

**Abstract**

---

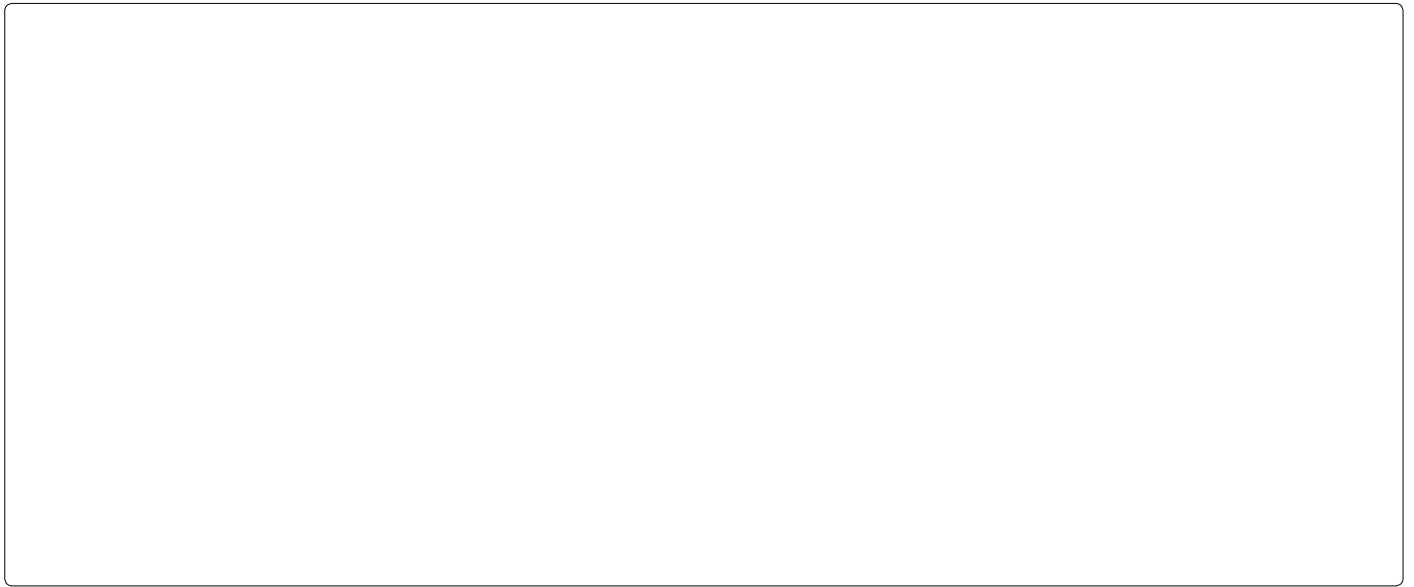
**\*Corresponding author:**

**Received:** ; **Accepted:** ; **Published:**

**Citation:**

**Copyright:**

Citation:





**Citation:**

---

## Implications for conservation

From the previous sections we conclude that operational offshore wind farms, in broad terms, have positive impacts on seabed habitats and benthos, epifaunal benthos, fish, seals and possibly porpoises. Impacts on seabirds seem mostly negative or neutral but some species also benefit from utilizing the turbine structures. These findings, summarized in Table 1, have implications for marine conservation.

### Direct benefits for conservation-wind farms functioning as reefs

Underwater the most striking effect of wind farms is the introduction of hard substrate and the associated colonization and attraction of fauna (the "reef effect") [77]. This kind of habitat enhancement and increased biodiversity in areas of hard bottom scarcity is often regarded as positive, which is illustrated by the common practice of installing artificial reefs for conservation purposes in parts of the world, including in Europe [78]. These artificial reefs provide space for settlement, shelter, foraging and for some species recruitment [38,79, 80]. While this is not necessarily a means of effective conservation it may be a way of strengthening affected populations. In some cases artificial reefs have been created specifically for conservation purposes [81]. In other cases man-made structures, such as oil platforms, have been shown to improve biodiversity and benefit endangered species with time, such as the threatened cold-water coral species *L. pertusa* [82].

With regard to offshore wind farms, the potential for the reef effect to work in direct favour of conservation may be limited to certain sessile species and mobile fauna with very small home-ranges (e.g. gobiid fish, molluscs and anthozoans). These organisms may spend a long time, or several generations, at single turbines where they benefit from space, food and shelter but will also be exposed to turbine noise and potentially increased predation pressure. For attracted species that move over large areas (e.g. seals, gadoid fish, and migrating crustaceans) the artificial reefs may only provide temporary advantages. Importantly though, the introduction of hard substrate per se can be considered a means of habitat conservation, or replenishment, in regions where vast areas of hard bottom substrates (stones, rocks, biogenic reefs) have disappeared due to bottom trawling, such as eastern Kattegat and south-eastern North Sea [28].

### Indirect benefits for conservation-wind farms functioning as marine reserves

The potential restriction of fishing is likely the most potent benefit of offshore wind farms from a conservation point of view. As previously mentioned, trawling is always prohibited for safety reasons.

**Citation:**

---

Citation:

**Citation:**