Application for Designation as

International Dark Sky Park

Møn and Nyord

Contents

Cover Photos

Front cover: *The white chalk cliffs of Møns Klint raises 100 m into the starfilled night sky. Photo Credit: Thomas Ix www.foto-ix.de*

Back cover: *Stairway to the Milky Way. There are approximately 550 steps from the shore of the Baltic Sea to the top where the Milky Way apparently ends. Photo Credit: Thomas Ix www.foto-ix.de*

Section 1

Summary

Two Danish islands, Møn and Nyord, wish to apply for approval as International Dark Sky Park Møn and Nyord. The application includes nature conservation areas on Østmøn (East Møn), Ulvshale and Nyord that are owned by the Danish state. An area outside the proposed International Dark Sky Park Møn and Nyord is seeking approval as International Dark Sky Community Møn and Nyord. The Dark Sky Community will act as a buffer zone for the Dark Sky Park areas.

Both islands are part of Vordingborg Municipality. A total of 9,400 people live on the islands. Nyord is is bridge-linked to Møn, while Møn is linked to Zealand via two bridges and causeways. A total of 2,2 million people live within a two-hour drive.

Measurements show that Møn and Nyord have outstanding dark skies with minimal light pollution. The best values in March and April measured with SQM-L have been 21.92 $mag./arcsec^2$. With the SQM-LU-DL instrument the best measurements have been 21.94 $mag./arcsec^2$.

All outdoor lighting in the areas has been reviewed and 95% of the lamps currently meet Full Cut-Off (FCO) requirements. Three lamps only have yet to meet the requirements. These will be replaced by Easter 2017.

The project and information work was officially kicked-off with a concert on Klintholm harbor. The event swept across the town and harbor. There were about 3,000 visitors. The concert succeeded in impressing Dark Sky Møn and Nyord into the hearts and minds of the local population. More informative meetings about light pollution have also been held. These were attended by more than 220 people.

GeoCenter Møns Klint is the only enterprise in the Dark Sky Park area. It has joined the local certification program. GeoCenter Møns Klint holds 3-4 Dark Sky events each year. The contents vary. Of the 250,000 tourists that come to Møn and Nyord each year, about 65,000 visit GeoCenter Møns Klint exhibitions.

The idea of preserving darkness and starry skies has taken hold among the local population of Møn and Nyord. The Dark Sky Park is a popular talking point. The idea has also spread beyond the islands and it is thanks to Dark Sky Park Møn and Nyord that, for the first time, light pollution is an issue debated in the Danish media.

International Dark-Sky Association
IDA Board of Directors
3223 N. First Avenue
Tucson Arizona 85719
USA

Møn, November 25, 2016

Nomination of the selected areas at the islands Møn and Nyord as International Dark Sky Park

Dear IDA Board of Directors,

I would like to announce the nomination of selected areas of the islands Møn and Nyord in Denmark as an International Dark Sky Park.

In 2010 I moved to Møn and noticed the exceptional dark sky, the best I had seen in Denmark. In 2011 an article in Sky & Telescope inspired me to start developing the project. The project took for earnest off in May 2013 when I made contact with a group of enterprise owners (Bed & Breakfast), a group which had already recognized the exceptional starry nights of Møn as an asset. Together we developed the idea further and in November 2013 the Municipality of Vordingborg was contacted. The Municipality was positive and wanted to support the development of the Dark Sky Community and Dark Sky Park. The official start of the project was in April 2014.

The Working Group of Dark Sky Møn and Nyord, Vordingborg Municipality, The Danish Nature Agency and National Museum of Denmark has worked close together the last two years in planning and developing a unique Dark Sky Park.

- The International Dark Sky Park is unique as it is comprised of a number of areas (12), with protected nature owned by the Danish State and the National Museum of Denmark. The reason behind this "patchiness" is discussed in the application. Adding to its uniqueness is the fact that the Dark Sky Park is within the borders of the International Dark Sky Community Møn and Nyord, see separate application. The International Dark Sky Community will serve as "buffer zone" for the International Dark Sky Park. A sort of Dark Sky Reserve in miniature.
- The area of the Dark Sky Park provides an even grander experience of the night sky, compared to the Community, as any light from the Community area are shielded by woods and hills.
- During the project the Working Group and Vordingborg Municipality, The Danish Nature Agency and National Museum of Denmark have succeeded in bringing the loss of the night and the issues of light pollution into public awareness. This have been done through info public meetings across the islands and press coverage.
- Developing a Local Certification Program for the Enterprises and Associations in the Park areas. Only one Enterprise exist within the Dark Sky Park. This Enterprise will by Easter 2017 fulfill the Light Management Plan for the Dark Sky Park.

- A Dark Sky News paper has been issued the last three years. A total of 15,000 news paper have been distributed to local enterprises, tourist info boots, dark sky events and other places where people and tourists comes. The feed-back about the news papers have been very positive.
- Partnership Agreements have been signed between Vordingborg Municipality and The Danish Natur Agency and between Vordingborg Municipality and National Museum of Denmark. The agreements ensures the organizations are working together to protect the night environment in the Dark Sky Park.
- A survey of outdoor lighting in the Dark Sky Park areas, showed a total of 56 light fittings. Of these 31 fulfilled the LMP. Another 22 light fittings have by 2016 September 10, been replaced with light fitting and light sources fulfilling the LMP with full-cut off light fitting and a color correted temperature of max 3,000 K. As I'm writing this, 95% of the light fittings in the Dark Sky Park fulfill the LMP. The last 5% (three light fitting) will fulfill the LMP by Easter 2017.
- Night Sky Brightness measurements have been made with SQM-L instruments from several locations in the Dark Sky Park in the spring of 2015 and 2016. The measurements showed an exceptional night sky quality with magnitude up to 21.93 mag/arcsec^2. Comparable to natural sky and well within "gold" tier.

In Denmark any debate about light pollution have been close to nonexistent, only on occasions appearing within the amateur astronomer community, and very rarely in any other media. Thanks to this project the issue of light pollution and especially the loss of the star filled night sky have started to appear in national news papers, radio and TV. Which, as seen with the scope of protecting the night sky and lessen the light pollution, is a very important development.

The interest in the project among the local population, enterprises and NGO's have surprised the Working group of Dark Sky Møn and Nyord and Vordingborg Municipality as it surpassed any expectation we had when the project started. Furthermore, the feed-back from the afore mentioned groups have only been positive, which shows that the idea of protection the night environment and the starry sky have been adopted by the groups and the unique quality of the night sky gives people a proudness of their home-island. A proudness which will ensure future support of both the International Dark Sky Communitry and the International Dark Sky Park.

I highly recommend that the IDA Board of Directors grant the selected areas of the islands Møn and Nyord the title of International Dark Sky Park Møn and Nyord.

Tom Axel

Tom Axelsen

MSc. E.E.,
Chairman of Astronomical Society of Southern Zealand,
Member of International Dark Sky Association

Bringtoftevej 2
4780 Stege, Denmark
ta@grib-stjernerne.dk

Section 3

Vision for the Project Dark Sky Møn and Nyord

THE vision for the work of the Dark Sky Møn and Nyord Project is as follows:

Purpose
Through Dark Sky to create new local development opportunities on Møn og Nyord that combine Dark Sky activities with environmental protection and business development initiatives. Business development shall flourish and interact with activities to protect dark skies, nature, cultural environments and active outdoor pursuits.

Vision
The vision is to preserve and enhance our dark skies and opportunities for specific outdoor and natural experiences at night, while promoting a sustainable economy.

Goal

- to improve education and guidance in and dissemination of night skies, natural and cultural-historical values and values associated with outdoor activities and
- to support sustainable development for the benefit of local people – including the business community.

Strategy
As part of the planning process, we will compile a strategy to include a catalog of specific initiatives and events. For each proposed initiative and event, we will evaluate the likelihood of its being realized. We will also investigate the instruments available to help realize the initiatives in question.

Where business development is concerned, there is potential especially in improving the quality of tourist facilities. With Dark Sky as an additional attraction in this area, we expect to welcome more visitors. It is important that more tourism supports the kind of development that will benefit the local community. Dark Sky is expected to have a number of positive consequences for development of Møn. We can create better conditions for tourism and better conditions for marketing local produce. There are also potential synergies regarding the

biosphere, which can be exploited to the benefit of sustainable development in this area.

Section 4

Letters of support

A number of stakeholders in the area have send in letters showing their support to the project of establishing a Dark Sky Park at Møn and Nyord.

The most important stakeholders are The Danish Nature Agency and The National Museum of Denmark. Both agencies are the owners and administrators of the areas which constitute the Dark Sky Park.

The letters of support are reproduced on the following pages, all of which have been translated into English (and printed opposite the original text).

4.1 Letter of Support – The Danish Nature Agency

Miljø- og
Fødevareministeriet
Naturstyrelsen

Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

Storstrøm
Ref. HCG
Den 31. oktober 2016

Letter of support

Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord

Vordingborg Kommune og en række interessenter arbejder på, at blive Dark Sky-certificeret på Møn og Nyord. Udviklingsprojektet blev igangsat i 2013 og initiativtagene har fået hjælp fra en bred kreds af foreninger, virksomheder og borgere mv, som deltager i projektet. Der er således tale om en velfunderet proces.

Naturstyrelsen Storstrøm under Miljø- og Fødevareministeriet ejer størstedelen af de naturarealer, der vil danne grundlag for Dark Sky Park på Møn og Nyord. Vi forvalter arealerne med henblik på en balance mellem beskyttelse af naturværdierne og unikke naturoplevelser for de mange besøgende.

Projektet bidrager til, at vi handler mere miljøvenligt, og projektet er til fordel for naturen og miljøet og ikke mindst muligheden for at nyde stjerner på nattehimlen. Endvidere har projektet en række positive effekter for den bæredygtige turisme i kommunen.

Dette er baggrunden for, at vi kan give vores anbefaling af og fulde støtte til at skabe den første International Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord.

På vegne af Naturstyrelsen Storstrøm

Dato: 31. oktober 2016

Skovrider Claus Jespersen

Naturstyrelsen • Hannenovvej 22 • Egehus • Tingsted • 4800 Nykøbing Falster
Tlf. 72 54 30 00 • Fax 54 43 98 13 • CVR 33157274 • EAN 5798000860216 • sts@nst.dk • www.nst.dk

To: Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

Letter of Support

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Vordingborg Municipality and a number of stakeholders wish to be granted a "Dark Sky" certificate on Møn and Nyord. The development project was launched in 2013 and the group behind this initiative has received help from a wide circle of associations, enterprises and local citizens, who are active participants in the project. The process is therefore well-established.

The Danish Nature Agency (Storstrøm Section) part of Ministry for Environment and Food owns the most part of the natural areas, which will form the basis for the Dark Sky Park on Møn and Nyord. We manage the areas with a balance between protection of natural heritage and unique experiences for the many visitors.

The project will help to ensure that our actions are more environmentally friendly. The project itself is beneficial to the natural environment and, not least, it encourages people to enjoy the night sky. Moreover, the project will have a number of positive effects on sustainable tourism in the municipality.

For these reasons, we can recommend and give our unconditional support to the creation of Denmarks first international Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord.

On behalf of Naturstyrelsen Denmark
Date: 31. October 2016

Claus Jespersen
Forest Manager

4.2 Letter of Support – National Museum of Denmark

Nationalmuseet

24. november 2016

Sagsnummer

Forskning og Formidling
Formidling
41 20 60 20
Anni.Mogensen@natmus.dk

Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

Letter of support

Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord
Vordingborg Kommune og en række interessenter arbejder på at blive Dark sky certificeret på Møn og Nyord. Udviklingsprojektet blev igangsat i 2013 og initiativtagene har fået hjælp fra en bred kreds af foreninger, virksomheder og borgere mv, som deltager i projektet. Der er således tale om en velfunderet proces. Projektet bidrager til, at der handles mere miljøvenligt og projektet er til fordel for naturen og miljøet og ikke mindst muligheden for at nyde stjerner på nattehimlen. Endvidere har projektet en række positive effekter for den bæredygtige turisme i kommunen.

Nationalmuseet, Liselund Park, er en romantisk have og en kulturhistorisk perle i den nordlige del af Møns Klint. Parkens ro og fred bringer den besøgende ned i tempo og er med til at give ro i sindet. Parkens kultur- og naturoplevelse passer til formålet i Dark Sky og kan give et fredfyldt kig til stjernehimlen uden forstyrrende lysforurening.

Dette er baggrunden for, at vi kan give vores anbefaling af og fulde støtte til at skabe det første International Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord. Vi støtter op om projektet og vil fremover, indenfor de rammer som vi råder over, forsætte med at støtte projektet.

På vegne af Nationalmuseet

Anni Mogensen
Formidlingschef

National Museum of Denmark

Nationalmuseet 24 November 2016

To: Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

Letter of Support

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Vordingborg Municipality and a number of stakeholders wish to be granted a "Dark Sky" certificate on Møn and Nyord. The development project was launched in 2013 and the group behind this initiative has received help from a wide circle of associations, enterprises and local citizens, who are active participants in the project. The process is therefore well-established.

The project will help to ensure that our actions are more environmentally friendly. The project itself is beneficial to the natural environment and, not least, it encourages people to enjoy the night sky. Moreover, the project will have a number of positive effects on sustainable tourism in the municipality.

National Museum Liselund Park is a romantic garden and a cultural highlight in the northern part of Møns Klint. The park's tranquility and peace brings the visitor into the pace and helps to provide peace of mind. The park's natural and cultural experience fit for purpose in the Dark Sky and can give a serene look to the sky without disturbing light pollution.

For these reasons, we can recommend and give our unconditional support to the creation of Denmarks first international Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord.

We support the project and will in future continue to give our support within the framework that is our mandate.

On behalf of Nationalmuseet

Anni Mogensen
Head of Public Programmes

4.3 Letter of Support – Other Stakeholders

VORDINGBORG KOMMUNE

Valdemarsgade 43
Postboks 200
4760 Vordingborg
Tlf. 55 36 36 36
www.vordingborg.dk

Sagsbehandler:
Martin Nilsson
D. 1.11.2016

Dark Sky
There is support for Dark Sky from political quarters.

We have recently been designated by the national tourism unit Danish Coastal and Nature Tourism as one of just four national projects that make up the master plan of the unit's work in the field of destination development.

Together with the work to become a UNESCO biosphere reserve, Camønoen and the projects that are under way at Klintholm harbour to transform the town and hopefully establish a service port for Kriegers Flak, the future is looking brighter for Møn than it was just a few years ago.

The Dark Sky project is of great importance to the development of Vordingborg Municipality. The starry sky is a wonderful history book of myths and legends, and part of our identity and culture.

Due to light pollution from major towns and cities, there are now only a few places where you can see the Milky Way – and Møn is one of them. Here, the Milky Way is viewed as a large, luminous band of stars stretching from horizon to horizon on late summer nights and autumn evenings. The experience of the many thousands of twinkling stars is the very reason we have worked so hard to get Møn and Nyord certified as a Dark Sky Park.

Things are progressing well, and the first municipal institution has been Dark Sky certified.

It is my firm belief that Dark Sky is a highly unique project – a project that will put us on the map once again.

It has been an exciting process thus far, involving many initiatives such as guided tours and events. The magnificent concert in Klintholm, which kicked it all off, is something that we will remember for a long time to come. It was a truly fantastic evening, which shows that we can do things when we put our minds to it.

Dark Sky itself has given us a great publicity and a lot of press attention.

None of the work so far would have been possible without the support of a group

of passionate people. Their visions have set goals for the community and generated commitment with regard to the Vordingborg Municipality of the future.

In the light of globalisation, it is a challenge to create a local identity based on our values. Dark Sky is an example of this. Format and quality are the starting point, and the ambition is to strengthen the local identity. I hope that we can enjoy and be proud to present a new beacon in Denmark in the form of Dark Sky, and contribute to the realisation of our shared visions.

Yours sincerely

Asger Diness Andersen
Chairman of the Business Committee
Vordingborg Municipality

NOTAT

REGION SJÆLLAND
– vi er til for dig

Til: Vordingborg Kommune

Fra: Region Sjælland – Regional Udvikling

Dato: 20. juni 2016

Brevid: 2986755

Regional Udvikling
Alléen 15
4180 Sorø

Tlf.: 70 15 50 00
Dir.tlf.

regionaludvikling
@regionsjaelland.dk
dajm@regionsjaelland.dk

www.regionsjaelland.dk

Letter of support

Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord

Vordingborg Kommune og en række interessenter ønsker at blive "Dark sky"-certificeret på Møn og Nyord. En Dark Sky-certificering gives af nonprofit-organisationen *International Dark-Sky Association*, som arbejder for at bevare nattemørket og bekæmpe lysforurening.

Udviklingsprojektet blev igangsat i 2013 og initiativtagerne har fået hjælp fra en bred kreds af foreninger, virksomheder og borgere mv., som deltager i projektet.

Region Sjælland er en af de fem danske regioner – bl.a. med ansvar for regional udvikling. Region Sjælland arbejder med sin regionale vækst- og udviklingsstrategi med attraktivitet som et gennemgående tema – og med en målsætning om at være en attraktiv region med en bæredygtig udvikling af kultur og natur, som danner rammen for kulturelle aktiviteter til gavn for både borgere og turister.

Projektet bidrager til målsætningen. Gennemførelsen af projektet vil betyde en ressourcebesparelse og give positive effekter for bæredygtig turisme i regionen.

Region Sjælland anbefaler derfor projektet og støtter etableringen af det første International Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord.

På vegne af Region Sjælland
Underskrift

David Jens Meinke
Udviklingschef
Regional Udvikling – Vækst og Innovation

Memorandum

To: Vordingborg Municipality
From: Region Zealand - Regional Udvikling

Letter of Support

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Vordingborg Municipality and a number of stakeholders wish to be granted a "Dark Sky" certificate on Møn and Nyord. Dark sky certification is granted by the International Dark Sky Association, a non-profit organization that strives to preserve dark skies and combats light pollution.

The development project was launched in 2013 and the group behind this initiative has received help from a wide circle of associations, enterprises and local citizens, who are active participants in the project.

Region Zealand is one of five regional authorities in Denmark. Our responsibilities include regional development. Region Zealand has a regional strategy for growth and development, in which attractiveness is a recurrent theme. We aim to be an attractive region that maintains sustainable development of its cultural and natural resources as these form a backdrop for cultural activities that benefit the local community and visitors to the area.

The project in question makes a positive contribution to regional goals. Its success will preserve resources and benefit sustainable tourism in the region.

Region Zealand can therefore recommend the project and supports the establishment of Denmark's first International Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord.

Best Regards

David Jens Meiner
Development Manager

KØBENHAVNS UNIVERSITET
DET NATUR- OG BIOVIDENSKABELIGE FAKULTET

Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord

27. JUNI 2016

JOHAN PETER ULDALL FYNBO
PROFESSOR MSO
NIELS BOHR INSTITUTET
JULIANE MARIES VEJ 30
TELEFON 28755983
E-MAIL: JFYNBO@NBI.KU.DK

SAMT FORMAND FOR ASTRONOMISK SELSKAB
ASTRONOMISK.DK

Min far var forpagter af et lille landbrug i en landsby i trekantsområdet. Oplevelsen af den mørke nattehimmel var en central del af min barndom. Når vi står under den stjernedækkede himmel på en stjerneklar nat uden måneskin, så drages tankerne mod det store Univers og vi tænker på tidens fylde, uendelighed, liv på andre kloder og hvem vi selv er.

P.g.a. den stigende lysforurening er det færre og færre forundt at få disse eksistentielle oplevelser. For få uger siden kom det f.eks. frem, at mere end en tredjedel af jordens befolkning ikke har mulighed for at se Mælkevejen på himlen. Spørger man folk på gaden vil de færreste vide hvad Mælkevejen er endsige have set den selv. Af denne grund er bestræbelser på at skabe "Dark Sky" parker overordentlig prisværdigt. På samme måde som vi skaber naturparker, hvor vi freder truede landskabsformer eller dyrearter, så bør vi også skabe sikrede områder, hvor vi stadig kan nyde den mørke nattehimmel og studere og nyde lyset fra verdensrummet. Erfaringer fra andre dele af Europa og USA viser at sådanne områder kan have store turistmæssig værdi – særligt på tider af året, hvor der ikke ellers kommer turister.

Af disse årsager giver jeg på egne vegne og på vegne af Astronomisk Selskab Dark Sky Park på Møn og Nyord min uforbeholdne og varmeste anbefaling.

Venlig Hilsen,

Copenhagen University
Faculty of Science

To: Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

My father was a tenant farmer. He ran a small farm in a rural community in East Jutland. The night skies were a very important feature of my childhood. When we gaze at a starry sky on a clear night before the moon comes up, our thoughts drift inevitably to the universe. We muse about time, eternity, life on other planets and who we are in the great scheme of things.

Due to increasing light pollution, increasingly fewer of us are blessed with existential experiences of this kind. A few weeks ago, we learned that more than one-third of the world population is unable to see the Milky Way. If you ask people on the street, very few will know what the Milky Way is, let alone have seen it for themselves. For these reasons, every effort to create s Dark Sky Park is highly commendable. As we create nature parks in order to preserve threatened landscapes and species, I believe we should create preservation areas, in which we can still enjoy the dark skies, and study and revel in light coming from space. Experience from other parts of Europe and the US indicate that such areas can be of value to tourism, especially at times of the year when tourists are otherwise thin on the ground.

For these reasons, for my own part and on behalf of the Astronomisk Selskab (Danish Astronomy Society), I can wholeheartedly recommend the establishment of a Dark Sky Park on Møn and Nyord.

Yours faithfully,

Johan Fynbo

Stege og Omegns Lokalråd
27. juni 2016

Letter of support

Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord

Vordingborg Kommune og en række interessenter arbejder på, at blive Dark sky certificeret på Møn og Nyord. Udviklingsprojektet blev igangsat i 2013 og initiativtagerne har fået hjælp fra en bred kreds af foreninger, virksomheder og borgere mv, som deltager i projektet. Der er således tale om en velfunderet proces.

Stege og Omegns Lokalråd, som omfatter alle borgere bosat indenfor lokalrådets område, har til formål at varetage og være behjælpelig overfor borgere i området, vedrørende behov og ønsker om indflydelse på udviklingen af lokalområdet. I den sammenhæng skal det ses, at Lokalrådet beskæftiger sig med ønsket om certificering af Møn og Nyord som Dark Sky Community og Dark Sky Park Park.

Projektet bidrager til, at vi handler mere miljøvenligt og projektet er til fordel for naturen og miljøet og ikke mindst muligheden for at nyde stjerner på nattehimlen. Endvidere har projektet en række positive effekter for den bæredygtige turisme i kommunen.

Dette er baggrunden for, at vi kan give vores anbefaling af og fulde støtte til at skabe den første Internationale Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord. Vi støtter op om projektet og vil fremover, indenfor de rammer, som vi råder over, forsætte med at støtte projektet.

På vegne af
Stege og Omegns Lokalråd

Camilla Bøggild
formand

Stege og Omegns Lokalråd / co. Camilla Bøggild – Søndersognsvej 101 Svendsmarke - 4780 Stege
www.stegeogomegn.dk kontakt@stegeogomegn.dk

Letter of Support

To: Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Vordingborg Municipality and a number of stakeholders wish to be granted a "Dark Sky" certificate on Møn and Nyord. The development project was launched in 2013 and the group behind this initiative has received help from a wide circle of associations, enterprises and local citizens, who are active participants in the project. The process is therefore well-established.

Stege og Omegns Lokalråd (The Community Council for Stege and its environs) is a committee that represents people living in our area. The council's objective is to protect and act on behalf of local citizens in respect of their wishes and needs to influence local development. It is in this context that the committee has become involved in the issue of the certification of Møn and Nyord as a Dark Sky Community and Dark Sky Park.

The project will help to ensure that our actions are more environmentally friendly. The project itself is beneficial to the natural environment and, not least, it encourages people to enjoy the night sky. Moreover, the project will have a number of positive effects on sustainable tourism in the municipality.

For these reasons, we can recommend and give our unconditional support to the creation of Denmark's first International Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord. We support the project and will in future continue to give our support within the framework that is our mandate.

On behalf of Community Council for Stege and its environs

Camilla Bøggild

Vordingborg Erhverv A/S
Marienbergvej 132
4760 Vordingborg
Tlf. +45 55 34 03 93
info@vordingborgerhverv.dk
www.vordingborgerhverv.dk
CVR 35857133

Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

Dato 27. juni 2016

Letter of support

Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord

Vordingborg Kommune og en række interessenter arbejder på, at blive Dark sky certificeret på Møn og Nyord. Udviklingsprojektet blev igangsat i 2013 og initiativtagene har fået hjælp fra en bred kreds af foreninger, virksomheder og borgere mv, som deltager i projektet. Der er således tale om en velfunderet proces.

Vordingborg Erhverv A/S udvikler og driver aktiviteter og projekter som understøtter erhvervslivet og fremmer vækst og erhvervsudvikling i Vordingborg Kommune.

Projektet bidrager til, at vi handler mere miljøvenligt og projektet er til fordel for naturen og miljøet og ikke mindst muligheden for at nyde stjerner på nattehimlen. Endvidere har projektet en række positive effekter for den bæredygtige turisme i kommunen.

Dette er baggrunden for, at vi kan give vores anbefaling af og fulde støtte til at skabe den første International Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord. Vi støtter op om projektet og vil fremover, indenfor de rammer som vi råder over, forsætte med at støtte projektet.

Med venlig hilsen

Vordingborg Erhverv A/S

Susanne Kruse Sørensen

Direktør

To: Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

Letter of Support

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Vordingborg Municipality and a number of stakeholders wish to be granted a "Dark Sky" certificate on Møn and Nyord. The development project was launched in 2013 and the group behind this initiative has received help from a wide circle of associations, enterprises and local citizens, who are active participants in the project. The process is therefore well-established.

Vordingborg Erhverv A/S (Vordingborg Chamber of Commerce) develops and runs activities and projects in support of the business community and to promote growth and business development in Vordingborg Municipality.

The project will help to ensure that our actions are more environmentally friendly. The project itself is beneficial to the natural environment and, not least, it encourages people to enjoy the night sky. Moreover, the project will have a number of positive effects on sustainable tourism in the municipality.

For these reasons, we can recommend and give our unconditional support to the creation of Denmark's first International Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord. We support the project and will in future continue to give our support within the framework that is our mandate.

Yours faithfully Vordingborg Erhverv A/S

Susanne Kruse Sørensen
Director

Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord

Vordingborg Kommune og en række interessenter arbejder på at blive Dark sky certificeret på Møn og Nyord. Udviklingsprojektet blev igangsat i 2013, og initiativtagene har fået hjælp fra en bred kreds af foreninger, virksomheder og borgere mv, som deltager i projektet. Der er således tale om en velfunderet proces.

VisitSydsjælland-Møn er et væksthus for turismen. Med effektiv kommunikation og destinationsudvikling bidrager vi til at skabe ny vækst i turismen. VI fokuserer de kommende år på Sydsjællands tre største vækstudfordringer, nemlig, at øge antallet af kommercielle overnatninger, at etablere et internationalt brand samt destinationsudvikling og service.

Projektet bidrager til, at vi handler mere miljøvenligt, og projektet er til fordel for naturen og miljøet og fokuserer ikke mindst muligheden for at nyde stjerner på nattehimlen. Endvidere har projektet en række positive effekter for den bæredygtige turisme i kommunen.

Dette er baggrunden for, at vi kan give vores anbefaling af og fulde støtte til at skabe den første International Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord. Vi støtter op om projektet og vil fremover, indenfor de rammer som vi råder over, forsætte med at støtte projektet.

På vegne af VisitSydsjælland-Møn

Ida Lund Winther
Udviklingschef
VisitSydsjælland-Møn

SYDKYSTDANMARK
HER BEGYNDER HISTORIEN

VISITSYDSJÆLLAND-MØN
Kornerups Rådhus
Algade 97, 4760 Vordingborg
www.vism.dk

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Vordingborg Municipality and a number of stakeholders wish to be granted a "Dark Sky" certificate on Møn and Nyord. The development project was launched in 2013 and the group behind this initiative has received help from a wide circle of associations, enterprises and local citizens, who are active participants in the project. The process is therefore well-established.

VisitSydsjælland-Møn is a tourism development center. By means of effective communication and destination development, we contribute to the growth of tourism in this area. We focus on South Zealand's biggest challenges, i.e. we seek to increase the number of business-related overnight stays, establish our area as an internationally recognized brand, and develop the destination and services.

The project will help to ensure that our actions are more environmentally friendly. The project itself is beneficial to the natural environment and, not least, it encourages people to enjoy the night sky. Moreover, the project will have a number of positive effects on sustainable tourism in the municipality.

For these reasons, we can recommend and give our unconditional support to the creation of Denmark's first International Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord. We support the project and will in future continue to give our support within the framework that is our mandate.

On behalf of VisitSydsjælland-Møn

Ida Lund Winther
Development Manager
VisitSydsjælland-Møn

Letter of support

Vordingborg Kommune

Valdemarsgade 43

4760 Vordingborg

17 juli 2016

Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord

Vordingborg Kommune og en række interessenter arbejder på, at blive Dark sky certificeret på Møn og Nyord. Udviklingsprojektet blev igangsat i 2013 og initiativtagene har fået hjælp fra en bred kreds af foreninger, virksomheder og borgere mv, som deltager i projektet. Der er således tale om en velfunderet proces.

Vi en forening der driver et forsamlingshus, det vil sige at vi udlejer vores lokaler til fester med mere. Vi planlægger at afholde arrangere Dark Sky aftener.

Projektet bidrager til, at vi handler mere miljøvenligt og projektet er til fordel for naturen og miljøet og ikke mindst muligheden for at nyde stjerner på nattehimlen. Endvidere har projektet en række positive effekter for den bæredygtige turisme i kommunen.

Dette er baggrunden for, at vi kan give vores anbefaling af og fulde støtte til at skabe den første International Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord. Vi støtter op om projektet og vil fremover, inden for de rammer som vi råder over, forsætte med at støtte projektet.

På vegne af Borre Forsamlingshus Klintevej 353 Borre

Torben Nielsen formand

Toftevænget 1, 4791 Borre tlf. 4046 2336

Torben Nielsen

Letter of Support

To: Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

17. July 2016

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Vordingborg Municipality and a number of stakeholders wish to be granted a "Dark Sky" certificate on Møn and Nyord. The development project was launched in 2013 and the group behind this initiative has received help from a wide circle of associations, enterprises and local citizens, who are active participants in the project. The process is therefore well-established.

We are an association that runs a local community center, i.e. we hire our rooms out for parties and other social gatherings. We plan to hold Dark Sky evenings.

The project will help to ensure that our actions are more environmentally friendly. The project itself is beneficial to the natural environment and, not least, it encourages people to enjoy the night sky. Moreover, the project will have a number of positive effects on sustainable tourism in the municipality.

For these reasons, we can recommend and give our unconditional support to the creation of Denmark's first International Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord. We support the project and will in future continue to give our support within the framework that is our mandate.

On behalf of Borre Forsamlingshus (Community Center)

Torben Nielsen
Chairman

Museum Sydøstdanmark
Museum Southeast Denmark

Letter of support

Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

22. juni 2016

Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord

Vordingborg Kommune og en række interessenter arbejder på, at blive Dark sky certificeret på Møn og Nyord. Udviklingsprojektet blev igangsat i 2013 og initiativtagene har fået hjælp fra en bred kreds af foreninger, virksomheder og borgere mv, som deltager i projektet. Der er således tale om en velfunderet proces som Museum Sydøstdanmark har støttet og fortsat ønsker at være en del af.

Museum Sydøstdanmark er et statsanerkendt kulturhistorisk museum som dækker kommunerne Vordingborg, Næstved, Køge, Faxe og Stevns. Museet har to museer på Møn: Møns Museum og Museumsgården ved Keldbylille og er projektejer for den nyetablerede natur- og kulturhistoriske vandrerute Camønoen.

Camønoen samarbejder allerede med Dark Sky projektet og har samme fokus hvad angår afledte effekter. Der etableres som et synligt resultat af samarbejdet et Dark Sky "observatorium" ved Gurkebakke på Østmøn i form af et shelter med kig til stjernerne.

Dark Sky bidrager som Camønoen til, at anvende natur og miljø fysisk og mentalhygiejnisk og ikke mindst muligheden for at nyde stjerner på nattehimlen. Endvidere har projektet en række positive effekter for miljø og natur og den bæredygtige turisme i kommunen.

Dette er baggrunden for, at vi kan give vores anbefaling af og fulde støtte til at skabe den første International Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord. Vi støtter op om projektet og vil fremover, indenfor de rammer som vi råder over, forsætte med at støtte projektet.

På vegne af Museum Sydøstdanmark

Keld Møller Hansen
Museumsdirektør

Museum Sydøstdanmark
Algade 97
DK - 4760 Vordingborg

t +45 2371 4108
kmh@museerne.dk

Museum South-East Denmark

Letter of Support

To: Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

22. June 2016

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Vordingborg Municipality and a number of stakeholders wish to be granted a "Dark Sky" certificate on Møn and Nyord. The development project was launched in 2013 and the group behind this initiative has received help from a wide circle of associations, enterprises and local citizens, who are active participants in the project. The process is therefore well-established. Museum Southeast Denmark has supported and intends in future to continue to support the project.

The museum is a state-registered cultural and historical museum, which covers five municipalities: Vordingborg, Næstved, Køge, Faxe and Stevns. The museum runs two museums on Møn: Møns Museum and Museumsgården at Keldbylille. We also own the new nature, culture and historical hiking trail, Camønoen.

Camønoen is already working with the Dark Sky project and has identical focus regarding the consequences. As a palpable result of this partnership, a Dark Sky "observatory" has been set up at Gurkebakken on East Møn. We have erected a shelter with a view of the stars.

Like Camønoen, Dark Sky will help to ensure that we use our natural environment for the benefit of our physical and mental health. Not least, we give people an opportunity to enjoy the night sky. Moreover, the project will have a number of positive effects on sustainable tourism in the municipality.

For these reasons, we can recommend and give our unconditional support to the creation of Denmark's first International Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord. We support the project and will in future continue to give our support within the framework that is our mandate.

On behalf of Museum Southeast Denmark

Keld Møller Hansen
Director

Brorfelde Observatorium
Observator Gyldenkernes Vej 7
4340 Tølløse
Tlf. 72 36 39 00
E-mail brorfelde@holb.dk
www.brorfelde.dk

Tølløse den. 28. juli 2016

Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord

Vordingborg Kommune og en række interessenter arbejder på at blive Dark sky certificeret på Møn og Nyord. Udviklingsprojektet blev igangsat i 2013 og initiativtagene har fået hjælp fra en bred kreds af foreninger, virksomheder og borgere mv. som deltager i projektet. Der er således tale om en velfunderet proces.

Brorfelde Observatorium er et opdagelsescenter med afsæt i astronomiens forunderlige verden, hvor udforskningen af universets hemmeligheder bliver en håndgribelig, meningsfuld og sjov oplevelse. Områdets fredning ved Brorfelde Observatorium er omfattet af et fredet nattemørke. Dette giver unikke muligheder for at observere nattehimlen, uforstyrret af lysforurening. En Dark Sky certificering af Møn og Nyord kan være med til at skabe større opmærksomhed for mørkets betydning for vores kultur og natur samt være med til at skabe gunstige områder til observation af nattehimlen. Ligeledes må det forventes, at det vil give en langt højere og ønskværdig interesse og gejst for astronomi og general naturvidenskab for den brede befolkning.

Projektet bidrager til, at vi handler mere miljøvenligt og projektet er til fordel for naturen og miljøet og ikke mindst muligheden for at nyde stjerner på nattehimlen. Endvidere har projektet en række positive effekter for den bæredygtige turisme i kommunen.

Dette er baggrunden for, at vi kan give vores anbefaling af og fulde støtte til at skabe den første International Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord. Vi støtter op om projektet og vil fremover, indenfor de rammer som vi råder over, forsætte med at støtte projektet.

På vegne af Brorfelde Observatorium

Julie Kh. Bouchet

Julie Bouchet
Leder ved Brorfelde Observatorium

OBSERVATOR GYLDENKERNES VEJ 7 DK 4340 TØLLØSE +45 72 36 39 00 BRORFELDE@HOLB.DK WWW.BRORFELDE.DK

Brorfelde Observatory

Tølløse, 28 July 2016

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Vordingborg Municipality and a number of stakeholders wish to be granted a "Dark Sky" certificate on Møn and Nyord. The development project was launched in 2013 and the group behind this initiative has received help from a wide circle of associations, enterprises and local citizens, who are active participants in the project. The process is therefore well-established.

Brorfelde Observatory is a discovery center. We introduce visitors to the wonders of astronomy and do what we can to make discovering the universe's secrets palpable to our visitors. We hope to make their visit fun and meaningful. The preservation order on the area around Brorfelde Observatory includes preservation of dark skies, which means that we have unique opportunities to observe the night sky undisturbed by light pollution. A Dark Sky certification of Møn and Nyord may help to create greater awareness of the importance of darkness for our culture and nature and help to dedicate more areas to observation of the night sky. We can also expect Dark Sky certification to encourage much more of a desirable interest and enthusiasm for astronomy and science generally among the general public.

The project will help to ensure that our actions are more environmentally friendly. The project itself is beneficial to the natural environment and, not least, it encourages people to enjoy the night sky. Moreover, the project will have a number of positive effects on sustainable tourism in the municipality.

For these reasons, we can recommend and give our unconditional support to the creation of Denmark's first International Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord. We support the project and will in future continue to give our support within the framework that is our mandate.

On behalf of Brorfelde Observatory

Julie Bouchet
Leader of Brorfelde Observatory

Letter of support

Geocenter Møns Klint A/S
Stengårdsvej 8
DK - 4791 Borre
T : +45 55 86 36 00
E : geocenter@moensklint.dk
CVR: 3007 2863
Bank: 6140 4072110
www.moensklint.dk

Vordingborg Kommune

Valdemarsgade 43

4760 Vordingborg

Møns Klint, den 16. August 2016

Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord

Vordingborg Kommune og en række interessenter arbejder på, at blive Dark sky certificeret på Møn og Nyord. Udviklingsprojektet blev igangsat i 2013 og initiativtagene har fået hjælp fra en bred kreds af foreninger, virksomheder og borgere mv, som deltager i projektet. Der er således tale om en velfunderet proces.

GeoCenter Møns Klint vil gerne støtte arbejdet med at gøre Møn og Nyord til Dark Sky Community. Vi er en organisation der formidler Naturen på Østmøn til områdets mange gæster. Vi har hvert år ca. 200.000 besøgende, hvoraf 65.000 betaler entré til vores udstillinger og 3D biograf. Vi er i fuld gang med at implementer DARK SKY anbefalingerne og har allerede ture med vores gæster, der formidler stjernehimlen.

Projektet bidrager til, at vi handler mere miljøvenligt og projektet er til fordel for naturen og miljøet og ikke mindst muligheden for at nyde stjerner på nattehimlen. Endvidere har projektet en række positive effekter for den bæredygtige turisme i kommunen.

Dette er baggrunden for, at vi kan give vores anbefaling af og fulde støtte til at skabe den første International Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord. Vi støtter op om projektet og vil fremover, indenfor de rammer som vi råder over, forsætte med at støtte projektet.

På vegne af GeoCenter Møns Klint

Nils Natorp
Direktør

Letter of Support

To: Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

Møns Klint 16 August 2016

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Vordingborg Municipality and a number of stakeholders wish to be granted a "Dark Sky" certificate on Møn and Nyord. The development project was launched in 2013 and the group behind this initiative has received help from a wide circle of associations, enterprises and local citizens, who are active participants in the project. The process is therefore well-established.

GeoCenter Møns Klint supports every effort to create a Dark Sky Community on Møn and Nyord. We are an organization that informs visitors to the area about the natural environment on East Møn. Each year we receive about 200,000 visitors, of which 65,000 pay to see our exhibitions and 3D movie theater. We are in full swing with implementation of the DARK SKY recommendations and already offer astronomy-oriented tours to our guests.

The project will help to ensure that our actions are more environmentally friendly. The project itself is beneficial to the natural environment and, not least, it encourages people to enjoy the night sky. Moreover, the project will have a number of positive effects on sustainable tourism in the municipality.

For these reasons, we can recommend and give our unconditional support to the creation of Denmark's first International Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord. We support the project and will in future continue to give our support within the framework that is our mandate.

On behalf of GeoCenter Møns Klint.

Nils Natorp
Director

MØN SYDSJÆLLAND TURISTFORENING
Hejrevej 3
2720 Præstø

Letter of support

Vordingborg Kommune

Valdemarsgade 43

4760 Vordingborg

Møn, den 16. august 2016

Vedr. Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord

Vordingborg Kommune og en række interessenter arbejder på, at blive Dark sky certificeret på Møn og Nyord. Udviklingsprojektet blev igangsat i 2013 og initiativtagene har fået hjælp fra en bred kreds af foreninger, virksomheder og borgere mv, som deltager i projektet. Der er således tale om en velfunderet proces.

Vi i Møn Sydsjælland Turistforening er en organisation, der arbejder for at varetage turisterhvervets interesser lokalt og regionalt. Organisationen har godt 100 medlemmer som kommer fra hele Vordingborg Kommunes geografi. Vi vil godt støtte arbejdet med at gøre Møn og Nyord til Dark Sky Community.

Projektet bidrager til, at vi handler mere miljøvenligt og projektet er til fordel for naturen og miljøet og ikke mindst muligheden for at nyde stjerner på nattehimlen. Endvidere har projektet en række positive effekter for den bæredygtige turisme i kommunen.

Dette er baggrunden for, at vi kan give vores anbefaling af og fulde støtte til at skabe den første International Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord. Vi støtter op om projektet og vil fremover, indenfor de rammer som vi råder over, forsætte med at støtte projektet.

På vegne af Møns Sydsjælland Turistforening

Nils Natorp
Formand

Møn Sydsjælland Turisforening

Letter of Support

To: Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

Møn 16 August 2016

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Vordingborg Municipality and a number of stakeholders wish to be granted a "Dark Sky" certificate on Møn and Nyord. The development project was launched in 2013 and the group behind this initiative has received help from a wide circle of associations, enterprises and local citizens, who are active participants in the project. The process is therefore well-established.

Møn Sydsjælland Turistforening is an association that seeks to advance the cause of tourism-related businesses in the local and regional areas (i.e. Møn and Southern Zealand). The organization has more than 100 members from all corners of Vordingborg Municipality. We support every effort to create a Dark Sky Community on Møn and Nyord.

The project will help to ensure that our actions are more environmentally friendly. The project itself is beneficial to the natural environment and, not least, it encourages people to enjoy the night sky. Moreover, the project will have a number of positive effects on sustainable tourism in the municipality.

For these reasons, we can recommend and give our unconditional support to the creation of Denmark's first International Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord. We support the project and will in future continue to give our support within the framework that is our mandate.

On behalf of Møn Sydsjælland Turistforening.

Nils Natorp
Chairman

Letter of support

Danmarks Naturfredningsforening

Vordingborg Kommune

Valdemarsgade 43

4760 Vordingborg

24 aug 2016

Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord

Vordingborg Kommune og en række interessenter arbejder på, at blive Dark sky certificeret på Møn og Nyord. Udviklingsprojektet blev igangsat i 2013 og initiativtagene har fået hjælp fra en bred kreds af foreninger, virksomheder og borgere mv, som deltager i projektet. Der er således tale om en velfunderet proces.

Danmarks Naturfredningsforening, støtter på det varmeste projektet. Vi er rystede over så få steder man kan opleve en naturlig uspoleret nattehimmel, og at det er vigt at værne om de få steder, det lader sig gøre. Tænk at vokse op i Hovedstadsområdet og aldrig have set mælkevejen. Desuden mener vi at projektet kan bidrage til, at vi handler mere miljøvenligt, og at projektet er til fordel for naturen og miljøet -ikke mindst muligheden for at nyde stjerner på nattehimlen. Endvidere har projektet en række positive effekter for den bæredygtige turisme i kommunen.

Dette er baggrunden for, at vi kan give vores anbefaling af og fulde støtte til at skabe den første International Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord. Vi støtter op om projektet og vil fremover, indenfor de rammer som vi råder over, forsætte med at støtte projektet.

På vegne af bestyrelsen for

DN-Vordingborg

Martin Vestergaard

Formand

Letter of Support

The Danish Society
for Nature Conservation

To: Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

24 Aug 2016

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Vordingborg Municipality and a number of stakeholders wish to be granted a "Dark Sky" certificate on Møn and Nyord. The development project was launched in 2013 and the group behind this initiative has received help from a wide circle of associations, enterprises and local citizens, who are active participants in the project. The process is therefore well-established.

The Danish Society for Nature Conservation offers whole-hearted support to this project. We were shocked to learn that only a handful of locations remain where it is possible to experience an unspoiled natural dark sky. It is important to preserve these few locations. Imagine growing up in Greater Copenhagen and never seeing the Milky Way! The project will help to ensure that our actions are more environmentally friendly. The project itself is beneficial to the natural environment and, not least, it encourages people to enjoy the night sky. Moreover, the project will have a number of positive effects on sustainable tourism in the municipality.

For these reasons, we can recommend and give our unconditional support to the creation of Denmark's first International Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord. We support the project and will in future continue to give our support within the framework that is our mandate.

On behalf of the Board of

DN Vordingborg

Martin Vestergaard
Chairman

30. juli 2016

Støtte til Dark Sky Community og Dark Sky Park på Møn og Nyord

Vordingborg Kommune og en række interessenter arbejder på, at blive Dark sky certificeret på Møn og Nyord. Udviklingsprojektet blev igangsat i 2013 og initiativtagene har fået hjælp fra en bred kreds af foreninger, virksomheder og borgere mv, som deltager i projektet. Der er således tale om en velfunderet proces.

Københavns Astronomiske Forening (KAF)

Foreningens formål er at samle astronomisk interesserede

Foreningens arbejdsområde er alle former for amatørastronomi. Foreningen har teleskoper, der kan benyttes af medlemmerne. Foreningen afholder også arrangementer for publikum, hvor aktuelle observationer af astronomiske fænomener er udgangspunktet. Foreningen tilstræber en høj grad af social aktivitet. Foreningen arbejder aktivt for bevarelse af den mørke stjernehimmel.

Projektet bidrager til, at vi handler mere miljøvenligt og projektet er til fordel for naturen og miljøet og ikke mindst muligheden for at nyde stjerner på nattehimlen. Endvidere har projektet en række positive effekter for den bæredygtige turisme i kommunen.

Dette er baggrunden for, at vi kan give vores anbefaling af og fulde støtte til at skabe den første International Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord. Vi støtter op om projektet og vil fremover, indenfor de rammer som vi råder over, forsætte med at støtte projektet.

På vegne af Københavns Astronomiske Forening

Gunnar Tyrsted

Gunnar Tyrsted

30. July 2016

In support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Vordingborg Municipality and a number of stakeholders wish to be granted a "Dark Sky" certificate on Møn and Nyord. The development project was launched in 2013 and the group behind this initiative has received help from a wide circle of associations, enterprises and local citizens, who are active participants in the project. The process is therefore well-established.

The Astronomical Society of Copenhagen (KAF)

The purpose of the society is to gather people who are interest in astronomy.

The society works with every field of astronomy. The society makes telescopes accessible to its members. The society also holds public events based on current observations of astronomical phenomena. The society strives to achieve a high level of social activity. The society plays an active role in preserving the nocturnal darkness and starry skies.

The project will help to ensure that our actions are more environmentally friendly. The project itself is beneficial to the natural environment and, not least, it encourages people to enjoy the night sky. Moreover, the project will have a number of positive effects on sustainable tourism in the municipality.

For these reasons, we can recommend and give our unconditional support to the creation of Denmark's first International Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord. We support the project and will in future continue to give our support within the framework that is our mandate.

On behalf of Astronomical Society of Copenhagen.

Gunnar Tyrsted

Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

Møn, den 15. august 2016

Letter of Support til International Dark Sky Community og International Dark Sky Park på Møn og Nyord

Astronomisk forening for Sydsjælland er en amatørastronomisk forening som dækker Sydsjælland med medlemmer fra Haslev i nord til Møn i syd. Foreningens formål er at udbrede kendskabet til astronomi og at skabe kontakt mellem amatørastronomer i Sydsjælland, samt at give medlemmerne kendskab til praktisk observationsteknik.

Foreningen er aktiv med flere arrangementer om året, hvor vi invitere offentligheden til stjernekig i områder, med meget lidt lysforurening. Specielt står et arrangement på Nyord i vinteren 2013, stadig tydelig i foreningens hukommelse, fordi stjernehimlen var så klar og stjernerne så tætpakket, at alle blev rørt af ærefrygten ved at stå under en stjernehimmel, som var overvældende smuk.

Som amatørastronomer har de fleste af vores medlemmer et godt kendskab til stjernehimlen og ved hvor vigtigt der er at have en mørk nattehimmel. Med den stadig stigende brug af lys om natten oplever vi som amatørastronomer at det bliver stadig sværere at finde områder, hvor udsynet til stjernerne og universet ikke forstyrres af lys.

Astronomisk forening for Sydsjælland, har siden det første ideforslag støttet arbejdet med at skabe den første International Dark Sky Community og den første International Dark Sky Park i Danmark, på Møn og Nyord. Foreningen støtter og vil fremover, indenfor de rammer som foreningen nu en gang råder over, fortsætte med at støtte projektet.

På vegne af Astronomisk forening for Sydsjælland

Tom Axelsen
Formand

Vordingborg Kommune
Valdemarsgade 43
4760 Vordingborg

Møn 15. August 2016

In Support of Dark Sky Community and Dark Sky Park on Møn and Nyord

Astronomisk Forening for Sydsjælland (the South Zealand Astronomy Society) is an amateur astronomy association, which covers the south of Zealand. We have members from Haslev in the North to Møn in the South. The objective of the society is to disseminate knowledge of astronomy and create contact between amateur astronomers in Southern Zealand and teach our members practical observation techniques.

The society organizes several events each year, where we invite the general public to gaze at the stars in areas where there is little light pollution. An event of this kind on Nyord in Winter 2013 remains clear in our memory because the sky was so clear. There were so many stars shining in the night sky that we were completely in awe. It was an overwhelmingly beautiful sight.

As amateur astronomers, most of our members are well-acquainted with the stars and aware of the importance of a dark sky. As more and more lights are used at night, we as amateur astronomers, find that it is increasingly difficult to find areas, in which we can observe the stars and the universe undisturbed by light.

Since the idea was first mooted, Astronomisk Forening for Sydsjælland has lent its support to the creation of Denmark's first International Dark Sky Community and the first International Dark Sky Park in Denmark on Møn and Nyord. The society supports the project and will in future continue to give support within the framework that is our mandate.

On behalf of Astronomical Society of Southern Zealand.

Tom Axelsen
Chairman

Section 5

Proposed International Dark-Sky Park Møn and Nyord

THE area that is seeking recognition as an International Dark Sky Park is made up of several parts of two Danish islands, Møn and Nyord. The parts not covered by this application are seeking status as International Dark Sky Community Møn and Nyord. See separate application.

Parts of Møn and Nyord are nature conservation areas that are owned and managed by the Danish state. In this application, these areas seek approval as International Dark Sky Park Møn and Nyord.

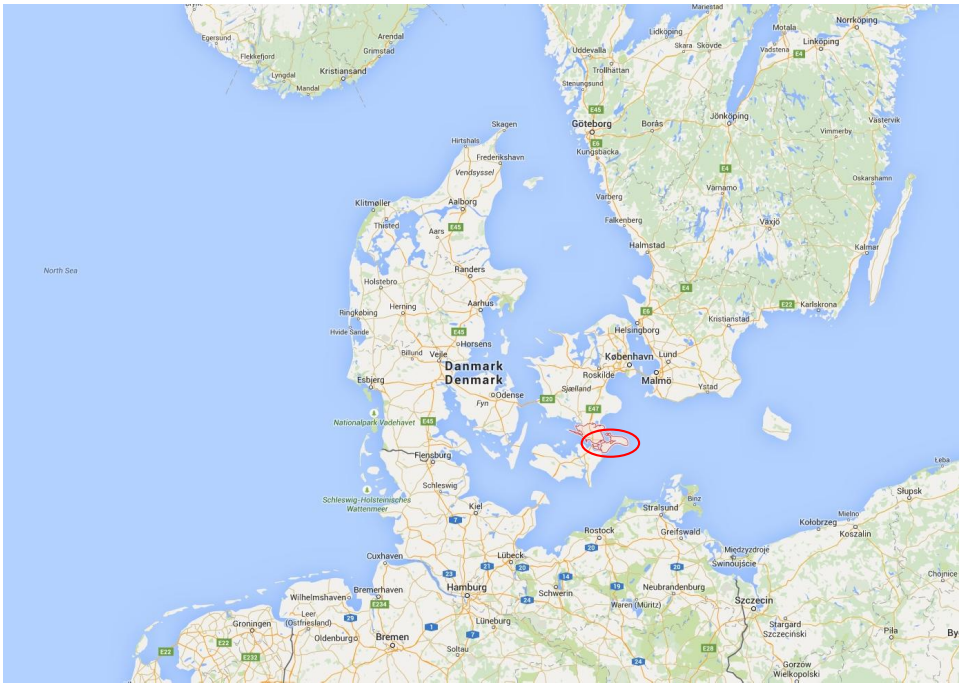


Figure 5.1: Denmark and neighboring countries. Møn and Nyord are circled in red. Map Source: GoogleMaps

The islands of Møn and Nyord are part of Vordingborg Municipality. The municipality covers the southernmost parts of Zealand with the islands of Møn, Nyord and Bogø. Møn and Nyord lie between Zealand and the Baltic Sea.

5.1 The structure of the proposed IDSP Møn and Nyord

THE areas that are applying for approval as an International Dark Sky Park are marked in red in Figure 5.2 and in more detail in Figures 5.3 and 5.4. For exact borders of the Dark Sky Park see maps included in the Partnership Agreement between Vordingborg Municipality and The Danish Natur Agency, Section 10.2.1.

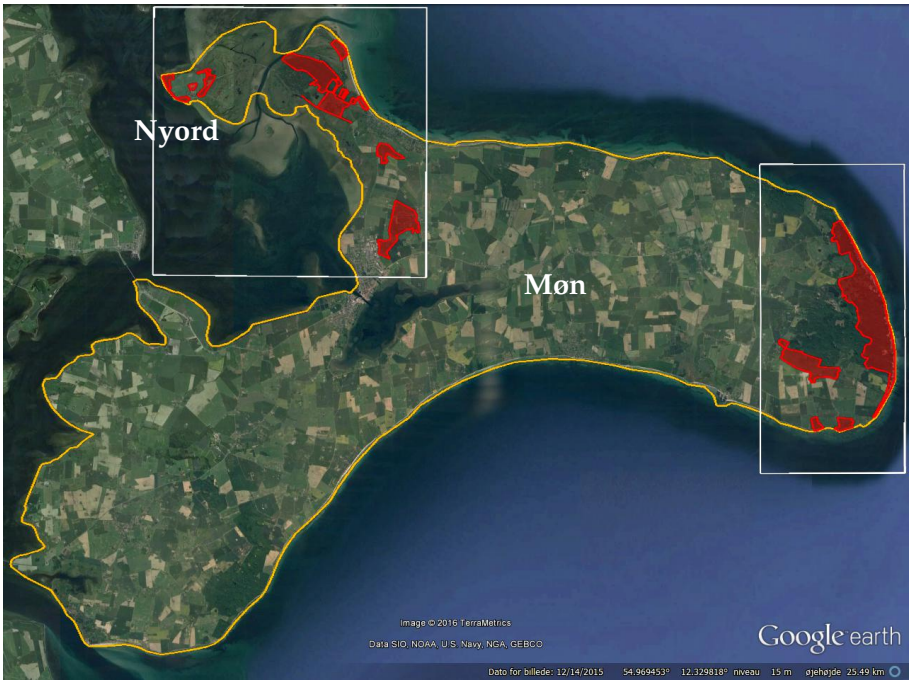


Figure 5.2: Areas applying for approval as an International Dark Sky Park are marked in red on the map. White outlines show the map-sections which are given in the more detailed maps in Figures 5.3 and 5.4. The yellow line marks the boundaries of the International Dark Sky Community. See separate application. Map Source: GoogleEarth

5.1.1 Nature Conservation in Denmark

The area aspiring to status as International Dark Sky Park Møn and Nyord is fragmented as many small areas. Fragmentation is due to the way nature conservation is managed in Denmark.

For as long as anyone can recall, every part of Denmark has been exploited in some way, i.e. forestry, agriculture or as an urban center. The exceptions are isolated pockets of land owned by the Danish state and even these areas are normally utilized in some way.

When an area is designated a nature conservation area, the lion's share of the area in question will be privately-owned land. This also applies to the nature conservation areas of East Møn, Ulvshale and Nyord, of which the proposed Dark Sky Park forms a part.

Conservation orders oblige landowners to meet certain restrictions regarding the use of nature conservation areas. In response to the imposition of restrictions, some landowners lose interest in the area and sell the land to the Danish state.

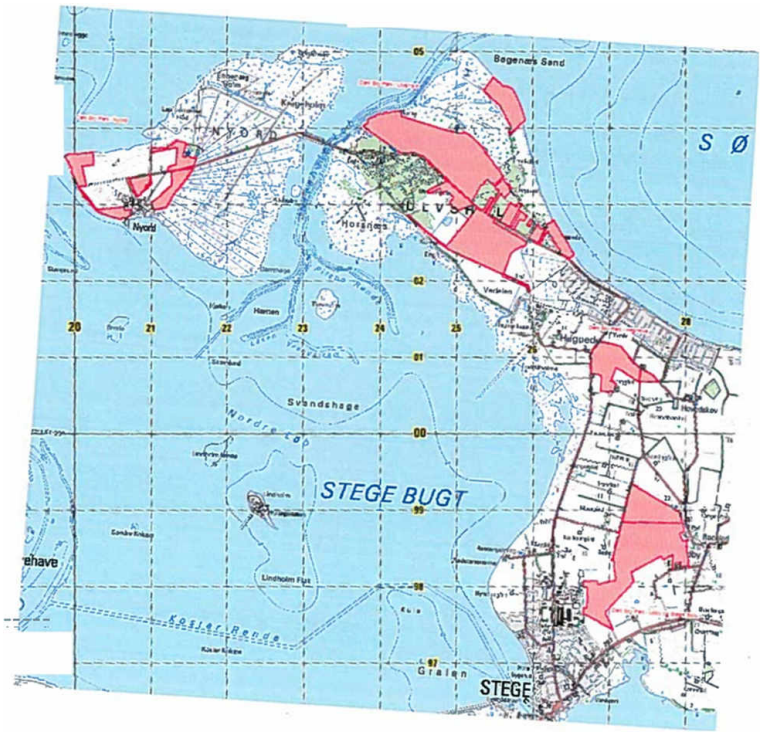


Figure 5.3: The map shows Nyord and Ulvshale. Red areas is the area applying for approval as International Dark Sky Park Møn and Nyord. The map was drawn up by the Danish Nature Agency (Storstrøm Section), which owns and manages these areas. It has validity of other maps showing the area of the proposed International Dark Sky Park, e.g. Figure 5.2. Map Source: The Danish Nature Agency (Storstrøm Section)

The areas are not systematically sold or purchased. This explains why the state owns many small patches of land on Møn and Nyord, rather than large areas.

To ensure public access to the proposed International Dark Sky Park at night, it was decided to restict the International Dark Sky Park to the areas owned by the Danish state, instead of the much larger area with conservation orders.

The areas with conservation orders, owned by the Danish state and managed by the Danish Nature Agency and the National Museum of Denmark, which are set aside as Dark Sky Park are shown with red in figure 5.3 and 5.4.

By restricting the Dark Sky Park area to areas owned by the Danish state, it is ensured that the public will have access to the Dark Sky Park at any time of the day or night, without supervision. For events, e.g. starparties, a permit from the park management must be gained beforehand. Permission to hold an event is sought at www.booking.naturstyrelsen.dk, where every danish citizen can have an userprofil and seek permission to hold events at areas owned by the danish state and managed by the Danish Nature Agency.

The proposed International Dark Sky Park includes nature conservation areas, in which very stringent restrictions apply. The conservation orders are subject to Danish legislation (see Section 9). International regulations regarding the protection of particularly vulnerable species and biotopes may also apply (see Section 6).

Figure 5.4: The map shows East Møn. Red areas is the area applying for approval as International Dark Sky Park Møn and Nyord. The map was drawn up by the Danish Nature Agency (Storstrøm Section), which owns and manages these areas. It has validity of other maps showing the area of the proposed International Dark Sky Park, e.g. Figure 5.2. Map Source: The Danish Nature Agency (Storstrøm Section)

5.1.2 Buffer Zone

The proposed International Dark Sky Park area meets the requirements stipulated in the Dark Sky Park Designation Guidelines:

- It comprises a nature conservation area, owned by a public authority.
- There is public access at night.
- Compared with other parts of Denmark, and Zealand in particular, the proposed Dark Sky Park area is an exceptional Dark Sky resource. See Section 8

As the proposed International Dark Sky Park Møn and Nyord is comprised of several smaller areas, protecting the darkness efficiently would be difficult if the Dark Sky Park was surrounded by areas where outdoor lighting was unrestricted. We have therefore decided to surround the Dark Sky Park with a buffer zone, i.e. the International Dark Sky Community Møn and Nyord. See separate application. Most of the local outdoor lighting is found in the buffer zone, on private- and publicly owned land. Where public outdoor lighting is concerned, Vordingborg Municipality has decided to work in line with a Light Management Plan (LMP) that is only marginally less restrictive than the LMP that will apply within the Dark Sky Park. The two LMPs will provide adequate protection of the darkness in the Dark Sky Park. Meanwhile, the local community and visitors to the area will be able to move in the Dark Sky Community area and see examples of good outdoor lighting.

5.2 Light Pollution in Denmark

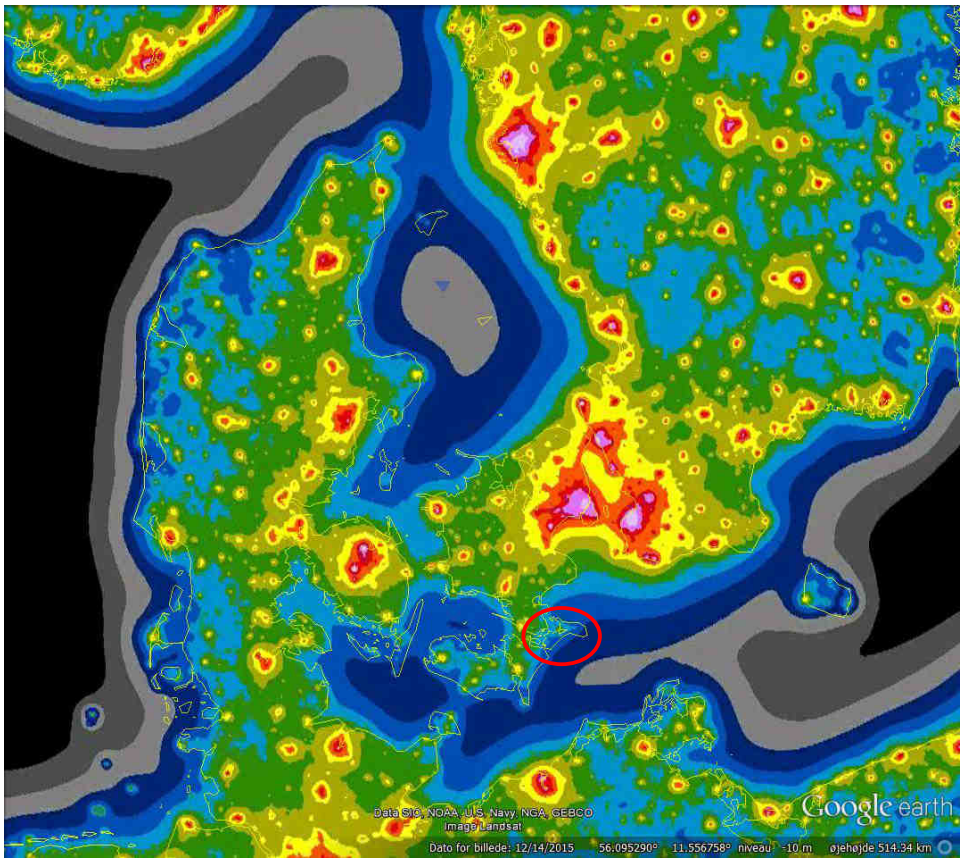


Figure 5.5: Extract from Fabio Falchi et al [6] showing light pollution in Denmark. Dark green areas correspond to a light pollution of 21.55 $mag./arcsec.^2$, i.e. bordering between lost natural night sky and natural night sky with adverse effects of light pollution The threshold 21.90 $mag./arcsec.^2$ is between blue and dark blue. Map Source: GoogleEarth with overlay of Fabio Falchi et al [6].

Before work to establish a Dark Sky Park on Møn and Nyord began, there was very little, if any, debate about light pollution in Denmark. Since Vordingborg Municipality and the Dark Sky Møn and Nyord working group announced that they were working to establish Denmark's first Dark Sky Park and Dark Sky Community, has the issue of light pollution and the necessary debate about our loss of the night started to appear in the media.

Zealand, with Greater Copenhagen and other large towns, is the area of Denmark that is most affected by light pollution. According to *Falci et al* [6], lives 89.3% of the Danish population under a night sky that is affected by light pollution to the extent that the natural night sky is lost. The threshold value used by *Falci et al* in their definition is a Night Sky Brightness (NSB) of or larger than $0.260 mCd/m^2$ or approximately 21.55 $mag./arcsec.^2$. The same study indicates that 99.9% of the Danish population lives under a sky that is lighter than $0.188 mCd/m^2$ or 21.90 $mag./arcsec.^2$.

Figure 5.6 shows that Møn and Nyord are within blue and dark blue areas. The dark green color is found only around Stege. The islands belong to the 0.8% of Denmark's area that suffers least light pollution. Much of the International Dark Sky Park will be within the dark blue area on East Møn. Night Sky Brightness

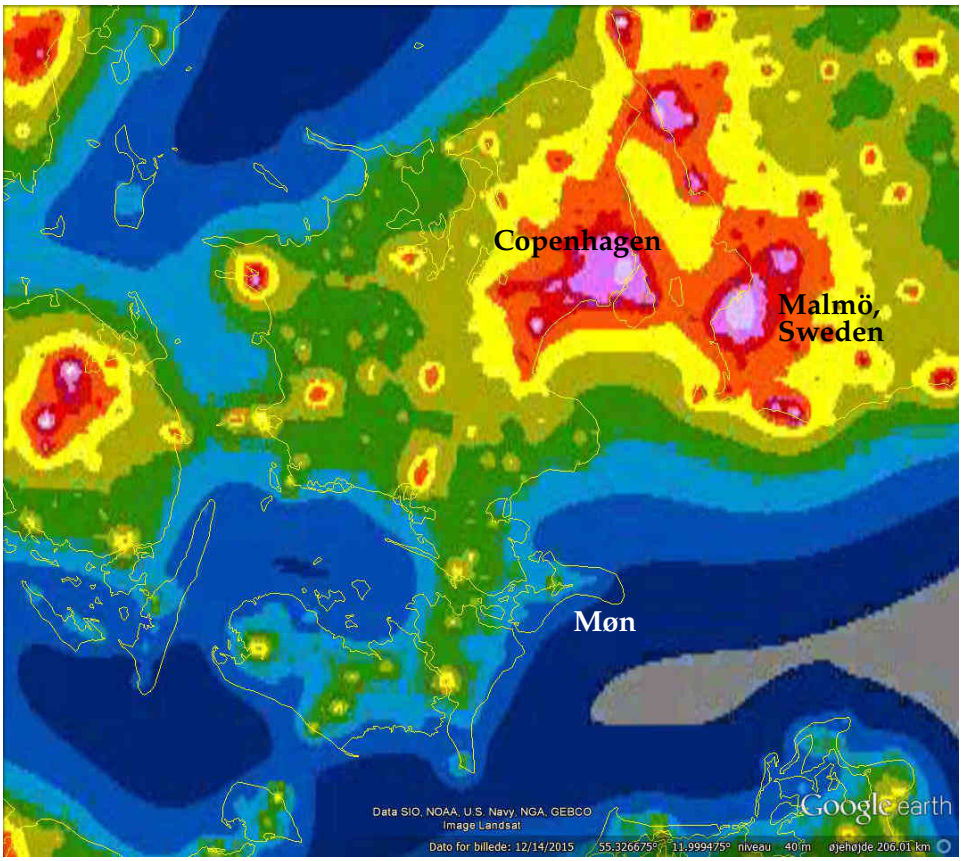


Figure 5.6: Extract from 5.5. The unique location of Møn and Nyord is clearer here. Copenhagen and Malmö are also shown on the map. Two major cities, Copenhagen (pop. 1,263,698 on 1 January 2015) and Malmö (pop. 318,107 on 31 March 2012), are the largest sources of light pollution in this area. Map Source: GoogleEarth with overlay of Falci et al [6].

(NSB) measurements taken on the two islands confirm these conditions. For more details about measurements, see Section 8.

Møn and Nyord are the darkest area on the map. The islands can easily be reached by car from Copenhagen and Zealand. To get from Zealand to Møn, you only have to cross one bridge or, alternatively, a freeway bridge and a causeway. The journey by car from Copenhagen is $1\frac{1}{4}$ to 2 hours, depending on which part of Copenhagen you come from and your destination on Møn. The journey takes no more than $1\frac{1}{4}$-2 hours from anywhere on Zealand. In total more than 2.2 million people live in close proximity and can reach a dark area of Møn and Nyord within two hours. In addition, more than 250,000 tourists visit Møn and Nyord every year.

Section 6

Nature Conservation

6.1 Natur Conservation

COASTAL areas, and in particular coastal waters, are largely designated as European Union Natura 2000 zones and therefore protected by the regulations under this scheme. There are five Natura 2000 zones on and around Møn and Nyord. No. 168 the sea and coast between Præstø Fjord (inlet) and Grønsund (straits), no. 171 Klinteskoven (forest) and Klinteskov Kalkgrund (chalk banks), no. 180 Stege Nor, no. 183 Busemarke Mose (marshlands) and Råby Sø (lake) and no. 208 Bøchers Grund (sandbanks). Both main areas of the IDSP area, Nyord – Ulvshale and Høje Møn (East Møn) are included in the Natura 2000 zones as they are valuable natural habitats.

Natura 2000 designation means that special measures have to be taken to protect and restore the natural environments and species, for the sake of which the area is designated a Natura 2000 zone.

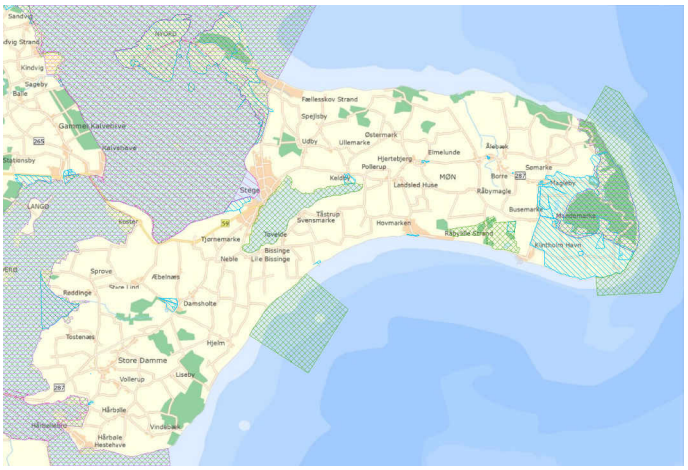


Figure 6.1: Conservation areas and wildfowl protection areas on Møn and Nyord. Areas shaded in blue are conservation areas, protected views and biotopes. Areas cross-hatched in green are Natura 2000 zones. Credit: The Danish Natural Environment Portal

In pursuance of the Danish Nature Conservation Act, the coast of Møn is generally protected by a 300 m (yard) wide belt, within which construction work and changes may not be made except by special permission. The protective belt is restrictive as it is intended to ensure that Denmark's open coastal landscapes remain open.

Large areas of woodland (more than about 49 acres) are subject to a woodlands protection belt that protects the open landscape.

Both sub-zones in the park area are subject to conservation orders. Both private- and publicly owned areas are protected with a view not only to preserving the open landscapes (conservation of views), but also to safeguarding unique populations of flora and fauna (biotope conservation) The conservation orders have been established by an independent conservation body and strict regulations apply here.

Other conservation orders cover landscapes and natural environments, primarily along the coast.

Across Møn and Nyord, there are registered natural habitats, such as heathlands, pastures, meadows, salt marshes and lakes larger than about 100 m^2 (119 square yards), which, in pursuance of the Danish Nature Protection Act, are protected from change in order to protect plant and animal life.

6.2 UNESCO Biosphere Reserve

In Parallel with the work to preserve the night skies, efforts are under way for Møn and Nyord to become a UNESCO Biosphere Reserve. The area in question will include the International Dark Sky Community Møn and Nyord are in its entirety, plus the neighboring island of Bogø and surrounding waters. The core of the Biosphere Reserve are marked with red in Figure 6.2 and coincides with the proposed International Dark Sky Park.

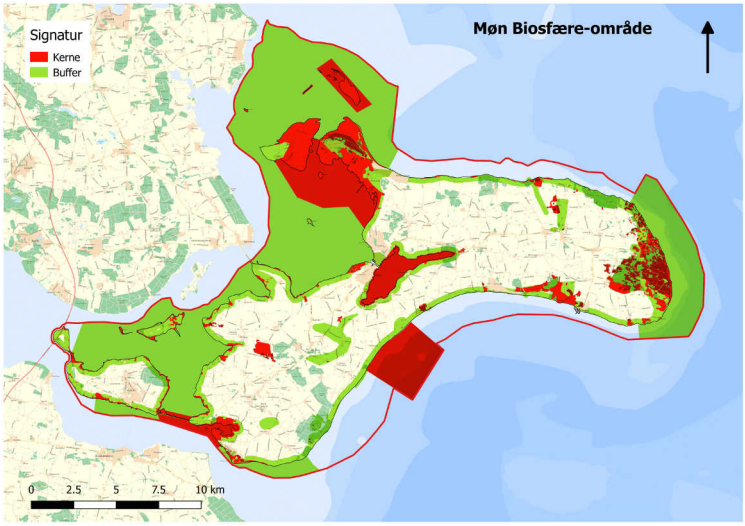


Figure 6.2: The map shows the proposed UNESCO Biosphere Reserve. The red areas are the core of the Biosphere Reserve. Green areas is Biosphere buffer zone. If we compare the core area of the Biosphere Reserve with Figure 5.2, it is clear that the area coincides with the International Dark Sky Park areas. Map Source: Biosphere Project

Section 7

Basic information of the Islands

7.1 Key Data and basic info

Table 7.1: *Key data for Møn*

Coordinates	54.88° - 55.06° N	12.10° - 12.55° E	
Area	237.47		km^2
Altitude	Sealevel – 143		m
Inhabiters	9,400		
Population Density	49		inhabitans/km^2
Tourism	>250,000		visitors/year

Møn is an island off the coast of of South Zealand. It is part of Vordingborg Municipality. The island is 237.47 km^2. The Ulvsund straits lie between Møn and Zealand to the north of the island. To the west, the Grønsund straits lie between Møn and another island, Falster. Møn is a popular destination and an area of natural beauty, which has good bathing beaches, churches with the Elmelundmesteren's frescoes and Møns Klint cliffs. Møn is linked to Zealand via the Queen Alexandrine Bridge. Møn is also connected to Bogø via a causeway across the small island of Barholm and from there, to the E47 freeway at Farø.

Figure 7.1: Elmelund Church is famous for its outstandingly beautiful, detailed frescoes. Credit: Niels Elgaard Larsen

Møn is a destination in its own right in Vordingborg Municipality. It has three local community councils: West Møn, Stege and its environs, and East Møn.

The largest town on Møn is Stege, which has one of Scandinavia's best preserved fortresses. Møn is a predominantly rural community with sporadic settlements in the landscape. Most are small farming communities. Coastal towns, Klintholm Havn, a harbor town to the south-east of the island The neighboring island of Nyord is considered part of the destination.

Nyord boasts a uniquely well-preserved cultural and natural environment, which, despite its relative isolation, is close to Stege. Nyord town and agricultural land lie above the level of the salt marshes, which cover about 80% of the total area. Like Møn, Nyord faces demographic challenges. There is an aging population and large-scale emigration. Part-time residency is, meanwhile, a growing phenomenon. There are 40 permanent residents and 100 part-time residents on Nyord.

A total of 9,400 people live on Møn and Nyord. Total population in Vordingborg Municipality is 45,806.

7.2 Geography and Nature

THE Dark Sky Park has two main zones: Høje Møn and Ulvshale – Nyord. In geological terms, the zones are linked because Ulvshale – Nyord was formed from debris swept by sea currents from Møns Klint. This area is on the seaward side of the Høje Møn escarpment. The Møn escarpment was created when chalk was driven upwards by glacial flow in the last Ice Age. The landscape is hilly and the soil extremely chalky. Aborrebjerget (143 m) in Høje Møn is East Denmark's highest point. Most of the area is covered by a thin soil layer, with bare outcrops of chalk. The thin soil layer and hills make this area particularly difficult to cultivate. The vegetation is unique and there are many rare species here that are found either only here or indigenous to only a few other places in Denmark.

The deciduous woods in this area have large areas of Common Beech (Facus sylvatica), whose conditions for growth and health are strongly impacted by the chalkiness of the subsoil. As the conditions here make cultivation difficult, grazing has been regarded as the only option. Grazing has created different types of nutrient-poor open landscapes, which are generally called "overdrev" (pastures).

Limestone-loving plants, including many orchids, are characteristic of Høje Møn. Denmark has 45 indigenous species of orchids. 18 of these grow in the DSP area. Some orchids are found only here and others only in a few other places in Denmark. The pastures here have rich insect life including rare and endangered species. For example, The Large Blue Butterfly (Maculinea arion) and The Transparent Burnet (Zygaena purpuralis) are found on Høje Møn, but nowhere else in Denmark.

The Nyord – Ulvshale area was formed from debris from the Møns Klint cliffs. This area is just above sea level and some parts are flooded at high tide. Most of the area is salt meadow. Other nutrient-deficient natural habitats, such as heathlands, pastures and cliffs, dominate the landscape.

Ulvshale has stony wash fringes with a thin layer of soil. At the center of this area, there is a unique forest with an outstanding population of Wild Service (Sorbus terminalis). The salt meadows on Nyord are the second-largest salt

meadows by area in East Denmark. Nyord – Ulvshale is a habitat for many shore and water fowl and, at certain times of the year, the area is a breeding and resting place for migratory birds.

As the islands lie on the main migratory route between continental Europe and Scandinavia, there is a rich and varied bird life across Møn and Nyord. In recent years, the Peregrine Falcon (Falco perigrinus) has returned to Møn, where it breeds on the cliffs (four of the six breeding pairs). Other Peregrine Falcons use Nyord as hunting territory.

As Møn and Nyord has such unique natural habitats in both park areas, the islands are home to a total of 341 red-listed (endangered and vulnerable population) and 138 yellow-listed (shrinking population) species on the European Red List of Species in Denmark.

7.2.1 Bird migration

As the islands lie on the main migratory route between continental Europe and Scandinavia, there is rich and varied bird life on Møn and Nyord. The coastal meadows on Nyord are East Denmark's second-largest coastal meadows by area and an important breeding and resting place for many shore and water fowl passing Møn and Nyord during migration or in the breeding season. In recent years, the Peregrine Falcon (Falco perigrinus) has returned to Møn, where it breeds on the cliffs (Dark Sky Park). Two of six breeding pairs use Nyord as their hunting territory.

The White-tailed Eagle (Haliaeetus albicilla) has also recolonized in Denmark. There is one breeding pair on East Møn. The White-tailed Eagle is often seen foraging in shallow waters off Nyord.

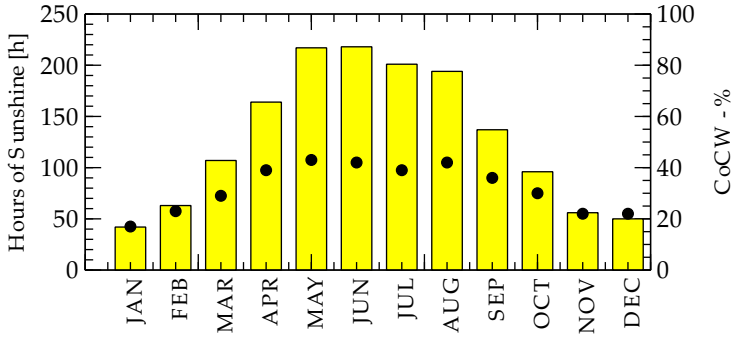
7.3 Climate

DENMARK is located in the Westerlies, which means that the climate here is impacted by weather systems moving in from the Atlantic Ocean and affected by the Gulf Stream. The weather is very variable, but there are no real extremes of climate throughout the year. Mean annual temperature (1961-1990) for Møn and Nyord is 8.1°C. The mean temperatures during summer and winter are 15.8°C and 0.6°C, respectively.

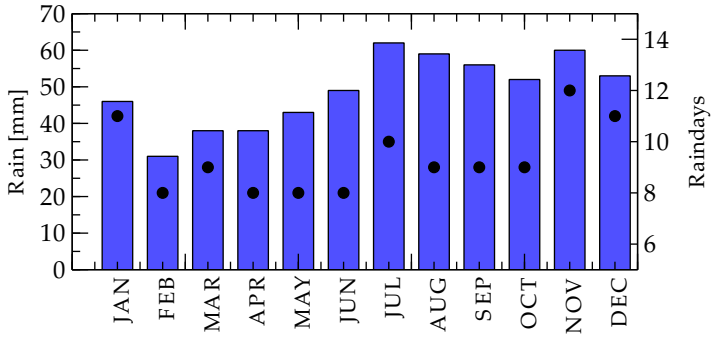
Møn and Nyord have comparatively more hours of sunshine (1564 h) per year than the rest of Denmark (1495 h). The difference is due to the effect of the Baltic Sea, which means that local showers are less likely to develop here during the summer months.

As Møn and Nyord are located on the eastern side of Denmark, weather systems coming in over Denmark from the Atlantic have already covered land and, to a certain extent, discharged rainfall before they reach Møn and Nyord. The difference is clear in average rainfall figures. Møn and Nyord receive 584 mm of rain each year (1961-1990), while on average Denmark as a whole has 712 mm rainfall per year.

The percentage change of clear weather in any given month is expressed as "Chance of Clear Weather" (CoCW), which is a percentage derived from dividing



(a)



(b)

Figure 7.2: Climate normals for the area, Western and Southern Zealand including Møn and Nyord for the periode 1961 -1990.
a) Left axis and yellow block bar is the hours of sunshine per month. Right axis and black dots is the chance of clear weather (CoCW) in percent.
b) Left axis and blue block bar is the rainfall in millimeters per month. Right axis and black dots is the number of days per month with rain. Source: Danish Meteorologic Institute [3]

the total number of daylight hours (from sunrise to sunset) with the normal monthly number of hours of sunshine. Even though CoCW is based on the number of hours of sunshine, CoCW is also a good indicator of the chances of clear weather at night.

7.3.1 Local weather phenomenas

During the winter months, when a zone of high pressure builds over Scandinavia or Western Russia, the wind comes from the east. The east wind brings Siberian temperatures. As the wind has come over the Baltic Sea before it reaches Møn and Nyord, it absorbs moisture and creates a phenomenon, known as Baltic showers. Baltic showers bring cloudy weather with a chance of snow, sometimes a great deal of snow. The phenomenon lasts no more than a few days, depending on the stability of the high pressure zone.

Another local weather phenomenon is the formation of orographic (mountain) clouds above Høje Møn. These are also the result of an easterly wind bringing moist air from the Baltic. As the wind is forced up the 100 m high Møns Klint chalk cliffs, it cools and the moisture condenses to form clouds. Orographic clouds are a strictly local phenomenon that typically extend only a few miles

in behind Høje Møn. Høje Møn is the only location in Denmark, at which orographic clouds are formed.

7.4 Land Ownership and Administration

THE areas proposed as International Dark Sky Park Møn and Nyord are owned by the Danish state and managed by two state institutions:

- The National Museum of Denmark manages Liselund Park, in the Høje Møn area.
- The Danish Nature Agency manages areas of East Møn, Ulvshale and Nyord.

Section 8

Documentation of Sky Quality

MEASUREMENTS of night sky brightness (NSB) above Møn and Nyord was started in September 2012 with a Unihedron SQM-L. Normally the measurements was excecuted between the end of astronomical twilight and local midnight. The first measurement in the Proposed Dark-Sky Park area was made in early March 2013. In April 2015 and again in Marts 2016 measuring runs were made covering all the areas included in the Proposed Dark-Sky Park.

In March 2016 an Unihedron SQM-LU-DL instrument was install in the Dark-Sky Park, close to GeoCenter Møns Klint, DSP09 in Figure 8.1, which have the supervision of the instrument. With the SQM-LU-DL it is possible to obtain a large number of measurements in Zenith throughout the night. With the large set of data it is possible to put constrains on the influence of the Milky Way. And through the way twilight, the moon and clouds influence the NSB it is possible to ignore data points obtained during twilight, with the moon above horisont or with cloudcover. The criteria for useful measurements are:

- Between end of and start of astronomical twilight.
- Clear sky.
- Moon below horisont.
- Measurements in Zenith

8.1 Measurements with SQM-LU-DL

THE SQM-LU-DL instrument installed at GeoCenter Møns Klint has the serial no. #2586. The instrument measures every night except those days and nights when it is brought in for maintenance. Measurements are obtained every 5. minut.

From the nights fulfill the criterias given above, two values, the brightest and the darkest measurements are given in table 8.1. As the table show some of the best nights appearently have magnitudes better that 22.00 $mag./arcsec^2$, which are normaly considered pristine sky. The measurements from Dark Sky Community at the same nights are also exceptional, but in the range 21.83 – 21.94 $mag./arcsec^2$. A likely reason for the exceptional values at GeoCenter Møns

Klint can be a high moisture contend of the air, but still below the dewpoint. The moisture will attenuate the light from the night sky, and with no local sources of light, no light pollution will be around to reflect in the moisture and brighten the measurements. In effect the night sky will appeare darker. The exact reason will be a topic of further investigation as more data is collected. All-night curves from the nights tabulated in table 8.1 are shown in Appendix B.

Table 8.1: *Summary of all clear nights from March to start of May 2016. Brightest and darkest measurements and the time of night they were measured are given. Instrument, Unihedron SQM-LU-DL #2586 from DSP09*

Night Date	Time hh:mm	Brightest of the night $mag./arcsec^2$	Time hh:mm	Darkest of the night $mag./arcsec^2$
7-8. March 2016	21:00	21.53	03:50	21.78
8-9. March 2016	22:40	21.54	02:55	21.88
9-10. March 2016	20:15	21.47	23:55	21.68
11-12. March 2016	20:30	21.60	01:40	22.13
15-16. March 2016	04:10	22.00	03:00	22.07
16-17. March 2016	04:05	21.86	03:45	21.89
26-27. March 2016	21:10	21.76	20:50	21.78
29-30. March 2016	22:25	21.70	00:50	21.87
30-31. March 2016	22:00	21.74	23:45	21.85
7-8. April 2016	01:55	21.79	03:15	21.85
8-9. April 2016	03:50	21.84	00:35	21.91
9-10. April 2016	22:25	21.78	01:05	22.01
10-11. April 2016	22:30	21.68	02:40	22.19
28-29. April 2016	01:25	22.01	00:30	22.06
1-2. May 2016	23:55	21.93	01:20	22.09
2-3. May 2016	00:05	21.98	01:35	22.04
4-5. May 2016	00:15	22.08	01:35	22.12
5-6. May 2016	01:00	21.92	00:20	21.94
6-7. May 2016	00:10	21.80	01:35	21.86
7-8. May 2016	00:15	21.83	01:05	21.89
8-9. May 2016	01:40	21.73	00:35	21.75

Møn and Nyord is located at a geografic latitude where different parts of the Milky Way is continually culminating in Zenith during midnight or evening hours, from August to end of January. All the measurements obtained so far with #2584 are obtained in March through May. The influenced from the Milky Way in this period have not been an issue. It is expected that the Milky Way will increasing the NSB with 0.3-0.4 $mag./arcsec.^2$ when it is culmination in Zenith.

Airglow is another major contributer to the NSB, but its influence is not evident in the data from the Dark-Sky Park, from spring 2016.

SQM-LU-DL data from the periode August to October 2016 was lost. Due to an error in the installement of the instrument it did not obtain data in this periode and the error was not discovered until the start of October when it was brought in for maintenance.

8.2 SQM-L Measurements in DSP-area

MEASUREMENTS of the NSB have been performed in all areas of the Proposed Dark-Sky Park with a handheld SQM-L instrument. The instrument used was the reference instrument #6409.

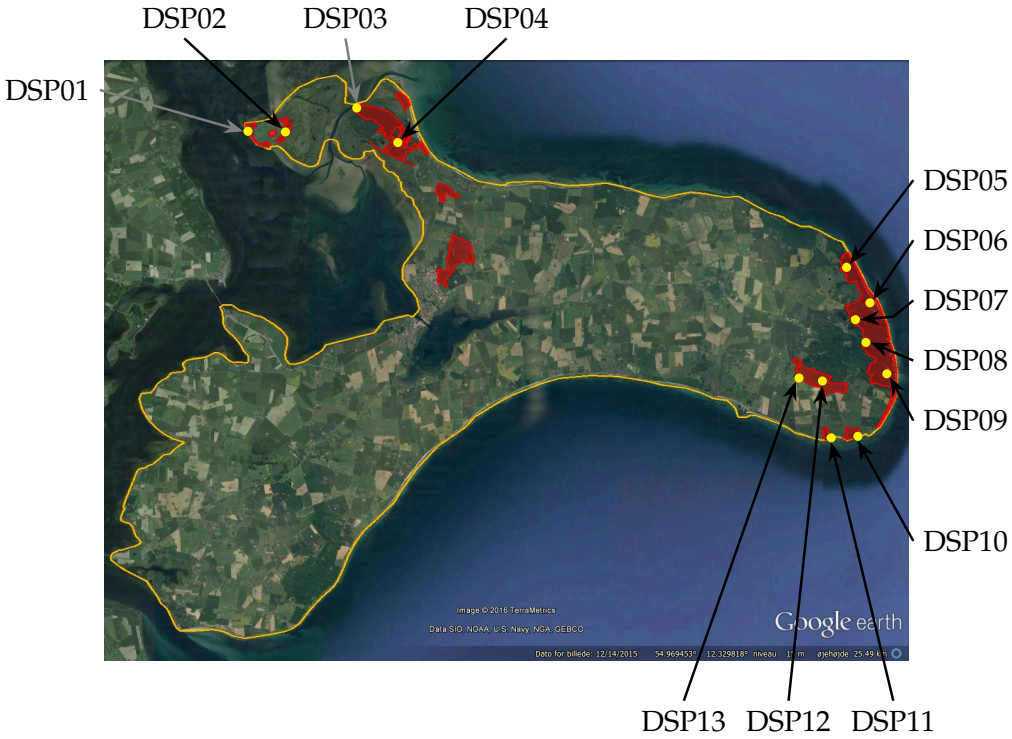
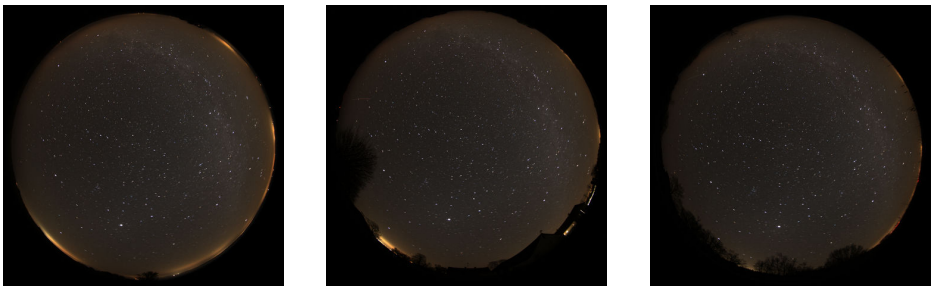


Figure 8.1: Map to show sites where in the proposed Dark Sky Park measurements of the NSB were taken using SQM-L instrument #6409. ID coding is reproduced in the measurement tables. Map Source: GoogleEarth

Figure 8.1 shows where the measurements was made. At every measuring-station a all-sky photo was obtained, the photos are shown in figure 8.2.

8.2.1 All-Sky Photos

All-sky images were also taken on the measurement field trips. The images were taken using identical settings on a Nikon D700 camera, NEF format (raw), Sigma 8 mm fisheye with aperture 3.5, ISO 1250 and three minutes' exposure. All the NEF images were converted and processed using IRIS software [5], offset and dark frame were subtracted and ADU in the image file was set to include data from 1-3,000. For all-sky images, see Figure 8.2.



DSP01 - 21.75

DSP02 - 21.76

DSP03 - 21.83

DSP04 - 21.85

DSP05 - 21.85

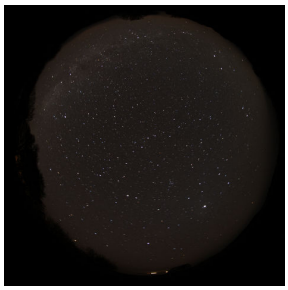
DSP06 - 21.88

DSP07 - 21.91

DSP08 - 21.92

DSP09 - 21.92

DSP10 - 21.91



DSP11 - 21.93

Figure 8.2: All-Sky photos of the night sky above the measuring stations. North is at the top of each photo, east to the left. Below each photo is the stations ID-number, see figure 8.1 and the NSB in $mag./arcsec.^2$, at the time of the photo. All photos are 3 minutes exposure. The normal dome of skyglow above the the cities Copenhagen and Malmö are not evident in the all-sky photos due to low cumulus clouds covering the cities.

8.2.2 Light domes above Copenhagen and Malmö

On the night 28. to 29. October a third measurement run was made, primary to document the light domes above Copenhangen and Malmö. The night sky was relative clear, but with a little cirrus left over from a front passage earlier in the day. The main concern was the high level of airglow, giving the night sky a greenish cast. Compared with the SQM-LU-DL measurements from the Dark Sky Community the NSB was 0.44 $mag./arcsec.^2$ brighter than normal

for this sidereal time (2h15m). For the park this corresponds to a night sky 0.50 – 0.55 $mag./arcsec.^2$ brighter than normal.

Visually the light domes above Copenhagen and Malmö are dim and low on the horizont. The brightest part of the light domes extend 5° above the horizont and with averted vision the domes may be traced to an altitude of approximately 10°, depending on the sky condition.

The only places the light domes "intrude" into the nighttime condition are at Nyord (DSP01) and on some parts of Ulvshale (DSP03), because there are so much open space here, the light domes are visible. Even if the light domes are visible they do not distract the view from the night sky. From the Dark Sky Park areas in the eastern end of Møn, the light domes are only visible from one hill top, otherwise they are hidden at the vally floors by hills and woods.

If medium high or high clouds (e.g. cirrus) appeare above the two cities the light domes becomes brighter and more visible. Examples of the effect of clouds can be found in the figure 8.6 or the all-sky photos in Dr. Andreas Hänels report D.

The other light domes appearing in the all-sky photos are very faint and non intrusive.

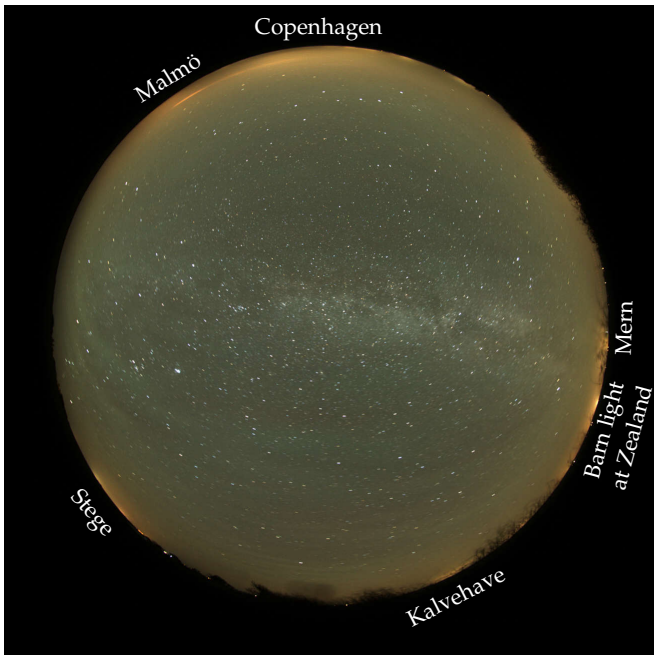


Figure 8.3: *DSP01, the measurement station closest to Zealand. Making the light domes from the small villages and farmes at Zealand more visible. The light dome of Copenhagen is the largest of the light domes, but it low on the horizont and is rather diffuse, which makes it less distinct. The Milky Way runs through zenith and the airglow gives the night sky an overall greenish cast. The SQM-L readings gave a mean NSB of 21.00* $mag./arcsec.^2$.

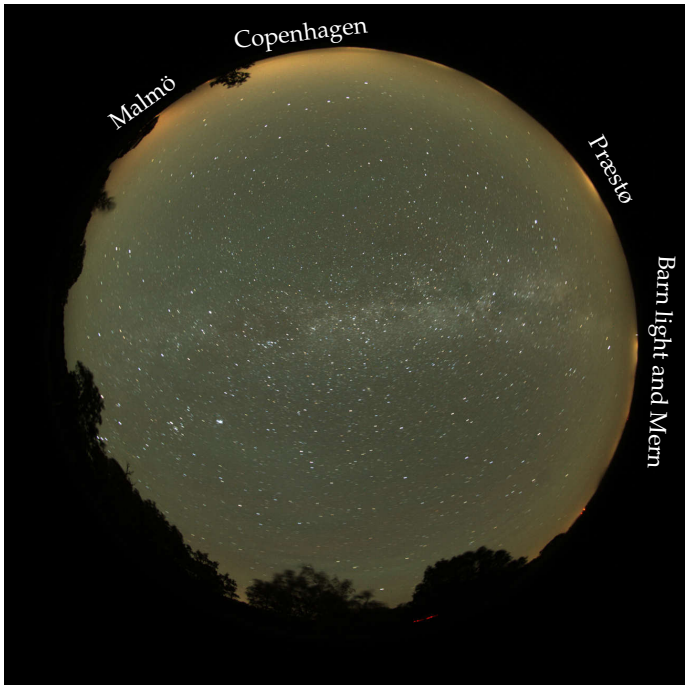


Figure 8.4: *DSP03, the light domes of Copenhagen and Malmö have the same apparance as from DSC01. Due to the greater distance from Zealand, the light domes from the small villages and farmes at Zealand are diminished. The SQM-L readings gave a mean NSB of 21.02* $mag./arcsec.^2$.

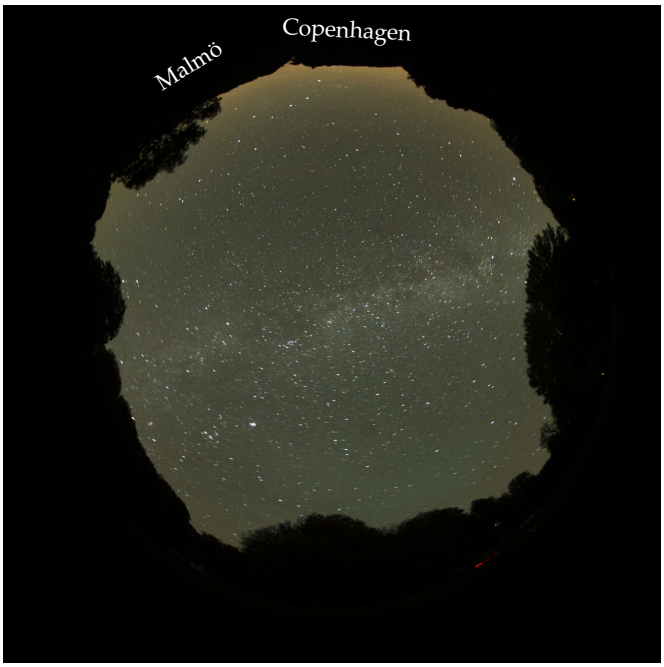


Figure 8.5: *DSP05, inside Liselund Park the trees surrounding the park shieldes the lowest part of the sky. Only the faintest part of the light domes from Copenhagen and Malmö is visible above the trees. Visually the glow was very faint and non intrusive. No other lights are visible from DSP05. The SQM-L readings gave a mean NSB of 21.16* $mag./arcsec.^2$.

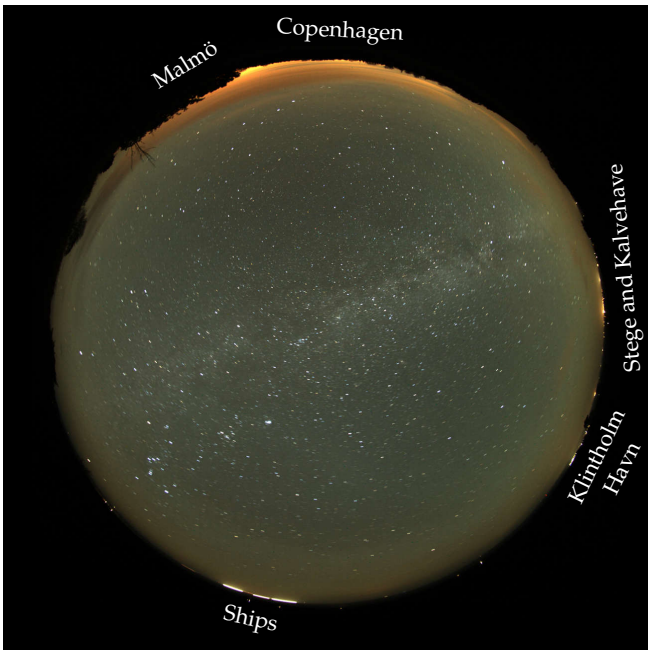


Figure 8.6: *DSP12. Above Copenhagen and Malmö clouds are appearing, making the light domes more visible. From DSP12 there is an open view over the Baltic Sea making the lights from ships and ferries visible. Small faint light domes are visible above Stege and Klintholm Havn, the village closest to DSP12. The country close to DSP12 are very hilly and places where the lights from the ships and Klintholn Havn are shielded is easily found. The SQM-L readings gave a mean NSB of 21.17* $mag./arcsec.^2$.

8.2.3 Results with SQM-L

For a full list of measuring results from both instruments, see Appendix A. In the following, we refer only to the best and most significant measurements taken on the measurement field trips.

Table 8.2: *Best measurements with SQM-L instrument #6409*

Instrument Serial No.	Date	Best $mag./arcsec^2$	Next best $mag./arcsec^2$	Notes
#6409	11.-12. March 2016	21.93	21.92	[a]
#6409	17.-18. April 2015	21.62	21.60	[b]
#6409	28.-29. October 2016	21.17	21.16	[c]

[a] Light from the two major cities, Copenhagen and Malmø, was reduced due to low cumulus clouds.
[b] During this measuring run the night sky was obvious brigther than normal, due to airglow. SQM-LU-DL measurements from the Dark-Sky Community area, confirmed this.
[c] Milky Way runs through Zenith interfering with NSB-measurements. Further a high level of airglow makes the NSB 0.5 – 0.55 $mag./arcsec^2$ brighter than normal for this sidereal time.

8.3 Seasonal variation of NSB

DATA from the SQM-LU-DL instrument in the Dark Sky Community #2547 and visual observation indicates a seasonal variation in the NSB, due to airglow. In the months October through February it is not unusual for the airglow to increase the NSB with 0.2 – 1 $mag./arcsec^2$, compared to nights with minimal airglow activity. Part of the reason for this increase may be found in changeable autume and winter weather in Denmark. Where weather fronts moves in every few days and the jetstream is located relative close to Denmark. Both weather patterns are known to induce gravity waves which subsequently induces the airglow to glow brighter than normal.

During March, April, May, August and September the airglow activity are relative low, giving the greatest chance of seeing the darkest and most brilliant starry sky. Fotunately these are also the monthe with the best chances of clear sky.

During part of May and all of June and July astronomical darkness is never achived, while Møn and Nyord is located at a northern latitude where the sun never venture below −18° during these months.

8.4 Measurement Program

A two part measurement program of Night Sky Brightness will be maintained. GeoCenter Møn Klint will continue to maintain and operate the SQM-LU-DL instrument located close to the museum (DSP09).

The second part are the measurements in the other parts of the Dark Sky Park. This will ultimately end up in the organisation of the Municipality under the de-

partment of the UNESCO Biosphere. Until this department is established in late summer or autumn of 2017, the measurement program will be maintained by the local astronomical association – Astronomical Society of Southern Zealand.

Once a year, in the spring, the measurements will be repeated in the Dark Sky Park.

8.5 Visit of Dr. Andreas Hänel

AROUND the end of March/beginning of April 2016, Dr. Andreas Hänel, *Section leader of the working group Dark Sky Germany*, visited Møn and Nyord. He was invited to give a talk to the Dark Sky Møn and Nyord working committee. After his talk, Dr. Hänel stayed two nights on Møn. Despite difficulties with clouds, Dr. Hänel made observations of his own regarding the quality of the dark sky over Møn and Nyord. Dr. Hänel's conclusions were as follows:

> Based on these observations I can confirm an exceptionally quality of the sky over the islands of Møn and Nyord. The local Dark Sky group is very engaged and therefore continuous support of the combination of Dark Sky Park and Dark Sky Community is promising. The traditional cut-off street lighting (though there are some exemples of non full cut-off luminaires) and the use of warm white lamps will help to keep the sky dark on the islands dark if in future similar lighting system will be used.
>
> Therefore I strongly support the application of the islands as a combination of Dark Sky Park in the East and Dark Sky community of the whole islands.

To read Dr. Hänel's full report, see Appendix D.

8.6 Visual Observation of Astronomical Phenomenas

THE full spectrum of astronomical phenomena can be observed from Møn and Nyord. Some are easier to see than others, but the atmospheric transparency here in combination with the experience, attention, routine and (naturally) the eyesight of the observer all determine whether a phenomenon is visible on any given night. The astronomical phenomena described here are based on the observations of Tom Axelsen. Tom Axelsen has more than 30 years of experience as a visual observer.

Visual observations are widely used in connection with Bortle classifications. Based on the visual observations described in this section, Møn and Nyord have Bortle classification 2-3.

8.6.1 Milky Way

The Milky Way is visible all year round. From early August until the end of October, the Milky Way dominates the night sky. The Milky Way is very broad,

clear and extremely structured. In Cygnus the Milky Way spans from wingtip to wingtip of the Swan and then a bit more. Many small and large dark nebulae are visible, including Barnard's E (B143 and B144). Star clouds, for example, M24 and Scutum star-cloud, appear as luminous blobs in the Milky Way. Nebulae, such as NGC 7000 and M8, appear as softly glowing spots between an incredibly large number of stars. Open star clusters are visible as small glowing spots.

In the winter months, the Milky Way is significantly fainter as we look out into the galaxy. The Milky Way is, however, just as wide as it is during fall. To the naked eye it appeares just as structured in the winter as during fall although the Dark Rift is missing. On especially clear nights, the Milky Way bears some resemblance to the powerful Cumulus clouds often seen before a thunderstorm!

8.6.2 Faint Meteors

Meteors or shooting stars are often seen. Meteors fainter than 4th magnitude contribute a significant part of the meteors seen. During the annual meteor shower a great number of meteors are observed. It is normal to spot a meteor or more every two minutes in connection with Perseides and Geminids.

8.6.3 Northern Light

Denmark is relatively distant from the magnetic North Pole. In a good year (around solar maximum), the Northern Lights are only visible about 5-10 times. In connection with the current solar max, Northern Lights have been observed at least three times from Møn and Nyord.

8.6.4 Outside the Milky Way - M31 and M33

The Andromeda Galaxy (M31) is clearly visible to the naked eye as an glowing and elongted cloudy spot on the perimeter of the Milky Way. The Triangulum Galaxy (M33) is visible to the naked eye as a small circular or slightly oval cloudy spot. It is quite faint but can be located easily using averted vision.

8.6.5 Messier Objects

Many Messier Objects are visible to the naked eye from Møn. As many of the Messier Objects observed are small and faint seen with the naked eye, spotting these visually must be described as something of a specialist field. A field for amateur astonomers and others who are well-acquainted with the starry sky's intricate details. Those observed most often are: M31, M33, M42, M37, M38, M45, M44, M34, M35, M67, M3, M13 og M8 inklusiv NGC6530. As many of the objects are small and obscure, any visual observations of Messier Objects are not only indicative of a good quality night sky but also an indication of the experience and dedication of the observer in pursuit of such small objects. A list of the Messier objects observed cannot stand alone as documentation for the quality of the night sky.

8.6.6 Kornmod

Figure 8.7: A distant thunderstorm lights up the night sky above Møn, creating heat lightning (known in Denmark as "kornmod"). The storm was 120 km distant. Airglow creates a green sheen in the sky. Credit: Tom Axelsen

"Kornmod" is the old Danish word for "heat lightning". Flashes of distant lightning drown easily in light pollution. "Kornmod" is a common phenomenon in July, August and, in some years, also in September. Due to the dark surroundings on Møn and Nyord, flashes of distant lightning often lights up the night sky, making this weather phenomenon particularly impressive seen from Møn and Nyord.

According to Danish folklore, "kornmod" ripened the grain in the fields [2].

8.6.7 Airglow

Figure 8.8: Airglow on 18 and 19 August 2015. Airglow is visible as a patchy sky. The image covers the sky from east to south and up to about 45° above the horizon. Credit: Tom Axelsen

Airglow visibility varies quite considerably. In some years, it is seen just a few times and in others very often. There was much airglow from August 2014 until 2015. It was seen as either a uniform glow across the sky or faintly glowing spots, belts and waves. Airglow has been repeatedly documented by means of visual observation, images and measurements of NSB.

The strength and visibility of airglow depend partly on the position of the jet stream relative to Denmark. During the winter months, the Polar fronts and associated jet stream often pass close to Denmark, causing increased airglow levels.

8.6.8 Zodiacal light

Zodiacal light is a permanent feature of the night skies during the spring. Zodiacal light is seen as a large, relatively bright pyramid of light in the western skies. During fall, zodiacal light is visible before dawn. Shortly after or before astronomical twilight the Zodiacal light is seen stretching at least 90° along the ecliptic path.

8.6.9 Gegenschein

Gegenschein (Counterglow) can be seen on clear nights in October, November and early December. Visibility varies a great deal, depending on the atmospheric transparency and airglow. During fall 2012 and fall 2013, gegenschein was observed on several occasions. In fall 2014 no gegenschein was observed, due to repeated outbreaks of airglow. Gegenschein was observed once in 2015. Incidentally, a Danish astronomer, T.H. Brorsen, was the first to describe gegenschein, based on astronomical observations made from another Danish island, Als. This was in 1851.

8.6.10 Light-Bridge

The light-bridge or Zodiacal band is a very faint band of light that connects zodiacal light with gegenschein. It has been seen a couple of times from Møn, most recently during a total lunar eclipse on 28 September 2015. Observations of this light phenomenon require a very clean atmosphere and very little airglow.

8.6.11 Other Objects

Uranus is visible to the naked eye as a faint star, which can easily be confused with other faint stars. During fall 2013, the planet's slow progress between the stars was followed with the naked eye. Uranus was also visible to the naked eye during the total lunar eclipse on 28 September 2015, here it was located using a star chart.

Section 9

Legislative Protection

DANISH legislation stipulates a few requirements for sensible use of light at night. However, the legislation is not specific and does not address the difficulties associated with a loss of darkness. The most significant and most specific legislation and legal guidelines are listed here.

9.1 Road Lighting

THE Danish state compiled "Vejbelysningsregler i Danmark" (Street lighting regulations in Denmark) arising from the Public Road Act (Act no. 1520 of 27. December 2014) [8] and Street Lighting handbook (Vejdirektoratets Håndbog, Vejbelysning (Danish Road Directorate Handbook, Street Lighting), 1. April 2015) [9].

The introduction to the Street Lighting handbook [9, Sec. 1.1, p. 10] states explicitly that street lighting should be designed so as to minimize light pollution (quote):

> It is important that the lighting is directed towards the areas, objects, etc. whose visibility is of great importance in the specific situation. At the same time, nuisance from the lighting should be avoided. This applies to nuisance from the light itself in the form of glare and "light pollution" as well as visual nuisances in the urban environments from architecturally maladapted systems.

9.2 Danish Working Environment Authority

DANISH Working Environment Authority Guidelines A.1.5 of February 2002 [10] describe the authority's requirements for artificial lighting at permanent places of work. The guidelines also contain guidance regarding conditions that are important for good lighting at Danish workplaces.

9.3 Advertising in the open countryside

THE Danish Nature Conservation Act (Act no. 933 of 24 September 2009) [11, Kapitel 3, §21] addresses light pollution or rather outdoor advertising, including illuminated advertising. Article 21 reads:

> Posters, images, freestanding signs, illuminated advertising and other hoardings designed for advertising and propaganda purposes must not be placed in the open countryside.

Section 10

Management plans and Partnership Agreements

THE Danish Nature Agency and National Museum of Denmark both supports the idea of protecting the night sky. This is apparent from their Letter of Support, see 4.1 and 4.2, their General Management Plan and the Partnership Agreements with Vordingborg Municipality.

10.1 Management plans

THE Danish Nature Agency (Storstrøm Section) has incoporated the Dark Sky Park in their General Management plan for Møn and Nyord, see [12] and [13]. Where they state that (quote is translated to English):

> Møn is one of the few places in Denmark where the stars in the night sky can be seen. It's got local activists to work for an international certification and endorsement of night sky's quality, thus the name Dark Sky Park can be used.
>
> Vordingborg Municipality's long-term goals for the development project Coastal Destination Møns Klint is to double tourism revenue Møn in 2022. The basis for the increase in revenue is to use the Cliffs of varying nature strategic. In the project's potential level, including pointed to Møn designated Dark Sky Park. In the operating plan has designated areas facility zones (e.g. Gurkebakken on High Møn) that could be applied as a backup for Dark Sky experiences.

The General Management Plan determine the development of state-owned land, administated by the Storstrøm Section of The Danish Nature Agency through 2029.

The National Museum of Denmark have not yet incorporated the protection of the dark night skies in their General Management Plan for Liselund Park.

10.2 Partnership Agreements

VORDINGBORG Municipality have signed two partnership agreements. One agreement with The Danish Nature Agency and the other agreement with National Museum of Denmark. In the partnership agreements the partners agrees to work together to protected the night sky and to establish a Dark Sky Park on Møn and Nyord.

The two Partnership agreements are reproduced at the next pages. A translation into English are printed opposite each original page.

VORDINGBORG KOMMUNE

Miljø- og Fødevareministeriet
Naturstyrelsen

Partnerskabsaftale vedr. Dark Sky på Møn og Nyord

Storstrøm
Ref. HCG
Den 9. august 2016

Aftaleparter

Denne aftale er indgået mellem:
Naturstyrelsen Storstrøm, Hannenovvej 22, 4800 Nykøbing F
Kontaktperson på aftalen er HC Gravesen, hcg@nst.dk, tlf. 25602714
og
Vordingborg Kommune, Valdemarsgade 43, 4760 Vordingborg
Kontaktperson på aftalen er Martin Nilsson, marn@vordingborg.dk, tlf. 51532357

2. Formål

Møn og Nyord er et af Danmarks mørkeste steder. Vordingborg Kommune og Naturstyrelsen Storstrøm er enige om, at det skal bruges aktivt til formidling af nattemørket, stjernehimlen, astronomien og universet og opleve områdets unikke nattemørke, der bliver bevaret, så det fortsat vil være egnet til observation af stjerner mv. Vordingborg Kommune og Naturstyrelsen Storstrøm vil derfor med denne samarbejdsaftale arbejde for at sikre en Dark Sky Park på Møn og Nyord. Det kræver, at der værnes om nattemørket i de af staten ejede og af Naturstyrelsen Storstrøm administrerede områder på Møn og Nyord.

3. Omfang

Naturstyrelsen vil, som en del af samarbejdsaftalen, gerne lægge jord til en Dark Sky Park. Områderne som aftalen omfatter, befinder sig på følgende lokaliteter: Nyord, Ulvshale, Hegnede Skov, Udby og Stege Skove, Klinteskoven, Jydelejet, Høvblege, Mandemarke Bakker, Mandemarke Haver og Busene Have jfr. bilag 1. For at opnå certificeringen som Dark Sky Park er der en række krav, som skal opfyldes for det pågældende område.

- Lysarmaturerne skal være "full-cut off", det vil sige at lysarmaturerne ikke lyser over det vandrette plan.
- Lyskilderne må ikke være kraftigere end nødvendigt. Arbejdstilsynets krav for arbejdspladser skal overholdes.
- Lyskilder må ikke være tændt natten igennem. De skal så vidt muligt styres af bevægelsessensor og timer.
- På de naturcentre der er i områderne, kan Vordingborg kommune opsætte information om nattemørket og beskyttelsen heraf. Det gælder Hyldevang på Nyord og Ulvshale Naturcenter.

Naturstyrelsen • Hannenovvej 22 • Egehus • Tingsted • 4800 Nykøbing Falster
Tlf. 72 54 30 00 • Fax 54 43 98 13 • CVR 33157274 • EAN 5798000860216 • sts@nst.dk • www.nst.dk

Partnership Agreement regarding Dark Sky Møn and Nyord

Parties to the Agreement
This is an Agreement between the Parties:
The Danish Nature Agency (Storstrøm Section), Hannenovvej 22
In connection with this Agreement, the contact person is H.C Gravesen, hcg@nst.dk, tel.: +45 25602714
and
Vordingborg Municipality, Valdemarsgade 43, DK-4760 Vordingborg
In connection with this Agreement, the contact person is Martin Nilsson, marn@vordingborg.dk, tel.: +45 51532357

2. Purpose
Møn and Nyord are one of the darkest spots in Denmark. Vordingborg Municipality and The Danish Nature Agency (Storstrøm Section) agree that they should actively exploit and communicate the importance of darkness, starry skies, astronomy and the universe, and promote and preserve activities in the uniquely dark nights so that it continues to be possible to observe the stars and other heavenly bodies here. Under the auspices of this Agreement, Vordingborg Municipality and The Danish Nature Agency (Storstrøm Section) intend to work together to establish a Dark Sky Park on Møn and Nyord. Success requires that we protect the nocturnal skies in areas of Møn and Nyord that are owned and managed by The Danish Nature Agency (Storstrøm Section).

3. Scope
As part of the Partnership Agreement, The Danish Nature Agency agrees to Dark Sky Park designation on its grounds. The areas covered by this Agreement are as follows: Nyord, Ulvshale, Hegnede Skov, Udby and Stege Skove, Klinteskoven, Jydelejet, Høvblege, Mandemarke Bakker, Mandemarke Haver and Busene Have (see Appendix 1).

There are a number of requirements that have to be met in these areas in order to achieve a Dark Sky Park certificate.

- Light fittings must have full cut-off (FCO), i.e. they do not shed light above the horizontal plane.
- Light sources must be no stronger than necessary. DWEA requirements for lighting at workspaces must be met.
- Light sources must not be switched on during the night and must, if possible, be controlled by motion sensors and timers.
- At nature activity centers in the DSP area, Vordingborg Municipality may set up information signs about darkness and protecting our dark nights from light pollution. This shall apply to Hyldevang on Nyord and Ulvshale Nature Center.

- Dark Sky hotspots: Naturstyrelsen tillader, at Vordingborg Kommune installerer nogle hotspots på Naturstyrelsens arealer. F.eks. med en piktogrampæl med et Dark Sky-logo sammen med et Naturstyrelsen-logo og i Naturstyrelsen-design. Derudover tillades opsætning af en eller to liggebænke på disse hotspots. Vordingborg Kommune skal afholde alle udgifter. Naturstyrelsen skal godkende liggebænkenes design, og skal desuden give tilladelse til specifikke placeringer.

De detaljerede krav til et Dark Sky Park område fremgår af dokumentet "DSMN-01-01 Lysplan for Dark Sky Park", som er vedhæftet denne aftale som bilag 2. Partnerne er enige om, at vilkårene "DSMN-01-01 Lysplan for Dark Sky Park", skal efterleves med Vordingborg Kommune som ansvarlig.

4. Fordeling af arbejdsopgaver og økonomi

Belysningsforhold: Vordingborg Kommune foretager undersøgelse af behov for ændring af belysningsforhold jfr. ovenstående krav, og at denne belysning ikke må reducere Naturstyrelsens behov for udendørs lys til boliger, værksted og øvrige anlæg. Vordingborg Kommune udarbejder en rapport til nærværende partnerskabsaftale, hvor fornyelse af belysningsforholdene beskrives og omkostningerne stilles op i et budget. Vordingborg Kommune afholder alle udgifter forbundet med fornødne udskiftninger af lysarmaturer m.v. Det gælder følgende steder: Hyldevang, Ulvshalegård/Ulvshale Naturcenter, Vogterhuset, Bodshøj, Liselund P-plads, Materialegården og Højholt.
Naturstyrelsen understøtter fornødne udskiftninger af lysamaturer m.v., så længe dette kan gøres udgiftsneutralt for Naturstyrelsen. Naturstyrelsen forbeholder sig ret til at ændre på belysningsforholdene, hvis der sker en ændret anvendelse af bygninger og anlæg. Naturstyrelsen forbeholder sig ret til at udtage en bygning af aftalen, såfremt bygningens formål ændres og Vordingborg Kommune ikke kan finansiere fornøden ændring af belysningen.

Fysiske anlæg: Vordingborg Kommune udarbejder en plan for informationsskilte, piktogrampæle og liggebænke. Naturstyrelsen skal godkende denne plan. Vordingborg Kommune afholder alle udgifter ved indkøb og installation af de fysiske anlæg.

5. Formidling

Naturstyrelsen giver mulighed for forskellige former for formidling om natten. Denne formidling skal være så afdæmpet som muligt af hensyn til dyrelivet. Aktiv formidling af natten, eksempelvis nattevandring og stjernekigger-arrangementer, sker af Dark Sky Møn og Nyord, Naturstyrelsen, GeoCenter Møns Klint eller fjerde part. Formidlingen skal bookes på Naturstyrelsens Web-booking, http://naturstyrelsen.dk/naturoplevelser/aktiviteter, hvor Naturstyrelsen giver godkendelse eller afslag på ansøgninger om aktiviteter på styrelsens arealer.
Ved kommercielle arrangementer på Naturstyrelsens areal skal der betales et gebyr til Naturstyrelsen på 10 % af den samlede indtægt. F.eks. hvis en arrangør opkræver et beløb pr. person for at deltage i arrangementet, eller hvis et firma eller organisation betaler et samlet beløb for arrangementet.

- Dark Sky hot spots: The Danish Nature Agency grants Vordingborg Municipality permission to install hotspots on The Danish Nature Agency's areas, e.g. pictograph posts carrying a Dark sky logo with a Danish Nature Agency logo to match the Danish Nature Agency design. One or two benches may also be installed at these hotspots Vordingborg Municipality will cover all costs. The Danish Nature Agency shall approve the bench design and give permission for their specific location.

Detailed requirements for a Dark Sky Park area are listed in DSMN-01-01 "Light Management Plan for Dark Sky Park", which is attached to this Agreement as Appendix 2. The Parties agree that the conditions listed in DSMN-01-01, "Light Management Plan for Dark Sky Park", shall be met. Vordingborg Municipality has full responsibility.

4. Distribution of work and costs
Lighting conditions: Vordingborg Municipality shall commission a study of the need to change lighting conditions in accordance with the above-mentioned requirements. New lighting shall not impair the lighting needed outside residential housing, workshops and other facilities run by The Danish Nature Agency. Vordingborg Municipality shall compile a report to describe refurbishment of lighting conditions. Costs shall be listed in the form of a budget. Vordingborg Municipality shall meet all costs incurred in connection with the necessary replacement of light fittings, etc. This shall apply at the following locations: Hyldevang, Ulvshalegård/Ulvshale Nature Center, Vogterhuset, Bodshøj, Liselund parking lot, Materialegården (goods yard) and Højholt.

The Danish Nature Agency shall assist in replacing the light fittings, etc. as necessary provided this can be achieved at no cost to The Danish Nature Agency. In the event of a change in the use of buildings and facilities, The Danish Nature Agency reserves the right to change lighting conditions accordingly. The Danish Nature Agency reserves the right to eliminate a building from the Agreement if the building is assigned a new purpose and Vordingborg Municipality is unable to finance any change of the lighting that may be necessary.

Physical equipment: Vordingborg Municipality shall prepare a plan of information signs, pictograph posts and benches. The Danish Nature Agency shall approve this plan. Vordingborg Municipality shall cover the cost of purchasing and installing physical equipment.

5. Interpretation/outreach
The Danish Nature Agency grants permission for different types of interpretation/outreach regarding the night. Interpretation/outreach shall be subdued so as not to disturb animal life. Active interpretation/outreach of the night, e.g. nocturnal hikes and stargazing events shall be organized by either Dark Sky Møn and Nyord, The Danish Nature Agency, GeoCenter Møns Klint or another party. An application to run an event shall be made via The Danish Nature Agency's web-based reservation system,
http://naturstyrelsen.dk/naturoplevelser/aktiviteter. The Danish Nature Agency shall approve or reject applications for activities on the Agency's property.

The Danish Nature Agency shall charge a fee of 10% of total event revenue for commercial events held on the Agency's property. The fee is, for example, 10% of the price an organizer charges per person or 10% of the price a company or association pays in total.

6. Aftalens varighed og opsigelse

Aftalen træder i kraft den 1. september 2016 og løber indtil videre. Aftalen kan af parterne skriftligt varsles til genforhandling med et varsel på 6 måneder til den 1. i en måned.
Aftalen kan af parterne skriftligt opsiges med et varsel på 12 måneder.

7. Misligholdelse

Såfremt én af parterne væsentligt misligholder sine forpligtelser i henhold til denne aftale, er hver af parterne berettiget til at ophæve aftalen.

8. Overdragelse

Vordingborg Kommune kan ikke uden NST's skriftlige accept overdrage sine rettigheder og forpligtelser i henhold til denne aftale til tredjemand.

9. Underskrifter

På vegne af Vordingborg Kommune:
Dato:

Asger Diness Andersen, udvalgsformand

På vegne af Naturstyrelsen:
Dato: 9. august 2016

Claus Jespersen, skovrider

Bilag 1: Kort over områder, som aftalen omfatter.
Bilag 2: DSMN-01-01 Lysplan for Dark Sky Park beskriver de specifikke krav til udendørsbelysningen, som skal overholdes i Dark Sky Park området.

6. Contract period and termination
The Agreement commences on 1 September 2016. There is no fixed term. Either Party may give at least six months' prior notice of renegotiation to the first day of a month. Either Party can terminate the Agreement at 12 months' notice in writing.

7. Breach of contract
If one of the Parties is in gross breach of its obligations in pursuance of this Agreement, either Party is entitled to cancel the Agreement.

8. Assignment
Vordingborg Municipality is not entitled to assign its rights and obligations in pursuance of this Agreement to a third party, without prior written consent of The Danish Nature Agency.

9. Signatures
On behalf of Vordingborg Municipality:
Date:

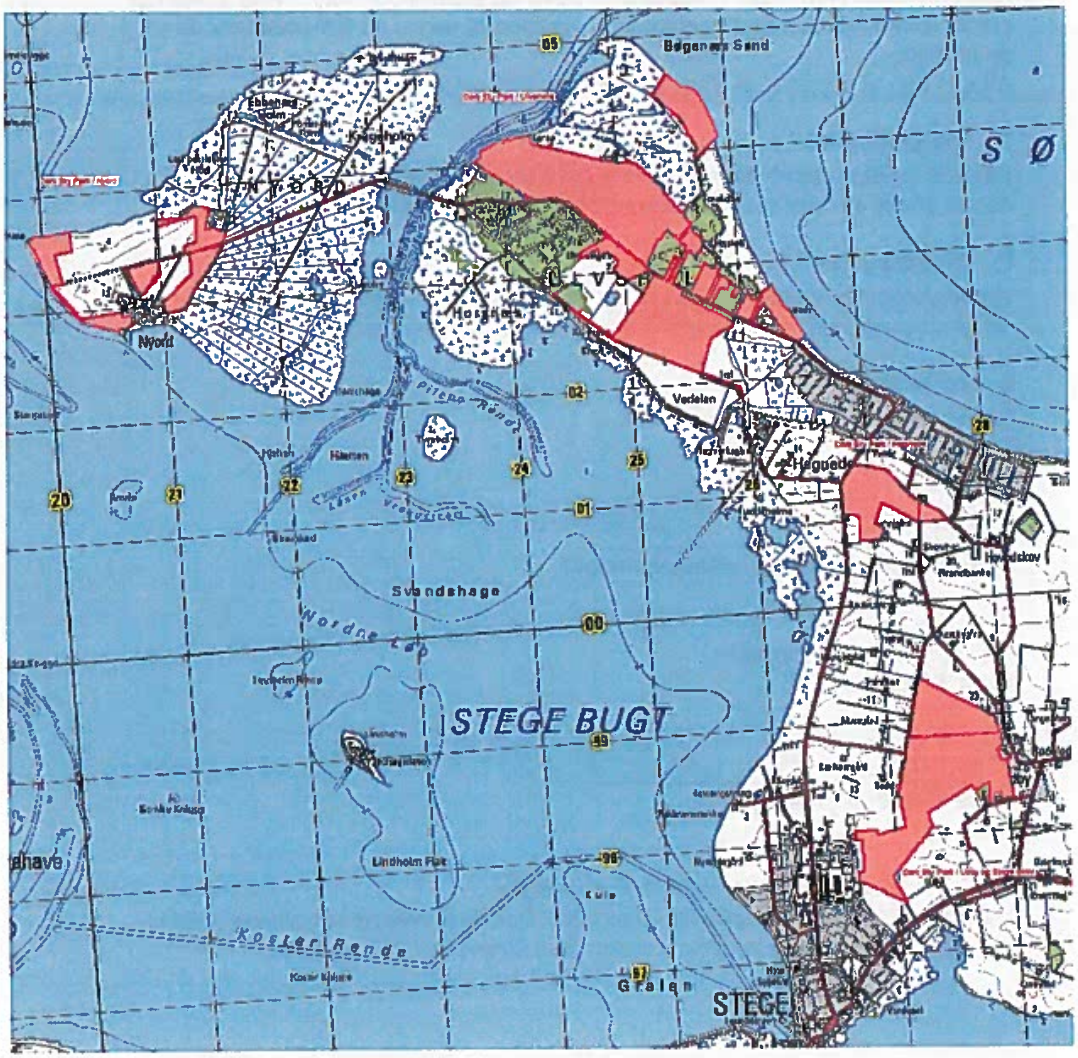
Asger Diness Andersen, Committee Chairman

On behalf of The Danish Nature Agency:
Date: 9 August 2016

Claus Jespersen, Forest Manager

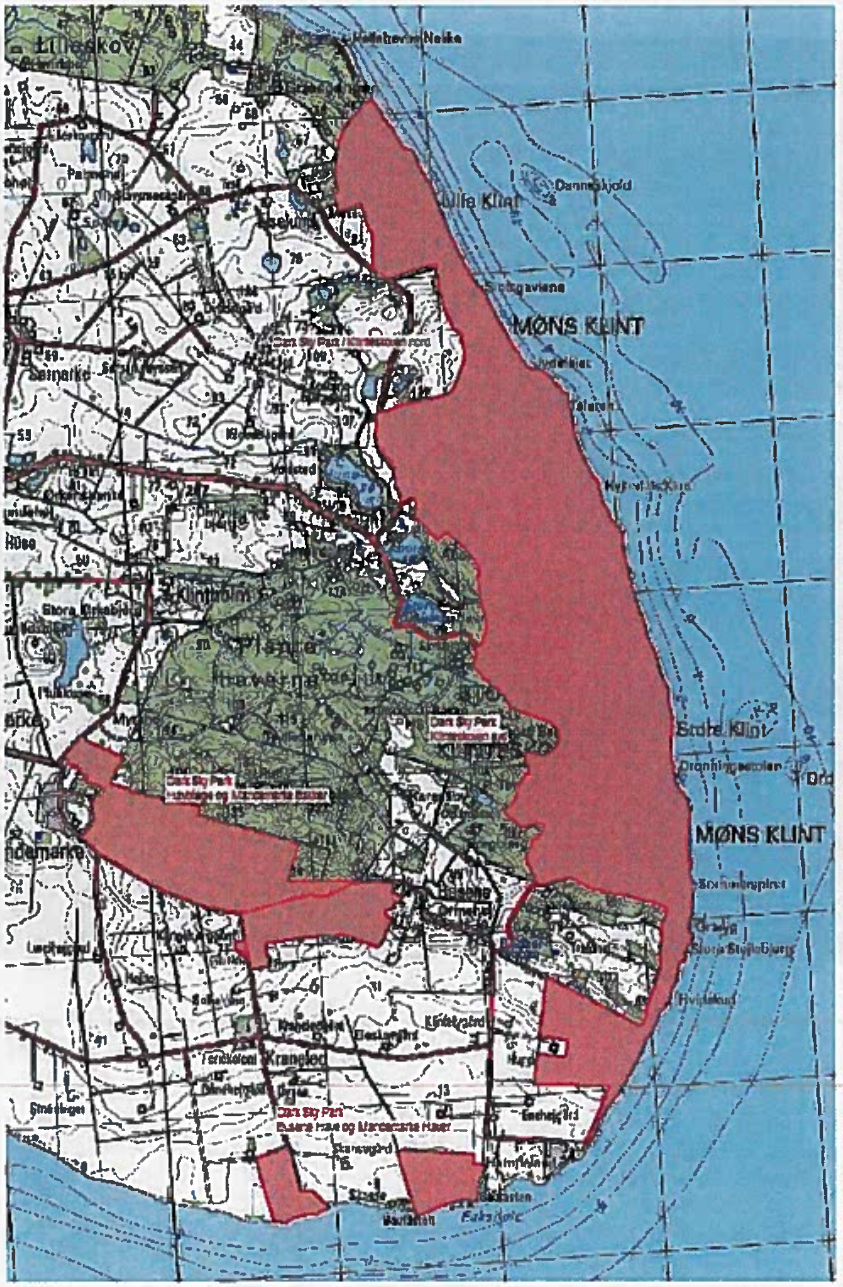
Appendix 1: Map of areas covered by the Agreement
Appendix 2: DSMN-01-01 "Light Management Plan for Dark Sky Park". The plan describes specific requirements for outdoor lighting that are mandatory in the Dark Sky Park area.

Bilag 1.1 Oversigt Ulvshale / Nyord / Hegnede / Udby-Stege

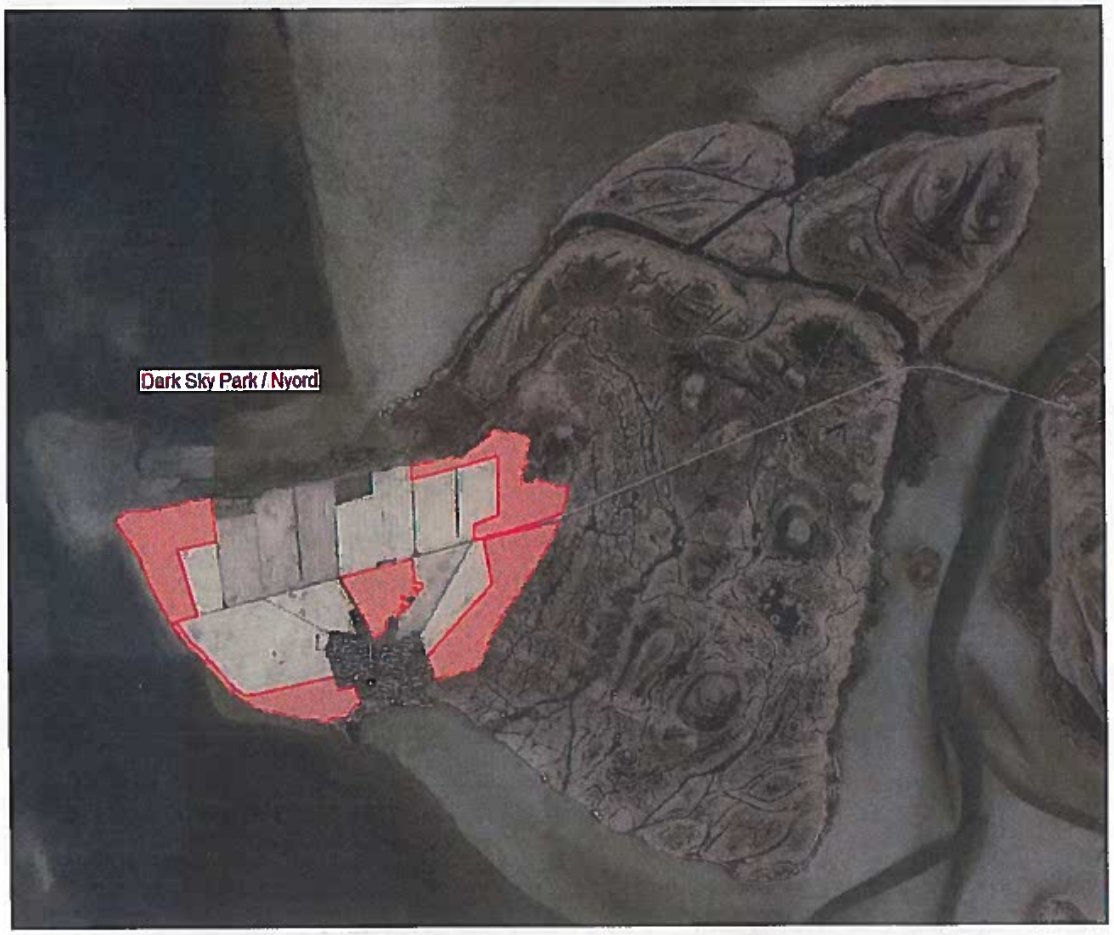


4

Bilag 1.2 Oversigt Østmøn

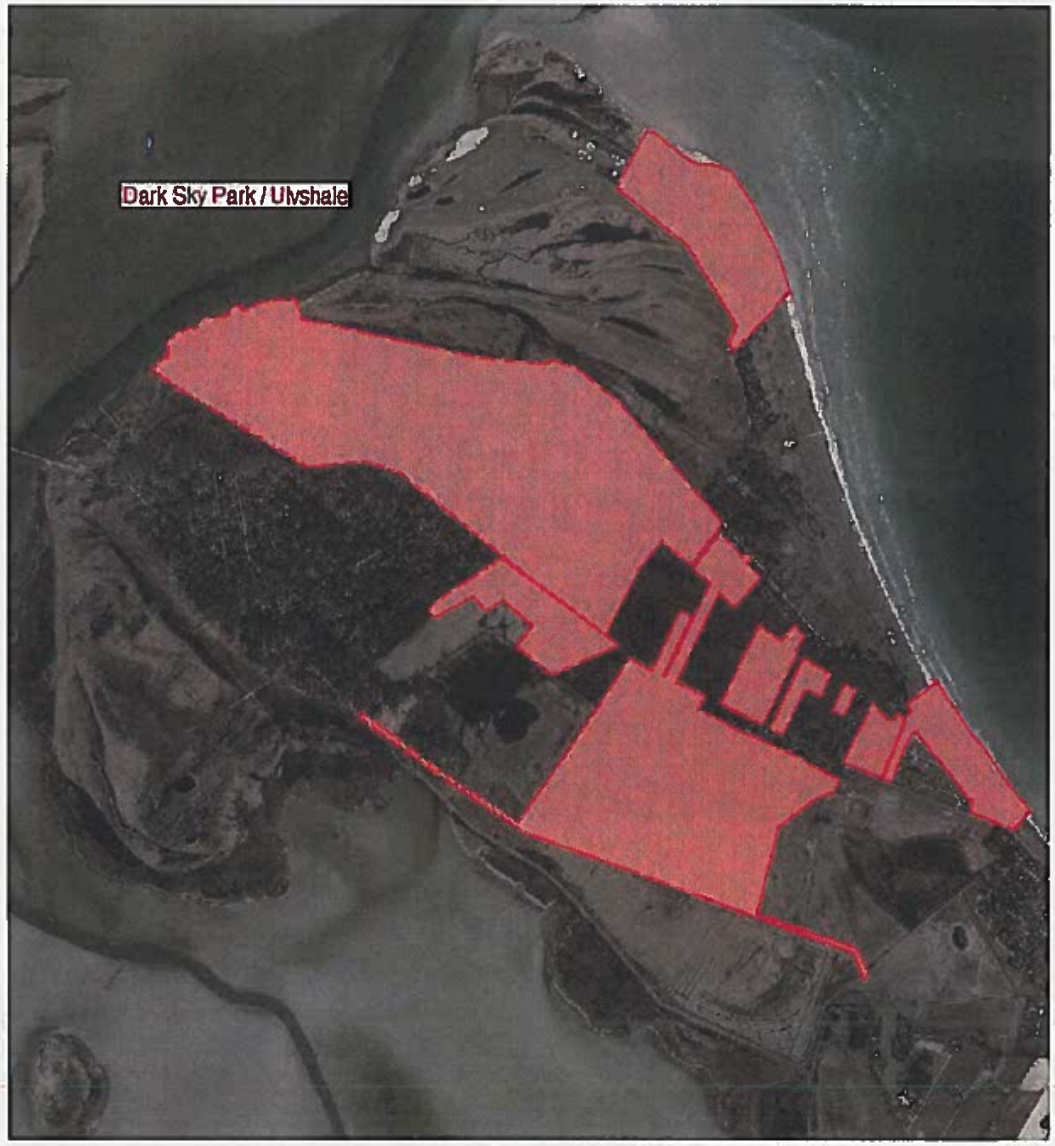


Bilag 1.3 Nyord



6

Bilag 1.4 Ulvshale

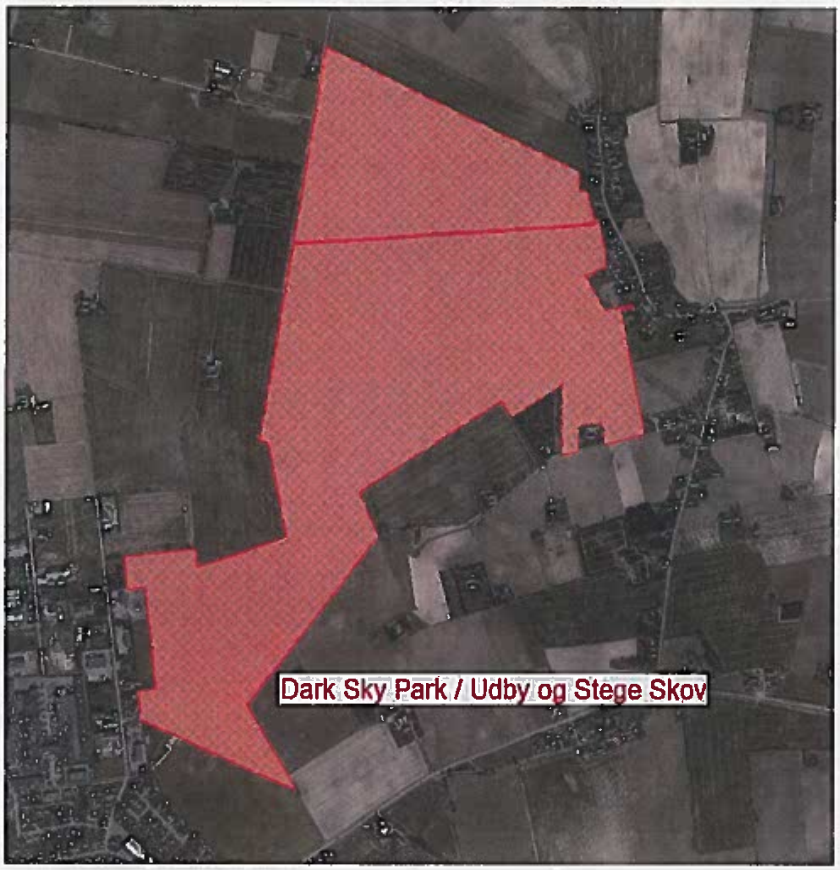


7

Bilag 1.5 Hegnede Skov

8

Bilag 1.6 Udby og Stege Skov



9

Bilag 1.7 Klinteskoven nord

10

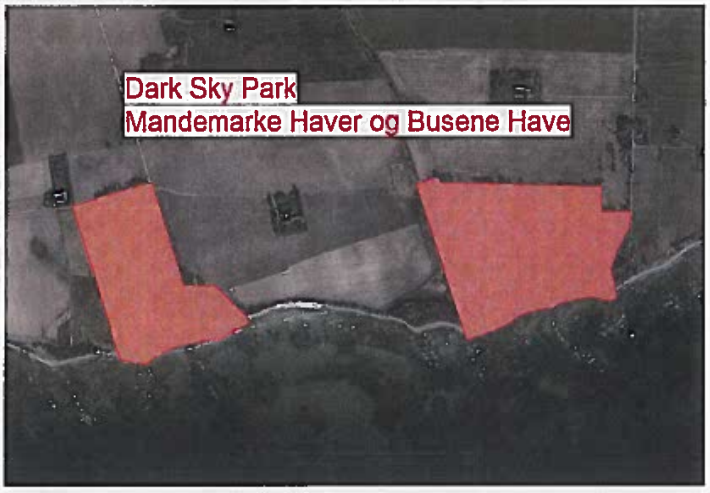
Bilag 1.8 Klinteskoven syd

11

Bilag 1.9 Høvblege og Mandemarke Bakker

12

Bilag 1.10 Mandemarke Haver og Busene Have



13

Nationalmuseet
National Museum of Denmark

VORDINGBORG KOMMUNE

Samarbejdsaftale om Dark Sky Park på Nationalmuseets område på Møn

Møn og Nyord er et af Danmarks mørkeste steder. Vordingborg Kommune ønsker, at dette skal bruges aktivt til formidling af nattemørket, stjernehimlen, astronomien og universet. Vordingborg Kommune ønsker at bevare områdets unikke nattemørke, så det fortsat vil være egnet til observation af stjerner mv. Med denne samarbejdsaftale tilkendegiver Nationalmuseet at ville arbejde for at sikre en Dark Sky Park på Møn, under forudsætning af, at Dark Sky Park ikke er en barriere for Nationalmuseets formidling i området. Dark Sky Park kræver, at der værnes om nattemørket i de af staten ejede og af Nationalmuseet administrerede områder.

Omfang
Nationalmuseet vil, som en del af samarbejdsaftalen, gerne lægge jord til en Dark Sky Park. Området, som aftalen omfatter, er Liselund Park. Se bilag 1.

For at opnå certificeringen som Dark Sky Park er der en række krav, som skal opfyldes for det pågældende område.

- Lysarmaturerne skal være "full-cut off", det vil sige, at lysarmaturerne ikke lyser over det vandrette plan.
- Lyskilderne må ikke være kraftigere end nødvendigt. Arbejdstilsynets krav for arbejdspladser skal overholdes.
- Lyskilder må ikke være tændt natten igennem. De skal så vidt muligt styres af bevægelsessensor og timer.
- På de naturcentre der er i områderne, opsættes der information om nattemørket og beskyttelsen heraf.
- Der udpeges et Dark Sky hotspot, hvor der opsættes en Dark Sky liggebænk, samt en pæl der markerer Dark Sky hotspottet. Liggebænkenes design skal godkendes af Nationalmuseet.

De detaljerede krav til et Dark Sky Park område fremgår af dokumentet "DSMN-01-01 Lysplan for Dark Sky Park", som er vedhæftet denne aftale som bilag 2. Partnerne er enige om, at vilkårene "DSMN-01-01 Lysplan for Dark Sky Park", skal efterleves.

Gennemførsel
Ovenstående krav vil Nationalmuseet opfylde, så længe det kan gøres udgiftsneutralt for Nationalmuseet, f.eks. ved at udskifte eksisterende belysning og derved spare på el-forbruget. Vordingborg Kommune er behjælpelig med at udarbejde en plan for belysning på det berørte areal.

Vordingborg Kommune undersøger mulighederne for at skaffe midler til information, såsom skilte samt fysiske anlæg, som f.eks. Dark Sky liggebænke.

Partnership Agreement regarding Dark Sky Park on National Museum of Denmark's properties on Møn.

Møn and Nyord are one of the darkest spots in Denmark. Vordingborg Municipality wishes to use this resource actively by communicating the night sky, stars, astronomy and the universe. Vordingborg Municipality wishes to preserve the outstanding dark skies in the area to ensure that it remains suitable for observing celestial bodies, etc. On signature of this Partnership Agreement, The National Museum of Denmark agrees to work to establish Dark Sky Park on Møn, provided that the Dark Sky Park does not constitute a barrier to The National Museum of Denmark's own communication in the area. Dark Sky Park requires that we protect the nocturnal skies in the area of Møn and Nyord that are owned and managed by The National Museum of Denmark.

Scope
As part of the Partnership Agreement, The National Museum of Denmark agrees to Dark Sky Park designation on its grounds. The area covered by this Agreement is Liselund Park. See Appendix 1.

There are a number of requirements that have to be met in this area in order to achieve a Dark Sky Park certificate.

- Light fittings must have full cut-off (FCO), i.e. they must not shed light above the horizontal plane.
- Light sources must be no stronger than necessary. DWEA requirements for lighting at workspaces must be met.
- Light sources must not be switched on during the night. Lighting systems must, if possible, be controlled by motion sensors and timers.
- At nature activity centers in the DSP area, Vordingborg Municipality may set up information signs about darkness and protecting our dark nights from light pollution.
- Dark Sky hotspots will be set up. Each will be marked with a post and equipped with a bench. The design of the benches shall be approved by The National Museum of Denmark.

Detailed requirements for a Dark Sky Park area are listed in DSMN-01-01 "Light Management Plan for Dark Sky Park", which is attached to this Agreement as Appendix 2. The Parties agree that the conditions listed in DSMN-01-01 "Light Management Plan for Dark Sky Park", shall be met.

Practical matters
The National Museum of Denmark shall meet the above requirements provided that they can be implemented at no cost the the museum, e.g. if changing the existing lighting saves energy. Vordingborg Municipality shall help to prepare a plan for the lighting in the area in question.

Vordingborg Municipality shall investigate opportunities to obtain funding for information, e.g. signs, posts and Dark Sky benches.

Nationalmuseet
National Museum of Denmark

VORDINGBORG KOMMUNE

Formidling
Nationalmuseet bidrager som udgangspunkt ikke med aktiv formidling, men vil gerne lægge jord til et Dark Sky Hotspot. Endvidere giver Nationalmuseet mulighed for etablering af andre former for formidling om natten. Som udgangspunkt skal denne formidling være så afdæmpet som muligt. Udformningen skal godkendes af Nationalmuseet.

Aktiv formidling af natten, eksempelvis natvandring og stjernekig, sker af Dark Sky Møn og Nyord eller tredje part.

Dato: 5/9 - 2016

Asger Diness Andersen
Vordingborg Kommune

Camilla Mordhorst
Nationalmuseet

Bilag
Bilag 1: Kort over områder, som aftalen omfatter.
Bilag 2: DSMN-01-01 Lysplan for Dark Sky Park beskriver de specifikke krav til udendørsbelysningen, som skal overholdes i Dark Sky Park området.

Interpretation/outreach
The National Museum of Denmark shall not generally participate actively in interpretation/outreach programs. The museum is, however, willing to allow Dark Sky hotspots on its property. The National Museum of Denmark shall also allow other types of interpretation/outreach regarding the night. It is essential that interpretation/outreach is as subdued as possible. Interpretation/outreach design must be approved by The National Museum of Denmark.

Active interpretation/outreach regarding the night, e.g. night hikes and stargazing events, shall be organized by Dark Sky Møn and Nyord or a third party.

Date:

Asger Diness Andersen	Camilla Mordhorst
Vordingborg Municipality	National Museum of Denmark

Appendices
Appendix 1: Map of areas covered by the Agreement
Appendix 2: DSMN-01-01 "Light Management Plan for Dark Sky Park". The plan describes specific requirements for outdoor lighting that are mandatory in the Dark Sky Park area.

Section 11

Light Managment Plan

11.1 Light Managment Plan for Dark-Sky Park

THE light management plan applies to all light sources installed outdoors that are or can be switched on at times between sunset and sunrise.

The light management plan is part of the two partnership agreements between Vordingborg Municipality and The Danish Nature Agency (Storstrøm Section), See Partnership Agreement 10.2.1 and Vordingborg Municipality and National Museum of Denmark, See Partnership Agreement 10.2.2. In both Agreements the LMP are refered to as *DSMN-01-01 Lysplan for Dark Sky Park*.

11.1.1 New outdoor light in the Dark sky Park

It should be avoided to install new outdoor lighting in Dark Sky Park area. If a clear public safety hazard is identified, new outdoor lighting may be installed. The new outdoor lighting must fulfill the following criteria.

- The area of the illuminated area must be as small as practicable.
- Outdoor lighting must comply with the requirements of this lighting plan

11.1.2 Street lighting

Any new street lamps must meet the requirements in *Street Lighting – Lighting Classification, Section 3.2*.

For street lights and lamps on access roads the lowest class in the L-series, L7b, must be used, equivalent to 0.50 cd/m^2 in average. The average may be exceeded with 10% according to *Street Lighting – Lighting Classification*.

For lights and lamps at parking spaces the lowest class in E-series, E3, must be used, equivalent to 1.0 lux in average. The average may be exceeded with 10% according to *Street Lighting – Lighting Classification*.

Light fittings must meet glare class G6.

The correlated color temperature (CCT) must be equal to or less than 2,000 K.

Taking traffic safety into account, street lighting must be attenuated and/or partly switched off during the period 23.00-05.00.

11.1.3 Pathway lighting

Any new pathway lighting must meet the requirements in *Street Lighting – Lighting Classification, Section 3.2.3, Class E*.

Pathway lighting must be designed on the "guiding star"-principle - E4. Maximum illuminance at ground level below the lamp 1.0 lux.

Light fittings must ensure that pathway luminaires do not shine above the horizontal plane but meet glare class G6.

The correlated color temperature (CCT) must be equal to or less than 2,700 K and $Ra \geq 0.8$.

Taking traffic safety into account, street lighting must be attenuated and/or partly switched off during the period 23.00-05.00.

11.1.4 Outdoor lighting

Lamps must meet glare class G6, corresponding to Full Cut-Off (FCO).

Lamps must not be switched on throughout the night. Lamps must be controlled by a motion sensor or designated timer, to reduce the risk of human "forgetfulness".

The correlated color temperature (CCT) must be equal to or less than 3,000 K and $Ra \geq 0.8$.

The lights at outdoor workplaces shall be adapted to comply with DWEA minimum requirements depending on the type of work performed in the area.

11.1.5 Signs

Signs must not be illuminated. This is in accordance with the The Danish Nature Conservation Act, see 9.3.

11.1.6 Illuminated Signs

Illuminated signs must not be installed in the Dark Sky Park area. This is in accordance with the The Danish Nature Conservation Act, see 9.3.

11.1.7 Floodlight and searchlight for advertising

Rotating or fixed projectors/searchlights must not be used for advertising purposes in the area.

11.1.8 Decorative Lighting

Non cut-off decorative lighting, must be avoided.

If decorative lighting is installed it must not exceed an illuminance of 1.5 lux at the illuminated object and the light must be shielded.

Up to a total of 700 lumens of decorative lighting may be installed per plot.

The correlated color temperature (CCT) must be equal to or less than 2,100 K.

Decorative lighting must not be switched on throughout the night. Decorative lighting can be controlled by a timer to ensure that it is switched off after midnight, i.e. minimizing the risk of human "forgetfulness".

11.1.9 Seasonal Lighting

Christmas lights must be limited to the Christmas period, i.e. from the first Sunday in Advent until 6 January (Twelfth Night).

During the Christmas period, a limited number of light chains and other chirstmas related light sources may be installed at the plot. The total amount of lumens from these lights must not exceed 700 lumens per plot and the light shall be warm white, 2,700 K or less.

11.1.10 Light Trespassing

The owner of a light fitting is responsible for ensuring that it is installed responsibly, i.e. so that it does not illuminate beyond the limits of the plot.

Light trespassing occurs when a light fitting illuminates a neighboring plot of land at the boundary with more than the light of the moon, corresponding to 0.3 lux.

Bordering to International Dark Sky Park
Plots of land that border onto a Dark Sky Park area must not contribute more than 0.3 lux of light into the DSP (measured at the boundary).

Measurement of light trespassing
Light trespassing must be measured at the boundary, closest to the light fitting in question, at ground level and with the light/lux meter pointing at and with an unobstructed view of the light fitting.

In an area bordering on a Dark Sky Park, measurements must be made at the plot's own boundaries, closest to the light fitting in question and at ground level.

All measurements must be made using a light/lux meter pointing at and with an unobstructed view of the light fitting.

Section 12

Lighting Inventory

12.1 Lighting Inventory

THERE is no street lighting in the Dark Sky Park. Outdoor lighting is installed in connection with buildings. The buildings are owned by The Danish Nature Agency, The National Museum of Denmark or by the DSP area's only enterprise, GeoCenter Møns Klint. All the buildings were suveyed with representatives of the owners.

The initial survey showed that many lamps did not meet mandatory FCO requirements in the LMP.

Table 12.1: *Survey of Public lighting*

ID-No.	Total number	Data light source	FCO	Photo	Note
1	2	3,000K	No		a
2	1	3,000K	No		a
3	1	3,000K	No		a, b

Table 12.1: *Survey of Public lighting*

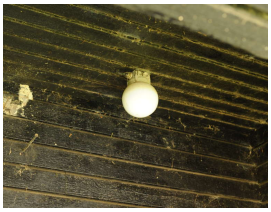
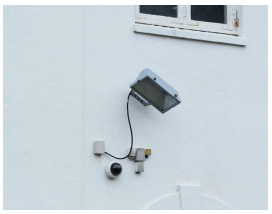
ID-No.	Total number	Data light source	FCO	Photo	Note
4	1	3,000K	No		a, b
5	1	Halogen, 1,000W, 3,000K	Yes		c, g
6	3	CFL, 11W, 2,700 K	No		
7	1	Tungsten, 25W, 2,700 K	No		d
8	2		Yes		e
9	1		Yes		e
10	2	CFL	No		
11	1	Halogen, 1,000W, 3,000K	No		

Table 12.1: *Survey of Public lighting*

ID-No.	Total number	Data light source	FCO	Photo	Note
12	3		No		
13	1	LED, 600 lumen, 2,700K	No		f
14	1		No		
15	1	CFL, 16W, 2,700K	No		
16	2	CFL, 11W, 2,700K	No		
17	2	Halogen, 250W, 3,000K	Yes		e
18	5		No		
19	1	Flourecent lighttube, 18W, 2,700K	No		

Table 12.1: *Survey of Public lighting*

ID-No.	Total number	Data light source	FCO	Photo	Note
20	1	Halogen, 250W, 3,000K	No		
21	3	Halogen, 1000W, 3,000K	No		c
22	20	2,700K	Yes		h

[a] Building including the fixtures, are protected for historic reasons. Nothing must be changed.
[b] The fixture has yellow glass, lowering the CCT to <2500K.
[c] The floodlight is part of the burglary system.
[d] Fixture is allowed for historic reasons.
[e] Building parts, shield the fixture.
[f] Borderline fixture, no light above the horizontal level, but it provides a lot of glare below the horizontal level.
[g] The floodlight have been provided with a shade making it functional FCO.
[h] The light source is installed in the top part for the fixture, with a flat glass. The top of the fixture makes an efficient shield against any direct upward light.

At the time of the survey, 8 August 2016, there were 56 outdoor lamps in the Dark Sky Park area. Of these, 26 are FCO. Five types of lamps may not be changed as they are attached to a listed building (i.e. a building where no changes can be made except by special permission). Thus a total of 31 lamps (55.4%) meet LMP requirements.

12.2 Fulfillment of LMP

THE Danish Nature Agency have replace their lamps in order to meet LMP requirements. This work was completed by 10 September 2016.

The National Museum of Denmark has replaced the light sources in the lamps on listed buildings. A shield has been fitted to the projector in order to comply with the LMP.

GeoCenter Møns Klint will bring their three projectors into line with the LMP by Easter 2017.

Per 10 September 2016 95% of the outdoor lighting in the Dark Sky Park meet the LMP requirements.

Table 12.2: *Light fittings before and after retrofitting*

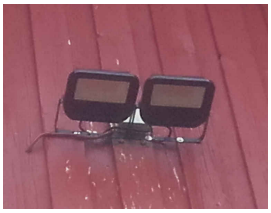
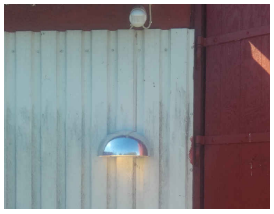
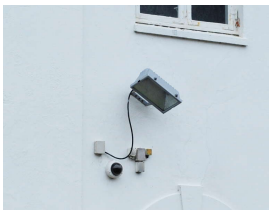
ID-No.	Data new light source	Before	After	Notes
5	Halogen, 1,000W, 3,000K			a
6	LED 400 lumen, 2,700K			
7	LED, 90 lumen, 2,100 K			b
10	LED, 130 lumen, 2,100 K			b
11	LED, total 10,000 lumen, 3,000K			c
12	LED, 400 lumen, 2,700 K			
13	LED, 400 lumen, 2,700 K			

Table 12.2: *Light fittings before and after retrofitting*

ID-No.	Data new light source	Before	After	Notes
14	LED, 400 lumen, 2,700 K			
15	LED, 400 lumen, 2,700 K			
16	LED, 400 lumen, 2,700 K			
18	LED, 400 lumen, 2,700 K			d
19	LED, 400 lumen, 2,700K			
20	LED, 5,000 lumen, 3,000K			b
21	Halogen, 1,000W, 3,000K			e

[b] Shield has been added, preventing light spill above the horizontal plan.
[b] Light source have been changed, to low lumen and very warm white light source.
[c] Floodlights are pointed downware, thereby utilising their housing as FCO.
[d] The five nonFCO lamp posts have been dismantled and replaced by a single FCO light fitting. The FCO light fitting are controlled by a motion detector.
[e] Light fitting will be in line with LMP, at latest by Easter 2017.

12.3 Seasonal light

CHRISTMAS lighting in Denmark has always been a relatively modest affair but, like everything else, outdoor Christmas lighting is becoming more intensive.

In the Dark Sky Park, there is Christmas lighting only at two houses owned by The Danish Nature Agency (housing for their employees). A third house is not currently inhabited. Christmas lighting is restricted to a single light chain or a Christmas tree with lights.

Section 13

Local Certification Program

In many contexts, darkness is a resource we tend to overlook. In addition to the municipal and state-owned light fittings, one important parameter for the success of Dark Sky Møn and Nyord is that we reach out into the community. One of the goals of our Vision (see Section 3) is therefore to inform local enterprises of the inherent potential of our dark skies and the need to preserve them and take care when we use light at night.

The local certification program has been a great success in the proposed Dark Sky Community Møn and Nyord and its success naturally has a derivative effect on the proposed International Dark Sky Park Møn and Nyord. The LMP requirements have been adapted for Dark Sky Park so that it will only be possible to achieve a four- or five-star rating in the Dark Sky Park area. For the list of requirements, see Appendix C.

Figure 13.1: Employees of GeoCenter Møns Klint receive their five-star sign. Credit: Tom Axelsen

There is currently only one enterprise in the Dark Sky Park area, GeoCenter Møns Klint. GeoCenter Møns Klint is certified in accordance with the local certification program in the Dark Sky Park. It is awarded five stars.

Section 14

Other Local Dark Sky Initiatives

THE working group is very pleased to see that the local population on Møn and Nyord welcomes the idea of conserving and preserving the islands' awesome dark skies. Some of the most important initiatives are listed in the application for the proposed International Dark Sky Community Møn and Nyord. A smaller selection of the initiatives that are most relevant to International Dark Sky Park Møn and Nyord are listed here.

14.1 Camønoen

ON 18. June 2016, a new hiking route was opened on Møn, Nyord and Bogø. It is called Camønoen. Camønoen is described as the Kingdom's most friendly hiking route. It is about 175 km (108 miles) long. The idea of the Camønoen is to promote a break from the hectic modern life and give the hikers time for serenity and contemplation or a hike in a beautiful countrysite. This matches perfectly with the Dark Sky concept.

The route is subdivided into 10 one-day stages. Each stage has a name inspired by the area covered that day. One stage is called The Milky Way. The path starts at the Møns Klint campground (an enterprise, which has achieved a four-star in the local certification program) into the proposed Dark Sky Park area and follows Møns Klint cliffs into Klinteskoven woods. At the edge of the woods, the path veers away from Møns Klint and into the Dark Sky Community area. At Gurkebakken (a hill), the path follows the perimeter of the Dark Sky Park. A large shelter will be built here inside the Dark Sky Park area. The shelter's working name is "The Observatory" because it will be designed to allow hikers to sit in the middle of the shelter and look up at the stars. The shelter will not be illuminated (there is no electricity supply to this area). If everything goes according to plan, "the Observatory" will be erected in March 2017.

After Gurkebakken and "the Observatory", the Milky Way stage proceeds to Klintholm harbor.

The link between hiking, contemplation, silence and an impressive starry sky over Møn is outstanding. It offers a combination of four elements, all of which are forced into the shadows of our busy modern lives but remain important for us as human beings if we are to feel complete.

Section 15

Outreach

SEVERAL outreach events have been held in the Dark Sky Møn and Nyord project period (i.e. just less than two years). Many of these events have been held in the Community area in order to explain and inform people about the Dark Sky Community and Park project.

In the Dark Sky Park area, GeoCenter Møns Klint has taken care of much of the communication and on-site interpretation regarding the darkness and stargazing. The South Zealand Astronomy Society, a local association, has focused on informing local people about the project. The society organized a stargazing event in the Dark Sky Park area in fall 2015.

In future, these two local stakeholders – GeoCenter Møns Klint and The South Zealand Astronomy Society – are expected to run most public stargazing events in the Dark Sky Park area.

15.1 GeoCenter Møns Klint

THIS is a museum and activity center with focus on Denmark's geology and nature. GeoCenter Møns Klint has a central location in the Dark Sky Park, about 100 m from the edge of Møns Klint. From the GeoCenter, there are steps to the foot of the 128 m high cliffs.

During 2015 and 2016, GeoCenter hosted several Dark Sky events, including:

- Dark Sky – Bonfire Food at Full Moon – 3 April 2015
- Dark Sky – the documentary "The City Dark" and stargazing from the cliffs – 3 October 2015
  Having watched the movie "The City Dark", visitors were brought to the foot of the cliffs. A guide explained about the stars against a background of rolling waves and 70-million year old cliffs with starry skies above. An evening that put time in a new perspective for most! Back at the top of the cliffs, the visitors observed stars and nebulae through a telescope.
- Dark Sky – Bonfire Food at Full Moon – 9 October 2015
- Dark Sky – Movie, "Night at the Museum" and stargazig – 13 October 2015

- Dark Sky – “Night at the museum” and Full Moon – 23 March 2016
  Visitors came to the museum after dark to see the movie in the GeoCenter movie theater. There was then a guided tour of the exhibition (with an element of horror) and, finally, a short hike along the edge of the cliffs in the light of the full moon.

Section 16

Publications

DURING the Dark Sky project a lot of information have been published, both in print and online. In the publications there have been no segregation between Community or Park. Because of this the publications for the Park are identical to the Community. Please refered to the *Application for Designation as International Dark Sky Community* for details.

Section 17

References

[1] Bodil Bengtsson et al, *De Søndre Byer, En lokal historie fra Møn*, Beboerforeningen: De Søndre Byer, 2006, Download PDF (in Danish) here: www.desøndrebyer.dk.

[2] Heat Lightning - Kornmod Kornmod on Wikipedia - Link to text in Danish Heat Lightning on Wikipedia - Link to text in English

[3] Danish Meteorologic Institute Link to Danish Climate Normals at Danish Meteorologic Institutes website

[4] Download PDF (in Danish) about the geology of Møn here: Møns geologi - en præsentation af den geologiske litteratur om Møn

[5] A freeware for processing astronomical images: IRIS - An astronomical images processing software

[6] Fabio Falci et al, *The new world atlas of artificial night sky brightness* Link to article at ScienceAdvances

[7] Brøndegaard, *Folk og Fauna 1*, The first florilegium about Danish ethnobotany. Four volumes in this series of books appeared from 1978-1980, reprinted in 1987. Now available as PDF files (in Danish) from Kungl. Skogs- och Lantbruksakademien (KSLA, The Royal Swedish Academy of Agriculture and Forestry). *Folk og Fauna 1* Link to pdf-file at Kungl. Skogs- och Lantbruksakademien web-site.

[8] Danish Public Roads Act, *Danish Public Roads Act, Act no. 1520 of 27 December 2014* Link to url with legislative text - in Danish.

[9] Street lighting, applicable handbook *Vejbelysning (Street Lighting), 1 April 2015* Link to english version of Handbook.

[10] DWEA Guidelines A.1.5 of February 2002, *DWEA Guidelines A.1.5 of February 2002* Link to Danish Working Environment Authority.

[11] Danish Nature Conservation Act *Act no. 1578 of 8 December 2015* Link to url with legislative text - in Danish.

[12] Danish Nature Agency (Storstrøm Section) – Management Plan for the Cliffs of Møn *Driftsplan – Møns Klint, see Sec. 3.3* Link to url with management plan - in Danish.

[13] Danish Nature Agency (Storstrøm Section) – Management Plan for Ulvshale and Nyord *Driftsplan – Ulvshale og Nyord, see Sec. 3.3* Link to url with management plan - in Danish.

Appendix A

Individual Night Sky Brightness Measurements

THE quality of the night sky was measured using a Unihedron SQM-L measuring instrument. Instrument #6409 was also used as the reference instrument in measuring NSB in the International Dark Sky Community area. Instrument data #6409, firmware _2.17.

During the visit of Dr. Andreas Hänel to Møn in spring 2016, the reference instrument was compared with Dr. Hänel's instrument (#2536), which was the reference instrument used in connection with measurements taken for the German International Dark Sky Reserves. The difference between #2536 and #6409 is 0.00 $mag./arcsec^2$.

Geographical measurement locations, a total of 13, were selected in order to produce best possible geographical cover. The minimum requirement is for 12 measurement locations in the Dark Sky Park area. The 13 measurement locations include dark and less dark environments.

Nights suitable for measurements must fulfill, the following requirements:

- Measurement period from 1 March until the first night with astronomical twilight troughtout the night, i.e. 8 May 2016. Measured values are comparable with other Dark Sky Parks, whose best measurements are also achieved in spring.
- Between end and start of astronomical twilight
- Clear sky.
- Moon below horizon.
- Measurement in Zenith

Figure A.1 shows the measurement locations. Each measurement location is given an ID code, which is used consistently in the remaining tables in Appendix A.

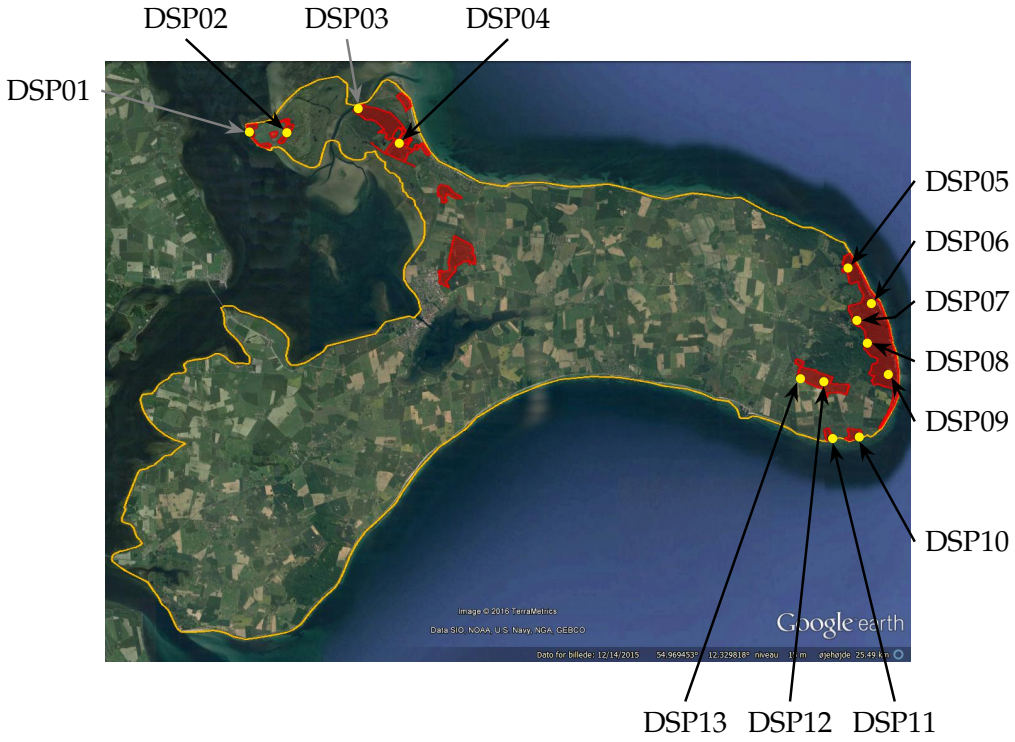


Figure A.1: Map to show sites in the Dark Sky Park areas where NSB measurements were taken. ID-coding is reproduced in the measurement tables. Instrument #6409 was used for all measurements. Map Source: GoogleEarth

A.1 Measurements with #6409

THE measurements taken in the Dark Sky Park area were all made with instrument #6409, i.e. the reference instrument.

Three thorough measurement runs were made in the Dark Sky Park area. The first took place on the night of 17/18 April 2015. As the night was adversely affected by airglow, the measurements are good but not awesome. The best measurement was 21.62 $mag./arcsec^2$ in Liselund Park (DSP05). The remaining measurement locations on East Møn (DSP06 – DSP13) gave almost identical good values of 21.59-21.60 $mag./arcsec^2$. The lightest values were measured on Nyord and Ulvshale (DSP02 and DSP04) at 21.54 and 21.53 $mag./arcsec^2$, respectively. Both measurement locations are relatively close to Zealand and Stege so it was expected that these locations would have lighter results.

The second measurement run took place on the night of 11/12 March 2016. Mother Nature had dimmed the light from Copenhagen and Malmö as there was thickening cumulus cloud and mists over both cities.

Again, the lightest NSB values were measured on Nyord (DSP01 and DSP02) at 21.75 and 21.76 $mag./arcsec^2$ respectively, which again is due to the island's relative proximity to Zealand and Stege. Even though these are the lightest NSB measurements, they are excellent.

The best NSB values were again measured on East Møn (DSP07, 08, 09 and 10) at values ranging from 21.91 – 21.92 $mag./arcsec^2$. The best measurement that night was 21.93 $mag./arcsec^2$ at DSP11. This was the last measurement taken before mists and cloud reached East Møn and obscured the view of the sky and

stars.

The third measurement run took place on the night of 28/29 October 2016. The main purpose of this run was to document the light domes above Copenhagen and Malmö. Making the measurements of this run less comparable to the measurement runs, conducted in the spring, is the fact than the Milky Way was culminating in zenith during the entire measurement run.

In addition to the Milky Way the airglow level was high giving the night sky a greenish cast in the photos, see figures 8.3, 8.4, 8.5 and 8.6 and visually making the sky and stars much less brilliant than normal. On the night 28/29 October airglow alone, had brighten the NSB with 0.5–0.55 $mag./arcsec^2$ compared to what it normally would be at this sidereal time.

All measurements from the two measuring runs are given in Table A.1. The columns in Table A.1 as follows:

Date:	Date format YYYYMMDD
Local time:	Time of measurement. Format HH:MM. Time stated at local time, i.e. CET Measurements taken in the period from the last Sunday in March until the last Saturday in October were taken at CET+1.
ID:	ID-code for geographical location. Geographical location shown in A.1.
Long:	Longitude of the geographical location.
Lati:	Latitude of the geographical location.
1. - 5.:	Five separate measurements, given in $mag./arcsec^2$.
Mean:	Average of the five measurements, given in $mag./arcsec^2$.

Table A.1: *Measurements in the Proposed Dark Sky Park with #6409*

Date	Local time	ID	Long.	Lati.	1.	2.	3.	4.	5.	Mean
20150417	23:05	DSP01	55.044	12.187	21.59	21.58	21.58	21.58	21.60	21.59
20150417	23:21	DSP02	55.044	12.203	21.54	21.53	21.54	21.53	21.54	21.54
20150417	23:46	DSP03	55.052	12.244	21.57	21.58	21.58	21.58	21.57	21.58
20150418	00:05	DSP04	55.042	12.268	21.55	21.55	21.53	21.52	21.52	21.53
20150418	00:39	DSP05	55.000	12.524	21.64	21.64	21.62	21.61	21.61	21.62
20150418	00:55	DSP06	54.983	12.527	21.60	21.61	21.58	21.57	21.60	21.59
20150418	01:22	DSP07	54.989	12.538	21.62	21.61	21.60	21.59	21.59	21.60
20150418	01:50	DSP08	54.975	12.534	21.63	21.61	21.58	21.58	21.59	21.60
20150418	01:57	DSP09	54.965	12.546	21.62	21.58	21.58	21.58	21.59	21.59
20150418	02:06	DSP10	54.944	12.530	21.59	21.58	21.58	21.58	21.59	21.58
20150418	02:15	DSP11	54.944	12.514	21.59	21.60	21.62	21.59	21.60	21.60
20150418	02:26	DSP12	54.963	12.509	21.58	21.58	21.58	21.58	21.58	21.58
20150418	02:35	DSP13	54.964	12.496	21.59	21.58	21.58	21.58	21.59	21.58
20160311	22:50	DSP01	55.044	12.187	21.75	21.75	21.75	21.75	21.75	21.75
20160311	23:22	DSP02	55.044	12.203	21.77	21.75	21.75	21.76	21.77	21.76
20160311	23:39	DSP03	55.052	12.244	21.85	21.82	21.82	21.85	21.82	21.83
20160311	23:55	DSP04	55.042	12.268	21.85	21.85	21.85	21.85	21.85	21.85
20160312	00:37	DSP05	55.000	12.524	21.86	21.84	21.85	21.85	21.85	21.85
20160312	00:51	DSP06	54.983	12.527	21.89	21.86	21.88	21.90	21.87	21.88

Table A.1: *Measurements in the Proposed Dark Sky Park with #6409*

Date	Local time	ID	Long.	Lati.	1.	2.	3.	4.	5.	Mean
20160312	01:10	DSP07	54.989	12.538	21.90	21.91	21.90	21.90	21.92	21.91
20160312	01:34	DSP08	54.975	12.534	21.92	21.92	21.92	21.92	21.93	21.92
20160312	01:47	DSP09	54.965	12.546	21.92	21.93	21.92	21.92	21.91	21.92
20160312	02:00	DSP10	54.944	12.530	21.90	21.90	21.90	21.92	21.92	21.91
20160312	02:15	DSP11	54.944	12.514	21.94	21.94	21.93	21.93	21.93	21.93
20161028	23:13	DSP01	55.044	12.187	21.02	21.01	21.00	20.99	20.99	21.00
20161028	23:36	DSP02	55.044	12.203	21.05	21.03	21.00	21.00	21.01	21.02
20161028	23:55	DSP03	55.052	12.244	21.01	21.01	20.99	20.98	20.99	21.00
20161029	00:52	DSP05	55.000	12.524	21.16	21.15	21.15	21.15	21.17	21.16
20161029	01:25	DSP12	54.963	12.509	21.19	21.18	21.18	21.16	21.12	21.17

Appendix B

Long Term Night Sky Brightness Measurements

SINCE March 2016, we have collected Night Sky Brightness (NSB) data using a Unihedron SQM-LU-DL measuring instrument, serial no. #2586. The instrument is located near GeoCenter Møns Klint close to a web camera that monitors the movements of the Peregrine Falcon (Falco peregrinus) in the area. The instrument is adjusted so that it has a clear view of the sky, including zenith, at which measurements are taken.

#2586 is set to measure at five-minute intervals. At this sampling frequency, clouds appear as fluctuations in the NSB measurements. When subsequently processing the data, it is possible to differentiate between cloudy and clear weather. It is also possible to distinguish the effect of moonlight, which causes a gradual increase in NSB until its culmination. After culmination, NSB gradually tails off.

B.0.1 Instrumentielle deviations

NO two instruments measure precisely the same. There will always be a small variation between them. The difference may be due to a faulty instrument, systematic errors or human error (incorrect use of the instrument).

The number of night where the instruments #6409 and #2586 have been used at the same location and time are very low, it makes no sense therefore to compare deviation between these two instruments.

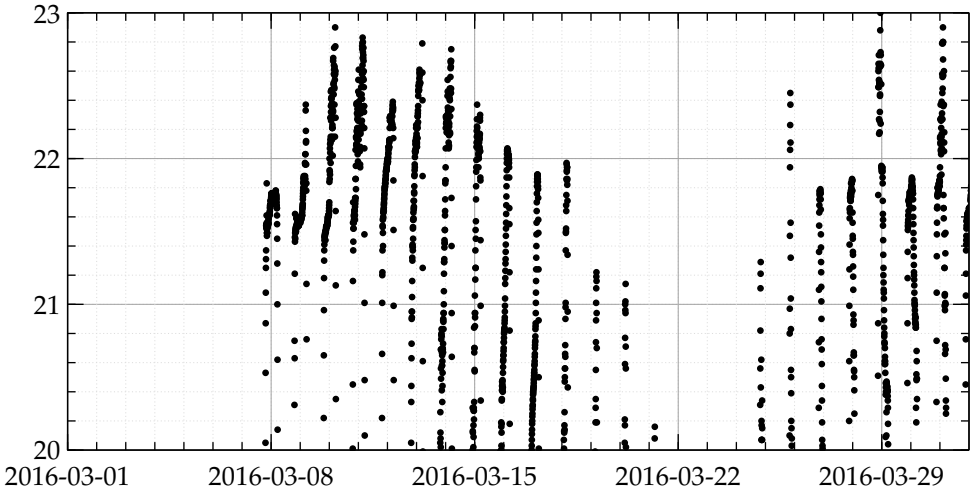
When #2586 was purchased, measurements were recorded simultaneously using instruments #2586 and #2547 at the same location in the Dark Sky Community area. Based on these measurements, we can determine the average deviation between the two instruments. Using #2547 as the reference instrument, the difference is

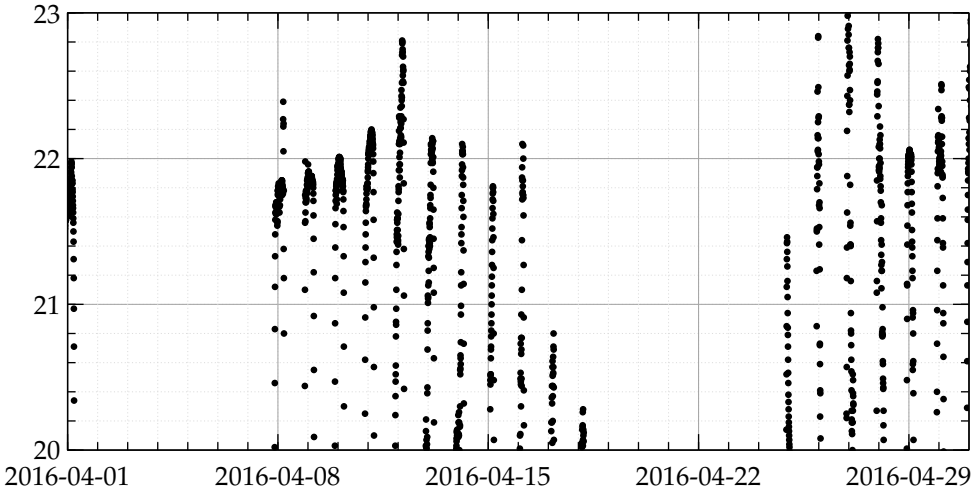
$$-0.023^{+0.01}_{-0.01}\ \ mag./arcsec^2$$

which means that, on average, #2586 produces values that are 0.023 $mag./arcsec^2$ too light.

The graphs on the following pages take this very small deviation into account. However, because the deviation between instruments is so small, the adjustment is not discernible on the graphs.

B.1 Data March 2016 to May 2016





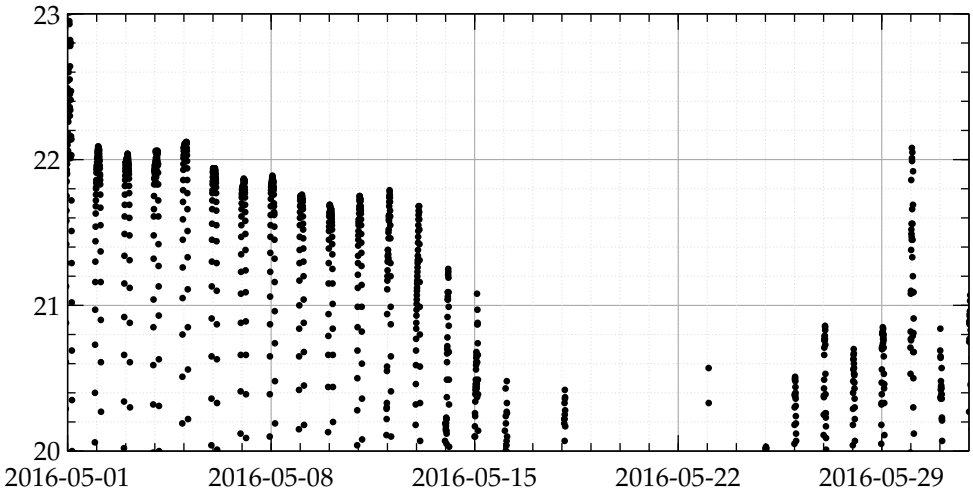


Table B.1: *All SQM-LU-DL data collected between Marts 2016 and May 2016.*

In Tabel B.1 the periode with astronomical darkness ends at May the 8. As it can be seen from Tabel B.1 the brightening of the night sky, does not show through in the measurements for a further 3-4 days.

The apparently holes in the 2016 data is due to the chosen brighter limit of 20.0 $mag./arcsec^2$ thereby leaving data from the nights close to fullmoon outside the range of the graphs.

Not apparent in the graphs are the influence of moon light, cloudes and fog. The Fullmoon can increase the NSB to values between 16 $mag./arcsec^2$ in December with the Fullmoon high in the sky and 18 $mag./arcsec^2$ in August with the Fullmoon low in the sky. Cloudes makes the NSB fluctuate, on cloudy and moonless nights the NSB above Dark-Sky Park becomes darker and drops below 22.00 $mag./arcsec^2$. This is worth noting as it indicates that the amount of localized lightsources are very low. If measurements from Dark-Sky Community and Dark-Sky Park are compared this difference in NSB-behavior is very apparent, see figure B.1.

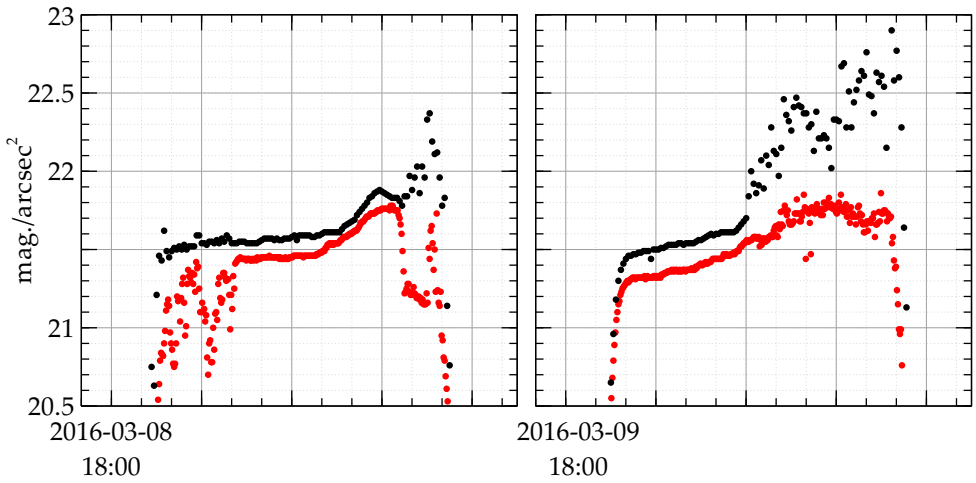


Figure B.1: Two different nights with both clear and cloudy weather. Red curve is SQM-LU-DL measurements from Dark-Sky Community area, black curve is SQM-LU-DL measurements from Dark-Sky Park area. It is obvious that clouds makes the curves fluctuate, but the behavior is different in Community versus Park. In Community the fluctuation with clouds is toward brighter NSB. In the Park the NSB goes significant darker, before the fluctuation starts.

From the curves in figure B.1 it is apparent that the NSB during clear sky is darker in the Proposed Dark-Sky Park area than in the Proposed Dark-Sky Community. The difference in the NSB at the two sites, varies between 0.06 and 0.17 $mag./arcsec^2$, with a typical value of 0.13 $mag./arcsec^2$ darker NSB in the Dark Sky Park. The smallest difference is achived during nights with very clear and clean air with a low contend of moisture.

B.2 Selected clear nights

How the detailed graphs of single nights on the next pages are interpreted is explained in Figure B.2.

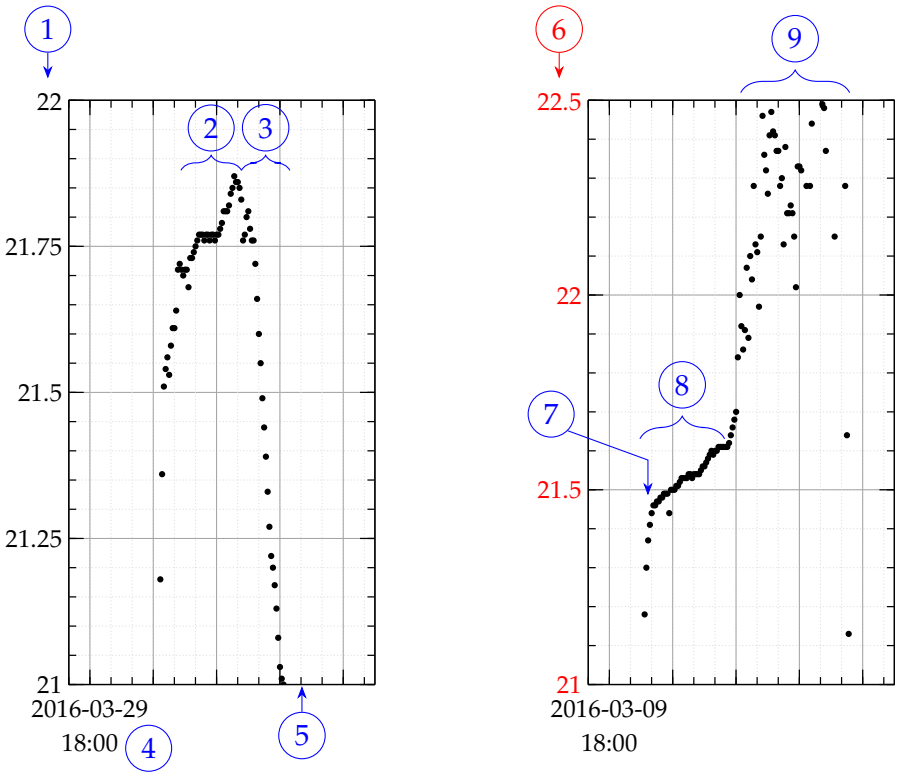
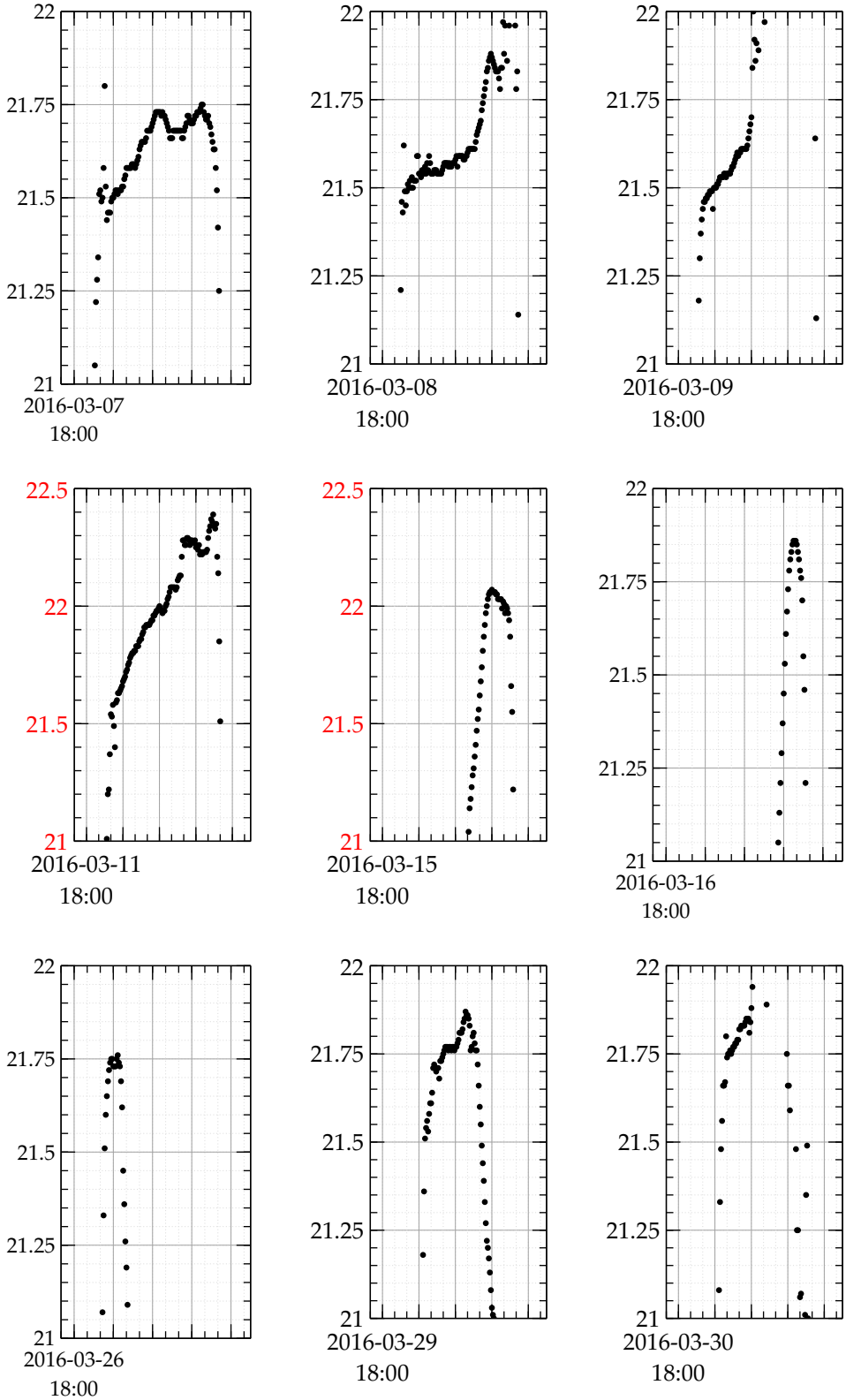


Figure B.2: How to read the graphes in this section. The numbers in the figure referes to the key below.

1. Normal night sky brightness-scale, with black lables. Measurements between 21 to 22 $\mathrm{magnitude/arcsec.}^2$ are shown.
2. Clear sky. Very small, if any, fluctuation of night sky brightness.
3. Moonrise with steady increase in night sky brightness. The setting Moon will give a steady decrease in night sky brightness.
4. Start date. A measurement runs from evening at 17:00 to 07:30 the next morning.
5. Time scale follows local time. Major ticks every 3 hour. The first major tick is at 18:00, the second at midnight and the last major tick at 6:00 in the morning. Inbetween are minor ticks for every hour.
6. Extended night sky brightness-scale, with red lables. Used on nights with extrem dark measurements. Measurements between 21 to 22.50 $\mathrm{magnitude/arcsec.}^2$ are shown.
7. End of astronomical twilight, evening.
8. Clear sky.
9. Fluctuation in night sky brightness due to clouds.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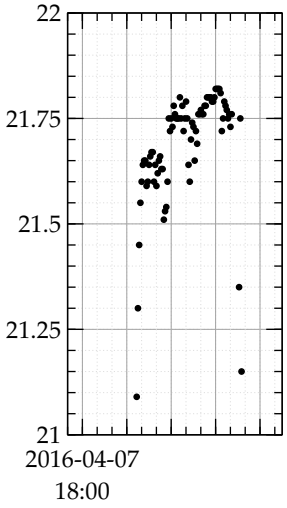
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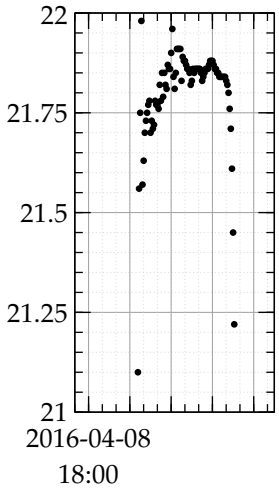
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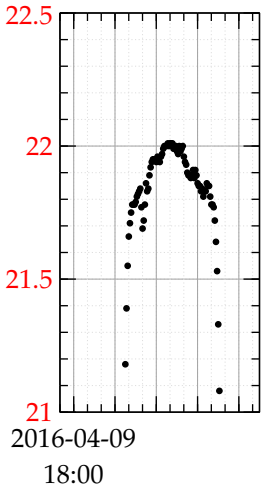
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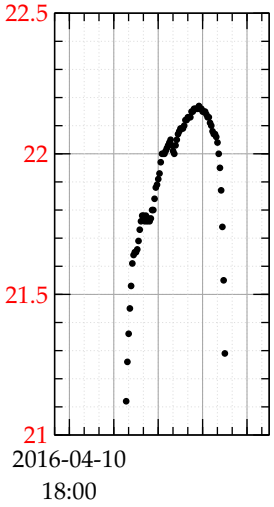
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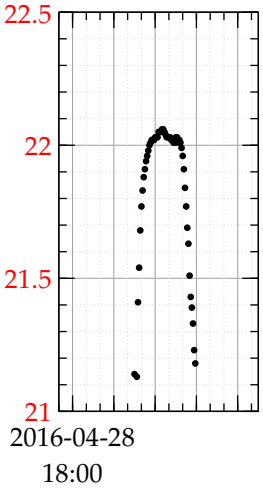
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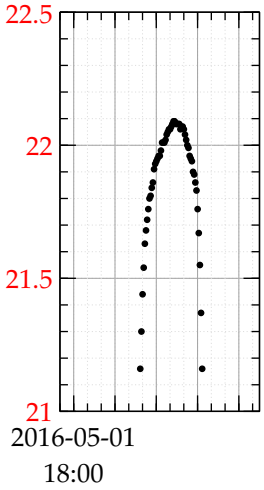
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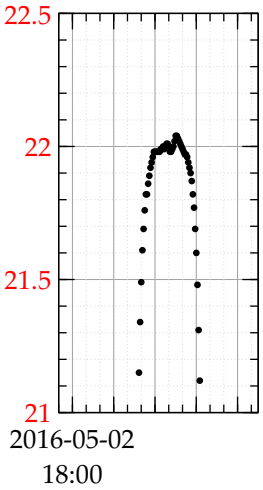
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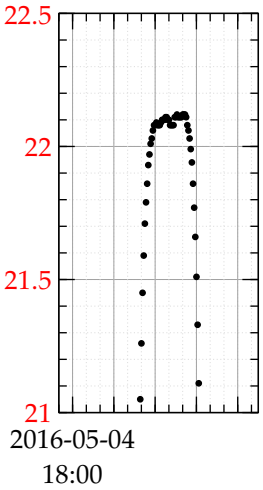
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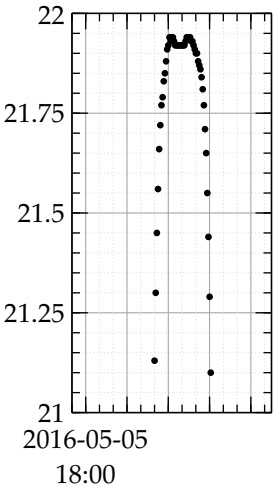
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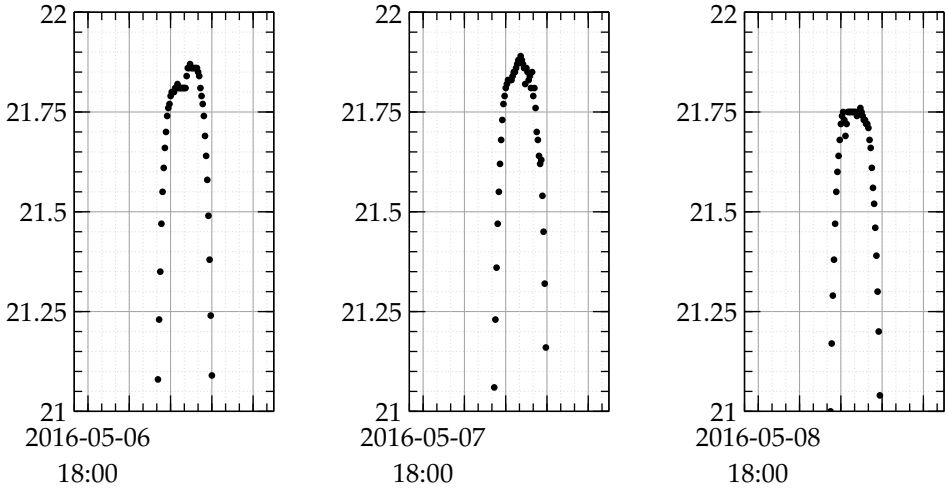
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Appendix C

Guidelines for Local Certification of Companies

THERE is only one enterprise within the Dark Sky Park. In line with local certification of enterprises in the Dark Sky Community, we have devised a local certification program for enterprises in the Dark Sky Park. This certification program is adapted to LMP for Dark Sky Park and confers four or five stars depending on how much the enterprise has done to protect the night sky and inform people about the consequences of light pollution.

Dark Sky Møn and Nyord

Certification of enterprises in Dark Sky Park

DSMN-02-A : 2015-03

Purpose

By Danish standards, Møn and Nyord have outstanding dark skies with very limited light pollution. The darkness makes being outdoors at night under a sky full of stars an overwhelming experience that hones the senses. You hear sounds more keenly and are aware of scents that fill the night air.

Enterprises on Møn and Nyord have an important role to play in communicating our dark skies. Most guests come from areas with considerable light pollution and it is likely that most guests will encounter Møn's night skies in connection with an overnight stay.

Visitors' experience of staying on Møn and Nyord will be clearer and more awe-inspiring if the enterprises optimize outdoor lighting to prevent obscuring their guests' dark sky experiences. The goal is to ensure that guests have so unforgettable an experience that they will make a return visit.

Enterprises on Møn and Nyord can be certified in accordance with their efforts to help their guests experience the darkness and starry skies from their accommodation.

This document lists the requirements that enterprises in the proposed Dark Sky Park area must meet in order to achieve a DSMN certificate.

Validity

The present document applies only to enterprises located in the Dark Sky Park area.

Definitions

Enterprise
Includes all types of contact and services for tourists, during which some type of exchange, monetary or otherwise, is made The term includes (NB: this list is not exhaustive): B&Bs, camp sites, youth hostels, campgrounds, restaurants, cafés, activity centers, tourist information and visitors' centers.

DWEA
Danish Working Environment Agency

Motion sensors
Electronic sensors and contactors that switch on the light source when the sensors register movement in their "field of vision". Motion sensors are usually connected to a timer.

Glare
Glare occurs when there are surfaces or light sources within our field of vision that are significantly lighter than the object we are looking at. These light sources include frosted glass domes in light fittings.

Certified enterprise
An enterprise that has been awarded a DSMN certificate.

CCT
Correlated Color Temperature expressed in Kelvin (K)
Sunlight, which human beings see as white light, has CCT 5,600 K. Light sources with a warm white color have a CCT of 3,000 K or less.

Deep Sky Objects
The astronomers jargon for everything outside the solar system: Galaxies, glowing nebulae, open star clusters, binary stars, planetary nebula and much more besides. Examples of clearly visible deep-sky objects are the Andromeda Galaxy, the Orion Nebula, Seven Sisters (Pleiades) and the Ring Nebula.

The horizontal plane
An imaginary horizontal plane that cuts through the light source.

DSMN
Dark **S**ky **M**øn and **N**yord. A joint term for Dark Sky Park Møns Klint and Dark Sky Community on Møn and Nyord.

FCO
Full Cut-Off, a light fitting that emits no light above the horizontal plane. A light fitting that emits light above the horizontal plan is considered FCO if it is installed under a roof/eaves that shield(s) light as efficiently as an FCO light source.

An efficient FCO counteracts glare as the light source is concealed inside the light fitting and directs light in the desired direction.

LED
Light-Emitting Diode. LEDs are highly efficient transducers that convert electrical energy into light.

Light source
The part of a lamp that emits light (all types of light source included). E.g. old-fashioned light bulbs, halogen lamps, strip lights, energy-saving lamps and LEDs.

Light fittings
An electromechanical component, into which one or more light sources can be fitted. Light fittings may be equipped with an electronic timer and/or motion sensors.

Lumen
A unit of luminous flux. Lumen replaces Watt (familiar to us from conventional electric light bulbs). As today's light sources are much more efficient than light bulbs, we can no longer use Watt as an indication of the quantity of light. Lumen is used instead.

Lux
Is a measurement of luminous flux per unit area. Ordinary office lighting is at 400-500 lux. A full moon lights at 0.27lux.

Light-sensitive switches

A switch with an integrated light sensor that registers ambient light intensity. The device activates an electrical circuit when light intensity falls below a value pre-set by the user.

Timer

An electronic device that activates an electrical circuit for a period of time. The time is pre-set by the user.

Certification

Requirement 0. General information

0.1 DSMN certification is managed by the administrative unit that manages work regarding Dark Sky Park and Dark Sky Community Møn and Nyord. DSMN certification equates with International Dark Sky Association (IDA) requirements, which must be met in order to be approved by IDA and certified as an International Dark Sky Park.

0.2 Certification is subdivided into two quality classes. The classes are denoted by four and five stars (where a five-star rating is best). These classes are comparable with classes four and five in DSMN-12-02 : 2015-04, which applies to the Dark Sky Community.

0.3 The quality requirements for both classes are listed below. Table 1 shows the requirements that must be met in each class. A certificate is issued only when all the requirements for a given class are met or exceeded. Preliminary approval may be awarded if the enterprise submits a detailed plan for improving outdoor lighting that will bring the enterprise's outdoor lighting in line with the requirements stipulated in this document. The plan must include a date, by which all the requirements will be met.

0.4 At least two requirements shall be met in each class. If secondary requirements in two different classes overlap, the most stringent secondary requirement will apply. *For example: a secondary requirement for CCT at 2,500 K is more stringent than a 2,700 K requirement. The lower of the two CCT ratings shall apply.*

0.5 When an enterprise applies to become DSMN certified, the enterprise shall submit a technical description of all outdoor light fittings on the enterprise's premises. The description shall document any initiatives already taken in an effort to meet the requirements of the class applied for. A detailed description of how and what to document in the application is described in DSMN-22.

0.6 An enterprise that fails to meet all the sub-requirements in Requirements 3 and 4 may be awarded a certificate or an extra star if it meets one or more of the sub-requirements in Requirement 7.

0.7 An enterprise that has a valid DSMN certificate may use this in its marketing activities. For details, see Sections on *"Validity of certificate" and "Forfeiture of certificate"*.

	Table 1						
Requirement Class	**1**	**2**	**3**	**4**	**5**	**6**	**7**
****			+	+	+		(+)
*****			+		+	+	

Requirement 3.

3.1. Some enterprises will not be able to meet Requirement 3. See Requirement 7 for alternatives (instead of Requirement 3).

3.2. A dark area of the enterprise's premises is reserved for observing the stars/night skies.

3.3. If it is possible to look into a lighted building from 3.1, a screen shall be erected to eliminate glare from indoor lighting. *Examples of screening: Tall hedges, bushes, windbreak, black-out drapes.*

3.4. To optimize the dark sky experience, the host provides special amenities. *Examples of special amenities: Deck chairs, sleeping bags, blankets, mattresses, hot drinks, etc.*

Requirement 4.

4.1. Some enterprises will not be able to meet Requirement 4. See Requirement 7 for alternatives (instead of Requirement 4).

4.2. All outdoor light fittings are changed to FCO.

4.3. Outdoor light sources have been replaced to the lowest possible lumen.

4.4. Areas in which work is performed shall fulfill DWEA requirements for the type of work performed. Lighting shall be controlled by a timer and/or motion sensor so that the lighting is only switched on when someone is working in the area.

4.5. Heavily used paths and walkways shall meet Street lighting class E2, mean 2.5 lux on a walkway. Example: A walkway that is heavily used could be the path between the enterprise's main entrance and parking lot. Lightly used paths and walkways shall meet Street lighting class E3, mean 1 lux on a walkway. *Example: Paths to individual chalets.*

4.6. Light fittings that are visible from 3.1. shall have light sources with CCT at ≤ 2,100 K.

4.7. Other light fittings shall have CCT ≤ 2,700 K.

4.8. A timer and/or motion sensors shall be connected to at least 80% (by number) of outdoor light sources. Exceptions from the 80% are light sources along paths and walkways that meet 4.4.

4.9. Information material DSMN-31 is located at the enterprise and is available to guests/customers. DSMN-31 explains why the nights on Møn and Nyord are unique and what makes for correct outdoor lighting.

Requirement 5.

5.1. The certified enterprise has contacted neighboring properties within a radius of 500 m (500 yards) and has persuaded them to change to FCO.

5.2. Signs belonging to the certified enterprise must not be illuminated. Signs may be designed with reflective materials and/or in light colors.

Requirement 6.

6.1. All outdoor light fittings are changed to FCO.

6.2. Outdoor light sources have been replaced to the lowest possible lumen.

6.3. Areas in which work is performed shall fulfill DWEA requirements for the type of work performed. Lighting shall be controlled by a timer and/or motion sensor so that the lighting is only switched on when someone is working in the area.

6.4. Heavily used paths and walkways shall meet Street lighting class E2, 2.5 lux on average on a walkway. *Example: A walkway that is heavily used could be the path between the enterprise's main entrance and parking lot.*
Lightly used paths and walkways shall meet Street lighting class E4 and a "guiding star" system used on the walkway. The light source used in the "guiding star" system must have no more than 130 lumens and CCT at 2,100 K. *Example: Paths to individual chalets.*

6.5. Light fittings that are visible from 3.1. shall have light sources with CCT at ≤ 2,100 K.

6.6. Other light fittings shall have CCT ≤ 2,700 K.

6.7. The enterprise maintains a curfew. At least 80% (by lumens) of all outdoor light sources shall be switched off (by a timer) between 22.00 and 05.00. If the enterprise has display or panorama windows, the light sources in relevant indoor areas must also be included in the

curfew or otherwise shielded.

6.8. During the curfew Limited outdoor lighting (so that people can see their way, e.g. in doorways) may remain lit or controlled by a motion sensor. If they remain lit, the light sources shall not exceed 130 lumens and CCT at 2,100 K.

6.9. Outside the curfew, if possible, all outdoor light sources shall be controlled by a motion sensor.

6.10. Information material DSMN-31 is located at the enterprise and is available to guests/customers. DSMN-31 explains why the nights on Møn and Nyord are unique and what makes for correct outdoor lighting.

6.11. The certified enterprise shall be able to disseminate and present the night sky to guests/customers. As a minimum requirement, the enterprise shall be able to point out the constellations that are easiest to recognize and explain the mythology in an inspiring way. The enterprise shall also be able to point out and explain about the planets and the clearest deep-sky objects. The enterprise shall also be able to introduce guests to these objects, using a hand-held binoculars or telescope.
Fulfillment of the minimum requirements shall be documented by means of a course certificate.
NB: The course details are not yet finalized. The details will follow in an update of this document.

Requirement 7.

If the company is unable to meet all the minimum requirements, one or more of the following activities can be carried out and qualify the enterprise for four stars.

Requirement 7 shall be applied by agreement with the DSMN Møn working group.

7.1 The effects of non-FCO light fittings can be neutralized by switching to a light source that emits maximum 130 lumens and CCT at 2,100 K. Light sources at this intensity and CCT do not cause glare. Low-level blue in the light is not detrimental to the nocturnal environment. The requirement also includes additional specification of radiation above the horizontal plane. The sum of lumens from lamps that do not meet FCO requirements shall not exceed 900 lumens on the enterprise's grounds.
NB: 130 lumens is very low. In most cases, lighting at this level is only suitable for decorative purposes and way-finding.

7.2 Execution of total light energy refurbishment on the enterprise's premises. The enterprise shall draw customers' attention to this fact in connection with the Dark Sky Park information,

7.3 The certified enterprise shall be able to disseminate and present the night sky to guests/customers. At a minimum, the enterprise shall be able to point out the constellations

that are easiest to recognize and explain the mythology in an inspiring way. The enterprise shall also be able to point out and explain about the planets and the clearest deep-sky objects. The enterprise shall also be able to present these objects, using a hand-held binoculars or telescope.
Fulfillment of the minimum requirements shall be documented by means of a course certificate.
NB: The course details are not yet finalized. The details will follow in an update of this document.

Certificate issue
The certificate is issued by the DSMN Møn working group.

Validity of certificate

- The certificate is valid for a period of two years from the date of issue.
- Each year in August, the certified enterprise shall send data sheet DSMN-23 to email: XXX@XXX.dk.
- To renew certification, the certified enterprise shall send data sheet DSMN-23 via e-mail to XXX@XXX.dk at least one week before the expiry date.
- In connection with renewal, the certification class may be changed (up or down).
- A certificate may be changed within the two-year period of validity if the certified enterprise submits a new registration form with new details.

Forfeiture of certificate
A certificate is forfeited if:

- information submitted regarding outdoor lighting installations does not reflect the actual installations.
- The certified enterprise fails to submit a DSMN-23 with a request for renewal. An email to remind the certified enterprise of the lack of information will be sent only once. The email will be sent about one week after the expiry date. Certification will be forfeited one month after the expiry date.
- Certification may be awarded again. The enterprise shall submit a complete application as described in DSMN-22.

NB:
The sections "Certificate issue", "Validity of certificate" and "Forfeiture of certificate" include responsibilities and administrative routines that have yet to be established.

During the project, permanent solutions will be identified and the text changed to ensure that certificate administration procedures continue after Møn and Nyord have an IDA certificate and the project is brought to an end. Furthermore, it is important that the administrative burdens are not excessive for any of the parties involved.

Appendix D

Report from Dr. Andreas Hänel

Dr. Andreas Hänel visited Møn og Nyord for a few days in March/April 2016. Dr. Hänel was invited by the working group to talk about German efforts to reduce light pollution and set up International Dark Sky Parks and Reserves. During his visit, Dr. Hänel took the opportunity to observe the quality of the night skies over Møn and Nyord.

Unfortunately the weather did not coorperate with the visit and all nights was either cloudy or covered with thin cirrus clouds. This has two effects. First, the light domes above Copenhagen and Malmö becomes brighter and more visible. Second, the night sky brightness measurements becomes brighter than a typical clear April night.

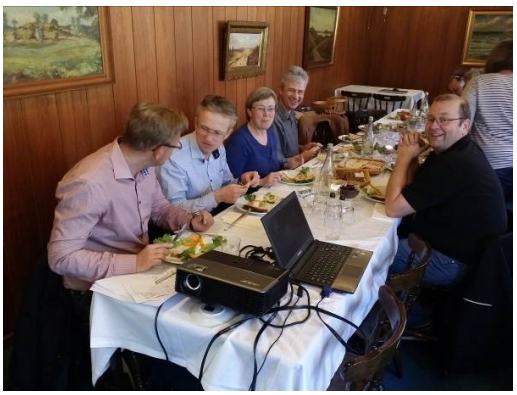
Dr. Hänel's report is reproduced below.

Dark Sky Park Møns Klint and Dark Sky Community Møn/Nyord

Were the 5000 years old megalithic remains already observatories for celestial objects?

Tom Axelsen from the Møn Dark Sky Group invited me to give a presentation to them in April 2016. On this occasion I also could visit the region during three nights and got an impression of what is going on in the region.

- The members of the Dark Sky Group are from different professions providers of accommodations, business men (e.g. an electric dealer), amateur astronomer, administration

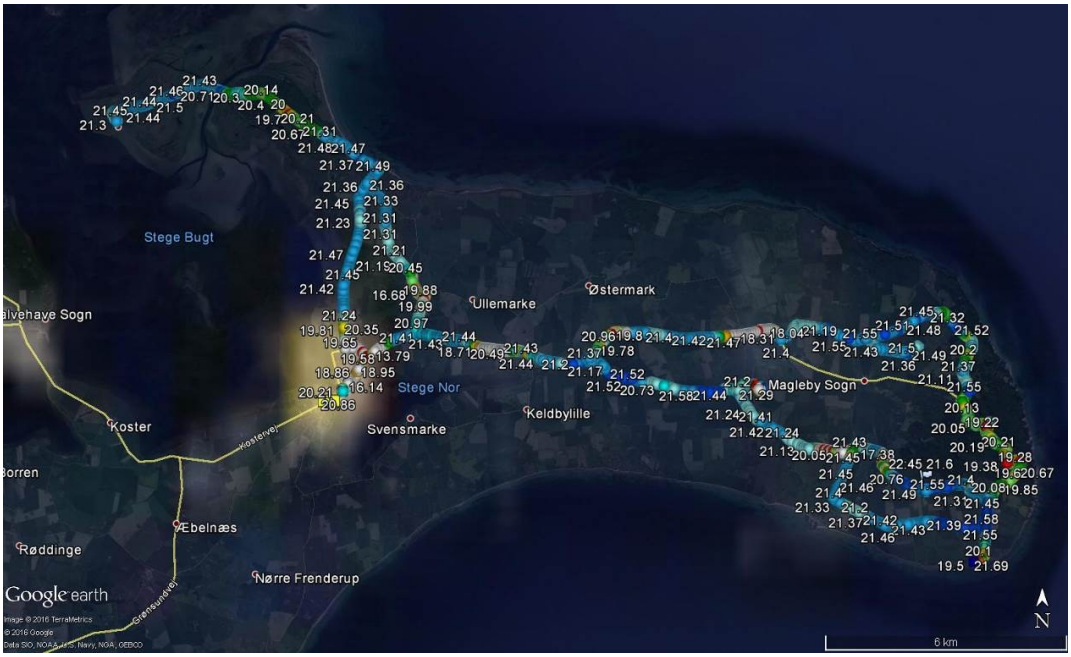


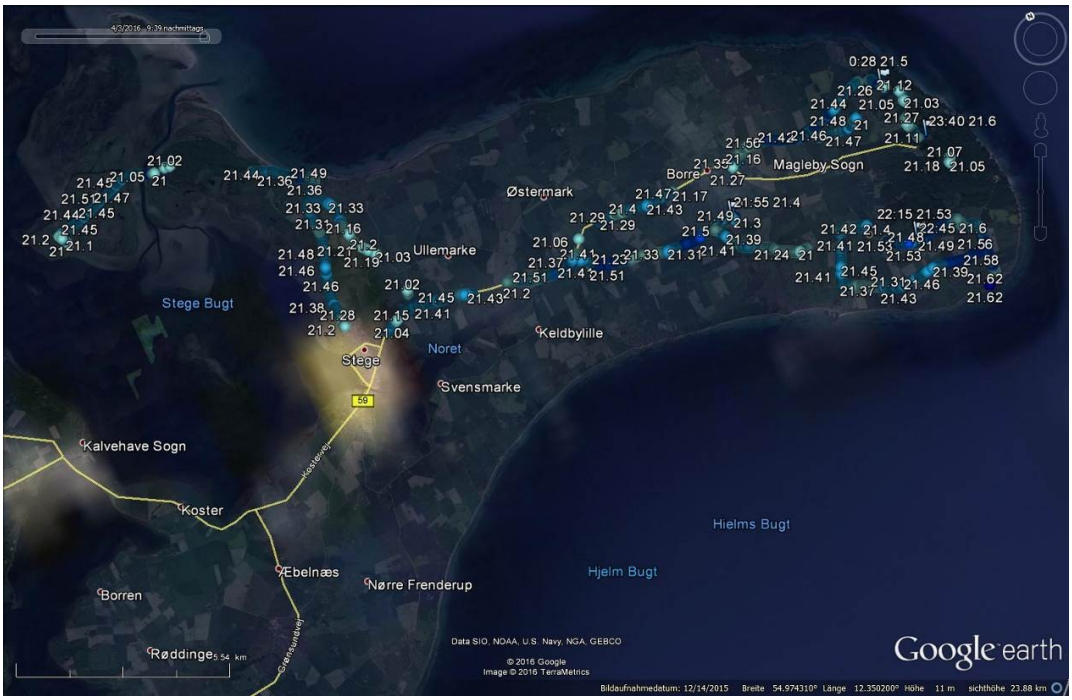
- They have already created a lot of advertising material: a Dark Sky journal, post cards, schnaps, coffee, ice cream etc.

- Touristic information material of the region contains information about the Dark Sky Park.
- Dark sky meals are offered on special occasions.
- A labelling system with stars was created for accommodations and business.

One interesting observation was that contrary to many other European countries most of the street lighting uses full cut-off luminaires (mainly from the Danish firm Louis Poulsen). In some villages every second luminaire is switched off late in the night, some are not illuminated at all.

The first night was cloudy with some cirrus clouds, the measurements in dark regions were at 21.6 mag/arcsec² (top left Hoefblege, middle Aborrebjerg), the second night was totally covered and the last night started clear with 21.5 mag/arcsec², then clouds came up, but later in the night the brightness was at about 21.7 mag/arcsec² (right Tiendegaarden), In all nights the humidity was high and towards the North the light dome of Kopenhavn(Malmö was well visible, the light domes of German villages over the Baltic Sea near the horizon, while the East was still very dark.





In all three nights measurements with the Roadrunner (SQM-LU #1049 and GPS) were taken over the northern part of the island. The original data are shown above. Bright parts (< 21 mag/arcsec²) have been eliminated, they were taken under trees or street lightings. Parts of the routes were identical during the 3 nights and no systematic differences larger than 0.2 mag/arcsec² could be detected, even between the cloud covered and the clear nights. The variation over the island was not large, towards the main village Stege, brightness increased by about 0.2 mag/arcsec².

Date	MEZ	Place	long	lat	alt	mag	mcd	remarks
2016-03-31	20:55	Tiendegaarden, Moen	12.44495	54.98315	0	21.40	0.30	diesig, Wolken
2016-03-31	21:49	Hoefblege, Moen	12.50934	54.96087	79	21.60	0.25	DSLR, Wolken
2016-03-31	22:42	Aborrebjerg, Moen	12.52975	54.98140	137	21.60	0.25	DSLR, Wolken
2016-03-31	23:28	Liselund, Moen	12.52176	54.99648	73	21.50	0.27	diesig
2016-04-01	0:50	Tiendegaarden, Moen	12.44545	54.98323	0	21.60	0.25	Wolken
2016-04-02	21:15	Hoefblege, Moen	12.50938	54.96085	82	21.50	0.27	Wolken
2016-04-02	22:15	Tiendegaarden, Moen	12.44621	54.98295	-5	21.70	0.23	DSLR klar

The individual zenith measurements were taken with the SQM-LU #2536.

Based on these observations I can confirm an exceptionally quality of the sky over the islands of Møn and Nyord. The local Dark Sky group is very engaged and therefore continuous support of the combination of Dark Sky Park and Dark Sky Community is promising. The traditional cut-off street lighting (though there are some exemples of non full cut-off luminaires) and the use of warm white lamps will help to keep the sky dark on the islands dark if in future similar lighting system will be used.

Therefore I strongly support the application of the islands as a combination of Dark Sky Park in the East and Dark Sky community of the whole islands.

Dr. Andreas Hänel,
Section leader of the working group Dark Sky Germany,
Astronomer and director of the planetarium in the Museum am Schölerberg, Osnabrück
Member of the International Dark Sky Association IDA, Member of the International Planetarium Society IPS,
Member of the Astronomische Gesellschaft, Member of the International Astronomical Union IAU