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Dark skies use in tourism

Good practices examples



Publication series: Karelia University of Applied Sciences Publications C: Reports, 95

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ISBN 978-952-275-367-0

ISSN 2323-6914

Karelia University of Applied Sciences 2022



EUROPEAN UNION

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NPA project "GLOW" (Sustainable Green Energy Technology Solutions for Tourism Growth) is funded by the Northern Periphery and Arctic Programme of the European Union.

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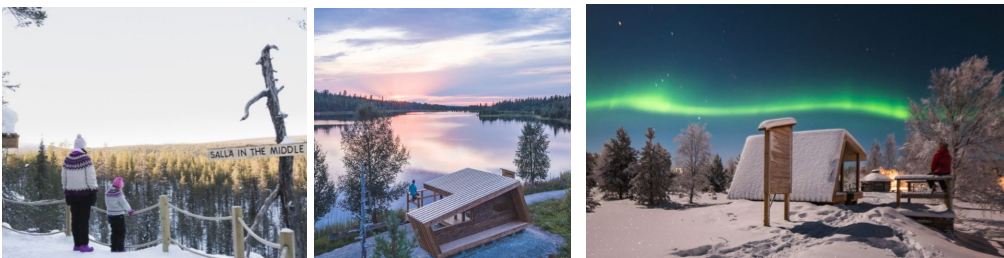
1 The state of dark skies tourism and infrastructure in Finland

Dark skies as part of tourism marketing offer is still in its infancy in Finland when comparing for example to other countries across the globe where themed routes, festivals, accommodation and service packages are used as added value to tourism offer and/or lengthening the visitor stays or the tourism season (See chapter on best practices and innovations). Most listed observatories in Finland are mainly in the central and south Finland.

1.1 Observation points (North Finland)

In the Northern part, within the Northern Periphery and Arctic geographical area of Finland, there exists:

- **Kaunisharju observation point:** located next to the road in Kaunisharju about 4 km from the center of Sallatunturi to the direction of Kuusamo. From the page description, in the daylight landscapes open towards Kaunisharju and in the dark one can admire the starry sky, the moonlight or if lucky, the Northern Lights.
- **Lake Keselmäjärvi observation point:** This observation point offers accessibility for persons with reduced mobility.
- **Observation place by the swamp:** located on the edge of a beautiful marshland and close to the Sallatunturin cottages behind Arctic Safaris of Sallatunturi. In this beautiful forest-lined landscape, easy walk via long trees gives chance to admire the breezes of the sky, the twinkling of the stars or the atmosphere of the surrounding nature. Next to the observation place is also a cozy lean-to for open fire.

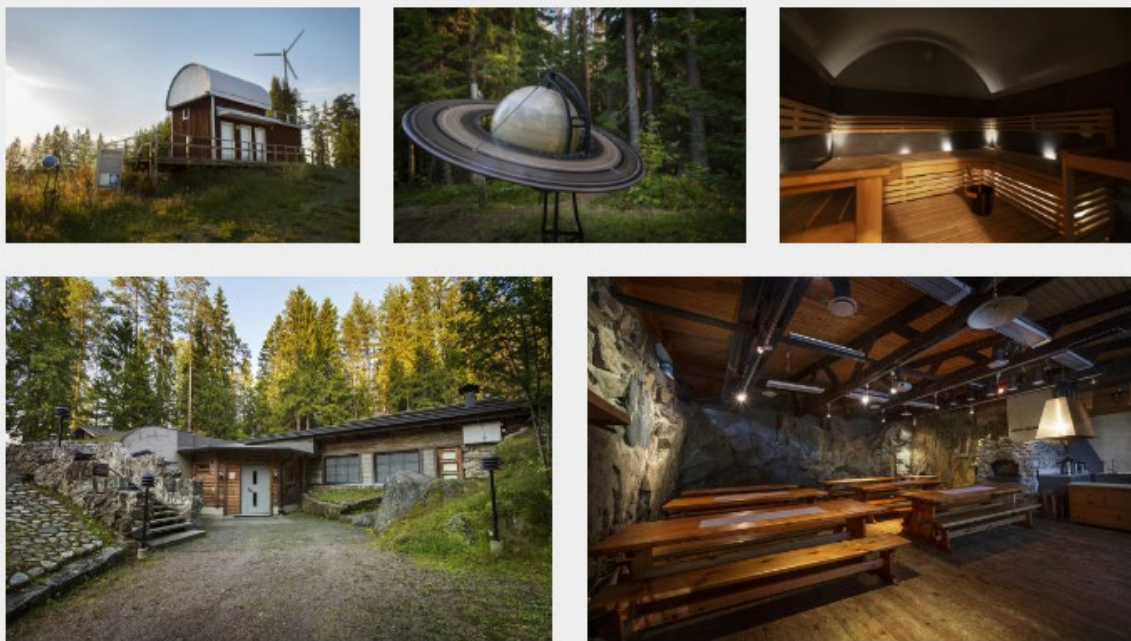


Photos: Visit Salla.¹

¹ Visitsalla 2022.

1.2. Jakokoski's Tähtikallio and Observatory (North Karelia)

The observatory was built between 1997 - 1998 by joint collaboration of University of Joensuu, municipality of Kotiolahti, village of Jakokoski, and amateur Astronomers Association Seulaset. The telescope belongs to the University, and the camera belongs to Seulaset. Astronomers may use the Observatory for their hobby provided that star shows and lectures are provided to local schools and the public.² A Planetary Path to the Observatory starts from the Tähtikallio courtyard, where star performances are held during the dark season. The planetary path was introduced in August 27, 2011 and the scale models of the planets were renewed in 2018.³ Tähtikallio offers a conference and festive hall built during the Second World War, the ammunition depot of the Salpalinja artillery station excavated into the rock. Tähtikallio is open by appointment and serves as a conference and festive hall.⁴



Photos: Playkontiolahti.⁵

² Wikiuef 2013., Jakokoski 2022.

³ Seulaset 2022.

⁴ Playkontiolahti 2022.

⁵ Playkontiolahti 2022.

1.3. Sodankylä Geophysical Observatory (North Finland)

The Sodankylä Geophysical Observatory is located at 67° 22' N, 26° 38' E, which is 130 km north of Rovaniemi and 7 km south of Sodankylä, in the middle of Finnish Lapland by the beautiful banks of the river Kitinen. It was established in 1913 by Finnish Academy of Science tasked to perform geophysical measurements and research based on the observation results. Starting 1st August 1997, the observatory became an independent research department of the University of Oulu. The station organizes Observatory Days to discuss science and future strategies and actions related to space research.⁶



Photo: Sodankylä Geophysical Observatory.⁷

1.4. Arctic Academy (East Finland, North Karelia)

The Arctic Academy is a programme service company that offers knowledge updates and essential tips about Northern Lights.⁸

1.5. Aurora Spotting and Stargazing (North Finland)

The site offers good-to-know practical guidelines for spotting aurora borealis. Stargazing too, is stated as one of the most accessible natural experiences. National Parks and other protected areas have very little light pollution and therefore are ideal places for

⁶ SGO 2022.

⁷ SGO 2022b.

⁸ Arctic Academy 2022.

both aurora spotting and stargazing. Night sky activities can be easily combined with other activities, such as cross-country skiing, snowshoeing, or hiking (apart from hiking in summer months when there is plenty of daylight).



Photos: NationalParks.⁹

1.6. Samiland Oy (North Finland)

The observatory is part of the UNESCO Observatory's Cultural Village Program. The vision of the UNESCO Observatory is to increase the share of art subjects in the curricula of cultural villages. According to the pages, the Samiland exhibition tells about the thousands of years of history, culture and mythology of the Sámi people. In the indoor exhibition, visitors learn what the difference is between the Skolt Sámi and the fell Sámi, what the traditional Sámi livelihoods and ancient mythical characters. The outdoor exhibition introduces one to Sámi buildings and reindeer husbandry. The exhibition for example indulges one in among other, Sámi mythology (since December 2013), myths, samiland winter.



Photo: Samiland Oy.

⁹ National Parks 2022.

Even though the Northern lights, star gazing are not part of the guided tours, this offers an example of how culture and mythology could be developed by further linking activities, or creating added value to experiences through linking of the dark skies concept.¹⁰

1.7. Syrjävaara is a dark sky park and dark nature reserve¹¹

Syrjävaara is a dark sky park and dark nature reserve on the border of North Savo and North Karelia managed by Syrjävaara Good Night Oy. The farm is over 300 years old and Finland's first star park and dark nature reserve. In the park you can experience the night nature, the starry sky and the northern lights, in all its forms from the full moon to the darkest darkness of autumn. The premises consist of Dark Sky Centre, a Star Park, accommodation and activities e.g., star gazing and night photography. This is an exemplary example of not only adding value to regions, but also reimagining spaces by giving them new uses based on area's strengths (preserving dark skies areas) while preserving old buildings (giving old buildings new uses over breaking them down).



Photos. Syrjävaara.

¹⁰ Samiland 2022. Website.

¹¹ Syrjävaara 2022.

2 Main challenges facing the sector¹²

Dark skies and low light pollution have not been utilized in tourism development. It is underutilised or unused as added value to tourism provisions in many Northern Periphery and Arctic areas, even though Nordic areas within the Northern Periphery and Arctic geographical areas have vast areas with potential i.e. areas with little or no light pollution. This use is still in infancy compared to other areas across the globe, even though these NPA areas consist sites with least light pollution.

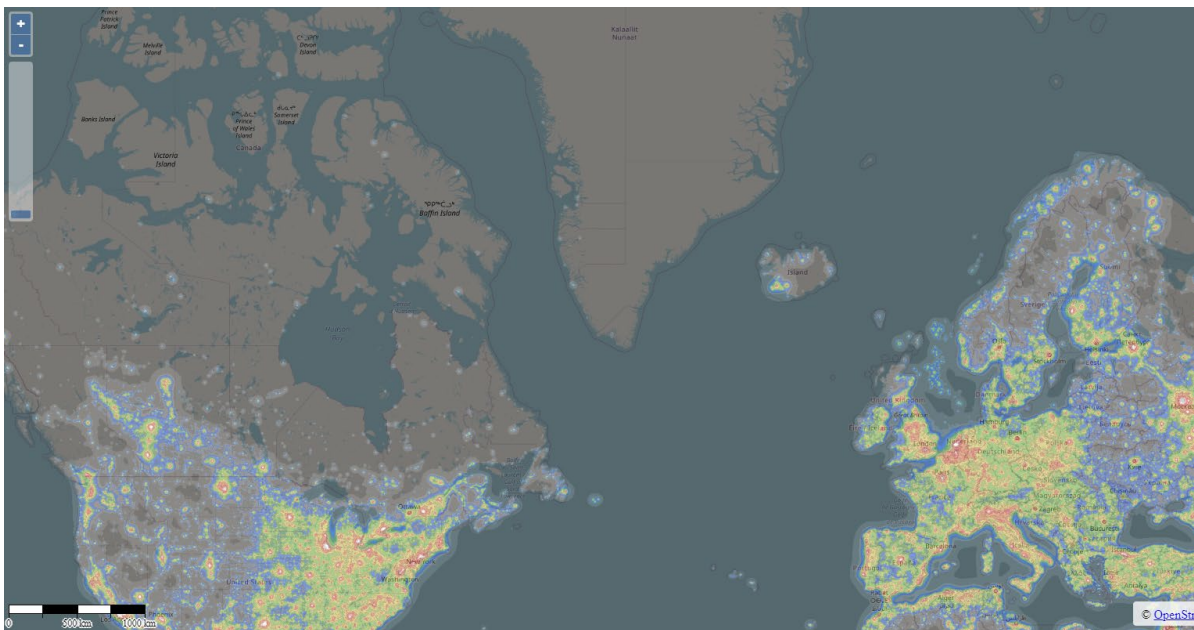


Figure 1. Light pollution map and the NPA.¹³

Uncertainty of/ unused potential

Lack of information on ways to develop dark sky as added value to tourism, and difficulty in seeing something normal in one's environment as a value or added value for tourism are some reasons for not taking advantage and utilising of the dark skies as resources and regional strengths. Linking regional heritage and nature within the dark sky concept is still not easy as information about how this could be developed is lacking.

¹² Summary from discussions with regional stakeholders (stakeholder workshop 13.5.2022., 12.4.2022 discussion with regional stakeholder from Lapland., 21.4.2022 discussion with regional tourism association from North Karelia., 20.4.2022 discussion with tourism expert organization from Scotland.

¹³ Cleardarksky 2022.

During discussions with regional stakeholders, Kalevala themed dark sky concept was mentioned as an example and one tourism entrepreneur stated that he would be very interested in dark sky tourism development. During discussions with Lapland stakeholders, the appreciation of Sami heritage was also mentioned, while dark skies development was considered needed. A regional tourism destination management organization representative also stated that it will be a good idea to learn about ways dark skies and darkness of nature can be made an opportunity.

As an example, Finland has 41 National Parks. North Karelia alone consist 3 National Parks, 1 Nature Reserve and 1 Hiking Area, with one of the National Parks (Koli National Park) as most famous in Finland. North Karelia also has regional expertise for example in photonics, and in tourism and wellness development. Still, according to map of current International Dark Skies Places showed during the workshop, it was clear that across the Northern Periphery and Arctic Area (NPA), only Ireland had Parks presenting the Dark skies.

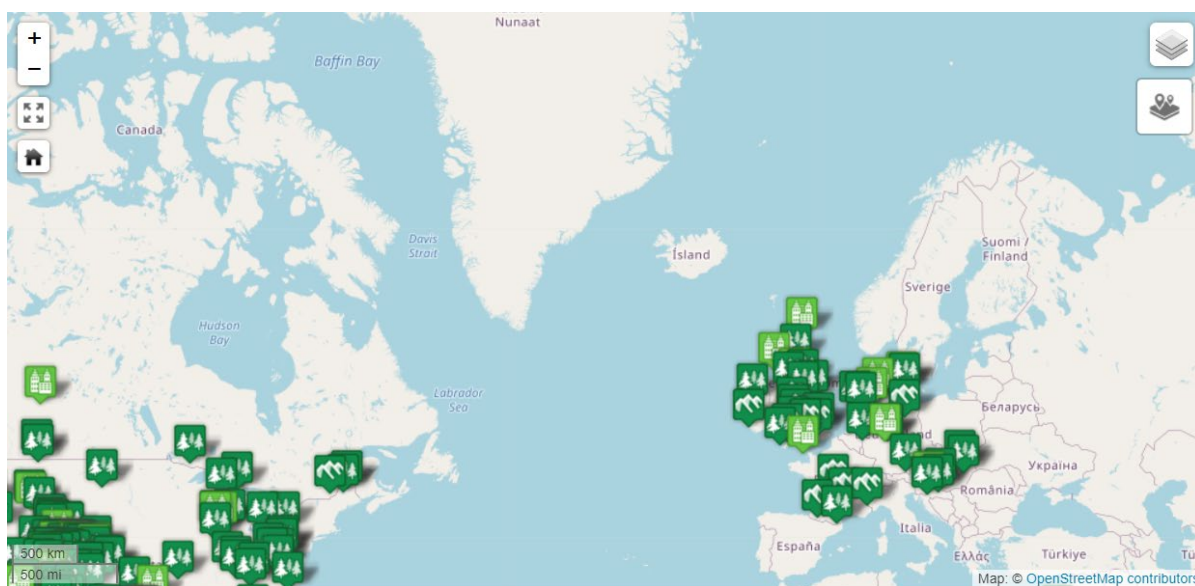


Figure 2. State of international Dark Sky Parks designated and the NPA area.¹⁴

Climate Change and weather changes

There is need for developing representation of the dark skies but also educating about the climate change and light pollution. For example, some visitors get disappointed

¹⁴ International Dark Sky Association 2022.

when they cannot see the starry nights and other representation which might have taken place a day before their arrival for example. Basic sensory experiences (smell, hear more, etc) could be other aspects to consider in dark skies development. Heat sensitive cameras are for example used in some destinations to watch wildlife, what's going on with close to no impact on lives of the nocturnal wildlife. Immersive technologies could be used as a plan B in guaranteeing experiences in instances whereby weather impacts experiences.

Innovativeness about ways to develop dark sky concept missing

Dark skies is not just about darkness, it is also about different types of light, pastel colours for example. There is huge potential for using dark skies in tourism when one is innovative. For example, would be good to use already existing infrastructure used in summer, to extend the winter period and utilize it for dark skies tourism too. Incorporation of virtual technologies, mobile applications can also be added values to experiences. Immersive technologies were considered one way to present and/or link dark skies to regions services and heritage. Ideas of how Dark skies could be developed in the region, how it could be linked to regional services, regional events such as festivals were presented. New potential products/ services also came up.

3 Dark skies tourism – best practice examples

Finland has 41 National Parks. North Karelia alone consist 3 National Parks, 1 Nature Reserve and 1 Hiking Area, with one of the National Parks (Koli National Park) as most famous in Finland. North Karelia and Finland in general also possesses a rich cultural heritage that can be basis for linking of the dark skies (e.g. Finnish national epic Kalevala, Sámi heritage, etc). North Karelia also has regional expertise for example in photonics, and in tourism and wellness development, in addition to existing infrastructures (e.g. visitor centres in national parks, observatory, old village schools) that could be used in developing this concept further. In this chapter we present best practice examples from across the globe, in an attempt to try to develop detail understanding of current dark-sky tourism practices, their collaborations, attitudes towards approaches, and identification of barriers and opportunities for NPA regions.

3.1 Dark Sky Parks and Reserves

Dark Sky Parks and Reserves are one way of promoting dark skies and the appreciation of it. International Dark Sky Association is one of other organizations challenging and encouraging actors to combat light pollution.¹⁵

Mayo Dark Sky Park (Ireland)

Mayo Dark Sky Park consisting both Ballycroy National Park and the adjacent Wild Nephin Wilderness, comprises about 150km² of protected lands in the Owenduff/ Nephin Mountains area of the Barony of Erris in northwest County Mayo, Republic of Ireland.¹⁶The Park protects one of the largest expanses of peatland in Europe and supports a diversity of species in a unique habitat and is especially important in this regard as it is stated as one of the largest remaining examples of a blanket bog habitat remaining in Western Europe.¹⁷ Mayo is Ireland's first International Dark Sky Park, and on a clear night, one can see over 4,500 twinkling stars, along with other planets in our solar system, The Milky Way and even meteor showers all with the naked eye.

¹⁵ International Dark Sky Association 2022.

¹⁶ Mayo Dark Sky Park 2022a.

¹⁷ International Dark Sky Association 2022c.



Photos: Mayo.¹⁸

Mayo Dark Sky Park is a great example of a collaborative project in communities, as it involved National Parks & Wildlife Service, Coillte, GMT Mayo Campus, South West Mayo Development and Mayo County Council.¹⁹ Local people and state agencies who worked together on the dark sky project; an application process that took over two years to complete from when initial research undertaken in 2013. Today, formal responsibility for Mayo Dark Sky Park is shared between the management of National Parks & Wildlife Service and Coillte with both parties committed to a responsible lighting plan for the Dark Sky Park.²⁰ Experienced team of guides from Ballycroy National Park welcome visitors to the Dark Sky Park, offering pre-booked guided tour for your groups, and run the Dark Sky Educational Programme all-year round. The offering include for example:

- National Parks & Wildlife Service's Education Programme (free of charge for schools);
- group tours to all interested groups with special programmes available and ability to tailor visits to suit requirements (e.g., involve talks, walks and indoor and outdoor activities);
- culture and heritage outreach events focusing on night sky and nocturnal heritage e.g., light pollution impacts to fire the imagination of future generations, and designed to highlight the cultural value of Mayo's night sky heritage;
- astrophotography; giving interpretation of the night sky showing how it interacts with the landscapes, seascapes, buildings, sculptures and people as a link to the past and region's heritage;
- offer fun facts and activities about dark skies.

¹⁸ Mayo 2022.

¹⁹ Mayo Dark Sky Park 2022b.

²⁰ Mayo Dark Sky Park 2022b.



Photos: Mayo Dark Sky Park. The park has also created own light pollution map and offers guidelines on reducing the impact of light pollution e.g., during winter parties and when lighting spaces.²¹

²¹ LUC Maps 2022., Mayo Dark Sky Park 2022c.

Jasper's Dark Sky Reserve



Photos: Jasper Dark Sky Reserve.

Extending 11,228 square kilometers (4,335 square miles), Jasper National Park is Canada's largest park in Canadian Rockies and part of UNESCO's Canadian Rocky Mountain Parks World Heritage Site.²² The park is also the second largest Dark Sky Preserve in the world²³. With little light pollution and optimal conditions for dark sky viewing, Jasper was designated as a Dark Sky Preserve by the Royal Astronomical Society of Canada.²⁴ Activities include snowshoeing, fat biking, cross-country skiing, down-hill skiing, pond skating, canyon ice walks, ice-skating and wildlife watching.²⁵ Jasper's Dark Sky is stated to invite astronomers at every level to gaze upon the wonder of one of the world's largest dark sky preserves. The park consists shimmering glaciers, abundant wildlife, crystal-clear lakes, thundering waterfalls, deep canyons and evergreen forest — all surrounded by towering mountains.²⁶

Jasper Dark Sky Festival to connect regional tourism offers and dark sky

October is set as an ideal time for celebrating the skies with the annual Jasper Dark Sky Festival, an ever-growing festival aimed at connecting people of all ages. The festival connects with the regional services and links the nature and culture targets of the area. The date for next Dark Sky festival is scheduled for Oct 14-23rd 2022.²⁷

²² Parks Canada 2022.

²³ Jasper Dark Sky 2022.

²⁴ Jasper Canada 2022a.

²⁵ Jasper Canada 2022b.

²⁶ Jasper Canada 2022c.

²⁷ Jasper Dark Sky 2022a., Jasper Dark Sky 2022b.

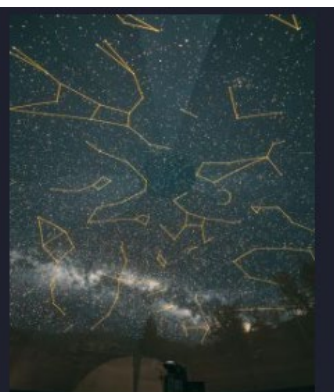
Jasper Planetarium extending tourism season

With a 40-seat domed theatre located on the lakeside grounds of the Fairmont Jasper Park Lodge and the largest, most powerful telescopes in the Rockies, the Jasper Planetarium is considered the local source for guided tours of the universe. There knowledgeable staff tell local legends about constellations, show recent views of the northern lights as seen from iconic Jasper locations, and answer questions. The Jasper Planetarium offers fun, funny, inspiring and interactive experiences most nights, year-round, but becomes even more interesting during the Jasper Dark Sky Festival.²⁸

EXPERIENCE STARRY SKIES RAIN OR SHINE WITH JASPER PLANETARIUM

OCTOBER 14, 2020

With a 40-seat domed theatre located on the lakeside grounds of the Fairmont Jasper Park Lodge and the largest, most powerful telescopes in the Rockies, the Jasper Planetarium is the local source for guided tours of the universe.



Stories of the dark skies—using local storytellers

MY LIFE UNDER THE STARS: NIKI WILSON ON JASPER'S DARK SKY PRESERVE

AUGUST 28, 2019

As host of the Jasper Dark Sky Festival, science journalist Niki Wilson has extensive knowledge about the protected skies above Jasper National Park. But she also grew up in Jasper, giving her an intimate familiarity with the local celestial wonders. Here, she writes about what those stars mean to her.



²⁸ Jasper Dark Sky 2022d.

Linking dark skies to regional events and services

SYMPHONY UNDER THE STARS PROVES THAT MUSIC IS BETTER OUTSIDE

OCTOBER 9, 2018

Join the Edmonton Symphony Orchestra Strings and conductor Bob Bernhardt for an unforgettable concert at the Fairmont Jasper Park Lodge.



NEW MUSEUM EXHIBITION TO SHOWCASE ARTWORK INSPIRED BY DARK SKIES

SEPTEMBER 14, 2018

The stars have long inspired the human race. From early navigators who told stories anchored by constellations to modern artists like Destanne Norris who commit stunning nebulas to canvas, the cosmos is an boundless muse.



FEED MIND AND BELLY AT NEW DARK SKY FESTIVAL EVENT: FOOD LAB

OCTOBER 3, 2018

Gourmet meals meet fascinating science demos at Food Lab, a delicious new event presented by Jasper Food Tours and Olive Bistro.





The park also has an official dark sky beer. Jasper's National Park Brewery has six signature beers brewed on-site. They state that the final ingredient is the pure, natural mountain water sourced from the great Canadian Rockies, which unlike most commercial breweries, they do nothing to their water but remove the chlorine added to it. In addition, desserts depicting dark skies are also offered during the festival.²⁹

Community involvement and awareness about light pollution

The Municipality of Jasper also support and enhances Jasper's Dark Sky Preserve designation. In addition to public education and community outreach, the Municipality is stated as working towards compliant lighting on all municipal buildings and working with partners and stakeholders to develop a conversion plan to dark sky friendly streetlights. Efficient outdoor lighting guidebook is one example.³⁰

²⁹ Jasper Dark Sky 2022e.

³⁰ Municipality of Jasper 2022.

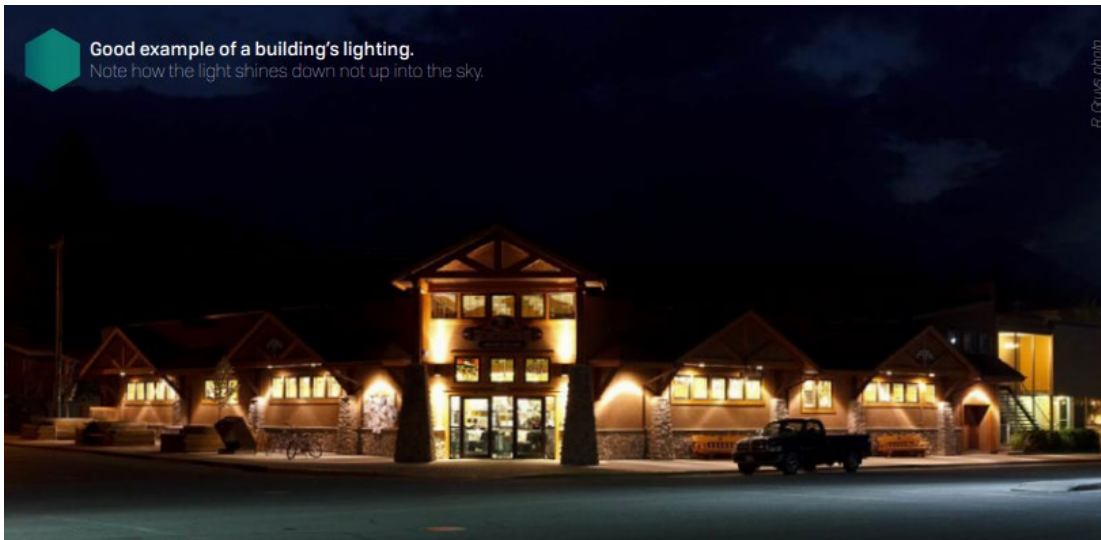


Photo about good lighting example: Jasper-alberta.³¹

Aoraki Mackenzie International Dark Sky Reserve

In 2012, 4300sq km area was declared as the Aoraki Mackenzie International Dark Sky Reserve and is the southern hemisphere's largest dark sky reserve and one of only eight in the world. Keen stargazers will see amazing constellations that can only be seen in the southern hemisphere, including the Southern Cross, to the Magellanic Clouds and the Milky Way.³²

The Aoraki Mackenzie International Dark Sky Reserve consists of Aoraki/Mt. Cook National Park and the Mackenzie Basin of New Zealand's South Island³³. Outdoor lighting controls are stated to have been first introduced in the area during the early 1980s. These have not only helped minimize light pollution for the nearby Mt. John Observatory, but also conserve energy, protect wildlife and make the area a popular stargazing destination for tourists.³⁴

The natural night has played a critical role in the area's history since its first residents, the Māori, not only used the night sky to navigate to the island but also integrated astronomy and star lore into their culture and daily lives. A history the reserve seeks to

³¹ Municipality of Jasper 2022.

³² The Mackenzie 2022a.

³³ Aoraki Mackenzie International Dark Sky Reserve 2022.

³⁴ International Dark Sky Association 2022a.

honor by keeping the night sky a protected and integral part of the area's natural and cultural landscape.³⁵

Sir Edmund Hillary Alpine Centre- cultural heritage³⁶

The Sir Edmund Hillary Alpine Centre's 126-seat custom-designed theatre is stated as the world's only theatre with 2D, 3D and a Digital Dome Planetarium, contained within the same space, with cutting edge technology allowing the 2D screen to raise up for storage while the 3D screen is in use and the Digital Dome Planetarium to lower into place when required. The centre is a tribute to Sir Edmund Hillary, a humanitarian, ambassador and one of the world's greatest explorers, with the centre showcasing the Aoraki/Mount Cook region, its people and its place in the universe. In the foyer of the theatre is also a museum showcasing the history of the Mount Cook region.

3.2. Observatories

Aurora Basecamp; Iceland's only Northern Lights Observatory³⁷

The Aurora basecamp is located just 20 minutes from Reykjavik. The concept of the park is: Observatory – Aurora lounge – Dark park. At the observatory, one can get unprecedented look at what causes the northern lights and their spectacular displays, and have a unique experience watching the Aurora Borealis in the company of their expert guides. The experience is real-time, indoor simulation of the Northern Lights, in a warm and relaxing environment.



Photo: Aurorabasecamp³⁸

³⁵ International Dark Sky Association 2022b.

³⁶ The Mackenzie 2022b.

³⁷ Aurorabasecamp 2022a.

³⁸ Aurorabasecamp 2022b

At the lounge one can relax and enjoy a cup of hot chocolate or tea before heading out into the surrounding lava fields to observe the Northern Lights. One can also get the chance to chat with Aurora Basecamp guides.

Inside the dark park are 6 large glass tubes, replicating the conditions to match the blend of the gases and air pressure where the Northern Lights are formed in the upper atmosphere. The gases are then charged with electrical energy, creating the actual Northern Lights just as they appear in the skies above. It's stated as a scientifically accurate and beautiful display that mirrors what's going on in the night skies.

The Aurora Basecamp domes can accommodate up to 120 persons and targets weddings, birthday parties, reunions, graduation and staff parties, seminars/ workshops, confirmation parties as well as just regular parties for group of friends, etc. It is short distance from the blue lagoon attraction.

3.3. Events and festivals

Canoeing and dark sky watching – Nebraska star party³⁹

Nebraska Star Party is one of the nation's premier stargazing events held under the dark skies of Nebraska's beautiful Sandhills.⁴⁰ The astronomical views consist views of Merritt Reservoir's Snake Campground, and plenty of recreational opportunities to keep the visitors (target group; families) entertained all week long at the annual Nebraska Star Party.⁴¹ For newcomers, NSP is stated as the perfect place to get acquainted with the wonders of the heavens which can't be seen from cities. The organizers offer unique Beginner's Field School exploring the skies of Nebraska. The 29th Annual Nebraska Star Party will be in July 24th – 29th, 2022.

³⁹ Nebraska Star Party 2022a.

⁴⁰ Nebraska Star Party 2022e.

⁴¹ Nebraska Star Party 2022b.



Photos: Left (Nebraska preparations before event), and right (after dark, dark skies experiences).⁴²

Apart from the starry central attraction, the remote sandhills of north-central Nebraska are also marketed to the visitors. Examples are:

- vacation full of western and natural history;
- short day trips to historical sites important to the settlement of the west;
- the spring-fed water and sugar sand beaches of Merritt Reservoir swimming, boating, and fishing experience;
- a window into the ecology of the prairie by visiting Valentine national Wildlife Refuge;
- Niobrara river cooling tube float or canoe trip through the surrounding cattle and buffalo ranching country.

Equipment e.g. boat rentals, telescope rentals, accommodation options and meal services are offered, while nearby historical museums and other attractions e.g., museums, indoor activity areas are also marketed to the visitors.⁴³

3.4. Cruising and luxury experiences

Viking Jupiter star gazing- Explorer Dome planetarium luxury experience⁴⁴

Founded by Norwegian Torstein Hagen, Viking is stated to have started off in river cruising, before branching out into the ocean in year 2015. The atmosphere on board 930

⁴² Nebraska Star Party 2022c.

⁴³ Nebraska Star Party 2022d.

⁴⁴ Vikingcruises 2022.

passenger Viking Jupiter, the sixth and newest in the company's sleek fleet of ocean-going vessels, is stated as calm, inviting and akin to that of a gallery or a private club. The ship uniquely features an Explorers' Dome, a high-tech planetarium, which can transport guests to distant lands and galaxies, offering e.g., a 15-day cruise from Barcelona to Copenhagen. three days at sea, including one navigating the Kiel Canal, which links the North and Baltic Seas via the pretty countryside of northern Germany.



Photos: The planetarium as added value to cruise experience. (Viking cruises).⁴⁵

The planetarium seats up to 26 people with Explorers' Lounge opposite it showcasing antique globes, displays of star constellations and a golden telescope. During the cruise, three panoramic films are beamed on the dome's ceiling screen. Films shown feature for example Experience the Aurora; one of the team of photographers to the Arctic Circle as they attempt to track down the Northern Lights in temperatures that drop to minus 50, and Explore and Hidden Universe; 3D shows mesmerizing visuals and tales of space exploration, faraway stars and planets, and the potential for humans to settle on Mars. A resident astronomer additionally talks about the night sky on various topics from black holes to stars such as Arcturus.

The ship additionally features mainly Scandinavian art and artefacts enjoyed by visitors, which can be combined with listening to a narrated tour via the Viking Art Guide app. Examples are:

- paintings by Edvard Munch;
- outfits once worn by Viking men and women;
- reproductions on stairwell walls of the Bayeux Tapestry which charts the AD1066 invasion of England by the Vikings' Norman descendants;
- live performances of classical violin music;
- Scandinavian history lectures and port talks;

⁴⁵ Traveller 2022.

- cosy lounges with huge collection of coffee table books about subjects from architecture, polar exploration, to fashion and astronomy.

A 15-day cruise from Barcelona to Bergen (Norway) on Viking Jupiter is priced from \$7295 a person, based on double occupancy (2020 price) and included 24-hour room service, wine with meals and use of the ship's spa.⁴⁶

3.5. Destination level experiences

Star village of Cornedo – Europe's first star village in the Val d'Ega

This destination – Europe's first star village in the Val d'Ega- was created in the year 2012. It is located in the municipality of Cornedo in South Tyrol, Italy. The destination has a planetarium, an observatory, a solar observatory and a planetary trail which together with other regional services, offer the dark-sky experience.



The village also offers specialist accommodation with rooms containing telescopes, constellations, windows to the stars over the beds and even a space shuttle.⁴⁷ This star-studded all-round offer in the star village is complemented by a number of special events, proving that dark skies can be a year-round service offering.

Photos: Range of offering depicting the dark sky. This is also made as a year-round service.⁴⁸

⁴⁶ Ibid.

⁴⁷ Stenendorf Astrovillaggio 2022a.

⁴⁸ Stenendorf Astrovillaggio 2022b.

Example of offers include:

Star treks in summer: Each Friday during the summer months of July and August the star village offers an astronomically special day starting at 10:00 in the South Tyrol Planetarium with a screening in two languages, followed by a walk in the company of an astronomer on the planet path at San Valentino di Sopra (approx. 1½ hours) followed by a lunch break, and later view of the sun at 15:00 through the telescope of the solar observatory.

Full moon events: A relaxed mood under the stars with gastronomic delicacies that reflect star-studded creations and visually bring the universe onto the plate: rice pudding in the style of the Milky Way, dumplings that depict a lunar eclipse, Pluto mozzarella and numerous other heavenly dishes. At full moon the Val d'Ega becomes a celestial stage for events, with sufficient culinary conviviality to make anyone starry-eyed.

Winery PITZNER – Farm tour followed by a tasting: Every Thursday between months of February and March, there is a guided tour offer of the farm followed by a wine tasting which takes approx. 2 hours and organized for min. of 4 persons at 25 € /person and only by reservation. This offer also includes advice on favoring public transportation and short walk and gives directions when using bus.⁴⁹

The planetary trail: starts from the Max Valier astronomical observatory and themed around space: the solar system is laid out for walkers at a scale of 1:1,000,000,000, offering an interplanetary trip through the natural surroundings of the star villages – a total of ten kilometers and 2½ hours, all the way from Mercury to Pluto.⁵⁰ Using Smartphone and the free app izi.TRAVEL one can access own pocket astronomer, with every planet station giving fascinating facts about each celestial body.⁵¹

⁴⁹ Stenendorf Astrovillaggio 2022c.

⁵⁰ Stenendorf Astrovillaggio 2022d.

⁵¹ Ibid.



Photos: Example offers at Star village of Cornedo ⁵²

Other offers include presentations at the Planetarium Südtirol/Alto Adige with changing themes⁵³, astronomical hiking week by night with astrophotography teaching how to take night photos⁵⁴, bread baking and tasting at a local inn, and week hike events.⁵⁵ There's also a **star village sticker album** – challenges guests to picking these from accommodation places, and use those to make exciting journey through our solar system and the structures in the Star Village. It has the list of attraction sites and services, and every time visitors visits a restaurant, a guesthouse or one of our structures in the Star Village, such as the Planetarium, Observatory, Museum and many more, they receive another pack of stickers which they can use to make a memory album of the places of visit in the destination. Activities such as themed trails (0,7-10km), mountain biking, winter skiing, winter hiking and Christmas markets are also offered. The trails include astronomical open-air exhibitions, hikes through forests, meadows and gorges with a view of the mighty earth pyramids and remnants from the ice age, as well as trails through family friendly treehouse rocket play park.

⁵² Stenendorf Astrovillaggio 2022e.

⁵³ Stenendorf Astrovillaggio 2022f.

⁵⁴ Stenendorf Astrovillaggio 2022g.

⁵⁵ Stenendorf Astrovillaggio 2022b.

Sicily- Italy

The Sicilian night sky offers darkness and warm evenings that are great for stargazing without a telescope. With the ever-changing sky - planets, comets shower timings and the moon constantly moving on its skies.⁵⁶ Several locations are certified in Italy.⁵⁷



Detail of a starry sky within the walls of an ancient castle

Photo: Starry sky within walls of an ancient castle.⁵⁸

⁵⁶ Nicastro Gianluca 2022.

⁵⁷ Astrotourism 2022.

⁵⁸ Ibid.

4 Light pollution initiatives

In this chapter, we present examples of the light pollution initiatives across the globe with the aim of understanding their scales, collaborations, attitudes towards approaches, etc in an attempt to identify opportunities for developing initiatives and collaborations in NPA countries and/ or across the NPA regions.

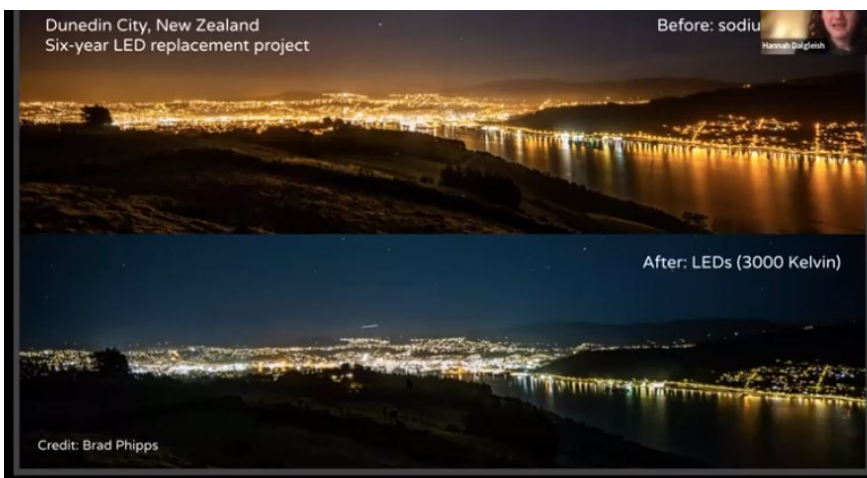


Figure 3. Light pollution example (from Wester Ross Biosphere Webinar on Dark Skies).⁵⁹

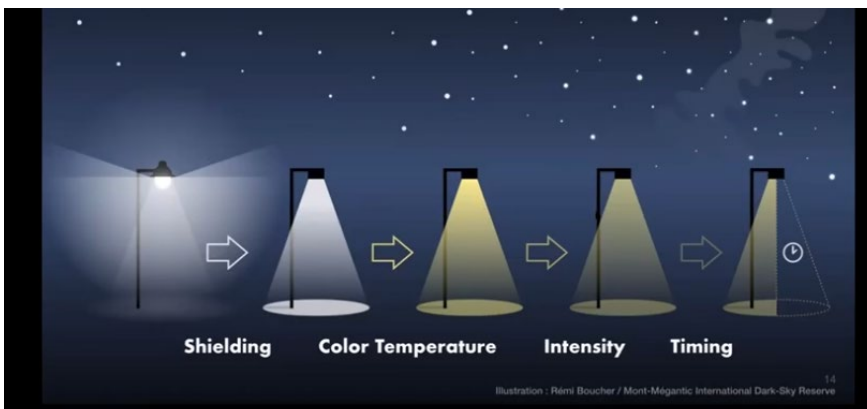


Figure 4. Mitigating light pollution example (from Wester Ross Biosphere Webinar on Dark Skies).⁶⁰

⁵⁹Wester Ross Biosphere 2022.

⁶⁰[Ibid.](#)

Impacts of light pollution on humans and environment:

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- URSA light pollution project <https://www.ursa.fi/wiki/Keli/IYA-projektit>

Europarc training tools

- Webinar: Dark sky parks. <https://www.europarc.org/tools-and-training/euro-parc-webinars/previous-webinars/webinar-dark-sky-parks/>

Dark skies awareness initiative <http://www.darks skiesawareness.org/>

TOOL Limiting Magnitude Calculations <http://www.cleardarksky.com/others/BenSugerman/star.htm>

Dark night related events and activities:

- International Year of Astronomy 2009 and Beyond⁶¹
- Globe at Night⁶²
- Earth Hour⁶³
- Sidewalk Astronomy⁶⁴
- 100 Hours of Astronomy
- World Night in Defence of Starlight⁶⁵
- International Dark Skies Week
- Astronomy Week
- Astronomy Day⁶⁶

Associations combating light pollution or presenting dark skies:

- Dark Skies Awareness⁶⁷
- International Dark-Sky Association

⁶¹ Astronomy 2009.

⁶² GlobeatNight 2022.

⁶³ Earth Hour 2022.

⁶⁴ The Sidewalk Astronomers 2022.

⁶⁵ Starlight Universe 2022.

Dark Skies Awareness 2022.

⁶⁶ The Astronomy League 2022.

⁶⁷ Dark Skies Awareness 2022.

- The Astronomical League⁶⁸
- Night Sky Network⁶⁹
- Astronomy from the Ground Up⁷⁰
- Association of Science-Technology Centers⁷¹
- Astronomers Without Borders⁷²
- Skywarden observation service⁷³

⁶⁸ The Astronomy League 2022.

⁶⁹ Night Sky Network 2022.

⁷⁰ The Astronomical Society of the Pacific 2022.

⁷¹ ASTC 2022.

⁷² AWB 2022.

⁷³ URSA Association 2022.

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