

Marine pollution

- 1. State in German, what the main pollutions and causes of the precarious water quality of the seas and oceans are.
- 2. Explain in English afterwards, how death zones in the seas develop.

**NITRATE UND PHOSPHATE**  
**URSACHEN:** Industriell betriebene Landwirtschaft wie intensive Tiermast und intensiver Ackerbau.  
**FOLGEN UND TRENDS:** Seit den 1950er- und 1960er-Jahren hat sich die Landwirtschaft weltweit zu einer Massenindustrie fortentwickelt. Einträge von Tiergülle und Kunstdünger gelangen über das Grundwasser in die Flüsse und anschließend ins Meer. Todeszonen vor den Küsten sind die Folge. Internationale Abkommen versuchen mit einer Reduzierung der Einträge gegenzusteuern.

**PLASTIKMÜLL**  
**URSACHEN:** Nur 20 Prozent des Plastikmülls, der im Meer landet, entstehen auf See. 80 Prozent entstehen an Land. Und zwar in solchen Ländern, die kein oder ein sehr schlechtes Abfallmanagement betreiben.  
**FOLGEN UND TRENDS:** Fünf große Müllstrudel sind bekannt. Der meiste Müll landet jedoch an allen lokalen Küsten und ist somit ein globales Problem. An den abgelegenen Küsten Svalbards auf Spitzbergen beispielsweise wurden im Jahr 2015 100 Kubikmeter Kunststoffmüll abgesammelt. Der Müllberg wächst von Jahr zu Jahr.

**CHEMIE UND SCHWERMETALLE**  
**URSACHEN:** Industrielle Abwässer und Abgase, Bergbau, die Verbrennung von Heizöl.  
**FOLGEN UND TRENDS:** Nach Angaben der OECD sind weltweit etwa 100.000 unterschiedliche chemische Substanzen im Umlauf. Dazu zählen unter anderem Schwermetalle wie Blei und Quecksilber, aber auch langlebige organische Schadstoffe, sogenannte POPs (Persistent Organic Pollutants). Viele dieser Stoffe sind gesundheitlich höchstproblematisch, da sie sich in den Organismen der Lebewesen im Meer anreichern und über die Nahrungsnetze auch für Menschen eine Gesundheitsgefahr darstellen.

Fig.1: Heinrich-Böll Stiftung 2017: 16

Task 1

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## Subject area III

### Threat constellation

## Marine pollution

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2. Explain in **English** afterwards, how **death zones** in the seas develop.

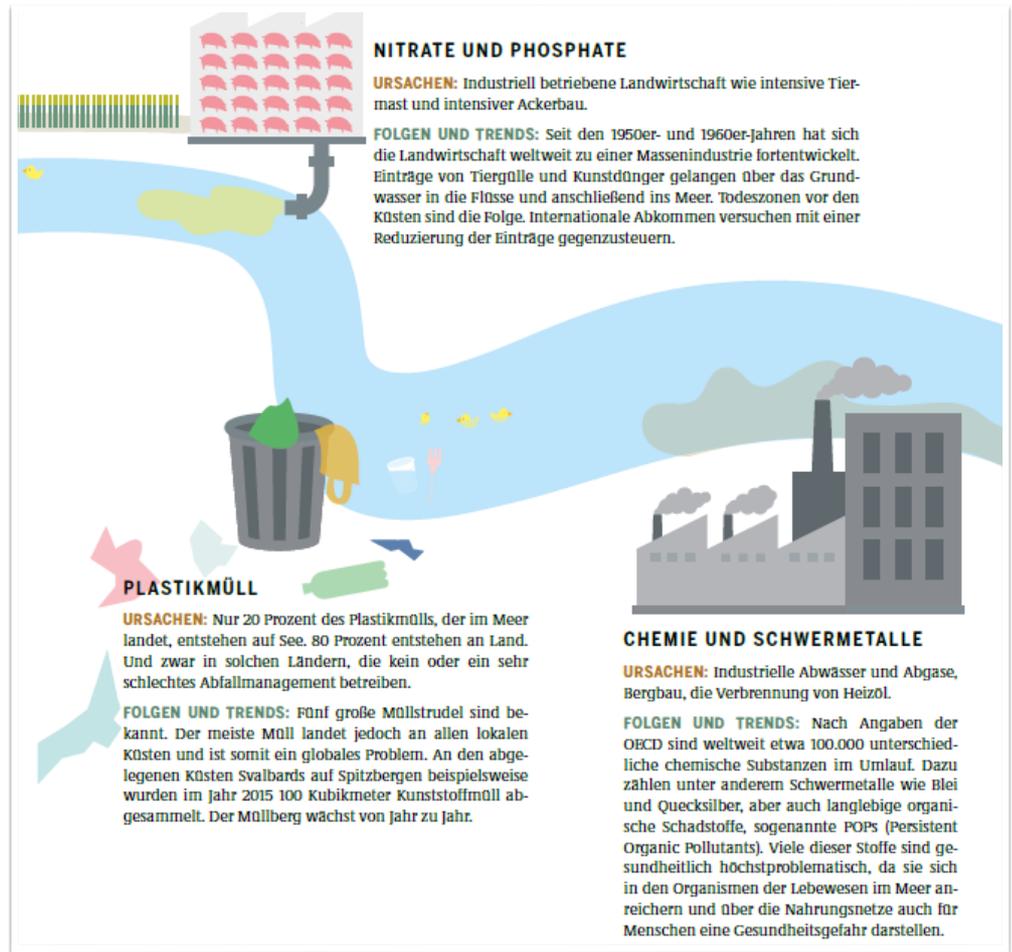


Fig.1: Heinrich-Böll Stiftung 2017: 16

### Task 1

Main sources and burdens:

- Nitrates and phosphates from agriculture (pig farming and intensive arable farming)
- Heavy metals by industries
- Plastic waste decomposing into microplastics



Fig.1: Heinrich-Böll Stiftung 2017: 14

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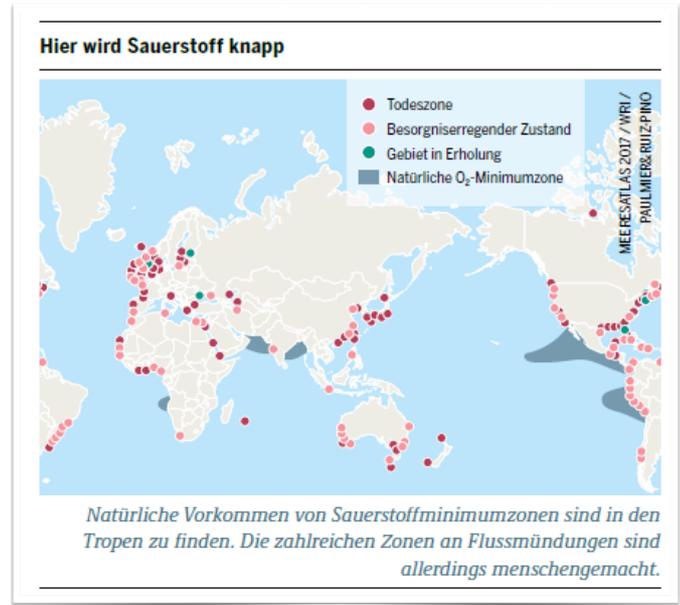
Creation of death zones

One cause was the growth of the cities. As a result, more and more wastewater entered the rivers and bays. Today there are sewage treatment plants, but since the middle of the last century we have been using such large quantities of **artificial fertilizer** in agriculture that crops cannot absorb it and it then ends up in the sea. Here, it does its job - except that it now fertilizes algae and phytoplankton. When these plants die, they sink to the bottom, where bacteria decompose them and consume even the last bit of oxygen at depth. For many species there is then no escape. This effect, triggered by overfertilization of seawater - known as eutrophication in technical terms - can be observed in many places around the world: **In the Pearl River estuary in the South China Sea or also in India, at the Ganges estuary in the Bay of Bengal.**

The Baltic Sea, one of the largest death zones in the world in terms of area, has experienced a sharp decline in oxygen levels since the 1950s-1960s.

Again, this is a consequence of the industrialization of the agriculture. In the Baltic Sea, the situation is aggravated by the fact that it is a shallow inland sea with little water exchange.

Source: (Heinrich-Böll Stiftung 2017)



Task 2  
Emergence of death zones

Overfertilization in agriculture leads to nitrates and phosphates being washed into the sea in large quantities via the rivers (eutrophication). This leads to strong plant growth, which initially produces oxygen, but the decomposition of the dead plants consumes a lot of oxygen, so that there is no oxygen left at depth.

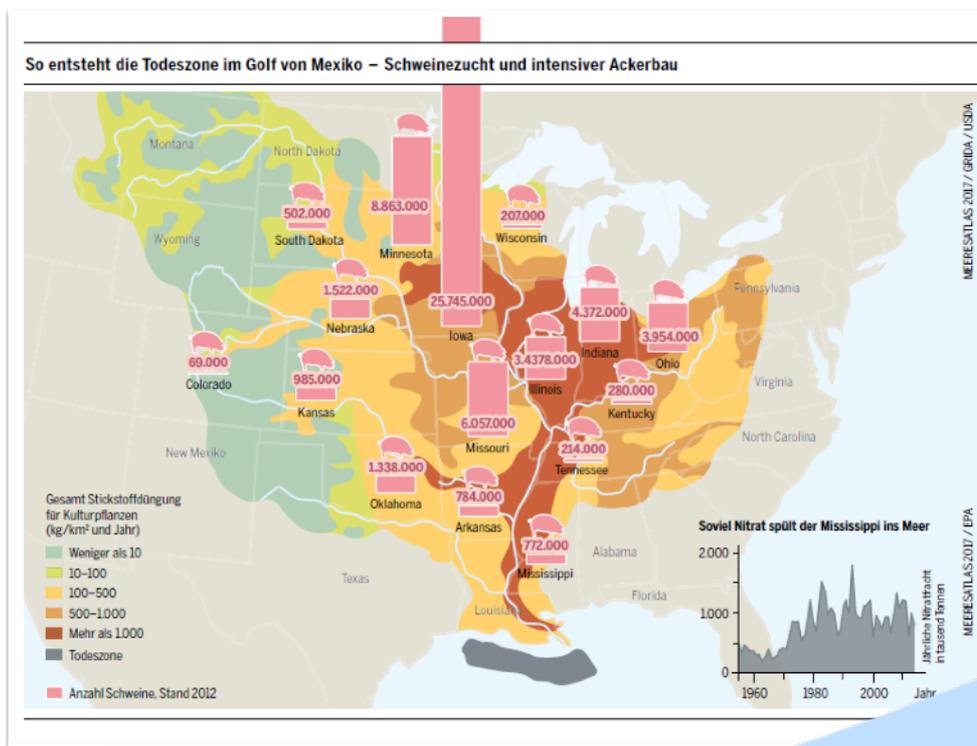


Fig.2: Heinrich-Böll Stiftung 2017: 15

## Environmental pollution - a catastrophe with advance notice

1. Explain how the environmental disaster on Florida's coasts could have occurred.
2. Comment on the poster's statement that this is a natural process. Also, include the materials Fig. 1-3 and T 1 from the previous page.

Source

→ [Info: Audio, more detailed than the written texts](#)

Florida is facing a natural disaster: Boats plow through a thick carpet of dead fish, crabs and sea turtles along a 250-kilometer stretch of coastline. Here and there, a meter-sized bloated manatee drifts belly up.

## M 2

**The "Red Tide" is out of control and threatens people and animals**

The reason for the mass die-off is a toxic algae. In Florida, the "Red Tide", the red algae bloom, is an annual phenomenon and actually not unusual. Records of it date back to 1840. But according to state wildlife officials, this year the algae are up to 17 times more concentrated than the highest level ever measured. [The algae are microscopic. In the waves, they break down and release their deadly toxin.](#) If it gets into the air, it attacks the respiratory system. People say that they have to cough because of it. The stench is acrid, it smells like fermented fish.

**A chemical leak could be to blame for the abnormal algae bloom**

The primary reason for this old nightmare, according to environmentalists and fishermen, is an environmental mess condoned by DeSantis. In March, a chemical basin leaked at a [fertilizer plant in Piney Point](#). The basin was drained and up to 1,500 million gallons of phosphate broth, ammonia and nitrate flowed directly into Tampa Bay. "We finally need laws that prohibit the poisoned water from being dumped into the ocean," says one fisherman.

Source**Dam failure hazard at Florida wastewater ponds averted for now**

## M 3

The leak is still not fixed, yet residents of the Tampa Bay area can return to their homes. Remediation or closure of the basin is being discussed.

Emergency workers have brought the situation under control at a large sewage pond threatened to burst in [Florida](#). An evacuation order affecting more than 300 homes and other businesses was lifted on Tuesday. Some roads were initially expected to remain closed for safety reasons, but there were no restrictions on residents returning to their homes or businesses resuming operations, Public Safety Director Jacob Saur said at a news conference.

## Environmental pollution - a catastrophe with advance notice

Following the appearance of a leak at the 33-hectare-wide and eight-meter-deep basin in the Tampa Bay region, [there had been concern in recent days that the dam would burst](#). Millions of liters of wastewater contaminated with phosphorus and nitrogen from an old fertilizer plant in Piney Point would then have flooded roads and fields.

More than two dozen pumps and other equipment were deployed to discharge the polluted water. They were supposed to pump more than 130 million gallons of wastewater a day into Tampa Bay to relieve the dam - but this could lead to a fish kill and algae bloom there. The leak is still not fixed, but less water is leaking, Saur said. "We believe the hazard has been mitigated and is under control," said District Administrator Scott Hopes.

Source: [Zeit Online 2021](#)

### Proposed solutions to the AB environmental disaster

1. On a 250 km long route, there is a death zone, where tons of fish, crabs, sea turtles, but also mammals have died.
2. The direct cause is the mass occurrence of a toxic red alga. The discharging of 1.5 billion liters of chemicals from a fertilizer factory in the spring, to prevent the dam bursting of a retention basin, resulted in massive overfertilization of the water body, which led to the explosive growth of algae.
3. The growth of algae is a natural process, but the mass growth is man-made.

### References pollution

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