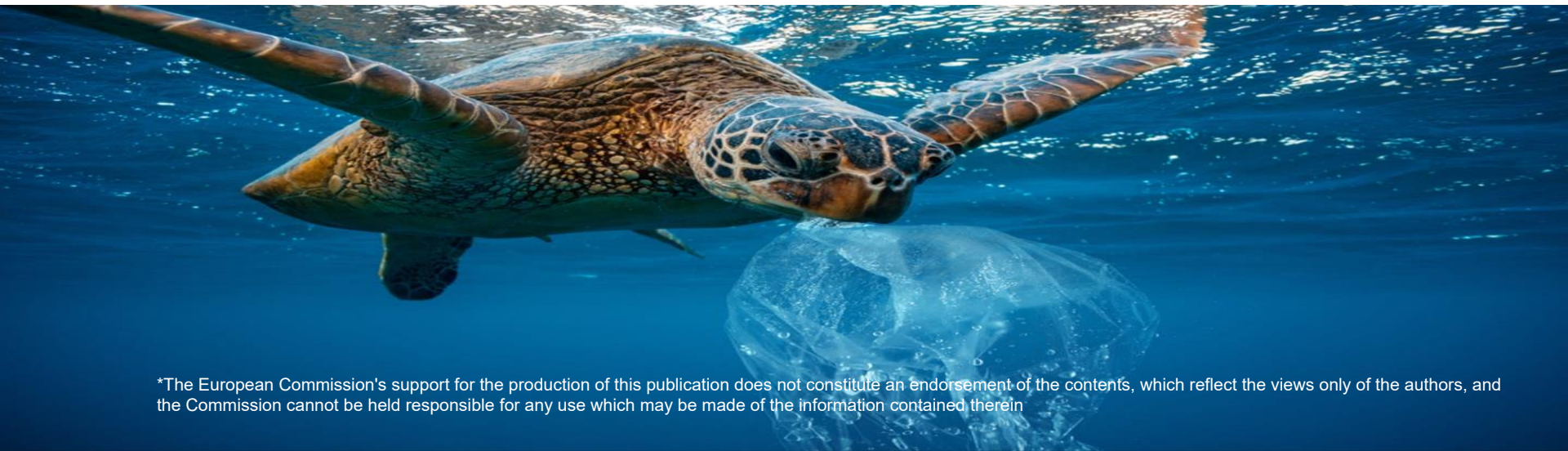




LECTURE

CONTROL OF MARINE POLLUTION

Lecturer: Prof. Nguyen Ky Phung
MSc. Dang Thi Thanh Le



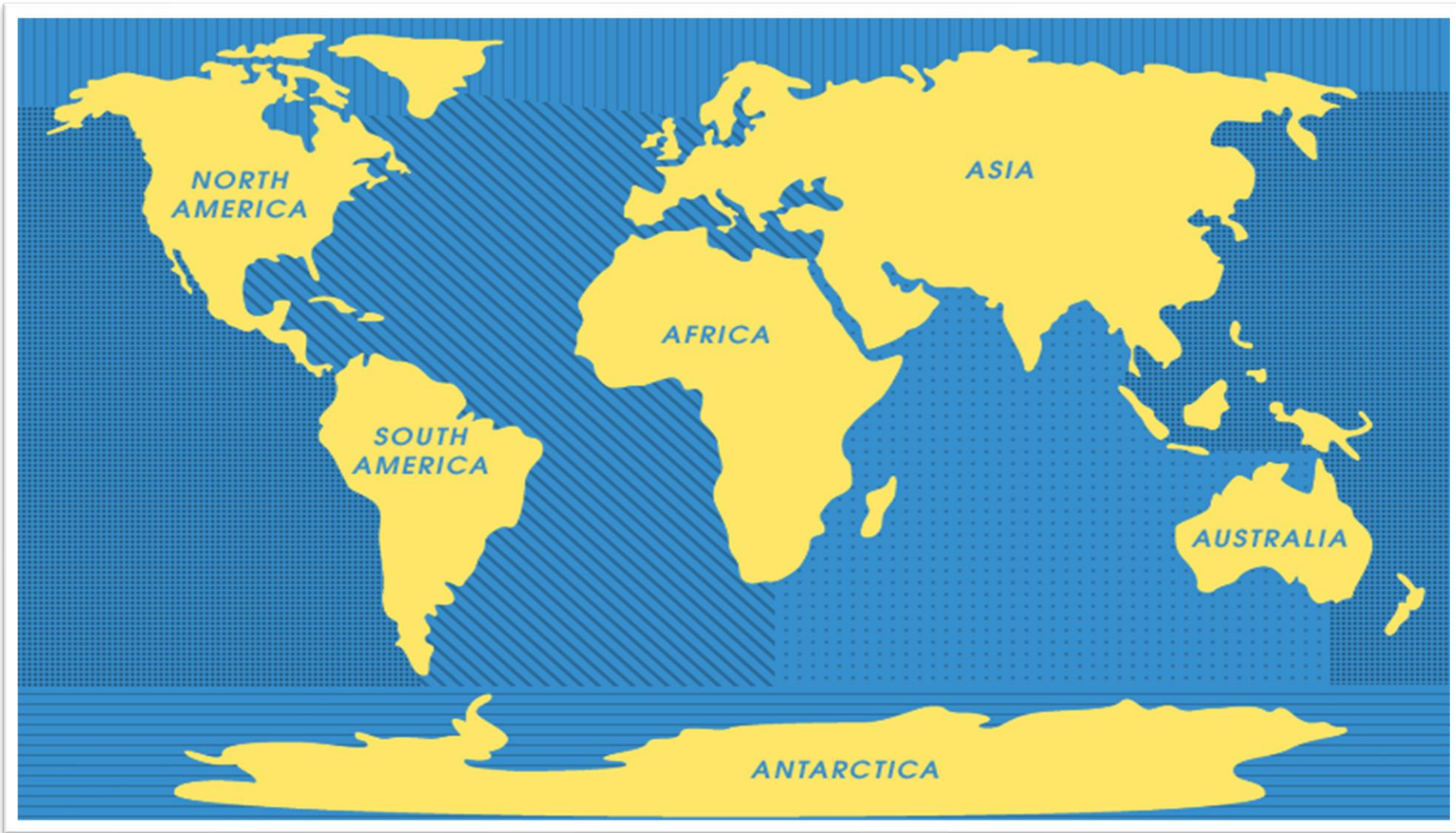


Lecture 1

MARINE ENVIRONMENTAL ISSUES

Lecturer: Prof. Nguyen Ky Phung
MSc. Dang Thi Thanh Le

Video 1



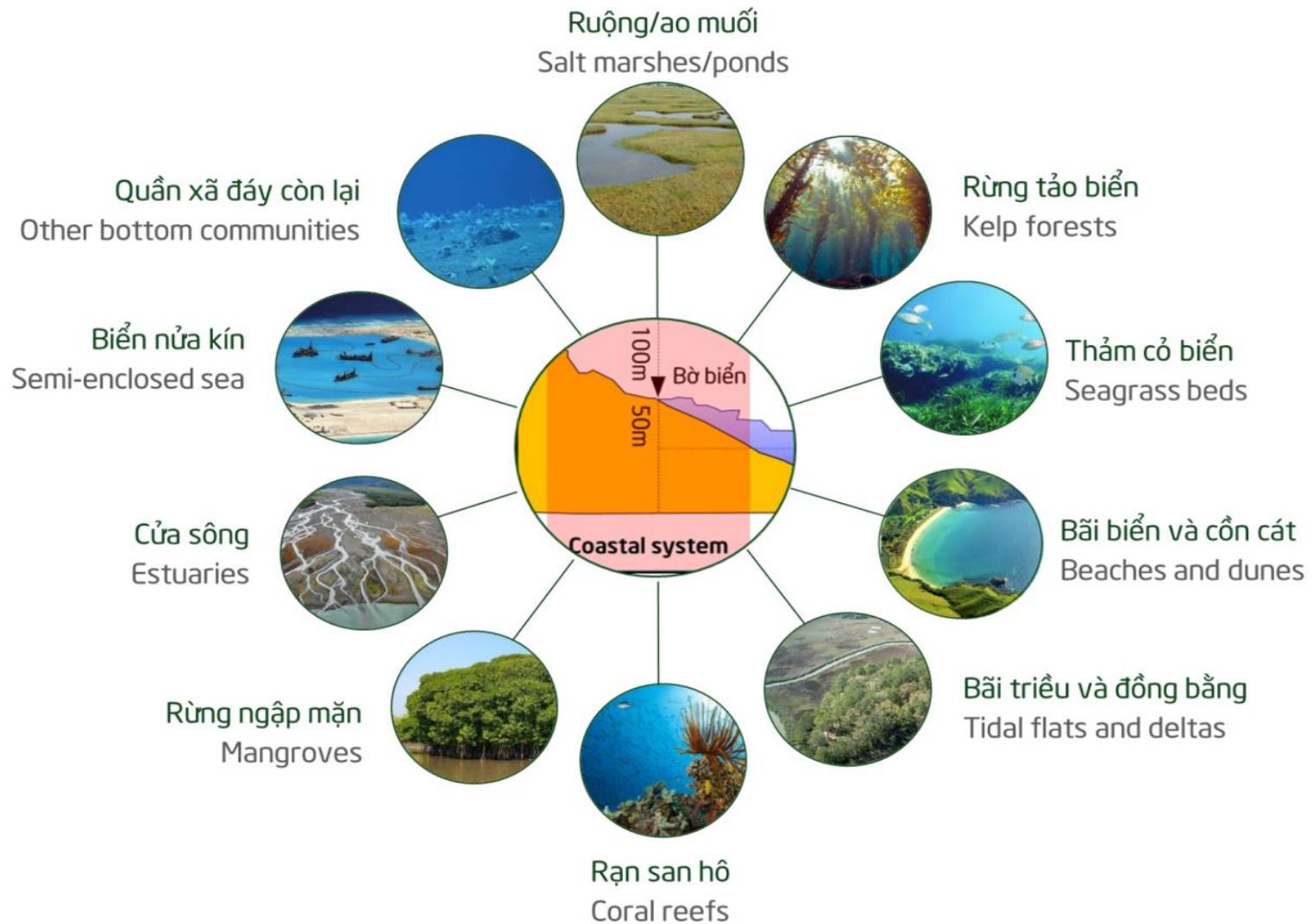
Nguồn: Marine pollution, 1st theme of the 2017 [#OurOcean](#) conference

NATURAL CONDITIONS AND MARINE ENVIRONMENT



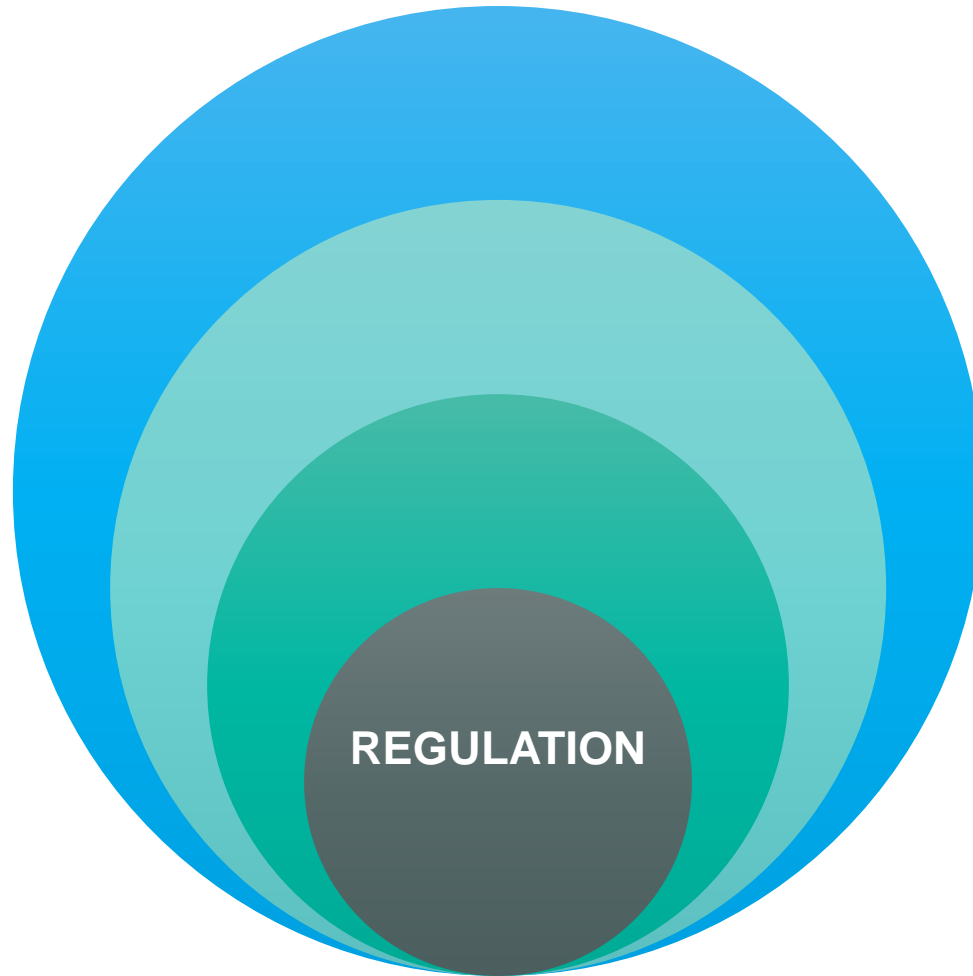
- The ocean covers about 71% of the Earth's surface.
- They play an important role in the chemical and biological balance of life on Earth.
- They are critical to our food, trade and transportation security.
- Ensuring the comforts for people (travel, sports, rest)

COASTAL ECOSYSTEMS



(Source: UNEP, 2006)

FUNCTION OF COASTAL ECOSYSTEMS



Source: De Groot, Wilson và Boumans (2002)

FUNCTION OF THE COASTAL ECOSYSTEM



Function	Service
Regulating function	Maintain essential ecological processes and life support systems
1. Air conditioning	1.1. Prevent UVB radiation by O ₃ 1.2. Stabilize air quality 1.3. Influence on microclimate 1.4. Maintain atmospheric chemical balance
2. Climate control	2.1 Maintain favorable climatic conditions (such as temperature, precipitation, gas cycle) for living, health and production
3. Prevent turbulence	3.1. Prevent storms, waves (eg coral reefs, mangroves, casuarina forests, ...) 3.2 Flood prevention (e.g. wetlands, mangroves)
4. Water regulation	4.1. Regulating the hydrological regime through currents and tides 4.2. Environment for transport
5. Water supply	5.1. Supply water to the users
6. Sediment stabilization (water retention)	6.1. Water purification (increasing water clarity) 6.2. Prevent erosion
7. Erosion, accretion (soil formation)	7.1. Increasing coastal accretion
8. Nutrition Cycle/Regulation	8.1. Maintain nutrients and health for ecosystems
9. Waste treatment	9.1. Pollution control 9.2. Detoxify
10. Biological control	10.1. Control insects and diseases 10.2. Biodiversity control

(Source: De Groot, Wilson and Boumans, 2002)

FUNCTION OF THE COASTAL ECOSYSTEM



Habitat function	Provide habitat (suitable living space) for wildlife
11. Residual function (Refugium)	11.1. Maintain biodiversity and genetic resources (foundation for other functions)
12. Incubator function (Nursery)	12.1. Nurture and create habitat for native and cultivated species. 12.2. Maintain commercial efficiency for cultivated species

(Source: De Groot, Wilson and Boumans, 2002)

FUNCTION OF THE COASTAL ECOSYSTEM



Production function	Provide all kinds of natural resources
13. Food	13.1. Caught seafood 13.2. Seafood Aquaculture
14. Raw materials	14.1. Raw materials for construction and civil production 14.2. Renewable energy sources (eg tidal, wave, wind, geothermal, solar, bioenergy) 14.3. Fertilizers and other organic substances
15. Gene source	15.1. Applications in medical and other fields
16. Medicinal herbs	16.1. Medicines and pharmaceuticals 16.2. Chemistry 16.3. Experimental creature
17. Jewelry	17.1. Resources for religion, spirituality, fashion, handicrafts, decor and souvenirs

(Source: De Groot, Wilson and Boumans, 2002)

FUNCTION OF THE COASTAL ECOSYSTEM



Information function	Provide opportunities to develop awareness
18. Cosmetology	18.1. Enjoy the scenery (e.g. seascape, seashore, cliffs, etc.)
19. Entertainment	19.1. Eco-tourism, outdoor activities (boating, kayaking, fishing, wildlife watching, beach sports, recreation, ...)
20. Culture and art	20.1. Use coastal elements as symbols or artistic inspiration
21. Spiritual history	21.1. Use of coastal elements for spiritual or historical purposes (eg Heritage value)
22. Science of Education	22.1. Using natural ingredients of the coastal zone for teaching purposes 22.2. Using natural components of the coastal zone for scientific research purposes


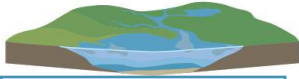






(Source: De Groot, Wilson and Boumans, 2002)

FUNCTION OF COASTAL ECOSYSTEMS

marine and coastal ecosystems in Vietnam

8 million poor people depend on ecosystems and 20 million people are indirectly affected by these services

Marine and coastal ecosystems in Vietnam provide many economic benefits (food, income, employment) and many community values (visits, entertainment, culture) for human life, through important services and functions such as regulation, provision of food, culture and support

				
	mangrove forest	tidal flats, bays and coastal lagoons	seagrass	Coral reef
Diverse marine ecosystems	155.000ha	800.000ha	~16.000 ha	~1.300km ²
value of products and services of some marine ecosystems	provide seafood production	provide seafood production	provide seafood production	provide seafood production
	 450 kg /km ²	 > 2.000 USD /ha	 > 1.250 USD /ha	 10.000 USD /km ²

THE BASIC CONCEPTS

The marine environment - including the oceans and all seas and adjacent coastal areas - forms an integrated whole that is an essential component of the global life-support system and a positive asset that presents opportunities for sustainable development. – (Agenda 21)



THE BASIC CONCEPTS



Threat to the marine environment is the possibility of damage to people, property, resources, living conditions and socio-economic activities caused by pollution of the marine and island environment.



Oil and chemicals at marine means the discharge of oil, toxic chemicals from ships, aircraft, transportation or from works, equipment and oil fields to the sea. It can be caused by natural incidents, natural disasters, accidents or human-caused.

THE BASIC CONCEPTS



Monitoring of natural resources, marine and island environment is a systematic monitoring of natural resources, marine and island environment, factors affecting natural resources, marine and island environment in order to provide information and assess the current state of natural resources, marine and island environment and forecasts and warnings of developments, marine and island environment and forecasts and warnings of developments, marine and island environments.



Disposal is the intentional sinking or disposal into the sea of materials and substances. It is a process of sinking in the sea in accordance with this Law.

BASIC CONCEPTS

Marine pollution is...



is defined as the introduction by man, directly or indirectly, of substances or energy into the marine environment, including the atmosphere, which results or is likely to result in such deleterious effects as harm to living resources and marine life, damage to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, reduction of quality for use of sea water and reduction of amenities; (Joint Group of Experts on the Scientific Aspects of Marine Pollution – GESAMP, 1981)



is defined as the transformation and disturbing the chemical components of seawater caused by activities such as oil spills (oil spreads into seawater when oil tankers are wrecked or cargo ships, passenger ships ...), oil extraction (oil leakage from drilling rigs, oil pipelines, refineries, etc.), or due to the release of substances from the mainland (toxic radioactive wastes dumped into the sea by industrial and agricultural activities, nuclear power plants, etc.), or due to the release of substances from ships ... affect the lives of marine species and adversely affect the growth, and the use of the sea. (United Nations Convention on the Law of the Sea 1982, Article 1, Clause 4)

SOURCES OF MARINE ENVIRONMENTAL POLLUTION

According to the 1982 United Nations Convention on the Law of the Sea, marine environmental pollution consists of the following six main sources:

Land-based

**Activities related to
the seabed**

**Sinking hazardous
waste and other
substances**

Ship

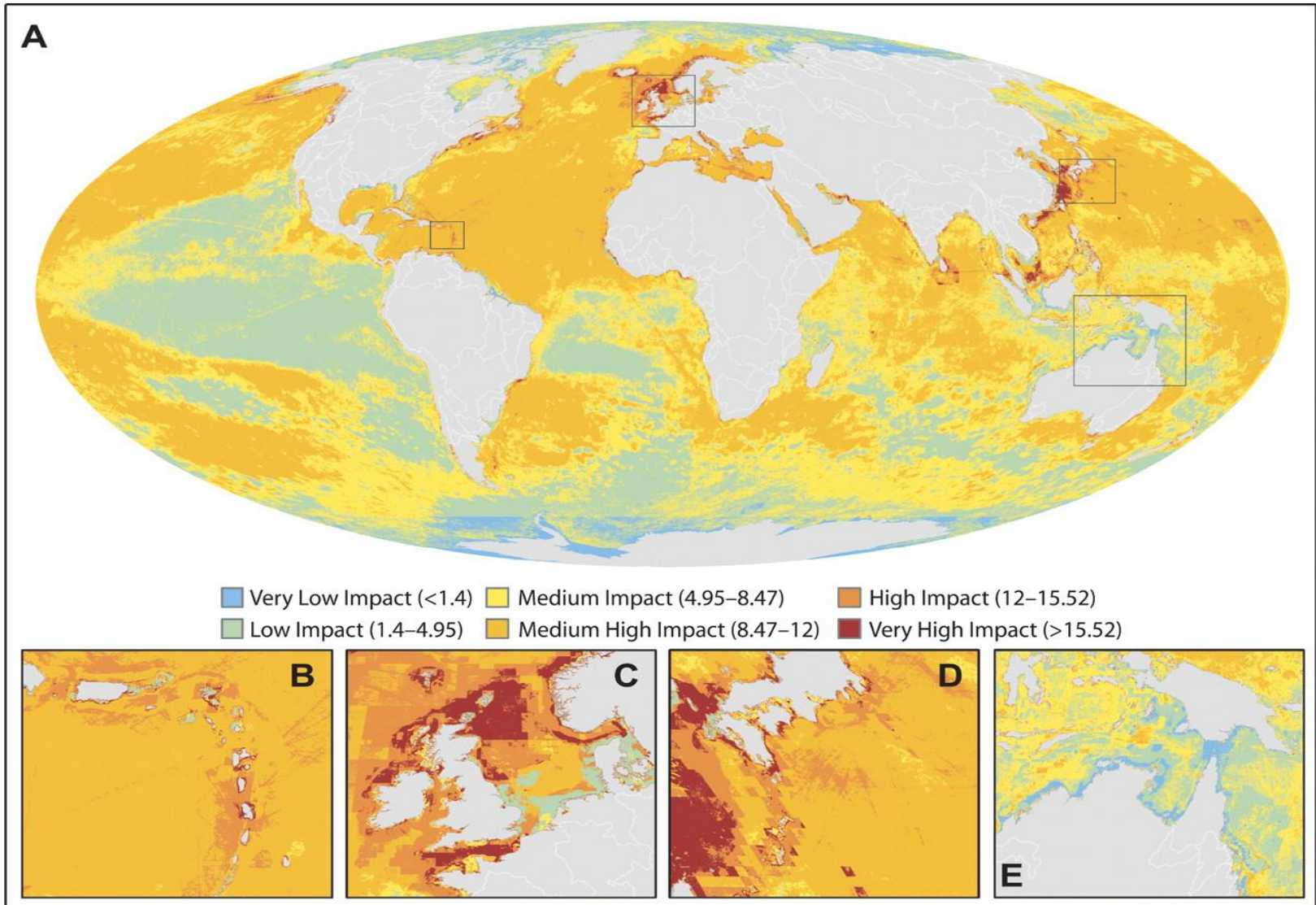
Atmosphere

THE BASIC CONCEPTS

Marine pollution control – involving methods to prevent and minimize the negative impact of human and natural activities on the marine environment, pollution and degradation of the marine environment.



HUMAN IMPACT ON THE MARINE ENVIRONMENT

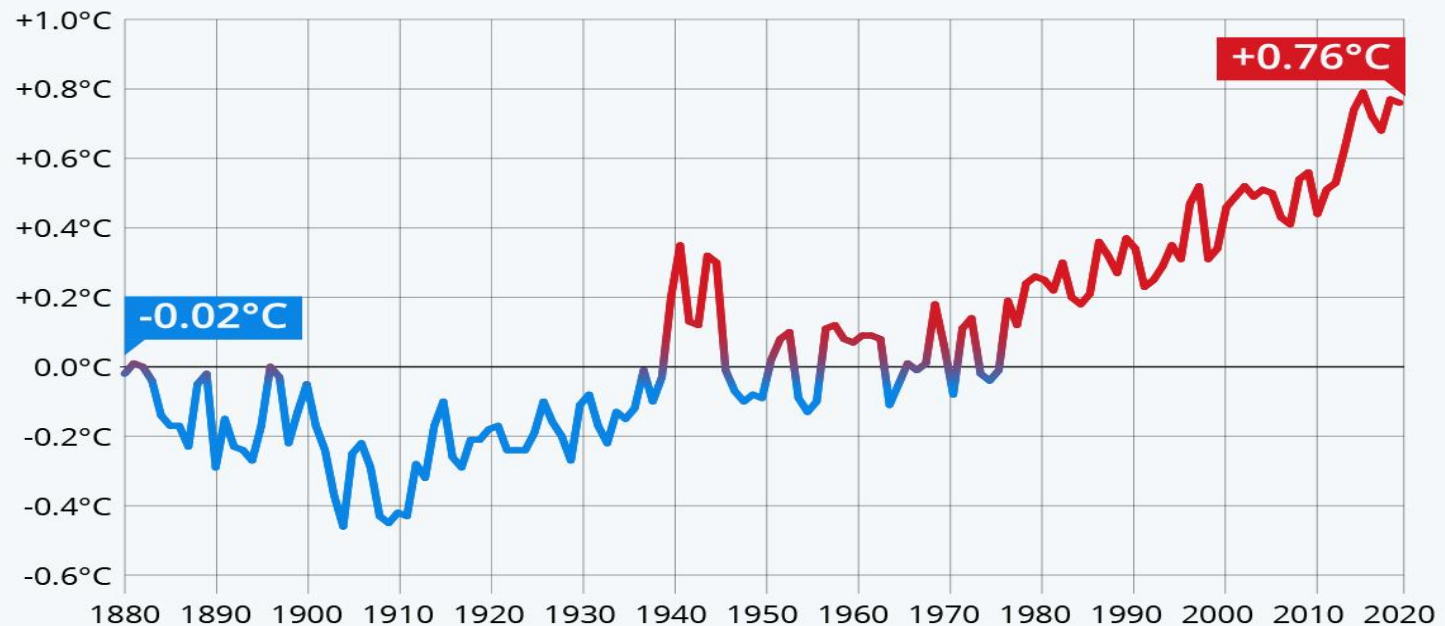


Source: National Center for Ecological Analysis and Synthesis, 2015)

THE EFFECT OF CLIMATE CHANGE

The Oceans Are Getting Warmer

Annual divergence of global ocean temperature
from 20th century average (1880-2020)



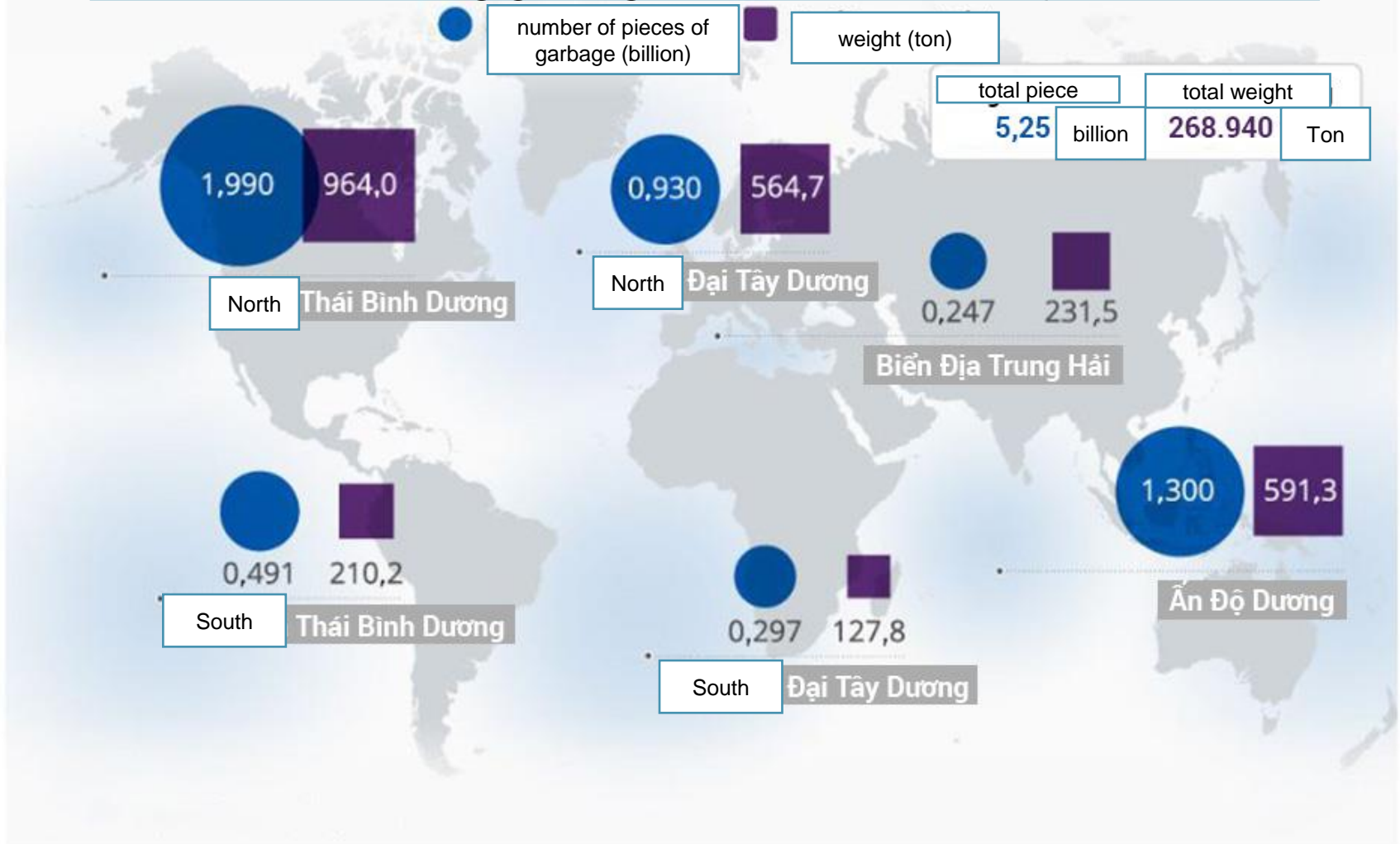
Ocean surface temperatures

Source: NOAA National Centers for Environmental Information (NCEI)



MARINE POLLUTION

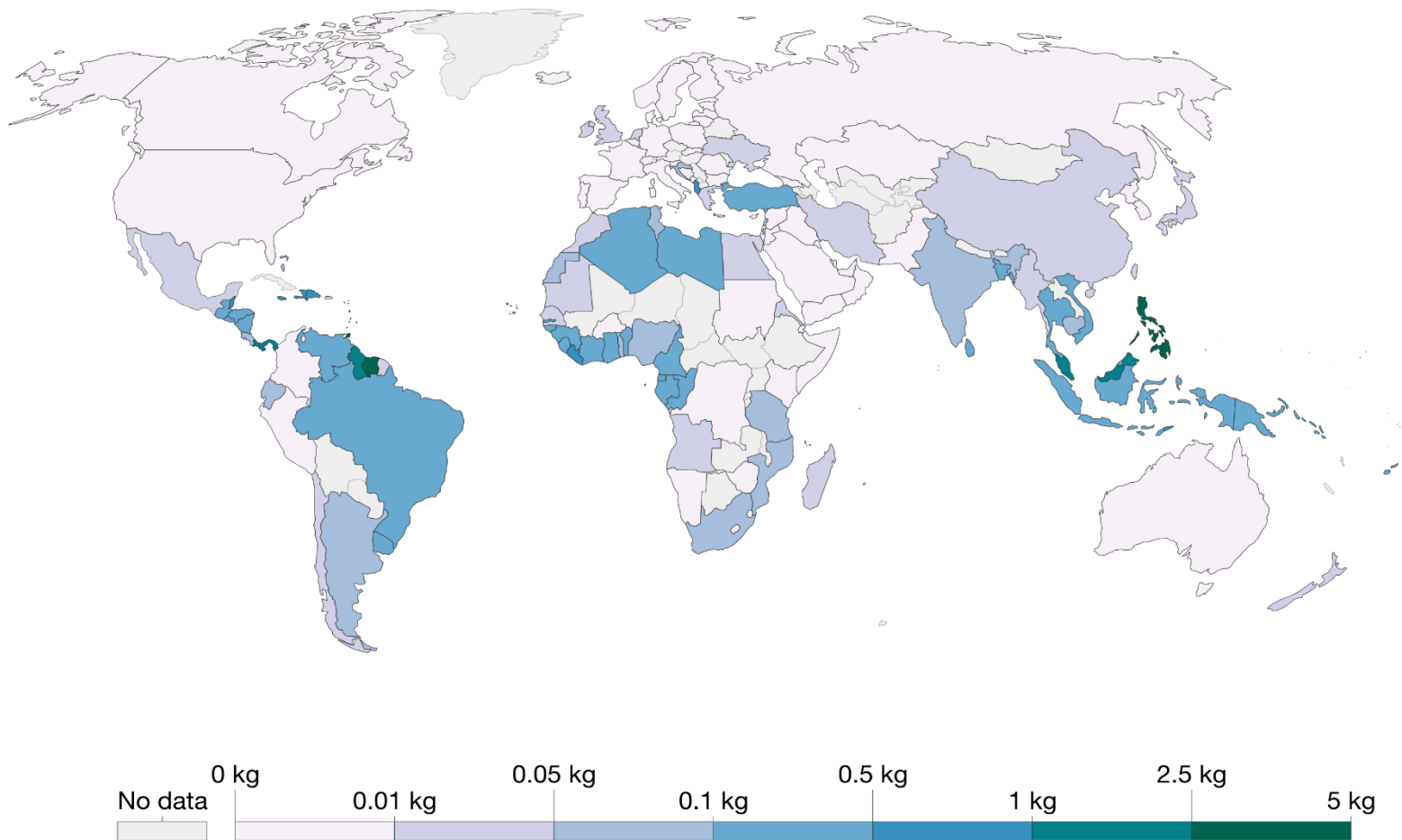
The world's oceans are overflowing with plastic waste (according to the number of pieces and the total weight of floating garbage on the sea surface)



MARINE POLLUTION

Plastic waste emitted to the ocean per capita, 2019

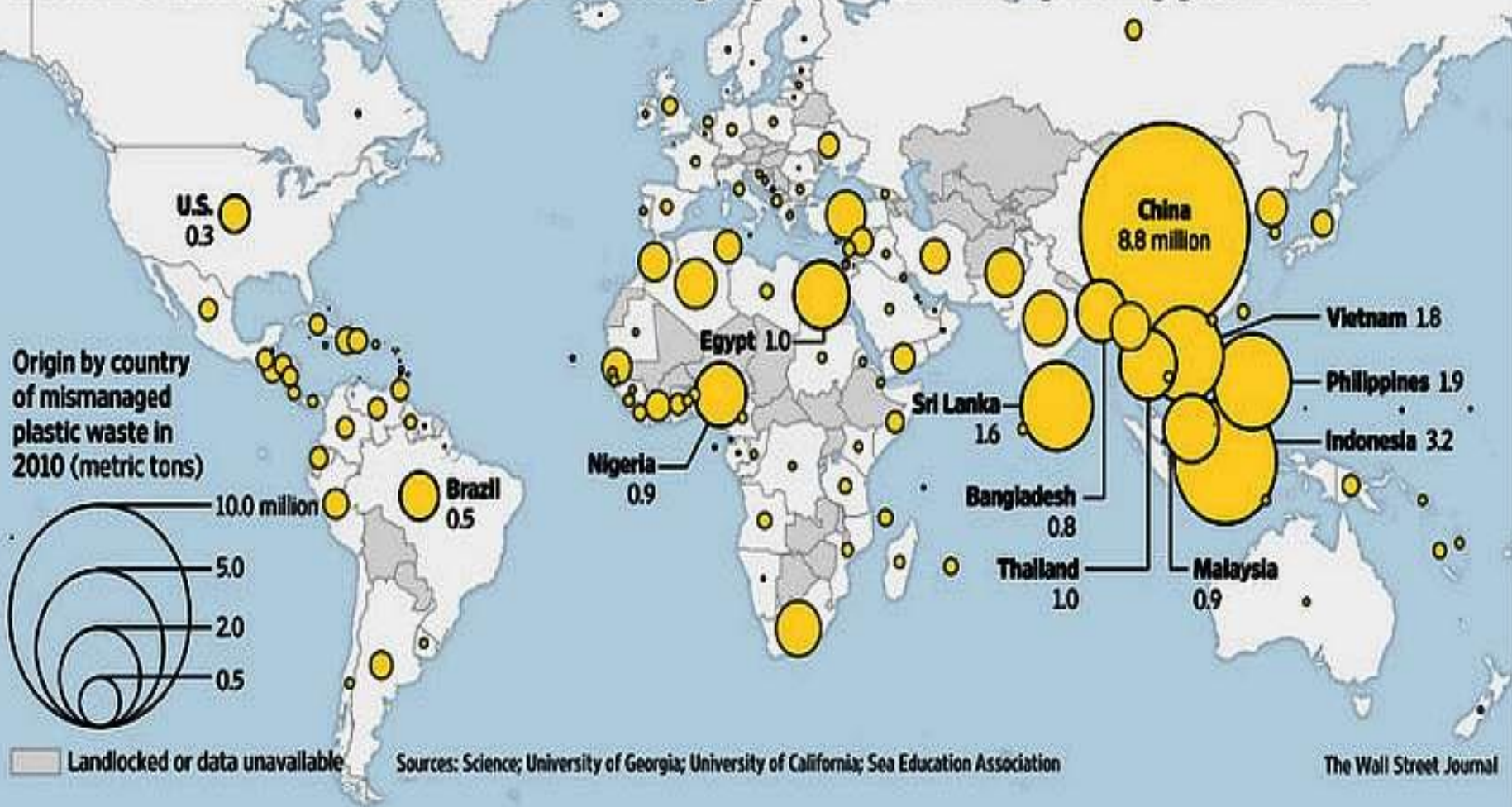
Our World
in Data



Source: Meijer et al. (2021). More than 1000 rivers account for 80% of global riverine plastic emissions into the ocean. Science Advances. CC BY

MARINE POLLUTION

Ocean Detritus | Much of the world's mismanaged plastic waste ends up fouling global waters

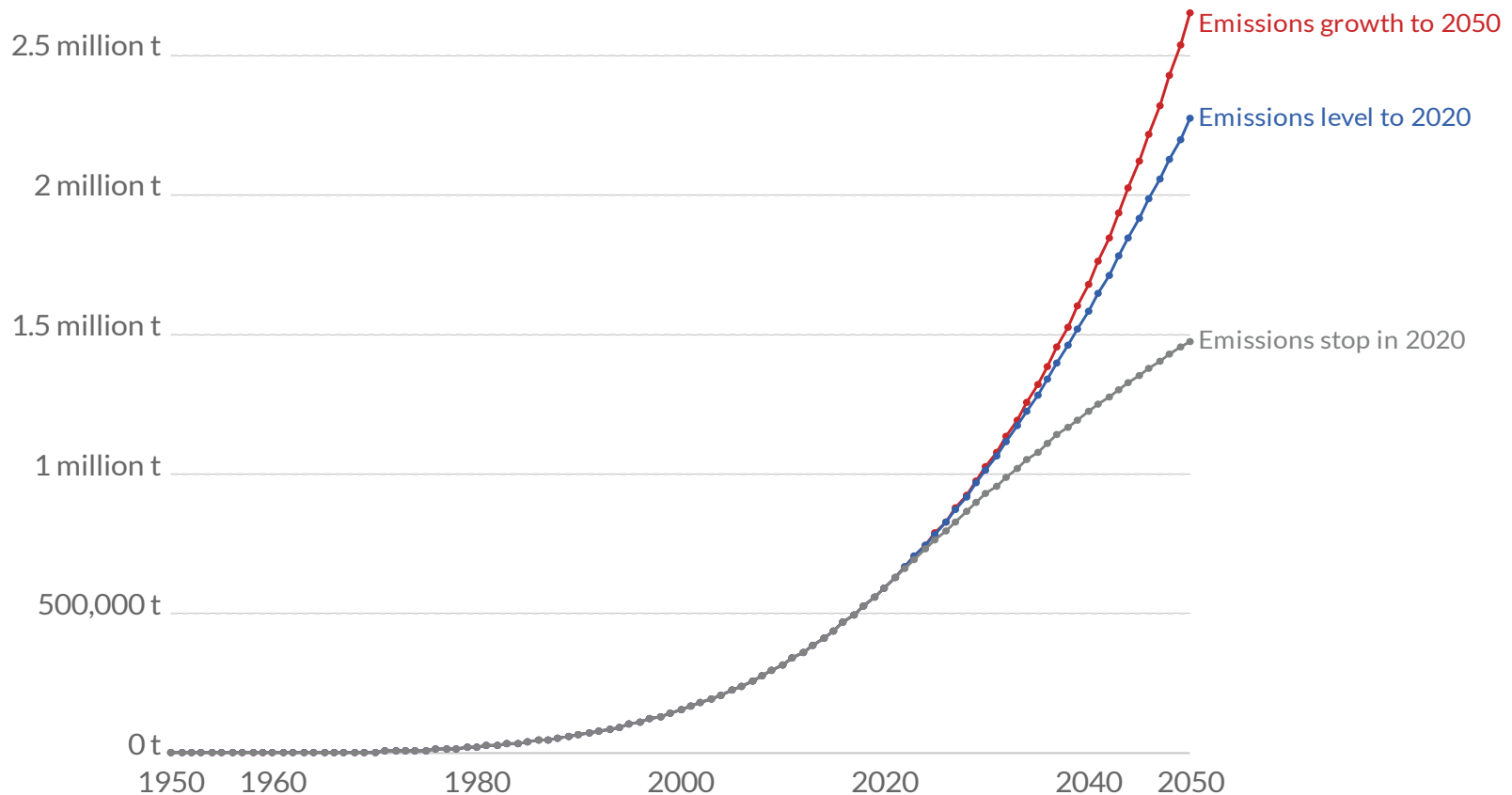


MARINE POLLUTION

Microplastics in the surface ocean

Microplastics are buoyant plastic materials smaller than 0.5 centimeters in diameter. Future global accumulation in the surface ocean is shown under three plastic emissions scenarios: (1) emissions to the oceans stop in 2020; (2) they stagnate at 2020 emission rates; or (3) continue to grow until 2050 in line with historical plastic production rates.

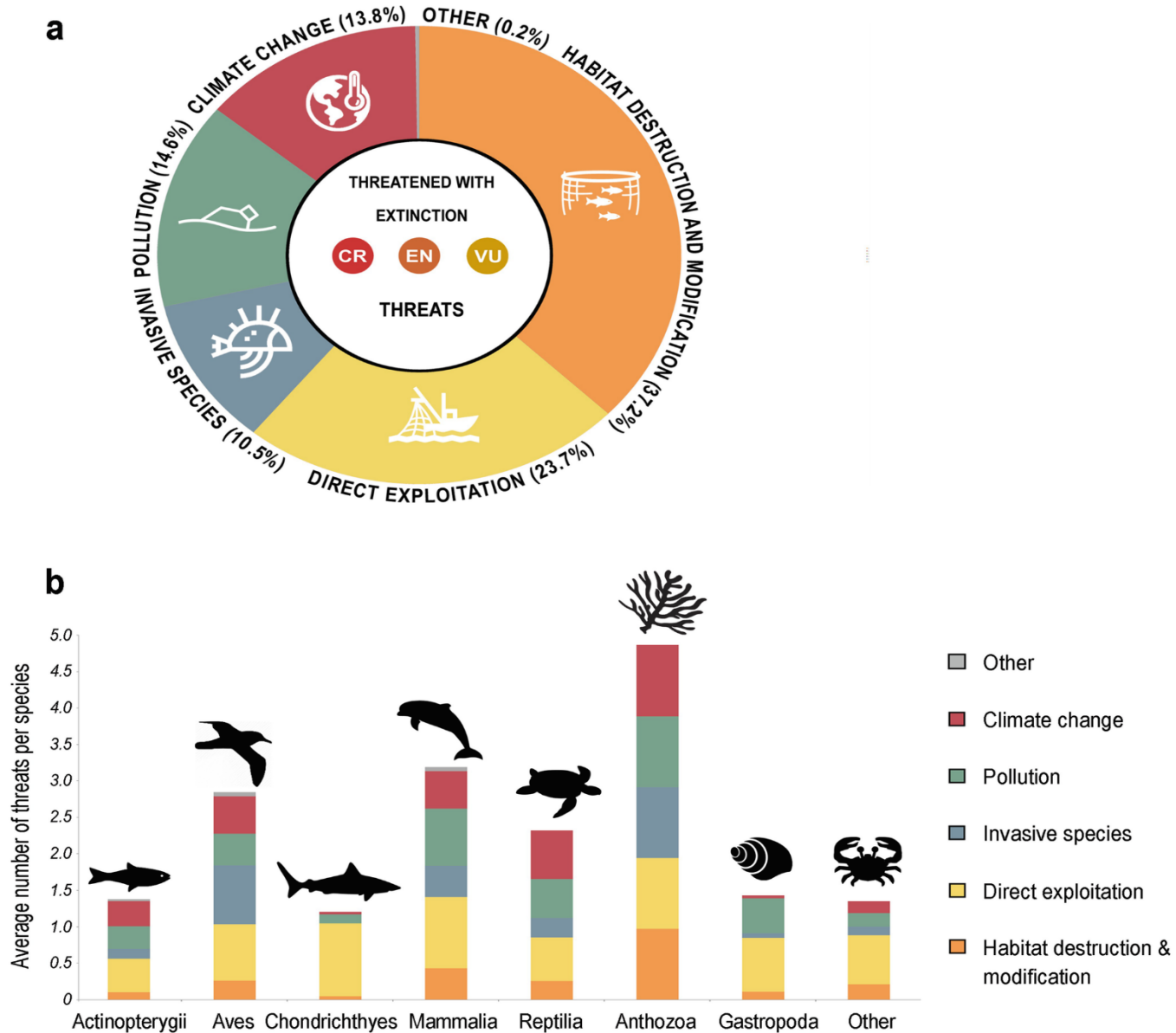
Our World
in Data



Source: Lebreton et al. (2019). A global mass budget for positively buoyant macroplastic debris in the ocean.

CC BY

BIODIVERSITY DECLINE



(Source: Luypaert T., Hagan J.G., McCarthy M.L., Poti M. (2020) Status of Marine Biodiversity in the Anthropocene. In: Jungblut S., Liebich V., Bode-Dalby M. (eds) YOUMARES 9 - The Oceans: Our Research, Our Future. Springer, Cham.

ASSIGNMENT

- [1] Describe of the importance of the marine environment?
- [2] How many coastal ecosystems are there?
- [3] Presentation of the function of coastal ecosystem?
- [4] Presenting the state of the marine environment?
- [5] Why do we need to control marine pollution?



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LECTURE

CONTROL OF MARINE POLLUTION

Lecturer: Prof. Nguyen Ky Phung
MSc. Dang Thi Thanh Le





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LECTURE 2

LEGAL ASPECTS OF MARINE POLLUTION CONTROL

Lecturer: Prof. Nguyen Ky Phung
MSc. Dang Thi Thanh Le



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MARPOL CONVENTION 73/78

Lecturer: Prof. Nguyen Ky Phung
MSc. Dang Thi Thanh Le

Marpol Convention 73/78 - The International Convention for the Prevention of Pollution from Ships is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes.. Is a combination of two international agreements adopted in 1973 and 1978 respectively, updated and revised over the years.



The Convention was born in 1973

The MARPOL Convention
73/78 includes 6 annexes

Vietnam officially joined the
Convention on March 18, 1991

REGULATIONS
FOR THE OF
PREVENTION BY
OIL

REGULATIONS FOR
THE CONTROL
OF POLLUTION BY
NOXIOUS LIQUID
SUBSTANCES IN BULK

PREVENTION OF
POLLUTION BY
HARMFUL SUBSTANCES
CARRIED BY SEA IN
PACKAGED FORM

PREVENTION OF
POLLUTION BY
SEWAGE FROM
SHIPS

PREVENTION OF
POLLUTION BY
GARBAGE FROM
SHIPS

PREVENTION
OF AIR
POLLUTION FROM
SHIPS

MARPOL CONVENTION



ANNEX I: REGULATIONS FOR THE PREVENTION OF POLLUTION BY OIL



Entered into force 2 October 1983)

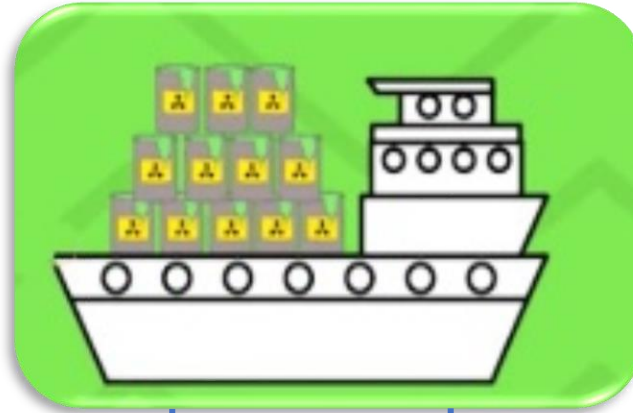
Details the discharge criteria and requirements for the prevention of contamination by oil and oily substances.

The discharge of oil inside them was banned entirely, with well-defined minor exceptions.

It largely maintains the oil discharge criteria set forth in the 1969 amendments to the 1954 Oil Pollution Convention.

ANNEX II: REGULATIONS FOR THE CONTROL OF POLLUTION BY NOXIOUS LIQUID SUBSTANCES IN BULK

Entered into force 2
October 1983

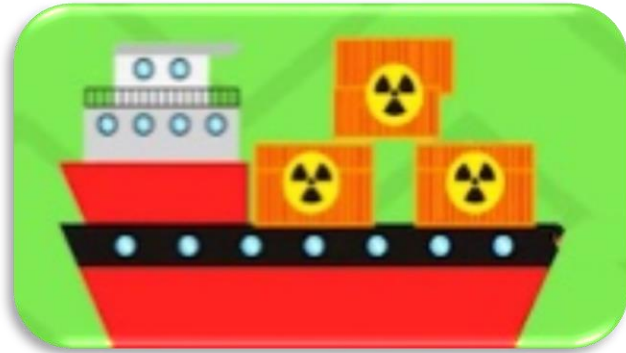


About 250 50 substances were
evaluated and included in the list
appended to the Convention.

Details the discharge
criteria and measures
for the control of
pollution by noxious
liquid substances
carried in bulk

Discharge of their residues
is allowed only to reception
facilities until certain
concentrations and
conditions (which vary with
the category of substances)
are complied with.).

ANNEX III: PREVENTION OF POLLUTION BY HARMFUL SUBSTANCES CARRIED BY SEA IN PACKAGED FORM



Entered into force: 1 July 1992.

Contains general requirements for the issuing of detailed standards on packing, marking, labelling, documentation, stowage, quantity limitations, exceptions and notifications..

Harmful substances” are those substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code) or which meet the criteria in the Appendix of Annex III.

ANNEX IV: PREVENTION OF POLLUTION BY SEWAGE FROM SHIP



- Entered into force: September 27, 2003

- Contains requirements for the control of marine pollution caused by wastewater from ships. The discharge of sewage into the sea is prohibited, except when the ship has in operation an approved sewage treatment plant or when the ship is discharging comminuted and disinfected sewage using an approved system at a distance of more than three nautical miles from the nearest land;

- Sewage which is not comminuted or disinfected has to be discharged at a distance of more than 12 nautical miles from the nearest land.

ANNEX V: PREVENTION OF POLLUTION BY GARBAGE FROM SHIPS



- Entered into force : December 31, 1988

- Appendix V covers the different types of waste and defines how far from land they are and how they can be disposed of.

- The Annex is the complete ban imposed on the disposal into the sea of all forms of plastics.

APPENDIX VI: PREVENTION OF AIR POLLUTION FROM SHIPS



Entered into force: May 19, 2005.

Sets limits on sulphur oxide and nitrogen oxide emissions from ship exhausts and prohibits deliberate emissions of ozone depleting substances

Designated emission control areas set more stringent standards for SO_x, NO_x and particulate matter

A chapter adopted in 2011 covers mandatory technical and operational energy efficiency measures aimed at reducing greenhouse gas emissions from ships.



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LECTURE 2

LEGAL ASPECTS OF MARINE POLLUTION CONTROL

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United Nations Convention on Law of the Sea - UNCLOS (1982)

**Lecturer: Prof. Nguyen Ky Phung
MSc. Dang Thi Thanh Le**



The United Nations Convention on the Law of the Sea (UNCLOS) is an international agreement. It was officially formulated at the third United Nations Conference on the Law of the Sea, which took place between 1973 and 1982.

The Law of the Sea Convention defines the rights and responsibilities of nations in their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources. The Convention, concluded in 1982, replaced four 1958 treaties.

Signed

10/12/1982



UNCLOS

167

Entered into force

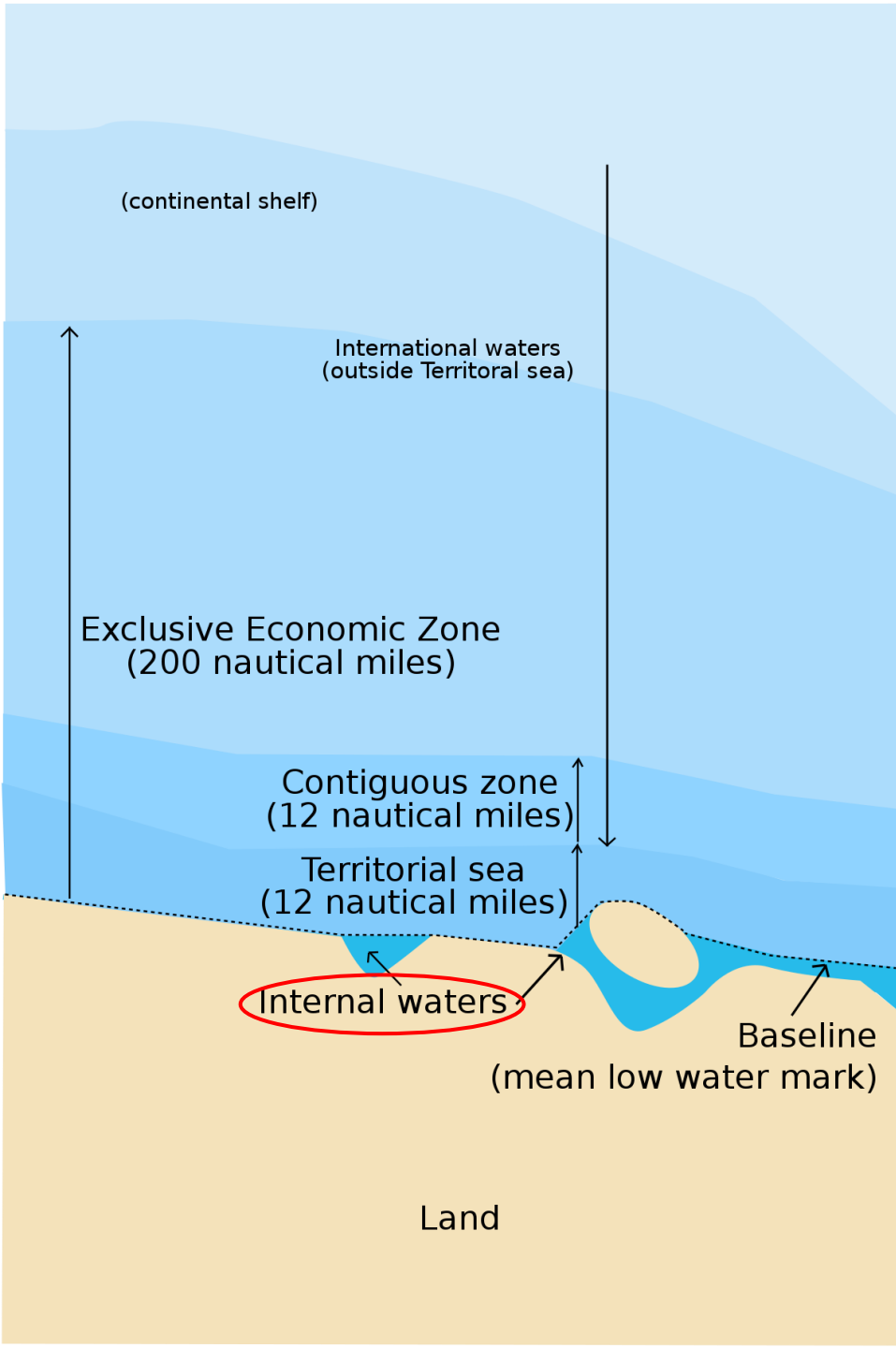
16/11/1994



OCEAN

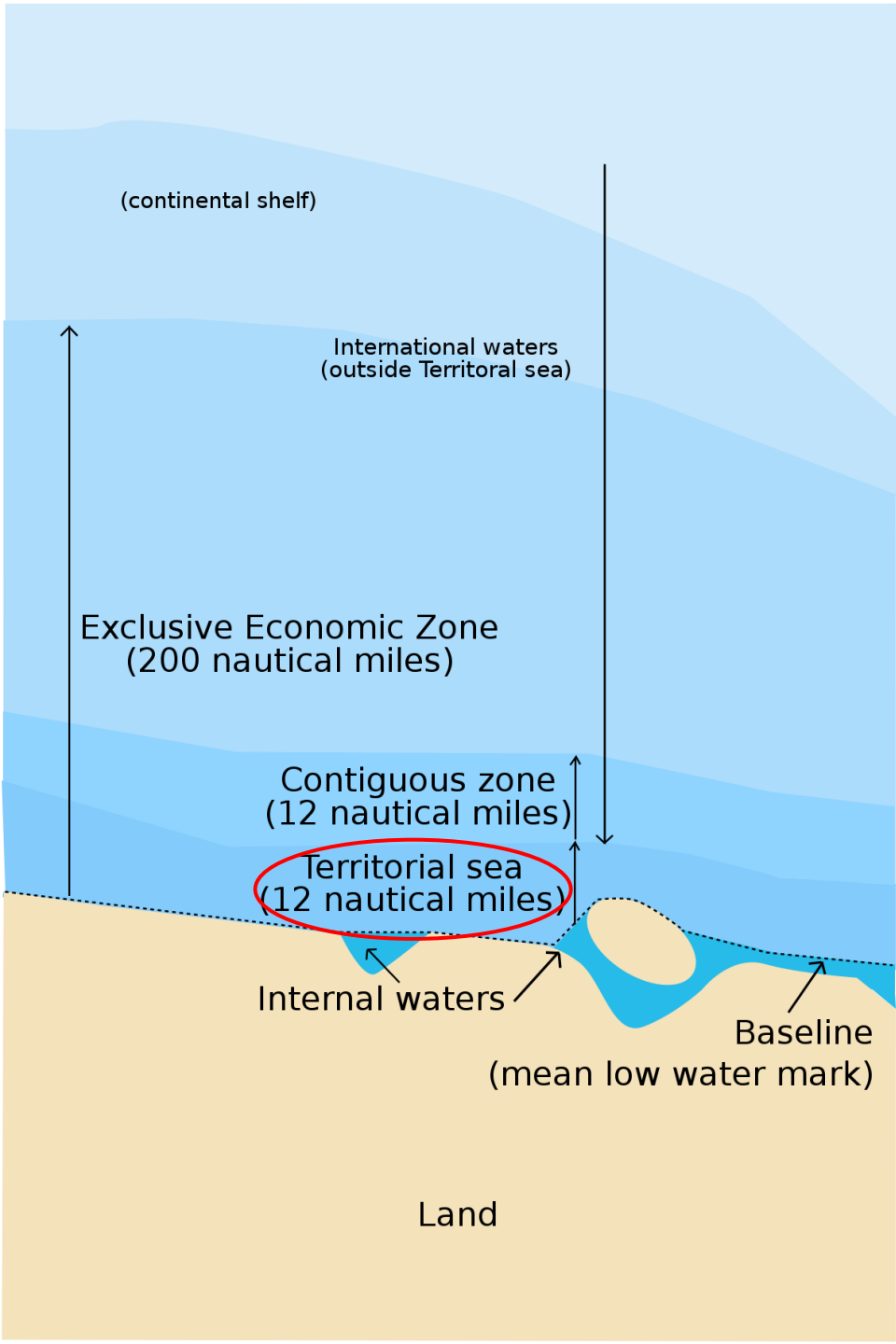


Internal waters



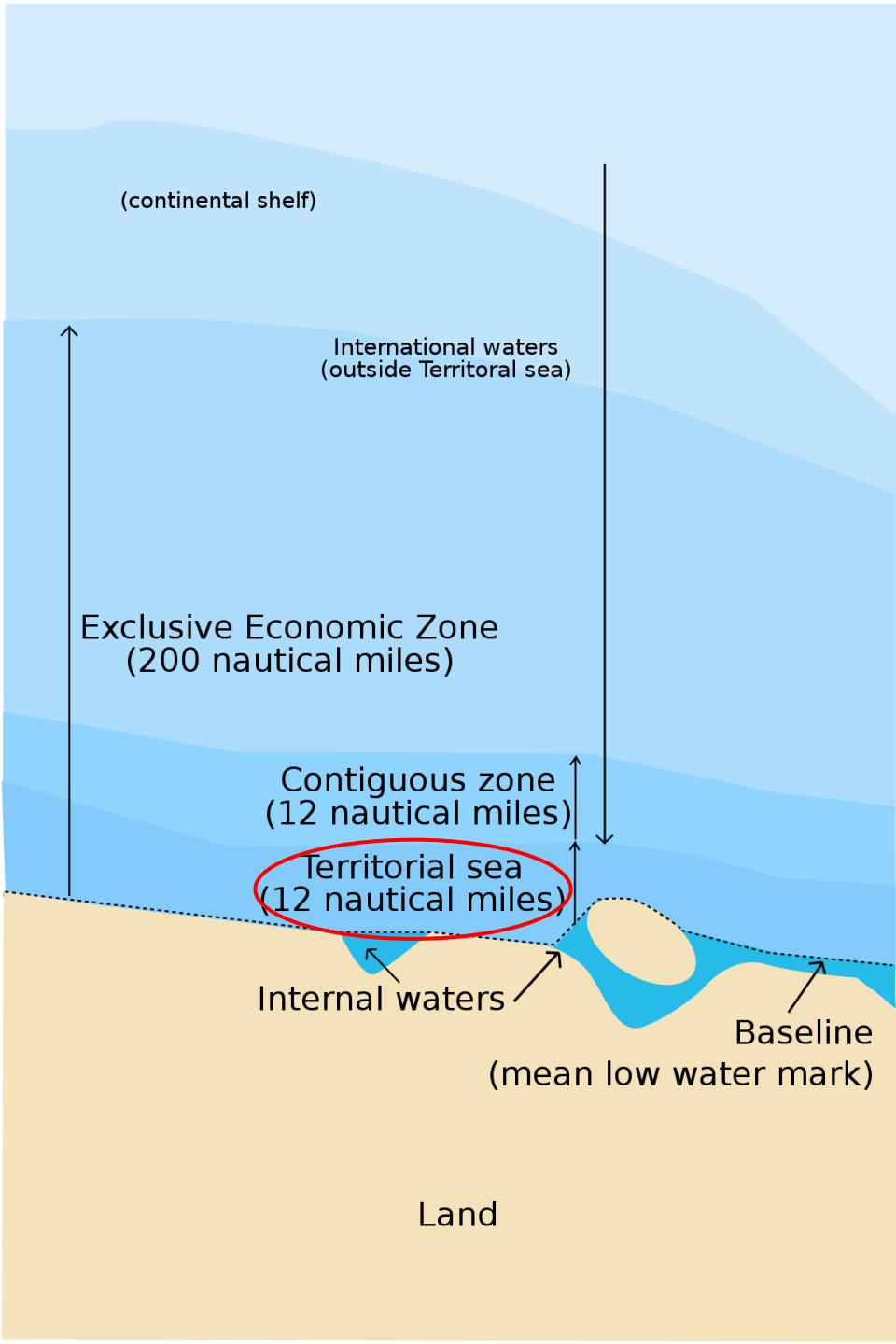
- An area located within the baseline and adjacent to the coast.
- The coastal states are free to make laws, regulate the use and use of any resources in the internal waters.
- Foreign ships do not have the right to navigate in the internal waters
- With respect to ships entering internal waters or entering a port facility outside such internal waters, the coastal State also has the right to take such measures as may be necessary to prevent any violation of the conditions This vessel must comply in order to be allowed to enter the said internal waters or port facility.

Territorial Sea



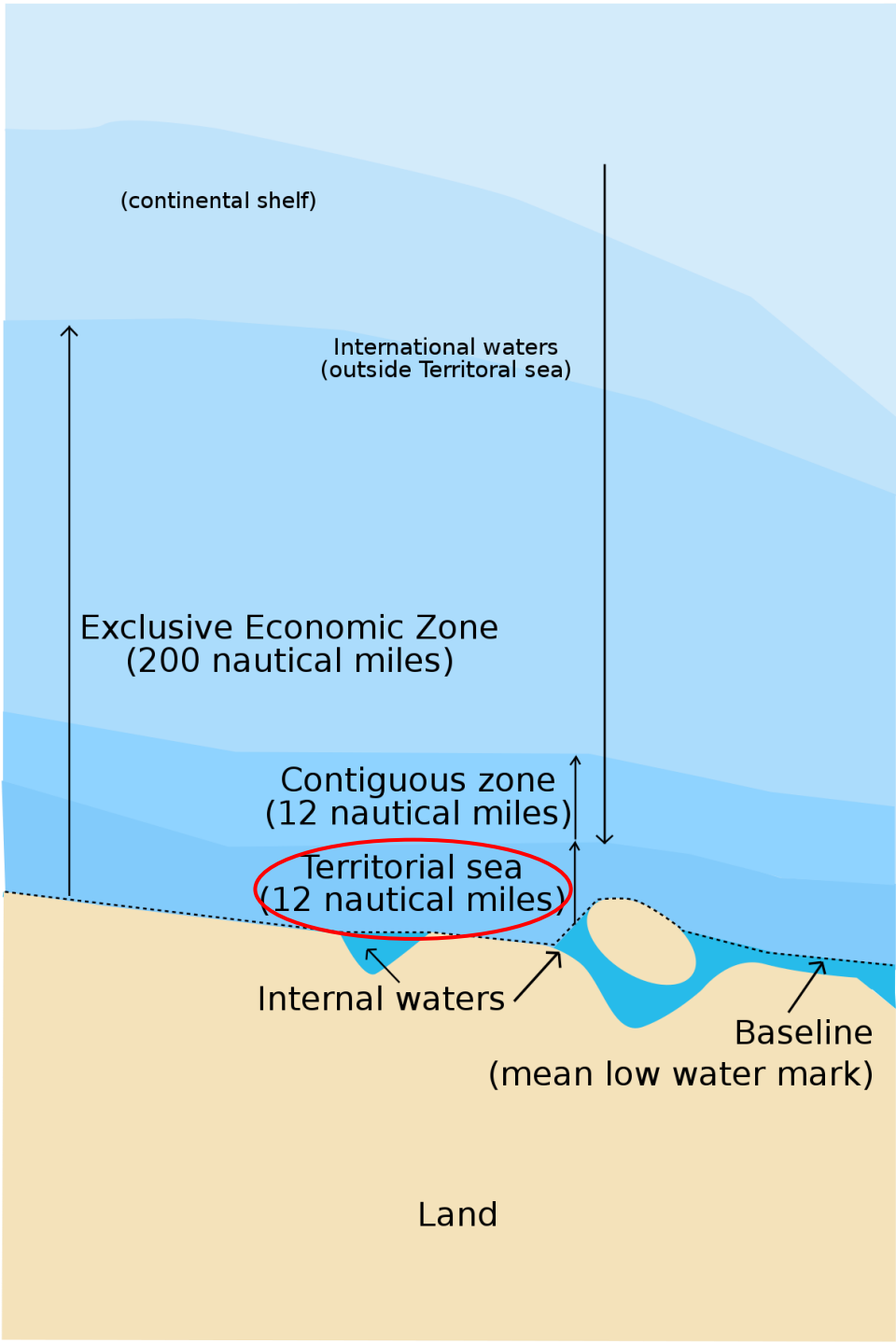
- Every State has the right to determine the breadth of its territorial sea; this breadth shall not exceed 12 nautical miles from the baselines drawn in accordance with the Convention.
- The outer limit of the territorial sea is a line on which each point is separated by a distance equal to the breadth of the territorial sea from the nearest point of the baselines.
- Subject to compliance with the Convention, ships of all nations, whether sea or land, enjoy the right of innocent passage through the territorial sea.
- Vessels used regularly for loading and unloading and as anchorage areas, which normally lie wholly or partly outside the outer boundary of the territorial sea, are also considered to be part of the territorial sea.

Territorial waters



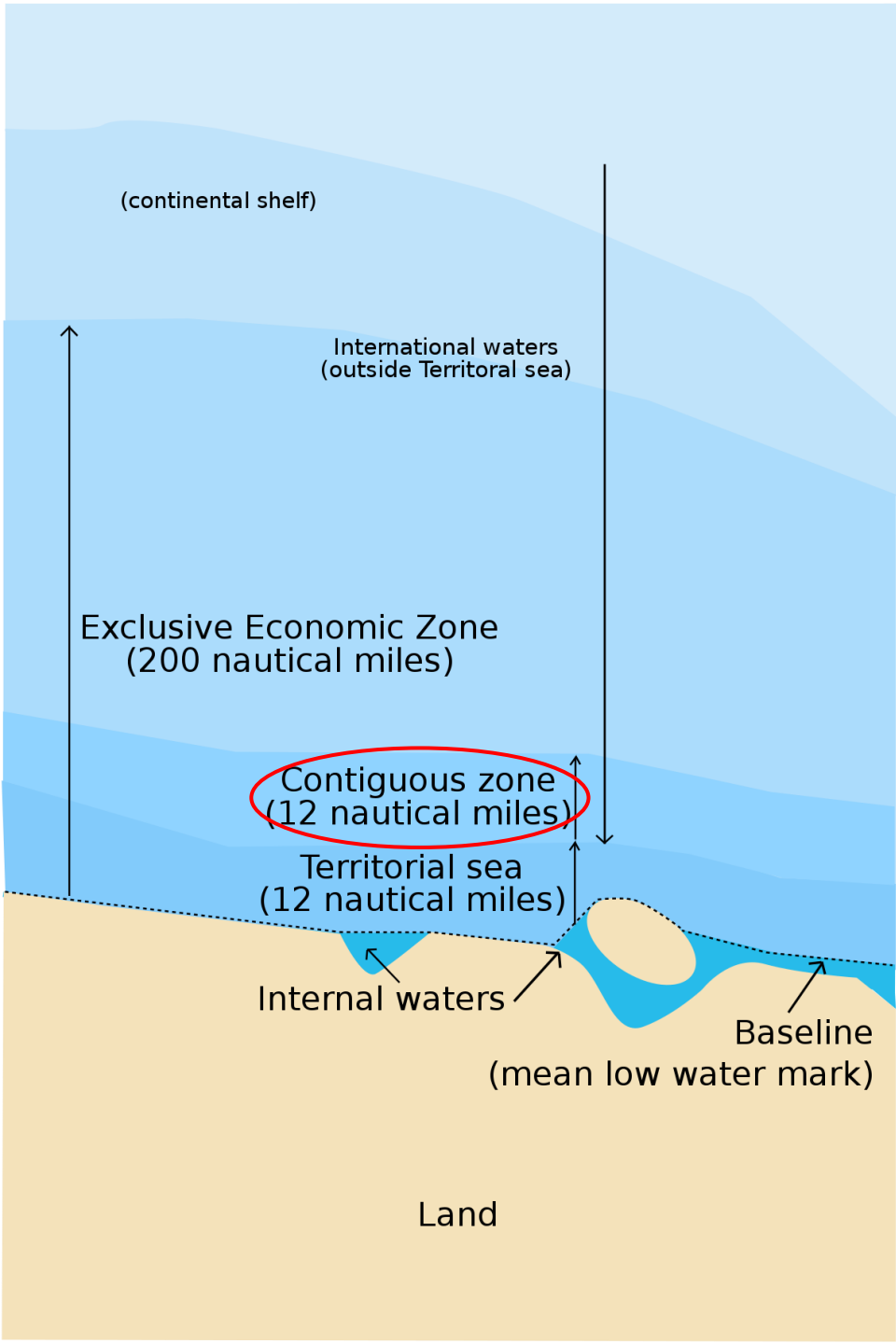
- When two states have adjacent or opposite coasts, neither State is entitled to extend its territorial sea beyond the median line, all points on which are equidistant from the nearest points of the baselines from which the direction is measured. the territorial sea of each State, unless otherwise agreed. However, this provision does not apply in cases where, due to historical titles or other special circumstances, it is necessary to delineate the territorial sea boundary of the two States differently.
- The coastal State, when it is necessary to ensure the safety of navigation, may require foreign ships to pass innocently through its territorial sea to follow the routes it determines and to respect the dividing arrangements. the traffic flows prescribed by them in order to coordinate the passage of ships.

Territorial waters



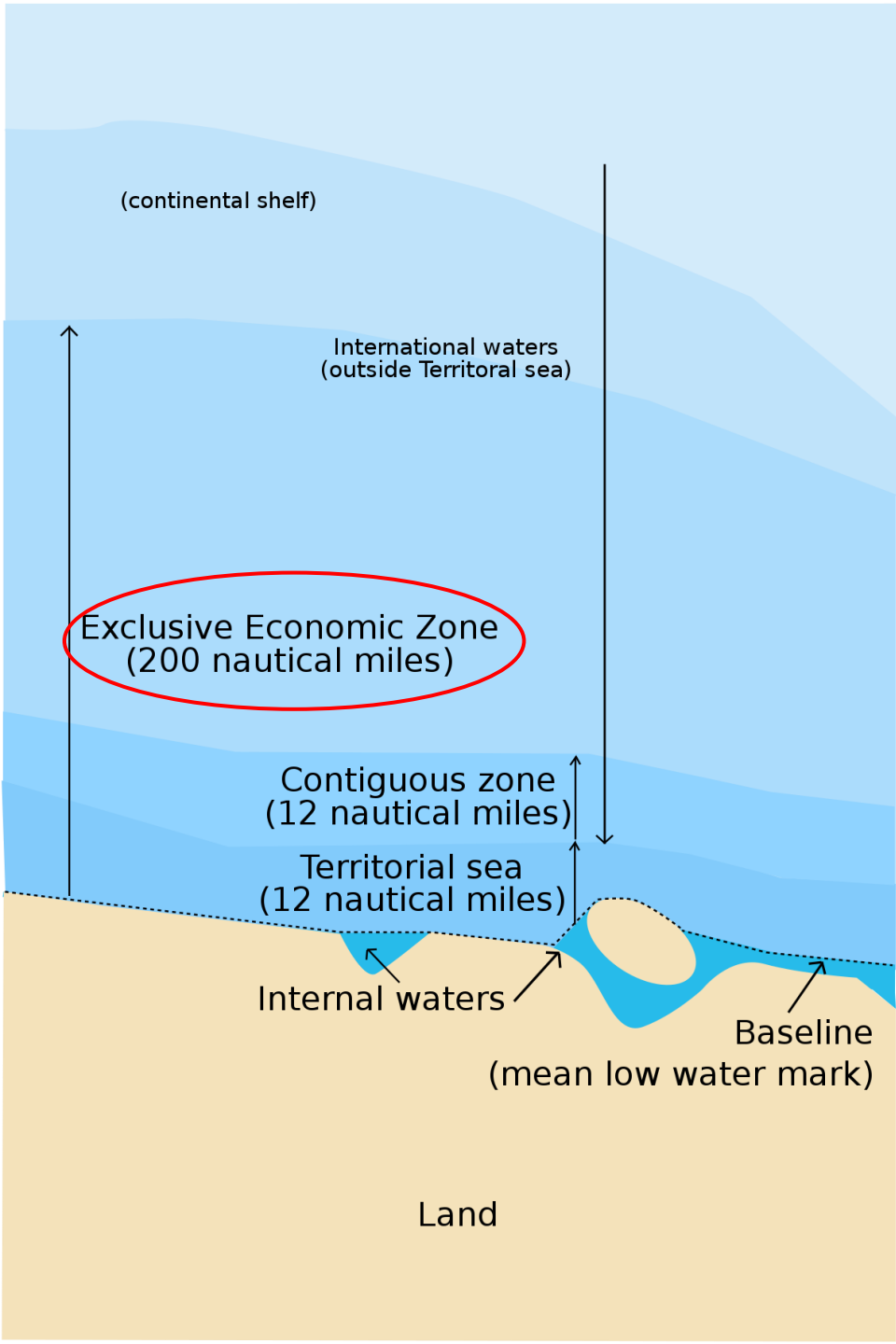
- Foreign ships with nuclear powered engines, as well as ships carrying radioactive or other substances which are dangerous or toxic, when exercising the right of innocent passage in the territorial sea, are obliged to must carry all documents and take special precautions as required by international treaties for that type of vessel.
- In the territorial sea, submarines and other submarines are forced to stay afloat and must fly their national flags.
- If a warship fails to respect the laws and regulations of the coastal State relating to passage in the territorial sea and disregards the requirement to comply with such laws and regulations notified to it, the The coastal state may require the ship to leave the territorial sea immediately.

CONTIGUOUS ZONE



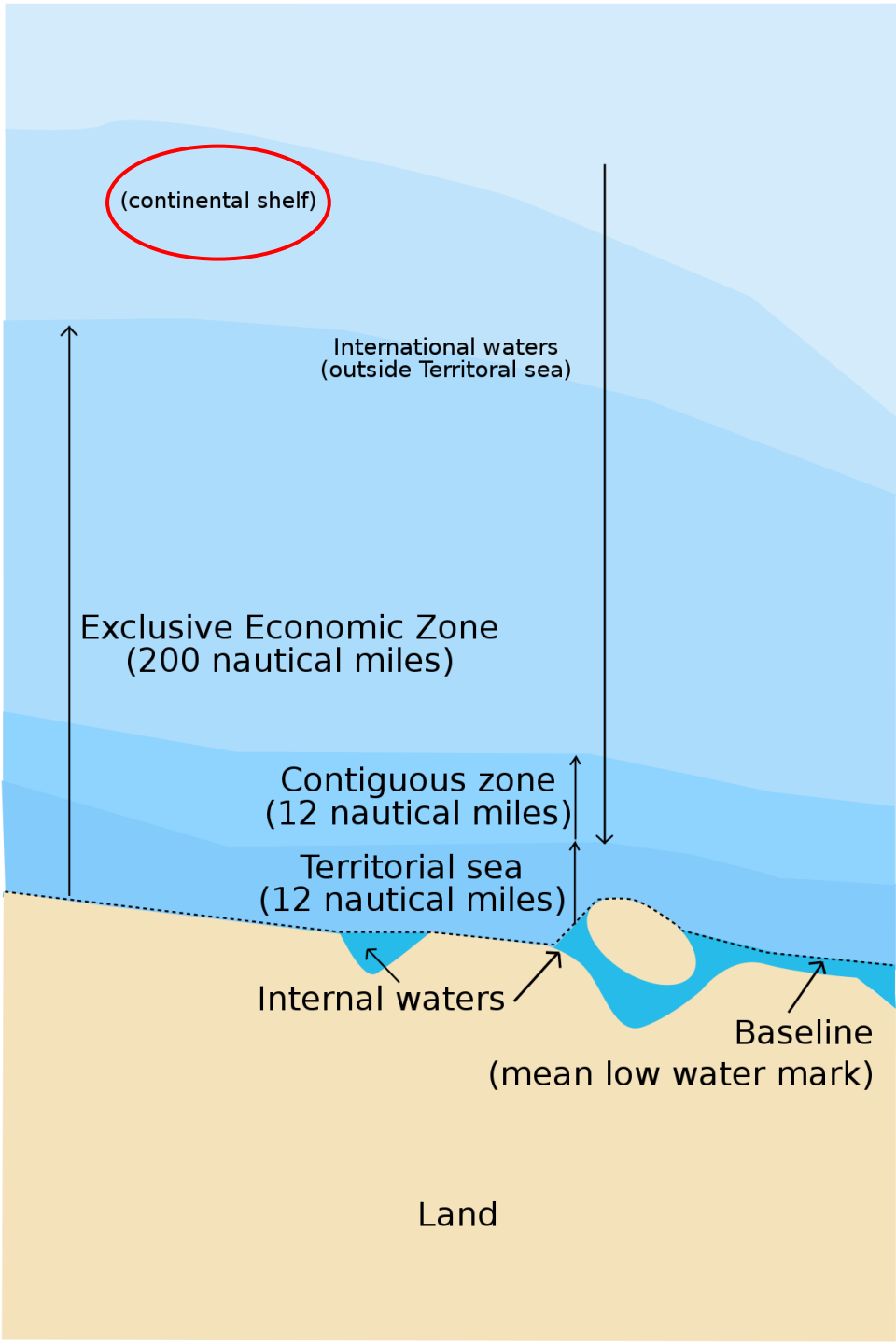
1. In a zone contiguous to its territorial sea, described as the contiguous zone, the coastal State may exercise the control necessary to:
 - (a) prevent infringement of its customs, fiscal, immigration or sanitary laws and regulations within its territory or territorial sea;
 - (b) punish infringement of the above laws and regulations committed within its territory or territorial sea.
2. The contiguous zone may not extend beyond 24 nautical miles from the baselines from which the breadth of the territorial sea is measured.

Exclusive economic zone



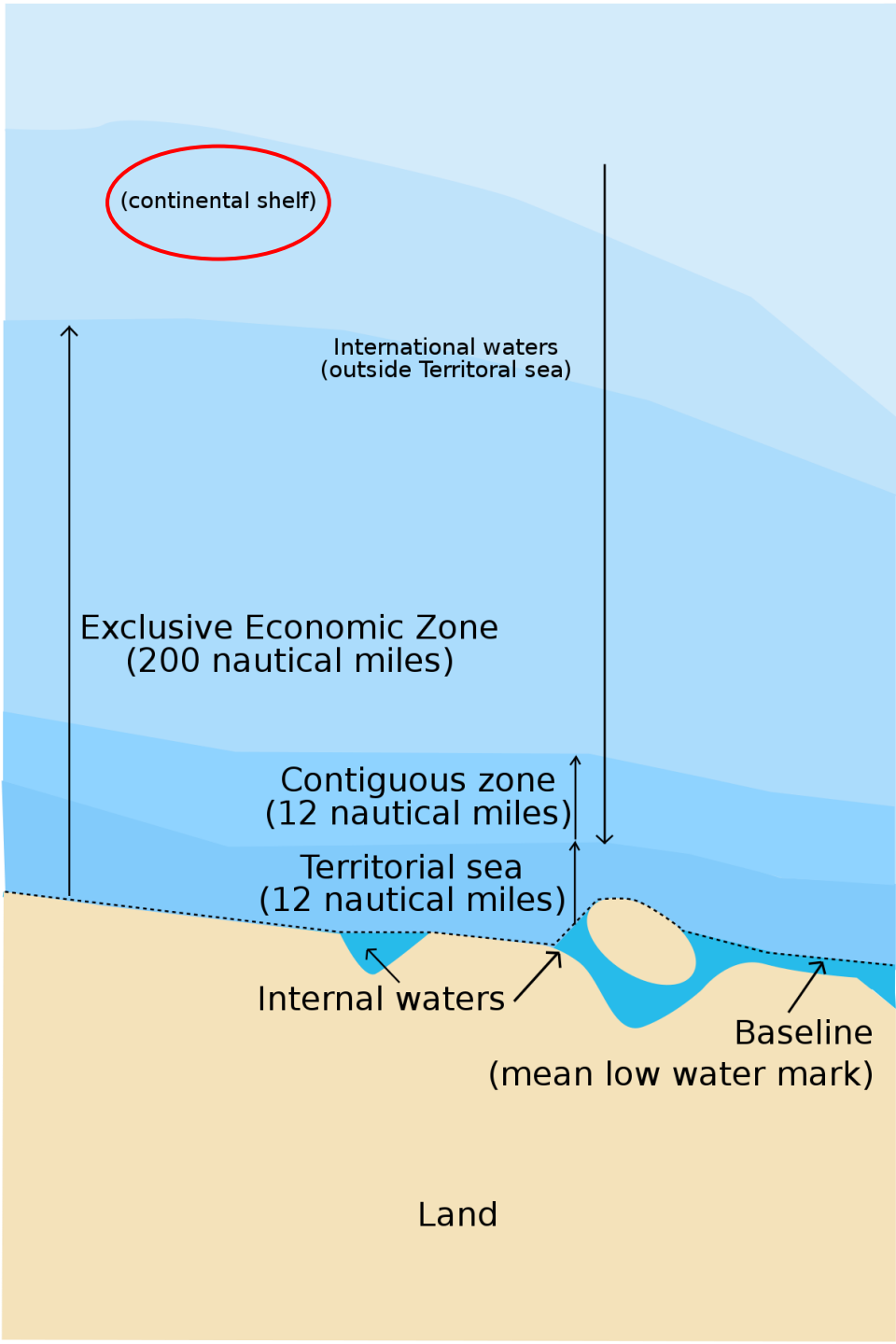
- The sea area including the water, seabed and subsoil of the seabed outside the territorial sea and extending up to 200 nautical miles from the baselines. In this area, the coastal state has the sole right to exploit all natural resources.
- The exclusive economic zone is an area beyond the territorial sea and adjacent to the territorial sea, subject to the separate legal regime provided for in this part, under which the rights and jurisdiction of the coastal State and freedoms of other States are governed by the appropriate provisions of the Convention.
- Foreign countries have the right to freedom of navigation and overflight, subject to the regulations of the coastal states. Foreign countries can also lay submarine pipes and cables under the sea.

CONTINENTAL SHELF



1. The continental shelf of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance
2. The continental shelf of a coastal State shall not extend beyond the limits provided for in paragraphs 4 to 6.
3. The continental margin comprises the submerged prolongation of the land mass of the coastal State, and consists of the seabed and subsoil of the shelf, the slope and the rise. It does not include the deep ocean floor with its oceanic ridges or the subsoil thereof.

CONTINENTAL SHELF



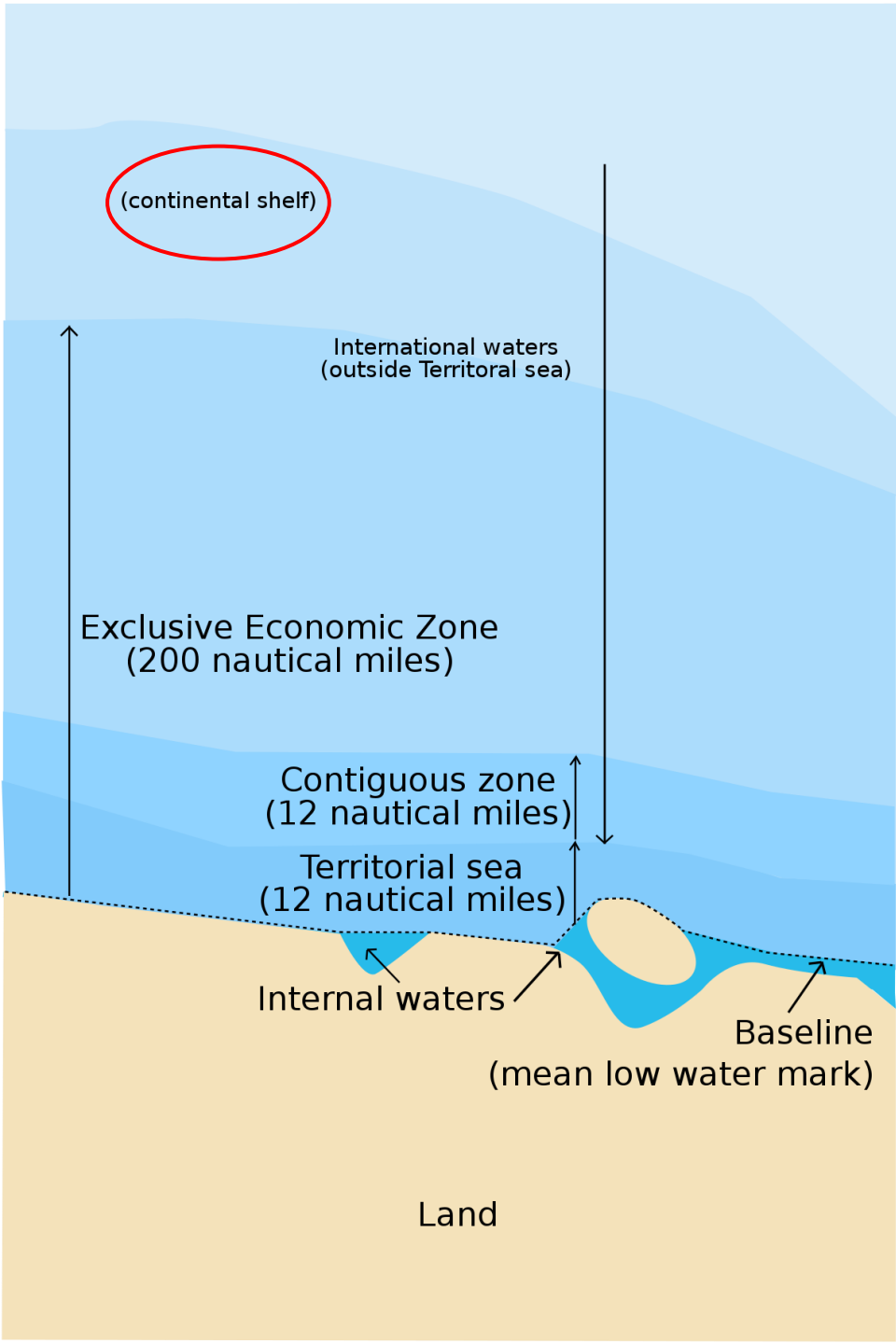
4. a) For the purposes of this Convention, the coastal State shall establish the outer edge of the continental margin wherever the margin extends beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, by either:

(i) a line delineated in accordance with paragraph 7 by reference to the outermost fixed points at each of which the thickness of sedimentary rocks is at least 1 per cent of the shortest distance from such point to the foot of the continental slope; or

(ii) a line delineated in accordance with paragraph 7 by reference to fixed points not more than 60 nautical miles from the foot of the continental slope.

(b) In the absence of evidence to the contrary, the foot of the continental slope shall be determined as the point of maximum change in the gradient at its base.

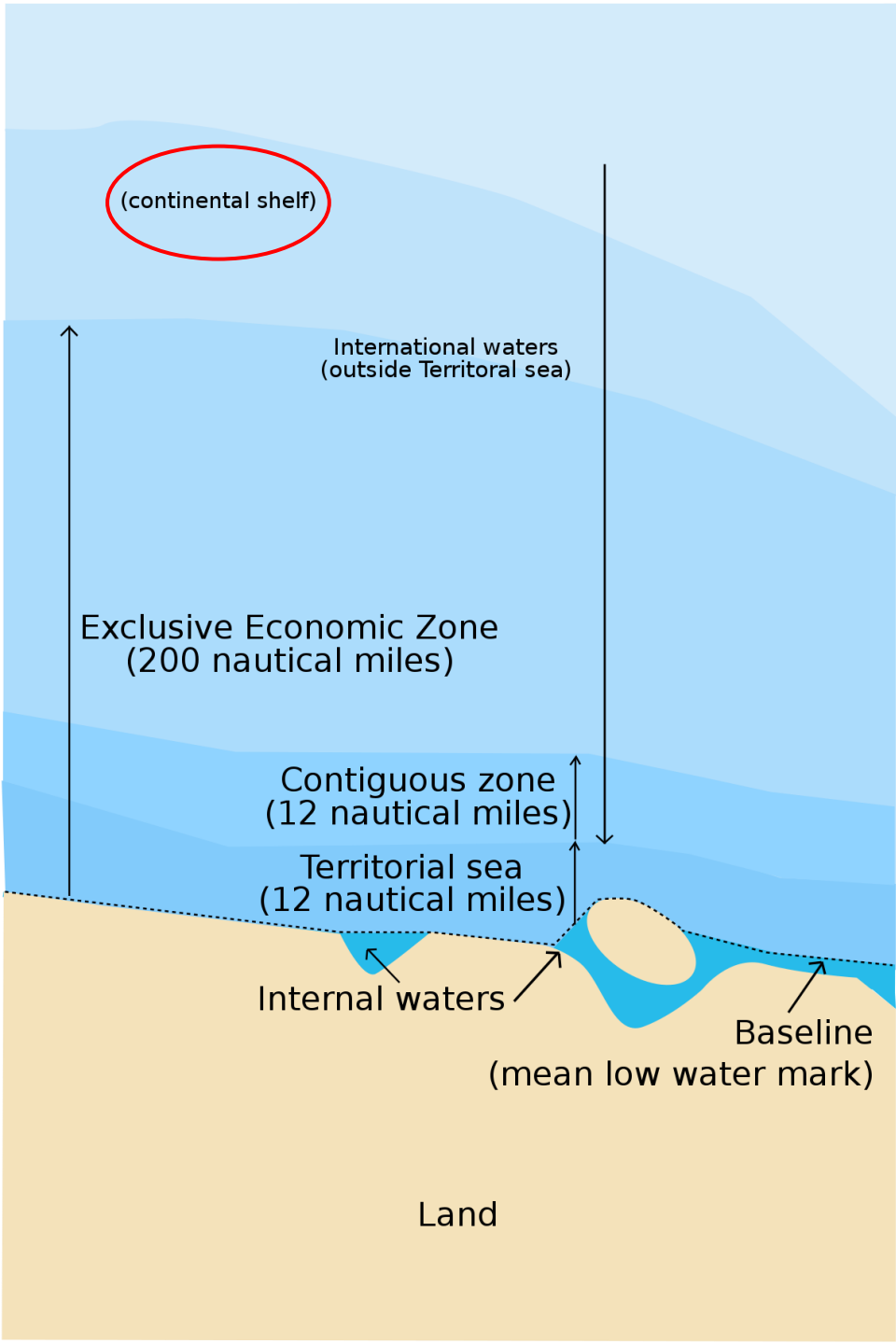
CONTINENTAL SHELF



5. The fixed points comprising the line of the outer limits of the continental shelf on the seabed, drawn in accordance with paragraph 4 (a)(i) and (ii), either shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured or shall not exceed 100 nautical miles from the 2,500 metre isobath, which is a line connecting the depth of 2,500 metres.

6. Notwithstanding the provisions of paragraph 5, on submarine ridges, the outer limit of the continental shelf shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured. This paragraph does not apply to submarine elevations that are natural components of the continental margin, such as its plateaux, rises, caps, banks and spurs.

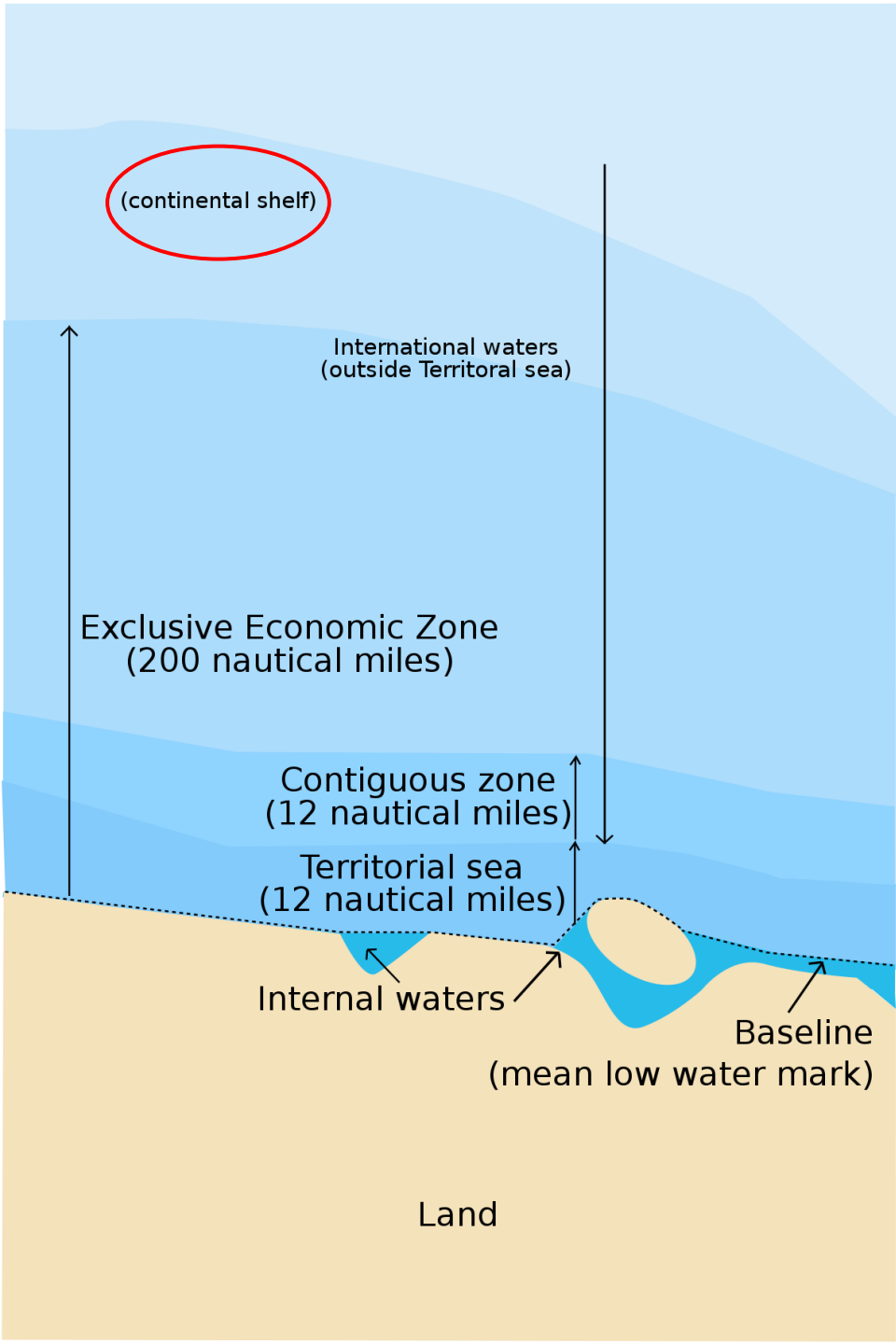
CONTINENTAL SHELF



7. The coastal State shall delineate the outer limits of its continental shelf, where that shelf extends beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, by straight lines not exceeding 60 nautical miles in length, connecting fixed points, defined by coordinates of latitude and longitude.

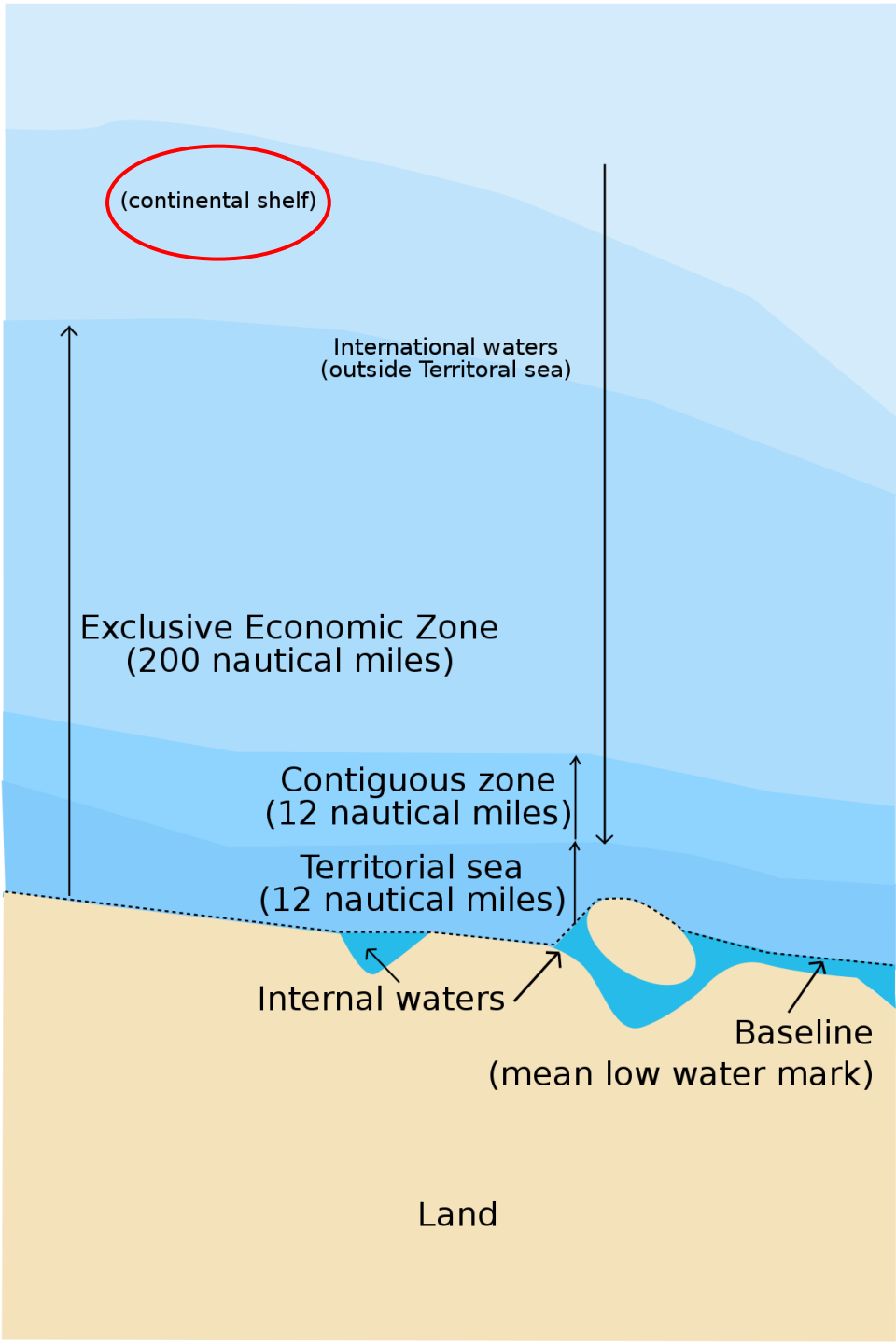
8. Information on the limits of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured shall be submitted by the coastal State to the Commission on the Limits of the Continental Shelf set up under Annex II on the basis of equitable geographical representation. The Commission shall make recommendations to coastal States on matters related to the establishment of the outer limits of their continental shelf. The limits of the shelf established by a coastal State on the basis of these recommendations shall be final and binding.

CONTINENTAL SHELF



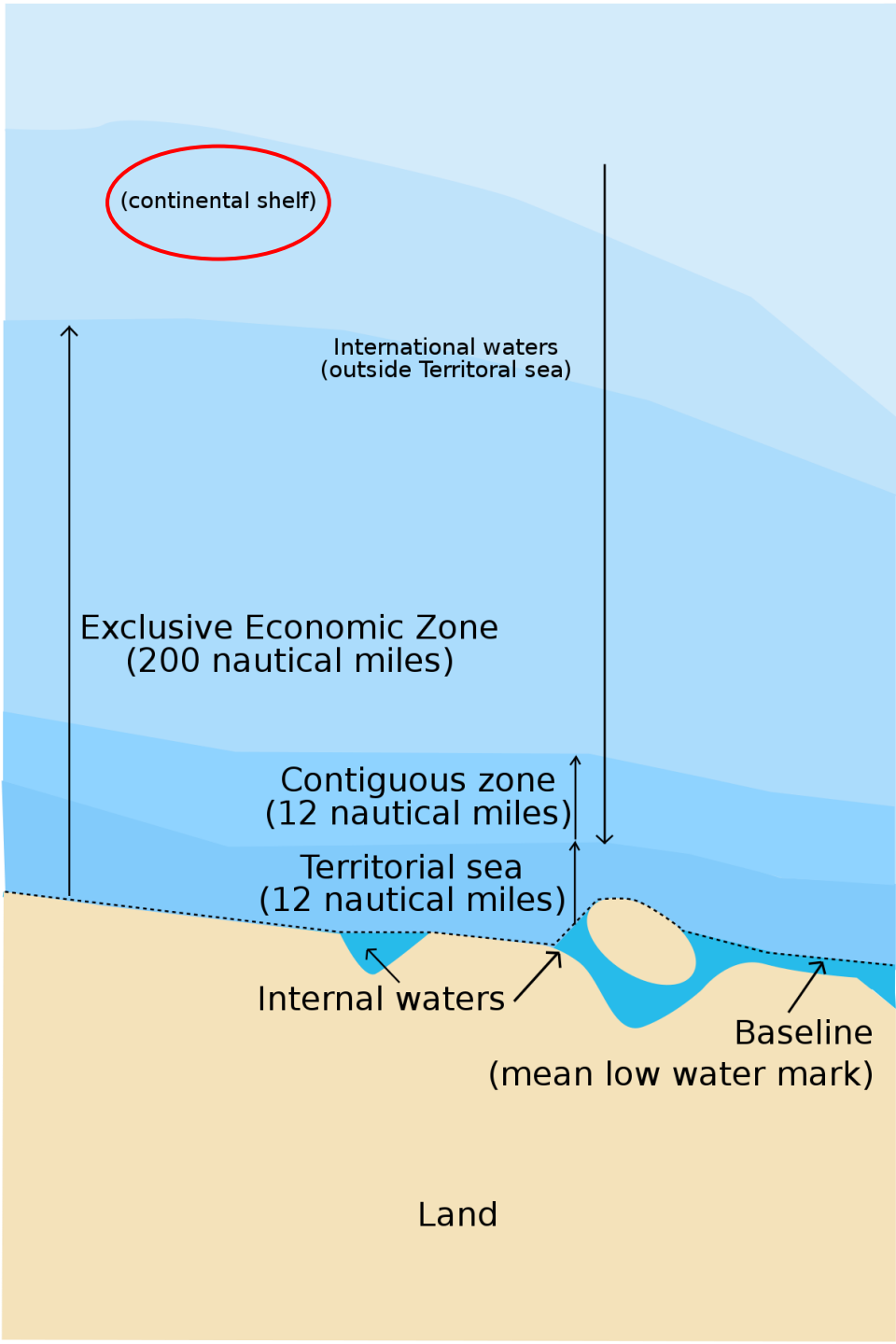
9. The coastal State shall deposit with the Secretary-General of the United Nations charts and relevant information, including geodetic data, permanently describing the outer limits of its continental shelf. The Secretary-General shall give due publicity thereto.
10. The provisions of this article are without prejudice to the question of delimitation of the continental shelf between States with opposite or adjacent coasts.

CONTINENTAL SHELF



- The coastal State exercises sovereign rights over the continental shelf in terms of the exploration and exploitation of its natural resources.
- The rights referred to in paragraph 1 are exclusive, meaning that coastal States that do not explore the continental shelf or exploit the natural resources of the continental shelf have no right to conduct such activities, without the express consent of that country.

CONTINENTAL SHELF



- The natural resources in this section include the mineral natural resources and other non-living natural resources of the seabed and subsoil of the seabed, as well as living organisms of the settled type, i.e. any organism that, at the time of its capture, lies motionless at the bottom, or underground; or unable to move without the ability to contact the bottom or the bed of the seabed.
- The exercise by a coastal State of its rights with respect to the continental shelf shall not prejudice the navigation or other rights and freedoms of other States recognized by the Convention, nor shall it impede the exercise of its rights to the continental shelf. these rights in an inexcusable manner.



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LECTURE 3

INTEGRATED MARINE POLLUTION MANAGEMENT

Lecturer: Prof. Nguyen Ky Phung
MSc. Dang Thi Thanh Le



CONTENT

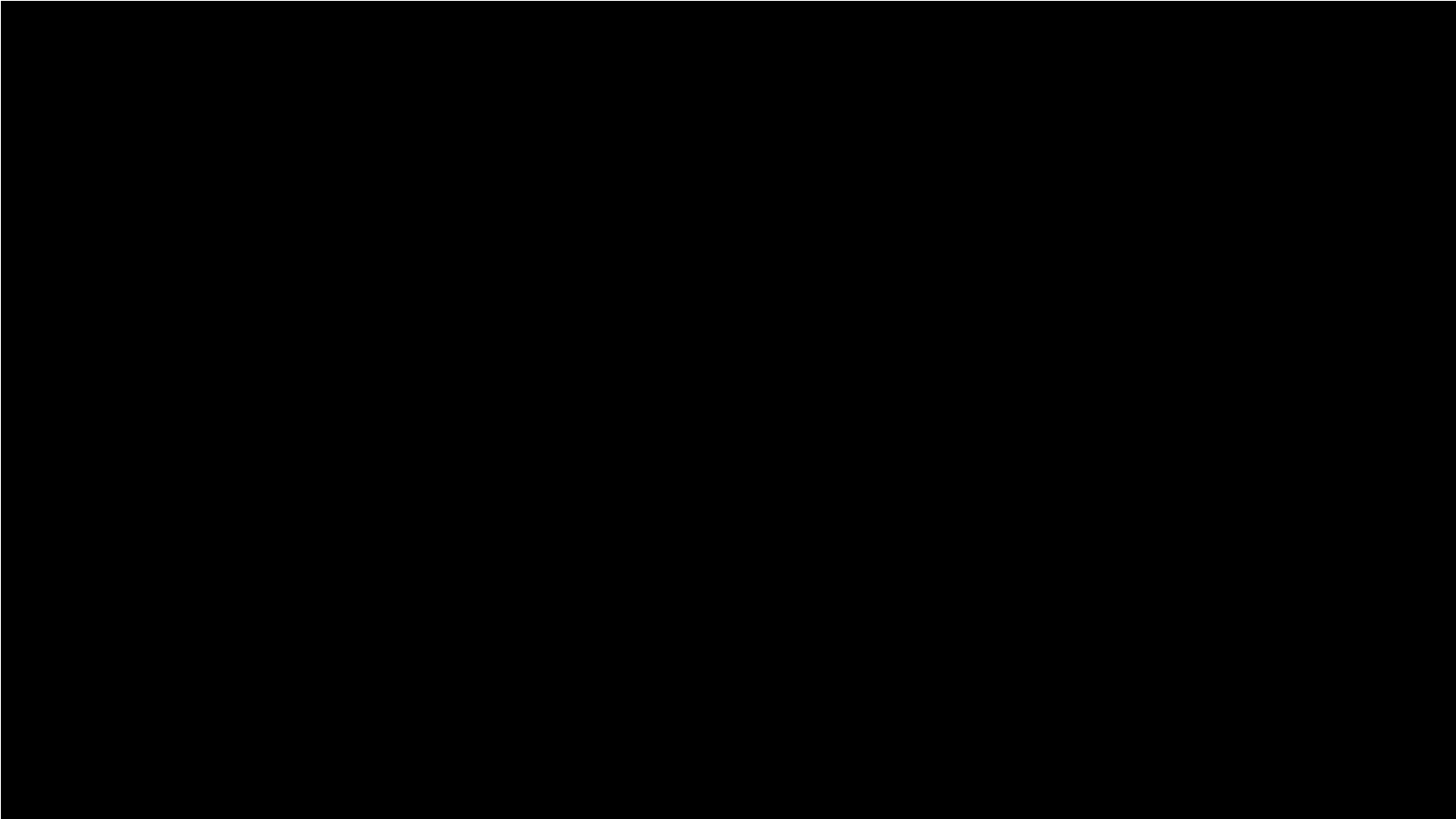


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1. CAUSES AND EFFECTS OF MARINE POLLUTION

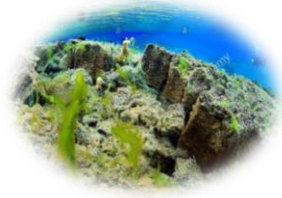
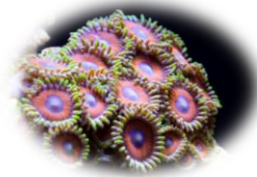
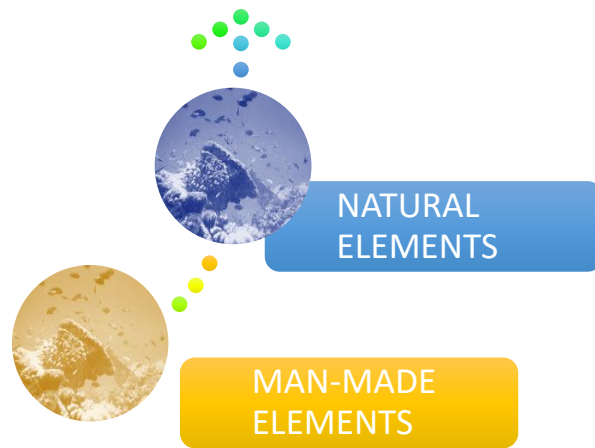
2. INTEGRATED MARINE ENVIRONMENTAL POLLUTION MANAGEMENT

Video 1



Nguồn: Marine pollution, 1st theme of the 2014 [#OurOcean](#) conference

CAUSES AND EFFECTS OF MARINE POLLUTION



CAUSES AND EFFECTS OF MARINE POLLUTION

The impact of marine pollution

Reducing marine biodiversity - loss of natural resources



Damage to the fishing industry



Impact on the tourism industry



Fees for pollution control, incident prevention, and corrective work are increased.



Human health risk



INTEGRATED MARINE ENVIRONMENTAL POLLUTION MANAGEMENT

CONCEPT

- The concept of environmental control first appeared in 1971 by the Scientific Committee of Problems of the Environment (SCOPE)
- Then in 1972, the Union of Environmental Issues (Stockholm) developed into the Global System for Environmental Control (GSME).
- Since 1975, UNEP has been developing a control system-oriented development, having established a program-based work centre (CWP) in Nairobi (Kenya).
- Integrated global control over the ocean includes ecological control and physical control (Izrael, Shban, 1985).
- Ocean ecosystem control is a system for analyzing, evaluating and forecasting the state of marine ecosystems.

INTEGRATED MARINE ENVIRONMENTAL POLLUTION MANAGEMENT

CONCEPT

- The most important component of ecological control is the biological control of the marine environment (figure 1).
- Biological control is combined with geochemical control system, carrying out inspections of sources and levels of marine environmental pollution (figure 2)

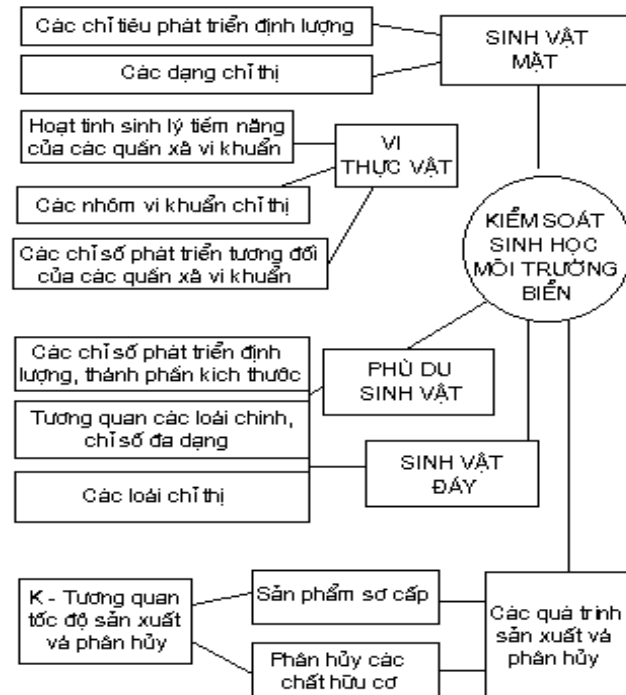


Figure 1. System of marine environmental biological control indicators

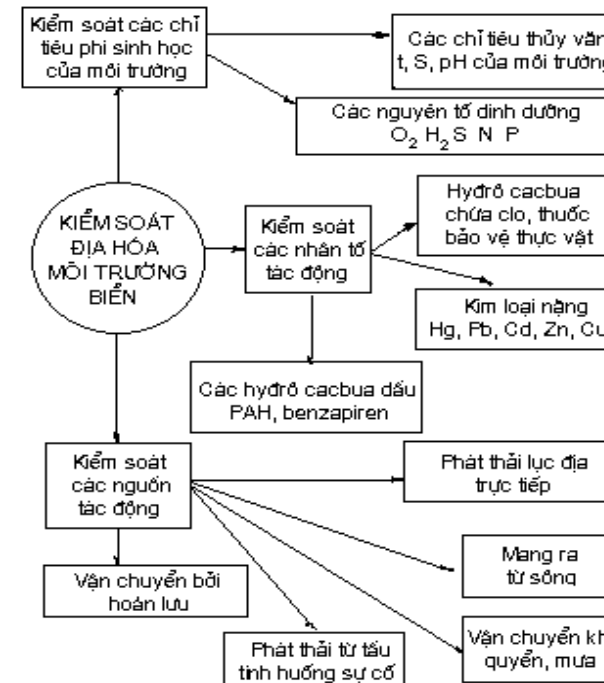


Figure 2. System of indicators to control the geochemicalization of the marine environment

INTEGRATED MARINE ENVIRONMENTAL POLLUTION MANAGEMENT

PRINCIPLES OF CONTROLLING MARINE ENVIRONMENTAL POLLUTION

- Regular pollution control of the marine and island environments is required, with a focus on prevention. Pollution, marine environmental incidents, and marine and island environmental degradation must all be dealt with immediately and successfully.
- Garbage from land-based operations, sea and island activities, unknown origins and across borders must all be controlled. It is important to take into account the environmental load capacity of marine and island areas while controlling waste sources and trash.
- Close coordination between sectors, levels, organizations and individuals involved in controlling marine and island environmental pollution.

(Article 42 of LAW ON MARINE AND ISLAND RESOURCES AND ENVIRONMENT, 2015)

TASKS AND SCIENTIFIC BASIS OF INTEGRATED CONTROL OF MARINE POLLUTION

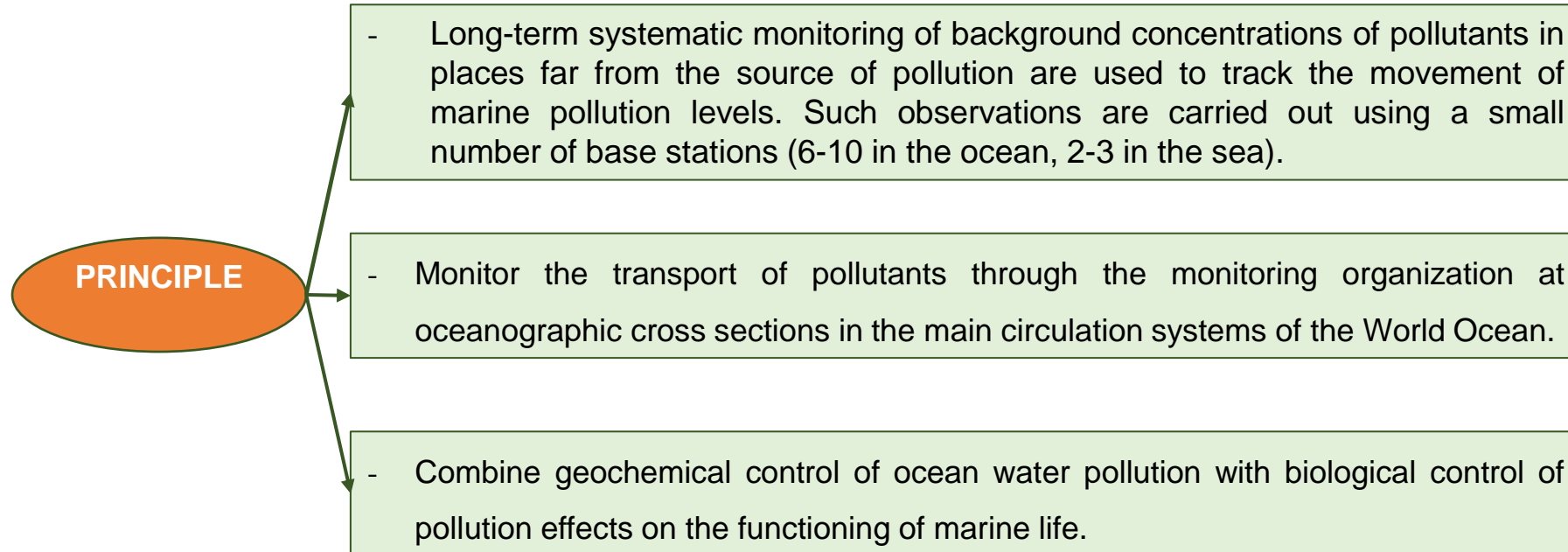
Objective

- Xác định trạng thái các hệ sinh thái quan trọng nhất của Biển và Đại dương Thế giới
- Predict the transformation that takes place in ecosystems under the influence of causal factors.

Mission

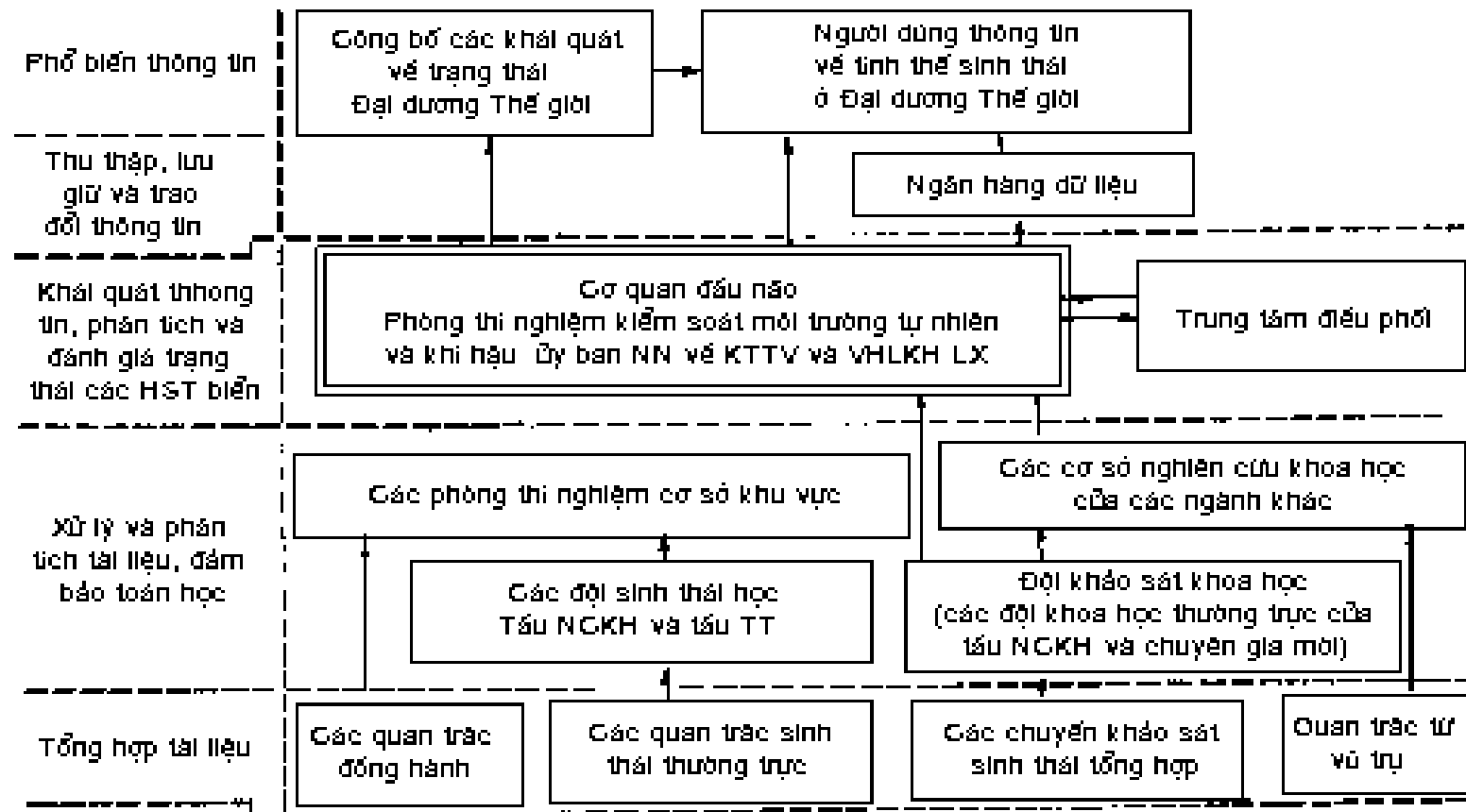
1. Identify channels of intrusion and evaluate the flow of pollutants in the rich and vulnerable ecosystems of the World Seas and Oceans
2. Study the consequences of marine pollution on ecosystems
3. Study the physical, chemical, and biological processes that determine the harmonized capacity and evaluate the harmonized capacity of marine ecosystems in the most studied regions of the World Ocean
4. Build mathematical models for separate ecological processes to predict ecological situations in the ocean at regional, regional and global scales

MARINE POLLUTION CONTROL SYSTEM



MARINE POLLUTION CONTROL SYSTEM

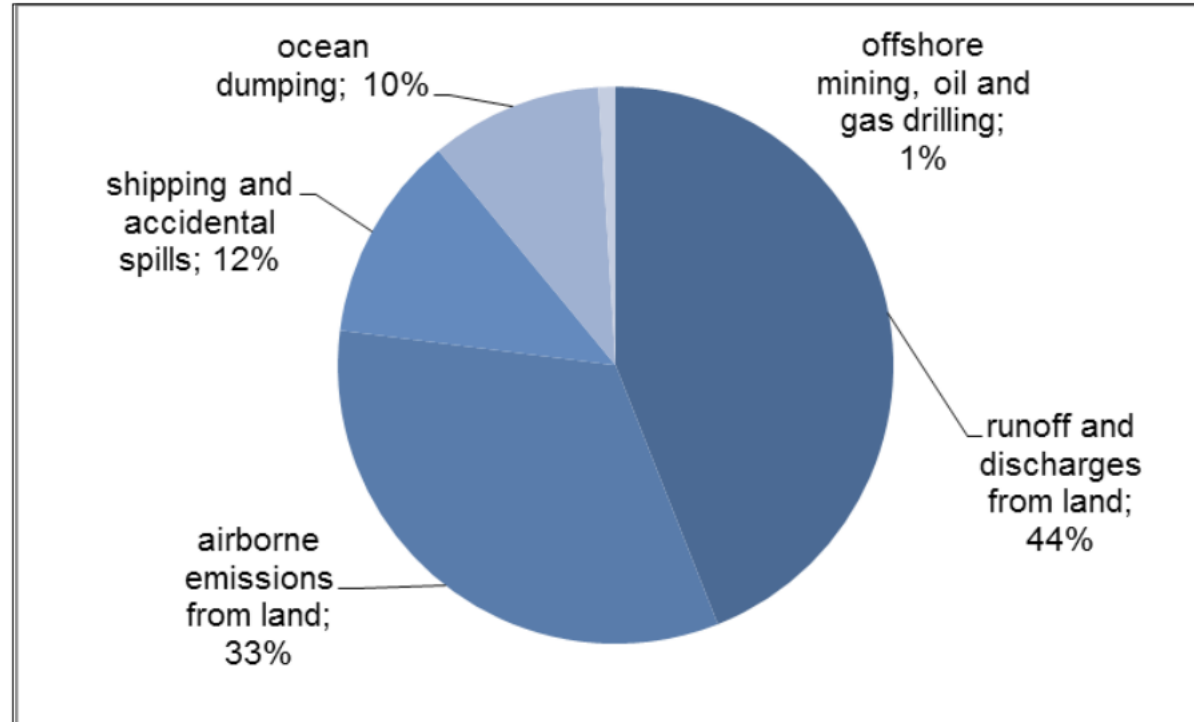
- In 1974 UNEP implemented the Global Integrated Control Program on oceans, which covers 11 ocean regions, more than 120 countries have participated in this program.
- Plan to plan the organizational structure and information assurance of the ocean control program



MARINE POLLUTION CONTROL SYSTEM

- Statistics of the International Maritime Organization show that marine pollution comes from the following sources:

-



Source: After IMO (2012)

MARINE POLLUTION CONTROL SYSTEM

To prevent marine pollution, it is possible to apply advanced technologies, clean technologies, cleaner production to exploit marine resources. Techniques can be applied such as:

Waste-free technology

- In the energy sector, converting thermal power plants to non-sulfur and liquid fuel; cleans smoky air from nitrogen oxides, sulfur dioxide, synthetic recycling of smoke residues and smog waste dumps.
- In the mining industry, the problem of underground synthetic mining needs to be geared towards perfecting enrichment methods with the aim of getting all the useful components, cleaning the mine water and using them properly, renovating the soil.
- In the metallurgical industry proceeds to establish scientific arguments - theories for closed water rotation schemes

MARINE POLLUTION CONTROL SYSTEM

Waste-free technology

In the chemical and petrochemical industry, in order to ecologicalize the industry, apply filtration membrane methods, absorb and extract, develop methods of making clean ecological fertilizers and means of improving harvesting, substitutes for chemicals that harm the environment as well as biodegradable substances that are fast and easy to assimilate in the natural environment.

In the senlulo- paper industry today emerges the problem of building organic solvent solubility technology and other methods of wood synthesis recycling, dry paper and carbide production methods, switching to closed water rotation schemes.

PROTECTING THE MARINE ENVIRONMENT FROM SHIPS

A huge source of pollution in the marine environment:

Oil pollution

Pollution caused by liquid chemicals carrying buckets on board

Pollution caused by dangerous goods

Pollution caused by waste

Pollution caused by toxic materials used to build ships

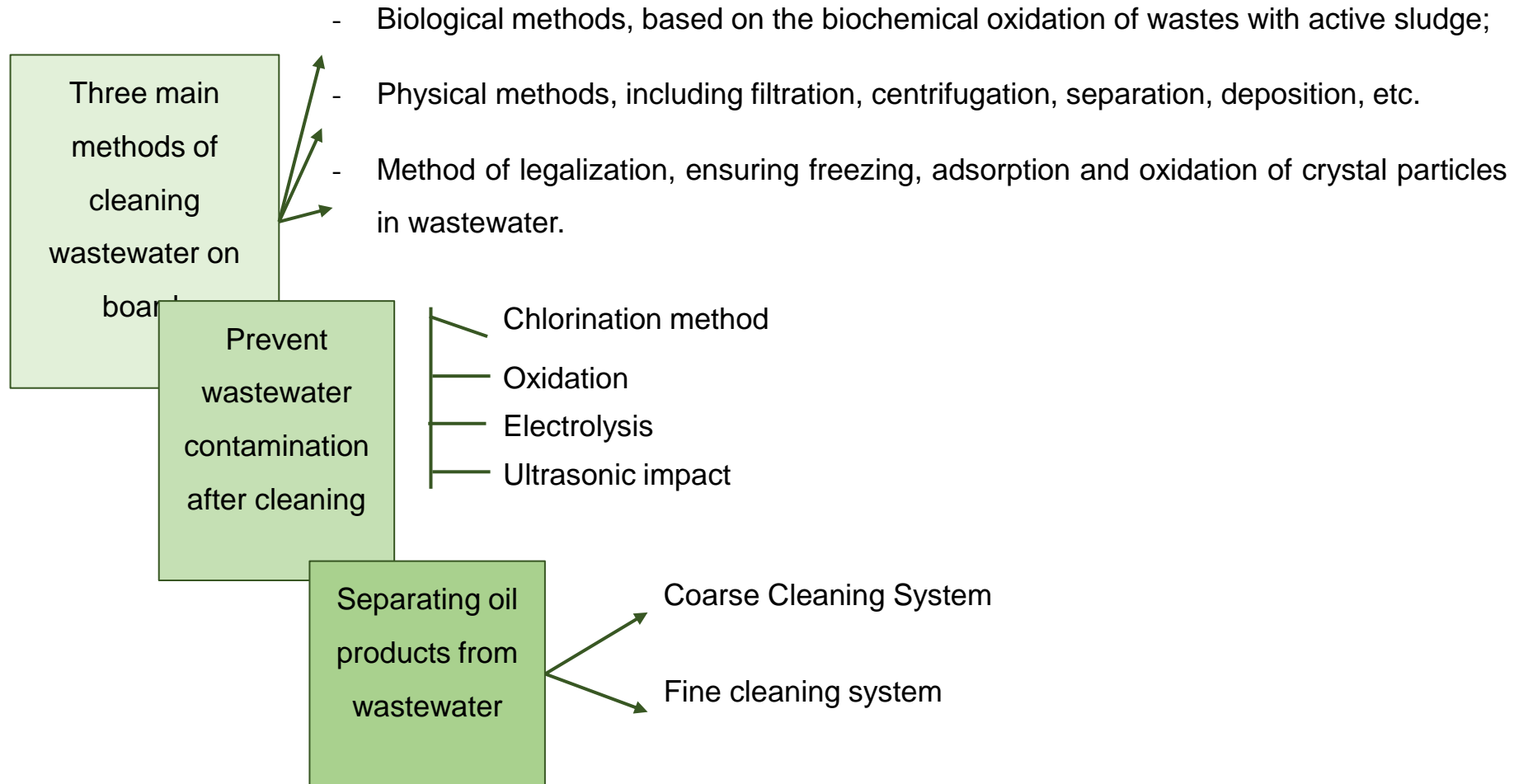
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**Resolution
direction**

- Building closed cycle systems reuses a major amount of waste
- Clean and minimize the calculation of waste that definitely enters the marine environment.

PROTECTING THE MARINE ENVIRONMENT FROM SHIPS

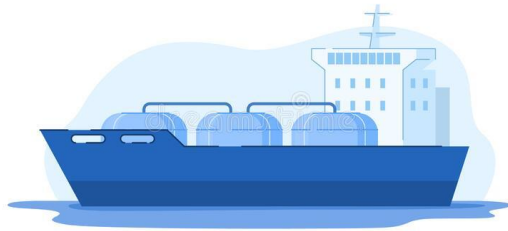


PROTECTING THE MARINE ENVIRONMENT FROM SHIPS

Method of washing oil tankers

Before

- Use hot water to wash and then pour large amounts of water out of the vessel.
-



Now

- Emulsification method
 - This method avoids the dumping of oil pollutants into the sea while washing metal surfaces, storage compartments, plunger, tanks, tanks, containers on oil tankers.
 - The emulsification method ensures the cleaning of the containers in a closed cycle without discharging washing water.

PROTECTING THE MARINE ENVIRONMENT FROM SHIPS

Oil collection methods

- Collect oil using specialized pumps to suck and filter the oil and then put it in storage tanks placed on board or on land and then process the oil separation for reuse.
- Collect oil with materials that cause oil accumulation floating on the water surface: natural materials (straw, bushes, sawdust, plants ...) and synthetic substances (plastics, foams, powders)
- Method of decomposition of oil by chemicals: Using dispersants capable of decomposing oil sprayed on the surface of the oil layer, these substances will break down the oil to reduce the toxins of the oil.
- Method of burning oil: It is possible to burn the oil patch as soon as the oil spills on the sea surface, but this method pollutes the air, does not recover the oil ... It should be used less.



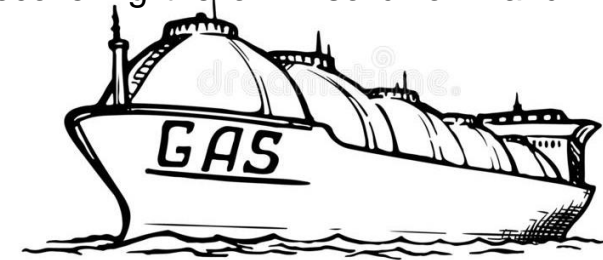
PROTECTING THE MARINE ENVIRONMENT FROM SHIPS

Oil spill remedies

- Circle the oil patch with mechanical and physical barriers (buoys) to prevent the oil from spreading.
- Fold the oil with glue: the essence of this method is to glue the oil spill layer by spraying into the oil layer of glues (isocyanat amines, aliemimum chocolate ...) then recovering the oil in solid form and further processing to recover the oil.

Vietnam

- Set up oil spill response centers in Vung Tau, Da Nang and Hai Phong.
- These centers are equipped with specialized oil spill response vessels that can operate in all weather conditions and are equipped with state-of-the-art oil collection and treatment equipment.



ASSIGNMENT

[1] Explain the causes of marine pollution

[2] Presenting the mission and scientific basis of integrated control of the marine environment

[3] What is waste-free technology?



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THANK YOU





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LECTURE

CONTROL OF MARINE POLLUTION

Lecturer: Prof. Nguyen Ky Phung

MSc. Dang Thi Thanh Le





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LECTURE 4

PREVENTION AND RESPONDING TO MARINE POLLUTION INCIDENTS

CONTENT

- PREVENTION OF POLLUTION FROM LAND-BASED SOURCES
- PREVENTION OF POLLUTION FROM SHIP

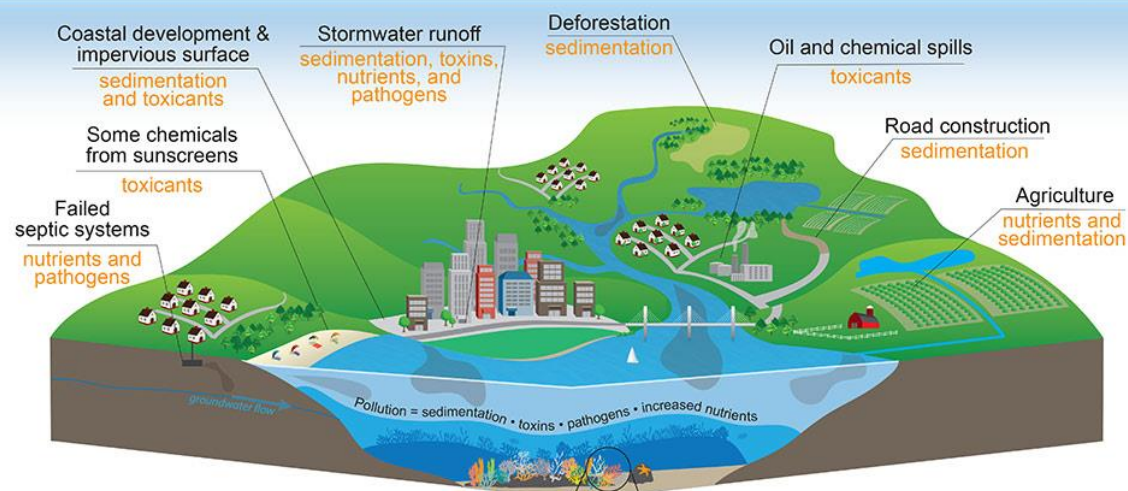


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PREVENTION OF POLLUTION FROM LAND-BASED SOURCES



THREATS TO CORAL REEFS LAND-BASED SOURCES OF POLLUTION

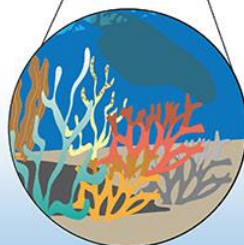


POLLUTION

sedimentation
toxicants
pathogens
increased nutrients



causes disease and mortality
disrupts ecological functions
changes dynamics and feeding behaviors
prevents coral growth and reproduction



As human population & development expands in coastal areas, the landscape is altered, increasing land-based sources of pollution & **THREATENING CORAL REEF HEALTH.**

HOW YOU CAN HELP

Apply fertilizers and pesticides sparingly.



Pick up after your pets.



Wash your car on your lawn.



Dispose of lawn clippings in a compost pile.



Harvest rooftop rain water through rain barrels or rain gardens.



DO NOT dump paint, oil, antifreeze, debris, or other household chemicals into street gutters or storm drains.



Clean up spilled brake fluid, oil, grease, and antifreeze.



Maintain proper septic system function with inspections and pumpouts every 3-5 years.



Seek shade between 10 a.m. and 2 p.m., use Ultraviolet Protection Factor (UPF) sunwear, and choose sunscreens with chemicals that don't harm marine life.



For more information, visit oceanservice.noaa.gov/sunscreen.

DEFINITION



According to the United Nations Convention on the Law of the Sea, article 207: "Pollution of the marine environment from land includes pollution arising from rivers, creeks, estuaries, pipelines and other means of transport. There is a separate provision for the pollution of the marine environment caused by activities or incidents in the exercise of sovereign rights or jurisdiction, or derived from artificial islands and equipment works in the continental shelf (article 208).

SOURCES OF MARINE POLLUTION

❖ Defined source

- A source is considered to be identified if it can be exactly pinpointed where pollutants are released into the marine environment and can be categorized into metals, organics, hazardous compounds, etc.



❖ Unidentified sources

- Unidentified sources are dispersed sources that reach the marine environment through indirect routes such as the atmosphere, precipitation falling into rivers and out...
- These unidentified sources can be divided into four categories related to urban, agricultural, industrial and construction development.



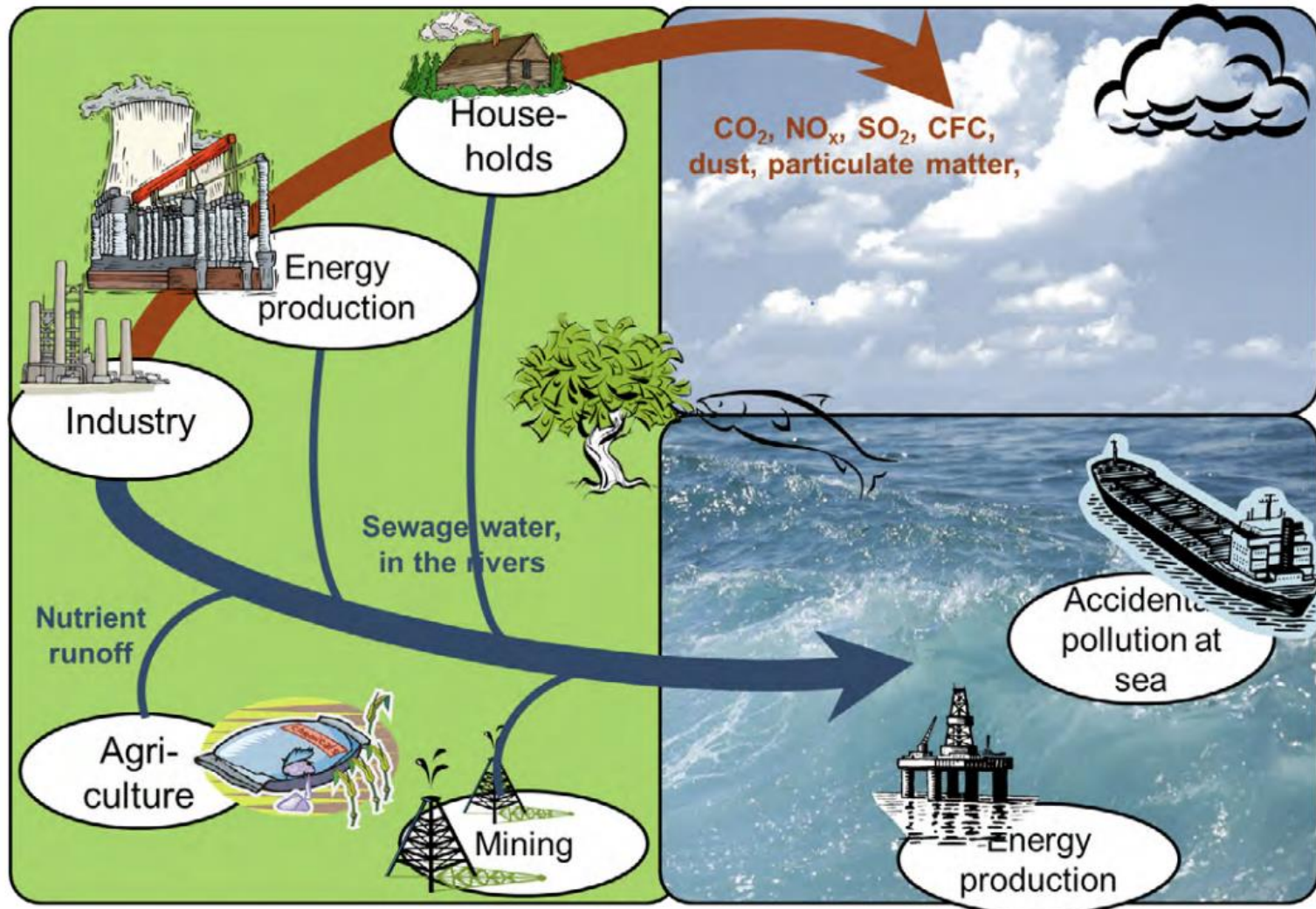
SOURCES OF MARINE POLLUTION

Agenda 21 of the Rio Conference on Environment and Development stated:

- Land-based source accounts for 80% of marine pollution, with marine transportation operations and sea submersion contributing 10% each.
- Pollutants pose a strong threat to the marine environment.
 - + Wastewater, organic matter, synthetic organic components, sediments, waste
 - + Plastic, metal, radioactive, oil bags
 - + Aromatic Synthetic Petroleum Compounds (PAH)).
- Many of the pollutants that come from land-based are specifically related to the marine environment because they represent the same period of toxicity, stability, and the ability to accumulate toxic substances in the food chain.



SOURCES OF MARINE POLLUTION



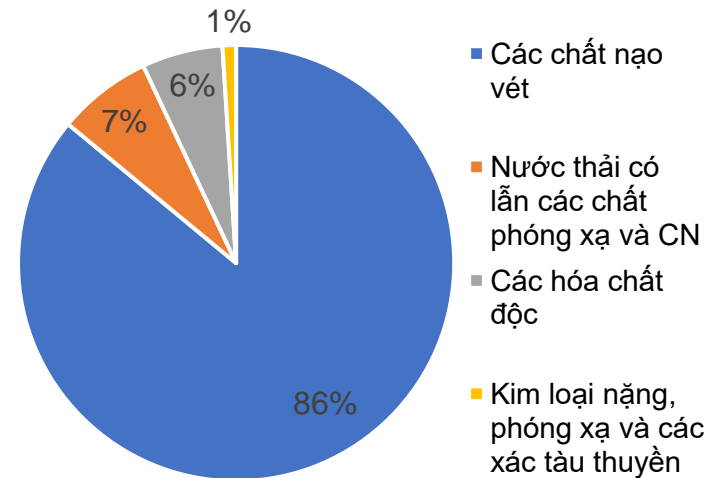
IMPACTS

- Up to two thirds of marine resources may be negatively impacted by pollution coming from the land-based, as the majority of marine resources take up nutrients either directly or indirectly from estuarine water sources.
- The destruction of marine facilities, which adversely affects tourism, contaminates beaches, prevents sea turtles from laying eggs, and decreases the productivity and biodiversity of the maritime environment.
- Human health and resource threats.
- Pollutant deposition gradually alters the quality of seawater and the physical features of the coastal marine environment, resulting in the deterioration of vital ecosystem habitats.



IMPACTS

- According to GESAMP figures, 10% of land waste is dumped into the sea and 90% is transported by other routes, with the two most significant sources of pollution entering coastal waters being domestic wastewater and agricultural waste from fertilized fields.
- The most alarming part is how non-biodegradable trash, such as plastic bags, water bottles, and fishing nets, is carelessly thrown on beaches and other coastal areas..
- If not effectively prevented, hot water that absorbs heat from nuclear power plant equipment will be dumped into rivers and estuaries and destroy marine ecosystems.



IMPACTS

- Oceans and coastal provide crucial ecological roles by maintaining food chains, controlling climate, and facilitating transportation. This ecosystem's functional value is estimated to be \$2.5 billion annually, ranking it as the seventh largest economy in the world (GEF,2018). With fisheries depletion, hurricane damage to the Gulf of Mexico, decreased tourism earnings, and other effects, it is estimated that environmental deterioration of coastlines and oceans costs \$350-940 billion yearly. other (GEF, 2018).

PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

The restriction of this source of land-based pollution is tied to the problem of countries exploiting natural resources in accordance with their environmental policies. International environmental law has few specific provisions on this issue. The obligation to protect the marine environment from activities derived from land is established in article 207 by the 1982 United Nations Convention on the Law.

1. States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources, including rivers, estuaries, pipelines and outfall structures, taking into account internationally agreed rules, standards and recommended practices and procedures.
2. States shall take other measures as may be necessary to prevent, reduce and control such pollution
3. States shall endeavour to harmonize their policies in this connection at the appropriate regional level.

PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

4. States, acting especially through competent international organizations or diplomatic conference, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment from land-based sources, taking into account characteristic regional features, the economic capacity of developing States and their need for economic development. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.

5. Laws, regulations, measures, rules, standards and recommended practices and procedures referred to in paragraphs 1, 2 and 4 shall include those designed to minimize, to the fullest extent possible, the release of toxic, harmful or noxious substances, especially those which are persistent, into the marine environment.

PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

Montreal Guide 1985

The Montreal Guidelines on marine pollution of land origin were a non-binding document adopted by UNEP in 1985. In order to reduce marine pollution coming from land-based, this guideline urges for negotiations on global standards and principles. It offers advice on substance classification and control measures.

PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

THE GLOBAL PROGRAMME OF ACTION FOR THE PROTECTION OF THE MARINE ENVIRONMENT FROM LAND-BASED ACTIVITIES (GPA)

Through regional marine treaties, nations are urged to engage in regional cooperation on topics like harmonizing pollutant discharge rules and jointly protecting coastal habitats.

The GPA was adopted by 108 Governments, and the European Commission at an intergovernmental conference convened in Washington, D.C., in 1995.

The GPA's focus has gradually narrowed to three primary areas: wastewater, nutrient management, and marine litter (Kimball, 1995; Vanderzwaag and Powers, 2008; UNEP).

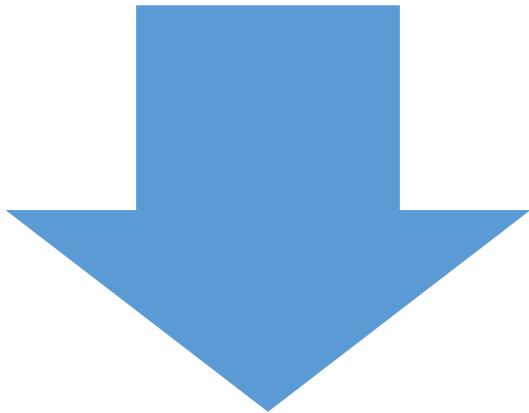
PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

THE GLOBAL PROGRAMME OF ACTION FOR THE PROTECTION OF THE MARINE ENVIRONMENT FROM LAND-BASED ACTIVITIES (GPA)

Goal



Prevent the degradation of the marine environment from land-based activities by helping countries conserve and protect the marine environment.



Assist countries in taking autonomous or appropriate steps that are compatible with their policies, objectives, and resources in order to progress toward preventing, minimizing, controlling, and/or eliminating deterioration of marine habitats, as well as restoring them from the consequences of land-based activities.

PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

THE GLOBAL PROGRAMME OF ACTION FOR THE PROTECTION OF THE MARINE ENVIRONMENT FROM LAND-BASED ACTIVITIES (GPA)

Identify nine types of sources of marine and coastal pollution: wastewater, hard-to-decompose organic pollutants (POP), radioactive substances, heavy metals, oils (hydrocarbons), nutrients, sedimentary movement, waste, and physical changes and habitat destruction

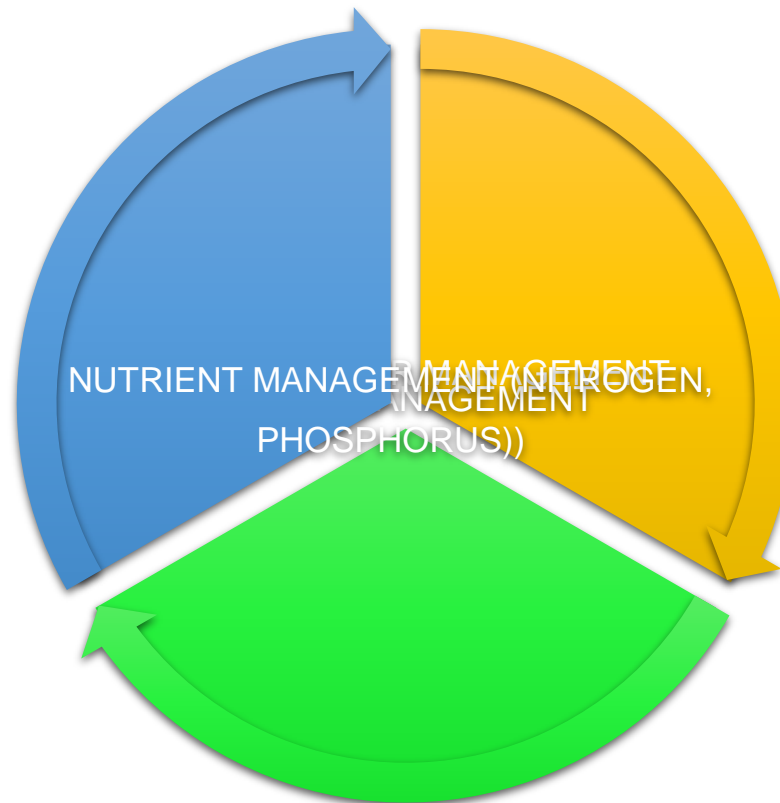
Propose a streamlined sequence of problem assessments, priority settings, management strategies, assessments, and finances to address these sources of pollution

Create a clearinghouse to increase access to information and expertise in each field.

PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

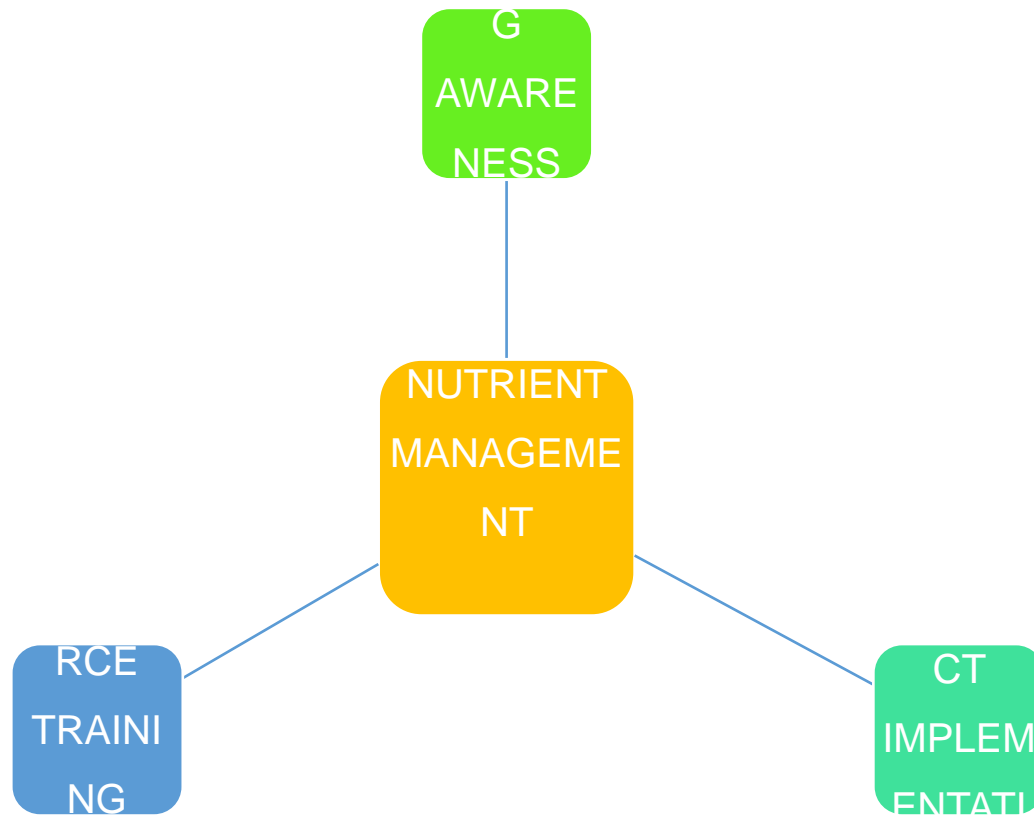
GLOBAL PARTNERSHIPS

A five-year strategy for cooperation on wastewater pollution, fertilizer management, and ocean discharge operations was put into place by UNEP and GPA in January 2019. It emphasizes the various global partnerships the GPA has. Later that year, at the United Nations General Assembly, governments decided that operations in each of these three sectors should become part of UNEP's regular work schedule.



PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

NUTRIENT MANAGEMENT



PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

NUTRIENT MANAGEMENT

INDIA: Linking land-based activities to the ecosystem dynamics and nutrient management of the Pulicat Lagoon in India



SRI LANKA: Reduce the risk of degradation of Kayankerni and Paskudah reef ecosystems in Sri Lanka by addressing sources of nutrition, wastewater and other sources of land-based marine pollution in the Maduru Oya basin

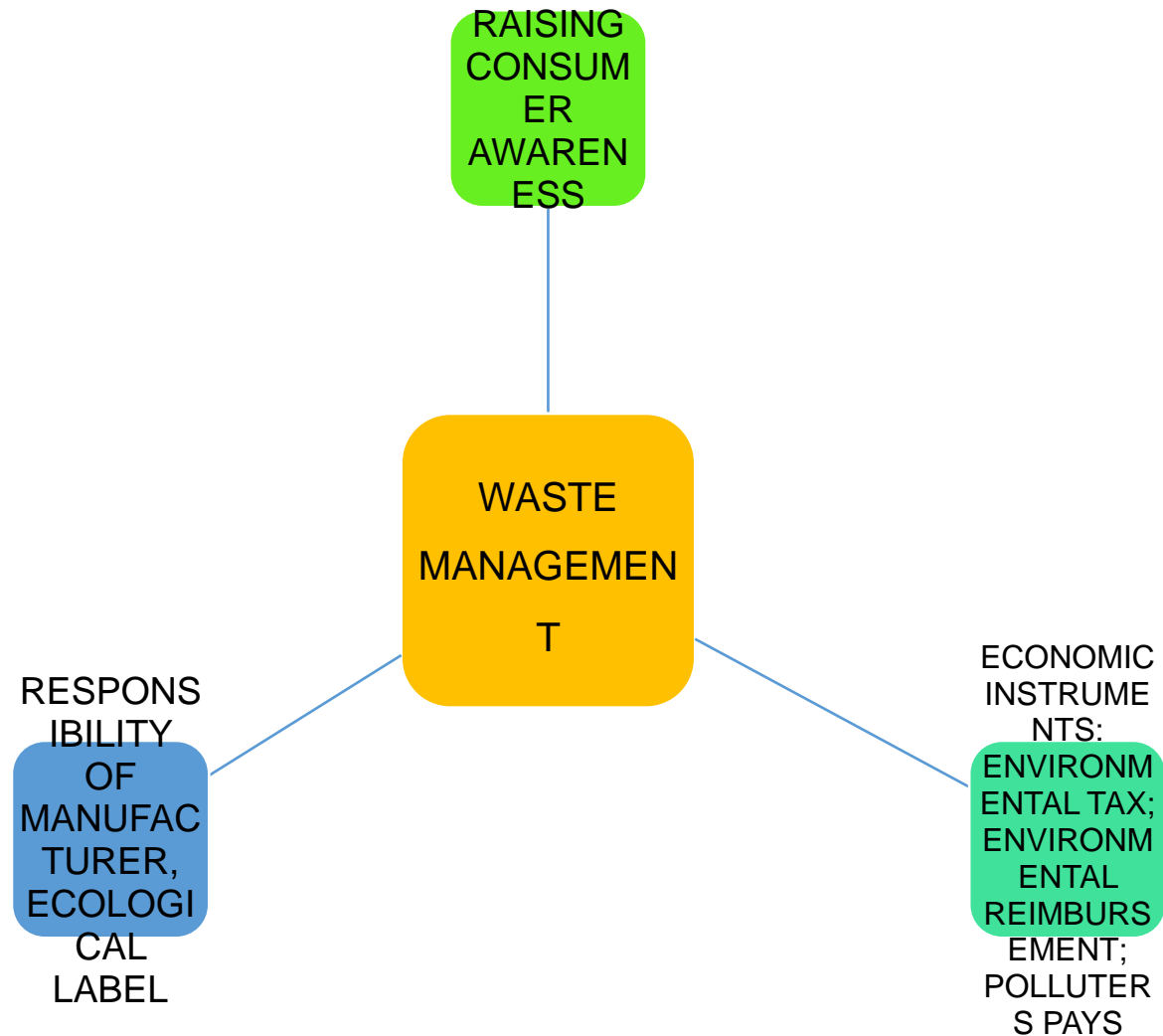


CHINA: Linking land-based activities to the ecosystem dynamics and nutrient management of Chongming Island in China



PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

WASTE MANAGEMENT



PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

WASTE MANAGEMENT

AFRICA: SHARE YOUR STORY: 100 African Voices



FLIPFLOPI PROJECT: The Clean Sea campaign launched a traditional dhow boat on Lake Victoria in 2019 made entirely from recycled plastic, including discarded footwear. The boat is used for awareness-raising activities in Kenya, Tanzania and Uganda. (Photo by Mike Muzurakis, IISD/ENB)



Nestlé: has committed to making all its plastic packaging 100% recyclable or reusable by 2025. They want to encourage the use of plastics that allow for better recycling rates and eliminate or Changing complex combinations of plastics makes recycling difficult..

Unilever: committed to ensuring that all of their plastic packaging is fully reusable, recyclable or compostable by 2025.

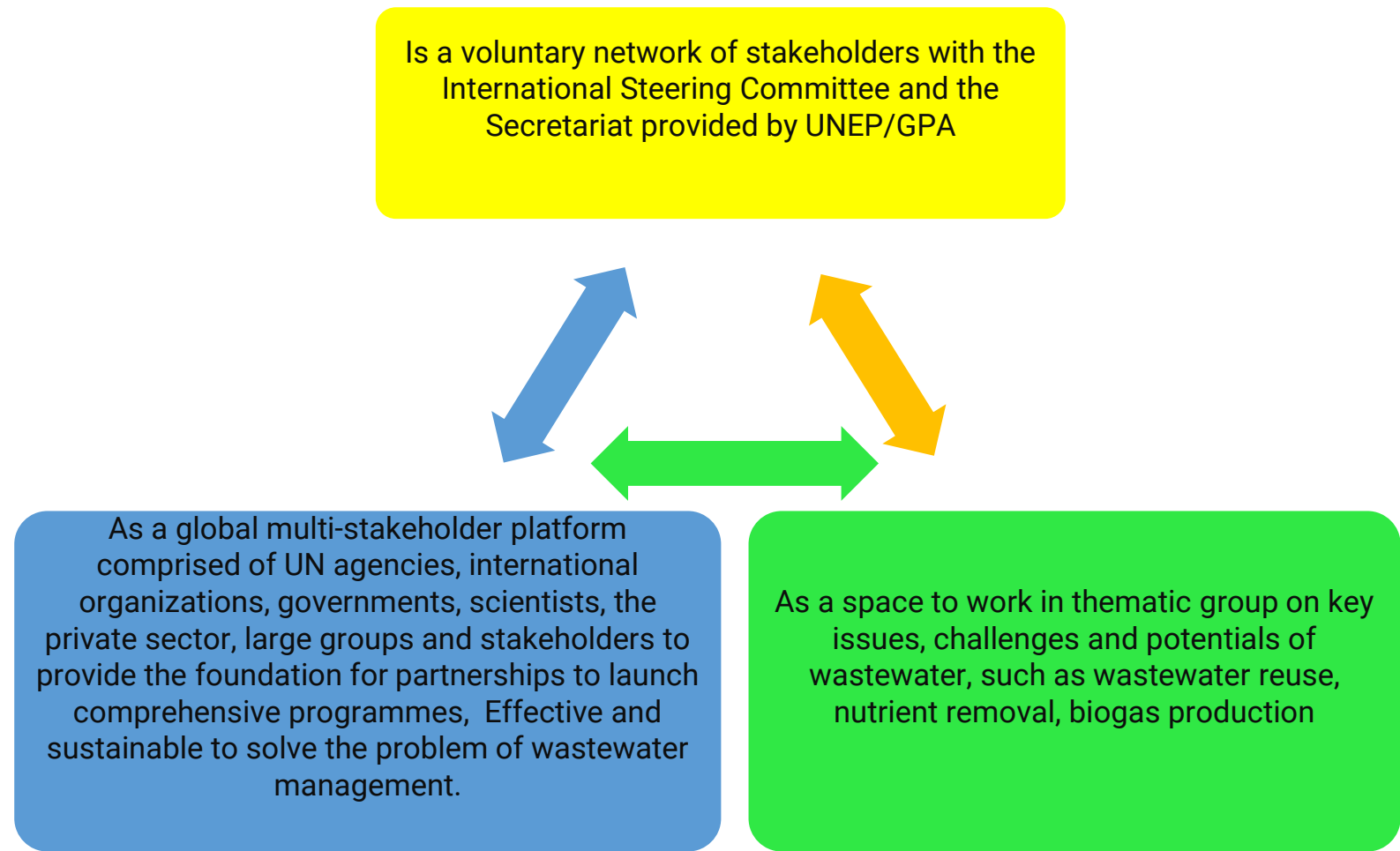
Volvo: At least 25% of the plastics used in the company's new models from 2025 will be made from recycled materials..

Dell Set a goal of making its packaging 100% waste-free by 2020, using raw materials from sustainable sources.

PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

WASTEWATER MANAGEMENT

INITIATIVES TO PROMOTE WASTEWATER MANAGEMENT PRACTICES



PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

WASTEWATER MANAGEMENT

THE INITIATIVE PROMOTES WASTEWATER MANAGEMENT PRACTICES.

Supportive Policies: Initiatives to assist countries in sharing information, developing and applying the right policies and guidelines for sustainable management of wastewater and sanitation.

Appropriate technical technology: Operational initiatives aimed at reducing wastewater pollution through demonstration projects and technical support.

Innovation Finance: The initiative serves as a bridge between various stakeholders, including the private sector, to leverage additional resources, solutions, and opportunities for wastewater recovery and reuse.

Raising awareness and building capacity: The initiative strives to produce and disseminate outreach materials to raise awareness of the challenges and opportunities associated with wastewater management. It requires addressing the capacity gap of target groups through special tools, publications, training materials and online courses.

PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

- Land-based sources of marine pollution are a complex and large-scale set of problems that no regulated approach or overall program can adequately address.
- Global governance responses have become more specialized over time, focusing on specific pollutants, such as the Stockholm Convention on POP substances and the Minamata Convention on Mercury.
- However, as a program of international cooperation and support for national actions, the GPA has created change. By 2018, 107 countries had relevant policy frameworks (UNEP, 2018). The GPA has advanced its knowledge of sources of land-based marine pollution through the implementation of scientific assessments and the publication of guidelines for countries.

PREVENTION OF POLLUTION FROM LAND-BASED SOURCES

In Viet Nam

Article 46 Law on natural resources and environment of Sea and Islands, 2015 Ministry of natural resources and environment

Controlling marine environmental pollution from the mainland, regulations:

1. Waste generated from production, business and daily life activities on land, before being discharged into the sea, must be treated up to environmental technical regulations.
2. The arrangement of points for discharging treated wastewater into the sea must be considered on the basis of natural conditions of the wastewater discharge area; dynamics, environment, ecology and biodiversity, resources and current status of exploitation and use of sea areas. Points for discharging wastewater into marine protected areas, beach areas, coastal scenic spots and landscapes must be assessed, considered and treated according to the provisions of the law on environmental protection.
3. Production, business and service establishments on coastal lands and on islands must have adequate means and equipment for waste treatment to ensure environmental technical standards are met; must periodically report to competent state management agencies on the current status of waste treatment and discharge into the sea according to regulations of the Minister of Natural Resources and Environment.
4. Pollution sources from river basins to the sea must be closely investigated, evaluated and controlled



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PREVENT POLLUTION FROM SEABED ACTIVITIES

SOURCES OF POLLUTION

Activities related to the seabed may include:

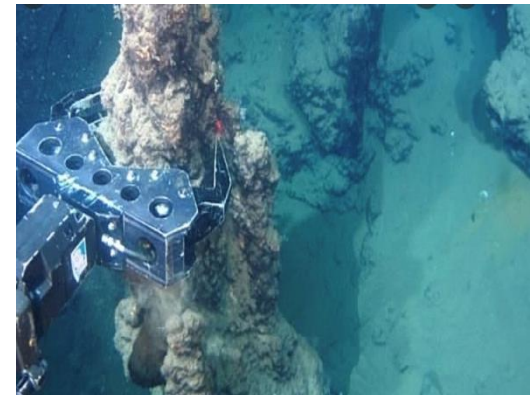
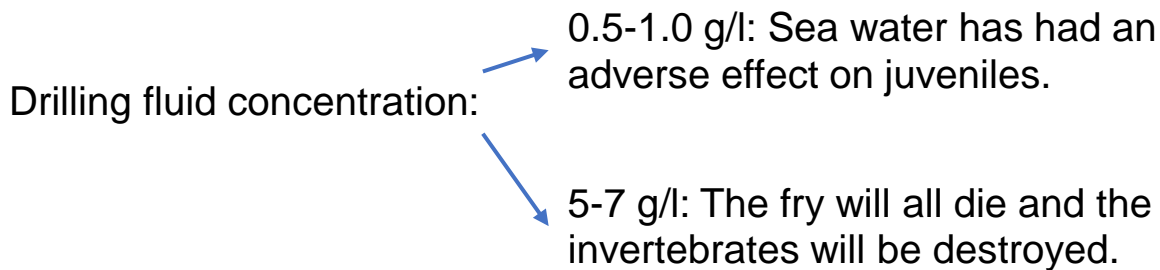
- Oil and gas exploration and exploitation activities;
- Exploration and mining activities,
- Drilling, digging, explosion activities aimed at building tunnels, laying cables, ducts ...

Seismic surveys, discharges, drilling fluids, boat traffic, installation of equipment works, drilling rigs, as well as dumping and leaks or incidents during exploration, Oil and gas exploitation such as rig explosions or collisions, oil spills when ships are anchored at rigs, all affect the quality of the marine environment.



IMPACT

- Every year, about 0.08 million tons of oil are released into the marine environment from offshore exploitation, of which 0.06 million tons are due to incidents.
- According to research, drilling activities introduce 98-99% of substances other than oil into the marine environment.
- The toxins contained in the waste can cause many harmful effects to the ecosystem: destroying biological species, reducing fertility, causing genetic mutations...
- Offshore exploration and production facilities and equipment are also obstacles to traffic and are often connected to pipelines that are prone to breakage. Their proximity to coastal areas increases the potential for adverse effects on marine life and reduces other marine convenience values.



PREVENT POLLUTION FROM SEABED ACTIVITIES

Section 17.30 of Agenda 21 requires countries to assess the need for additional measures to address the degradation of the marine environment caused by activities emanating from offshore oil and gas rigs. existing waste and safety regulations, and outlines actions to be taken within the framework of IMO and other relevant international organisations, sub-regional, regional or global.

POLLUTION CAUSED BY DUMPING OF HAZARDOUS SUBSTANCES AND OTHER SUBSTANCES

Cause

- Transporting hazardous waste across borders
- High radioactive waste is produced from nuclear energy production activities.
- The accidents of nuclear submarines carrying nuclear warheads can also turn them into major sources of sinking pollution

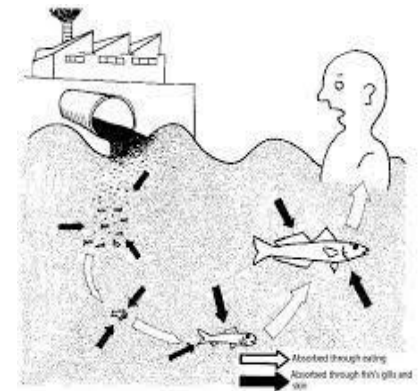


Effect

- Chemicals and hazardous substances containing chemicals often have an impact on the environment based on their toxicity and duration and concentration in seawater.

For example: Minamata disease in Japan in the 50s and 60s of the twentieth century was the result of the dumping of chemical plants into the sea, which contaminated fish with mercury.

- Radioactive wastes that are dumped at sea can have adverse effects on marine organisms, especially young marine organisms, which are in the adult stage, causing genetic changes, mutations, and development of bad genes.



POLLUTION CAUSED BY DUMPING OF HAZARDOUS SUBSTANCES AND OTHER SUBSTANCES

Control method

The Program advises States to ratify the 1972 London Convention and the 1996 Protocol in order to prevent the source of pollution from submergence, and to consider outright banning dumping rather than allowing controlled submergence in low concentrations of nuclear waste (clause 22.5b). State participation in and enforcement of the Code of Practice for the Transboundary Transport of Radioactive Waste should also be increased.

In the IMO's 1974 International Convention on the Safety of Life at Sea (SOLAS 1974), Chapter VIII also contains regulations governing the operation of nuclear-powered non-military vessels. In November 1981, the IMO adopted the Nuclear Safety Code for commercial vessels.





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PREVENTION OF POLLUTION FROM SHIP

SOURCES OF POLLUTION

Pollution caused by boats accounts for 12% of marine pollution. Vessels can cause air pollution due to a variety of functional activities: burning fuel in engines; burning garbage at sea; the use of CFCs (chlorofluorocarbons) and halons in refrigeration equipment and fire protection equipment; volatilization of some special substances on board during transportation, import, dismantling and washing of hold tanks. Pollutants from these sources can enter and impact the marine environment through the atmosphere.

According to Egard Gold, marine pollution from ships can be divided into the following five groups:

- Discharge operations from oil tankers when washing ships;
- Blowdown operations from all types of ships
- Oil spills, hazardous substances...due to incidents at sea such as collision, sinking, explosion, fire...;
- Spilling oil, hazardous substances..., in the process of loading, unloading, transporting and putting into storage;
- Intentionally dumping garbage, domestic wastewater



SOURCES OF POLLUTION

- According to the IMO, 90% of marine pollution incidents are caused by human errors when operating ships, only 10% are due to technical and mechanical faults.
- The majority of pollution caused by ships comes from unintentional or intentional dumping of water, waste generated from the normal activities of ships at sea or ballast water, bringing unnatural plants, animals and pathogens into the marine environment. Accidents at sea causing oil spills account for only about a quarter of all pollution due to The boat caused it..



MARINE POLLUTION CAUSED BY NON-OIL SUBSTANCES

(Sources of pollution)

Non-oil substances that are discharged into the sea are normally solid and liquid waste, garbage and ballast water, hazardous substances, radioactive substances and domestic wastewater.

- Due to accidents at sea such as collisions, sinkings, loss of cargo, a large amount of these substances can spill into the marine environment.
- Nuclear-powered vessels or carrying radioactive substances are also a potential source of marine pollution.
- Domestic wastewater from ships, plastic wastes and sustainable materials, discharges ballast water from ships.
-

MARINE POLLUTION CAUSED BY NON-OIL SUBSTANCES

(EFFECT)

- Creates risk to human health, damages marine life and biological resources, degrades sensory values, or obstructs other permitted uses of the sea.
- The environmental effects of dangerous or toxic substances are: bacterial accumulation; destruction of biological resources (by toxins); damage to human health (through the mouth); damages human health (through skin and breathing, excretion) and reduces the sensory value and other conveniences of the sea
- Domestic wastewater from ships can contain the types of bacteria that pollute fishing grounds near shore and beaches. They can also damage coral reefs, destroying the ecological environment.



MARINE POLLUTION CAUSED BY NON-OIL SUBSTANCES

(EFFECT)

- The activities of fish, seabird colonies, and marine animals are hampered by plastic garbage and sustainable materials. Garbage diminishes the aesthetic value and beauty of coastal environments, including coral reefs, beaches, and undersea scenery.
- The disposal of sediments can have a direct impact on the marine environment, in which case they are polluting toxins, or indirectly by degrading oxygen or depositing on the sea floor.
- Discharging contaminated ballast or sediment into the waters of the port country can lead to the introduction of unwanted samples, seriously harming the existing ecological balance.
- The fact that there are epidemics can also be the result of the port waters being poisoned by large amounts of ballast water containing bacteria or viruses.



MARINE POLLUTION CAUSED BY NON-OIL SUBSTANCES

(Control method)

- To control this source of pollution, all ships must be equipped with equipment that can significantly limit garbage and wastewater. The ability to incinerate waste on the deck, recycle, reuse and other systems also need to be studied advancedly, especially to raise the awareness of people on board.
- The control and prevention of marine pollution caused by ballast water is a content of MARPOL Convention 73/78.
- On November 4, 1993, the IMO again adopted Resolution A. 774 (18) "Guidelines for preventing the introduction of unwanted pathogens from the discharge of ballast water and ship sediment". The general principle is as follows:
 - i. States Parties may adopt procedures for discharging ballast and sedimentary vessels to protect the health of their citizens from external infectious agents, in order to protect fisheries and aquaculture, against foreign threats and to protect the environment in general.
 - ii. The application of procedures for discharging ballast water and ship sediments in order to minimize the risk of importing unwanted seafood and pathogens, one can include in the provisions of quarantine laws to guidelines, recommend measures to control and limit the problem.
 - iii. In any case, the authorities have the port of phải considering the general impact of ballast discharge procedures and ship sediments on the safety of the ship and those on the deck.
 - iv. The procedures for discharging ballast water and ship sediments need to be practical, efficient, designed so that the cost and storage time are lowest.

v.

MARINE POLLUTION CAUSED BY NON-OIL SUBSTANCES

(Control method)

The specific measures are as follows:

1. For the normal operation of the vessel:

- i. Not discharging ballast water;
- ii. Ballast water exchange and ship descaling shall be carried out at sea or in such areas as may be acceptable to the port State Government for that purpose;
- iii. Ballast water management aims to prevent or minimize contaminated water or sediment during ballast water intake and discharge operations;
- iv. Discharge of ballast water to onshore facilities for treatment and control.

Ô NHIỄM BIỂN DO CÁC CHẤT KHÔNG PHẢI DẦU

(Control method)

2. For training activities, awareness raising and management plans **MARINE POLLUTION CAUSED BY NON-OIL SUBSTANCES**

, it is necessary to:

Educating ship crews to be aware of the ecological and health hazards resulting from the improper entry and discharge of ballast water as well as the need to maintain cargo holds, equipment, anchors, cables, pipes from mud, sediment;

- i. Internship, short-term training on regulations on discharge of ballast water and sediment. The instructions shall include keeping the ship's logbook showing the date and time of entry, change and discharge of ballast water, salinity and geographical location of such operations;
- ii. Vessels shall have a ballast water management plan with the necessary information.
- iii. There should be an operating manual on the ship on the basis of this Guidance Resolution and should be in accordance with the ship's ballast water and sediment discharge procedures

POLLUTION OF THE MARINE ENVIRONMENT FROM OIL

(Cause)

According to the general assessment, every year about 600,000 tons of oil is released into the marine environment, the normal operation of ships, accidents and intentional dumping.

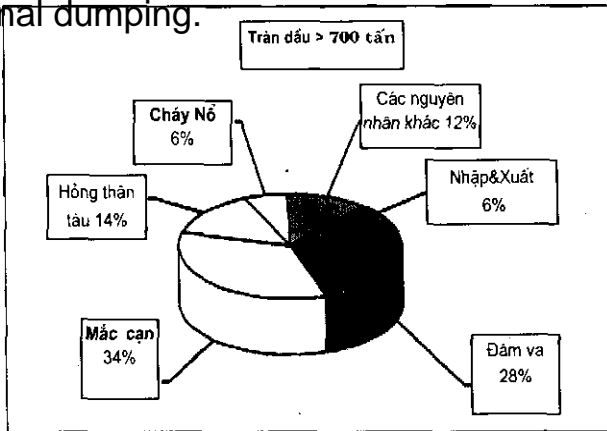
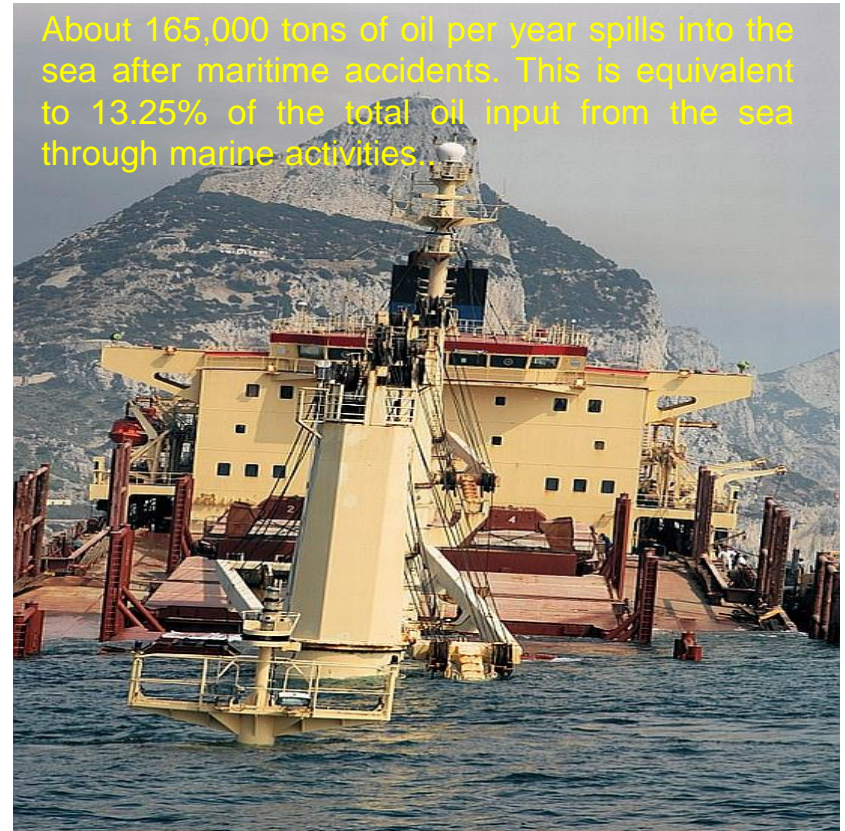


Figure 3. Oil spills over 700 tons and caused between 1974 and 1999.



About 165,000 tons of oil per year spills into the sea after maritime accidents. This is equivalent to 13.25% of the total oil input from the sea through marine activities...



Another 206,000 tons of oil (16.54%) is released each year due to regular discharge; 186,000 tons (14.94%) of which is fuel sludge from ships. Other sources of marine oil input include the deliberate dumping of waste oil.

POLLUTION OF THE MARINE ENVIRONMENT FROM OIL

THE BIGGEST SHIP ACCIDENTS AND OIL POLLUTION IN THE WORLD

Name of ship	Year	Location	Oil loss (tons)
Atlantic Empress	1979	Tobago Coast, Dong An	287.000
ABT Summer	1991	700 nautical miles from Angola	260.000
Castillo de Bellver	1983	Saldanha Bay, South Africa	252.000
Amoco Cadiz	1978	értagne Coast - France	223.000
Haven	1991	Genoa, Italia	144.000
Odyssey	1988	700 nautical miles from Nova Scotia, Canada	132.000
Torrey Canon	1967	Scilly Island, England	119.000
Urquiola	1976	La Coruna, Spain	100.000
Hawaiian Patriot	1977	300 nautical miles from Honolulu	95.000
Independenta	1979	Boxpho, Turkey	95.000
Jakob Maersk	1975	Oporto, Portugal	88.000
Braer	1993	Shetland Islands, England	85.000
Khark 5	1989	120 nautical miles off the Atlantic coast of Morocco	80.000
Agean Sea	1992	La Coruna, Spain	74.000
Sea Empress	1996	Milford Haven, England	72.000
Katina p	1992	Maputo Coast, Módhambich	72.000
Nova	1985	Gulf region, 20 nautical miles off Iran	70.000
Assimi	1983	55 nautical miles off Muscat, oman	53.000
Metuia	1974	Isthmus of Magellan, Chile	50.000
Wafra	1971	Cape Agulhas Coast, South Africa	40.000
Exxon Valdez	1989	Alaska, USA	37.000

POLLUTION OF THE MARINE ENVIRONMENT FROM OIL

(Effect)

- Oil spills can have a serious economic impact on coastal operations and for marine users.
- Marine life is heavily affected not only by mechanical contamination but also by the toxic components in the oil. Every year, on the coast of England, about 250,000 birds die. The Sinking of the Torrey Canon alone killed 25,000 submersibles of 17 different species.
-
- Oil scares away marine fish herds as it has disappeared herring in the Hokaido Island region (Japan).
- The oil enters the body of fish and krill species with poor resistance, accumulates in the layers of fat, potentially causing cancer.



POLLUTION OF THE MARINE ENVIRONMENT FROM OIL

(Effect)

- Marine zooplankton also died as an oil patch prevented oxygen from entering seawater..
- When oil enters the coasts, it has formed patches and deposits on beaches, damaging beaches, salt-producing areas, industrial production, irritating marine users.
- Oil can kill coral reefs, leading to the erosion of islands and coastal areas.
The oil damages mangrove forests, deprives habitat and provides food to marine life.
- Plants that use cooled seawater can also be damaged by oil, causing congestion, reducing machine productivity.
-



POLLUTION OF THE MARINE ENVIRONMENT FROM OIL

(Effect)

- Oil can directly damage vessels, fishing nets, aquaculture tools as well as indirectly reduce fishing and farming productivity due to concerns about not consuming products produced in the contaminated area.
- In addition, the effects of chemical breakdowns when cleaning contaminated areas also have an indirect and direct impact on animals and plants and human activities in contaminated areas such as oil.

POLLUTION OF THE MARINE ENVIRONMENT FROM OIL

(OIL SPILL RESPONSE)

Reducing an oil spill's effects on the environment, human health, and daily activities are the "main goals" of the response. A thorough and continual evaluation of the spill conditions is essential to choosing the best course of action. Such are the size of the spill, its course, and its expected outcome.



The first measure to take is to try to retain as much oil in the barrels of the vessel in distress as possible before the oil spills into the sea. For this purpose, the ship is stabilized and the remaining oil is pumped into another tanker.

Once discharged into the sea, the spilled oil must be constantly monitored. Under normal circumstances (i.e. if weather conditions permit), this is done by helicopter. Every effort is made to collect oil as close to the spill source as possible. Once the spill begins to spread and heavy parts sink, the oil will be difficult to remove.

POLLUTION OF THE MARINE ENVIRONMENT FROM OIL

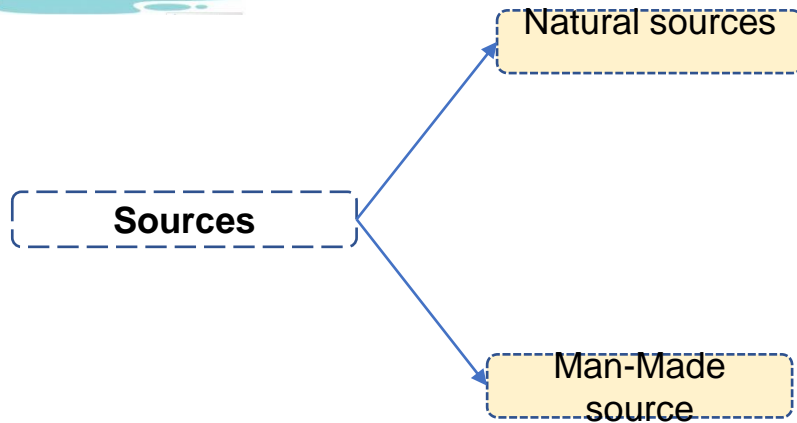
(OIL SPILL RESPONSE)

If additional risks to humans and the environment can be eliminated or at least reduced to a minimum, then burning pollutants may be another option. Absorbers or coatings can help reduce the spread and thinness of the oil film before physical removal from the water surface.



Another option is to use a chemical dispersant. When the conditions for the use of dispersants are suitable, their application has been shown to be effective and balanced, ecologically acceptable (note that the alternative may be oiled yards). Dispersants can be used by spraying ships and/or aircraft. The more widespread the spill (due to the influence of wind and flow), the thinner the membrane. When the membrane thickness drops below 1 mm, the removal of the physical oil is almost impossible (see Figure below). When the paint film thickness is less than 0.1 mm, the oil is usually not processed.

POLLUTION OF THE MARINE ENVIRONMENT FROM THE ATMOSPHERE



Example

- In the South Pacific, the amount of contamination introduced into the atmosphere can be 5 to 10 times lower than the amount of contamination in the North Pacific region.
- According to preliminary assessments on a global scale, 98% of the lead introduced into the sea is derived from the atmosphere..

POLLUTION OF THE MARINE ENVIRONMENT FROM THE ATMOSPHERE

Control method

- In 1990, the U.S. revised the Clean Air Act to include provisions governing aspects of air pollution caused by the related activities of tankers and tanker importing equipment.
- In 1991, the IMO adopted a strategy to combat pollution from the atmosphere. The use of CFCs (Chlorofluoron-Carbons) in refrigeration devices and other structures was banned from November 6, 1992, and the use of halons in ship-based firefighting equipment was also banned from July 6, 1992. The IMO also added to MARPOL 73/78 a new annex - Appendix VI - air pollution from ships.
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ASSIGNMENT

[1] Presenting methods to prevent marine pollution from land-based activities?

[2] Overview of the Global Action Plan to Protect the Marine Environment from Land-Based Operations (GPA)?

A scuba diver in black gear is swimming horizontally in the upper right quadrant of the frame. Below the diver is a large, intricate, light-colored fan coral. The reef is diverse, with various other coral species and small fish swimming around. The water is a deep, clear blue.

THANK YOU
FOR YOUR LISTENING