How underwater gardening can rewild the Atlantic Ocean

November 6 2017, by Richard K.f. Unsworth And Ruth Callaway

Credit: PR Unsworth, Author provided

From the use of seaweed for bleaching linen, to Roman emperors eating oysters as aphrodisiacs, human culture along the North Atlantic coast has been integrally linked to the exploitation of the sea for centuries. But as populations have expanded and economies grown, people have impoverished the ocean.

The history of Atlantic Ocean exploitation is in no small part due to its

immense productivity. Legend has it that stocks of Atlantic cod were once so plentiful that fishermen proclaimed they could walk across the ocean on the backs of fish.

By 1913, 1.2m tonnes of fish were being landed in the UK alone. At the same time 700m European flat oysters were being consumed annually in just London. Since then, landings have been in steady decline. Catch is now at around 0.4m tonnes and the number of employed fishermen has fallen from 50,000 in 1938 to 12,000 in 2015.

The Atlantic Ocean of 2017 is a shadow of its former self. The once productive fishery resources were supported by rich, biodiverse and expansive habitats such seagrass meadows and kelp forests, but study after study has shown that these habitats have been destroyed and degraded by poor water quality, destructive fishing practices and coastal developments.

Now the Atlantic is facing fresh challenges, this time from the growth of marine renewable energy infrastructure. But there is a potential solution: ocean rewilding.

Seagrass seeds can be collected by divers as one might pick blackberries on land.

Finding green shoots

Ocean rewilding is "the large-scale restoration of ecosystems where nature can take care of itself". The concept encourages a balance between people and the rest of nature where each can thrive.

Terrestrial restoration of ecosystems such as woodlands, rivers and marsh lands are commonplace. And commercial companies are even providing "off the shelf" solutions for some of this. The reintroductions of species such as the beaver, wolves and ospreys have been a success, but to date comparable rewilding of our oceans has only been minimal. With the major loss of seagrass and oyster well documented, there is now growing interest and opportunities for this kind of restoration to occur underwater too.

Researchers across the globe have pioneered the restoration of the marine environment, and our knowledge of this is growing. Large scale restoration successes in places such as Chesapeake Bay – an estuary off the coast of Virginia, US – using seed dispersal have transformed the marine environment. Restored seagrass meadows have been proven to provide important fisheries habitat, and at the same time are beginning to sequester large amounts of CO_2 from the atmosphere.

Many Atlantic cod stocks are now exploited at more sustainable levels, and regulation across Europe is resulting in cleaner coastal waters. This is leading to the belief that major steps can be made to reverse degradation that has taken place in this ocean too.

Seagrass shoots protected from disturbance using biodegradable plastic frames. Credit: PR Unsworth, Author provided

Renewables and conservation

Our team has been underwater gardening to help improve methods for marine habitat restoration. This underwater rewilding work commenced in 2014 with initial laboratory trials but has now expanded into the sea. It's not just about planting pretty flowers, or creative rockeries, like one might do outside their home, these projects are attempting to utilise the opportunities of offshore and coastal renewable energy. Tidal lagoons, for example, are being proposed around the world as a potential option

for reliable and predictable power generation. But these large sheltered lagoons can also be a major opportunity for environmental renewal.

We have been working with a company, Tidal Lagoon Power, to examine methods for creating new seagrass habitats in these lagoons. This includes growing seedlings in labs and planting them, deploying lines of seed bags, and transplanting plants from donor sites. Just like terrestrial gardening this is done using trowels and all the paraphernalia from a garden shed – albeit underwater.

And working with partners in the Netherlands we've been taking part in a major test to utilise biodegradable bio-plastics to help support these transplanted seagrass. The use of these biodegradable materials is vital given the vast problems of plastics in our oceans and the risk of inadvertently polluting the ocean with parts of our experiments.

With further research we hope to take trials of underwater gardening in tidal lagoons and turn them into actual habitat creation and ultimately bolster the rewilding of our oceans. As marine renewable energy options grow and develop, these need to be seen not in terms of the conflict with the productivity of our oceans but as an opportunity to enhance it.

This article was originally published on The Conversation. Read the original article.

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