



# Ecology and offshore work



## Impact Studies on Marine Benthic Fauna

Bureau Waardenburg is a specialist in marine hard substrate ecology and in impacts on marine benthic fauna. We have a team of experienced marine biologists that are fully certified professional divers. Our experience extends from North Sea ecology to sub-tropical and tropical marine ecology.

Where offshore activities occur, impact on marine benthic fauna is inevitable. These impacts, however, are not always negative.

The underwater environment changes when new offshore structures are constructed. In the North Sea this generally means that new hard substrates occur on the previously sandy bottom.

This attracts new benthic communities with species characteristic for hard substrates.

### Example:

The first Dutch offshore wind farm (OWEZ): Development of underwater flora-and fauna communities on new hard substrates.

NoordzeeWind designed an extensive Monitoring and Evaluation programme to study the effects of the Offshore Wind farm Egmond aan Zee (OWEZ). The execution of this programme was granted to a consortium of IMARES, Bureau Waardenburg and the Royal NIOZ. Monitoring the development of underwater benthic communities was one of the tasks of Bureau Waardenburg.

In the OWEZ, large quantities of shellfish, crustaceans and other organisms, occurred rapidly after construction. This resulted in the development of abenthic community with a high biodiversity. Bureau Waardenburg used video footage and specialist hard-substrate sampling techniques, handled by divers, to document and quantify the species present.



Where offshore activities occur, impact on the marine ecosystem and its inhabitants is inevitable. Bureau Waardenburg is a specialist in offshore impact assessments and monitoring & evaluation programmes. This leaflet will guide you through the different aspects of offshore ecological research in which Bureau Waardenburg is active.

## Offshore Environmental Impact Assessments

Since 1997 Bureau Waardenburg has prepared ecological chapters for several offshore EIAs for a variety of clients, both independently and in collaboration with other institutes and consultancies. These studies state the possible effects of offshore activities for marine wildlife but also migratory terrestrial birds. Effects of offshore activities on marine wildlife are put in the context of the relevant national and international legislation. The findings often result in advice and input in the design and development of compensatory or mitigating measures.

We contribute to species (-group) specific ecological knowledge from specialist research, to effect modelling and risk analyses, to actual EIA contributions. If significant effects cannot be ruled out an Appropriate Assessment is made. In 2009 we, together with several partners, produced 19 offshore Appropriate Assessments for offshore wind farms.

## Qualified Marine Mammal and Bird Observers



Many offshore activities require monitoring of marine wildlife by human observers. Bureau Waardenburg has several experienced specialists that are trained and certified Marine Mammal Observers (MMOs). In addition, these people also hold the other necessary certificates like offshore survival NOGEPA 0.5A, HUET, offshore medical and VOL-VCA.

MMOs record marine wildlife (marine mammals, turtles and birds) before and during offshore operations like seismic surveys, flaring operations and offshore pile-driving to ensure smooth and environmentally safe working conditions. They can guide you through all applicable legislation to minimise the risk of injury and disturbance to marine mammals.

Our marine mammal specialists also conduct research on the distribution and abundance of seals, dolphins and whales and the effects of human activities on their behaviour and distribution.

## Offshore seabird research with bird radars

Ornithologists at Bureau Waardenburg conduct on- and offshore research on seabirds all over the world and with a variety of methods. One of our state of the art methods is the use of radar to track flight movements of birds. In 2007-2010 we participated in a long-term monitoring and evaluation programme to study the effects of the first Dutch offshore wind farm (OWEZ). Numbers of birds, flight altitude and flight routes of local seabirds and migratory birds were recorded 24/7 with an automated bird recording radar system. Currently, a similar set-up is being used to study bird migration on an offshore platform in the North Sea 80 km from the coast.

We generally use radar studies to record flight movements of individual species in location specific studies. One recent example involves sea ducks in a future wind farm location. Radar can also be used to locate and monitor breeding locations of nocturnally active seabirds. We recently carried out such a study in Portugal.

In addition to radar research, seabird specialists at Bureau Waardenburg conduct ship-based and aerial surveys and have experience in many parts of the world. In addition, tracking of seabird movements with GPS loggers is a speciality of Bureau Waardenburg. Bird movements and daily activity can be thus followed throughout the year and linked to environmental factors and human activities. Density maps and population growth models are made from the data using several different (spatial) statistical techniques.



### Some recent projects that Bureau Waardenburg carried out / contributed significantly to:

- ▼ Monitoring and evaluation programme Offshore Wind farm Egmond aan Zee (2007-present)
- ▼ Environmental Impact Assessment OWEZ (2003-2006)
- ▼ Monitoring and evaluation programme Maasvlakte 2 environment compensation (2007-present)
- ▼ Environmental Impact Assessment Maasvlakte 2 (2004-2006)
- ▼ Monitoring and evaluation programme Kustlijnzorg (2009-present)
- ▼ Several Marine Mammal Observer projects for offshore construction work (2010-present), like pile-driving (marine mammals) and flaring operations (birds)
- ▼ Capacity building in Environmental Impact Assessments in Ambon, Indonesia (2010)
- ▼ Several (19) Appropriate Assessments for offshore wind farms



Bureau Waardenburg bv  
P.O. Box 365  
4100 AJ Culemborg  
Tel +31 345-512710



Fax +31 345-519849  
E-mail [info@buwa.nl](mailto:info@buwa.nl)  
[www.buwa.nl](http://www.buwa.nl)