



AQUATIC LIFE LAB

Project number: 2017-1-IT02-KA201-036817



Co-funded by the
Erasmus+ Programme
of the European Union

ENVIRONMENTAL ALTERATIONS



Jelena Basta

Blue World Institute of Marine Research and Conservation





**Can you list the 5 biggest
threats to marine
environment according to
your opinion?**



MARINE LITTER

- Originating from sources both on land and at sea
- Composition of marine litter varies between locations, but usually most of the litter consists of plastic (> 90%)
- Distribution: sea surface, shoreline, water column, seafloor, sea ice & biota



MARINE LITTER MACROPLASTICS

- Impacts:
 - Entanglement (Ghost nets)
 - Smothering on the seafloor (sessile invertebrates, plants)
 - Invasive species (anthropogenic litter provides a habitat for a variety of marine organisms)



MARINE LITTER MICROPLASTICS

- UV-radiation and thermal energy induces weathering and causes plastic to fragment into small pieces called microplastics
- Impacts:
 - Toxicity (heavy metals, pesticides, polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs))
 - Bioaccumulation (hazardous chemicals can enter marine organisms and food webs via the surrounding environment and diet)



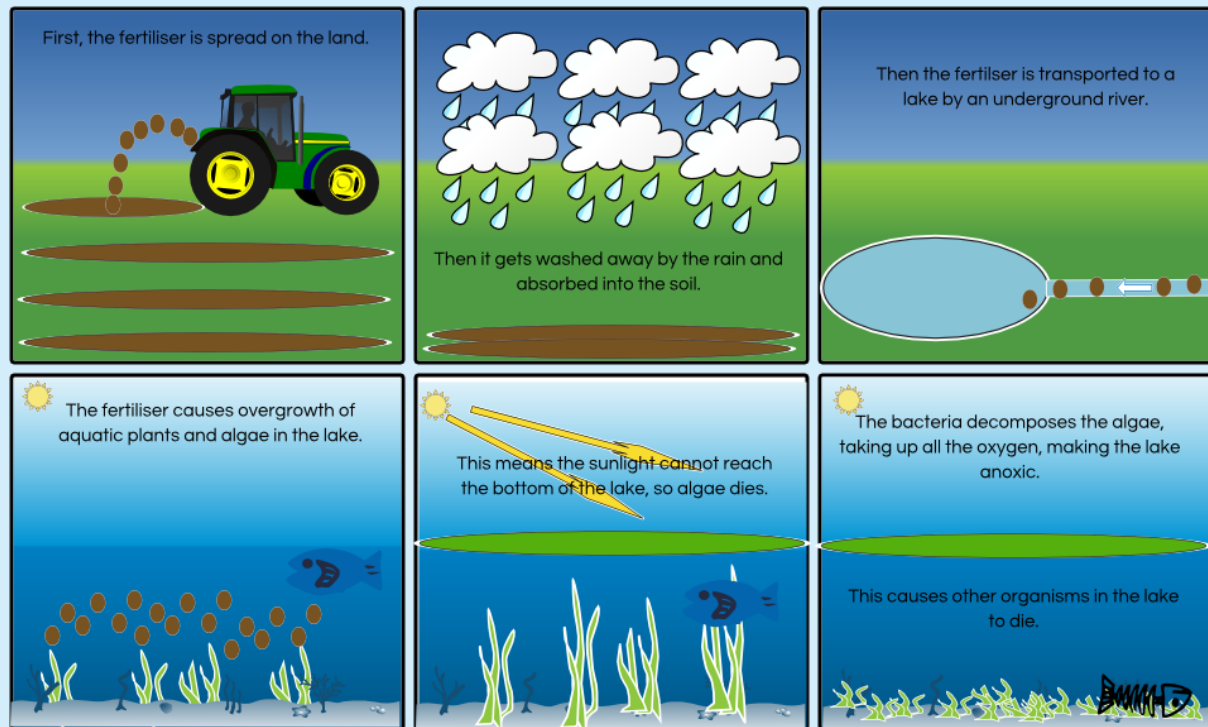
CONTAMINANTS

- Contamination is the presence of elevated concentrations of substances in the environment above the natural background level for the area and for the organism
- Sources of different contaminants are various and often difficult to track - effluents from aquaculture ponds, agriculture runoff, sewage discharge, toxic effluents from industry into the contiguous water body
- Plastic particles in the sea could be a source of contaminants like PCB's
- Sea salt around the world has been contaminated by plastic pollution



EUTROPHICATION

- process of enriching water with nutrients, resulting in increased primary production



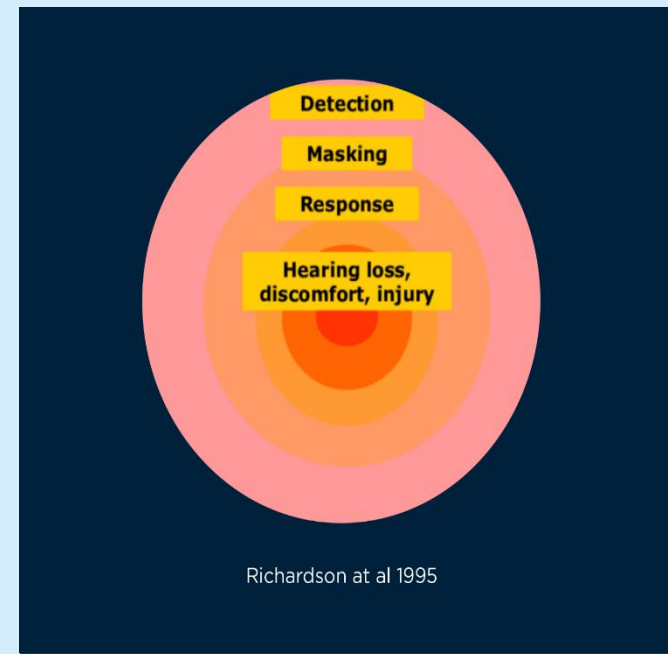
NOISE POLLUTION

Sources:

Marine traffic, naval sonars, military exercises, construction of offshore and coastal works, explosions to demolish offshore structures, airgun for geospatial prospecting

Impacts:

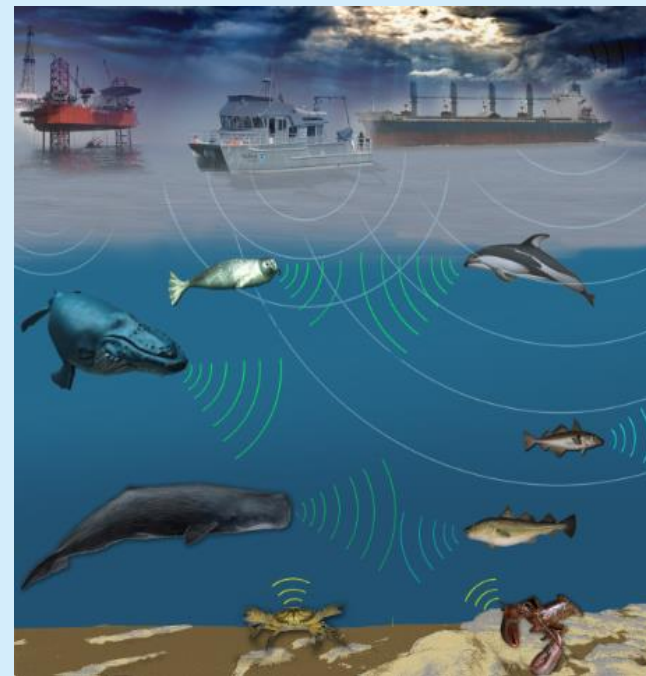
Many marine organisms produce and perceive sounds to fit their environment, some use them in "passive" mode, others in "active" mode



NOISE POLLUTION

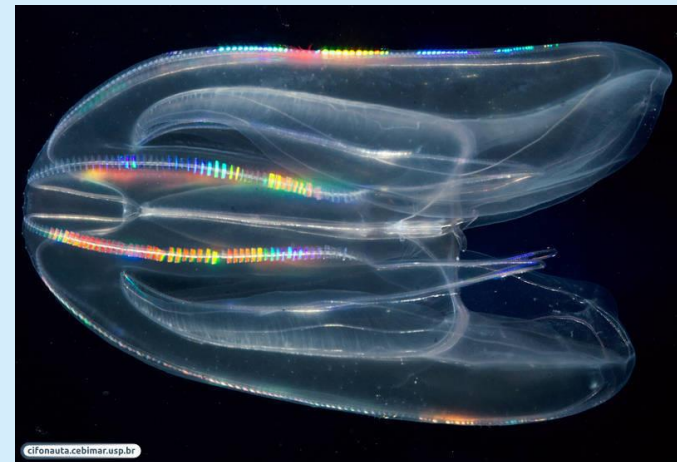
Soundscape

- Sound as indicator of diverse ecological processes
- Signal diversity reflects ecosystems health
- Use of passive acoustic monitoring (PAM) to monitor soundscapes



ALIEN SPECIES

- Animal and plant species that are not part of a given area, whose original habitat is far from where they were found
- Invasive alien species - negative consequences on biodiversity and the ecosystem



ALIEN SPECIES

Where do these species come from into the Mediterranean?

- Entry through the opening of artificial channels (ex. Suez Canal) or natural entrances (ex. Strait of Gibraltar)
- Transport on the ship's hull - especially larval forms of the animals
- Transportation with the ballast water
- Importation for aquaculture
- Escaped from Aquariums during the cleaning or some other activities
- Climate changes that have led to the increase in temperature are causing geographical redistribution of Mediterranean species

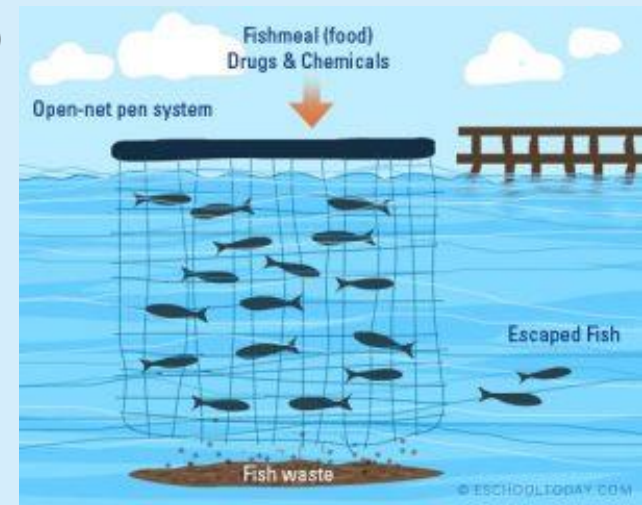
LOSS OF FISH STOCKS

- Number of causes - climate change, pollution, over capacity of modern fishing fleets to effectively take far more fish than can be replaced (OVERFISHING)
- 93% of the fish settlements in Mediterranean are exploited, which is why many commercial fish species are on the verge of extermination



AQUACULTURE

- farming of aquatic organisms
- one of the fastest growing food-producing sector (50 % of the world's fish that is used for food)
- intensity and type of environmental impacts are dependant upon the species farmed, the intensity of production and on the farm location:
 - Fish culture - intensive industry that involves an addition of solids and nutrients to the marine environment (potential for algal blooms, which deplete the water of oxygen)
 - effect on local wild fisheries
 - escapees from fish farms (competition for food)
 - Shellfish farming usually results in a net removal of nutrients from the water column - less environmental damage

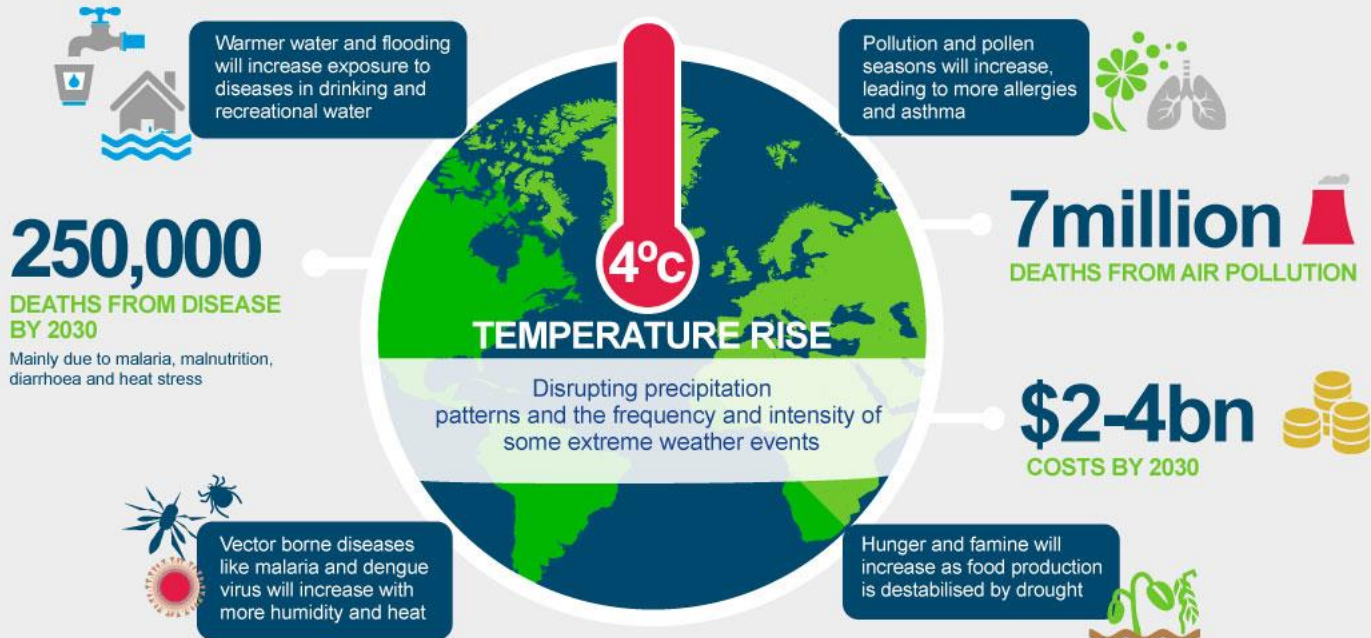


CLIMATE CHANGES

- climate change is already happening: temperatures are rising, drought and wild fires are starting to occur more frequently, rainfall patterns are shifting, glaciers and snow are melting, and the global mean sea level is rising
- very likely due to the observed increase in atmospheric greenhouse gas concentrations as a result of emissions from human activities
- oceans that absorb almost a third of greenhouse gas emissions in the atmosphere are rapidly becoming acidic for the rise of carbon dioxide in the atmosphere - significant consequences on marine ecosystems

CLIMATE CHANGES

How climate change could impact the world



Source: WHO
Credit: Rebecca Robinson/LSHTM

COASTAL EROSION

- Breaking down and removal of material along a coastline by large storms, flooding, strong wave action, sea level rise and human activities
- Coastal population is constantly growing and this leads to a consumption and modification of coastal terrain for tourism and various types of infrastructure



TOURISM AND HUMAN DISTURBANCE

- almost half of the world's human population lives within 50 miles of the coast
- sudden rise in population in tourist places have negative consequences such as traffic overload, overload of water supply and electricity grid, lack of drinking water in the season, problem disposal of increased waste and wastewater



TOURISM AND HUMAN DISTURBANCE

- great concentration of human population in one area can lead to ecological problems such as water pollution, pollution of the sea, pollution of the beach, increased crowd (motor vehicles), increased noise (entertainment facilities), increased waste, increased risk of fire and so on
- tourist facilities occupy the most attractive locations resulting in overdevelopment and devastation of space, seizure of access to the coast, the destruction of old city cores and other tourist attractions and the changes in landscape of the entire area



OIL SPILLS

- Oil spills from tankers or crashes on oil wells are the worst sources of oil pollution in world seas and oceans
- Oil drains oxygen from the sea and thus destroys the plant and animal world in it
- It is estimated that 2.3 million tons of oil per year is poured into the sea





Can you think of some positive environmental alterations in last 100 years?





**What can we do to prevent negative
environmental alternations?**

