



# Dark Skies

above the UNESCO  
Wadden Sea World Heritage

*Final Report*

WSF, 5 January 2020

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## Final Report

Wadden Sea Forum, 5 January 2020

### 1. Introduction

Building on the interim report of 2 December 2019, a trilateral joint project to reduce light emissions and to valorise the dark night sky as part of the World Heritage Partner Hub will be discussed in more detail. For a comprehensive project in the Wadden Sea Region a trilateral approach is necessary, which incorporates experiences from the different regions and promotes a learning process between the actors involved. The integration of the joint project into the partner-hub of the World Heritage Partnership Centre involves the various organisations such as science, nature conservation associations, education, tourism and various stakeholders from society, so that a Dark Sky Area Wadden Sea Region can gain wide acceptance.

### 2. Inventory of activities regarding the reduction of light emissions

There are many local and regional initiatives to reduce light pollution and to raise awareness about dark skies, of which some already are mentioned in the interim report. In 2015 a few government initiatives started along the Dutch Wadden Sea coast. Examples are "safe and illuminated" on Texel, "the stars nearer" in Noord-Holland, "Dark Sky Park Lauwersmeer" and "dimmable LED lights". The idea was, to reach a dark landscape without additional policies by addressing innovation in light systems. This should stimulate entrepreneurs as well as municipalities to invest in advanced lighting systems and to reach positive effects on landscapes and well-being.

Another approach was taken by the society, who addressed tourism as motor for reducing light pollution. This resulted in the implementation of the dark sky park Terschelling, feel the night event, after sunset festival and the night of electricity. With new initiatives tourism seasons should be extended by offering new attractions like night gardens, star gazing and night walking tours.

Also in Denmark and Germany activities are in place, marketing the night. Many of these activities focusses on walking tours during the night with experiencing nightly appearances and storytelling to make darkness interesting (and sometimes a bit scary). These walking tours are offered on almost all Wadden Sea islands and in some coastal towns and villages like Ribe, Husum, Büsum, Leer, Aurich and others.

An emphasis of activities under a dark sky are astronomical observations, documented by a big number of public and private observatories along the Wadden Sea coast. Some can be visited like the ones on Texel, Groningen, Norderney and Cuxhaven. Guided tours, presentations and education are part of the offered programs. Others are private owned, mainly small home observatories, which also contribute to raise awareness in their neighbourhood.

Other advantages of dark nights like positive effects on health and biodiversity were not addressed so far. Also intrinsic values of dark nights and starry skies have not been in the focus until now.

In the following some examples of observatories in the Wadden Sea Region are introduced:



Observatory for the society on Texel (photo from homepage <https://orientexel.nl/>)



Private observatory Leerhafe (photo from homepage <http://www.sternwarte-leerhafe.de/>)





In the Netherlands and Germany star gazing is quite popular. Many amateur astronomers are organized in societies, who do attract the people living in the area by workshops, field trips and observation nights.

These societies are important multipliers in raising awareness about the value of dark nights and skies and in supporting education in this field, e.g. in schools.

Furthermore, initiatives to reduce light emissions are part of these activities.

Unfortunately, data about observatories in the Danish Wadden Sea Region are missing.

#### Public observatory Norderney

(photo from homepage [www.sternwarte-norderney.de/sternwarte.html](http://www.sternwarte-norderney.de/sternwarte.html))

In all three countries concrete actions have been taken to implement dark sky parks or so-called dark sky communities. Two are already implemented, which are located in the Netherlands, the Boschplaat on Terschelling and Lauwersmeer.

In Germany the islands Spiekeroog in Niedersachsen and Pellworm in Schleswig-Holstein are preparing for an application to become a dark sky island/community.

In Denmark it is the small island of Mandø, who will apply for a dark sky park according to international rules.



The certification process for Dark Sky is modelled on other conservation and environmental designation programs, such as the UNESCO World Heritage Sites and Biosphere Reserves. There are five categories for designation within the International Dark Sky Places Program: Dark Sky Parks, Communities, Reserves, Sanctuaries, and Urban Night Sky Places. Each category has its own set of guidelines based on land management, size, and sky quality. The International Dark-Sky Association elaborates an initial assessment of the place and will provide support during the application process.

### **3. Potential partners**

The partnership for a joint international project on dark skies is a crucial element to reach the defined objectives. Ideally, partners from the listed organisations/sectors should be involved:

- municipalities and regional government representatives
- science sector
- green NGOs
- education
- stakeholders and interest groups

Potential partners in the development of a joint project are municipalities from Denmark, such as the municipality of Esbjerg with the island of Mandø, the Wadden Sea National Park administrations in Schleswig-Holstein and Lower Saxony including their Rangers, the municipalities of Pellworm and Spiekeroog, and the Dutch partners on Terschelling, Ameland and Lauwersmeer.

The scientific community is also an important partner contributing with investigations in various fields, e.g. effects of light pollution on flora and fauna, health and safety aspects. Also surveys about perceptions and acceptance of the society would be helpful to draw the right objectives of a joint project. The Dutch Wadden Academy, universities of Groningen Oldenburg, Hamburg and South Jutland are potential partners in a joint project.

Green NGOs have best experiences how to integrate wildlife and biodiversity needs. With the Wadden Sea Team, a connection of green NGOs on trilateral level, several partners of this sector could be involved.

With the Trilateral Wadden Sea School (IWSS), also partner in the partner-hub, education can easily be integrated. Nevertheless, organisations for adult education should also be approached.

Finally, various stakeholders like the tourism branch, amateur astronomers and story tellers as well as nature programs like "Programma naar een Rijke Waddenzee" should be approached and contribute to the project.

A partner from outside the WSR could be the expert group on dark sky of the "Vereinigung der Sternfreunde e.V.", who facilitated many projects on dark sky in Germany.

#### 4. Proposal for a joint project on Dark Skies

For a joint project Dark Sky, the partners of the partner hub should be deeply involved in addition to the partners who have already taken initiatives on Dark Sky at local level. The existing Operational Team Partner-Hub can provide great support in this respect. The Wadden Sea Forum could take the lead, as a Dark Sky working group has already been established on a trilateral level under the umbrella of the WSF.

In a first meeting, goals and tasks could be discussed and provisionally determined. It must be taken into consideration to include the OUVs of the Wadden Sea World Heritage Site. This means working out the positive aspects of reducing light pollution and a dark night sky on the Wadden Sea ecosystem and the biodiversity in the hinterland. The importance for the society in the Wadden Sea Region in terms of health, tourism and innovation could form a second pillar in the objectives to be carried out.

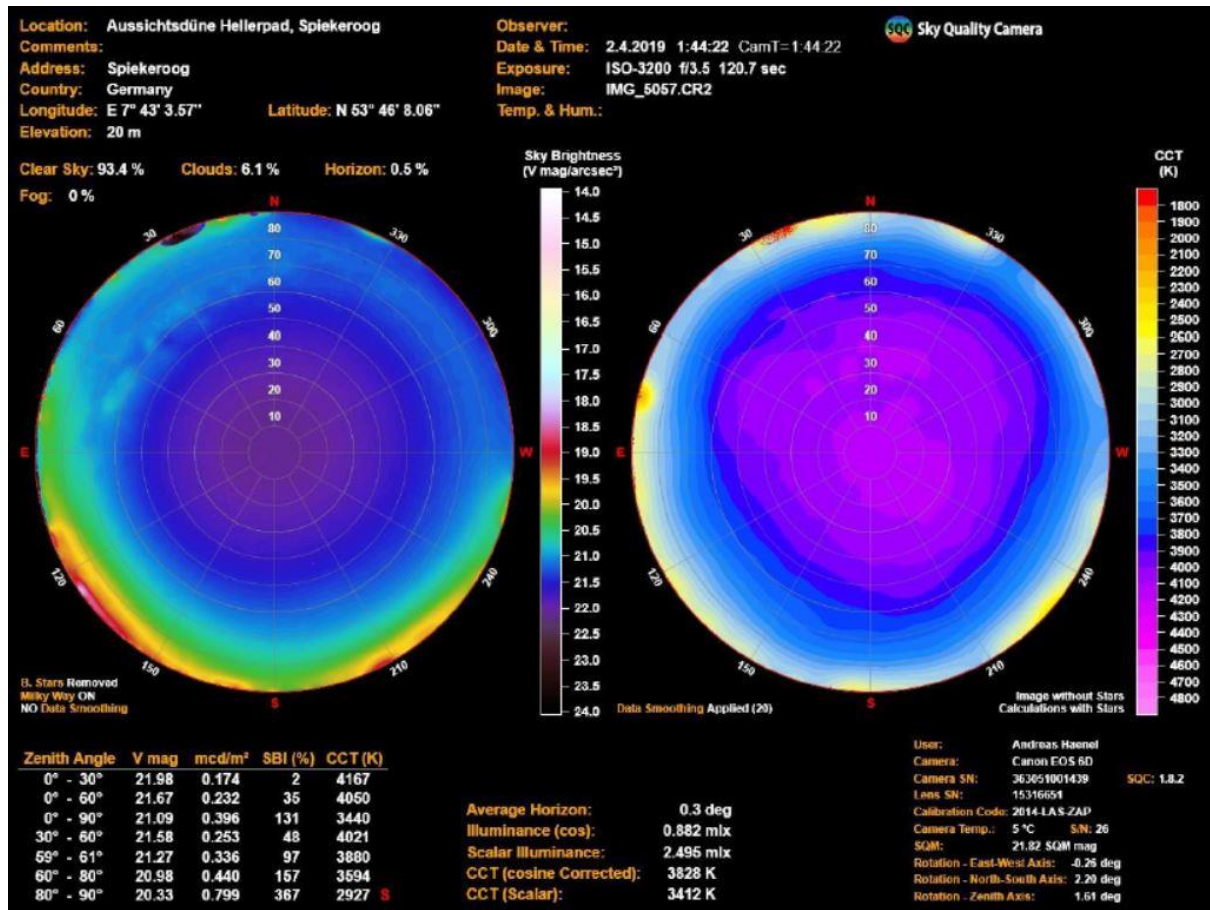
Guidelines of the International Dark Sky Association could help to define the objectives for such a large area as the Wadden Sea Region is.

##### **Box: Eligibility of Dark Sky Sites according to international rules**

The eligibility of sites for participation in the International Dark Sky Places program depends on the category of the designation sought.

- **Communities:** Must have some type of legal organization that is officially recognized by outside groups. This can be in the form of a town, city, municipality or other legally organized community (such as an urban neighborhood or subdivisions). There is no night sky quality criterion associated with this category.
- **Parks:** Must be public or private land, accessible to the public in part or whole, that is legally protected for scientific, natural, educational, cultural, heritage and/or public enjoyment purposes. The core area must provide an exceptional dark sky resource, relative to the communities and cities that surround it, where the night sky brightness is routinely equal to or darker than 21.2 magnitudes per square arc second.
- **Reserves:** Must be a public or a private land of at least 700 km<sup>2</sup>, accessible to the public in part or whole, that is legally protected for scientific, natural, educational, cultural, heritage and/or public enjoyment purposes. The core area must provide an exceptional dark sky resource, relative to the communities and cities that surround it, where the night sky brightness is routinely equal to or darker than 20 magnitudes per square arc second.
- **Sanctuaries:** Must be a public or a private land, accessible to the public in part or whole, that is legally protected for scientific, natural, educational, cultural, heritage and/or public enjoyment purposes. The site must provide an exceptional dark sky resource where the night sky brightness is routinely equal to or darker than 21.5 magnitudes per square arc second.
- **Urban Night Sky Places:** Must be a a municipal park, open space, observing site, or other similar property, accessible to the public in part or whole, located within the region enclosed by a perimeter extending 50 km beyond the edge of the continuously-built area of a municipality with a permanent population of 10,000 or more people within its territorial jurisdiction, or 50,000 or more people if defined as a "metro area" of two or more adjoining municipalities. There is no night sky quality criterion associated with this category.

Following, the joint project could develop methods and instruments to achieve the defined objectives. Experiences from local initiatives should be included. Case studies can be implemented for concrete examples. An important part will be measurements of light pollution and the quality of the night sky. This has been already done for some areas in the Wadden Sea Region, recently on the islands of Spiekeroog and Pellworm.



The figure above, provided by Andreas Hänel, member of the WSF working group on dark sky, shows the results of the quality of the night sky on Spiekeroog. The figure on the left side shows a sky brightness of less than 21.5, which is very good for this Region. The figure on the right provides the colour temperature of the sky, which should be as high as possible.



A visual result of the measurements is shown in the figure above. The picture shows the night sky in reality and the milky way and even the zodiacal light can be observed.



To achieve good qualities of darkness, the reduction of light emissions are crucial. Measures could be taken by municipalities (reducing the illumination of public buildings, improvement of street lights, etc.) as well as by the economic sector. Also harbours have to aim at a new lighting concept, already taken into account by the green harbour initiative. Furthermore, the private sector could do a lot to reduce light pollution with directed light beams, using LEDs and aiming at a lower light temperature with a maximum of 3000K.

The project should also develop proposals for accompanying programmes and concrete activities. These could include sky observation, educational events in schools and in the region, and adventure tours in the dark. The effects of light emissions on ecosystems as a whole, but also specifically on flora and fauna, should be addressed too. A detailed work plan will be agreed with all stakeholders.

Communication is an important instrument to ensure attention and acceptance. A communication plan for the project itself, as well as for its external impact, should be part of the project. Particularly with regard to safety, sound communication within the region is crucial. In general, brighter does not mean safer and this has to be communicated with experiences made and best practise examples.

After determining the contents and structure of the project, a financial plan is drawn up, which includes possible third-party funding. Applications can be made not only to the relevant foundations in the region but also to EU funding programs under ERDF and to Interreg programmes. Concrete applications and its elaboration efforts should be discussed and finally decided on by the project partners depending on the scope of the project.

An example of an European project is the Interreg Europe project "Night Light", running till end of 2021 and which is about improving regional policies to reduce light pollution and protect and valorise dark night skies (see figure below).

## Projektpartner



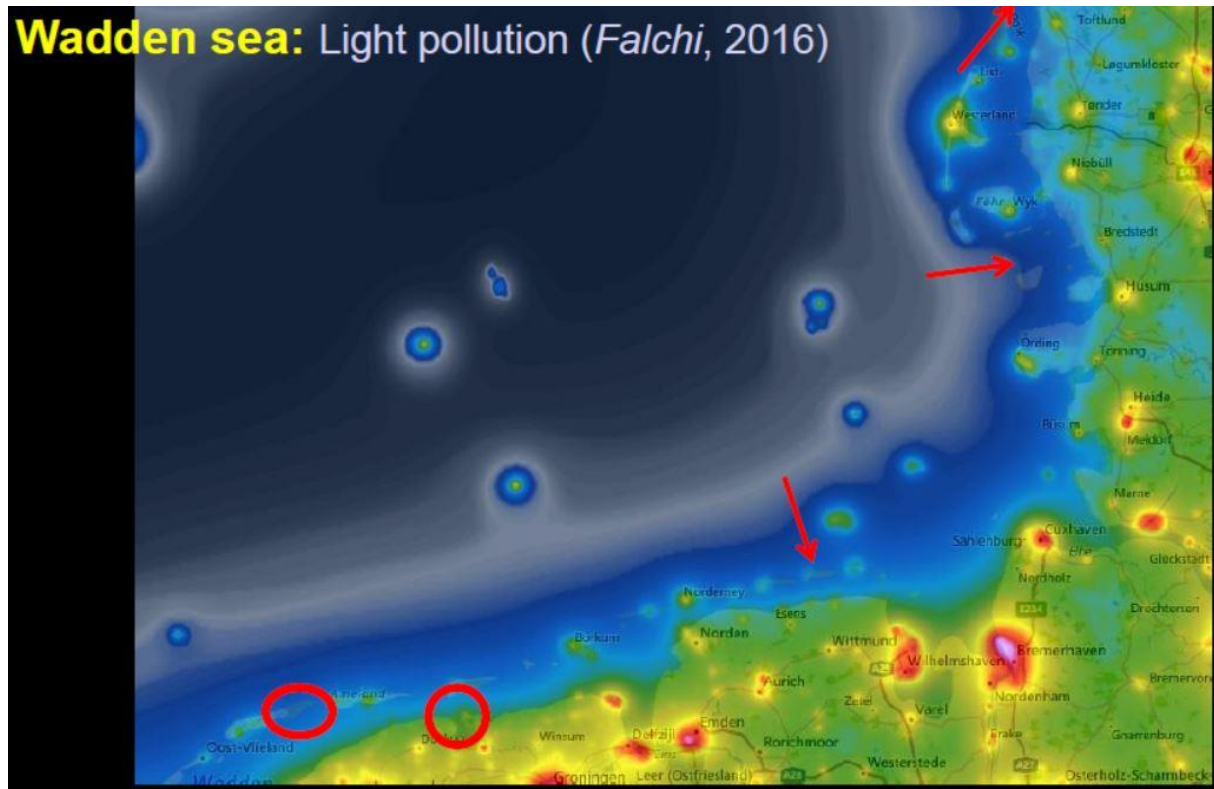
### INTERREG Europe NIGHT LIGHT Improving regional policies to reduce light pollution and protect and valorise dark night skies



The potential project in the Wadden Sea Region could use experiences from this Interreg project to set up a program and to analyse possibilities for funding.



The Wadden Sea Region has many dark places, particular the Wadden Sea islands, but also areas along the coast. Light pollution is concentrated on some cities like Groningen, Wilhelmshaven and Bremerhaven as well as on small towns like Delfzijl (habour), Emden, Cuxhaven and Heide (refinery). This is well indicated in the map below and provided by Andreas Hänel. Red circles point at the existing dark sky parks Terschelling and Lauwersmeer, the red arrows point at the islands of Spiekeroog, Pellworm and Mandø, striving for dark sky communities.



The working group dark sky of the Wadden Sea Forum has agreed to implement an international symposium on dark sky in autumn 2020. This is to bring organisations and stakeholders working on dark sky issues Wadden Sea Region wide together to raise broad awareness and to discuss possibilities to make progress in developing the WSR into a dark sky region.

To form a coalition of the willing, the trilateral Wadden Sea World Heritage partner-hub has to be deeply involved to form a joint working group to prepare the symposium. Also the partnership of the Interreg Va project, Wadden Agenda 2.0, has to be approached to play a contributing role in preparing the event in autumn and possibly in the joint dark sky project.

A dark sky WSR across borders will probably receive a worldwide recognition too. The progress in implementing a dark sky WSR can be highlighted at the forthcoming Trilateral Governmental Conference 2022 in Wilhelmshaven. This could be a first step to work on more ambitious policies regarding light pollution and dark skies.