

4 Discussion and conclusions

The ecological monitoring of Borssele III/IV set out to answer the 7 questions stated in the introduction, and from this T-1 report we can state the following:

What is the survival and growth rate of flat oysters?

The average mortality at the T-1 was 3,7%, with just two baskets in D06 and D07 exceeding a mortality of 8%. Especially the baskets at D06 included some sediment, possibly explaining the increased mortality. One basket at D07, however, showed a mortality of 32%. It is unclear what happened there.

The size and quality of the flat oysters indicate that there was a proper set-up created for the pilot study at T-0. Measurements of the size of the oysters in T-1 has resulted in a clear indication for growth in size, especially in length.

Do the flat oysters produce larvae?

The water samples showed no flat oyster larvae around the eight monopiles at the time of sampling (beginning of July 2021). Also, no oyster-spat was found on the spat collectors. This coincided with the finding that most sampled oysters were (about to get) ready for spawning. Hence, at the time of the survey, oysters had not yet spawned.

Do the flat oysters stay free of the parasite Bonamia?

The quality of the oysters seemed very high before reinstallation. There was no Bonamia detected, either in inspection of oysters for lesions, nor RNA-analysis of both oyster-tissue and water-samples.

How is biodiversity in general developing on the different substrate variations?

Are there species-specific responses in relation to current directions or rock size of the scour?

How fast does succession of a hard substrate community occur in the Borssele area?

All samples had a very high similarity in species composition. The reason for this high similarity can be that Borssele III/IV is a recently constructed wind farm. It is assumed that there is a development in biodiversity and species composition over time (2020-2021). There are indications of differences between Borssele site III and IV, monopiles, years, scour-types and current directions. However, these differences account for a small part of the variation in species composition. For now, the species most influential in the differences between 2020 and 2021 are *Tubularia indivisa*, *Necora puber* and *Spirobranchus triqueter* all indicating the development/succession of a hard-substrate community. Analyses of the SACFOR scores (indicating abundances) have resulted in the impression that the sites have all become more populated in comparison with 2020 (abundances are higher in 2021) and Borssele IV (the H-monopiles) is lagging behind Borssele III in the development of abundances.

Is the species data found by ROV (remotely operated vehicle) video and photo analyses correlated to the eDNA data? Which species are not found or only found by a certain method?

In 2020 the environmental DNA-analysis proved to be a useful tool to indicate taxa difficult or impossible to see, and also point at the presence of species not (yet) spotted on video. While the comparison of results from video- and DNA-analysis indicated some overlap, both types of analyses largely accounted for unique occurrences of taxa, showing the potential of complementarity of both and the applicability of results in species composition analysis. Unfortunately, the T-1 analysis of eDNA somehow failed. Hopefully, the analysis of a new set of samples from Borssele (in 2022) will enable a comparison with the 2020 data. This comparison can hopefully be presented in the next report on T-3.

4.1 Conclusions

As stated beforehand, this report cannot draw conclusions on the success or trends in development of the ecology in Borssele Windfarm, because there is only the comparison with the T-0. From our analysis, however, it is clear that the development of species composition is still ongoing; there is a strong successive development in the whole area (Borssele III and IV) indicated by the difference in species composition between years. This development is largely overruling any effects that different treatments (oysters, current and scour type) may have. The photo/video analysis shows that differences between factors such as wind farm site are smaller in 2021 than in 2020. Possibly, the original differences found on substrate and bathymetry between these sites (in 2020 Borssele III seemed sandier than in 2021), has been erased or faded by the placement of the wind farm, moving sand waves and succession taken place. Even though this overruling effect of succession may indicate that the different treatments (scour types and oyster-tables) have little effect, this is not the end of the story since at least two more monitoring campaigns (T-3 and T-8) are planned.

The oysters placed at Borssele III show good survival and growth. All live oysters were fit; no *Bonamia*-infection has been detected and most of the inspected oysters were getting ready to reproduce. At the time of the T-1 survey, however, they did not seem to have spawned yet, because no oyster-spat or pelagic oyster-larvae were found. Given the state the adult oysters were in, there is no reason to doubt that the oysters will have reproduced in the autumn of 2021. When this reproduction of 2021 has led to spat, that spat/ongrowth of young oysters will be big enough to be noticed at the T-3 survey in 2023.