# News on www.bioconsult-sh.de 2015 to 2021

## Remarks

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**Inhaltsverzeichnis**

# DIGITAL AERIAL SURVEYS IN TEN COUNTRIES

07. Dec 2021

Since 2014, BioConsult SH uses a high-resolution camera system to carry out digital aerial surveys of birds and marine mammals at sea. We are involved in different projects in several countries.

We are pleased that we now have conducted our first survey flight in Lithuania in collaboration with the Coastal Research and Planning Institute (CORPI) in Klaipėda.

The investigations are carried out as part of plans for an offshore wind farm which will be the first in Lithuanian national waters. This makes Lithuania the tenth country where BioConsult SH and HiDef Aerial Surveying Ltd. have carried out digital surveys of marine birds and mammals.

For more information on our digital aerial surveys, click here.

# BIOCONSULT SH DEVELOPS AUTOMATIC BIRD DETECTION

30. Nov 2021

**BioConsult SH develops automatic bird detection**

Automatic detection and tracking of birds can be an important tool to avoid collisions with wind turbines. In this field, modern camera technology and artificial intelligence offer new possibilities. BioConsult SH has carried out extensive preliminary work for several years and we are very pleased that the Business Development and Technology Transfer Corporation of Schleswig-Holstein is funding the **AVES** project – **A**vian-**VE**rification-**S**ystem – within the framework of the Regional Economic Programme.

In the AVES project, an automatic detection system is being developed for the most sensitive bird species in relation to wind energy use, such as the red kite, white-tailed eagle, black and white stork, and other large birds. The system detects and tracks flying birds, which are determined based on various characteristics at species level. In future, AVES will be an important building block for the development of nature-friendly wind energy use.

https://vimeo.com/651502878

The development of automatic bird detection is demanding, because it is important to detect and reliably identify birds at great distances and even in unfavourable light conditions. The video sequence shows black storks at a distance of about 800 m.

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**Funded by:**

Schleswig-Holstein
Der echte Norden

We foster the economy
EU.SH
Regional Economic Programme: Funded by the European Union - European Regional Development Fund (ERDF), the Federal Government and Land Schleswig-Holstein

# BEACH LITTER SURVEY ON SVALBARD

16. Aug 2021

Marine litter is a global threat to the marine ecosystem. BioConsult SH is now launching a project to monitor beached litter in the Arctic.

We want to find out how to survey beached litter in the Arctic using drone- and satellite imagery. The drone provides perfect ground-truthing and gives an insight into beach litter monitoring on different spatial scales.

The project “Environmental Protection in the Arctic – support of German activities in the Arctic Council in terms of a pilot study on monitoring plastic litter on arctic coastlines applying remote sensing techniques - FKZ: 3719182010” is conducted by BioConsult SH and AquaEcology on behalf of the German Environment Agency (UBA). The project is funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

Click here for more information on our drone-based aerial surveys.

# STILL SEEKING MOBY DICK: SPOTTING WHALES FROM SPACE

05. Aug 2021

Our new service, “SPACEWHALE” (www.spacewhales.de), developed by BioConsult SH and HiDef Aerial Surveying Ltd, detects whales from space by combining modern space technology and artificial intelligence.

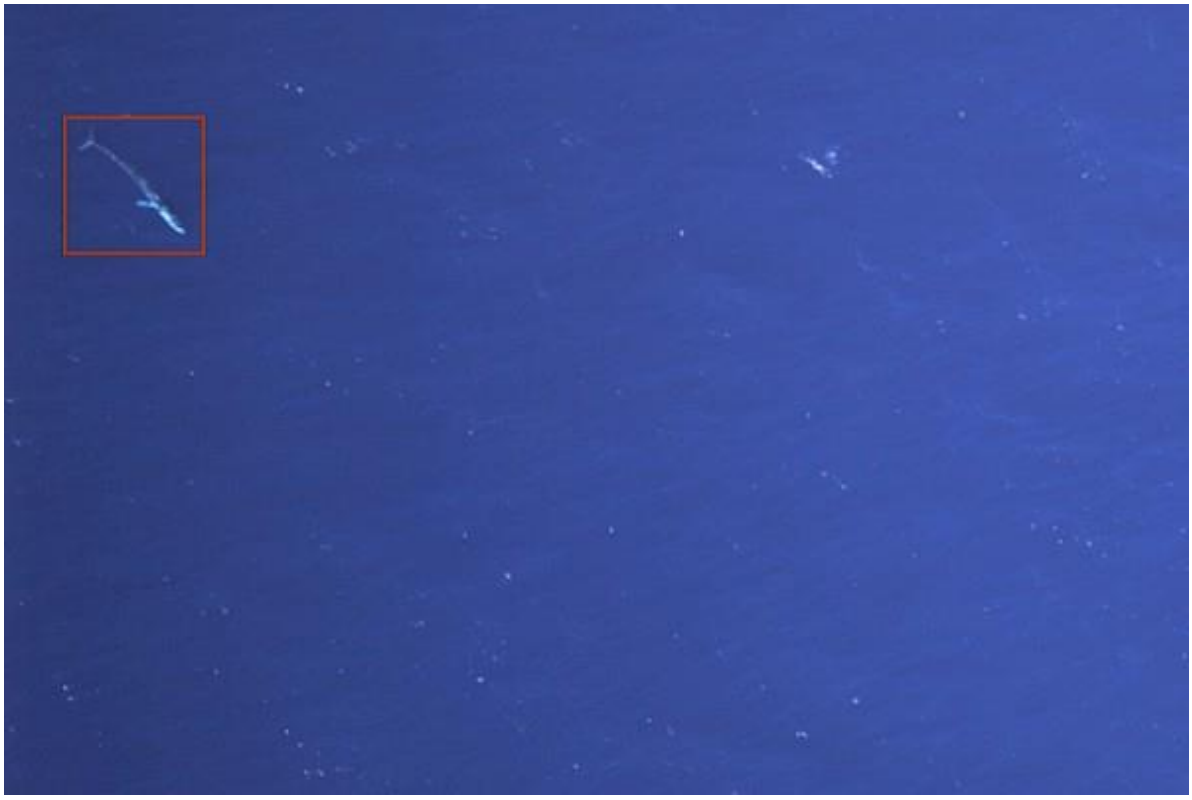
With SPACEWHALE, we can quickly and accurately scan large areas of the global ocean for large marine mammals. It enables surveys to be conducted at an unprecedented scale in a fraction of the time.

SPACEWHALE brings together modern space technology and artificial intelligence: We use a specially developed algorithm that automatically detects whales on satellite images and to quantify their population and distribution on the high seas. The method was developed by scientists from BioConsult SH in collaboration with English and American scientists. Supported by funding from the European Space Agency (ESA) under the Space Solutions Programme.

In contrast to previous whale monitoring by ship or aircraft, satellite images cover the global ocean surface. SPACEWHALE does not only detect whales but also other large marine animals. Many questions that previously required individual biological studies can now be answered with just a few clicks. Which areas are especially used by marine mammals? When do whales pass through a certain region during their migration? With the answers to these and other questions, solutions can be found that combine species protection on the one hand and human use of the seas on the other. For example, periods can be determined in which oil and gas or offshore wind farm activities cause the least disturbance to wildlife.

“SPACEWHALE makes a significant contribution to marine conservation; artificial intelligence combined with satellite images offers completely new opportunities,” says project manager Caroline Höschle from BioConsult SH. "The application of SPACEWHALE can help identify critical habitats of whales and inform marine spatial planning and impact assessments of offshore developments."

Further information can be found on the service website www.spacewhales.de.



*Fin whale detected from the SPACEWHALE algorithm (photo: BioConsult SH)*

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# NEW STUDY ON DIVERS AND WIND FARMS IN THE GERMAN NORTH SEA

20. Jul 2021

See our new study on the impacts of offshore wind farms on seabird populations: In the North Sea, the protected diver species red-throated Diver (Gavia stellata) and black-throated Diver (Gavia arctica) widely avoid offshore wind farms. We used an explicit spatio-temporal Bayesian model to get a robust estimate of the diver population during the spring season between 2001 and 2018, based on a set of aerial surveys from long-term monitoring programs within the German North Sea. Despite the erection of 20 offshore wind farms in the study area and marked responses of divers to wind farms, model results indicated that there was no population decline, and overall numbers fluctuated around 16,600 individuals. Although, avoidance behavior due to wind farm development led to a more narrowly focused spatial distribution of the birds centered in the persistent high concentration zone in the Eastern German Bight Special Protection Area, the results provide no indication of negative fitness consequences on these long-lived species.

Vilela, K., Burger, C., Diederichs, A., Bachl, F.E., Szostek, L., Freund, A., Braasch, A., Bellebaum, J., Beckers, B., Piper, W., & Nehls, G. (2021):
Use of an INLA Latent Gaussian Modeling Approach to Assess Bird Population Changes Due to the Development of Offshore Wind Farms
Front. Mar. Sci. 8:701332. https://doi.org/10.3389/fmars.2021.701332

# VIBRATING INSTEAD OF HAMMERING: NEW RESEARCH PROJECT INVESTIGATES INNOVATIVE INSTALLATION TECHNIQUE FOR OFFSHORE FOUNDATIONS

18. May 2021


"VISSKA" is the German acronym for a research project aimed at aimed at exploring the use of vibratory pile driving at the Kaskasi II offshore wind farm, in terms of installation, noise emissions and impacts on harbour porpoises. BioConsult SH and RWE Renewables, itap GmbH as well as the University of Stuttgart (Institute of Geotechnical Engineering) and Technische Universität Berlin (Foundation Engineering and Soil Mechanics) just recently signed a corresponding cooperation agreement. The German Federal Ministry of Economic Affairs and Energy is funding the research project, which is being coordinated by RWE Renewables.

This year, RWE Renewables will start constructing the Kaskasi offshore wind farm (342 megawatts) off the German island of Heligoland. It will be the first offshore wind farm in the world to use the improved installation method for driving the wind turbine foundations into the seabed to target penetration depth. The innovative vibro pile driving method significantly speeds up the process of installing the foundations, is gentler in its impact on the structure and produces far less noise.
Up to now, foundations for offshore wind turbines have been driven into the seabed with individual blows from a hydraulic hammer. The new, reduced-noise process uses vertical vibrations to drive the foundations into position.

The pilot at Kaskasi is accompanied by a comprehensive research project. Together, the partners want to develop forecast models for installing monopiles using the vibro pile driving method, the associated noise emissions, and to validate these models through measurements in offshore conditions.
The response of harbour porpoises to continuous noise in contrast to impulse noise in terms of avoidance or displacement of these animals is still largely unknown. To gain more insight into this, BioConsult SH surveys harbour porpoises in digital aerial surveys (HiDef) and continuous recording of echolocation sounds using C-PODs in and around the site of offshore wind farm "KASKASI II" prior to, during and after vibratory piling. These data will allow to detect a possible response of harbour porpoises during construction works and to evaluate the acoustic effect of vibratory piling in the context of the protection of these animals.

The first offshore surveys are scheduled for summer 2021. The overall 38 foundations for the wind turbines will be installed from the third quarter of 2021 onwards. The final report of the 28-month research project is to be completed by early 2023.
The project's objective is to build and expand on the results from previous research in the area of vibro pile driving. In the long term, the innovative pile driving method is to be established as a lower noise and more environmentally friendly alternative to conventional hammering techniques.

# HOW DIFFERENT KNOWLEDGE OF SCIENTISTS AND FISHERMEN BENEFITS FISHERIES MANAGEMENT

13. Apr 2021

Fisheries management addresses problems and conflicts generated around the exploitation of complex socio-ecological systems. Fisheries policy makers need to receive the most complete information possible to minimise the risks of their decisions in a scenario of uncertainty. In fisheries, moreover, decision-making must consider the different perspectives of the actors involved in the process. Therefore, decision-making must be based both on the consideration of the available scientific evidence and the context in which it will be applied and the perception of fishermen (tacit knowledge). However, policy formulation has tended to prioritise formalised knowledge over contextualised knowledge.

In the recent article published in Sustainability, our colleague Raúl Vilela has collaborated with members of the applied economics department of the University of Santiago de Compostela and the Spanish Institute of Oceanography, in the framework of the LIFE iSEAS project, to establish a theoretical framework that explains not only why the knowledge of different types of actors differs, but also why it should do so and why this divergence is useful for advancing fisheries management. To this end, they have integrated the theory of perception and the evolutionary theory of innovation, which has made it possible to introduce the concept of proximity.

Rodríguez-Rodríguez, G., Ballesteros, H.M., Martínez-Cabrera, H., Vilela, R., Pennino, M.G. & Bellido, J.M. (2021):
On the Role of Perception: Understanding Stakeholders' Collaboration in Natural Resources Management through the Evolutionary Theory of Innovation
Sustainability 2021, 13, 3564. https:// doi.org/10.3390/su13063564

# VIDEO OBSERVATIONS AT NESTS OF THE HONEY BUZZARD

11. Mar 2021

Insights into a live in airy height: A paper published in the Corax journal by Fridtjof Ziesemer, Malte Schlüter and our colleague Thomas Grünkorn summarises the results of an observational study of honey buzzards at the nest.

In this study, two nests with two young each were observed using cameras until the young birds left the nest after about eight weeks. Aim of the study was to add to existing knowledge about behavioural patterns. Video footage and photographs allow for a detailed insight into a birds' life. In comparison to direct observations, relatively accurate analyses of the food spectrum or nighttime observations are possible based on especially video footage.


*Cameras also allow for nighttime observations. Here, a female tries to scare off a nocturnal threat.*

It was found for example that the young birds partly reacted aggressively or only reluctantly accepted the food when their parents returned to the nest with no or not their favourite food, i.e. wasp nests. In addition, the paper discusses further observations on the distribution of tasks between the male and female adults as well as nighttime behaviour.

The paper can be downloaded here.

The common buzzard is a further bird of prey species for which BioConsult SH carried out intense nest observations in a long-term project. Please refer to our project page for further information.

# CONGRATULATIONS!

02. Mar 2021

We congratulate our colleagues Anna Backes and Julika Voss who successfully completed their respective master thesis earlier this year! Both studies were part of projects carried out at BioConsult SH.

**Anna Backes** is part of our environmental and conservation planning team. She specialises in raised bogs as well as assessments, concepts for measures and reports for species protected under the Habitats Directive. She concluded her course of study in Environmental Management at the University of Kiel with her thesis “Degradation, succession, and regeneration processes in the raised bog Königsmoor – Classification of vegetation indicators with UAV data”. The study was part of a pilot project carried out by BioConsult SH on behalf of the Foundation for Nature Conservation (Stiftung Naturschutz) Schleswig-Holstein.

In her thesis, Anna analysed the degradation, succession and regeneration areas of raised bogs by training a random forest algorithm using 18 indicator plants and multi-spectral drone-based vegetation mapping aiming to automatically classify the entire area.

In the future, automated capture of single plant species or species groups of plants may facilitate monitoring of Natura 2000 sites or habitat analyses for single species.

After an internship ten years ago, **Julika Voß** stayed with us helping us out during her time at school and freelancing throughout her student time. She now concluded her studies in Marine Environmental Sciences (Marine Umweltwissenschaften) at the Carl von Ossietzky University of Oldenburg.

At BioConsult SH, Julika's thesis “Response of harbour porpoises (Phocoena phocoena L., 1758) to the FaunaGuard and subsequent piling during the construction of offshore wind farms” was supervised and initially examined by Dr. Armin Rose of our offshore team. The FaunaGuard is an acoustic system used to deter harbour porpoises temporarily from areas at risk of the occurrence of excess noise. In a cross-project evaluation, Julika analysed data of occasions where the system was used and compared these to data collected using previous methods.

The study shows that the FaunaGuard system is as an effective acoustic deterrence device for use in the North and Baltic Seas to deter harbour porpoises temporarily from a smaller area exposed to high levels of noise. Deterrence using the FaunaGuard system will therefore be an important step towards piling with less impact on the harbour porpoise.

We are proud for Anna and Julika and wish them both all the best for the future.

Backes, Anna M. (2021):
Degradation, succession, and regeneration processes in the raised bog Königsmoor - Classification of vegetation indicators with UAV data
Masterarbeit im Studiengang Environmental Management der Agrar- und Ernährungswissenschaftliche Fakultät der Christian-Albrechts-Universität zu Kiel

Voß, Julika (2021):
Response of harbour porpoises (Phocoena phocoena L., 1758) to the FaunaGuard and subsequent piling during the construction of offshore wind farms
Masterarbeit im Studiengang Marine Umweltwissenschaften der Carl von Ossietzky Universität Oldenburg

# MAPPING WHALES FROM SPACE – LATEST DEVELOPMENTS

18. Feb 2021

Satellites and very high-resolution cameras allow for surveys of large whales from space.

A paper, giving an overview of the current state of this method, the associated challenges and aims for future developments, has now been published in the Sensors journal. The paper is based on a workshop led by our colleague Caroline Höschle together with Hannah Cubaynes of British Antarctic Surveys in December 2019 at the World Marine Mammal Conference in Barcelona.

Workshop and paper are part of the SPACEWHALE project. In this project, we train an algorithm to detect large whales in very high-resolution (VHR) satellite imagery using artificial intelligence and deep-learning techniques. The VHR imagery has a spatial resolution of 31 cm/pixel on the ground and is capable of capturing whale-defining features such as flukes and flippers.

The paper can be downloaded at:

https://www.mdpi.com/1424-8220/21/3/963

Please refer to our project page for further information about SPACEWHALE.

# SPACEWHALE II – WHALES IN THE BAY OF BISCAY

11. Jan 2021

The Bay of Biscay off the coasts of France and Spain is the site of a further study of BioConsult SH's SPACEWHALE project. In this project – funded by the European Space Agency (ESA) – we train an algorithm to detect large whales in very high-resolution satellite imagery using artificial intelligence and deep-learning techniques.

Fieldwork is now successfully completed:

*Cuvier's beaked whale*

In a comparison of methods, an area of 4,000 km² was covered by HiDef aerial transect surveys recording digital video footage of the sea surface using a high-resolution camera system. WorldView 3 satellite imagery of the same area was taken almost simultaneously.

The Bay of Biscay is one of the European marine areas hosting the largest number of different whale species. Due to the partly steeply descending seafloor, deep diving species as for example the Cuvier's beaked whale (*Ziphius cavirostris*) will occur close to the coast. The investigated area includes a submarine canyon with up to 4,700 m deep valleys.

We were able to find fin whales and several pods of dolphins in the HiDef video footage. In a next step, the satellite imagery will be evaluated.

*Fin whale*

The SPACEWHALE project aims to develop a method to support surveys and monitoring of large whales using satellite imagery and image recognition. Please visit our project page and the pages of the European Space Agency (ESA) for further information about the project.

# USE OF DRONES IN SURVEY OF BIRD POPULATION FILMED BY NDR

30. Nov 2020

BioConsult SH annually monitors breeding populations in bird colonies in selected areas of the Wadden Sea using drones. In a report on the ornithological station on the island of Amrum, the NDR team also documented our staff at work. To find the report in the NDR media centre click here.

Sea birds breeding along the coast are counted every year. In this way, population developments as well as changes in the species composition can be determined. Usually, a lot of work is involved in counting the birds using binoculars and spotting scopes.

Use of drones and high-resolution cameras can support this work in bird colonies. Analysis of aerial photographs will enhance the accuracy of counts and at the same time minimise potential disturbances caused by the observer.

For further information on different areas of use of drones at BioConsult SH click here.

# DIVER ABUNDANCE REMAINS STABLE DESPITE FURTHER DEVELOPMENT OF OFFSHORE WIND FARMS

06. Jul 2020


On 25 July, BioConsult SH, together with IBL and IfAÖ, has presented a study on the abundance of red- and black-throated divers in the German North Sea to more than 50 interested authorities, associations and representatives of the wind energy industry. This study, carried out on behalf of the Association of German Offshore Wind Farm Operators (BWO) under the leadership of BioConsult SH, is based on the best currently available data on the abundance and distribution of red- and black-throated divers at sea. Possible impacts of offshore wind farms on the population and habitats of the two diver species were investigated. A new geostatic approach allows for model predictions with high spatial precision.

With an average estimated abundance of 16,500 birds, the spring population of divers in the German North Sea remained overall stable over the study period between 2001 and 2018 even after the increasing development of offshore wind energy use of the last years. Despite a spatial shift in the area with major diver aggregations north-east of the island of Sylt, diver populations in this area are still stable. The area remains to be of major importance for resting divers in spring. Avoidance distances of divers towards wind farms differed depending on regional and seasonal aspects. The largest theoretical habitat loss of 5 km around offshore wind farms was determined for the northern part of the study area in spring.

The study is a further important step towards an as nature-compatible as possible further development of wind energy use in German waters. The report can be downloaded here:

Vilela, R., Burger, C., Diederichs, A., Nehls, G., Bachl, F., Szostek, L., Freund, A., Braasch, A., Bellebaum, J., Beckers, B. & Piper, W. (2020):
Divers (Gavia spp.) in the German North Sea: Changes in Abundance and Effects of Offshore Wind Farms. Final Report.
Prepared for Bundesverband der Windparkbetreiber Offshore e.V.
Created by BioConsult SH GmbH & Co KG, Husum, IBL Umweltplanung GmbH, Oldenburg, Institut für Angewandte Ökosystemforschung GmbH, Hamburg

# THE HAZEL DORMOUSE – AGILE CLIMBER IN OUR HEDGEROW LANDSCAPE

08. Jun 2020

The hazel dormouse is critically endangerd in Schleswig-Holstein. The species is especially threatened by habitat fragmentation.
South of the Kiel Canal, BioConsult SH currently investigates populations of the hazel dormouse (*Muscardinus avellanarius*) in several smaller and larger project areas. Aim is to develop specific possibilities for action in case of interventions in the habitat of this species.
Please refer to our project site for further information.

# USING DRONES TO STUDY THE SOCIAL RELATIONSHIPS OF DOLPHINS

25. May 2020

How do you study the social behaviour of dolphins who spend most of their time underwater? A new study uses drone video footage to study the social relationships of a pod of Risso's dolphins (Grampus griseus) in the Azores, Portugal.

Collecting data is highly dependent on factors like group size and structure as well as the observation platform. Using drone video footage allows to collect new data regarding the relative position and synchronisation within the group for each individual, opening the door to perform statistical analyses of sociality that would not be possible using photo-ID from ship-based surveys. The paper has been prepared in collaboration with the Nova Atlantis Foundation, based in the Azores. It can be downloaded here:

Hartman, K., van der Harst, P. & Vilela, R. (2020):
Continuous Focal Group Follows Operated by a Drone Enable Analysis of the Relation Between Sociality and Position in a Group of Male Risso's Dolphins (Grampus griseus)
Front. Mar. Sci. 7:283. doi: 10.3389/fmars.2020.00283

There is also a video abstract giving an overview of the aims and methods of the project. You can find it here.

https://vimeo.com/384551409

# TELEMETRY OF DIVERS (DIVER) – PROJECT COMPLETED

21. Feb 2020

Divers are a group of aquatic birds breeding at water bodies in the tundra and taiga zones of the Northern Hemisphere. The German Bight is an important wintering area for the two diver species red- and black-throated diver.

So far, little has been known about origin and migration patterns of these birds. Within the framework of the DIVER-project, a total of 45 red-throated divers were fitted with satellite transmitters to investigate migration routes and movement patterns in especially the wintering area in the Eastern German Bight.

Major aims were to estimate potential threats and to develop suitable measures to protect diver species.

The results show extensive use of the eastern part of the German Bight as wintering area. Breeding areas of the tagged red-throated divers stretch from Greenland over Norway and Spitsbergen to Russia.

Investigations of the displacement of red-throated divers from offshore wind farms and the surrounding area formed an important part of the project. Based on the results of these investigations, recommendations for use of marine areas were developed to avoid or reduce negative effects of offshore wind farms and vessel traffic on red-throated divers in important wintering areas.

Please refer to the project page for further information and the results. Here, the final report is available for download.

# TELEMETRIC MONITORING OF EAGLE OWLS – PROJECT COMPLETED

20. Nov 2019

Several eagle owls in Schleswig-Holstein were equipped with GPS transmitters within the framework of a BioConsult SH telemetry study. The research project investigated habitat use and flight behaviour of the nocturnal eagle owl in the vicinity of existing wind farms. Aim was to provide a more accurate estimate of the risk for eagle owls to collide with wind turbines.

Two years and almost 2 million GPS data records later the final report is now available. The results yielded interesting findings on the home range size and gave insight into which areas are used by eagle owls apart from the breeding site.

The study was carried out on behalf of the Landesverband Eulen-Schutz Schleswig-Holstein funded by the the Ministry of Energy, Agriculture, the Environment, Nature and Digitalization (MELUND).

Here you can find further information about the project and download the final report.

# STUDY ON OFFSHORE WIND ENERGY USE AND MARINE PROTECTED AREAS IN THE MEDITERRANEAN

28. Oct 2019

Within the framework of an international project BioConsult SH has carried out a study on wind energy development in the Mediterranean on behalf of WWF France. There are no offshore wind farms in the Mediterranean region so far, but it is expected that this sector will rapidly develop over the next years. The BioConsult SH report summarises information about the impacts of offshore wind farms on the environment. The study provides an overview about possibilities to avoid and minimise negative influences and to develop monitoring programs against the background of existing and planned marine protected areas.

Over the past ten years, BioConsult SH has been involved in the accompanying ecological research in the field of offshore wind energy use and has carried out the first ever environmental impact study for an offshore wind farm in German waters.

Please refer to our project site for further information.

# BIOCONSULT SH SURVEYS WHALES FROM SPACE!

17. Oct 2019


In collaboration with ocean ecologists of the Stony Brook University in New York and HiDef Aerial Surveying Ltd from the UK, BioConsult SH has created a semi-automated process for whale detection from very high-resolution satellite images using deep learning artificial intelligence.

The algorithm was trained to classify whether a tile image was likely to contain a whale. The best model correctly classified 100 % of tiles with whales, and 95 % of tiles containing only water.

While the relatively poor resolution of commercially available satellite images continues to make whale identification a challenging problem, our approach provides the means to efficiently eliminate areas without whales and, in doing so, greatly accelerates whale surveys.

Please refer to our project site for further information.

# IMPORTANT: NEW PHONE NUMBER!

01. Sep 2019

On Sept. 13th we'll get a new phone number and BioConsult SH will therefore only partly reachable via landline on that day. The new number is: +49 (0)4841 77937-0
Information on updated extension numbers for employees, can be found on our website from Sept. 12th. 2019.

# NDR REPORT ON SEAL COUNTS IN THE WADDEN SEA

28. Aug 2019

Regular surveys of harbour and grey seal populations are carried out from the aircraft in the Danish-Dutch-German Wadden Sea National Parks. Since 2016, BioConsult SH carries out aerial surveys in the Schleswig-Holstein Wadden Sea on behalf of the government-owned Company for Coastal Protection, National Parks and Ocean Protection (Landesbetrieb für Küstenschutz, Nationalpark und Meeresschutz – LKN Tönning).

*Adult seals (red dots) with this year's young (yellow dots) on a sand bank. (Click the image for a larger view.)*

During aerial surveys, all seal haul-out sites in the Schleswig-Holstein Wadden Sea are covered at low tide capturing digital photographs. The exact number of seals in these photographs is determined subsequently.

Recently, a camera team of the Norddeutscher Rundfunk accompanied our biologists on one of these flights. The report is available from the media centre.

For further information on seal monitoring, click here.

# PODS DEPLOYED MORE THAN 4000 TIMES IN HARBOUR PORPOISE MONITORING

14. Aug 2019

An important focus of monitoring harbour porpoises for research and construction projects in marine areas is on distribution patterns and reactions of harbour porpoises towards noise-intensive construction measures. But how exactly are these animals, which spend a major part of their lives below the sea surface, monitored?

To achieve this, BioConsult SH uses so-called PODs in addition to aerial and ship-based surveys. The abbreviation stands for Porpoise Detector. These are instruments containing a battery-powered hydrophone and a storage device to record echolocation sounds of harbour porpoises (and other toothed whales). They are able to detect the presence of whales within a radius of up to about 100 m. The approximately 90 cm long devices are deployed in the study area and firmly fixed at a depth of between 5 and 40 metres. After 4 to 6 weeks, the PODs are retrieved and long-term data can be downloaded and evaluated.

PODs are used worldwide. BioConsult SH deployed the first of these devices in July 2008. Eleven years later, our devices have been deployed more than 4000 times in the North and Baltic Seas for many different projects. In March 2019 alone, 101 PODs maintained by BioConsult SH were in use simultaneously. Every year, about 100 GBs of data are recorded. Together with data of aerial and ship-based counts as well as HiDef surveys these data are the basis for environmental impact assessments and research reports.

# BASKING SHARK AND MINKE WHALE SURVEYS IN SCOTTISH WATERS

31. Jan 2019

Our HiDef Aerial Surveying Ltd colleagues in England have carried out a pilot study on the abundance of basking sharks and minke whales within the Sea of the Hebrides. Three surveys have been carried out showing that digital aerial surveys using high-definition cameras are suitable for collecting data on these animals.

Whereas minke whales were only observed in very small numbers due to their typically long and deep dives, the method achieved very good results for basking sharks. Basking sharks filter-feed on plankton near the surface.

Scottish Natural Heritage has published the study in the "SNH Research Report 974 – Basking shark and minke whale pilot aerial survey report". The report is available for download from the Scottish Natural Heritage website.

*Two basking sharks recorded in an aerial survey in Scottland.*

In Europe, basking sharks are mainly distributed within the Irish Sea between Scotland and Ireland. In the North Sea, they are rare visitors but even here single individuals were already captured by our cameras. Even a minke whale could be recorded in the North Sea.

Since 2016, the English company HiDef Aerial Surveying Ltd is part of BioConsult SH.

For more information on our digital aerial surveys, click here.

# 5 YEARS OF HIDEF – 300 FLIGHTS – 2 MILLION BIRDS

15. Jan 2019

Five years ago, BioConsult SH has started with digital surveys of birds and marine mammals for projects in the North and Baltic seas. Where ornithologists were once counting whales and birds from the aircraft, high-definition cameras now film the sea surface. Evaluation then takes place in the office.

Just in time for the fifth anniversary, an aircraft of our Danish partner Bioflight A/S has touched down for the 300th time with video footage recorded in an aerial survey above the North Sea.

Since the first year, about 250,000 km of transects were covered, which is more than six times around the world. Aircraft were in the air for about 1130 hours corresponding to 47 days. The total area covered is about nine times the size of Schleswig-Holstein or as large as 18.9 million soccer pitches. At a rate of seven recorded frames per second, video footage consisting of about 28.5 million single frames was recorded – and watched.

Thus, our HiDef team colleagues spotted and identified more than 2 million birds. Over 100 species have been identified so far. More than 40,000 seals and whales, mainly harbour porpoises, harbour seals and grey seals, are to be added. We always appreciate highlights like ocean sunfish, basking shark and common minke whale.

We are looking forward to further exciting observations. But above all, we hope that our pilots will continue to always land safely!

Grey heron, harbour porpoises, oystercatcher and barnacle geese recorded in aerial surveys.

# DIGITAL AND VISUAL – TWO SURVEY METHODS IN COMPARISON

07. Jan 2019

Since 2014, BioConsult SH has used high-definition aerial video technology to perform digital aerial surveys to record sea birds and marine mammals. There have been questions around the advantages and disadvantages of this method and how the results compare to those from traditional visual aerial survey flights. To answer these questions, parallel flights were carried out using the HiDef method closely followed by a visual aerial survey team. The results of this study are now published in the Journal of Ornithology.

Among other things the study shows that the digital survey provided higher numbers of bird sightings and higher spatial accuracy than the visual survey. Also, more individuals were identified to species level in the digital survey dataset for the majority of taxonomic groups. These advantages supplement other previously identified benefits of digital aerial surveys, such as the elimination of bird disturbance due to high flight altitude, reduced observer bias, and availability of raw data for quality assurance.

Žydelis, R., Dorsch, M., Heinänen, S., Nehls, G. & Weiss, F.
Comparison of digital video surveys with visual aerial surveys for bird monitoring at sea.
J Ornithol (2019). https://doi.org/10.1007/s10336-018-1622-4

For more information on our digital aerial surveys, click here.

# THE EAGLE OWL RESEARCH PROJECT ON TELEVISION

27. Sep 2018

BioConsult SH on television! The NDR television programme “NaturNah” features the eagle owl research project. The camera accompanies biologists Thomas Grünkorn and Jorg Welcker from nocturnal capture of the eagle owls and fitting of the GPS transmitters to evaluation of the data in the office.

The eagle owl is Germany's largest owl species. The research project investigates habitat use and flight behaviour of the nocturnal eagle owl in the vicinity of existing wind farms. Aim is to provide a more accurate estimate of the risk for eagle owls to collide with wind turbines.

You can stream the episode of “NaturNah” from the website of the NDR.

Also on the website there is an interview with Thomas Grünkorn explaining about the work involved with the project work as well as the life of the eagle owls.

# NEW STUDY ON BIRD MIGRATION ACROSS THE GERMAN NORTH AND BALTIC SEAS

26. Sep 2018

A large number of birds migrate across the German part of the Baltic and North Seas every year. But how exactly does bird migration take place over the sea? What influence does the weather have? How high is the risk that birds migrating across the sea collide with wind turbines? These questions are addressed in a current BioConsult SH project.

Collisions of birds with wind turbines are usually considered to be a major conflict between nature conservation and further development of offshore wind farms. So far, only little information is available on temporal and spatial migration patterns in the offshore area. The project summarises and evaluates data of many years of monitoring. Aim is to create models describing nocturnal bird migration. In addition, models are to be developed to predict the risk that birds collide.

Please refer to the project site for further information on the project.

# TRACKING DOWN THE EAGLE OWL – THE EAGLE OWL RESEARCH PROJECT ON TELEVISION

05. Sep 2018

BioConsult SH on television! The NDR television programme “NaturNah” features the eagle owl research project. The report is scheduled for broadcast on Tuesday, 25 September at 18:15 (rerun on Thursday, 27 September at 11:30).

The camera accompanies biologists Thomas Grünkorn and Jorg Welcker from nocturnal capture of the eagle owls and fitting of the GPS transmitters to evaluation of the data in the office.

The eagle owl is Germany's largest owl species. The research project investigates habitat use and flight behaviour of the nocturnal eagle owl in the vicinity of existing wind farms. Aim is to provide a more accurate estimate of the risk for eagle owls to collide with wind turbines.

Here you can find further information on the television report (in German).

# CLIMATE CHANGE AND BIRDS BREEDING ON THE HALLIGEN

19. Jul 2018

What does the rise of the sea level mean for birds breeding on the Halligen in the Schleswig-Holstein Wadden Sea? This question was addressed in a current BioConsult SH study on behalf of the WWF Germany.

In the future, the Halligen will be particularly affected by the rise of the sea level due to more frequent flooding. This will impact the people living there but also the avifauna and in particular the breeding birds. Hosting a considerable proportion of coastal bird populations, the Halligen are of major importance for these birds.

The study presents direct and indirect impacts of the climate change on the breeding birds and identifies possible joint solutions of coastal protection and nature conservation to protect these birds.

Please refer to the project site for further information on the project.

# THE EFFECTS OF THE CONSTRUCTION OF OFFSHORE WIND FARMS ON HARBOUR PORPOISES

12. Jun 2018

We are delighted to announce that results from our GESCHA 1 study on the effects of the construction of seven offshore wind farms in German waters between 2010 and 2013 on harbour porpoises are now published in Marine Ecology Progress Series (www.int-res.com/abstracts/meps/v596/p213-232/).

Investigations were conducted using acoustic porpoise monitoring data and noise measurements during construction of the first seven large-scale offshore wind farms in the German Bight, the majority of which was constructed using noise mitigation systems (NMS). We found a clear gradient in the decline of porpoise detections after piling, depending on noise level and distance to piling. Declines were found at sound levels exceeding 143 dB re 1 µPa²s (SEL05) and up to 17 km from piling. When only considering piling events with NMS, the maximum effect distance was 14 km and porpoise detections declined to a smaller extent. Within the vicinity of construction, porpoise detections declined several hours before the start of piling and were reduced for about 1–2 days after piling. Use of first generation NMS thus clearly reduced harbour porpoise disturbance. Since then, NMS have continuously improved and even stronger reductions of disturbance effects are expected in more recent projects.

Brandt MJ, Dragon AC, Diederichs A, Bellmann MA, Wahl V, Piper W, Nabe-Nielsen J, Nehls G (2018) Disturbance of harbour porpoises during construction of the first seven offshore wind farms in Germany. Mar Ecol Prog Ser 596:213–232.

# ECOLOGICAL EFFECTS OF OFFSHORE-WIND FARMS: AN INTERVIEW WITH DR. GEORG NEHLS

06. Jun 2018

What impact does the construction and operation of offshore wind farms have on birds and marine animals? What measures can be taken to minimize any negative effects? These and other questions are discussed by Dr. Georg Nehls, Director of BioConsult SH, in an interview with the online portal „energie-winde.de“.

Read the full interview here (in German):

www.energie-winde.de/mensch-und-umwelt/details/schweinswale-in-offshore-wind-parks.html

# BIOCONSULT SH LAUNCHES SPACEWHALE

19. Apr 2018

Funded by the European Space Agency (ESA) and in collaboration with the Norwegian Institute of Marine Research, Bergen, BioConsult SH follows a cutting-edge approach to automatically detect marine megafauna, especially whales, by analysing Very High Resolution (VHR) satellite images: SPACEWHALE.

Satellite images are now available at very high resolutions of < 50 cm which allows detecting whales and other marine megafauna. The challenge in using these images is the tremendous effort needed to survey vast marine areas where the densities of such animals are very low. To overcome this problem, a combination of machine learning and vision tools will be applied to perform automatic detection of marine megafauna. The project will build on extensive experience on automatic object detection and classification developed by BioConsult SH and its sister company HiDef Aerial Surveying and makes use of their unique databases of digital aerial video footage. The new method will greatly enhance the abilities to survey whales at large scales and thus opens new opportunities for population studies.

A wide range of people interested in whales can be provided with consistent large-scale surveys and population assessments of marine megafauna. The project intends to especially enhance the conservation of endangered species. Research institutes, governmental agencies for nature conservation, fisheries authorities and NGOs engaged in the protection of marine wildlife as well as oil & gas companies performing seismic surveys and whale watching companies will benefit from these large-scale surveys.

*Common minke whale*

# WHERE DO EAGLE OWLS FLY WHEN NIGHT FALLS?

09. Apr 2018

... and how high do they fly in doing so? These are just some of the questions addressed in a current BioConsult SH project. In particular the potential vulnerability of these nocturnal birds to collide with wind turbines will be assessed. Several eagle owls in Schleswig-Holstein have been equipped with GPS transmitters within the framework of a telemetry study. The first months of investigation yielded interesting findings on the size of the home range and gave insight into which areas are used by eagle owls apart from the breeding site. For further information on the project and the first results please see here.

# WADDEN SEA QUALITY STATUS REPORT 2017 ISSUED

04. Jan 2018

At regular intervals, the Common Wadden Sea Secretariat issues assessment reports on the current ecological status of the Wadden Sea (Wadden Sea Quality Status Report – QSR ). These reports, compiled in a trilateral cooperation between Denmark, Germany and the Netherlands, describe and evaluate current developments within the Wadden Sea ecosystem identifying possible causes, issues of concern as well as gaps in knowledge.

As in previous Quality Status Reports, several reports in the sections „Habitats and communities“, „Species“ and „Humans activities“ have been prepared by BioConsult SH. These reports are also available on our website.

# SEAL CENSUS 2017

06. Dec 2017

Since 2016, BioConsult SH carries out aerial surveys to assess the harbour and grey seal population in the Schleswig-Holstein Wadden Sea on behalf of the government-owned Company for Coastal Protection, National Parks and Ocean Protection (Landesbetrieb für Küstenschutz, Nationalpark und Meeresschutz – LKN Tönning). The results of the 2017 seal census are available now. In August, a total of 8,834 seals were counted in the Schleswig-Holstein Wadden Sea, a number exceeding the two counts of the previous year. The number of animals is now as high as before the population decline between 2014 and 2016. Visit the seal monitoring section of our website for further information.

# VIDEO FOOTAGE FEATURING WHITE-BEAKED DOLPHINS AND A COMMON MINKE WHALE

05. Oct 2017

Normally, harbour porpoises, seals or marine birds show on the footage of our digital aerial surveys. After basking shark and ocean sunfish our colleagues were pleased to find further exciting recordings of not quite so common species: white-beaked dolphin (*Lagenorhynchus albirostris*) and common minke whale (*Balaenoptera acutorostrata*).

The **white-beaked dolphin** is endemic to the North Atlantic Ocean and the North Sea with a few sightings in the western part of the Baltic Sea. The geographic range stretches between Massachusetts in the USA and France in the south and up to the Arctic ice pack between Southern Greenland and Svalbard in the north. After harbour porpoises, white-beaked dolphins are the second most common cetacean species in the North but can unlike these usually be found in open waters. In the North Sea they are often observed in the Dogger Bank area. In a comprehensive survey of all dolphin species in the European Atlantic Ocean as well as North and Baltic Sea about 10,000 individuals were counted in 2005.

Even at birth these dolphins, which can live as long as 37 years, are more than one metre long. Adult males measure just more than three metres. Characteristic are the name-giving white beak and the light grey “saddle” behind the dorsal fin as can be seen in the animals in the picture.

Despite their smaller size **common minke whales** are counted among the great whales. They are a relatively common species of baleen whales. In the Northern Hemisphere they are widely distributed in the North Atlantic and the North Pacific Ocean. While these animals prefer warmer waters in winter, they partly migrate up the the Arctic ice pack in summer. Some whale populations even stay in the same area all year round. Common minke whales usually live solitary or can be observed in pairs or smaller groups. They mainly feed on schooling fish (herring, capelin) and crustaceans. In the North Sea sandeels are an important source of food for the whales.

Fully grown common minke whales are about ten metres long and weigh more than nine tonnes. They reach an age of up to 50 years. Like the white-beaked dolphin, the common minke whale mainly occurs offshore in the North Sea and can occasionally be observed especially in the Dogger Bank area. The white band on the upper side of each flipper, clearly visible in the picture, is typical for common minke whales.

# OFFSHORE WIND ENERGY 2017

09. Jun 2017

London Offshore Wind 6.-8. June 2017

BioConsult SH GmbH & Co.KG participated at the worlds largest offshore conference and exhibition with an own stand, posters and a talk to present our and HiDef´s expertise in environmental monitoring and consulting.

The participation was funded by WT.SH GmbH

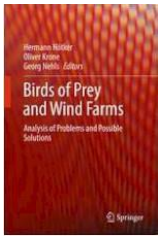
We foster the economy

EU.SH

Regional Economic Programme: Funded by the European Union - European Regional Development Fund (ERDF), the Federal Government and Land Schleswig-Holstein

# BOOK RELEASE: “BIRDS OF PREY AND WIND FARMS: ANALYSIS OF PROBLEMS AND POSSIBLE SOLUTIONS”

05. May 2017




This book discusses the increase in number and capacity of wind farms in Germany and how this is affecting birds of prey. Several methods are used to study the behaviour of birds of prey in relation to wind farms, including telemetry data, field observations, and comparisons of turbine base areas. Special attention is given to the effects on different bird species and the impact wind farms may have on population growth and breeding success of birds of prey. Chapter 6 discusses the collision risks at wind turbines and provides an analysis of the fatalities. In the concluding chapter, ideas are put forward to help minimize conflicts, estimate risks, and offer practical recommendations for future research.

This book will be of interest to wind farm developers, researchers, applied ecologists and landscape planners.

Editors: Hötker, Hermann; Krone, Oliver; Nehls, Georg (Eds.)

Link to the publisher's website

# ”FROM AVIAN TRACKING TO POPULATION PROCESS”: BRITISH ORNITHOLOGISTS' UNION 2017 ANNUAL CONFERENCE

12. Apr 2017

This year’s BOU conference ”From avian tracking to population process” took place from the 28th to the 30th of March 2017 at the University of Warwick (UK) and some results of the DIVER project were presented.

The conference covered topics of movement ecology and their consequences for a suite of population processes. The objective of the conference was to bring together ornithologists and ecologists from academic and conservation organisations, to explore how the tracking of individuals can help to address key questions about population processes and their implications for conservation and management.

The two posters featuring the DIVER project displayed data of tracked red-throated divers, where one focused on site fidelity and temporal consistency during migration, moult and wintering, while the other had its focus on mobility and space utilisation during the annual cycle.

**Abstracts:**

Kleinschmidt, B., Dorsch, M., Žydelis, R., Heinänen, S., Morkūnas, J., Burger, C., Nehls, G. & Quillfeldt, P.
Site fidelity and temporal consistency of Red-throated Divers (Gavia stellata) during migration, moult and wintering

Žydelis, R., Dorsch, M., Heinänen, S., Kleinschmidt, B., Morkūnas, J., Quillfeldt, P. & Nehls, G.
High mobility of Red-throated Divers revealed by satellite telemetry

**Poster:**

Kleinschmidt, B., Dorsch, M., Žydelis, R., Heinänen, S., Morkūnas, J., Burger, C., Nehls, G. & Quillfeldt, P.
Site fidelity and temporal consistency of red-throated divers (Gavia stellata) during migration, moult & wintering
British Ornithologists' Union 2017 Annual Conference, University of Warwick, UK (2017)

Žydelis, R., Dorsch, M., Heinänen, S., Kleinschmidt, B., Morkūnas, J., Quillfeldt, P. & Nehls, G.
High mobility of Red-throated Divers revealed by satellite telemetry
British Ornithologists' Union 2017 Annual Conference, University of Warwick, UK (2017)

**Abstract book:**

British Ornithologists’ Union
Abstract book - BOU 2017

Visit the DIVER project site on the BioConsult SH webpage.

More information about the project as well as daily updated tracks of tagged divers can be found on the dedicated DIVER project webpage.

# PROGRESS DISCUSSION MEETING: SUMMARY PUBLISHED

16. Mar 2017

About 150 representatives from authorities, academia, associations and companies from all over Germany as well as from Switzerland took part in a discussion meeting on the results of the research project "Prognosis and assessment of bird collision risks at wind turbines in northern Germany" that was held on the 17th of November 2017 in Hanover and was organized by the "Fachagentur Windenergie an Land e. V." (FA Wind). The meeting had several objectives: firstly, the new findings of the PROGRESS study were to be presented, discussed and evaluated. On the other hand, potential planning-relevant practical consequences were to be discussed.

In three lectures the researchers presented the most important results of the study. In a subsequent panel discussion, the results were then evaluated and the possible effects on the planning practice were discussed with the participants. A lecture on legal aspects concluded the event.

The results of this event are summarized in the following report:

Fachagentur Windenergie an Land e.V. (Hrsg.)
Windenergie und Artenschutz: Ergebnisse aus dem Forschungsvorhaben PROGRESS und praxisrelevante Konsequenzen

to the project site

# 1ST INTERNATIONAL CONFERENCE ON RADAR AEROECOLOGY: APPLICATIONS AND PERSPECTIVES

21. Feb 2017

The 1st International Conference on Radar Aeroecology takes place on February 23rd/24th in Rome. This Conference is an initiative of ENRAM (European Network for the Radar surveillance of Animal Movement) and brings together experts working with different radar technologies and different species (birds, insects, bats) to present the state-of-the-art of the current research on radar aeroecology and to discuss future challenges. Jan Blew from BioConsult wil give a presentation on “Results of pencil beam and surveillance radar compared to German and Danish weather radar at the Baltic sea coast” in the session “Advances in radar methodology” (abstract, see below).

Blew, J.

Results of Pencil Beam and Surveillance Radar compared to German and Danish Weather Radar at the Baltic Sea Coast.

1st International Conference on Radar Aeroecology: Applications and perspectives

Radar-Aeroecology-conference-programme

Moreover, a three-day practical workshop on the processing of weather radar data takes place prior to the conference, with our employee Vladislav Kosarev as one of the instructors.

1st International Conference on Radar Aeroecology: Applications and perspectives
ENRAM-training-school-agenda

# INTERNATIONAL WORKSHOP ON RED-THROATED DIVERS, 24./25. OF NOVEMBER 2016, HAMBURG

08. Dec 2016

As a part of the DIVER project an international workshop on Red-throated Divers was held on the premises of the BSH in Hamburg from the 24th to the 25th of November 2016. The workshop was a great success with more than 40 participants including diver researchers from different countries, representatives of German regulators and offshore wind energy industry.

During the 2-day meeting interim results of the DIVER project as well as presentations of international diver experts from Germany, Denmark, Sweden, the Netherlands, Lithuania, UK and the US were presented and discussed. The main focus of these presentations and discussions was on the effect of offshore wind farms on divers, but also on different aspects of diver biology, such as diver diet and migration patterns.

The workshop agenda as well as most of the presentations (published with the permission of the authors) can be found on the DIVER website.

# FIRST RESULTS OF LARGE-SCALE DIGITAL AERIAL SURVEYS WITH A FOCUS ON DIVERS IN THEIR CORE WINTERING AND STAGING AREA IN THE GERMAN NORTH SEA.

18. Oct 2016

As part of the DIVER project, data from two large-scale digital aerial surveys performed in April and May 2016 covering the core diver wintering and staging area in the German North Sea were analysed. These surveys were conducted within our partner project HELBIRD of the “Forschungs- und Technologiezentrum Westküste” (FTZ, Büsum, Germany).

A total of 1,427 (April 2016) and 1,122 (May 2016) divers could be detected on the recorded video material from these surveys. Originating from a coverage of 6.55% of the study area, a simple extrapolation of these numbers leads to estimates of approximately 21,700 and 17,100 divers, respectively, in the surveyed areas for these two months. Identification rate of divers was high for both surveys with more than 97% of divers being identified to the species level. Almost all divers identified were Red-throated Divers. These numbers indicate that diver abundance and especially that of Red-throated Divers is considerably underestimated in the standard data forms of the Natura 2000 areas in this region: there 3,580 divers (3,300 Red-throated Divers) are listed as a maximum estimate for the SPA Eastern German Bight and 10,500 divers (10,000 Red-throated Divers) for the larger SCI “Sylter Außenriff”.

Diver distributions from these two aerial surveys demonstrate that divers clearly avoid areas of offshore wind farms in the surveyed area. This confirms results of the satellite telemetry analyses conducted within the DIVER project, which also indicate that divers avoid offshore wind farms.

Please also check out a brief introduction to the DIVER project on our website, or visit the DIVER project website itself.

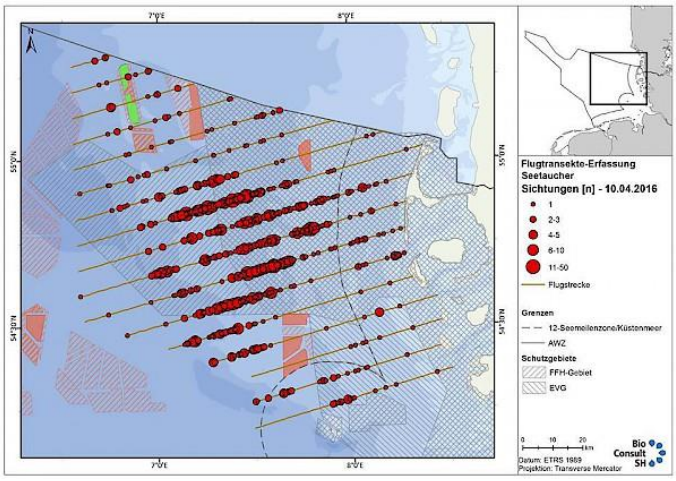



**Fig. 1:** Diver observations of the digital aerial surveys from 10.04.2016.

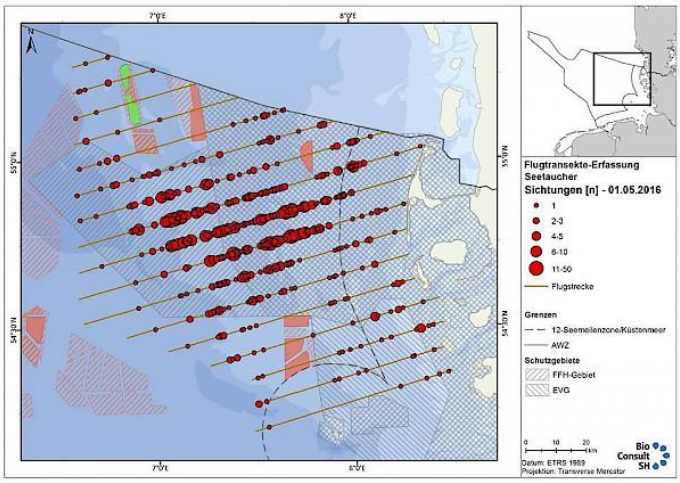



***Fig. 2:*** *Diver observations of the digital aerial surveys from 01.05.2016.*

# BIOCONSULT SH WELCOMES HIDEF-TEAM

12. Aug 2016

Since the 1st of August 2016 the english company HiDef Aerial Surveying Ltd has become a part of BioConsult SH and we welcome our new team members!

Both companies have already been closely collaborating for the last three years and BioConsult SH is conducting sea bird and marine mammal population surveys in the North and Baltic Sea since 2014 using the high definition video camera system that has been developed by HiDef Aerial Surveying Ltd (see also our field of work "HiDef - digital aerial surveys"). The method that has been developed by HiDef Aerial Surveying Ltd represents a new standard for ecological population surveys and provides significantly improved data sets for impact assessment studies and Nature conservation projects.

The merging of HiDef Aerial Surveying Ltd and BioConsult SH combines the profound experience of both companies in the fields of sea bird and marine mammal aerial surveys as well as marine ecological research. Furthermore, HiDef Aerial Surveying will be able to expand their spectrum of provided services by drawing from BioConsult SH's expertise as a consultancy firm.

HiDef Aerial Surveying will continue to be lead by CEO Kit Hawkins.

For more information please visit http://www.hidefsurveying.co.uk/latest-news.html

# GESCHA FINAL REPORT PUBLISHED.

27. Jul 2016

The project was conducted by BioConsult SH GmbH & Co KG, IBL Umweltplanung GmbH and IfAÖ GmbH and commissioned by „Arbeitskreis Schallschutz“ of the Offshore Forum Windenergie, in which all wind farm developers with projects within the German North Sea are represented.

The project employs a comprehensive and unique dataset that did not previously exist in a similar form worldwide. It is comprised of hydrosound measurements, C-POD data from passive acoustic monitoring of harbour porpoises, porpoise abundance data from aerial surveys and detailed information on installation characteristics that were provided by the developers and operators of eight offshore wind farms within the German North Sea.

Between 2009 and 2013 eight offshore wind farms with a total of over 400 wind turbines were constructed within the EEZ of the German North Sea and coastal waters of Lower Saxony. For all projects steel foundations were driven into the seabed using impulse ramming procedures. Extensive environmental monitoring was conducted before and during construction during all projects. Furthermore, additional data were collected on noise emission and porpoise presence within the vicinity of construction sites. The collection and combination of all this information formed a large dataset on abundance and distribution of harbour porpoises within the German Bight and on noise emission into the water column during pile driving procedures, which had previously only been analysed for the individual projects. Therefore, this dataset provides a solid and extensive database for a comprehensive study on disturbance effects of offshore construction activities on harbour porpoises.

In order to achieve the best possible assessment of harbour porpoise distribution within the German Bight, data were complemented by porpoise monitoring data from seven further wind farm projects, which in 2013 were still in the planning phase and partly realized during later years. In this way, almost all relevant information available for the German Bight was compiled and transferred into a single joint database.

**Project aims**

The aim of this study was to utilize the data on abundance and distribution of harbour porpoises collected within the framework of offshore wind energy development and production within the German Bight so far, within joint cross-project analyses. Central to the study objectives weres analyzing and assessing significant disturbance effects as defined in § 44 Abs. 1 Nr. 2 BNatSchG caused by pile driving during the installation of turbine foundations. Both, small-scale as well as broader scale temporal and spatial aspects of disturbance were considered and addressed. Furthermore, abundance and distribution of harbour porpoises over a four to five year time period were assessed against the background of increasing piling activities over this time period.

Please find the final report for download below:

Brandt, M. J., Dragon, A.-C., Diederichs, A., Schubert, A., Kosarev, V., Nehls, G., Wahl, V., Michalik, A., Braasch, A., Hinz, C., Ketzer, C., Todeskino, D., Gauger, M., Laczny, M. & Piper, W. Effects of offshore pile driving on harbour porpoise abundance in the German Bight Im Auftrag des „Arbeitskreis Schallschutz“ des Offshore Forums Windenergie. Created by BioConsult SH GmbH & Co KG, Husum; IBL Umweltplanung GmbH, Oldenburg; Institut für Angewandte Ökosystemforschung GmbH, Hamburg

# GREY SEAL FEEDS ON A JUVENILE HARBOUR PORPOISE

25. Jul 2016

It has only been known for a few years that male grey seals (Halichoerus grypus) also prey and feed on harbor porpoises (Phocoena phocoena). On the 12th of August 2015, two of our staff witnessed such a spectacular event while they were observing birds for the environmental monitoring for the offshore wind farm "Dan Tysk".

They spotted and then recorded a male grey seal (identifiable by the shape and size of its head) devouring a young harbor porpoise. In the brief movie below it can be seen how the grey seal handles the harbor porpoise with its pectoral flippers, tearing off and feeding on pieces of blubber. Muscles and intestines are also gradually consumed. At the time our colleagues detected the seal, the porpoise was already dead; therefore, it remains unclear whether the porpoise had been killed by the grey seal.

You can watch the video here:

https://vimeo.com/176144943

Similar observations have only been reported and documented in recent years. The first reports in 2012 were on harbor porpoise carcasses that had stranded on the Belgian and Dutch coast and showed grey seal bite marks from which grey seal DNA could be recovered (1,2,3). Off the coast of France, in the eastern English Channel, observations of grey seals preying on and scavenging porpoises were recorded (4). In the UK, male grey seals were observed attacking, immobilizing and consuming harbor porpoises (also taped on video) (5).

**References:**


1. Haelters, J., Kerckhof, F., Jauniaux, T. & Degraer, S.
   The grey seal (*Halichoerus grypus*) as a predator of harbour porpoises (*Phocoena phocoena*)? Aquatic Mammals, 38 (4), 343-353.
2. Leopold, M. F., Begeman, L., van Bleijswijk, J. D. L., Ijsseldijk, L. L., Witte, H. J. & Gröne, A.
   Exposing the grey seal as a major predator of harbour porpoises. Proceedings of the Royal Society of London B: Biological Sciences, 282 (1798).
3. van Bleijswijk, J. D. L., Begeman, L., Witte, H. J., IJsseldijk, L. L., Brasseur, S. M. J. M., Gröne, A. & Leopold, M.F.
   Detection of grey seal Halichoerus grypus DNA in attack wounds on stranded harbour porpoises *Phocoena phocoena*. Marine Ecology Progress Series, 513, 277-281.
4. Bouveroux, T., Kiszka, J. J., Heithaus, M. R., Jauniaux, T. & Pezeril, S.
   Direct evidence for gray seal (*Halichoerus grypus*) predation and scavenging on harbor porpoises (*Phocoena phocoena*). Marine Mammal Science, 30 (4), 1542-1548.
5. Stringell, T., Hill, D., Rees, D., Rees, F., Rees, P., Morgan, G., Morgan, L. & Morris, C.
   Predation of harbour porpoises (Phocoena phocoena) by grey seals (Halichoerus grypus) in Wales. Aquatic Mammals. 41 (2), 188-191.

# PROGRESS FINAL REPORT PUBLISHED

28. Jun 2016

In June 2016 the project PROGRESS was completed successfully. The final report or a summary can be dowloaded using the following links:

final report (in german):

Grünkorn, T., Blew, J., Coppack, T., Krüger, O., Nehls, G., Potiek, A., Reichenbach, M., von Rönn, J., Timmermann, H. & Weitekamp, S.
Ermittlung der Kollisionsraten von (Greif-)Vögeln und Schaffung planungsbezogener Grundlagen für die Prognose und Bewertung des Kollisionsrisikos durch Windenergieanlagen (PROGRESS)
Created by BioConsult SH, ARSU, IfAÖ & Universität Bielefeld

summary and conclusions (in german):

Grünkorn, T., Blew, J., Coppack, T., Krüger, O., Nehls, G., Potiek, A., Reichenbach, M., von Rönn, J., Timmermann, H. & Weitekamp, S.
Ermittlung der Kollisionsraten von (Greif-)Vögeln und Schaffung planungsbezogener Grundlagen für die Prognose und Bewertung des Kollisionsrisikos durch Windenergieanlagen (PROGRESS) (Zusammenfassung)
Created by BioConsult SH, ARSU, IfAÖ & Universität Bielefeld

The PROGRESS team thanks all its contributors and those who have supported or accompanied it throughout the years.

to the project site

# ECS 2016 – 30TH CONFERENCE OF THE „EUROPEAN CETACEAN SOCIETY“

25. Apr 2016

From the 14th to the 16th of March 2016 three BioConsult SH employees attended the 30th conference of the „European Cetacean Society“ in Funchal, Madeira. Three poster were presented during the main conference and two presentations were given during a Scientific Advisory Committee "Best Practices" Wokshop on "Measuring and Interpreting Behavioural Responses of Marine Mammals at Sea to Anthropogenic Sounds". One of these talks presented our study on behavioural responses of harbour porpoises to sealscarer sound, while the other summarized the results of some of our studies on porpoise responses to offshore pile driving noise.

**Presentations:**

Brandt, M. J., Höschle, C., Diederichs, A., Betke, K. & Nehls, G.
Behavioural responses of harbor porpoises (Phocoena phocoena) to a Lofitech seal scarer

Brandt, M. J., Diederichs, A., Betke, K., Rose, A. & Nehls, G.
Responses of harbour porpoises to offshore pile driving

**Poster:**

Brandt, M. J., Schäfer, V., Diederichs, A. & Nehls, G.
Can diel rhythms of harbour porpoise click recordings reveal information on foraging behaviour and prey choice?
30th Annual Conference of the European Cetacean Society, Madeira, Portugal (2016)

Rose,A., Diederichs, A., Kosarev, V., Liesenjohann, T., Schubert, A., Bellmann, M. & Nehls, G.
Harbour porpoise detection rates decreased from up to one day before pile driving for the offshore wind farm Global Tech I
30th Annual Conference of the European Cetacean Society, Madeira, Portugal (2016)

Schubert, A., Diederichs, A., Kosarev, V. & Nehls, G.
Is the swimming direction of harbour porpoise affected by seal scarer and/or pile driving?
30th Annual Conference of the European Cetacean Society, Madeira, Portugal (2016)

# 100TH HIDEF FLIGHT

23. Mar 2016

On February 28, 2016 the Partenavia P68 of our Danish colleagues from bioflight A / S set down on the tarmac of the Husum-Schwesing airport and the 100th HiDef aerial survey by BioConsult SH was captured on film. A rapid development considering that the method was introduced within our company a mere two years ago. 2015 the first 31 aerial surveys were completed, in 2016, already 62 and the flight plan for this year is filled once more.

Assessing the video material of these 100 flights, our experienced team of reviewers and ornithologists found and identified more than half a million birds and about 8,000 harbour porpoises and seals as well as individuals from rare species such as Great Northern Diver, Basking Shark and Ocean Sunfish. Finds like these are a special joy for the team and we look forward to the next 100 flights.

visit our HiDef page

# WAVE OR WHALE - RESEARCH WITH POLITICAL IMPLICATIONS

16. Feb 2016

**Wave or whale - research with political implications**

Read more about it (Link to the site of the TV station; in german)

# OUR "WIPFELSTÜRMER" ON TV (NDR)

03. Dec 2015

Save the date: Tuesday, 15th of December 2015, 18:15 to 18:45 on NDR: "NaturNah: Der Wipfelstürmer".

Read more about it (Link to the site of the TV station; in german)

Stream this episode of "Naturnah" from the NDR website.

# BASKING SHARK AND OCEAN SUNFISH, TWO RARE GUEST IN THE NORTH SEA

24. Nov 2015

Our colleague Sardar was quite astonished when he found out of the blue a 2.5 m long Basking Shark on his screen while he was scanning video footage from a HiDef survey this summer. Fully grown they reach about 10 meters of length, making them the second largest shark species in the world. Interestingly, these gentle giants forage on microscopically small plankton that they filter out of the upper water layers with their gill rakers. In the North Sea, these enormous fish are rare guests. They mainly occur in Europe in the Irish Sea between Scotland and Ireland.

Another rare guest in German waters is the Ocean Sunfish that we found in our footage from July. Reaching a weight of up to 2.3 tons this species is the heaviest bony fish and typically inhabits warmer waters. Sunfish often lay on their sides in the water, and reflecting the sunlight with their bright flanks appear in the surrounding dark water like the sun. Their main prey is jellyfish while they have no predators to fear themselves. Their up to 6 cm thick leathery skin protects them effectively.

visit our HiDef webpage

# SMM 2015 - 21ST BIENNIAL CONFERENCE ON THE BIOLOGY OF MARINE MAMMALS

12. Nov 2015

At the 21st Biennial Conference on the Biology of Marine Mammals BioConsult SH will be represented by two employees. This year the conference, which is organized by the Society for Marine Mammalogy, is held from the 13th to the 18th of December 2015 in San Francisco.

On the one hand BioConsult SH will present research results on real-time harbour porpoise detection. Noise emissions from offshore pile driving of turbine foundations regularly exceed the sound level at which harbour porpoises may suffer temporary threshold shifts. However, by detecting the animals in the danger zone in real-time, deterrence measures can be initiated immediately, in order to prevent this. Further information on this project can be found on our website or in the following abstract.

Georg Nehls, Caroline Höschle, Vladislav Kosarev, Miriam J. Brandt, Ansgar Diederichs
2015 SMM - abstract "real-time porpoise detection"

Brandt, M. J., Höschle, C., Kosarev, V., Diederichs, A. & Nehls, G.
Applying the wireless detection system (WDS)– a real-time monitoring tool for harbour porpoise activity around construction sites
21st Biennial Conference of the Society for Marine Mammolgy, San Francisco, USA (2015)

Secondly, the method for high-definition digital aerial surveys for marine mammals will be presented. It has been successfully applied by our company since January 2014. Conventionally, aerial surveys were carried out with human observers. At the conference, the results comparing the two methods will be presented and discussed. Further information on this project can be found on our website or in the following abstract.

Caroline Höschle, Ansgar Diederichs, Georg Nehls
2015 SMM - abstract "digital aerial surveys"

Höschle, C., Diederichs, A. & Nehls, G.
Aerial high definition video surveys – an advanced method to monitor marine mammals
21st Biennial Conference of the Society for Marine Mammolgy, San Francisco, USA (2015)