

Our Oceans, Seas and Coasts

Descriptor 8: Contaminants

"Contaminants are at a level not giving rise to pollution effects."

Contaminants in the marine environment

Contaminants are defined in the European legislation as:

"substances (i.e. chemical elements and compounds) or groups of substances that are toxic, persistent and liable to bio-accumulate and other substances or groups of substances which give rise to an equivalent level of concern" (Water Framework Directive, Article 2(29)).

Examples of such substances found in the marine environment include pesticides, anti-foulants, pharmaceuticals and heavy metals, among others.

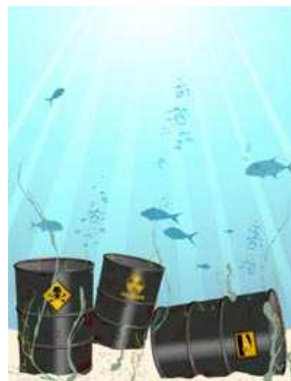
Preventing and reducing inputs to the marine environment, with a view to phasing out pollution, is clearly stated as one of the main objectives of the [Marine Directive](#), in line with international commitments at global and regional level. Pollution by contaminants is one form of pollution of the marine environment and the aim of Descriptor 8 is to ensure that the levels of contaminants in the marine environment do not give rise to pollution effects.



Why should we pay attention to contaminants?

Human activities affect the marine environment through the release of chemical contaminants, which degrade the state of marine waters and can cause serious damage to its functioning. Contaminant inputs to marine waters may be diluted with the sheer size and volume of the ocean, and therefore pollution incidents may not become apparent immediately after release and changes may not be detected until the appearance of effects due to chronic exposure.

In addition to the degradation of the state of marine waters, a consequence from the contamination of seas is that organisms themselves or biological processes may be adversely affected. The toxic effects of a given cocktail of chemicals on marine organisms depend on the toxicity profile of the chemicals, their synergetic or antagonistic effects, bioavailability and persistence as well as the ability of marine organisms to take up, accumulate and metabolize the chemicals. It also depends on the status of the considered ecosystem: it is indeed a very complex issue. There is growing evidence that contaminants may be partly responsible in outbreaks of diseases or endocrine effects, which adversely affect individuals, or populations of marine organisms.



Examples of pollution effects include:

- Eggshell thinning in peregrines exposed to DDT, resulting in a population decline;
- "Imposex", a condition involving the formation of male sex organs in female dogwhelks exposed to TBT (the main active ingredient in many biocides);
- Vitellogenin (egg-yolk protein) induction and observation of eggs/oocytes in the male testis of fish;
- Skewed sex ratio after exposure of fish populations to chemicals.

However, it is still difficult to ascribe a specific effect to a given chemical.

What are the sources of these contaminants?

Contaminants can arise from numerous anthropogenic sources such as land-based industrial activity, pollution by ships, atmospheric deposition, oil, gas and mineral exploration and exploitation and riverine inputs.

It should be noted, however, that natural oceanographic and geological factors, including geothermal activity, can sometimes be responsible for elevated levels of some contaminants (such as heavy metals).

What can be done?



The simplest measure to improve the situation is to reduce the source of contamination, i.e. the number and quantities of compounds used in the course of human activities. For example, in agriculture, the number of pesticides applied could be reduced in favor of organic farming or, in

the industrial sector, "green" policies could be implemented within companies to reduce the number and quantities of chemicals used.



The EU REACH Regulation (Registration, Evaluation, Authorisation and Restriction of Chemical substances), which entered into force in 2007, is one way of achieving a better environmental status. The aim of REACH is to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances, like the environmental risk they pose. Under the REACH regime, manufacturers and

importers are required to gather information on the properties of chemical substances, which will allow their safe handling, and to register the information. The Regulation also calls for the progressive substitution of the most dangerous chemicals when suitable alternatives have been identified.

Other European legislation

The Water Framework Directive (Directive 2000/60/EC) lays down a strategy to fight against the pollution of water, including adopting specific measures against pollution by individual pollutants or groups of pollutants presenting a significant risk to or via the aquatic environment. For those pollutants, measures should aim at the progressive reduction and, for priority hazardous substances, as defined in Article 2(30) of the Directive, at the cessation or phasing-out of discharges, emissions and losses. The relevant provisions in the Directive regarding territorial and/or coastal waters have to be taken into consideration to ensure proper coordination of the implementation of the two legal frameworks.

The Environmental Quality Standard Directive (Directive 2008/105/EC) establishes requirements for the chemical status of surface waters including marine waters defining an Environmental Quality Standard (EQS), which is the maximum allowable concentration of a contaminant not causing harm. The EQS is based on the lowest toxic effect observed for aquatic organisms during testing in the laboratory with standard organisms. Environmental Quality Standards for "Priority Substances and certain other pollutants" can be found in Annex I to the EQS Directive.