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— MMS3623 —
MARINE RESOURCES MANAGEMENT

CHAPTER 1
INTRODUCTION TO MARINE RESOURCES

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LECTURE OUTLINE

-  Defining marine resources
-  Type of marine resources
-  Marine resources use overview and history
-  Human association with marine resources

What is MARINE RESOURCES?

Components/materials that exist in marine environment and have economic value to the country.

Example: oil and gas, minerals (gold, REEs, metals, etc.), fish and seafood supplies, sand and gravel, corals, etc.

[Sustainable Oceans: Marine Biodiversity for the Future We Want - YouTube](#)



Type of marine resource

Living marine resources

- Biological diversity
- Fish
- Seashells (Oyster, crab, bivalve, etc)
- Seaweed
- Coral
- Etc.



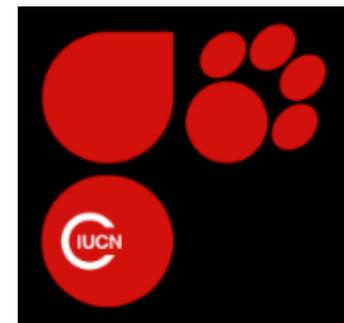
Non-living marine resources

- Petroleum
- Natural gas
- Sand
- Minerals
- Water
- Etc.



Biological Diversity?

- Variety/diversity of life on earth, millions of plants, animal and microorganisms
- Malaysia is known as one of the 12 mega-diversity countries in the world, based on species richness and high degree of endemic species
 - *Endemic spp: confined entirely to that area.
- Based on the IUCN Red List, Malaysia is home to **MORE THAN 1,141** threatened species including plants and animals.



The International Union for Conservation of Nature (IUCN) Red List of Threatened Species (also known as the IUCN Red List or Red Data Book), founded in 1964, is the world's most comprehensive inventory of the global conservation status of biological species.

IUCN Red List of Threatened Species



Marine Protected Area (MPA)



- An essentially a space in the ocean where human activities are more strictly regulated than the surrounding waters – similar to the parks we have on land.
- These places are given special protections for natural or historic marine resources by local, state, territorial, native, regional, or national authorities.
- Authorities differ substantially from nation to nation.
- Focus:
 - Limiting human-caused damage to marine ecosystems.
 - Restoring damaged marine ecosystems.
 - Preserving vulnerable marine species.



Department of Marine Park Malaysia - What is Marine Park
(dof.gov.my)

The Official Sabah Parks Website - Home

Official Website of Forest Department Sarawak

Marine protected areas represent a wide range of habitats, including coral reefs, sea grasses and mangrove forests. As of 2018, the Department of Marine Park Malaysia manages 42 islands in Peninsular Malaysia and federal territories that are gazette as marine parks. There are 6 marine protective area in Sabah waters is supervised by the Sabah Parks whereas several areas in Sarawak waters is supervised by the Sarawak Forestry Department.

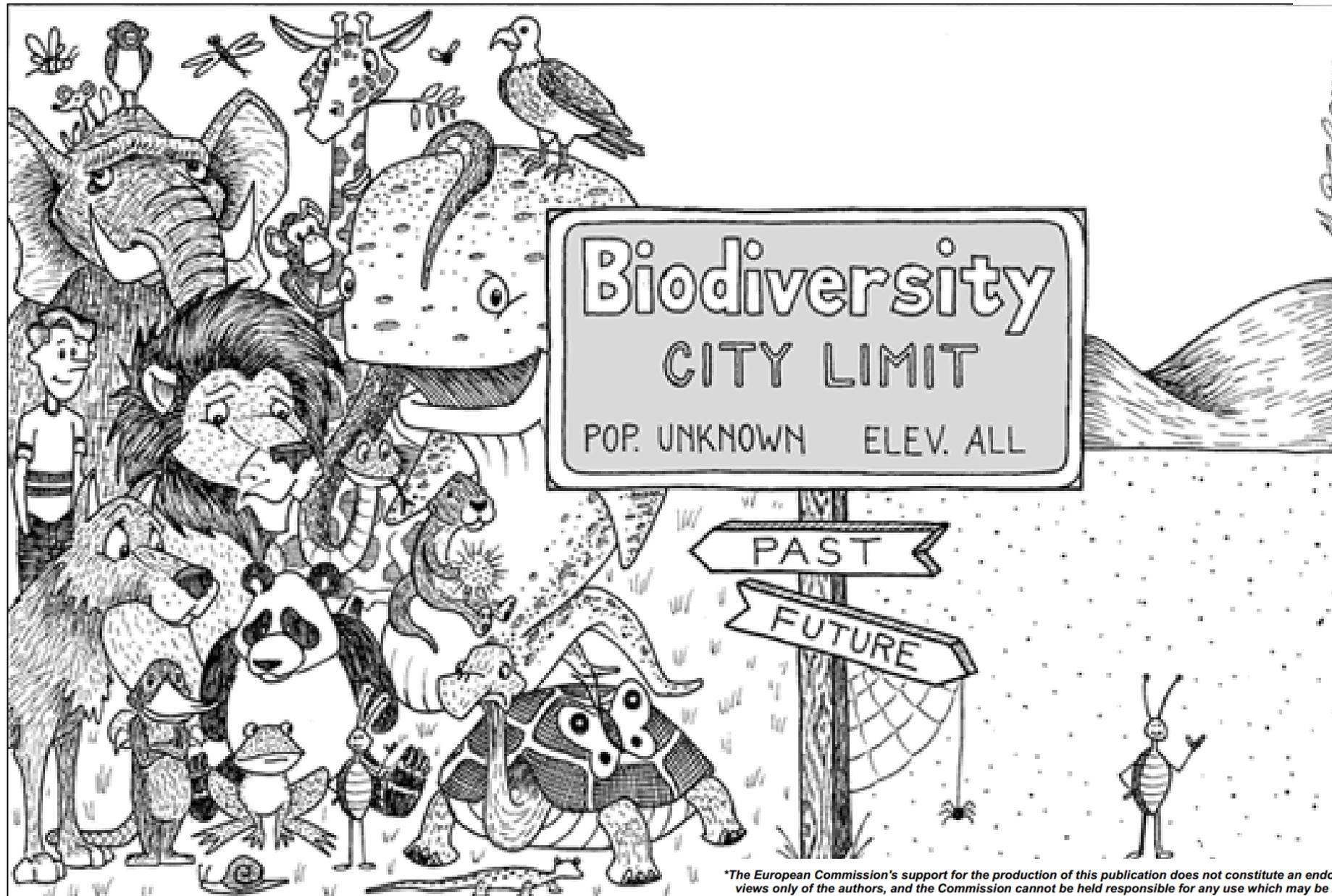
Why do we need to manage our maritime areas, resources, industries, etc???

Who has the right to manage/exploit or claim ownership???
Individual?? Agencies?? Public??

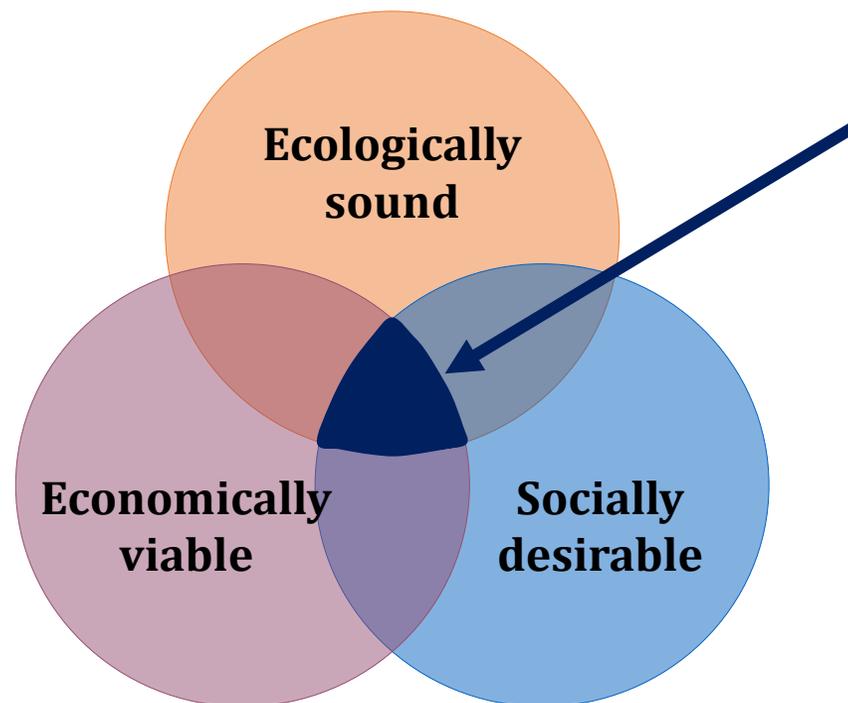
Whose responsibility for any mishap such as oil spill, pollution, etc???

How are we going to manage and protect our marine resources???

The sea in the post-industrial stage has profoundly **affected by human presence** and involved in increasing **exploitation of marine resources**. The advances in technology in sea uses has played important role for the evolution of the post-industrial stage.

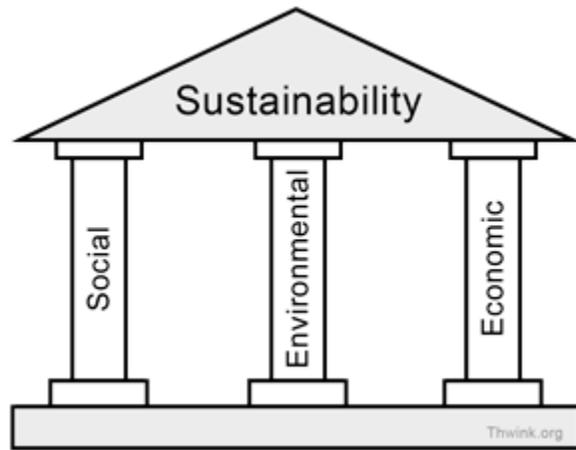


Marine resources sustainable management



**Sustainable
Management**

The "**three pillars**" of sustainability.

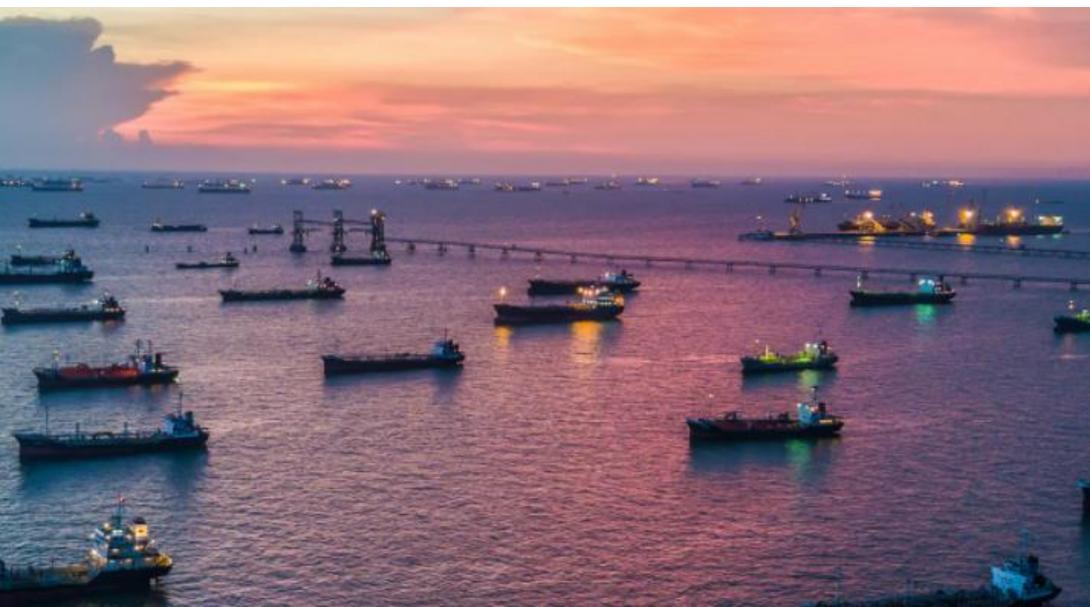


The goal of The Three Pillars of Sustainability.

1. **Environmental sustainability** is the ability to maintain rates of renewable resource harvest, pollution creation, and non-renewable resource depletion that can be continued indefinitely.
2. **Economic sustainability** is the ability to support a defined level of economic production indefinitely.
3. **Social sustainability** is the ability of a social system, such as a country, to function at a defined level of social well being indefinitely.

Three distinct ideas about “sustainability” are in use today:

1. Sustained yield of a resource
2. Sustained abundance and diversity of species and ecosystems
- 3. Sustained economic and social development, without compromising existing resources for future generations**



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OUR WORLD OCEAN provides

THE AIR WE BREATHE

>50% The ocean produces over half of the world's oxygen and stores 50 times more carbon dioxide than our atmosphere.



CLIMATE REGULATION

70% Covering 70% of the Earth's surface, the ocean transports heat from the equator to the poles, regulating our climate and weather patterns.



TRANSPORTATION

76% Percent of all U.S. trade involving some form of marine transportation.



RECREATION

From fishing to boating to kayaking and whale watching, the ocean provides us with so many unique activities.



ECONOMY

\$282 billion Amount the U.S. ocean economy produces in goods and services. Ocean-dependent businesses employ almost 3 million people.



FOOD

The ocean provides much more than just seafood. Ingredients from the sea are found in surprising foods such as peanut butter and soymilk.



MEDICINE

Many medicinal products come from the ocean, including ingredients that help fight cancer, arthritis, Alzheimer's disease, and heart disease.



PLASTIC OCEAN

192 COUNTRIES BORDERING THE ATLANTIC, PACIFIC, INDIAN OCEANS AND MEDITERRANEAN AND BLACK SEAS PRODUCED **2.5 BILLION METRIC TONS OF SOLID WASTE IN 2010**.
AN ESTIMATED **8 MILLION METRIC TONS** OF PLASTIC ENTERED THE OCEAN THAT SAME YEAR.



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Open access peer-reviewed chapter

Human History of Maritime Exploitation and Adaptation Process to Coastal and Marine Environments – A View from the Case of Wallacea and the Pacific

By Rintaro Ono

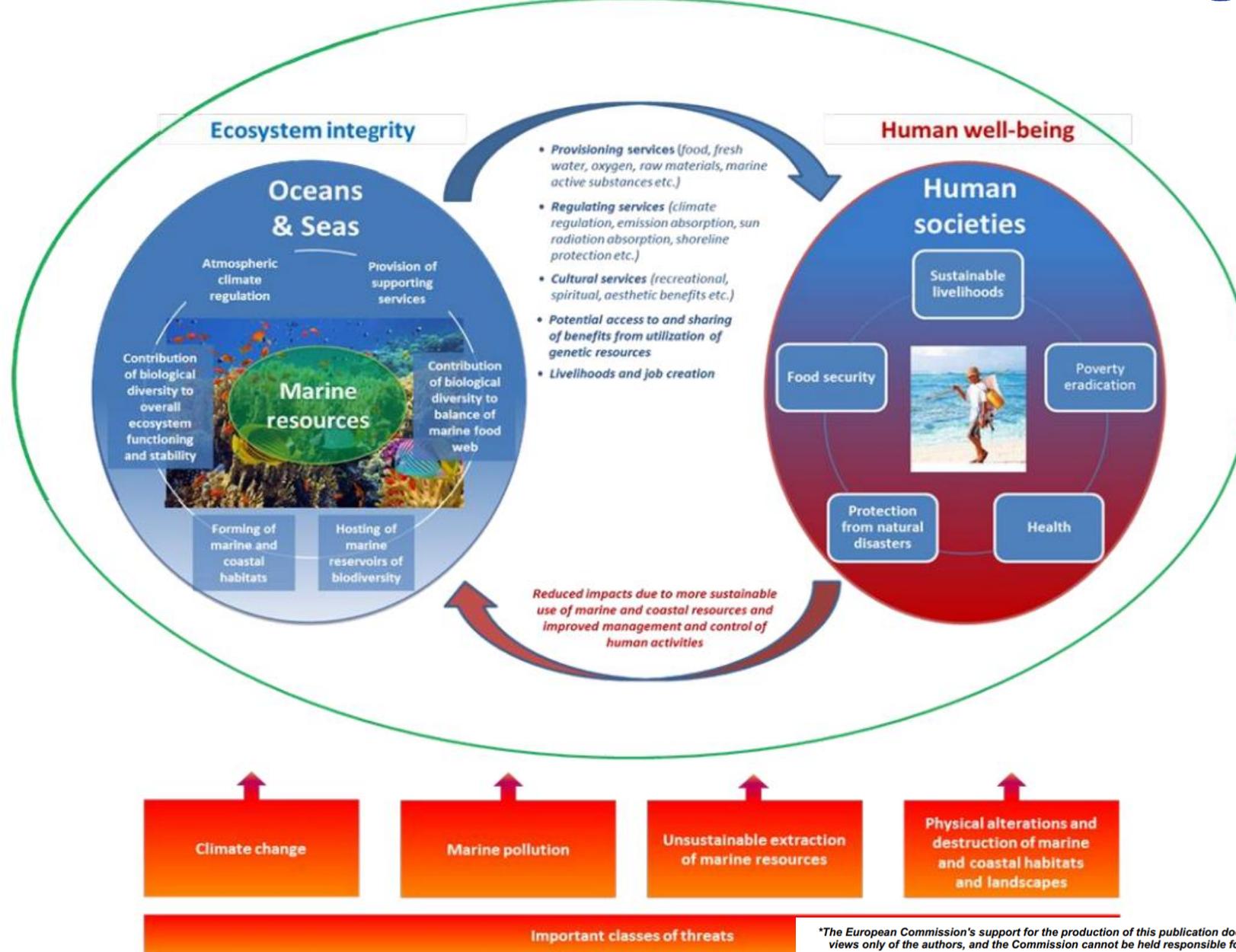
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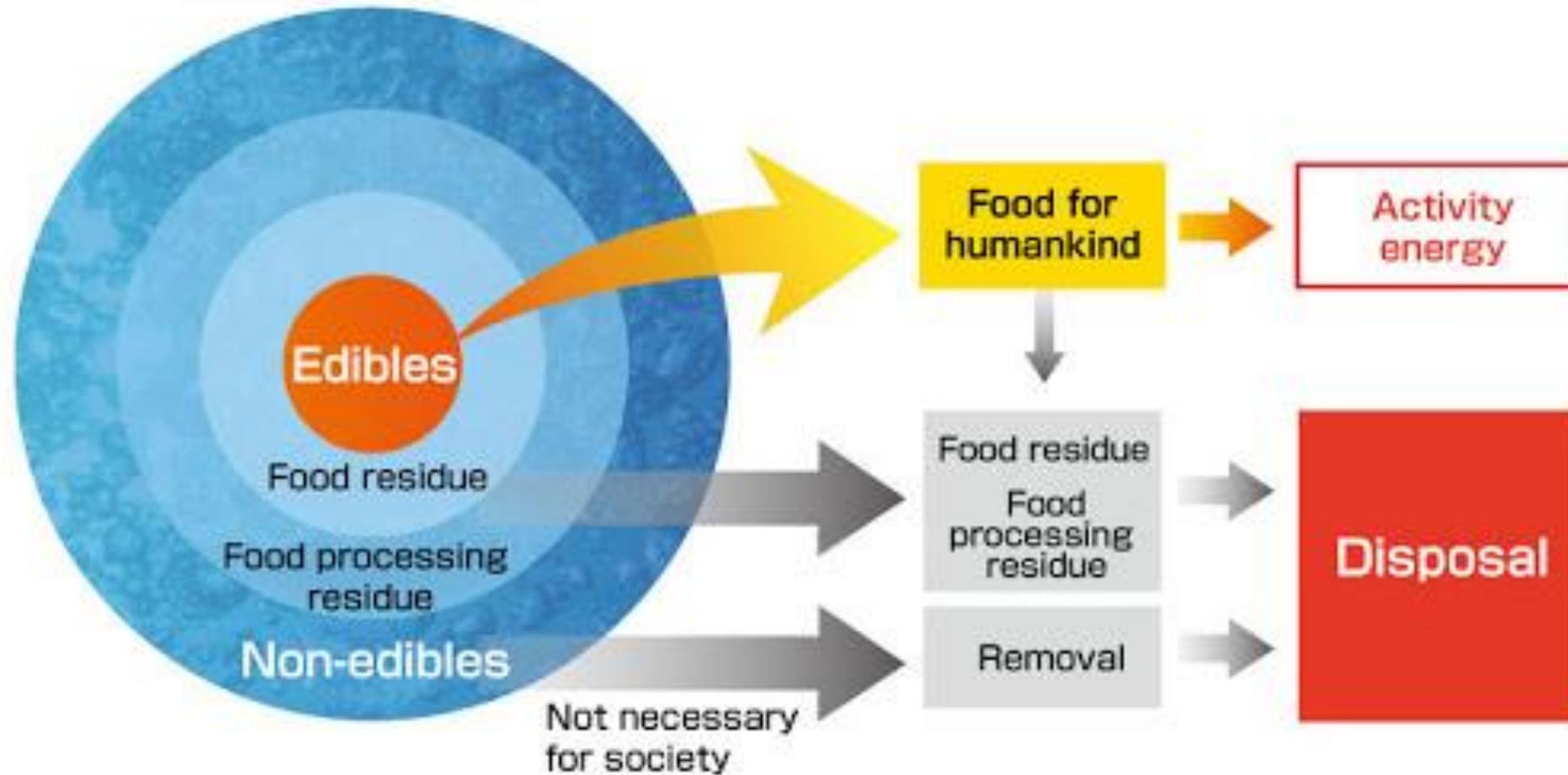
[Human History of Maritime Exploitation and Adaptation Process to Coastal and Marine Environments – A View from the Case of Wallacea and the Pacific | IntechOpen](#)

This chapter introduces the archaeological new findings and current outcomes for the past human marine exploitation and maritime or coastal adaptation particularly in the Wallacea region where I have studied for long time. One of the oldest and important data I discuss here is from Jerimalai Cave site from East Timor and Leang Sarru site from Talaud Islands. The finds from East Timor demonstrate the high level of maritime skills and technology possessed by the modern humans who colonized Wallacea. These skills would have made possible the occupation of the faunally depauperate islands of Wallacea and facilitated the early maritime colonization of Australia and Near Oceania. On the other hand, Leang Sarru site dated back to 35,000 years ago on Talaud Islands where located over 100 km away from neighbour islands. The site also produced large number of marine shells from the late Pleistocene via Last Glacial Maximum (LGM) to the early Holocene, then we can also discuss the past maritime exploitation and adaptation from the late Pleistocene to the early Holocene in the Talaud Islands, where located in Northern part of Wallacea. During the Holocene after 12,000 years ago, various capture technology invented, and great variety of fish and shellfish species had been exploited by modern human. Especially the fishing technology and Ocean navigation technology were developed after the Neolithic times in Wallacea to the Pacific. Most famous archaeological records related them are the Lapita migration and colonization to many islands in Melanesia to Western Polynesia where were mostly uninhabited islands before them. After the Lapita colonization, the Polynesians who are the descendant of Lapita people succeeded to colonize Hawaii, Easter Island, and New Zealand by the 12th to 13th centuries. The distance to these islands from their neighbour islands or continent is over 4000 km, hence the success of migration by the Polynesian clearly indicate their maritime adaption and navigation technology were highly developed. In fact, it is a dramatic event that modern human succeeded to migrate to all over the world except North and South Pole when the colonization to New Zealand was done by the Polynesians. It also shows that marine environment were our last target for migration and colonization in this world after the human birthed in and around inner forest environment over 600 million years ago. This chapter also discuss such developments of marine exploitation and maritime adaptation after the Holocene or Neolithic to modern times, then reviewing the human adaptation history to coastal and marine environments.

Enabling environment



Marine resources

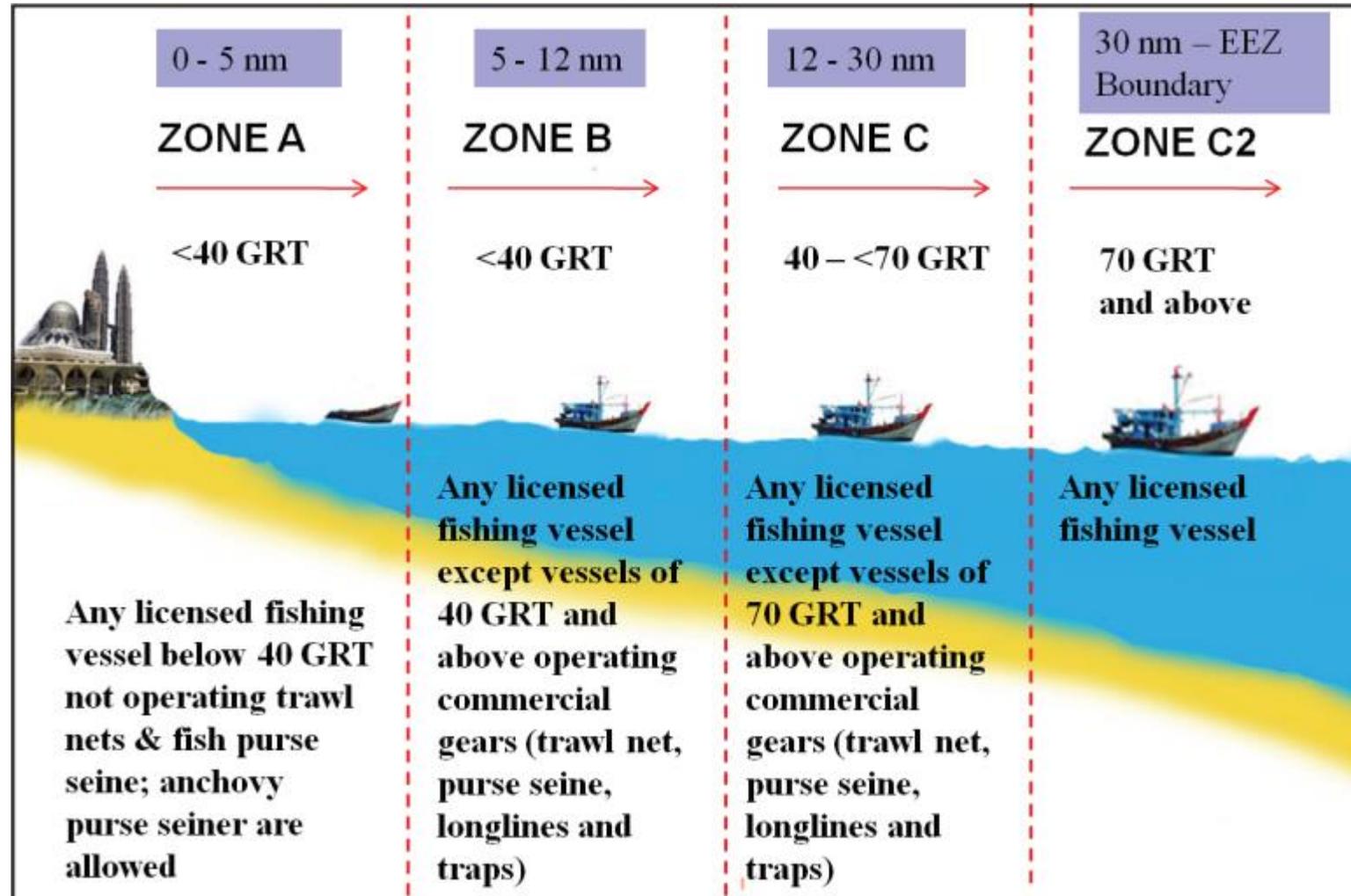


Fisheries management in Malaysia

Malaysia manages the fisheries resources through an area zoning system. The system divides the areas into four fishing zones based on the distance from the shoreline.

GRT (gross registered tonnage) of a fishing vessel in Malaysia is calculated by the formula :

$$[L (\text{Length overall} \times B (\text{breadth}) \times D (\text{depth})) \text{ metres} \times 0.02827$$



The fishing zones in Malaysia

Institutional Arrangements for Monitoring, Control & Surveillance of fisheries in Malaysia

Monitoring as the collection, measurement and analysis of fishing activity including, but not limited to catch, species composition, fishing effort, by-catch, discards, area of operations, etc.

Control involves the specification of the terms and conditions under which resources can be harvested.

Surveillance involves the regulation and supervision of fishing activity to ensure that national legislation and terms, conditions of access and management measures are observed.





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