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Introduction

- 1 Considered in times gone by as a hostile environment and visited by only sailors and fishermen (Saffache, 2003). Later on as a place of healing¹, today, the marine environment serves as a receptacle for the most toxic effluents. In an effort to evaluate such a phenomenon, and above all, the impact it has on the environment, two forms of pollution will be highlighted, oil discharge and nitrogen and phosphorus-based products.

1. Oil Pollution: scope, consequences and anti-pollution efforts

- 2 Oil spillage into the marine environment has been considerably reduced thanks to the enforcement of several international conventions [CLC (1969), COLREG (1972), FIPOL (1971–1992), MARPOL (1973–1978), the Bonn agreements (1983), OSPAR (1992), etc.]. Although during the 1970s, marine oil pollution was estimated at over 300,000 tons/year, by the end of the XXth century, this figure has dropped to 130,000 tons/year; representing a 60% drop over a 30-year period. The frequency of accidents has also decreased, since the figures have dropped from approximately twenty events in the 1970s to less than a dozen by the end of the 1990s (Babillot *et al.*, 1999).
- 3 Despite such improvements, the marine environment is still very vulnerable, since the carrying capacity of the oil tankers has increased, a single wreck can now discharge over 300,000 tons of crude oil in a few hours. Along the European coasts, there are several examples of oil slicks: Torrey Canyon (1967), Amoco Cadiz (1978), Gino (1979), Haven (1991), Erika (1999), and these are only the accidents which received the widest media coverage. Every there are over a hundred pollution alerts recorded along French coasts.

The heavy traffic recorded in the English Channel, the North Sea (145,000 vessels per year) and in the Mediterranean Sea (8,000 vessels per year), accentuates the vulnerability of the coastline in terms of oil slicks. Excluding exceptional accidents, it is quite frequent for vessels to degas in the high seas, discharging any remaining tar and petroleum. For example; approximately one hundred acts of this type are recorded every year in France (Marchand, 1996).

- 4 Pollution alerts do not always involve the presence of oil. According to CEDRE listings, during the period 1979-1998, only 16 cases of major oil slicks in French territorial waters have been recorded. The other alerts are the result of the loss of tanks or a container (11 events), chemical spills (6 cases). No matter the types of products spilled into the sea, they have a direct and sustainable impact on the various environments.
- 5 To take a very well-known example – due to considerable media coverage – at the time of the Amoco Cadiz wreck, tens of millions of marine invertebrates and tens of thousands of birds perished. The biomass destroyed as a result of this accident was estimated at approximately 260,000 tons (Babillot *et al.*, 1999). These statistics only include the direct consequences, for a few months after the spill, great numbers of contaminated marine birds produced fledglings too weak to survive.
- 6 Such pollution also has a direct and sustainable impact on the coastline. According to IFREMER, the duration of the pollution varies with respect to its intensity, the nature of the pollutant, the type of shore (fine sand, silt or pebble beach, a rocky platform) and the state of the sea (calm or rough). The pollution can, therefore, last a few weeks or several years.
- 7 No matter the nature of the pollution, it is always harmful for it upsets seaside recreational activities and above all, disturbs the equanimity of potential vacationers. Once a doubt exists, the client is considered lost. Following the pollution generated by the Erika shipwreck, hundreds of restaurant and hotel owners experienced a drastic drop in their tourist revenues.
- 8 In 1978, an attempt was made to manage such crises. The French government created the "Plan Polmar" program that exists under two different forms: land and sea. At sea, the rescue plan falls under the authority of the "Maritime Prefect" and managed by the French Navy, whereas on land, it is assigned to the Prefects in charge of coastal regions and managed by the Ministry of Infrastructure or its local headquarters in the French Overseas Regions (DOMs). For such rescue plans to be operational, anti-pollution drills are conducted yearly in the English Channel, the Mediterranean Sea and the overseas regions of France.

2. Nitrogen & Phosphorus-based Pollution

- 9 The rivers of France discharge a yearly average of 646,000 tons of nitrogen², 43,800 tons of phosphorus and nearly 10 million tons of sediment into the sea (Crouzet *et al.*, 2002); most of these effluents are transported by the Rhône, Loire, Gironde and Seine rivers. For example, the Rhône river discharges 140,000 tons of nitrogen, the Gironde and Loire rivers respectively 75,000 and 128,000 tons, while the Seine discharges 129,000 tons of nitrogen (Crouzet *et al.*, 2002).
- 10 Such high concentrations have incited the regions falling under the OSPAR Convention to attempt to reduce their input by 50% during the period 1985-1995. In 1999, four years

after the expiry of the project, polluting discharges were decreased by only 12.5%. It induced the eutrophication of the environment, anoxia and disappearance of a considerable portion of the freshwater and marine plant and wildlife.

Conclusion

- 11 Faced with such constant failures, should we not enforce the polluter-pays principle or heavily fine industries and the most polluting urban centers? When concerted efforts and negotiations fail, repressive measures might still be the only means of safeguarding the marine environment.
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NOTES

1. Herodotus considered that sea water could heal all diseases; Hippocrates recommended it only to heal open wounds. In reality, it seems the marine environment became popular between the mid XVIIIth and beginning of the XIXth centuries; indeed numerous writings relate sea bathing by the Prince of Wales in 1787, the future Napoleon III in 1812 (in Dieppe) and the Duchess of Berry as of 1824.

2. Of which 71% in the form of nitrate.

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