

New research reveals 12 ways aquaculture can benefit the environment

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Aquaculture, or the farming of aquatic plants and animals, contributes to biodiversity and habitat loss in freshwater and marine ecosystems globally, but when used wisely, it can also be part of the solution, new research shows.

Published today in [Conservation Biology](#), University of Melbourne researchers have identified 12 potential ecological benefits of [aquaculture](#). These include species recovery, habitat restoration, rehabilitation and protection, and removal of overabundant species.

Lead author, University of Melbourne researcher Ms Kathy Overton, said the potential environmental benefits of aquaculture have gone under the radar for many years.

"Most people around the world live near freshwater or marine ecosystems, and we rely on them as sources of food, tourism, recreation, culture, and livelihood," Ms Overton said.

"However, our impacts on freshwater and marine ecosystems are degrading important habitats and causing rapid declines in biodiversity. While the negative impacts of some types of aquaculture are well known, we can also use aquaculture as a tool to slow or stop these [negative impacts](#) and help restore ecosystems that have been largely lost over the last century."

Ms Overton explained that millions of tons of fish, shrimp, shellfish and seaweed are farmed for food each year, with some of this industrial production providing benefits to the environment when farmed in a specific way or place.

"Seaweed and shellfish farmed in [coastal waters](#) can remove excess nutrients coming from urban or [agricultural runoff](#) and reduce the likelihood of toxic algal blooms that kill fish and other native organisms," she said.

In addition, researchers found there are a range of new ways that conservationists are tapping into aquaculture techniques to create new ways to restore or conserve species and habitats.

"The world's largest conservation organization, The Nature Conservancy (TNC), has pioneered the use of aquaculture to restore lost [marine ecosystems](#)," Ms Overton said.

TNC Australia Dr. Simon Branigan said, "Aquaculture is a key part of our process to rebuild lost shellfish reefs through creating healthy oyster and mussel juveniles to kick start the reef restoration process."

"Reefs with abundant shellfish create strong ecological benefits—they are important habitats for a host of marine species, and they improve water quality. Without aquaculture, we would struggle to restore these lost marine habitats and get this important conservation work done," Dr. Branigan said.

Aquaculture is also used to help restore vulnerable or endangered fish populations around the world, by 'restocking' cultured farmed fish back into their habitats.

"Species recovery programs for fish such as the white sturgeon in North America, the golden mahseer in India, and the Macquarie perch in Australia, are trying to bring back wild populations and stop extinction," Ms Overton said.

Co-author and University of Melbourne researcher Dr. Luke Barrett said aquaculture can also be used to replace wild harvesting of threatened animals.

"Most freshwater aquarium species are now farmed, which means that you can stock your home aquarium without contributing to overfishing of vulnerable wild populations," Dr. Barrett said.

"However, many species in marine aquariums, like clownfish and corals, are still collected from coral reefs for the aquarium trade. Researchers

around the world are developing methods to farm these [species](#) too, and ease some of the pressure on [wild populations](#)."

The research team highlights the importance of using measurable indicators of success.

Co-author and University of Melbourne Professor Tim Dempster said, "By requiring a high standard of evidence to label something 'ecologically beneficial', this reduces potential for 'greenwashing', where aquaculture industries might claim to be providing ecological benefits that aren't really there."

"We want to ensure that aquaculture practitioners monitor their ecological impact before claiming their farm creates ecological benefits. Just because a particular aquaculture activity does one positive thing, it doesn't mean that it will deliver an overall benefit to the environment. It's important to weigh up overall impacts when deciding if something is ecologically beneficial or not," Professor Dempster said.

Researchers say that as aquaculture expands in freshwaters and the ocean, there's an opportunity to avoid the mistakes people have made farming on land that have led to [habitat](#) and biodiversity loss.

"We want people to reimagine what aquaculture is and what it can do, and to show people how it can be used as a tool to safeguard aquatic ecosystems and biodiversity for future generations," Professor Dempster said.

More information: Achieving conservation and restoration outcomes through ecologically beneficial aquaculture, *Conservation Biology* (2023). [DOI: 10.1111/cobi.14065](https://doi.org/10.1111/cobi.14065)

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