

# Nightscape



DarkSky

#117 | September 2024

## COVER STORY

# Nature's night shift

Invertebrates are the rarely-seen but critical creatures of the night

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Author Leigh Ann Henion  
on nocturnal species

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DarkSky's  
2023 Impact Report

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# DarkSky

We restore the nighttime environment and protect communities from the harmful effects of light pollution through outreach, advocacy, and conservation.

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## On the cover

### “Eerie glows”

**Anamalai Tiger Reserve, Tamil Nadu, India**  
by **Sriram Murali**

I study fireflies for the IUCN Fireflies Specialist Group. In December 2023, while on a field trip observing firefly larvae, we noticed odd, bluish firefly glows floating in moist air and moving swiftly. These are fireflies of the genus *Lamprigera*, a first-time find in the Anamalai Tiger Reserve and a genus very little described. Male fireflies fly low to the ground looking for females in the foliage. Females are in larval form even as adults. Their flashes appear bluish from a distance and lime green up close. This is likely due to the “Purkinje effect,” which explains that our eyes are more sensitive to blue light at night.

#### TECHNICAL DETAILS

Canon 6D | 37.5 min exposure (stacked, 75 continuous-sequence photos, 30s each) | 24mm | f2.0 | ISO 3200

#### FOLLOW

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Web: [linktr.ee/sriram\\_murali](http://linktr.ee/sriram_murali)

Watch Sriram’s film, Saving the Dark:

[youtu.be/6fHxNn-FEnc](https://youtu.be/6fHxNn-FEnc)

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# From the Executive Director



“One day while meeting with Dave I wondered aloud why nobody was taking action against light pollution and light trespass. Dave looked at me and said, “Why not us? Let’s make a difference and have fun doing it!” Thus, The International Dark-Sky Association (IDA), now DarkSky International (DarkSky), was born.”

– Co-Founder Tim Hunter



I was sitting, enjoying the evening sun setting over the Howgill Fells in northern England, when my phone flashed with Tim Hunter’s name. He was calling to share the news that Dave Crawford, the co-founder of DarkSky alongside Tim, had passed away peacefully at 93.

It felt fitting, as the Howgill Fells are now part of the Yorkshire Dales Dark Sky Reserve. My family and I had just been discussing how the skyglow from Sedbergh, the neighboring small market town, had recently diminished after the town upgraded to fully shielded lights. This simple yet profound idea is what Dave and Tim envisioned when they launched the International Dark-Sky Association – now DarkSky International – in Tucson in 1988.

From humble beginnings, DarkSky International has grown into a global movement that extends far beyond its early roots in astronomy. I credit Dave for this. While he was a professional astronomer, Dave understood that

the solution to light pollution required collaboration across multiple disciplines. I am writing this from Cape Town, South Africa, where I am attending the International Astronomy Union’s 32nd Annual General Assembly. Many of the delegates knew Dave, not from the halls of the IAU, but from his relentless efforts to engage with the lighting community and bring others into this movement.

As you will see in this issue, Dave’s legacy lives on in the work of DarkSky Advocates worldwide, who continue to frame light pollution control as a solvable problem in conservation. In doing so, we are all inspired by his admonition to “make friends, not enemies.”

Read our full tribute to Dave Crawford online: [bit.ly/dave-crawford](https://bit.ly/dave-crawford)



For the night,  
**Ruskin Hartley**  
ruskin@darksky.org  
Tucson, Arizona, U.S.

## From the Editor

I recently went on a moth-watching expedition on England's Suffolk coast. Moth enthusiasts use light at night to attract and trap moths, which are then carefully cataloged and set free unharmed. This crucial conservation practice allows scientists to track populations and migrations over time.



Left: Hawkmoth that migrated from southern Europe to England. Above: Bright green Brimstone moth common in the U.K.

Megan Eaves

I awoke before sunrise to meet one of Britain's leading moth specialists, Matthew Deans. He showed me how to identify, count, and catalog the moths that had flown into our traps. The sheer variety was staggering — there were stunningly colorful moths and a giant hawkmoth that had migrated from southern Europe. It was fuzzy and cute. I couldn't help but think of the journey it must've made from Spain or elsewhere using moonlight to navigate.

A 2017 study in the journal *PLoS ONE* found that there has been a 75% decline in insect biomass over 27 years in protected areas. Light pollution is a significant factor in this loss; it interrupts many invertebrates' mating rituals and navigation and kills millions of insects that mistake artificial light for the Moon. There are thought to be some 160,000 species of moths

worldwide. They are fascinating creatures too often vilified for flying erratically around light bulbs — something they cannot control and often die from.

I recently read *Silent Earth* by Dave Goulson, which explains how insects are crucial to life on Earth and ways to avert an insect apocalypse. One important thing we can do is to use responsible outdoor lighting practices at home. Switch off lights when not in use and install blinds, shielded fixtures, and timers to minimize light waste.

This issue of *Nightscape* is themed on the insects, arachnids, and bugs that keep Earth running overnight. Inside, you'll find an introduction from Buglife, a U.K.-based non-profit, plus a Q&A with Leigh Ann Henion, whose forthcoming book details her adventures spotting nighttime creatures. DarkSky's annual impact report and message from our president are on p14.

There is only one habitable Earth that we know of and we share it with creatures small and big. Thank you for protecting the night for us all.



**Megan Eaves**

nightscape@darksky.org  
London, U.K.

# Advocate highlights

News snippets from our network of DarkSky Advocates around the world

## A Sweden

Advocate **Henrik Sandgren** translated DarkSky's "Protect the Night" outreach materials into Swedish and handed them

out to members of the public during an open house in



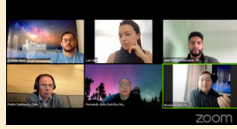
June. The event was part of a solar astronomy session held at the Slottsskogsobservatoriet astronomical observatory in **Gothenburg, Sweden**.

## B Colombia

DarkSky **Board Member Fernando Ávila Castro** was a featured guest at a dark sky event organized by the **Colombian Astronomy Network**

(**RAC**) in June. The event focused on dark sky regulations and mitigating

light pollution in Chile, Mexico, Spain, and Colombia. The discussion covered the background and evolution of dark sky regulations in each country and the pros and cons of their implementation. Watch the recording here: [bit.ly/4bR4sJm](https://bit.ly/4bR4sJm)



## C Australia

Large digital billboards could be turned off late at night in **Melbourne** under a

proposal by its city council to crack down on light pollution and reduce its health and

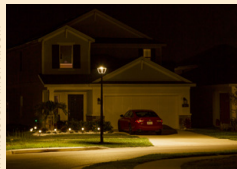
environmental impacts. Advocates from **DarkSky Victoria**, led by **President Judith Bailey**, have supported Greens Councillor Rohan Leppert with a review, commissioned by the council, which recommended a curfew for illuminated signs above ground level.



## D United States

Thanks to the tireless work of DarkSky Advocates in Florida, including **Delegate Steven Miller** and the **Central Florida DarkSky Chapter**, the city of **Groveland, Florida**, adopted a dark sky lighting ordinance that preserves its views of the Milky Way, saves energy, and

enhances streetscapes. Groveland is a rapidly growing city west of Orlando. Its new ordinance includes updates to exterior lighting citywide with lighting that will be shielded and have better color temperature, intensity, and timing.



NOVEMBER 8-9, 2024

# UNDER ONE SKY

Join us as we unite to protect the night at Under One Sky 2024, a 24-hour virtual event designed to inspire and strengthen the growing dark sky movement and combat light pollution worldwide.

DarkSky's annual conference brings together the brightest minds dedicated to protecting the night. From astronomers exploring vast galaxies to entomologists studying the tiniest insects, our shared commitment to dark skies and pristine nighttime environments unites us all.

Experience transformative talks, engage in thought-provoking panels, and participate in interactive workshops that will empower you to make a real difference. Whether you're interested in reducing light pollution to create safer urban communities or promoting responsible dark sky tourism to protect rural areas and parks, we have a session for you.

Register now to join fellow advocates and dark sky defenders, learn from leading experts, and equip yourself with the essential tools and knowledge to fight light pollution's harmful impacts. Together, we can reclaim the night!

*"Under One Sky never fails to impress me with its showcase of talent, passion, and expertise."*

*- James Lowenthal, DarkSky Massachusetts Chapter President and Professor of Astronomy at Smith College*

## FEATURED SPEAKERS



**Leigh Ann Henion**

**Keynote Speaker**

*New York Times bestselling author of Phenomenal: A Hesitant Adventurer's Search for Wonder in the Natural World.*

**Travis Novitsky**

**Closing Speaker**

*Citizen of the Grand Portage Anishinaabe Nation and wildlife photographer focused on the woods and waters of the north shore of Lake Superior in northeast Minnesota.*



**Interested in attending Under One Sky 2024?**

Register for our Global Conference at [conference.darksky.org](https://conference.darksky.org)





## BRINGING THE DARK SKY MOVEMENT TOGETHER.

Spanning two days and five continents, this truly global event will cover a variety of topics concerning the protection and preservation of the night. Check out the list of sessions and engagement workshops below!



## CONFERENCE AGENDA

*November 8-9 – All times are listed in U.S. Eastern Time & UTC*

<b>5:00 PM ET (22:00 UTC)</b>	Opening and keynote: New York Times bestselling author Leigh Ann Henion
<b>6:30 PM ET (23:30 UTC)</b>	Global networking & breakout sessions
<b>8:30 PM ET (01:30 UTC)</b>	Dark sky tourism engagement workshop
<b>10:00 PM ET (03:00 UTC)</b>	<b>E &amp; SE Asia, Australia, &amp; New Zealand</b> Regional stories and experts
<b>11:45 PM ET (04:45 UTC)</b>	DarkSky ecology engagement workshop
<b>5:00 AM ET (10:00 UTC)</b>	<b>Europe, Middle East, India, &amp; Africa</b> Regional stories and experts
<b>6:45 AM ET (11:45 UTC)</b>	Health & safety engagement workshop
<b>11:00 AM ET (16:00 UTC)</b>	<b>North, South, &amp; Central America</b> Regional stories and experts
<b>12:45 PM ET (17:45 UTC)</b>	Dark sky policy engagement workshop
<b>2:00 PM ET (19:00 UTC)</b>	Awards ceremony & networking
<b>5:00 PM ET (22:00 UTC)</b>	Global close and closing keynote: Travis Novitsky, wildlife photographer

Meet an Expert

# Night Magic







## Q&A with Leigh Ann Henion

By Megan Eaves,  
London, U.K.

In this issue of *Nightscape*, we meet author Leigh Ann Henion, who will be the keynote speaker for DarkSky's 2024 Under One Sky global conference on November 8–9. Based in the Appalachian Mountains in the U.S., her book, *Night Magic: Adventures Among Glowworms, Moon Gardens, and Other Marvels of the Dark*, comes out on September 24. Her first book, *Phenomenal*, was a *New York Times* bestseller.

### **What made you want to write a book about nocturnal species?**

*Night Magic* was, in part, inspired by an article I wrote for the *Washington Post Magazine* about synchronous fireflies. After that piece ran, many readers reached out to let me know that they'd started turning off their porch lights more often. They wanted to know what they'd been missing out on by not inviting darkness into their own yards, and I was amazed that my story had inspired real-world action that led to reduced light pollution. I've subsequently spent the past couple of years in the company of owls, bats, salamanders, and other nocturnal creatures to explore the importance of natu-

ral darkness in an age of increasing artificial light.

### **In your new book, *Night Magic*, you take a variety of adventures searching for creatures and plants in the dark. Tell us about some of the most intriguing species you encountered.**

One of the most delightful things about my journey is how often I've gone seeking night wonders, only to find they were much closer than I realized. For example, I'd always thought the glowworm caves of New Zealand were something I'd like to see, only to discover that their blue-glowing cousins, *Orfelia fultoni*, were living in mossy patches of my own neighborhood. I have long been familiar with Woolly Worm, or Woolly Bear, caterpillars that are beloved in parts of North America. But it wasn't until I was deep into *Night Magic* fieldwork that I met my first

Left: Dung beetles navigate by using the Milky Way as a guide, allowing them to roll their dung balls in a straight line away from competitors, showcasing an example of celestial navigation in the animal kingdom.

Isabella Tiger moth, realizing that, until that moment, I'd never considered what those famous caterpillars became. It was humbling! Every creature I encountered was intriguing in different ways. But one of the most intriguing parts of this quest is the notion that, before I set out to explore darkness, I'd only half-known a landscape that I thought I knew well.

passenger train. Migrating spotted salamanders led me to ephemeral pools, where I met fairy shrimp, invertebrate crustaceans as magical as their name indicates. And, as an attendee at Mothapalooza — a festival dedicated to mothing, the moth-loving equivalent of birding — I got to know moths of all patterns and colors, diverse and lovely beyond my imagination.

I've probably spent the most time thinking about moth behavior. Most of the time, when we encounter moths, we're seeing them in situations where they're reacting to artificial light exposure. Mothapalooza utilizes light stations. But being introduced to so many different species — and watching people use light in such pointed ways — helped me recognize that, before researching *Night Magic*, I'd never spent time with moths when we weren't all under the influence of artificial light.

Ultimately, I had an opportunity to observe sphinx moths in their natural habitat — among night bloomers without fixed points of light around. Moth-human interactions often consist of moths acting erratically in the presence of lights and people flailing around trying to avoid their unpredictable movements. But, in natural darkness, observing moths doing their own thing among flowers can be a serene experience. This seems obvious in hindsight, but after a lifetime of encountering moths in frenzied porch-light situations that made me feel hyper, too, the serenity was a little surprising in practice.



Thomas Shahan, Oregon Department of Agriculture

Railroad worms are predominantly nocturnal when the larvae emerge to hunt for prey, mainly soft-bodied invertebrates like slugs and snails. They use their glowing light to navigate through the darkness and locate their prey.

**What types of insects/  
invertebrates did you encounter?  
Anything surprising that you  
learned about how these creatures  
interact with the nocturnal  
environment?**

I unexpectedly encountered a railroad worm, named for the way that its glow looks like lit windows on a



## What are your takeaways from this research?

I could have traveled the globe to seek out nocturnal biodiversity, but I chose to focus on my home region — not as a provincial limitation, but as a way of making the personal



### **Night Magic**

2024

In a world of ubiquitous artificial light, *Night Magic* is a powerful call to action to reconnect with the natural world. Through encounters with naturalists, biologists, primitive-skill experts, and others who've dedicated their lives to cultivating relationships with darkness and the creatures who depend on it, Henion encourages us to leave our well-lit homes and step outside to embrace the forgotten magic of the night.

universal. We're all in need of ways to find wonder on our own patch of planet. Darkness is a connector, but the living marvels of night are often unique to local ecosystems. Wherever you live, you're living among marvels — and there's a good chance you don't know about many of them.

I think that approaching darkness as a place thriving with life, as opposed to continuing the cultural narrative that it is a void, stands to change the way humans interact with their immediate surroundings. I know that appreciating night's magic has changed the way that I engage with mine.

## Did spending time in the natural world at night change your perspective?

Yes, in a myriad of ways! I'm more comfortable with darkness now. Not surprisingly, I've been inspired to limit light pollution outside of my house. But my journey has also changed the way I use lighting indoors. Becoming better acquainted with darkness has helped me become more mindful of all the lights in my life. Early in my fieldwork, I learned that red spectra light is often less disruptive to wildlife, but it took a long time for me to absorb that, at night, warm light or no light at all can also be helpful for human animals. Watching so many different animals' reactivity to artificial light helped me finally absorb the reality that light is a stimulant — not just for moths, but also for me — and, in an oft-frenetic world, I now consume a little less of it. That's been one of *Night Magic's* ultimate gifts to me, personally.

## Why is the night important, to you as an individual and to all life on Earth?

In just a few electrified generations, we've become alienated from night as our ancestors all over the planet experienced it. Most sto-



rylines that we're familiar with teach us to fear darkness, to see it as a place of death and dearth. But night plays a large role in nourishing life. In addition to being crucial for human health, wildlife, and entire ecosystems, some research suggests that natural darkness has played a role in the development of human culture and spirituality the world over. Experiencing darkness is important in ways we're only beginning to understand. New species

are continually being discovered — often by accident when people roam areas where, previously, they'd only walked around with flashlights on. In *Night Magic*, I've attempted to focus not on what artificial light takes away, but, rather, on what darkness has to offer. As I learned from my original firefly story — and, later, my overarching journey — igniting curiosity has the power to turn off lights. ✦

## Inspiration

*“O voyager of that universe which lies  
Between the four walls of this garden fair,—  
Whose constellations are the fireflies  
That wheel their instant courses  
everywhere,—  
Mid faery firmaments wherein one sees  
Mimic Boetes and the Pleiades,  
Thou steerest like some faery ship of air.”*

An excerpt from the poem *A Twilight Moth* by  
Madison Cawein (1865–1914)

### PHOTO

Ruby tiger moth on a leaf, Tallinn, Estonia  
by Erik Karits / Unsplash



# Nature's night shift

By David Smith,  
London, U.K.

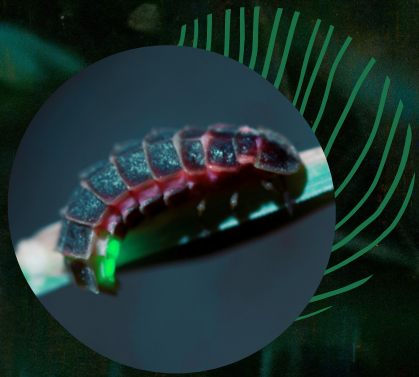


David Smith is the Social Change and Advocacy Officer at Buglife, a U.K.-based non-profit that is working to save invertebrate species.

Though small and often overlooked, invertebrates including insects, arachnids, worms, snails, and marine life, are the backbone of our ecosystems. Unfortunately, these creatures face severe threats. Alarmingly, current trends indicate that 41% of the world's insect species could vanish in the coming decades. Buglife's 2023 "Bugs Matter" survey revealed a startling 78% decrease in the number of flying insects found on vehicle license plates in the U.K. since 2004. These tiny creatures, critical to our ecosystems, represent most of the life on Earth.

Most people notice daytime insects like bees and butterflies, as they are busy with essential tasks like pollination. Yet, an entire night shift of bugs also performs vital roles when the Sun sets. Nocturnal insects engage in pollination, nutrient recycling, and pest con-





Glow worms live in cool and damp places such as caves and on sheltered banks in native bush where humidity is high. Their diet is predatory, and they use their bluish green glow to lure in their prey.

Luca Calderone / Unsplash · Inset: Igor Krasilov / Shutterstock

trol, just like their daytime counterparts, but often with greater efficiency. Two-thirds of invertebrates are either partially or wholly nocturnal, relying on darkness to fulfill their roles. But what happens if darkness never comes?

## Pollination

Nature has evolved with the rhythm of day and night, but light pollution — increasing globally by 10% each year — now disrupts nocturnal activities. Darkness allows nocturnal species to move safely, avoiding predators and extreme

**GET INVOLVED**

Buglife is the only organization in Europe devoted to the conservation of all invertebrates. For further information on how you can get involved in Buglife's light pollution advocacy, visit [buglife.org.uk/campaigns/light-pollution](https://buglife.org.uk/campaigns/light-pollution)



natural light-dark cycles. For instance, moths, which are vital nighttime pollinators, often outperform their daytime counterparts, helping night-flowering plants reproduce, supporting wildlife, and benefiting agriculture. However, light pollution is reducing nocturnal pollinator visits to flowers by 62% in some areas.

# Night workers



## Luna moth

Also called the “American Moon moth,” luna moths were named after the Roman goddess of the Moon. Moths pollinate a third of all plants in towns and cities and their caterpillars are a food source for birds, mammals, and other insects.

## Grey hairstreak butterfly

These butterflies are pollinators active at night and during the day. Natural darkness is crucial to their reproduction, as mating is most often observed late at night after 10 pm.



## Firefly

Fireflies are pollinators and their larvae feed on snails, slugs, and earthworms, keeping ecosystems in delicate balance. They use their light to communicate and attract a mate.

## Dung beetle

By burying manure, dung beetles loosen and nourish soil, which recycles nutrients for grazing animals. Their compound eyes allow them to feed at night and they rely on starlight for navigation.



## Cricket

Crickets eat weed seeds and break down organic waste, returning nutrients to the soil and reducing greenhouse emissions. They are also an important food source for other creatures.

Photos  
Firefly: Megan Bonham  
Luna moth: Sara Parlier / Unsplash  
Grey hairstreak butterfly: Shawn Taylor CC BY 2.0  
Dung beetle: Brian Ralphs CC BY 2.0  
Cricket: Dean Morley CC BY-ND 2.0

## Communication and mating

Insects use natural light cues for communication, especially during mating. Fireflies and glowworms, famous for their light displays, depend on darkness to signal mates. Light pollution confuses or blocks these signals, hindering reproduction and contributing to their decline. Experts identify light pollution as a major factor in the global decrease of fireflies and glowworms.

## The food web

Darkness also reduces the risk of predation for insects. Artificial lights, however, attract and expose them, making them easy targets. Increased predation can disrupt the food web and force other species to adapt their behaviors. The attraction to artificial lights doesn't just increase predation. Insects often get trapped in the glow, leading to exhaustion. A German study suggests that up to a third of insects attracted to artificial lights will die as a result.

## Navigating by stars

Insects also navigate using natural light patterns. Some dung beetle species, for instance, use the Moon and stars to find their way. Artificial lights disorientate beetles and other species, sending them astray leading to exhaustion, reduced reproduction, and even death. Migrating insects like monarch butterflies rely on natural light signals for their journeys. Light pollution can misguide them, threatening their survival.

## Solutions for bugs

Unlike other environmental threats, light pollution presents a unique, easily solvable problem. Turning off lights eliminates the pollution instantly, unlike water or air pollution, which require complex and costly clean-up processes. To protect our natural world, we can take simple steps to reduce light pollution. Use

**Darkness is not just a backdrop for insects and invertebrates; it is vital to their existence.**

outdoor lighting only when necessary. Shield lights so they shine only where needed. Choose less intense and warmer bulbs. Support policies that protect natural darkness to create safe environments for nocturnal wildlife. First, we must recognize light as a pollutant on par with other threats to nature.

Darkness is not just a backdrop for insects and invertebrates; it is vital to their existence. By reducing light pollution, we can support these creatures and the ecosystems they sustain. ✦



# 2023 Impact Report

## President's message

"The zombie apocalypse is on its way and there is nothing you can do about light pollution." I have heard this and similar comments frequently during my outreach for DarkSky. Such pessimism is wrong.

I am old enough to remember the battles over water and air pollution. In 1969, the Cuyahoga River off Lake Erie in Cleveland, Ohio, U.S., caught on fire and people became serious about water pollution. I spent a decade working to improve water quality in the Chesapeake Bay and saw progress. Today, rivers in North America and Europe are cleaner than they have been in 100 years. Air pollution in cities such as Los Angeles and London in the 1950s and 1960s made life there unbreathable. But similarly, those cities' air is cleaner today. Water and air pollution remain problems that require constant attention around the world, but significant progress has been made.

The same can and will occur with light pollution. Activism is a combination of optimism and action. DarkSky has increased the awareness of light pollution to unprecedented levels worldwide. Now we are translating that awareness into action: developing model laws and lighting standards; encouraging more dark-friendly lighting products; educating professionals about responsible lighting; and certifying a broader range of dark sky places.

The next time you hear someone express pessimism about light pollution, tell them that DarkSky Advocates around the world will prove them wrong. Keep looking up!



**Tom Reinert**  
President, DarkSky  
International  
Virginia, U.S.

# 1. Reaching a Global Constituency



## Reach

299,780\*

supporters and members from 135 countries and territories around the world.

\* Includes supporters, members, advocates, event attendees, and social media. Does not include media reach.

## Engagement

- ◆ During International Dark Sky Week 2023, we reached 1 billion people through media outlets, demonstrating a growing global awareness of the impact of light pollution.
- ◆ Advocates and Delegates around the world submitted 127 proclamations to local legislatures and communities for International Dark Sky Week. At least 99 were accepted.
- ◆ November's Under One Sky 2023 global conference welcomed 756 participants from 53 countries in a 24-hour virtual event.
- ◆ The DarkSky Approved Luminaire program brought in 20 new lighting companies in 2023 for a total of 180 registered companies and 1,433 product families in 2023.

## Conservation

171,330+

sq km of protected lands and night skies in 32 countries and territories on 6 continents.

227

total International Dark Sky Place designations.

20

new International Dark Sky Places approved in 2023:

1. Arkaroola, Australia
2. Bee Cave, U.S.
3. City of Jonestown, U.S.
4. City of Rocks National Reserve, U.S.
5. Dark Sky Park Bulbjerg, Denmark
6. Groveland, U.S.
7. Hauts-Plateaux of Vercors, France
8. Aenos National Park, Greece
9. Joya-La Barreta, Mexico
10. Minami-Rokuroshi, Japan
11. Parc national du Mont-Tremblant, Canada
12. Presteigne and Norton, U.K.
13. Saguaro National Park, U.S.
14. Sinks Canyon State Park, U.S.
15. Sopotnia Wielka, Poland
16. Wairarapa, New Zealand
17. Springdale, U.S.
18. Town of Castle Valley, U.S.
19. Xichong, Shenzhen, China
20. Ynys Enlli (Bardsey Island), U.K.

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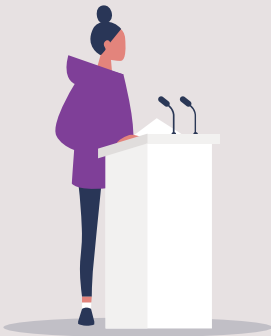
## 2. Empowering Chapters and Advocates



- ◆ Led by DarkSky Chapters and Delegates worldwide, our engagement programs reached more than 12 million people through online offerings and 46,150 dark sky events.
- ◆ DarkSky is now represented by Advocates in 98 countries and territories and on 6 continents.
- ◆ DarkSky Advocates and Delegates around the world together contributed more than 31,000 volunteer hours of work on dark sky protection in 2023 through outreach events, chapters, advocacy with policymakers and governments, media interviews, and important grassroots work to help protect the night for future generations.

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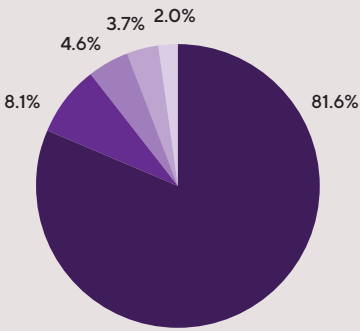
## 3. Advancing Policy and Science



- ◆ The International Union for the Conservation of Nature (IUCN) released a report for conservation managers and good-practice guidelines on conserving the night, with contributions from DarkSky.
- ◆ DarkSky Delegate and *Nightscape* Editor Megan Eaves was featured in a video about addressing light pollution as part of the UN Sustainable Development Goals, shown to participants at the 25th session of the UNWTO General Assembly in Uzbekistan in October 2023.
- ◆ Based on evidence given by U.K. Advocates and DarkSky Executive Director Ruskin Hartley, the U.K. House of Lords published a report stating that light pollution is a “neglected pollutant” that is “causing significant harm” to human health.
- ◆ Thanks to work by the West Chester Dark Sky Committee, U.S. and Advocate Mark Grosz, a light pollution and responsible lighting bill was introduced in the Pennsylvania House of Representatives.
- ◆ Guatemala released its “Plan Estratégico para el Desarrollo Sostenible del Turismo Astronómico,” a Spanish-language resource led by Advocate and Board member Sergio Montúfar Codoñer to guide efforts to leverage stargazing for tourism and educational purposes.

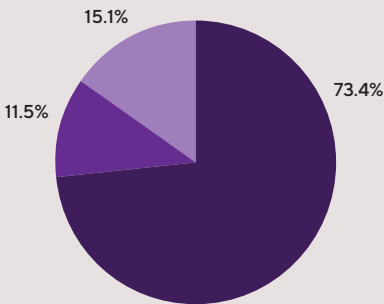
## 4. Statement of Financial Activity

This information is based on Reviewed Consolidated Financial Statements for the year ending December 31, 2023. For more detailed financial information, please visit [darksky.org/about/funding](https://darksky.org/about/funding)



### REVENUE

● Donations	\$ 1,788,352
● Program Revenue	\$ 177,595
● In-Kind Services	\$ 101,245
● Investment Income	\$ 81,044
● Other	\$ 43,069
<b>Total Revenue</b>	<b>\$ 2,191,305</b>



### EXPENSE

● Program Services	\$ 1,466,762
● General Administrative	\$ 229,259
● Fundraising	\$ 301,419
<b>Total Expense</b>	<b>\$ 1,997,440</b>

## Special thanks

DarkSky's Corporate Partners are dedicated members of the dark sky protection community from corporate and business sectors. They support programs, outreach, education, and nocturnal conservation efforts. These companies made philanthropic contributions from January, 2023 through December 31, 2023.

Barker & Scott Consulting  
 Crossroads  
 EarthAware  
 Earth, Sun, Moon  
 Holiday River Expeditions  
 Home Depot  
 Lowe's  
 Musco  
 Remy Martin  
 Under Canvas  
 Your True Nature  
 Zoo New England  
 1% For the Planet

## DarkSky Board of Directors

Tom Reinert, President, U.S.  
 Nalayini Brito-Davies, Vice-President, New Zealand  
 Brad Schlesselman, Treasurer, U.S.  
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 Sergio Montúfar Codoñer, Guatemala  
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## Non-voting members

Charles Mudd, General Counsel, U.S.  
 Ruskin Hartley, CEO and Executive Director, U.S.

## Immediate Past President

Diane Knutson, U.S.

## Committee Chairs

Nancy Clanton, U.S. and Terry McGowan, U.S. - Technical Committee  
 Dan Oakley, U.K. - Dark Sky Places Committee  
 Dajana Bjelajac, Serbia - Awards Committee

# Newly certified International Dark Sky Places

Announced since 15 May 2024



## ABOUT THE PROGRAM



The International Dark Sky Places program certifies communities, parks, and protected areas around the world that preserve and protect dark sites through responsible lighting policies and public education.

## BY THE NUMBERS

227

International Dark Sky Places around the world

32

Countries and territories represented

6

Continents represented

171,330+

Square kilometers of protected land and night sky

**Find a Dark Sky Place near you**

Use the Place finder at [DarkSky.org/places](https://DarkSky.org/places)





The Backyard Universe



## Carrickalinga <sup>1</sup> South Australia, Australia

A small coastal town on the Fleurieu Peninsula with few streetlights and a community that treasures the dark, starry skies.

Dark Sky Community      104 km<sup>2</sup>

bryanhalperinphotography.com



## Moab <sup>2</sup> Utah, U.S.

Gateway to Arches and Canyonlands Dark Sky Parks, Moab has a rigorous outdoor lighting ordinance to protect its iconic red rock canyons.

Dark Sky Community      12.34 km<sup>2</sup>

Greg Harman



## Bruneau Dunes State Park <sup>3</sup> Idaho, U.S.

Dune landscape in a horseshoe-shaped basin formed by an ancient channel of the Snake River, now home to two powerful public telescopes.

Dark Sky Park      19.42 km<sup>2</sup>

Ed Hurst



## Palm Beach Headland <sup>4</sup> Sydney, Australia

Outer-Sydney park with beach activities, picnics, boating, hikes to Barrenjoey Lighthouse, and famed filming location for the TV show “Home and Away.”

Dark Sky Sanctuary      .62 km<sup>2</sup>

Bernt Nilsen



## Øvre Pasvik National Park <sup>5</sup> Kirkenes, Norway

Norway’s first IDSP, located at 69° north above the Arctic Circle, where the aurora borealis and night sky are visible all day for two winter months.

Dark Sky Park      119 km<sup>2</sup>

Smiling Forest Photography



## Shield Ranch Barton Creek <sup>6</sup> Texas, U.S.

Protected wildland near Austin, and home to the popular Dusk to Dark Star Party and activities like wildlife viewing, hiking, and stargazing.

Urban Night Sky Place      25.9 km<sup>2</sup>

Christoph Putz



## Eiweiler Star Village <sup>7</sup> Saarland, Germany

Village featuring time and motion controls on lighting, an astronomy hiking trail, and the nearby Peterberg Observatory hosts lectures and tours.

Dark Sky Community      8.66 km<sup>2</sup>

# News & notables

News from the global movement promoting responsible outdoor light at night

## In memoriam

The world recently lost a visionary in David L. Crawford (1931–2024),



DarkSky archives

co-founder of DarkSky International. Crawford's lifelong dedication to promoting responsible outdoor lighting practices

has led to healthier communities, more energy-efficient cities, and a new commitment to preserving the beauty of the night sky. Read the full tribute online:

[bit.ly/dave-crawford](https://bit.ly/dave-crawford)



Mark Vuorani CC-BY-NC 2.0

## Light pollution harms small fish

Artificial light on coastlines lures small fish, such as blue-green chromis, to their doom according to a new study conducted on coral reefs in French Polynesia. Light pollution acts as a “midnight fridge,” attracting young fish that are snacks for predators. Nearly a quarter of the world’s coastline, excluding Antarctica, is artificially lit, according to the study. Read more:

[bit.ly/fish-study](https://bit.ly/fish-study)



## New European manifesto on light pollution

A new “Manifesto for Tackling Light Pollution & Proposing EU Light Pollution Monitoring” was drafted during the Light Pollution Meeting organized under the recent Spanish Presidency of the European Council from November 14–15, 2023. The manifesto emphasizes the need for cohesive measures to mitigate the adverse impacts of light pollution and proposes strategies for monitoring and reducing light pollution at the EU level.

[zenodo.org/records/12606631](https://zenodo.org/records/12606631)

## Dark skies in ‘Scape magazine

The latest issue of ‘Scape, the magazine for landscape architecture and urbanism, is devoted to darkness and includes an



© Uijn in Landeshap Foundation & Blauwdruk Publishers

interview and photos from DarkSky’s Betymaya Foott. The issue highlights the beauty and significance of darkness, lighting design for a healthy planet, and the

nocturnal landscape and its inhabitants as their point of departure. The magazine is available in print and digitally at:

[scapemagazine.com/scapemagazine223](https://scapemagazine.com/scapemagazine223)

OVERHEARD

I joined DarkSky only a few years ago, and I remember researching in awe at what you do for the cause! I knew nothing about light pollution and found it was so easy to educate myself and get involved, all thanks to your hard work.”

- Dr. Lindsay Demarchi  
U.S. Congressional Fellow & DarkSky Chicago Founder  
Chicago, U.S.



### Plan ahead for the holidays

Support DarkSky and get your holiday shopping done early by gifting our customized mugs, apparel, and totes.

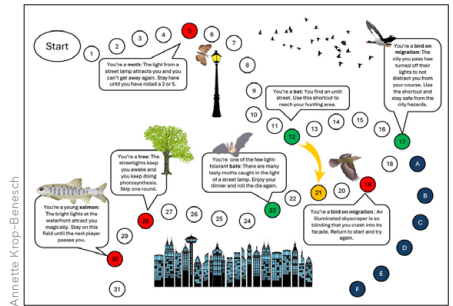
[bonfire.com/store/darksky](https://bonfire.com/store/darksky)



### Introducing the DarkSky Action Fund

Our new DarkSky Action Fund is a lifeline of support for projects combating light pollution now. Your donation to the DarkSky Action Fund supports communities, places, and people on their journey to protect the night around the world. Become a founding contributor today!

[bit.ly/darkskyactionfund](https://bit.ly/darkskyactionfund)



### Win the game of light pollution

German author Annette Krop-Benesch created a board game about light pollution. The game involves advancing around the board based on how artificial light at night affects different wildlife species. It is available to print at home in a variety of languages here:

[bit.ly/LPboardgame](https://bit.ly/LPboardgame)

### IN CASE YOU MISSED IT

### 2024 State of The Science report

DarkSky's annual *State of The Science* report by Dr. John Barentine was published in June. The report summarizes the scientific understanding of light pollution for the current year. Nearly 5,000 pieces of scientific literature were reviewed, creating a "big picture" of light pollution for everyone from researchers to advocates and policymakers. Download it:

[bit.ly/stateofscience2024](https://bit.ly/stateofscience2024)



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# Five Principles for Responsible Outdoor Lighting

## RESPONSIBLE OUTDOOR LIGHTING IS:

### 1. USEFUL

All light should have a clear purpose. Consider how the use of light will impact the area, including wildlife and their habitats.

### 2. TARGETED

Use shielding and careful aiming to target the direction of the light beam so that it points downward and does not spill beyond where it is needed.

### 3. LOW LEVEL

Use the lowest light level required. Be mindful of surface conditions, as some surfaces may reflect more light into the night sky than intended.

### 4. CONTROLLED

Use controls such as timers or motion detectors to ensure that light is available when it is needed, dimmed when possible, and turned off when not needed.

### 5. WARM-COLORED

Limit the amount of shorter wavelength (blue-violet) light to the least amount needed.

Learn more

[darksky.org/lighting-principles/](https://darksky.org/lighting-principles/)

