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# nightscape

A PUBLICATION OF THE INTERNATIONAL DARK-SKY ASSOCIATION

## IN THIS ISSUE

## NO, IT'S NOT A UFO

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# From the Executive Director

Dear Members,

Summer is here and what better way to spend it but protecting sea turtles on the Gulf coast of Florida? After a six-month procurement process, IDA has recently been awarded a major sea turtle habitat restoration contract from the Department of Environmental Protection/Florida Fish and Wildlife Conservation Commission (DEP/FWC). The project has been funded from the April 2010 Framework Agreement signed between the Deepwater Horizon NRDA Trustees and BP, to implement early restoration projects resulting from damages caused by the Deepwater Horizon oil spill.

This contract is designed to improve outdoor lighting along an approximately 100-mile section of the Florida Gulf coast to attract more female turtles to nest and to improve the chances that hatchlings reach the water. During the initial phase of the project, IDA will survey over 2,200 acres of beach and document lighting that adversely impacts sea turtles. Once inventoried and entered into a database, IDA will design solutions and submit its recommendations to the DEP/FWC. After the retrofits have been installed, we will return to ensure that the new lighting has been installed correctly and that it has been effective in remediating the adverse impact of the original offending light.

In addition, IDA will document the current night sky brightness along the beach using all-sky cameras in order to establish a baseline benchmark. In the future, IDA will return to analyze changes to the night sky to track progress of efforts to reduce sky glow.

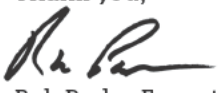
While the bulk of the work will be completed this year, the contract is for five years. It is hoped that after the original project is completed, IDA will be asked to address sea turtle habitat protection in other areas.

This is the largest consulting project that IDA has ever been awarded and follows a successful two-year cooperative agreement with the U.S. National Park Service (NPS) to survey and upgrade outdoor lighting in nine national parks. That project was completed earlier this year, but we continue to work with closely with NPS to develop comprehensive ecological lighting guidelines. This important work was instrumental in qualifying for the DEP/FWC project and we will bring the knowledge derived from it to bear on the sea turtle habitat protection work. The research and development that we did during the NPS co-op agreement produced new narrowband amber LED lamp sources and fixtures that we will be specifying in DEP/FWC project. The new contract also gives us the chance to field test other new technology, like bi-modal and adaptive controls, that was not used in the NPS project.

As IDA turns 25 years old, we can say with confidence that our knowledge and technical expertise in ecologically responsible outdoor lighting is being recognized on a global scale. In Paris this April, I chaired a meeting of the CIE TC 5-27 committee on Artificial Lighting and its Impact on the Natural Environment. The committee will collect research and summarize our understanding of the impact of LAN on ecology. Later this year, we will co-host the ALAN 2013 in Berlin that will bring scientists from around the world to present their research and to foster cooperation and collaboration on future research.

This is a very good time for IDA and we thank all who have supported us through difficult financial times. Please join us in Tucson for the Annual General Meeting on Nov. 15 and stay for the Arizona Science and Astronomy Expo on the weekend. It's going to be our birthday party...

Thank you,



Bob Parks, Executive Director

**On the Cover** In suburbs or small cities, the sky is darker and it is easy to capture the main stars of well known constellations such as Orion despite a powerful source of light. Photo by Laurent Laveder (Details: Canon 350D with Sigma 18 mm f/2.8. 30 s at 800 ISO.) Find out more about Laveder's photography on page 8.

The mission of the International Dark-Sky Association (IDA) is to preserve and protect the nighttime environment and our heritage of dark skies through environmentally responsible outdoor lighting. IDA was incorporated in 1988 as a tax-exempt 501(c)(3) nonprofit organization. (FIN 74-2493011)



**NIGHTSCAPE**

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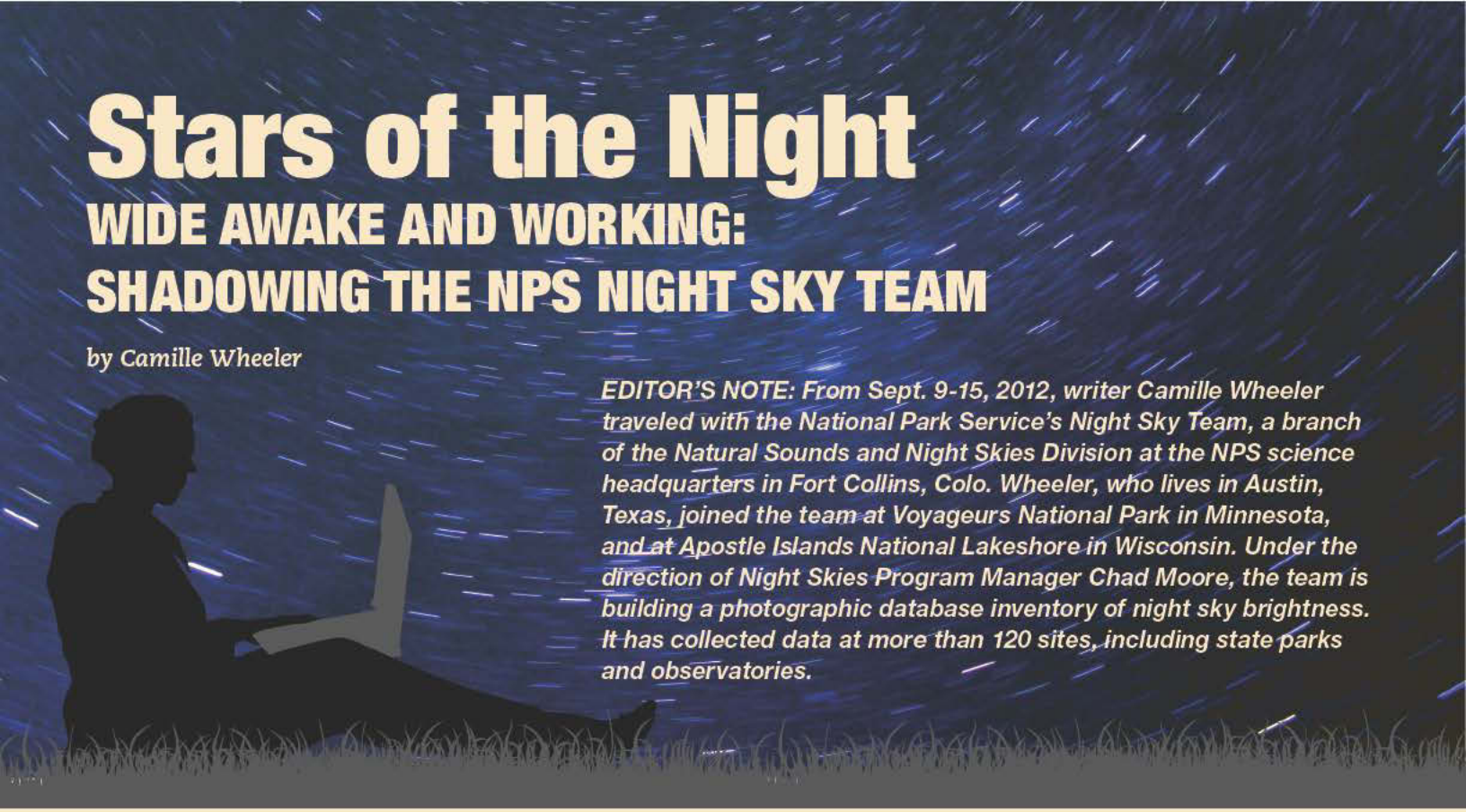
# Stars of the Night

## WIDE AWAKE AND WORKING: SHADOWING THE NPS NIGHT SKY TEAM

*by Camille Wheeler*



***EDITOR'S NOTE:** From Sept. 9-15, 2012, writer Camille Wheeler traveled with the National Park Service's Night Sky Team, a branch of the Natural Sounds and Night Skies Division at the NPS science headquarters in Fort Collins, Colo. Wheeler, who lives in Austin, Texas, joined the team at Voyageurs National Park in Minnesota, and at Apostle Islands National Lakeshore in Wisconsin. Under the direction of Night Skies Program Manager Chad Moore, the team is building a photographic database inventory of night sky brightness. It has collected data at more than 120 sites, including state parks and observatories.*

Contrary to fantasy, shadowing the National Park Service Night Sky Team for almost a week is no walk in the park.

Before joining the team in September in the Great Lakes Region, I envisioned leisurely daytime hiking in beautiful settings. Uh, no. The cruel paradox for these scientists, nature lovers all, is that their day job is their night job, and vice versa. They are researchers, not tourists, and seldom get to explore the national parks they're trying to protect … not because they're sleeping, but because they're wide awake and working.

Education is crucial, and the team spends much of its time in the field meeting with park officials and conducting facility lighting assessments. There's no time for sleeping in.

The irony is that national parks themselves, which harbor many of the country's last pristine night skies, might be contributing to the anthropogenic light – light pollution – threatening the wild nighttime environment.

The Night Sky Team vigilantly upholds an NPS management policy directing the park service to conserve natural lightscapes. "We all feel like we are doing our part for the public," says Chad Moore, the team's leader. "We're not evangelicals, we're scientists. And we're scientists who happen to be experts at protecting natural resources."

These scientists are guardians: of natural night skies, nocturnal wildlife that needs dark, and park visitors who need adequate light. Perhaps, I mused one night, watching them work in calm, robotic fashion, they're not really human. They're some sort of evolving species on a hybrid team that's the only one of its kind in the world.

On this trip, Misty Nelson, an acoustical technician from the Natural Sounds side, traveled for the first time with the Night Sky Team. Her presence symbolized what the Natural Sounds and Night Skies Division is all about: the marriage of all that's natural under the sun … and moon.

My thanks to the team members – Moore, Nelson, Teresa Jiles, Bob Meadows and Jeremy White – for letting me accompany them. (Dan Duriscoe, the team's technical leader based in Bishop, Calif., did not make the trip.) Following are selected trip journal entries:

**Sunday, 10 p.m.:** Night No. 1: We're in a dark, secluded spot of Voyageurs National Park – a tree-ringed parking lot a couple of miles from U.S. Highway 53. We can't see the lights of International Falls, Minnesota, to the northwest. But we can hear highway traffic.

Jiles set up camera equipment in this parking lot two years ago. Tonight, the team is repeating her data collection for comparison. Suddenly, we hear the mournful sounds of yipping. Dogs? Doubtful. Coyotes? Possibly. Wolves? I hope so. Goose bumps break out.

**Monday, 7 p.m.:** In the team's motel lobby in International Falls, Moore's comparing weather forecast models on a laptop computer. Heavy clouds are putting the night's plans in flux, but that's normal.

Based on solid forecasts, Moore's flown cross-country before, chasing the weather, only to see it all fall apart.

"It takes a certain demeanor of person to do this work," says Moore, wearing a tan NPS shirt, green pants and three furrows seemingly permanently etched onto his forehead.

The team always makes multiple travel plans. That means notifying park officials that the team might not be there. It means booking travel arrangements for two places and canceling one.

As Moore notes, not everyone can deal with that level of

stress: "I'm going on a trip next week, but I don't know where."

Plus, Voyageurs officials confirmed those were timber wolves we heard last night. "Some people would be really freaked out by that," he says. "We think it's great."

Tonight, the team will assess lighting at Voyageurs' headquarters facilities and collect data at the park's Rainy Lake visitors center. "Let's try to be back by 12:15," Moore says. "I'll let you off early so we can get some sleep." Everyone laughs. That's like jinxing a no-hitter.

**Tuesday, 9:30 a.m.:** The team members, cheerful despite going to bed around 2 a.m., are ordering breakfast at the Chocolate Moose restaurant. When Moore arrives, all stand in a playful salute to their chief.

The weather/logistics breakfast meeting segues to the team's motel lobby next door. Forecast models disagree on when dense clouds will move through the Great Lakes Region, affecting when the team will split into two units this week. Drive time must be factored in. Boat rides on Lake Superior, to Isle Royale National Park and Apostle Islands National Lakeshore, must be scheduled.

Meadows jokingly asks, "Should we get ready to deploy tonight?" He looks at his watch – it's 1 p.m. "It's getting closer."

"And we'll be in bed by 12:15," Nelson adds. Ha, ha. A little Night Sky Team humor.

**Thursday, 9:30 a.m.:** Meadows and White, their silver Jeep packed for the trip to Isle Royale in Michigan, stand watching Moore, Jiles and Nelson carefully cram equipment in the back of their black Jeep.

It's a four-hour drive from International Falls to Bayfield, Wisconsin, where the NPS deploys boats on Lake Superior – and Moore, Nelson and I have a 3 p.m. boat reservation. Jiles will work a mainland site.

***Jiles set up camera equipment in this parking lot two years ago. Tonight, the team is repeating her data collection for comparison. Suddenly, we hear the mournful sounds of yipping. Dogs? Doubtful. Coyotes? Possibly. Wolves? I hope so. Goose bumps break out.***

Finally, only one item remains unpacked: Nelson's purple insulated coffee mug resting on the pavement. "Sorry," Meadows deadpans, "but the coffee mug has to stay."

**Thursday, 3:30 p.m.:** Moore, Nelson and I are aboard the Ardea, one of four Munson high-speed landing crafts the NPS operates from Roys Point Marina. We're headed to Outer Island, the most remote of the Apostle Islands chain.

I gaze out a cabin window at blue-green water so vast I can't see the end of it. Moore disgustedly looks at tonight's forecast on his iPhone: extremely cloudy.

But it's smiles all around as we glide into shore. Boat driver Paul Wilcox lowers the electric winch-operated bow ramp – a bridge to land – into the crystal-clear shallow water.

We haul gear onto shore. My biggest fear – pitching my tent in front of backpacking experts – is quickly laid to rest as Moore and Nelson dash across the campsite to help, bending and staking poles into place.

**Thursday, 10 p.m.:** Fumbling to switch on my headlamp, I struggle to keep up with Moore and Nelson as we trudge a beach back to our campsite.

Unsure of my footing, I stare at the red beam dancing off the heels of Moore's hiking boots. I'm startled by the sound of his voice over the roar of the wind and waves tumbling into shore: "Do you want to try it without your light?"

"Sure," I respond, embarrassed I hadn't noticed mine was the only light on.

Clouds slowly obscure the stars and all but a thin ribbon of the Milky Way. Yet my eyes adapt to the dark. I see

CONTINUES ON PAGE 5

*National Park Service Night Sky Team leader Chad Moore sets up camera equipment for a night's work on Outer Island. The one-of-a-kind photography system utilizes a laptop computer, telescope mount and research-grade digital camera that communicate via cables. The robotic mount rotates the camera 360 degrees as it photographs the entire sky, from horizon to zenith. Computer software then stitches together a panoramic mosaic in which all natural light is subtracted, leaving only the light pollution: the anthropogenic light.*

PHOTO BY CAMILLE WHEELER

# Seeing is Believing

## NPS NIGHT SKY TEAM'S CAMERA SYSTEM PRODUCES ONE-OF-A-KIND DATA: PANORAMIC MOSAICS SHOWING ALL SOURCES OF LIGHT POLLUTION

*by Camille Wheeler*

Chad Moore remembers the details of the night: Gauging by the Milky Way's location – straight overhead Bryce Canyon National Park in southwestern Utah – it was probably early September.

Maybe it was five years ago, maybe six. But Moore, program manager of the National Park Service's Night Skies Division, remembers with clarity that the moonless night was clear and dark. Yep, he assisted with a public astronomy program. And he recalls the conversation he had with a couple in the visitor center's back parking lot.

The husband and wife, both in their 70s, had already looked through telescopes. Now, joined by Moore, they needed only the naked eye to see a planetarium-like night: star-studded perfection.

The memories start to blur. But Moore remembers the woman's white, curly hair and the couple's joy at witnessing such grandeur. This night sky, they said, was as good as the one they grew up with. Over the decades, they worried they'd never see such a night again. Or perhaps they were remembering those nights decades ago as too rosy. They questioned themselves – was it a dream? But no, this sky tonight was proof: Such beauty did, and does exist.

They're lucky: Many people don't even have such memories to doubt. In 2001, researchers used satellite data and modeling of light propagation in the atmosphere to calculate that roughly one-fifth of the world's population, including two-thirds of Americans, couldn't see the Milky Way. Satellite images released by NASA in December 2012 revealed an Earth globe glowing as never before. And according to the U.S. Census, more than 80 percent of Americans live in urban areas, where electric light blocks the night.

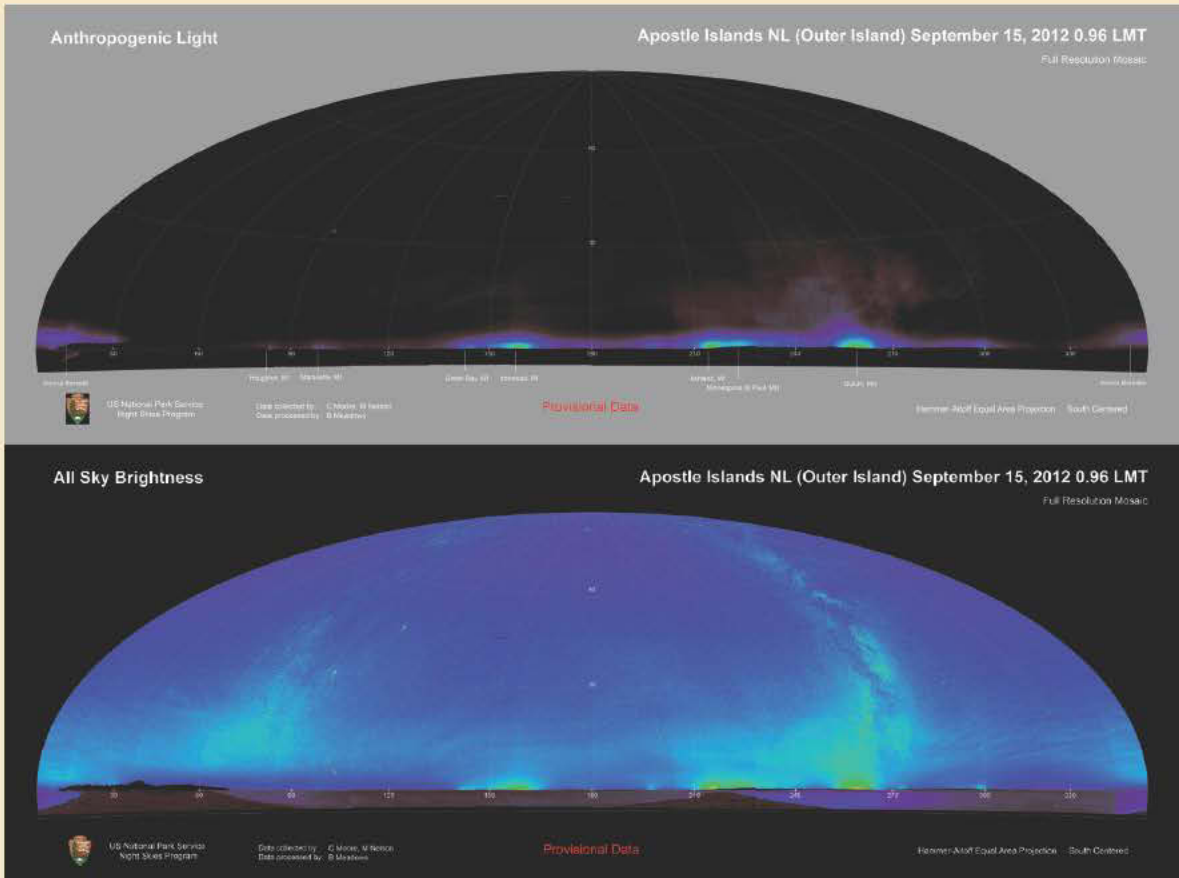
But despite the meddling of humans, the night sky, even though we can't see it, is alive and well. And interest in it, Moore says – absurd as it sounds that the world's largest natural resource would need help getting people's attention – is on the rise: "What I'm betting on, most of all, is that the night sky has always been important to humanity. We're just in this period where we've lost touch with it."

No, says Moore, a former International Dark-Sky Association board director, we're probably not ever again going to see the Milky Way from New York City. "But we can bring the Milky Way back to a lot of backyards," he says, "and we can bring the pristine sky back to parks within a day's drive of every American."

Seeing is believing, the central tenet of the Night Sky Team's work in measuring night-sky brightness. "If we don't measure this resource, we'll never be able to effectively manage it," Moore says.

The team's one-of-a-kind photography system features a research-grade digital camera and robotic telescope mount and laptop computer that communicate via cables. And there are enough customized parts, as cobbled together by Moore's longtime research partner Dan Duriscoe, a mathematics-minded physical scientist, to make even MacGyver – the TV action-adventure hero who somehow always saves the day with duct tape, glue and gum wrappers – jealous.

The telescope mount rotates the camera 360 degrees as it photographs the entire sky, from horizon to zenith, capturing 45 images per row, as the camera looks up, higher and higher into the night. The team then uses computer software to stitch together a panoramic mosaic of images in which all natural light – the Milky Way, stars, planets,




*Even on Outer Island, the most remote point of the Apostle Islands National Lakeshore in northern Wisconsin, anthropogenic light is intruding on the wilderness.*

IMAGES COURTESY OF NATIONAL PARK SERVICE NIGHT SKY TEAM

zodiacal light and airglow – is subtracted, leaving only the anthropogenic light.

No one else is operating this kind of camera system, Moore says. Here's what makes it stand alone:

- First, he explains, the equipment is transportable. That means his team can take the science to the mountain – or the beach or island – and enjoy the flexibility of collecting repeat data from remote sites.
- Second, by measuring the horizon, the camera's images quantify the character of the entire sky. The team can detect small light sources, such as a new box store on the edge of town, before they get overwhelmingly bright. And in so doing, Moore says the system "provides a picture that the public can understand. 'Oh, I get it.' That's very valuable. A picture says a thousand words – our picture has a million numbers in it."
- And finally, by producing a mosaic of the entire sky, the images carry a high degree of precision around the horizon where multiple light sources can quickly change.

In the hands of national park staffs, the data becomes a practical tool: By seeing the sources of anthropogenic light, park officials can then present the evidence to the public, including local governing bodies and business owners who have a say in controlling the lightscape that in turn affects the entire ecological system.

Moore adds that the modeling and isolation of artificial light becomes a precise tool – something almost unprecedented in terms of managing natural resources in national parks where rangers grapple with such fuzzy questions as: What's the impact of global warming?

The night sky, as team member Bob Meadows puts it, is 100 percent restorable. Even when we can't see the heavens, the stars and planets are up there, moving like clockwork. So the ability to measure the unpredictable, the anthropogenic light from ever-changing sources, becomes a powerful tool in accurately tracking condition changes.

The camera system is the backbone of what Moore and Duriscoe, the team's technical leader based in Bishop, Calif., call the Natural Sky Model. Although only two years old, the model was born from the duo's research that began 13 years ago.

The Night Sky Team, with Moore and Duriscoe as lead authors, plans to submit two research papers for publication this year about the Natural Sky Model, showing how it was created and the process involved in isolating anthropogenic light.

In 2007, Moore and Duriscoe teamed with U.S. Naval Observatory astronomer Chris Luginbuhl to write "Measuring Night-Sky Brightness with a Wide-Field CCD Camera," a research article published in the technical journal Publications of the Astronomical Society of the Pacific. Luginbuhl, a longtime dark-sky advocate, helped lead the charge to make Flagstaff, Ariz., the IDA's first International Dark Sky Community in 2001.

The Night Sky Team's research, says Teresa Jiles, the team's outreach and volunteer coordinator, will become the curriculum for the next generation of scientists.

Moore agrees: "Good science endures. If the work is as good as you think it's going to be, it will catch on and other people will pick it up and add to it in ways you didn't think of. It's that lineage of science that goes back to Galileo; it is something I trust."

Ultimately, based on peer review of Natural Sky Model research articles, the team is working toward creating a Sky Quality Index: a 1-to-100 scale, with a perfect natural night sky earning the top score. The idea for parks, though, is not to set an impossible standard, but to raise the bar: Start where you are. Want visitors to be able to see the Milky Way? Perhaps your park needs to score a 50. For another park, it might be a 60.

As Moore explains, most people lack access to the contrast between a dark night sky and a light-polluted one.

"It's important for us to articulate the gap between what is natural and what's available," he says. "Sometimes the science can get bewildering, and it is the responsibility of scientists to make their work understandable for the general public. The Sky Quality Index is one step in this direction, so at a glance, citizens and communities can know where their town or favorite park stands."

## Stars of the Night

CONTINUED FROM PAGE 3

starlight shining on the water and the outline of the island forest where our warm sleeping bags await.

We leave the hard-packed sand at the water's edge and tromp through a sand dune to reach a forest trail we've already traveled once today. Dry reindeer lichen crunches under our feet. Darkness deepens beneath a canopy of aspen, blossom fir and white pine trees. To my relief, Moore and Nelson flip on their headlamps for a larger puddle of luminous red.

After midnight, we'll hike back this way to a sand spit where Moore and Nelson set the camera up. But now, while waiting for the clouds to break, we'll grab some shut-eye.

As I stumble inside my tent, Moore sets his iPhone alarm for 12:45 a.m. An enormous blanket of clouds has seized the sky. The Milky Way is gone. I fall into an exhausted sleep with my winter hat, jacket, jeans and boots on. Much too soon, I'm awakened by Moore's voice outside my tent: "Camille … we have a clearing."

**Friday morning:** Shortly after sunrise, we hike to the sand spit to retrieve the camera equipment. It wasn't a good night, and no usable data was collected.

T-shirts in the Apostle Islands gift shop read: "The Lake is the Boss." So is the weather, and right now, it's winning. What Moore doesn't yet know is that later this morning, the forecast will swing his way: He and Nelson will be back tonight, collecting great data under clear skies.

But right now, Moore's had about three hours sleep. While waiting for our boat, he naps on a yellow pallet on the beach, a wild animal curled up in the sun dreaming of clear skies and dark, starry nights.

## A CONVERSATION WITH THE AUTHOR

# Paul Bogard's *The End of Night*

**Q: WHAT FIRST BROUGHT YOU TO THE TOPIC OF LIGHT POLLUTION?**

A: When you start to learn about the stars, you start to learn about light pollution. I grew up in Minnesota and my family has a cabin on a lake in the north. I was growing up seeing the Milky Way arching from one side of the horizon to the next and more stars than you can count. But it wasn't until I got out of college that I started to learn the constellations. You start to realize how important darkness is and how light robs us of dark. I pretty quickly started to learn about the importance of darkness for all the other subjects that I talk about in the book.

**Q: HAS DOING THE RESEARCH FOR THIS BOOK CHANGED YOUR PERSPECTIVE FOR NIGHT AND OUR NEED FOR IT?**

A: At our cabin in northern Minnesota, on a moonless night, especially in the woods, where you can't see your hand in front of your face, it's pretty easy to feel that ancient human fear of the dark. I admit that even still I have some of that, but what's really changed for me is that I've really come to respect the dark far more than fear it. I realize how important it is for life on Earth. So, even though I have that little sliver of fear, it's much more a sense of respect for darkness.

**Q: WHAT DO YOU HOPE IDA MEMBERS AND DARK SKY SUPPORTERS WILL TAKE AWAY FROM READING YOUR BOOK?**

A: I really hope that IDA members and dark sky supporters realize it's not just about the stars, that general darkness is so important for so many reasons; from the ecological reasons to the spiritual and mental health reasons. I think one of the challenges that those of us who love the darkness and the night have is that it is too easy to be pigeonholed; that the only people light pollution affects are people who look at the sky. That is not true. It is up to us to change that perception.

We can't rely just on remote, dark locations. We can't rely on thinking that there will always be a West Texas Star Party, so we have to care about the light pollution in Dallas. If we don't act now to control our use of light at night eventually every place will be affected and we won't be able to drive or fly away far enough to reach darkness. I just want people to not count on those remote dark places to always be there. In addition to that, if we rely on remote places that just cuts the experience off from so many people who might otherwise join us in our concern for darkness.

**Q: HOW ABOUT FOR PEOPLE THAT HAVE NEVER HEARD OF LIGHT POLLUTION?**

A: I would love to have everybody, but those folks especially, to come away with a deep appreciation for how important darkness is, for so many reasons. I would like people to come away with an appreciation for the beauty of darkness itself, and how it holds beauty with light. I love that idea that all life evolved in bright days and dark nights and how we need both. But also, I would like to leave them with a sense that this really is a problem that we can handle. There are so many other problems that seem so out of our control, and so huge, it's easy to wonder; "Well, what are we going to do?" Light pollution is so readily in our grasp to control. I would like people to come away feeling a sense of optimism about it; not that it's going to be easy to control, there are certainly challenges, but it really is something we can control.

**Q: WHICH PERSONS MADE THE LARGEST IMPACT ON YOUR THOUGHTS WHILE INTERVIEWING FOR THE BOOK?**

A: I would mention a number of people.

Fabio Falchi, who created the World Atlas of Artificial Night Sky Brightness along with Pierantonio Cinzano. That atlas shows light pollution in such a dramatic way that you can't help looking at it. I think Fabio has dedicated himself in a way that few of us can imagine doing. I really admire his dedication to darkness and his dedication to addressing light pollution.

I've known Chris Luginbuhl since 2005. I met him at an IDA convention in Tucson. He has taught me so much about the issues.

My friend and former colleague up in Wisconsin, David Saetre, is the pastor and professor of religion at Northland College. He was just so wise and appreciative of the spiritual and metaphorical value of darkness. Sometimes that can be a hard thing to talk about, a hard thing to help people understand. Even if they understand losing all the stars and how it's bad for our bodies, it can be hard to help people understand that we need it; to make people understand the importance of metaphorical darkness. We had this wonderful three-hour inter-

view where I wanted to include the whole interview in the book. He's just one of those guys that you're just really grateful to have the chance to talk to.

**Q: IF SOMEONE WERE TO READ ONLY THE LAST PAGE OF YOUR BOOK WHAT WOULD YOU WANT THAT PERSON TO TAKE AWAY FROM THE PAGE?**

A: Three things about the last page that I love are:

1) The Wendell Berry poem, because that's the whole poem, and it's just a short message about how if you want to know the dark, go dark, go without light. I love that message.

2) The point I make about how this experience of standing under the natural night sky used to be completely commonplace. I mean, every night as human beings we would walk out and see a sky like this, and now it's become so rare. That's remarkable. Most people just have no idea what they're missing.

3) Everything is still out there. There's so many things we're never going to get back, the kind of animal or bird life that used to inhabit this planet, there's just probably no way that that's going to happen. But we can do a lot to bring back a marvelous night sky. It's sort of like it's out there waiting for us to get our act together, and I love that it hasn't gone anywhere. You know we're the ones who put this blinding light between us and the night sky, but it's still out there.

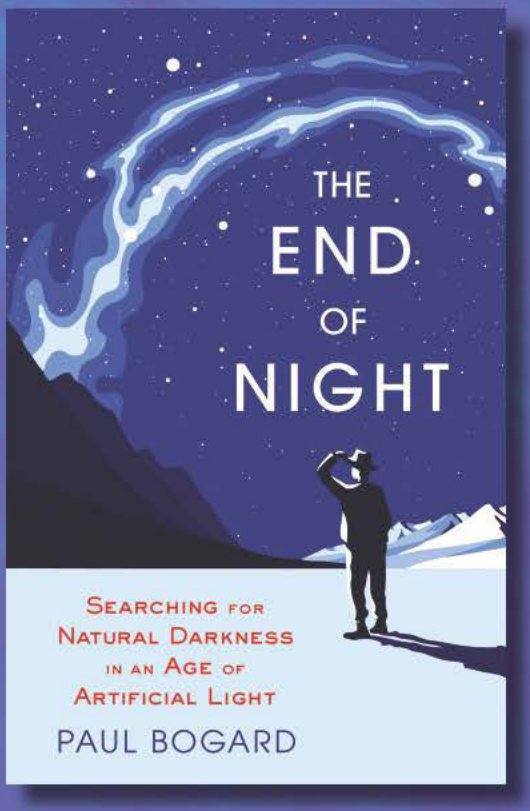
**Q: WHAT MADE YOU DECIDE TO END THE BOOK WITH A STAR PARTY?**

A: That was an unconscious decision. It was just an instinctual way to end. People will take the experience of a star party back with them, wherever they live. They'll go back to places where the sky doesn't look anything like that and maybe they'll start to think, "Well, why is that?"

I really like that sense at the end of the gathering of all sorts of people, all of whom are appreciating darkness and all of whom are feeling like 'wow this is so amazing' and "I never knew it was like this' or 'I haven't seen this in forever' – just that sense of togetherness under the night sky. I wanted to end on that note.

**Q: DO YOU PLAN TO WRITE FUTURE BOOKS ABOUT LIGHT POLLUTION AND DARK SKIES?**

A: I do. I have probably six different ideas that I'm working on right now and they all revolve around, in someway, the importance of the natural world. I really want people to understand how beautiful and wonderful and amazing and how vital the natural world is for itself and for us as well. Just trying to find the next angle where I can, I hate to say, shine a light on the next subject. I wish I could just write another book about night because, you know, I love the subject.




Embarking from a childhood of dark nights spent at a cabin at the edge of a Minnesota lake Paul Bogard set out across the globe to investigate the end of night with his dog and best friend, Luna. After gathering his findings together, Bogard ordered them into a book composed of nine chapters that mimics the Bortle Scale, taking his readers on a journey from the brightest nights to the darkest. Shedding light on the basic needs of planet Earth and our own human bodies for the dark night, Bogard shows us what it means to live in a world of artificial light.

Paul Bogard teaches creative nonfiction at James Madison University, sharing his passion for writing about ecology and the natural world. Along with "The End of Night: Searching for Natural Darkness in an Age of Artificial Light" he is also the author of "Let There Be Night: Testimony on Behalf of the Dark." Both may be purchased, and a portion of the cost donated to fighting for the night, through the IDA website at *www.darksky.org/shop*.

## LANDSCAPE ASTROPHOTOGRAPHY

# The Search for Stars in Light Polluted Skies

*Text and Photographs by Laurent Laveder*

When you "just" try to capture some deep-sky objects (mainly nebulae and galaxies), the skies have to be the darkest possible to increase the contrast between the black sky and the faint objects. But when you practice landscape astrophotography, try to link the sky with the landscape as it naturally appears when you're outside looking at the sky. Standing at the surface of the Earth, your eyes can embrace the sky and the landscape at the same time. In that case, a very dark sky won't be the best option.

If you enjoy capturing landscape astrophotography, you have to find a good compromise between the darkness of the sky and the luminosity of the landscape. I'm lucky, not only because I'm smart, funny, and handsome, but also because I live in West Brittany. This region is the northwestern "nose" of France. Surrounded by the sea (except to the East), I don't have to tolerate the light pollution from the rest of France. And one thing I didn't mention; Brittany is a picturesque area.

If I want to take a photo of the Milky Way in Sagittarius I just have to find a beach along the southern coast to avoid light pollution. The only sources of light come from behind me and from Spain, some 500-km in front of me. No need to tell you that Spain isn't an issue! If I want to capture the inconspicuous Zodiacal Light I can find a cliff along the West coast without any light in front of me until North America, about 4.000-km away.

You think it looks like Paradise? That's not necessarily true; because of course France is a modern country with illuminated towns. But fortunately, a bigger town has only 300,000 inhabitants in its suburbs. And like any country in the World, the South coastline is more populated, but not like the French Riviera with one 60-km long city. Here in Brittany, there are many little towns from 2,000 to 20,000 people with kilometers of uninhabited area between each of them.

So Brittany isn't Paradise, but it really looks like Heaven! But a rainy one! It's the rainiest region of France with about 140 days a year of rain but that doesn't mean that it will rain all day long. The best way to be reactive is to be ready to take some photos when the sky is clear. Landscape astrophotography is perfectly adapted for this, because all you need is a camera, a lens and a tripod. Plus, exposure times are short enough to freeze the stars (about 15s with a 24mm lens, 8s for a 50mm, etc.).

CONTINUES ON PAGE 11

*PAGES 8-9, TOP*
*On the right, see the orange halos of light pollution. On the left, see the blue sky due to the presence of a Crescent Moon (just right of the semaphore). Here, the beams of the lighthouse expose the landscape well.* DETAILS: CANON 5D MARK II WITH SIGMA 50 MM F/1.4 STOPPED DOWN TO F/2.0. 4 S AT 3200 ISO. PANORAMA OF 30 PHOTOS.

*PAGE 8, BOTTOM*
*The beams of light formed by the little port of Kerdruc filtering through the wood can't mask the band of the Milky Way, despite the blue light of the rising Moon behind the hill on the left.* DETAILS: CANON 5D MARK II WITH SIGMA 50 MM F/1.4 STOPPED DOWN TO F/2.0. 8 S AT 3200 ISO. PANORAMA OF 25 PHOTOS.

*PAGE 9, ABOVE*
*If you're stuck in a heavily light polluted city, you can always take some nice photos of the Moon or planets with buildings.* DETAILS: CANON 5D MARK II WITH SIGMA 100-300 MM F/4.0 AT 300 MM STOPPED DOWN TO F/20 AND F/9.0. 1/200 AND 1/5 S AT 1600 ISO. PANORAMA OF 5 PHOTOS.


## ABOUT THE BOOK

"Shower of stars in Brittany" is a book (available in English or French) of 60 landscape astrophotography panoramas taken in Brittany. The photos are printed on double or triple pages for a size of 58x20 cm and 85x20 cm. At the end of the book, a table gives the details for every photo including caption, exposure time, camera, lens, aperture, etc., so that everyone can try astrophotography with his or her own landscapes! More information about the book and how to purchase it can be found at *http://showerofstars.pixheaven.net*.

## ABOUT THE AUTHOR

Laurent Laveder is a professional photographer specializing in landscape astrophotography with a degree in physics. He lives in Southern Finistère, Brittany of France where he enjoys photographing the sky and the land, with and without light pollution. He's a member of The World At Night and the creator of the famous series called "Moon games" where his wife, Sabine, seemingly interacts with the moon. More information about the collection of photographs is available at *http://moongames.pixheaven.net*. More on Laveder may be found on his website at *www.pixheaven.net*.

# THE DARK SKIES OF WALES

# Brecon Beacons National Park

PHOTO CREDIT: MARTIN GRIFFITHS

Within hours after being designated the 5th IDA Dark Sky Reserve in the world, and the first in Wales, staff at the National Park and Park Society began to receive requests for interviews. The BBC, *The Daily Telegraph*, *The Guardian*, *The Times of London*, and more raced to hear the latest about this location's newfound status recognizing brilliant starry skies. Even students from Brecon High School joined in and interviewed representatives of the Brecon Beacons Park Society and Usk Astronomical Society about the status as part of their work with the BBC News School Report project (you can download it online *http://ow.ly/lKFnM*).

It's been only a few months since Brecon Beacons reached its goal, but since then, work to educate visitors about the need for darkness has not slowed. Events showcasing solar activity, meteor showers, and general stargazing give Brecon Beacons life that continues throughout the day and into the night. Also, hundreds of school children have taken part in a dedicated program to learn more about the problems of light pollution for the night sky and local wildlife.

Although the sheep outnumber the residents of the new IDA Dark Sky Reserve thirty to one, visitors for evening events flock to Brecon Beacons, averaging 80 visitors per event. Tourism businesses have also been signing up in the hundreds to participate in training courses, and there are now twenty-two newly qualified dark sky ambassadors who are qualified to tell their residents just how special the night sky is in the Brecon Beacons.

The national park boasts ten top stargazing locations on its website including Usk Reservoir, Crai Reservoir, Llanthony Priory, Hay Bluff, National Park Visit Center, Pen Rhiw Ddu, and more – many of which are now gaining the UK designated Dark Sky Discovery Site status. These locations provide unique opportunities for visitors to venture out on their own and experience the solitude and beauty offered by the IDA Dark Sky Reserve.

Ruth Coulthard, funding development manager for the National Park Authority, and one of the applicant writers says, "the response to us gaining the status has been incredible – everyone from local businesses, residents, and visitors have been overwhelming. We are now working hard to build upon this support to encourage more dark sky friendly lighting in the park to reduce light pollution and encourage more people to witness our amazing night sky. We are very grateful for the support of IDA and appreciative of them awarding us this fantastic accolade."

PHOTO CREDIT: WALLY PACHOLKA, ASTROPICS.COM

## FROM THE DESERT TO THE DARK
# Death Valley National Park

Death Valley National Park may seem dry and desolate from the perspective of a hiker at mid-summer, but quite the opposite view is available to a stargazer at midnight. As of February 2013, Death Valley took the prize for being the largest, at 3.4 million acres, IDA Dark Sky Park designated yet.

This location is also currently considered the lowest, driest, and, adding another superlative to the list, it can now be called one of the darkest locations in the USA. Amateur astronomers and astrophotographers from around the world visit the area specifically for its dark skies and serene atmosphere.

Compared to Las Vegas, a mere 60-miles from the park's eastern borders, Death Valley National Park maintains a practical utopia for the appreciation of a truly star-filled night sky. Measurements of the night sky even reached the point at which some of the dimmest and most astonishing astronomical phenomena are visible in the right conditions including the Milky Way, the Zodiacal Light (a glow often seen at sunset or sunrise caused by sunlight scattering on dust in space), and occasionally the Gegenschein (similar to the Zodiacal Light, but much rarer to see and directly opposite the sun).

Ranger Cheryl Chipman, who also helped submit Death Valley's application says, "Having the International Dark Sky Park designation brings additional attention to Death Valley's world class night skies. It will make Death Valley National Park a destination for those who value the celestial universe, and will inspire awe in all those who experience the darkness, quiet, and miracle of the Mojave Desert. Our hope is that it will foster appreciation of this wonderful resource that is becoming increasingly rare in a developed world."

Begin making plans to see these amazing sights. With its dark sky designation, Death Valley expects to see a substantial increase in attendance rates. The best times for viewing the night sky in the new IDA Dark Sky Park are October through April. And, if you really want to see the absolute best of what Death Valley has to offer, plan to stay in the northern part of the park. Exceptionally dark locations include the Mesquite campground, Ubehebe Crater, Saline Valley, and Hunter Mountain.

Death Valley rangers recommend that you bring good tires if you plan to drive off of paved roads, lots of water, telescopes, and maps (cell phone service is limited and GPS units are not always reliable). If planning to off-road, always check weather and road conditions beforehand. Ranger programs are offered daily and more details about them can be found at *www.nps.gov/deva/planyourvisit/tours.htm*

To learn more about this and other parks, reserves, and communities designated as IDA Dark Sky Places, visit *www.darksky.org/idsp*.

## Astrophotography

CONTINUED FROM PAGE 9

After years of experience, I can give you three pieces of advice:

- Try to put something in the frame that makes a link between the landscape and the sky (a tree, a lighthouse, a mountain, someone, etc.). Otherwise, your photo will look like a composite!
- To heighten your landscape, find a powerful source of light that extends into the sky (it will ensure that the link I spoke about in advice #1 is visible). It might be shocking for people involved in light pollution fighting, but a powerful source of light in a dark place doesn't hide the stars too much.
- If you need some light to illuminate the landscape wait for the moon. A quarter or crescent moon is able to light more or less of the foreground, casting some long shadows that enhance the photo; it also gives the sky a blue shade I really like.

We're all waiting for the return of dark skies with moderated light pollution. But as we will probably wait a long time, let's find a way to take creative pictures of the heavens with the sky we have. Then, share your photos with people. They will be amazed by the beauty of the sky and become new ambassadors for the protection of the night.

# Translating "Losing the Dark"

IDA's short new planetarium show, *Losing the Dark*, was released in late February on YouTube and as a free download from the IDA and Loch Ness Productions websites.

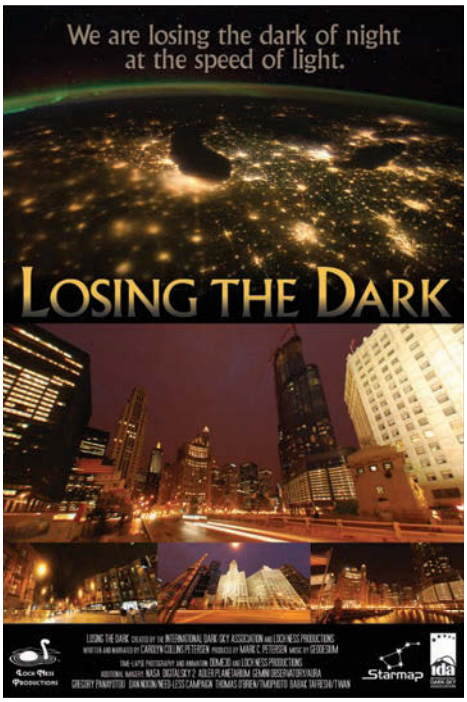
Just as the English version was being finalized, plans were underway to produce translations of the script and new narrations to make the show available to even more dark sky advocates speaking other languages. After all, light pollution is a global problem, so the show's message needs to have a global reach.

As of this publication, fully translated versions have been produced in French, German, Hindi, Japanese, Korean, Mandarin, Polish, and Russian, Spanish, and Turkish. Work is underway to finish up versions in Cantonese, Dutch, Greek, Hebrew, Italian, and Portuguese.

This work has been possible only through the efforts of the numerous people who have given to the project in many ways. Volunteers have provided their time and expertise to the project, while others have made direct financial contributions to help pay the production costs needed to assemble the versions for each language. Each new language narration is added in with the show's original music and visuals. The final result is made available in different file formats to accommodate the wide diversity of equipment and techniques used in planetarium theaters, and to allow the show to be viewed on a variety of flat screen devices.

To help fund the effort, IDA created its first Indiegogo crowdfunding campaign. The campaign officially raised $4,667 for the effort. However, donations continued to come in after the campaign's end, bringing the total higher and helping us to reach our goal.

Looking at the YouTube stats reveals the show's appeal. Combined, the different versions have had nearly 25,000 views on YouTube at the time this was written. If you haven't seen it take a look. You'll find the show and the download links at *www.darksky.org/losingthedark*





***A significantly noticeable trend towards warmer CCT LED sources and improved glare control optics was also prevalent at this year's expo.***

# Light Fair 2013

Light Fair 2013 was held in April at the Pennsylvania Convention Center in Philadelphia. This year's expo featured several manufacturers with Amber LED turtle-friendly products. Lighting Sciences Group (see photo at left) featured a turtle-friendly lighting display comprised of a variety of amber LED fixtures. Zenaro Lighting included several variations of narrowband amber LED replacement bulbs. IDA was pleased to see an emphasis on ecologically responsible lighting technologies at this year's show.

A significantly noticeable trend towards warmer Correlated Color Temperature (CCT) LED sources and improved glare control optics was also prevalent. The majority of LED fixtures featured at Light Fair recently attained IDA's Fixture Seal of Approval, which has established itself as a core requirement for outdoor lighting products and continues to grow.

Edward Smalley, director of the Municipal Solid State Street Lighting Consortium, Seattle City Light, gave a seminar entitled *LED Street Lighting: Changing The Landscape of the Night Sky*. This presentation outlined the implementation of LED Street Lighting and a case study of the City of Los Angeles conversion to 140,000 LED street lights.

# IDA at NEAF

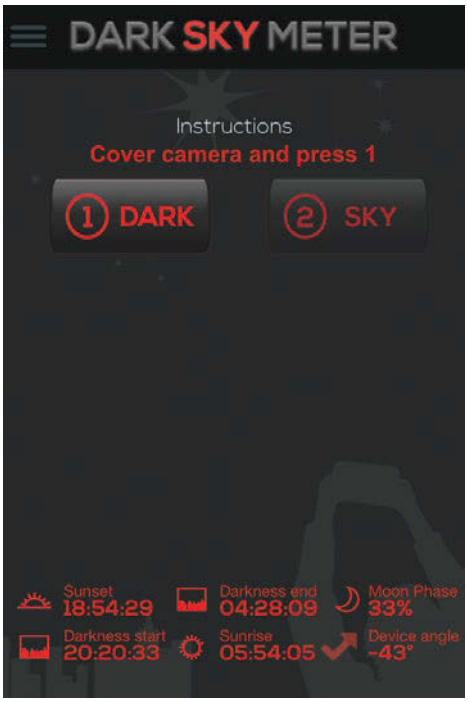
Last April, IDA again attended the Northast Astronomy Forum (NEAF) in Suffern, NY. IDA's Managing Director Scott Kardel gave a talk on light pollution where he showed off the new Dark Sky Meter iPhone app. The app, and our new *Losing the Dark* video, were both big hits at the IDA booth.

As always, NEAF is a great place to meet new and continuing IDA members. Many IDA supporters stopped in to join or renew their memberships, to say "hi", and to discuss issues related to outdoor lighting. IDA's Bob Parks and Scott Kardel staffed the booth, along with volunteers Milt Rooney, Graeme Birchall, David Ingram, Jonathan Nicholas and John Sillasen. The volunteers did a wonderful job of providing expert help and information to our many visitors.

We were especially happy to see some of IDA's corporate partners at NEAF. Astropics, Celestron, Sky & Telescope, Southern Stars, Stellarvue, and Tele Vue were all in attendance. Celestron generously donated a 6-inch Sky Prodigy telescope as an IDA raffle prize. The telescope was won by Chris, a budding young stargazer, who will likely enjoy it for years to come.


*International Dark Sky Association Managing Director Scott Kardel and Chris, the Celestron telescope winner, with the prize.*

# New Apps for Measuring Night Sky Brightness




*The Dark Sky Meter app is available for iOS users in both a free 'Lite' version and $3.99 'Pro' version.*

***The iPhone app is available at http://www.darkskymeter.com/ while the free Android app can be downloaded from https://play.google.com/store/apps/details?id=com.cosalux.welovestars***

Smart phone users interested in light pollution are in luck as two new apps, one for iPhone and one for Android, recently debuted allowing users to easily measure night sky brightness and report the results to a global database.

IDA worked with the developer of the new iPhone app, the Dark Sky Meter. It uses the phone's camera to accurately measure the brightness of the night sky and deliver the results to a central database creating a worldwide map of light pollution (see the map at *www.darkskymeter.com/map*).

The "pro" version of the app sells currently for $3.99 and compares favorably to a handheld device that retails for $130. Results can be viewed on a map that allows users to compare their results with other observers around the globe. The "Lite" version of the app is free for download, allowing anyone to contribute data. It provides a more simplified version of the results, showing how many times brighter a sky is as compared to a natural night sky.

The ease of making the measurements with the app makes it a great tool for public outreach programs, such as IDA's new Save Our Stars program. Crowdsourcing the measurements at events like star parties and night sky outreach events improves the accuracy of the measurements, increases the public's awareness of light pollution, and contributes to our understanding of the problem.

App developer Norbert Schmidt and engineer Harro Treur developed the Dark Sky Meter. During the development process, they took 5,000 measurements by hand and filled in 120 Excel spreadsheets with measurements before releasing the app. Each new measurement collected improves the app's algorithms making the data more accurate.

The other app, Loss of the Night, for Android was developed by IDA Board Member Christopher Kyba and researchers from the German "Verlust der Nacht" project. Because of wide variability of cameras across the Android platform, their app helps users to observe visible stars and identify stars washed out by light pollution to estimate sky brightness. Data from the Android app will be plugged into the GLOBE at Night citizen science project that measures light pollution.

# CIE 100th Anniversary Meeting in Paris

IDA attended the CIE 100th Anniversary Meeting held in Paris from April 12 – 19, 2013. The CIE is the International Commission on Illumination. IDA has been active in CIE for many years and it continues this involvement with the Technical Committee 5-27: Artificial Lighting and its Impact on the Natural Environment. IDA Executive Director Bob Parks chaired the third meeting of the committee and welcomed several new members to the group. The committee has set a schedule to deliver a preliminary report by the end of this year. The first phase of the work is collecting and reviewing all published research on the subject. The report will detail what is currently known and make recommendations on areas that need additional research.

When complete, the TC 5-27 report will become the basis for international outdoor lighting guidelines across the globe. The hope is that it will also encourage investment in critical research and will foster a new awareness of ecologically responsible lighting design.

# France Turns Down Lights for the World

In April, IDA met with French officials to discuss their work to pass the first national law requiring businesses to extinguish exterior lighting between 1 A.M. and 7 A.M. Representatives from the French Ministry of Ecology, Sustainable Development and Energy, and the French light pollution advocacy group l'Association nationale de Protection du Ciel et de l'Environnement Nocturnes (ANPCEN) were in attendance.

Diane Szynkier, Technical Advisor to the Minister Delphine Batho, and Anne-Marie Ducroux, President of ANPCEN, accepted awards of recognition from IDA's Bob Parks at the ministry's offices in Paris.

The new law took effect in July 1, 2013 and is expected to annually save 250,000 tons of $CO_2$ and the equivalent energy use of 750,000 homes. In presenting the awards, Mr. Parks praised France for its new protections that build on other light pollution laws that have been introduced since 2009. He said, "France has demonstrated global leadership by enacting legislation that will dramatically reduce energy consumption and $CO_2$ emissions, save money, and protect the night. This is a common sense energy policy that all countries should adopt."

IDA Board Member Martin Morgan-Taylor wrote about the new law for PublicLaw.net, saying that it "is a product of the 'Grenelle Environment Round Table' (Le Grenelle Environnement) meeting in France, which was instigated by President Nicolas Sarkozy, in order to legislate for the environmental problems associated with ecological and astronomical light pollution. This followed a call from the astronomical community in France to legislate against the degradation of the night sky due to the increase in lighting associated with urban sprawl." He concludes that the law is a "significant step forward" and that it will reduce light pollution, save energy, and cut carbon emissions. You can read his full analysis online here *http://ow.ly/mq5VJ*

***For more information on the new law, visit the French Ministry of Sustainability website at http://www.gouvernement.fr/gouvernement/une-nouvelle-reglementation-pour-les-eclairages-nocturnes***

***Visit the ANPCEN website: www.anpcen.fr***

*(L to R) Project Manager Lory Waks, light pollution, electromagnetic and acoustic waves building; Head of Mission Pascal Valentin, noise and physical agent; Technical Advisor Diane Szynkier, technological risks, nuclear safety, waste, environmental health and green industries; President l'Association nationale de Protection du Ciel et de l'Environnement Nocturnes Anne-Marie Ducroux; IDA Executive Director Bob Parks.*

# IDA Chapter News

## NEW CHAPTERS

IDA has two new chapters in the state of Utah. Brent Bennett, from Apple Valley is heading up the IDA Utah chapter (*www.swscience.org/IDA-Utah.html*), while Janet Muir runs the new IDA chapter for Ogden Valley, Utah. Check out their impressive website at *http://www.starrynightsutah.org*.

## IDA HARMONY FLORIDA

The annual Dark Sky Festival in Harmony Florida has been so successful that it will be expanding to two nights in 2014. This year, the festival had telescopes set up from four different astronomy clubs, two stages of speakers/entertainers, displays from NASA, planetarium shows, and much more. The event will be held from February 28 to March 1, 2014, with attendance estimates over 10,000. If you are interested in being a speaker or exhibitor for the festival, please contact Bill Fife, Harmony festival director, at *bfife@harmonyfl.com*.

*In Palm Beach, two young sea turtle lovers show their appreciation and hope for the future of hatchling sea turtles.* PHOTO BY CHRISTINA MENDENHALL

## IDA PALM BEACH COUNTY FLORIDA

IDA's Palm Beach County Chapter organized a festival as well. Working with Palm Beach County's Dept. of Environmental Resources Management, they hosted the event in early March at the Okeeheelee Nature Center in West Palm Beach, Florida. The festival was a free, family friendly event and with over 1,000 people participating, festival attendance far exceeded expectations. It was funded entirely by a grant from the Sea Turtle Grants Program, which is funded from proceeds gathered by the sales of the Florida Sea Turtle License Plate. Learn more at *www.helpingseaturtles.org*

The chapter has been very busy across the area with appearances, night hikes, presentations, screenings of *The City Dark,* and more. Learn about all of their activism at *http://idapalmbeach.org*

## IDA NEW YORK

Last Spring, New York City Dark Sky advocate Graeme Birchall alerted the New York Chapter to an impending project being promoted by the NYC Economic Development Corporation (EDC). The project ($1 million cost) was intended to bring "attention" to Lower Manhattan by projecting images at night onto buildings.

The projections were to be initiated on Memorial Day and continue for three years. A graphic design firm was selected and a presentation made to the local community board in which the description made it clear that they had not considered all the implications to the environment, including issues of light trespass, as well as driver and pedestrian safety due to distraction.

IDA Chapter Leader Susan Harder, working with the like-minded NYC Audubon, spoke with the EDC project managers to point out some of the issues that would result from these installations.

Lower Manhattan is increasingly residential, as historic office buildings are being converted to high-end condominiums. At the public hearing and in comments to *The New York Times* article, residents spoke out against the project as well, stating: "If I wanted to live next to light installations, I would live in Times Square. I can actually see a couple of stars in the sky at night in Lower Manhattan and I would like to keep it that way. I would rather see the stars in the sky than stars on the street."

Good news: the project has been dropped. NYC Audubon and the International Dark Sky Association successfully worked together to point out the numerous environmental and safety issues associated with these "billboard" type projections onto buildings. Citing funding issues, the EDC pulled the project. It would have cost millions of dollars and would have been a safety hazard for pedestrians and drivers whose attention would have been distracted.

***For more information go to:***

http://cityroom.blogs.nytimes.com/2011/12/13/in-lower-manhattan-a-light-show-looms/

http://www.nycedc.com/sites/default/files/files/rfp/qa-documents/Lower%20Manhattan%20Light%20RFP%20QA%2002%202012.pdf

CONTINUES ON PAGE 16

# Chapter News

CONTINUED FROM PAGE 15

### IDA TEXAS

After years of service, Benjamin Jones has stepped down as the chapter leader of IDA Texas. We thank him for his time and dedication to the cause. Stephen Bosbach is the new chapter leader for IDA Texas.

Stephen and the Texas Chapter are currently working with the Texas Parks and Wildlife Department to assess the outdoor lighting in the Texas state parks and to help them install dark-sky friendly lighting. We will update their progress in a future issue of *nightscape*.

### IDA WISCONSIN

Longtime IDA member Jerome P. "Jerry" Stueber of Muskeo, Wisconsin passed away earlier this year. Jerry's family asked that memorial contributions be made partly to IDA. While a teacher at Muskego High School, he installed an observatory and ran the school's astronomy club. The observatory has been named in Jerry's honor. IDA Chapter Leader Scott Lind is working with the high school to improve its lighting.

### IDA INDIA

IDA India had its induction party in early April. Chapter Leader Arun George organized the event that was held at the Kerala State Science and Technology Museum. Oommen Chandy, Chief Minister for Thiruvananthapuram India, was in attendance. Indian poet Sugathakumari talked about the beauty of the dark and was presented with an award. The Kerala State Biodiversity Board sponsored the event.

### IDA TOKYO

IDA Tokyo supported a public symposium on light pollution, which was held in Omiya (near Tokyo) on March 24. Chapter leader Nobuaki Ochi talked about IDA's worldwide activities including GLOBE at Night and skyglow measurements in front of a full audience of 80 people. IDA's *Losing the Dark* video was also shown at the event.

★ ★ ★ ★ ★ ★ ★

## MARK YOUR CALENDARS!

IDA's Annual General Meeting will be held in Tucson on Friday, November 15, 2013. The event will bring together a wide-range of dark sky advocates to discuss night sky preservation. IDA will be reporting on its major new sea turtle lighting program and the IDA Board of Directors will hold its annual public business meeting.

Astronomy enthusiasts can stay over through the weekend to enjoy the 2nd Annual Arizona Science and Astronomy Expo on Saturday and Sunday.

Registration details will be posted soon on the IDA website.

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## Now Accepting 2013 IDA Award Nominations!

Each year IDA likes to recognize the exceptional people that make the pursuit of a more natural nighttime environment a success. **If you would like to nominate someone for his or her contributions to the fight for the night please email IDA at ida@darksky.org.** In your email include the name of the nominee, contact information for the nominee and yourself, the award you would like to nominate him or her for, and a short explanation of how this person has made a difference.

Awards currently seeking nominations include:

- Hoag-Robinson Award
- Galileo Award
- Dark Sky Defender Award
- Rising Star Award (for children and young adults)
- Lighting Design Award (separate materials required, see website)

**For more information about each of these awards and previous winners please visit www.darksky.org/awards and see the bottom of the page.**

# The IDA Dark Sky Giveaway

Once again the IDA Dark Sky Giveaway is offering you the opportunity to win your choice of four different Tele Vue eyepieces. The eyepieces up for the prize are worth about $3,000. Online entry is available to IDA members only. It's easy to become a member by joining at *www.darksky.org/join*. Memberships start at just $35, making this the perfect time to join. To enter the contest visit *www.darksky.org/giveaway* and click the link to the contest. Official rules are also located at the contest entry page. Enter to win this great prize by July 20. The winner will be announced August 15.

# Starmap

## The Universe just got smaller.

**Starmap** is the perfect app for viewing the universe with realistic maps and detailed factual information. Based on the iPhone compass geo-location technology, **Starmap PRO** pinpoints your exact location and lets you view the sky in real-time, and zoom in/out on objects in the sky as you please.
**Starmap** has several other features to enhance your space-viewing experience, including information and images on celestial objects, sky-gazing information specific to your area, and more. This application is perfect for the casual stargazer or the professional astronomer.

**star-map.fr**

Available on the App Store



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