

Oyster restoration and reef discoveries in Holland



Marieke Reisinger

ARK Nature and World Wildlife Fund the Netherlands are currently working towards flat oyster reef and mussel bed restoration in the Voordelta, the southern part of the North Sea adjacent to the Dutch coastline. Two pilot studies with flat oysters and mussels were put into place, at locations with different environmental conditions in December 2015. The first results from this project are promising. In preliminary research carried out immediately prior to starting the project, a 'wild' mixed flat and Pacific oyster reef of about 10 hectares was discovered. Flat oyster beds were thought to be extinct in the Dutch part of the North Sea, so this discovery was a very welcome surprise discovery. It looks like some local production of larvae also takes place here. Download the 'Annual report Voordelta shellfish reefs' [at this link](#) and/or read the article here.

The pilot project

Since flat oyster beds have largely disappeared from the North Sea, too little is known about the critical success factors for development and sustaining flat oyster and mussel reefs in this area. The primary objective of ARK Nature and WWF is therefore to test and analyse what these factors are by means of a pilot project. The Flat Oyster Consortium (a cooperation of Bureau Waardenburg, Sas Consultancy and Wageningen Marine Research) is responsible for the design and execution of the current two pilots: maintenance, monitoring, analysis of monitoring results and reporting.

Two pilots were put into place, at locations with different environmental conditions ('Blokkendam' and 'Hinderplaat') in February 2016.

The shellfish are placed into cages with different

collectors are distributed around the racks, as settling substrate for spat, which may originate from the pilot shellfish or elsewhere. Reef domes are put around the racks, for physical protection and also as extra settling substrate.

Frequent monitoring and research visits were made by divers to the pilots during 2016. These visits were used to take samples from the shellfish, to collect water samples for larvae monitoring and to collect visual information about the pilots and the surrounding area.

10 hectares mixed flat and Pacific oyster reef discovered



Above: the mixed shellfish reef found at Blokkendam

As stated, during preparatory investigation of Blokkendam location, a mixed flat and Pacific oyster reef of about 10 hectares was discovered. Remarkably, the populations of Pacific and flat oysters are able to co-exist and may even support each other by providing settling substrate. Monitoring of larvae as well as water flow modelling carried out by Deltares show that, most probably, the flat oyster population in the reef originates from Lake Grevelingen, which has a flat oyster population and an outlet near this location. Some local production of larvae may also take place. In the spring and summer of 2016 an extensive mussel spat fall occurred around the pilot site and many mussels were still present in April 2017. It appears that mussels also settle, survive and grow well within the reef. The oyster reef appears to provide habitat to a large variety of other organisms, both attached and mobile (*see facing page*).

Results 2016 of the two pilots

One of the pilots was placed inside the reef, in order to study the factors, which have led to its development. As could be expected, it was shown that conditions for survival, growth and reproduction of mussels and oysters are good in the reef area. At the Hinderplaat location, conditions appear to be much less favourable for survival of flat oysters as well as mussels. This is probably due to regular occurrence of large freshwater outflow from the Haringvliet.



Above: map showing locations of the 2 pilot projects

mesh size, in order to investigate the influence of predators on survival of different size classes. These cages are placed into larger racks for stability and protection. Empty mussel shells and commercial spat

Oyster restoration in Holland cont.

Aims for 2017

The conclusions of the first year of experiments made us decide to speed up the flat oyster reef restoration attempts in the Voordelta area and monitor the development of the local mussel population. We are therefore continuing the pilot in the oyster reef. We aim to maximize our understanding of survival, growth and reproduction conditions of mussels and flat oysters and of enhancement methods for recruitment of these shellfish. We are analysing and measuring the critical success factors at this location.

We are attempting to extend the existing flat oyster reef by stimulating spat fall in or around it. We do this by distributing empty mussel shells in and near the reef, around the time that larvae are detected in the water. We will continue to monitor flat oyster larvae in the Voordelta and of the existing oyster reef. By doing so, we aim to optimize protection and extension of this reef and derive guiding principles for stimulation of flat oyster reefs elsewhere in the Voordelta and the North Sea at large.

Last but not least, in 2017 we are attempting to stimulate oyster and mussel bed development at a new location in the Voordelta. Extension of shellfish beds is the primary objective of the project and many lessons will be learned by this new initiative. Probably, the best

locations will be those where (occasionally) mussels or oysters can be found, or were found in recent years. In order to identify these locations, survey data on shellfish distributions will be analysed and presence of reef structures will have to be verified by underwater observation techniques.

We will keep the readers of The Grower updated on our results. In the meantime, you can follow this project and other interesting items on the Facebook-page of ARK Natuurontwikkeling or on www.ark.eu.

This project is co-funded by the National Lottery, the Ministry of Economic Affairs, the Ministry of Infrastructure and Environment, the Province of Zuid-Holland and the Port of Rotterdam.

The full report can be accessed at :-
www.ark.eu/sites/default/files/media/Schelpdierbanken/Rapport_Shellfish_Reef_hr.pdf

