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Phoenix Rising from the Ashes: Reviving Dead Zones

Background:

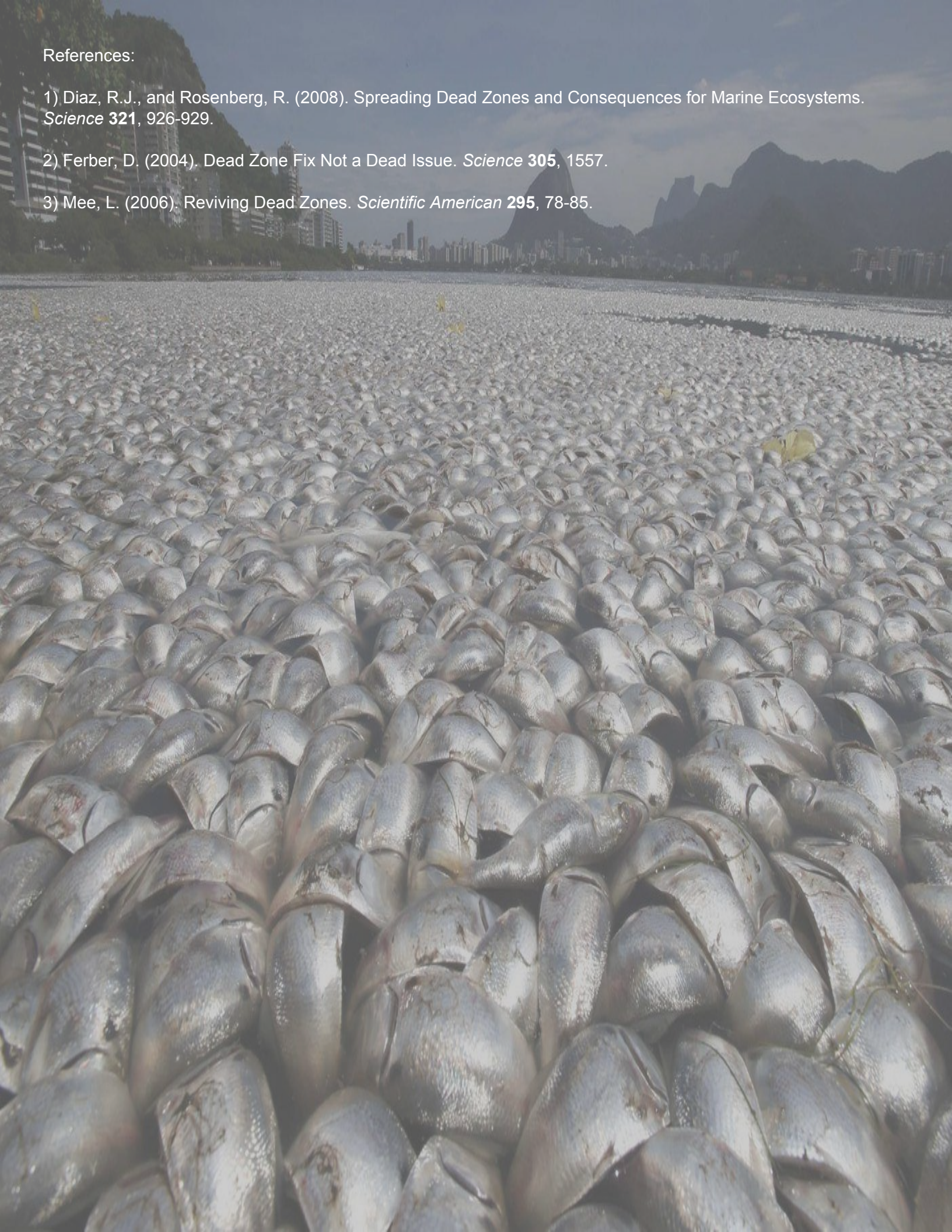
Dead zones are hypoxic (aka low oxygen) areas in bodies of water such as oceans and lakes. The creation of dead zones is most commonly linked to eutrophication, which is the addition of chemical nutrients (phosphorous and nitrogen in particular) in the water. This addition of chemical nutrients is caused mainly from pollution from human activity, such as run-off from factories and cities and the burning of fossil fuels. The addition of these nutrients causes blooms of phytoplankton, photosynthetic organisms that contribute to the global net primary production. In turn, this sparks off population increases in zooplankton, which consume phytoplankton. Afterwards, bacteria found on the seafloor of oceans and waters, feed on dead zooplankton and their waste, using up oxygen in bottom waters as they increase in numbers.

Low oxygen level areas pose dramatic consequences for marine ecosystems, starting with pelagic fish. Pelagic fish (fish that live neither near the shore nor the bottom of the water column) will experience loss of habitat via compression, due to hypoxia making deeper, cooler water unavailable in the summer. This habitat compression has huge impacts on ecosystem energetics and function as organisms dies and become decomposed by bacteria. Predators will have a harder time consuming fish in the lower part of the water column, as predators have less tolerance to low oxygen areas. Due to hypoxia in the lower level of water column limiting upward trophic level transfer, microbial pathway will dominate energy flows. Areas such as nursery and recruitment areas will suffer the most from this diversion in energy as hypoxia is most prominent in the summer, a time when growth and predator demands are high.

Solution:

Ways to remedy dead zones are plentiful, such as using less fertilizer, implementing better practices for discharge of chemicals, and finding alternative methods for sewage systems. By reducing the usage of fertilizer, we can reduce the amount of run-off that is drained into the sea. As mentioned before, factories that produce large amount of chemicals that drift into the sea are another major cause of dead zone. Better management of waste chemicals would lead to smaller amounts of it finding its way into the ocean. Tons of garbage is found in the sea, which affects not only the waters and sea life but also the plants life in the surrounding waters. By placing strict regulations against littering in the ocean and incentives for recycling, we can reduce the amount of trash that gets into the oceans in the first place.

While it is obvious that repairing dead zones would just require reducing nutrient run-off into the water from land, the key to reviving them is convincing governments that it is an important goal to achieve. Reducing nutrient run-off requires drastic changes in agricultural practices and wastewater management efforts, with most programs only achieving partial cuts in nutrient outflow. We now how to revive dead zones, but we need to recognize the impacts of waste disposal has on the environment and make the sacrifices we need to ensure sustainability of the world's marine ecosystems.



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