

# Special Effects of Contamination on Oceangoing Creatures

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## Abstract

This review focuses on the biological effects of pollutants, including human physical disturbances, on marine and estuarine plants, animals, ecosystems, and habitats. The review, which is primarily based on journal articles, covers field and laboratory measurement activities as well as current pollution issues such as endocrine disruptors, emerging contaminants, wastewater discharges, marine debris, dredging, and disposal. Because of the 2010 Deep-water Horizon oil spill in the Gulf of Mexico and the proliferation of data on the assimilation and effects of marine debris, there is a special emphasis on the effects of oil spills and marine debris. Several previously discussed topics were dropped this year. This review focuses on effects rather than pollutant sources, chemistry, fate, or transport.

**Keywords:** Ecosystems • Wastewater • Habitats • Pollutant

## Introduction

This Water Environment Research annual review of the literature on Effects of Pollution on Marine Organisms began over a half-century ago under the leadership recovery from marine pollution and has produced biology graduate students who have led in the field of marine and aquatic pollution for many decades [1].

Catechin, chlorogenic acid, and isorhamnetin-3-rutinoside, for example, all decreased in leaves and rhizomes in proportion to the shading caused by the wreck and the recovery platform. However, mutagenicity was absent in tissue samples, leading the authors to believe that minimal contaminant absorption occurred at the site. Because the observed effects were primarily caused by shading, natural recovery of the sea grass was expected after the wreck was removed [2].

Because of the high background noise in the data, biochemical assays in the gills did not have any strong links with other blocks in the analysis. Investigated the potential effects of contamination on the ability of an oyster to regulate water volume in tissues when exposed to varying salinities in two estuaries in Brazil. Oysters from three contaminated sites had a lower ability to regulate water volume than those from a control site, as well as an increase in multi-xenobiotic resistance phenotype (MXR) activity in gill tissue, indicating pollution exposure. Diaz-Garduno, Perales, and Biel will use a mobile laboratory to study the effects of tertiary wastewater effluent treatment with photobiotreatment (high rate algal pond) on survival and biomarker response in Manila [3].

Using a functional group analysis on data from field surveys of benthic communities in two large, widely separated areas of New Zealand's EEZ, the authors discovered differences in functional responses and reductions in functional groups at different levels of fishing effort, implying that increased disturbance leads to increased functional homogenization because less tolerant functional groups are excluded and functional diversity is reduced [4].

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Dureuil, Boerder, Burnett, Froese, and Worm discovered that commercial trawl fishing effort within marine protected areas (MPAs) in the European Union was 38% higher than trawling effort in unprotected areas and occurred in 59% of European MPAs; the authors reported that elasmobranch catch per unit effort from research surveys was-fold higher outside MPAs than within MPAs, with endangered and critically elasmobranch Investigating the state of horse mussel beds that have historically been subjected to heavy scallop fishing Farinas-Franco, Allcock, and Roberts (2018) reported lower biodiversity, particularly for sponges, hydroids, and tunicates, and up to 7 years after the introduction of legislation prohibiting all forms of fishing in Strangford Lough, Northern Ireland [5].

## Literature Review

While the salt-tolerant submerged aquatic grass Rupiah maritime is oil-tolerant, Martin and Swenson discovered that oil exposure reduced the carbon: nitrogen ratio, altering the food value of herbivorous animals such as grass shrimp and amphipods. When compared to unoiled sediment, both species preferred feeding on oiled extracts of rupiah leaves grown in sediment at four oil concentrations. Rupiah C: N ratios decreased as oil exposure increased. The oil type and weathering status were not specified. The authors speculated on how herbivores' decreased food value from submerged plants that survived direct oiling might affect food web dynamics [6].

## Description

Suite of Satellite Visible Infrared Imaging Radiometers Night-time annual average radiance composite image data were used to estimate light pollution along Florida beaches, which were then incorporated into generalised linear models with nest density data from the Florida State-wide Nesting Beach Survey programme for green turtles and leatherbacks to show that nest density is significantly negatively correlated with light pollution for each sea turtle species, with green turtles having the strongest negative association. Price, Dryer, Dominguez, and Paladin discovered similar results for loggerhead sea turtles nesting on a Florida barrier island in the northern Gulf of Mexico; increased luminance of landward light was significantly associated with fewer nests and increased hatchling disorientation nesting of sea turtles.

Increased growth of microphytobenthos, stimulated by artificial light at night, was found to be tempered on an Italian rocky coast by subsequent increased grazing by a small littorinid snail, suggesting that increased grazing by a small littorinid snail can provide a stabilising mechanism to counteract food web effects caused by artificial light at night. Developed a model to assess predicted responses of four different organisms to different spectral output lighting; using indices based on action spectra from behavioural or

visual characteristics of organisms and lamp spectral irradiance, the authors discovered that filtered yellow-green and amber light-emitting diodes had lower predicted effects on wildlife than high pressure sodium lamps, while blue-rich lighting had greater effects.

An experiment on the effect of broadband noise on foraging behaviour of shore crab and common shrimp in a quiet cove in the Oosterschelde estuary in the Netherlands discovered that in the presence of noise, the number of crabs that gathered around a food source decreased relative to controls, while the number of shrimp increased, which was negatively correlated with the number of crabs present. Physiology and discovered that anthropogenic sound had statistically significant negative effects on both fish behaviour and physiology, and that these effects were not limited to specific responses or species [7].

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## Conclusion

Organic material suspended in the water column that settles and accumulates on the seafloor is referred to as marine snow. Van investigated the effects of marine snow and lightly weathered crude oil on three species of invertebrates representing a naturally occurring benthic community, *Corophium* validator, *Macoma balthica*, and *Hydrobia ulvae*. The authors concluded that oil-contaminated marine snow increases the adverse effects of oil; a species' motility, feeding behaviour, sensitivity to hypoxic conditions, and sensitivity to oil toxins are influencing factors.

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## Acknowledgement

None.

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## Conflict of Interest

There is no conflict of interest by author.

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