



## OCEAN ORCHARDS – A CASE HISTORY

### CURRENT RELEVANCE

The global marine fisheries catch peaked at 86 million tonnes in 1996<sup>1</sup> and global fish stocks have been declining significantly since then because of the damage and destruction of marine ecosystems caused by the fishing industry. Trawling in coastal areas has destroyed reefs, seagrasses and soft-bottomed habitats - a significant factor in the decline of many fish stocks in heavily trawled areas. Loss of associated mangroves has also removed breeding grounds. This loss of marine biomass has a significant negative impact on atmospheric carbon dioxide concentrations - estimates of the scale of this vary widely - yet there is agreement that the impact is to increase atmospheric carbon dioxide by many millions of tons per year.



### CLIENT

This project started from an observation rather than a client need. The opportunity was identified from observing fish accumulating around oil and gas platforms in tropical waters. Later when working with a Malaysian installation contractor, delivering a rigs-to-reefs project, the idea was born to replicate the effect of oil platform structures on a massive scale to create a new national-scale fish restocking and recovery, and ongoing fish ranching, project. This process identified real interest from the Malaysia Ministry of Agriculture Dept. of Fisheries, UMT, several oil companies operating in Malaysia, and backing and support from NGO's including WWF, ReefCheck, and equipment and service suppliers including T7 and Subcon.

This project is seeking funding to scale up from an existing 80m<sup>2</sup> demonstrator site off the coast of Peninsula Malaysia to a 25 hectare 'proof of concept' site.

### BACKGROUND AND CHALLENGE

Fish love to accumulate in huge numbers around the legs of oil platforms. Fish need more than just water to live – they also need a habitat rich in food sources, with cover in which to breed and avoid predators, and for surface fish to find shade during the day to avoid too much sunlight. Structures in the ocean in the shallower depths where sunlight penetrates – typically less than 40m – provide these functions. Corals and submerged cliffs do this very well, and man-made structures too such as shipwrecks.



<sup>1</sup> According to the Food and Agriculture Organization (FAO) fisheries data.



# Herculean Climate Solutions

## *A thousand ways to do a million tonnes*

The creation of artificial reefs is common practice around the globe. However, these are almost all on a tiny scale. If the world is to rebuild the fish stocks that have been lost through industrial-scale trawling, then the world needs an industrial-scale solution to create the very habitats that the trawling has destroyed to create millions of tonnes of new fish.

This project has explored in depth the potential for such an industrial-scale solution for Malaysia.

### PROGRESS

Large numbers of small-scale artificial reefs have already been built around the Coral Triangle in the ASEAN area. In Thailand alone some 2,000 km<sup>2</sup> of simple artificial reefs have been built. There are 181 small-scale artificial reefs in Malaysia. The problem with these reefs is that they are individually each small-scale; disconnected from each other just like isolated islands of remaining jungle; and they are at the seabed and so do not provide any habitat for the many varieties of mid-water and surface fish.

The key insight from the oil platforms is that structure which rises to the surface provides the necessary additional habitat all the way to the surface creating very prolific fish habitat<sup>2</sup>. This is supported by independent observations of individual fish aggregating devices (FADs) which are known to attract fish very effectively. Bringing these observations together we can make a new type of habitat designed on an industrial scale to rebuild global fish stocks, creating de-facto Marine Protect Areas (MPA).

The Pulau Kapas artificial reef was fully populated within 12 months of installation proving that large areas of already trawled and denuded seabed can quickly recover. The addition of FADs can massively exceed the original productivity.

What is now needed is to apply massive-scale engineering project thinking to build very large areas of artificial reef by installing thousands of new concrete reef blocks and integrating sections of old oil platforms as

they become available, with FADs that extend to the surface. These Ocean Orchards need to be built as contiguous areas along very long stretches of the coast covering thousands of square km to make millions of tonnes of new fish every year, and this needs to be done rapidly using low cost materials.

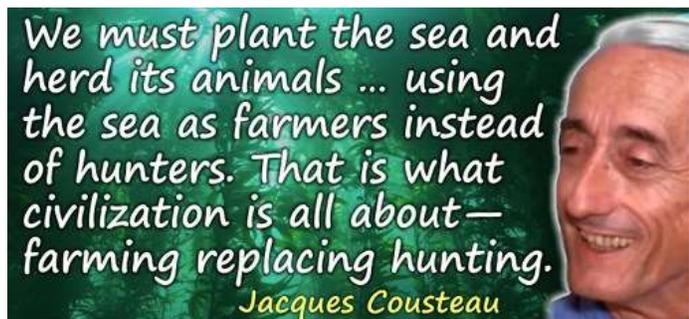


### NEXT STEPS

Malaysian authorities see this as a very promising project and are keen to see the results of the trial. However, without proof of concept they are not able to fund it.

Discussions are ongoing to identify a source of funding for in the large-scale pilot project.

Herculean Climate Solutions continues to seek out investors.



<sup>2</sup> Fish stock productivity around oil platforms is measured to be 20 times higher than natural reefs (ref: Claisse et al.).