

Science for Environment Policy

Immediate ban on fisheries discards may destabilise marine ecosystems

Discarding – returning unwanted catches to the sea – is seen as wasteful, but banning the practice would remove an important food source for many marine organisms. This study modelled the effects of gradually reducing and abruptly banning discards using data from a protected bay in Australia. The researchers recommend gradual reduction of discards in order to maintain ecosystem stability.

Food subsidies, which can be defined as easy-to-access and abundant nutritional resources that are not usually available to an organism, can alter ecosystem function and potentially reduce the goods and services they provide. Food subsidies can come from natural sources (for example, stranded seaweed on beaches can feed young fish) but the majority are the result of human activity.

Through the provisioning of food, humans have played a major role in how ecosystems function. As hunter-gatherers, humans provided food to wild animals in the form of remains, eaten by opportunistic scavenging species. This practice increased in Neolithic societies as agriculture provided food for other, domesticated species. Humans continue to provide animals with food to the present day, often predictably. For example, rubbish dumps routinely feed scavenger species, such as foxes. In fact, as much as 40% of food produced on Earth is wasted, providing a major food source for animals¹. These 'predictable anthropogenic food subsidies', or PAFS, have shaped natural communities and ecosystems.

PAFS may be necessary when natural resources are scarce, for example, to fulfil the energy requirements of endangered species (such as vultures). However, PAFS can have negative effects, increasing the number of scavenger species to an excessive level, disrupting the ecosystem and placing some species at increased risk of predation. In view of these risks, [environmental policies](#) have been developed to limit the production of PAFS or, in some cases, ban them altogether.

This study focused on [marine ecosystems](#), where discards (the unwanted fish that are returned to the sea, either dead or alive, during commercial fishing operations) are a major food subsidy, with over seven million tonnes discarded every year². Many animals have become adapted to this abundant food source, including sea birds, dolphins, sharks, fish and crabs.

The removal of this abundant food source to increase the sustainability of fisheries (as proposed by the EU [Common Fisheries Policy](#) (CFP)³) could therefore have marked ecosystem impacts. It is not yet known how a reduction in discards would affect marine food webs, with some suggesting it could do more harm than good.

This study explored the possible effects of removing PAFS from a marine ecosystem under two different scenarios: gradual removal over 20 years (modelling legislation that brings in a discard ban slowly, such as no-take zones in marine protected areas) and an abrupt ban (mimicking the CFP, which proposes an immediate ban on the release of discards into an area).

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Banning Fisheries Discards Abruptly Has a Negative Impact on the Population Dynamics of Charismatic Marine Megafauna. *PLOS ONE*, 10(12), p.e0144543.

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1. Oro, D., Genovart, M., Tavecchia, G., Fowler, M. & Martínez-Abraín, A. (2013). Ecological and evolutionary implications of food subsidies from humans. *Ecology Letters*, 16(12), pp.1501-1514.

2. FAO (2005) Discards in the World's Marine Fisheries An Update. <http://www.fao.org/docrep/008/y5936e/y5936e00.HTM>

3. CFP reform – the discard ban. http://ec.europa.eu/fisheries/reform/docs/discards_en.pdf

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The study modelled the effects of discards on Moreton Bay in Queensland, Australia, a popular site for prawn trawling. The model was built in [Ecopath with Ecosim](#), ecological modelling software which simulates complex food web interactions. The researchers constructed two models of the Bay. The first simulated gradual reduction of discards (between 1990–2013) while the second modelled an outright ban, in which discards were stopped suddenly in 1990.

The authors found that PAFS lower the position of opportunistic scavengers in the food chain and increase the routes by which they can obtain food. They also found that a certain amount of discards is required to keep the ecosystem stable. Although scavengers could switch prey when discards were gradually reduced, when they were banned suddenly, scavengers declined.

Both gradual and abrupt removal of PAFS decreased the survival of scavenger species and changed the ecosystem. However, the findings show that gradual removal could be beneficial, as it allows species to adapt to loss of food by switching gradually to alternative prey.

By modelling the impacts of reductions in discards, this paper may help policymakers to make more informed decisions on fisheries management and [conservation](#) of species dependent on discards, many of which are endangered, for example, dolphins, sharks and some seabirds. However, they say results differ between ecosystems, and more work is needed to determine whether discards should be eliminated, reduced or maintained for particular ecosystems.

