecosystem
- Their complex structure requires a balance of biotic (living) and abiotic (non-living) factors for it to function
- Corals are **sensitive** to external stressors
- Today, coral reefs face immense **man-made threats, locally and globally**



LOCAL THREATS

- Stressors arising from **local source**
- Effects are usually **confined** to a certain area
- Can be **resolved locally**
- Examples include:

  - Physical Destruction

  - Land-based Pollution

  - Overfishing

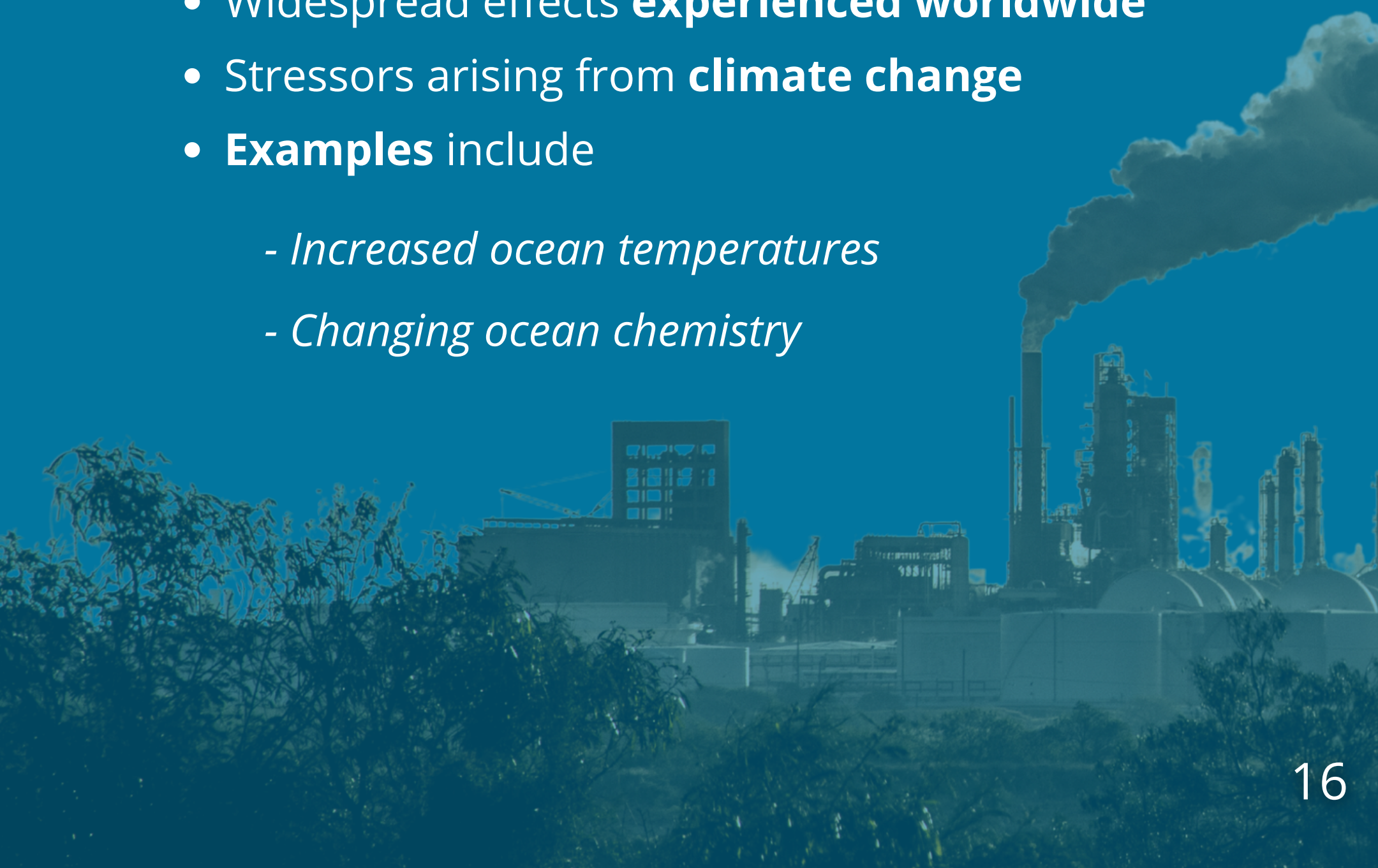
RCM FOCUSES ON ADDRESSING LOCAL THREATS

GLOBAL THREATS

- Requires **international cooperation** to resolve
- Widespread effects **experienced worldwide**
- Stressors arising from **climate change**
- **Examples** include

- Increased ocean temperatures

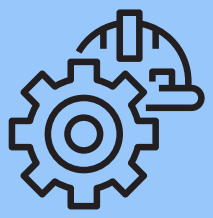
- Changing ocean chemistry



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LOCAL THREATS

PHYSICAL DESTRUCTION



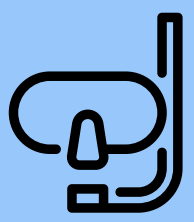
COASTAL DEVELOPMENT

destroys coral reefs ecosystem



DREDGING/ ANCHORS

physically damages coral reefs



RECREATIONAL MISUSE

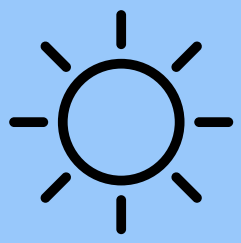
physically harming or collecting corals



DESTRUCTIVE FISHING

blasting and cyanide fishing

LAND-BASED POLLUTION



SEDIMENTATION

blocks out the all-important sunlight



TRASH & PLASTICS

entangles and poisons marine life



TOXIC SUBSTANCES

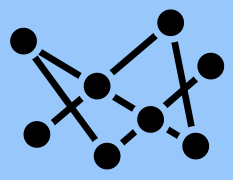
stunts or inhibits coral development



EXCESS NUTRIENTS

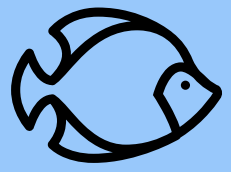
promotes algal growth and clouds water

OVERFISHING



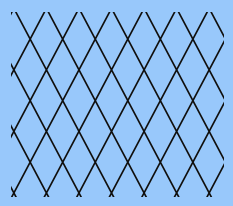
ALTERS FOOD WEB

cascading effect from removing key species



REDUCE GRAZING FISH

nothing to keep algae growth in check



MARINE DEBRIS

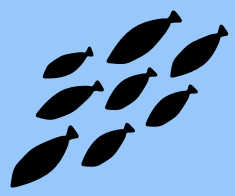
ghost nets & other fishing gear



BYCATCH

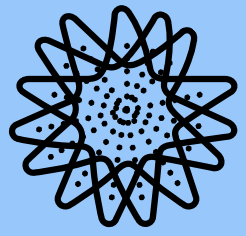
vulnerable species caught unintentionally

OTHER THREATS



ILLEGAL WILDLIFE TRADE

can develop into global threat



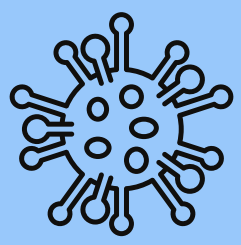
INVASIVE SPECIES

non-native species disrupt local ecosystem



CORAL HARVESTING

species-specific, aquarium/jewelry trade



DISEASE OUTBREAKS

exacerbated by other global threats

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GLOBAL THREATS

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GLOBAL THREATS

ROOT CAUSE OF GLOBAL THREATS

CLIMATE CHANGE

GLOBAL WARMING

OCEAN ACIDIFICATION

GLOBAL WARMING



INCREASED OCEAN TEMPERATURE OVER TIME



SYMBIOTIC ALGAE LEAVES CORAL



CORAL LOSES FOOD SOURCE & DIES

OCEAN ACIDIFICATION

MORE CARBON DIOXIDE DIFFUSES INTO THE OCEAN

INCREASE OCEAN ACIDITY & LOWER pH

REDUCE CORAL STRUCTURAL INTEGRITY

CORAL BLEACHING

- Coral polyps have a **symbiotic** relationship with zooxanthallae algae
- These algae provide **food** and **colour** to coral polyps
- When corals are stressed by the changes in the environment, they expel the algae, leaving behind the white coral polyps tissue - an event known as **Coral Bleaching**
- Prolonged bleaching will cause death

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MARINE DEBRIS

WHAT IS MARINE DEBRIS?

- Any **man-made materials** that have been used and discarded directly or indirectly into the rivers, seas or beaches
  - *E.g. plastics, ghost nets, cigarettes butts*
- Not to be confused with natural occurring debris such as driftwood



Here's a few things you should know:

- Marine debris that ends up in the ocean are being **carried away by the ocean currents** to distant waters
- **Not confined** to certain location
- Poses **significant threat** at a local, national and global level



DID YOU KNOW?

According to IUCN, **plastic-based materials makes up 80%** of all marine debris from surface waters to deep-sea sediments



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SOURCE OF MARINE DEBRIS

LAND VS OCEAN



LAND-BASED SOURCE

blown or washed out to the sea

through rivers, streams & beaches



OCEAN-BASED SOURCE

debris or materials from vessels

and stationary platforms at sea

LAND-BASED SOURCE

- Littering, dumping, and poor waste management practices for the disposal of domestic or industrial wastes
- Marine debris from storm water runoff
- Natural disasters such as flooding and landslides are capable of destroying properties and carrying various objects out to sea



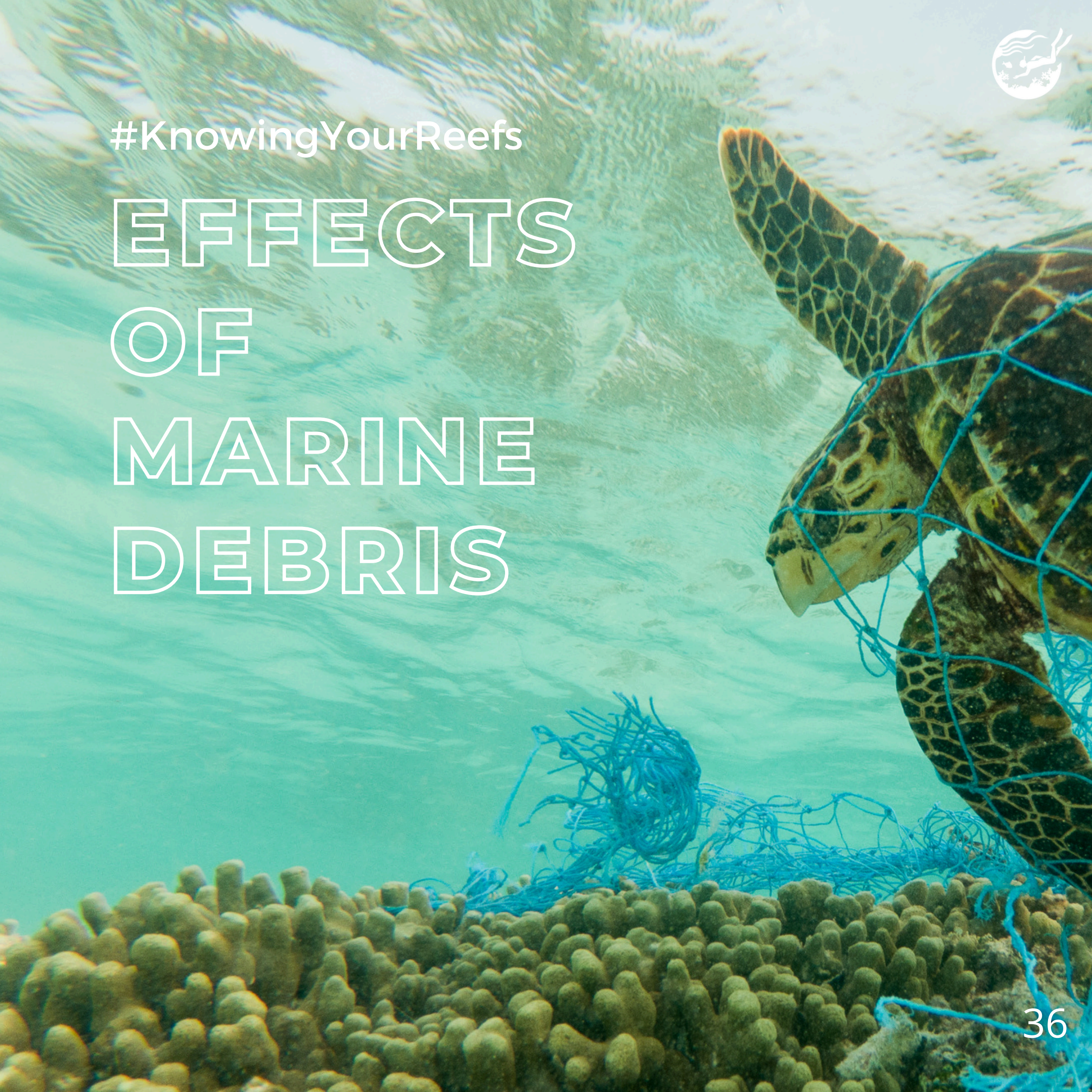
OCEAN-BASED SOURCE

- Fishing gears or equipment from fishing vessels and shore-fishing activities
- Materials from stationary platforms such oil and gas platforms
- Cargo or contents of containers lost by cargo ships and other vessels caught in rough seas



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EFFECTS OF MARINE DEBRIS





Marine debris have direct impact towards our marine ecosystem and wildlife. It causes **economic loss** and can be **costly to manage** especially at coastal area with high economic value



HABITAT DESTRUCTION

marine debris physically damages important marine habitat such as coral reefs and seagrass bed

WILDLIFE ENTANGLEMENT

marine life that gets entangled in marine debris/ ghost nets often time lead to injury, suffocation, and even death





INGESTION

debris mistaken as food and ingested by many animals would eventually lead to death



ALIEN SPECIES

marine debris can harbor non-native species that would disrupt the balance when introduced to a local ecosystem



NAVIGATION HAZARD

structural damage and tangled propeller incur costly damage to vessels when encounter marine debris at sea

ECONOMIC LOSS

shoreline debris portray negative image on popular tourist destination and incur clean-up resources & costs



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HOW CAN WE DO OUR PART?

CHOOSE RESPONSIBLE OPERATORS

Book your trip with a tourism operator that values sustainability

On your next holiday, consider choosing operators that have the certifications below:

- **GREEN FINS** for dive centres
- **Eco-friendly Snorkel Guide** for snorkel guides
- **ASEAN GREEN HOTELS** for hotels or resorts

REDUCE WASTE

You can significantly reduce your impact on the environment by reducing trash.

- **UPCYCLE** : Turn unwanted stuff into something useful like cans to new plant pots!
- **BUY LOOSE PRODUCTS :** Limits the amount of excessive packaging that enters your home
- **GIFT IT!** : If the item is still in a good condition, give or donate it to someone in need!

SUPPORT A CAUSE

Give back to the community & the environment!

SHARE

Know a local NGO that's doing work that you're really passionate about? Help them by sharing their efforts on your social media ♥

CONNECT

Join their community! Subscribe to their newsletter or find out if they have a volunteer group you can be a part of

DONATE

It can be in monetary form or in goods. What you can give may just be what they need!