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permaculture

Save Our Seas
Gardening the oceans

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TRANSFORMING LIVES IN REFUGEE CAMPS • NO DIG WINTER SALADS
REGENERATING COMMUNITIES WITH ORGANIC AGRICULTURE



Why Permaculture is So Much More than Gardening!

Though the garden is the backdrop, Simon Lacey explains how permaculture adds a new dimension to horticultural therapy

At Highbury Cambridge, we use permaculture in our work with people who have had a brain injury. Before I go on to say more about this work, it's worth saying a little about what brain injury is. Brain injury can happen to anyone at any time resulting from a simple fall to a major stroke, and it affects people in as many different ways as you could possibly imagine, from the physical and cognitive to the psychological and emotional. After an injury, I may not be able to walk without help, write a note to a loved one or hold onto my cup of tea. I might struggle to plan or problem solve day to day tasks like doing the weekly shop or catching a bus or I may suffer with crippling anxiety or deep depression.

Three years ago Highbury secured funding from the Department of Health and Social Care Innovation Fund to run a nine-month permaculture gardening course. As the course of writing we see just completing the third course. Each course has a mix of people who have had a brain injury, people who have experienced other kinds of challenges e.g. anxiety or depression, and those who wish to gain experience of supporting others.

Why Gardening?
Gardening is a unique activity involving digging and natural cycles. The change and loss we see in the cycle – there can be no bank and growth without decay and death. Through this perspective, the skills of loss we might experience through illness or injury can be set within a wider context and engaged with more acceptance. We are able to be more open to loss and change when we see it as part of a continuous cycling where new things and growth will follow.

Disrupting Patterns of Thinking
In Highbury, disabled people are often the catalyst for new growth. The first of our weekly sessions begins by exploring the role of the gardener and the functions of a garden, helping people to challenge their perceptions from the outset. Who or what is doing the 'gardening'? This also helps us to rethink our assumptions about illness and injury.

Course attendees do not know at the outset which of their fellow participants are 'disabled or ill' and who are 'well'. This gives everyone the opportunity to learn that we all have contributions to make, that those contributions often come out of our 'difficulties' (as opposed to being a source of stress), that there is more that connects us than separates us, and the skills we as gardeners can sometimes do more to develop and understand than to disseminate.

Simon, who is to see the course this year, says, "It does involve social activities. I had my preconceptions, but when you say that all day we are just a group of people working together to bring down the garden."

Empowerment
When I first studied permaculture with Graham Burnett around 18 years ago, the thing that I came away with more than anything else was that I could do something. The problems of the world weren't insurmountable and I didn't have to be an expert to affect change. In fact being an expert could get in the way of creative solutions – once you think you know what you're looking at, you stop looking. This applies to many what, or who, you're looking at (including yourself!).

On the course, we value the courage of the beginner over the person who has done the job before. Beginners are more likely to ask new and interesting questions that the seasoned expert may overlook as they have 'seen it all before!'

When we work on a task together, the person who has never done it before is the person who leads the discussion and challenges the group. Although this can be daunting at first, people soon realize how it and become more confident in the value of their contribution. What matters is not the information that we have but the questions that we ask.

The Problem is the Solution
Questioning is key when it comes to pushing down garden 'problems'. "Good problems" or an outbreak of a 'pest' offer opportunities to learn. What is a weed? What is its function in the system? Is it expelling soil or cycling nutrients? What would happen if we waited a little longer before intervening? How does this affect how we see

Left: Two of our clients in our accessible polytunnel. Above: Our clients and volunteers growing on and around again salads.

A glimpse at
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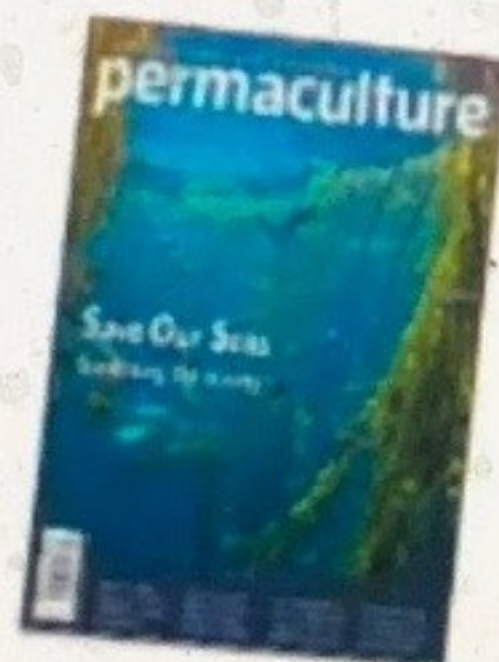
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Cover photo: Kelp forest ©Rynoplas/Wiki

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be operational without human intervention for up to three years at a time.

The Climate Foundation have collaborated with the Woods Hole Oceanographic Institution, researching the use of mesoscale cyclones that circulate in the Pacific Ocean. Between 5-50km (1.2-6.2 miles) in diameter, these cyclones, of which there can be hundreds at any give time and last for months, could carry dozens of MPAs through the seas, regenerating ecosystems as they go.

Regenerative Ocean Farming

On a different path, but with a similar outcome, is Bren Smith from Thimble Island Ocean Farm, U.S. A fisherman come restorative ocean farmer, Bren is growing seaweed and shellfish as a means to provide sustainable, local food whilst sequestering carbon and filtering water. As a fisherman, Bren felt the brunt of the cod stock crash in 1992, which laid off 35,000 fellow Newfoundlanders; the largest layoff in Canadian history.¹ Bren and a generation of fishermen went

in search of more sustainable ways to feed their country through the oceans. Bren finally found himself at Thimble Island in Connecticut, and began farming oysters. His farm was destroyed in Hurricane Irene and then again, after rebuilding, in Hurricane Sandy. This led Bren to design the 3D ocean farm he has today. Using the vertical columns of the sea, Bren grows four types of shellfish, including oysters that can filter 20-30 gallons of water a day, and native seaweeds, including kelp, the second fastest growing plant on the planet. The design allows for flexibility when surges hit, and the oyster beds can be raised from the ocean floor to prevent them being buried in mud during storms. Bren has always made his living on the seas, and renting 8 hectares (20 acres) of sea has not only given him a profitable business, but his quarry is also regenerating the seascape.

Seaweed can process large amounts of nitrogen – nitrogen leaks into the seas from agricultural fertilisers (and contributes more than one trillion pounds of greenhouse gas emissions to the atmosphere globally a year,² creating acidification, which kills swaths of coral and other ecosystems, leaving ocean deserts.

Recent work done by Roger Newell of the University of Maryland shows that healthy oyster habitat can reduce total added nitrogen by up to 20 percent. A three acre oyster farm filters out a nitrogen load equivalent to what is produced by thirty-five coastal inhabitants.³

The columns of seaweed and shellfish create a buffer against storms as well as acting as artificial reefs, providing habitat, and restoring ecosystems.

One acre of our farm has the capacity to grow 30 tons of sea vegetables and 250,000 shellfish per acre per year with no inputs, making it one of the most sustainable sources on the planet for food, animal feed and biofuel. Our crops also mitigate climate change through carbon and nitrogen sequestration, and create barriers that prevent storm surges from wrecking coastal communities.⁴

Bren doesn't own his ocean farm, he owns a process. The goal was protecting, not privatizing, the ocean. As farmers, we need to be the park rangers of the ocean commons and build community support through inclusion and thoughtful design.⁵ With it being all underwater, apart from several buoys, the farm is hidden from view. It is open to the public, for swimming and fishing, and Bren even has the local duck hunters on side, as his farm attracts a wide range of wildlife.

Bren's goal is for multiple ocean farms, all producing fresh ocean vegetables with their own distinct flavours in every region. His aim is for the dinner plate to be based around what the sea can provide for us, rather than what we want it to provide. Salmon and tuna are examples of the traditional foods the ocean used to provide in abundance, but with extreme over fishing and climate change, we need to look at the wide range of sea vegetables and shellfish that are available and able to feed us. A Napa Valley of ocean merroins, producing ocean vegetables with distinct flavours in every region. Ocean farms embedded into wind farms, harvesting not only wind but also food, fuel and fertilizers.⁶

Bren has also set up Greenwave, a charity to support those wanting to ocean farm. He wants to make it an easy and affordable career, with a goal of 500 farms across 10 regions, within five years. I see farms that are climate farms, producing zero-input food while sequestering carbon and rebuilding marine ecosystems.⁷

If you were to have farms covering 6% of the oceans, you could capture all the carbon that's currently put out by humanity and feed the planet.⁸

Another of the many positives with this style of polyculture farming, is that seaweed can also be used as biofuel and animal feed. If you were to take a network of farms totalling the size of the state of Maine, you can replace all the oil in the United States.⁹

Both of these models, and the many projects out there, provide positive solutions where humans work alongside Nature's systems to provide food, jobs and healthy ecosystems. We can regenerate and repopulate the oceans, help mitigate climate change and create resilient futures for people and planet.

¹ *Eat Like a Fish* by Bren Smith, published by Murdoch Books
² www.climatefoundation.org/marine-permaculture.html
³ www.theatlantic.com/international/archive/2011/11/the-coming-green-wave-ocean-farming-to-fight-climate-change/248750/
⁴ www.farmersview.com/brensmith
⁵ www.thimbleislandoceanfarm.com



OPPOSITE: Bren washing off the latest catch of oysters, which can filter 20-30 gallons of water a day

TOP: The spoons to grow the kelp sit in the white plastic tubes at the hatchery, in ideal conditions for maximum growth

ABOVE: The kelp spoons

Rozlie Apps is assistant editor at PM.

Resources
www.climatefoundation.org/marine-permaculture.html
www.thimbleislandoceanfarm.com
www.greenwave.org
www.youtube.com/watch?v=rLEDxatukCk



"While Earth has survived radical climactic changes and regenerated following mass extinctions, it's not the destruction of Earth that we are facing, it's the destruction of our familiar, natural world and our uniquely rich human culture."

"It may sound frightening, but the scientific evidence is that if we have not taken dramatic action within the next decade, we could face irreversible damage to the natural world and the collapse of our societies."

David Attenborough, *Our Planet*

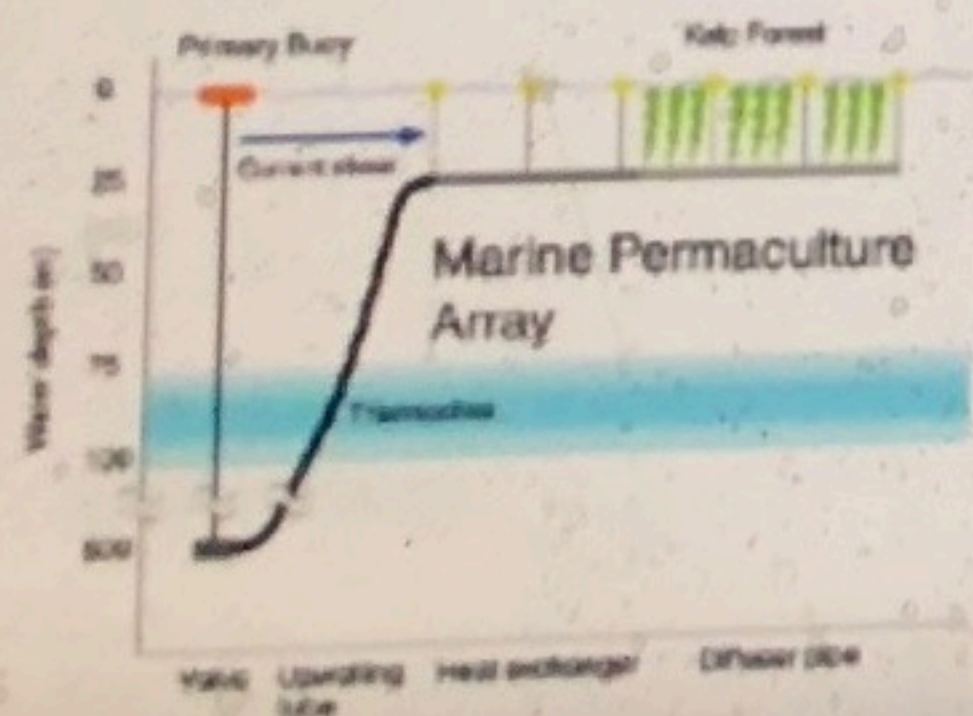
David Attenborough's *Blue Planet 2* brought to the limelight, the effects of climate change, plastic pollution and mainstream agriculture on our seas.

The oceans regulate the temperature of the planet, they provide us with oxygen, they are home to millions of creatures that make up diverse and intricate ecosystems, and they sequester carbon. However, scientists are finding that the oceans are saturated in carbon dioxide. They believe around half of the CO₂ produced by humans is absorbed by the oceans, and new research shows this is causing acidification, which affects the lifecycles of most marine organisms, especially plankton, the base layer of the ocean food chain. As well as starting diverse ecosystems, plankton also sequester carbon dioxide from the ocean, and when they die they take it with them to the ocean floor. Whole ecosystems are collapsing as the waters warm and acidify, creating rapidly expanding ocean deserts.

"In the last ten years alone, the impact of climate change has cost the American economy at least \$240 billion a year, and future economic costs within the U.S. borders are predicted to be the second-highest in the world, behind only India."¹

Marine Permaculture Arrays

Dr. Brian Von Herzen from the Climate Foundation has been researching into how to increase plankton blooms, which at times can be so vast they're seen from space. The increased global temperatures are creating a thickening layer of warm water near the surface, which creates a barrier to the upwelling of nutrients from the colder, lower levels of the ocean, which plankton feed on. Von Herzen and the Climate Foundation have created wave-driven pumps to upwell nutrients and grow plankton in a part of the Pacific Ocean around 100km north of Hawaii that is currently an ocean



desert. "In just 57 hours after deployment, the system sparked plankton growth. Shortly thereafter, these blooms attracted various species of fish. Two weeks later, a 17 foot long [5m] whale shark was circling the area feeding on plankton that had started blooming."²

An extension of this work is Von Herzen's 'marine permaculture' in the form of larger floating platforms that use wave energy to restore nutrient upwelling to pre-global warming levels. These lightweight, floating systems, called Marine Permaculture Arrays (MPAs), allow kelp to attach, providing food and habitat for forage fish, which in turn brings in tuna and sharks. These MPAs could provide valuable incomes for ocean communities, who could farm the kelp for food, biofuels and animal feed. The MPAs, made from strong, recycled materials, hang from a surface buoy, with a steel cable linking the buoy to the pumping system at the base of the array. As the buoy falls from the crest of a wave, a valve in the pump opens bringing up deep ocean water. As the buoy rises with a wave, the valve closes, forcing the water into an irrigation tube, and up to the floating platform made of interconnecting tubings, which sits 25m below sea level. Nutrient-dense water is released through the holes in the tubing, fertilising the kelp and attracting plankton. They are able to withstand adverse weather conditions, including hurricanes. The idea is that they will

OPENING PAGE
Bren harvesting kelp, the second fastest growing plant on the planet, known as the 'sequoia of the sea'

ABOVE
A view of the farm from the surface

RIGHT
Catherine Puckett measuring the kelp harvest

