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night scape

A PUBLICATION OF THE INTERNATIONAL DARK-SKY ASSOCIATION

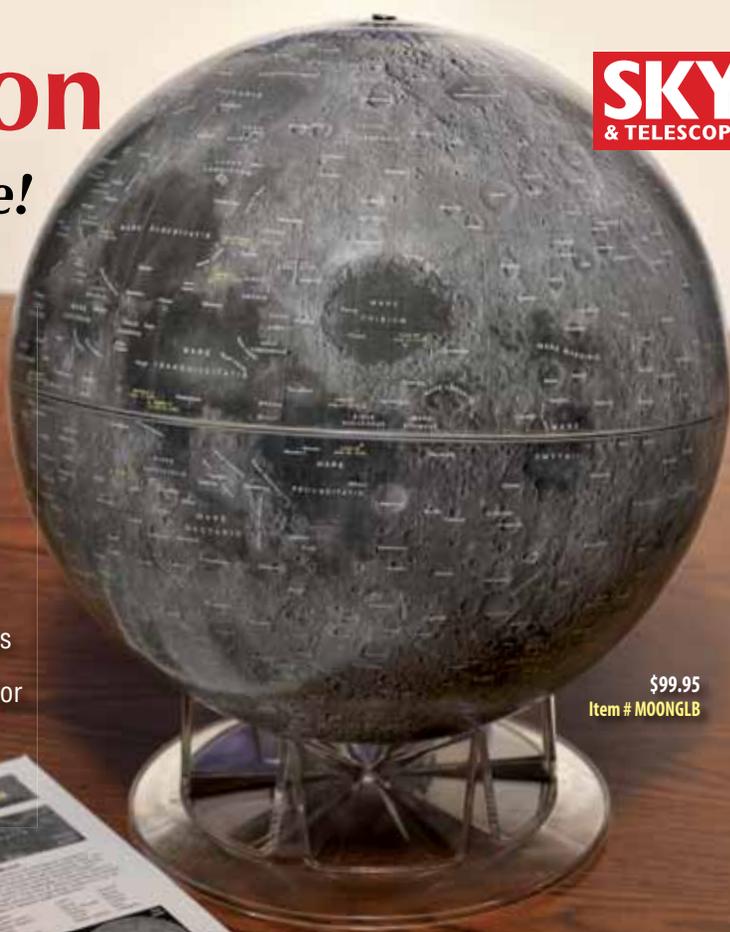
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From the Executive Director

Dear Members,

The International Dark-Sky Association's (IDA) Annual General Meeting is just around the corner and I look forward to celebrating our 25th anniversary with you. IDA staff and I recently returned from the Florida Gulf after completing an on-site survey of almost 100 miles of the coast, as part of the Florida Fish and Wildlife Conservation Commission sea turtle habitat restoration project. While the work was grueling at times, we were amazed by how dark the skies are over large sections of the Panhandle. The state parks we visited have done an exceptional job of ensuring that lighting is installed only when absolutely necessary. It gives us great hope that implementation of our lighting designs for adjacent residential and commercial properties will substantially increase sea turtle nesting and hatchling survival rates.

I am pleased to welcome two new staff members to our Tucson office. John Barentine is our new program manager and Cheryl Ann Bishop is communications and public affairs director. John will be handling several programs including the International Dark Sky Places (IDSP), Save Our Stars (SOS) and Technical Training. In addition to fielding inquiries from the public and press, Cheryl Ann will handle all communications including *Nightscape* magazine and IDA E-News as well as social media.

As we begin our next 25 years, we are giving a great deal of thought to how we can enhance our outreach efforts and continue to improve our programs. For the last several years, IDA has had to do more with less. Like many nonprofits, the difficult economy forced deep cuts in our organization. As we "turn the corner," we are committed to finding new sources of funding to increase our ability to meet the challenges ahead. At the same time, we all need to spread the word and actively recruit new members to join IDA in its mission. A strong, active membership base will send a powerful message to government and business leaders, as we urge them to adopt better outdoor lighting policies.

In that vein, I issue a simple challenge: Recruit a Friend. If each one of us commits annually to asking a friend, relative or neighbor to join IDA, it would benefit us financially, but more importantly, it would greatly increase our ability to raise awareness worldwide. It starts by educating your friends about light pollution and describing why you support our cause. As you share our mission with others, let them know how much we need their support. With your help, we can double our membership, which will allow us to advertise to promote IDA and attract even more new members. Once the process takes off, it will snowball and the possibilities are limitless.

In recognition of your commitment, we are introducing a new annual award to the member who recruits the most new members each year. Each award recipient will receive a gift of our appreciation ranging from gift certificates for the IDA Store to astronomy equipment from our corporate partners.

With your help, we will grow IDA to meet the challenges of the next 25 years. Thank you so much for your steadfast support.

Thank you,



Bob Parks, Executive Director

On the Cover Sean Parker, a Tucson-based independent photographer, took this photo in Zion National Park. Sean specializes in landscape, astro- and time-lapse photography. To see more of his work or learn about his photography workshops, visit him on Facebook, www.facebook.com/seanparkerphotography, and check out his website, www.sean-parker.com



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)

CHAPTERS

Australia, Österreich/Austria, Canada (2), República de Chile/Chile, Česká Republika/Czech Republic, 中国/China(4), India, Éire/Ireland, ישראל/Israel, Ελλάδα/Greece, 香港/Hong Kong, Magyarország/Hungary, Italia/Italy, 日本/Japan, Repubblika ta' Malta/Malta, Slovenija/Slovenia, Schweiz/Switzerland, Sverige/Sweden, United States (36)

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Protecting Night Skies

A RETROSPECTIVE

In its 25 years of existence, the International Dark-Sky Association has evolved from a tiny advocacy group into an organization that helps to shape the lighting industry. Here are some highlights.

- 1958** Flagstaff, Ariz., passes the first dark sky legislation in the world.
- 1972** City of Tucson and Pima County in Arizona pass lighting ordinances.
- 1973** Several influential works on light pollution published: Merele Walker's "Walker's Law," Arthur Hoag's work showing light pollution ordinances are effective, and Kurt W. Riegal's comprehensive article in the journal *Science*.
- 1985** Roy Garstang introduces sophisticated modeling techniques for estimating and measuring light pollution.
- 1984** Fred Schaff organizes Dark Skies for Comet Halley, creating public awareness about light pollution.
- 1986** Early discussions begin between David Crawford and Tim Hunter about creating a nonprofit organization to fight light pollution.



The original IDA logo

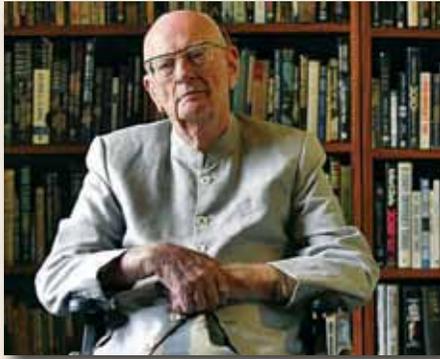
- 1987** Arizona approves Articles of Incorporation for new nonprofit co-founded by Crawford and Hunter; Crawford begins lengthy tenure as IDA executive director. Richard Stevens publishes groundbreaking article on light at night and circadian disruption.
- 1988** New nonprofit named International Dark-Sky Association and receives U.S. 501(c)(3) status. Bylaws approved, and IDA publishes first edition of newsletter. By year's end, IDA gains approximately 200 new members.

International Astronomical Union (IAU) Colloquium No. 112 focuses on light pollution, radio interference and space debris.

Spanish government passes law protecting "Astronomical Quality" for Canary Islands' observatories.
- 1989** IDA holds first annual meeting in Tucson, Ariz. Thirty people attend. First IDA quarterly column published in *Reflector*, the official journal of the Astronomical League. By year's end, IDA has more than 350 members.



IDA founders Dr. David Crawford and Dr. Tim Hunter



Arthur C. Clarke

1990 *Sky & Telescope* publishes its first article addressing light pollution.

1992 Sir Arthur C. Clark, “2001: A Space Odyssey” author, becomes IDA lifetime member and IDA Dark Sky Ambassador.

1993 By June, IDA has 1,260 members representing 49 states and 54 countries.

Fatal Light Awareness Program forms to protect migratory birds from urban lights.

1995 IDA website launched.

First Annual Belgian Night of Darkness held.

1997 IDA opens office at 3225 N. First Ave. and hires first regular employee. U.S. Post Office approves IDA nonprofit mailing permit. Nearly one million information sheets distributed by year’s end.

Australia develops standards to control obtrusive effects of outdoor lighting.

1998 IDA celebrates 10th anniversary, and Chris Walker begins generous and lifelong support of IDA. Thanks to *Sky & Telescope*, IDA membership drive yields more than 100 new members a day. By year’s end, nearly 3,000 people from 68 countries are members.



Chris Walker

First European Symposium for the Protection of Night Skies held in Paris, France.

Chile issues decree for light pollution regulation.

Parade Magazine publishes article on light pollution.

1999 IDA receives organizational development grant from National Science Foundation.

First IDA section (now called chapters) founded in California.

U.S. National Park Service (NPS) establishes Night Sky Team to address light pollution.



New Mexico Heritage Preservation Alliance declares New Mexico night sky as one of state’s “Most Endangered” resources.

International Engineering Society (IES) *Recommended Practices* manual, RP-33, recognizes skyglow in IES guidelines for first time.

First international campaign for school children to measure sky quality started in Greece by Margarita Metaxa.

Several national magazines publish articles on light pollution including *Country Living*, *Outside*, *Backpacker*, and *National Geographic Traveler*, and British Broadcasting Company airs live broadcast.

2000 IDA releases *Lighting Code* handbook, version 1.0.

Time and *Science* magazines publish light pollution articles.



2001 IDA Model Lighting Ordinance group established. Hoag-Robinson Award, named in honor of two outdoor lighting pioneers, begins. Flagstaff, Ariz., becomes first IDA International Dark-Sky Community.



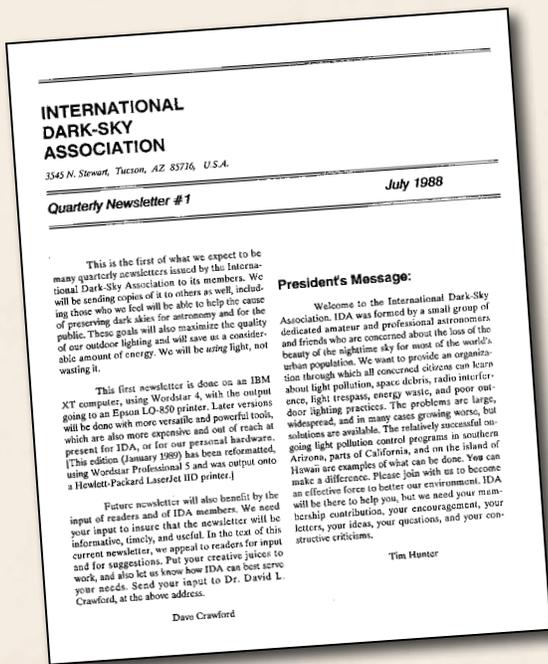
“The First World Atlas of the Artificial Night Sky Brightness,” was published.

The Economist and ABC World News Tonight report on light pollution.



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The first issue of IDA's newsletter

2002 50th issue of IDA newsletter published.

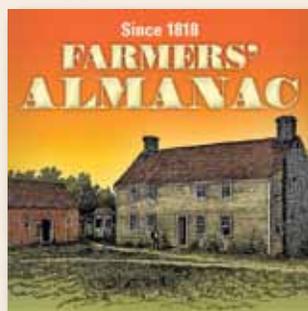
IDA holds conference in Boston to raise awareness and promote lighting reforms.

Czech Republic becomes first country to pass national light pollution law.

International conference on light and human health held in Orlando, Florida.

Bob Mizon book "Light Pollution: Responses and Remedies" published.

Farmers' Almanac starts including coverage of light pollution and IDA.



2003 IDA Section handbook, version 1.0 published.

Global outreach continues and more than 50 sections and affiliates added, including 19 outside U.S. Galileo Award, for outstanding work in Europe, established as annual presentation at European Symposium. IDA Lighting Award given to leaders of Hungarian National Railway lighting project for converting 16,000 high-glare lights to fully shielded lights, reducing energy needs by 40 percent.

Eight-grader Jennifer Barlow founds National Dark-Sky Week in U.S.

2004 IDA begins pilot testing Fixture Seal of Approval program.

2005 Alan McClure bequeaths his estate to IDA.

More than 1,000 U.S. communities are addressing light pollution through planning and zoning.

Light Pollution Project to monitor star count set up for school children in Chile and U.S.

2006 IDA Model Lighting Ordinance group forms partnership with Illuminating Engineering Society of North America (IES), and Natural Bridges National Monument (Utah) designated first International Dark Sky Park (IDSP).

More than 20 U.S. states address light pollution at current or previous state legislative sessions.



First annual GLOBE at Night – a worldwide project tracking and measuring star counts by school children – begins.

UK Parliament passes law declaring light pollution a nuisance.

"Ecological Consequences of Artificial Night Lighting," edited by Catherine Rich and Travis Longcore, published.

2007 A minor planet was named "Chris Walker" in recognition of his outstanding support of IDA and dark skies. IDA board of directors approves regional offices in Europe, northeast U.S., and Asia-Pacific. First issue of *Nightscape* magazine, IDA's renamed and revamped newsletter, published.

Washington, D.C. symposium, "The Night: Why Dark Hours are so Important," held.

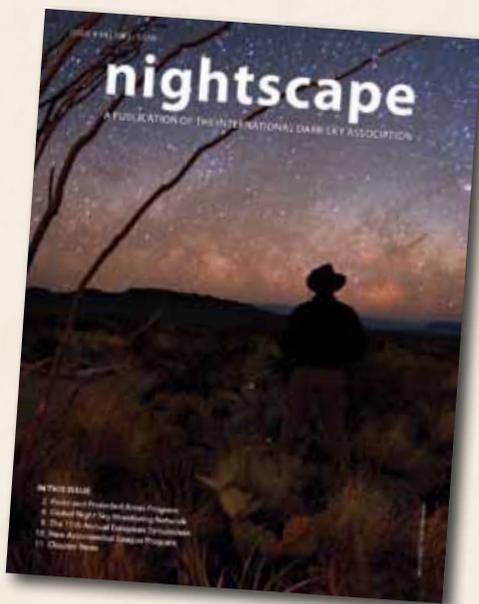
Slovenia passes national light pollution law.

IAU passes "Declaration in Defense of the Night Sky and the Right to Starlight" resolution declaring dark skies a human right.

Christopher Baddiley publishes "Understanding Skyglow."

New Yorker magazine publishes "The Dark Side: Making War on Light Pollution."





2008 IDA founder David Crawford retires as executive director and Elizabeth Hospodarsky becomes interim-director. IDA conducts first Congressional briefings on light pollution and U.S. House of Representatives submits bi-partisan letter on light pollution to U.S. Environmental Protection Agency (EPA). IDA partners with Gildea Foundation to promote research on artificial light at night on ecosystems. Cherry Springs State Park (Penn.) becomes IDSP. Mont Mégantic (Quebec, Canada) becomes first International Dark Sky Reserve (IDSR). Jack Sales, founder and leader of first IDA chapter becomes first recipient of the David L. Crawford Lifetime Achievement Award. GlareBuster, one of the first Fixture Seal of Approval lighting fixtures, wins American Lighting Association "Lighting for Tomorrow" award.

Flagstaff, Ariz., celebrates 50 years of dark sky legislation.

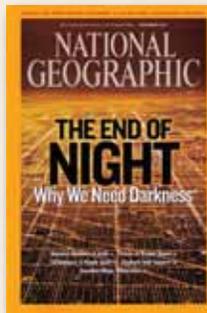
Approximately 2,500 U.S. cities are addressing light pollution through planning and zoning.

Spain adopts first national regulation on light pollution.

"Let Their Be Night: Testimonies on Behalf of the Dark," edited by Paul Bogard, published.

National Geographic publishes cover story on light pollution.

New York Times, Wall Street Journal and US News & World Report publish light pollution articles.



2009 IDA opens D.C. Office of Public Policy and Government Affairs. Night Sky Brightness Monitors project launched. IDA introduces new logo. Galloway Forest Park (Scotland) and Zselic National Landscape Protection Area (Hungary) become IDSPs. Borrego Springs, Calif., designated International Dark Sky Community (IDSC). Harmony, Fla. and Sierra la Rana, Tex., receive first IDA Dark Sky Friendly Development of Distinction Awards.

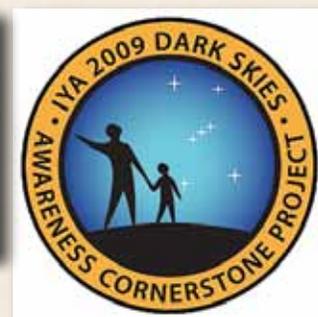
American Medical Association (AMA) unanimously adopts resolution supporting reduction of light pollution at the state and national levels.

International Year of Astronomy raises global awareness of light pollution through the Dark Sky Awareness section of Global Cornerstone Project.

UK Royal Commission on Environmental Pollution releases report declaring excessive artificial light a pollutant.

World Commission on Protected Areas creates Dark Skies Advisory Group.

Oprah magazine publishes story on light pollution.



2010 Bob Parks becomes IDA executive director after tenure as managing director of D.C. office. IDA publishes blue-rich white light report, the first to publicly call for more research on light and circadian rhythm. IDA begins cooperative agreement with U.S. NPS to develop best practices for outdoor lighting in U.S. federal park system. IDA/IES Model Lighting Ordinance released after nine years in development. Goldendale Observatory State Park (Washington) and Clayton Lake State Park (New Mexico) designated as IDSPs. NASA Kepler Scientist Lucianne Walkowicz named IDA Dark Sky Ambassador.

National Oceanic and Atmospheric Administration (NOAA) and the Cooperative Institute for Research in Environmental Sciences release study linking skyglow over Los Angeles, Calif., to increased air pollution.

2011 Lifetime IDA supporter Chris Walker passes away. National Optical Astronomy Observatory (NOAO) and IDA participate in National Geographic BioBlitz. Exmoor National Park (England) becomes IDSR. Hortobagy National Park (Hungary), Observatory Park (Ohio), and The Headlands (Michigan) become IDS Parks. The Isle of Sark (Channel Islands, UK) and the Village of Homer Glen (Illinois) become IDSCs.



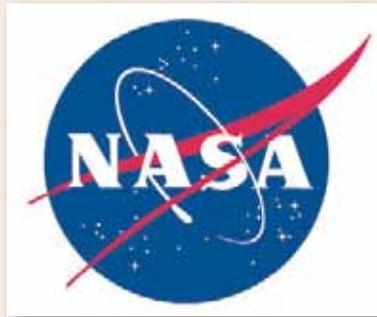
Light pollution documentary “The City Dark” released.

Sky & Telescope publishes lengthy article and appeal by IDA Executive Director Bob Parks.

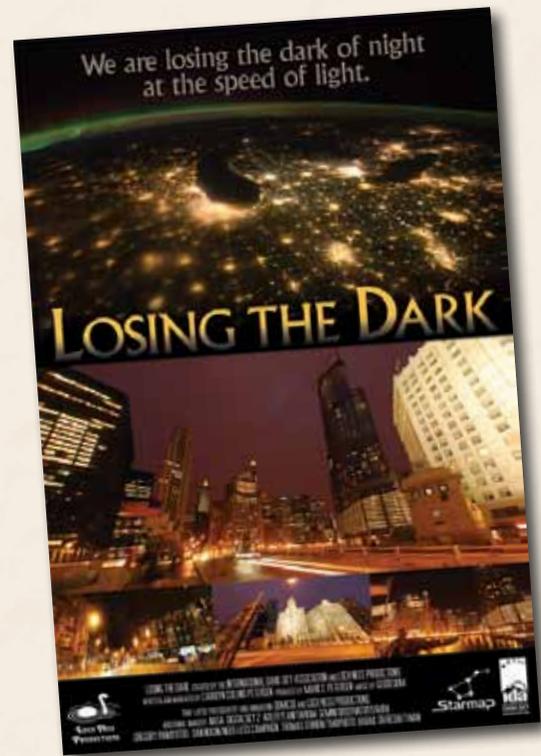
2012 In collaboration with the Royal Astronomical Society of Canada, IDA creates Guidelines for Outdoor Lighting in Canadian Dark Sky Preserves and IDA Dark Sky Places. IDA publishes “Fighting Light Pollution: Smart Lighting Solutions for Individuals and Communities.” Thirty-four new companies receive Fixture Seal of Approval. Walmart adopts IDA MLO Guidelines for stores worldwide. International night sky measurement standards finalized for IDA Night Sky Brightness Monitoring program. IDA names three Dark Sky Ambassadors: “The City Dark” producer Ian Cheney; Bill Nye, “the science guy” and CEO of the Planetary Society; and Kevin Poe, NPS ranger and first Dark (Sky) Ranger. Big Bend National Park (Texas) designated IDSP. Aoraki Mackenzie (New Zealand) and NamibRand Nature Reserve (Namibia) become IDSR.

NASA and NOAA release “Black Marble” images.

AMA releases comprehensive report on impact of light at night on human health.



2013 IDA turns 25! The Florida Fish & Wildlife Conservation Commission award IDA a contract to improve outdoor lighting along Florida’s gulf coast as part of a sea turtle restoration project. “Losing the Dark,” a short film created by IDA in collaboration with Loch Ness Productions, released and translated into several languages. IDA and German organization, Verlust der Nacht, co-host first international interdisciplinary conference on Artificial Light at Night in Berlin, Germany. Death Valley National Park (California) and Chaco Culture National Historical Park (New Mexico) designated IDSP and Brecon Beacons National Park (Wales) becomes IDSR.



Colorado Plateau Dark Skies Cooperative formed.

“Loss of the Night” Android app and “Dark Sky Meter” iOS app released allowing the public to document sky quality.

France implements countrywide lighting curfew for businesses.

Abraham Haim’s “Light Pollution as a New Risk Factor for Human Breast and Prostate Cancers” and Paul Bogard’s “The End of Night” published.

THE ROAD AHEAD AT IDA: *The Next 25 Years*

by Bob Parks

We stand at a crossroads. We have reached a once in a century convergence of a new LED lighting technology, increasing energy costs, and shrinking city budgets. LED lighting has the ability to dramatically reduce energy consumption (60 to 75 percent) if we use it wisely. But as long as the public is told that lighting is a cure all for crime, cities will continue to waste billions of dollars that could be used to repair our crumbling infrastructure and properly pay teachers, firefighters, and police.

During the last 25 years, IDA has changed the way outdoor lighting is done. Fully shielded fixtures have become the norm and their use will only increase with LED upgrades. This helps reduce light trespass, glare and skyglow. We have been less successful addressing the total lumens used for outdoor lighting. It continues to grow at double-digit rates and thwarts our mission to reduce light pollution and preserve the night sky. Until we can convince communities that more light does not necessarily mean increased

WE MUST FIND FUNDING TO CONDUCT RESEARCH TO DEFINITELY SHOW WHAT IMPACT OUTDOOR LIGHTING HAS ON CRIME AND TRAFFIC SAFETY.

safety, and safety is not compromised when adaptive controls and curfews are used, communities will continue trying to “light their way out of crime.”

We must find funding to conduct research to definitively show what impact outdoor lighting has on crime and traffic safety. Approximately 75 percent of outdoor lighting is used for public lighting, the bulk of it for highways, streets and parking lots. When bank robber Willie Sutton was asked why he robbed banks, he replied,

“Because that’s where the money is.” We need to adopt Willie’s logic and worry about “where the light is.” The highest potential for reducing total lumens is public lighting. Over the next 25 years, that’s where we need to focus our energy.

There are two hard facts that stand in our way: people are afraid of the dark and cities are afraid of lawsuits. Changing how society thinks about lighting will require a lot of education, but it is the only way to achieve our goals. The next 25 years will witness a total transformation of outdoor lighting to mostly to white LED and other solid-state light sources. It is essential that we raise the volume and reach of our education efforts now to provide planners and government officials alternatives to the short-sighted practice of simply swapping existing fixtures with more energy efficient ones and claiming to be “green.” If we don’t make the public aware of these alternatives, such as lighting with adaptive controls to dim and turn

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PHOTOS BY: BOB PARKS

The Birth of IDA and a Lifelong Mission Fighting Light Pollution

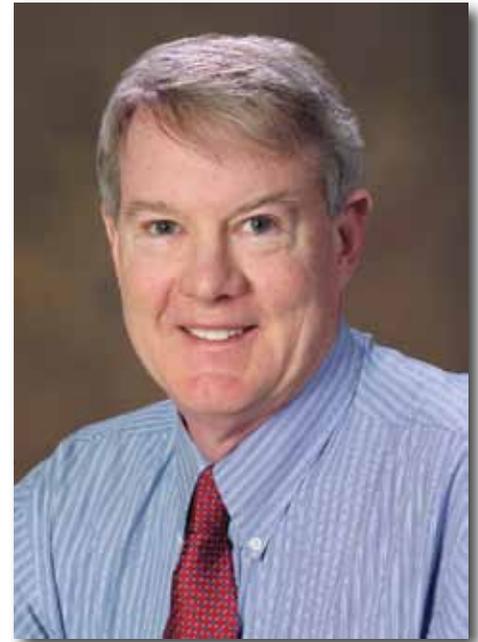
by Dr. Tim Hunter

Unfortunately, most people today have not experienced the dark skies that were found everywhere in the United States only a generation ago. Instead, they experience the bright night skies of light pollution. Unless one has lived on a farm, gone to camp away from cities, or belonged to an astronomy club, he or she has no idea what constitutes a dark sky or how much has been lost in just one generation. Light pollution is a pernicious evil that slowly crept up on us. Older people remember what it was like to see the stars at night, even in cities, and more acutely feel the loss of vibrant dark skies.

In my youth – a very long time ago in the 1950's and 60's – I was an active amateur astronomer equipped with a four-inch reflector that I purchased for \$50 in 1956. Growing up, I could easily observe the Milky Way through the elm trees surrounding my suburban Chicago home. I was more concerned with trees blocking my view of the sky than light pollution. Only gradually did I become aware that the stars were disappearing from urban and suburban areas due to increasing light pollution. Unfortunately, the elm trees and the stars are now long gone from my boyhood home.

In 1985, I received an unexpectedly large tax return. It felt like free

money, even though I knew it was money I had overpaid. I decided to buy a piece of land in a dark-sky area for a large telescope, an idea I had talked about for years but had never got off the ground. One thing led to another, and soon I was the owner of 20 acres of land 40 miles southeast of Tucson, Arizona, on a high grasslands plateau at an elevation of 5,000 feet. Thus, the Grasslands Observatory (<http://www.3towers.com>) was born. As the observatory developed, I realized my amazingly dark sky was a very precious and fragile resource, and noticed what seemed like a lot of bad lighting around Tucson. Moreover, the University Medical Center in Tucson converted its old dim globe-style lights to unshielded low-pressure sodium



(LPS) lighting. I was aghast. They were bright and spoiled the sky. How could this happen? I asked the hospital director and she informed me that astronomers had actually recommended the new lighting.

At that time, the Dark Sky Office at Kitt Peak National Observatory was headed by Dr. David Crawford, an internationally renowned astronomer known for his work on stellar photometry, who managed the largest telescope on Kitt Peak. Professional astronomers prefer LPS lighting

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ADVENTURES WITH IDA

The Early Years

by Bob Gent

Sixty years ago, I remember beautiful star-filled night skies over Phoenix, Arizona, and crystal blue skies in the day. Wow! How times have changed. In the 1970s, I became keenly aware of the problem of increasing skyglow and the loss of night skies. I had to drive farther and farther out of the city to appreciate the formerly magnificent night skies of the Phoenix suburbs. As if excessive lights weren't bad enough, a brown haze started looming over the city.

In 1994, a few years after the International Dark-Sky Association (IDA) was established, I began to tackle light pollution head-on. A friend suggested that our local astronomy club in San Antonio, Texas, set up a booth at Earth Day. She wanted to highlight the "endangered constellations" and had her high school class make posters of the threatened "species." My first reaction was, "You've got to be joking!" But, she was persistent, and I decided to help. We wrote to IDA co-founder Dr. Dave Crawford, and he sent us hundreds of fact sheets. We were off and running.

In 1995, we hosted an annual Astronomical League Convention in San Antonio and made "Dark Skies" our theme. Dr. Tim Hunter, IDA's other co-founder, was our lead speaker. Tim spent a lot of time with us and invited me to join IDA. I thought to myself,

We opened the new IDA office on North First Avenue in January of 1997. Back in those days, IDA could only afford one part-time employee.

"That's all I need – another organization to join."

In 1996, my wife, Terrie, was transferred to Tucson, Arizona, and I began volunteering at IDA. We opened the new IDA office on North First Avenue in January of 1997. Back in those days, IDA could only afford one part-time employee. I recall in 1997, we were printing IDA information sheets by the thousands and, in 1998, I estimated that we had distributed over 100,000 pages of information sheets.

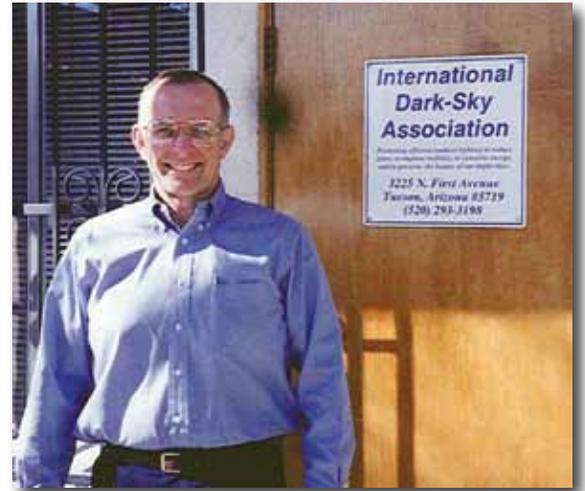
In 1998, while I was working alone in the IDA office to prepare for an upcoming IDA annual meeting, a lone man walked in. I welcomed him, showed him a seat, and continued working. He asked if I had a treasurer's report. I gave him a copy and

explained some of the details. He then asked what we could do if we had more money. I answered that it would be great to hire a full-time employee, run a big membership drive, and so much more. He said, "I'd like to begin donating \$50,000 per year to IDA. Begin sending me quarterly invoices for \$12,500." I almost fell out of my chair. The lone man was Chris Walker, long-time and generous benefactor of IDA. In addition to financial support, Chris contributed some of the most brilliant ideas IDA has ever received.

For the next twelve years, I continued my work as a full-time IDA volunteer. When my wife was transferred to Washington, D.C., I became IDA's Washington, D.C. liaison officer. I spoke at state, county, and city legislative sessions across the region whenever lighting control laws were being considered. Later, when Terrie was transferred to Italy to run the law office at Aviano Air Base, I became the IDA European liaison officer and traveled to dozens of countries to help with international meetings on preservation of the night skies.

While overseas, I worked with IDA headquarters to promote better outdoor lighting to control skyglow, glare, and other problems created by excessive nighttime lighting. We also helped support the annual European Symposium for the Protection of the

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How I Beat Light Pollution in My Home Town

text and photos by Bob Crelin

It began back in 1994, when I first became active in amateur astronomy. I took my daughter out to our backyard in Branford, Connecticut, to show her the Milky Way, which I remembered arching over the town when I was a child. We couldn't find it. The Milky Way of my boyhood was gone, hidden behind artificial skyglow stretching from horizon to horizon.

We were quickly losing Branford's night world to intrusive lighting from commercial properties and housing developments. I felt compelled to tap people's common sense and help them recognize the poor-quality lighting around them. I set out to enlighten everyone, from the citizens coming to my club's stargazing sessions to Branford's highest officials.

Other cities and towns around the country were beginning to adopt outdoor-lighting laws, and this seemed like the perfect solution for our grow-

ing community. I devised an easy way for people to send the message to town lawmakers: a preaddressed, pre-printed postcard. It expressed concern about light pollution and requested action from the Branford Planning and Zoning Commission. I handed out these cards at stargazing sessions and other local public events.

The postcards drew the attention of Branford's town planner, Shirley Rasmussen, and helped open the door for a meeting with her. To prepare, I did some homework using the resources of the International Dark-Sky Association. My enthusiasm, fortified by the IDA's information sheets, helped convince her that good-lighting regulations would greatly benefit everyone.

I borrowed parts from laws that other cities and towns had passed, which were also available through the IDA. I also spoke to lighting and security professionals, who helped me



understand modern lighting applications. Striving to keep the guidelines foolproof, I added illustrations showing examples of acceptable and unacceptable fixtures.

After some adjustments, Rasmussen accepted my draft of the regulations. The Branford Planning and Zoning Commission scheduled a public hearing on the proposed law, and I was invited to give a presentation. My message was simply that we need to use outdoor light more responsibly. Responsible lighting means better nighttime visibility, less intrusive light, and less overdone, energy-wasteful installations. Most people really want to do the right thing, and in the case of light pollution, most just don't realize the negative impacts of their actions.

I concluded with a very convincing clip-on lamp demonstration. This simple hardware-store light illustrated the difference between a shielded and an unshielded fixture and the loss of visibility from glare. When I aimed the unshielded light at the audience in the darkened room, it made people wince and turn away. They couldn't even see me standing behind it. When I turned





The biggest thing standing in the way of change is simply a lack of awareness. So, one person CAN make real change happen – armed with some IDA information, an awareness-raising presentation and a little persistence.

the light to its shielded position, the dazzling glare vanished, and there I stood in plain, well-lit view.

The Planning and Zoning Commission approved the regulations without contest, and they became effective on June 1, 1997. They continue to benefit residents and businesses in town by promoting better nighttime visibility, energy efficiency, and preservation of the natural night.

And the night sky? It has actually improved since 1997 despite the town's growth. The change is especially dramatic compared to what would have happened if the regulations had not been in place. The biggest thing standing in the way of change is simply a lack of awareness. So, one person CAN make real change happen – armed with some IDA information, an awareness-raising presentation, and a little persistence.

Oh... and don't forget the clip-on lamp.

To read Bob Crelin's full article visit Sky & Telescope: http://www.skyandtelescope.com/resources/darksky/How_I_Beat_Light_Pollution_in_My_Hometown.html



Chaco Culture, IDA's Newest Dark Sky Park, Has a Rich Astronomical History

Chaco Culture National Historic Park has much to offer the intrepid adventurer. Located in secluded northwestern New Mexico, it encompasses more than 33,000 acres of breathtaking desert landscape, expansive sandstone mesas, and safeguards mysterious ruins of a sophisticated ancient civilization that flourished more than 1,000 years ago. This summer the park attained yet another alluring draw – designation as a Gold-tier IDA Dark Sky Park, the highest standard for night sky quality.

With some of the darkest skies measured throughout the U.S. National Park system, Chaco Culture's spectacular starry nights are reason enough to navigate the 21-miles of mostly dirt road into the park. But Chaco Culture's unique cultural history also provides a rare opportunity to contemplate humanity's connection to the cosmos.

"Here you can look up and see essentially the same skies the people of Chaco did a thousand years ago" said Park Ranger G.B. Cornucopia. "For the Chacoans, the night sky was an ever-present reminder of their place in the world."

From A.D. 900-1150, Chaco Canyon was home to a thriving urban epicenter of commerce, culture and science that included a sophisticated tradition of astronomy. The distinctive Chacoan "great houses" are evidence of the civilization's advanced engineering and astronomical knowledge. The fifteen great houses were four to five stories tall and averaged 200 rooms with some up to 700 rooms. The scale of the massive structures, built from quarried sandstone and logged timber hauled from miles away, reflects their advanced level of architectural planning and building.

The Chacoan people's astronomical knowledge suggests a level of expertise requiring generations of careful

observations. Research has shown that the great houses and other archeological sites were aligned to coincide with known astronomical, lunar and other cosmic events. Prominent buildings throughout Chaco Canyon were built to precisely orient to the four cardinal directions. A "sun dagger" marked the midday summer solstice by channeling a shaft of sunlight through several sandstone blocks across the center of a spiral petroglyph. Some experts believe that another prominent pictograph was made to document a A.D. 1054 supernova.

According to Dee W. Friesen, president of the Albuquerque Astronomical Society (TAAS), "The human-created structures that still exist at Chaco were designed and constructed centuries ago by the ancient societies who had a deep and appreciative understanding of both the day and the night sky."

Astronomy still thrives at Chaco Culture. Its ancient astronomical traditions and dark skies provide inspiration for experts in archaeoastronomy and cultural astronomy, and amateur astronomers alike. The park offers excellent public

"Here you can look up and see essentially the same skies the people of Chaco did a thousand years ago" said Park Ranger G.B. Cornucopia. "For the Chacoans, the night sky was an ever-present reminder of their place in the world."



The Milky Way over Chaco Culture National Historic Park PHOTO CREDIT: WALLY PACHOLKA, ASTROPICS.COM



The “sun dagger” at Chaco Culture National Historic Park in New Mexico
PHOTO CREDIT: PEARSON EDUCATION FOR EDUCATIONAL PURPOSES ONLY (2009)

outreach programs such as “Archaeoastronomy of Chaco,” “Public Telescope Viewing,” “Campfire Astronomy” and special programs celebrating astronomical events such as eclipses and meteor showers. In addition, fifteen years ago TAAS helped Chaco establish an observatory that is used in the Chaco Night Sky Program.

The park pursued recognition as an IDA International Dark Sky Park in response to the U.S. National Park Service “Starry, Starry Night” initiative created to further protection of dark skies in national parks and protected areas. Through the initiative, the first U.S. Dark Sky Cooperative was created encompassing more than 25 national parks and monuments residing on the Colorado Plateau, a 130,000-square-mile area containing much of Utah, Colorado, Arizona and New Mexico. Chaco Culture is the twelfth park to be designated a Dark Sky Park and fourth in the U.S. National Park System.

Chaco Culture is also recognized as a UNESCO World Heritage Site due to its cultural significance. The park’s 4,000 known archeological sites is one of most extensive collections of ancient ruins north of Mexico, and embody the histories and traditions of the Pueblo Indian peoples of New Mexico, Hopi Indians of Arizona, and Navajo Indians of the Southwest.

An October celebration of Chaco Culture’s Dark Sky Park recognition was canceled due to the U.S. federal government shut-down. As of this printing, the Chaco Canyon Star Party, co-sponsored by TAAS, has not yet been rescheduled.

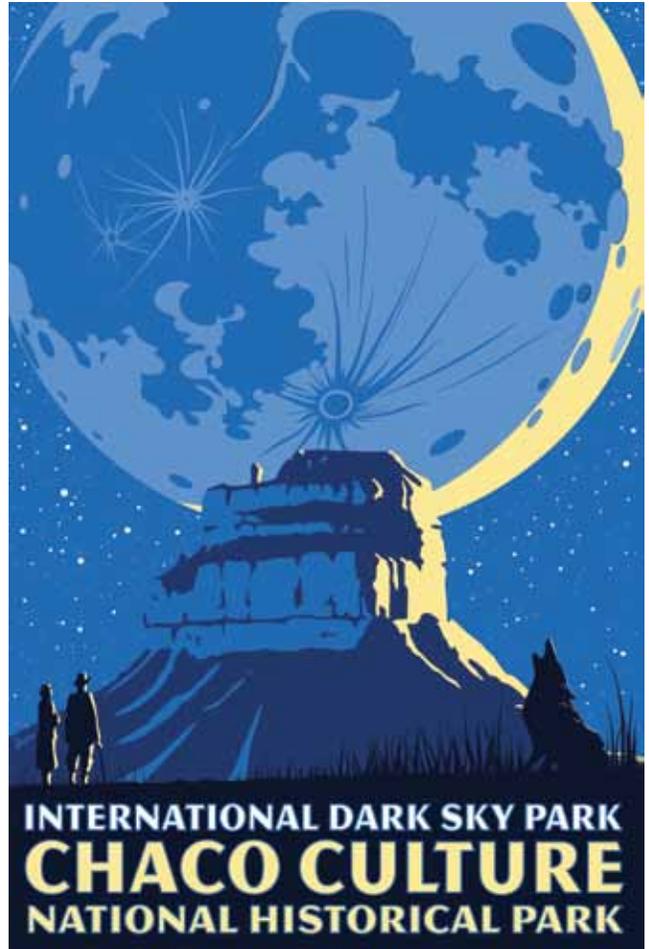


IMAGE CREDIT: TYLER NORDGREN

IDA Hits the Beaches for Sea Turtle Protection

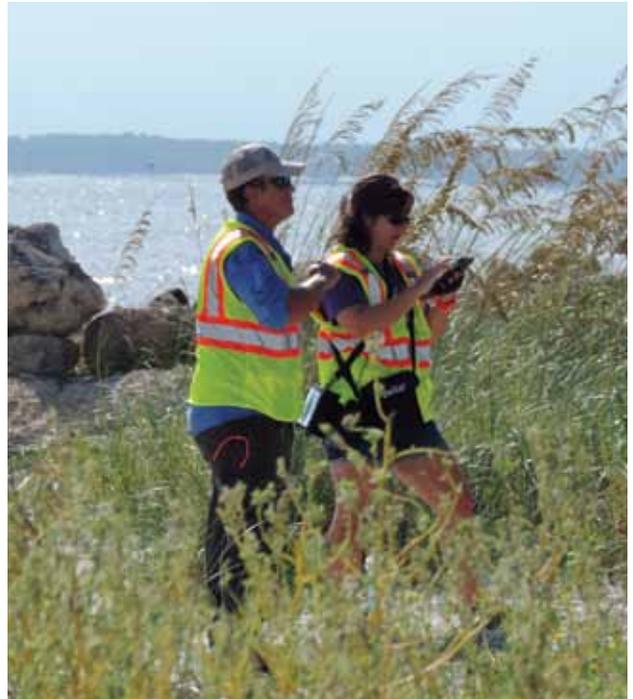
In a move to restore sea turtle habitat, IDA has entered into a four-year contract with the Florida Department of Environmental Protection and the Florida Fish and Wildlife Conservation Commission to evaluate artificial lighting that could impact sea turtle beach nesting habitat within and adjacent to 27 state, local and federal conservation lands in the Florida Panhandle. In August, IDA began conducting extensive surveys of the areas and providing lighting retrofit recommendations to replace existing exterior lights visible from the nesting beach in each park with fully shielded, long wavelength fixtures.

Of all the animals on our planet, perhaps none are under more threat from light pollution than sea turtles. Sea turtles live in the ocean, yet they hatch at night on sandy beaches. Hatchling sea turtles have one immediate goal to ensure their future survival – find the ocean. They have evolved to locate the sea by seeing the brighter horizon over the ocean, and moving away from landward silhouettes. On a natural beach the newly hatched sea turtles find the open horizon and make for the water.

Adult female sea turtles have a hard time finding an appropriately dark beach for laying their eggs and the lights of our cities confuse their hatchlings. Instead of reaching the safety of the ocean, the newborn sea turtles often head for illuminated roads, civilization, danger and death. Light pollution is a major impact to species of endangered or threatened sea turtles that nest on developed beaches. Employing proper lighting practices can greatly minimize the impact of artificial lighting on sea turtles.

Turtle-friendly light fixtures are designed to keep light where it is needed – pointed downward. And turtle-friendly light sources limit the spectrum of light emitted to minimize the impact on turtles. When used properly, these lights provide proper illumination for human safety without negatively impacting sea turtle nesting or hatchlings' turtles ability to find the ocean.

IDA Managing Director Scott Kardel, Technical Advisor Matt Root, and Florida staff Shawn Trindell and Christina Phillips hit the beach to perform a daytime lighting survey in Lighthouse Park, St. George Island on the Florida Panhandle.



Shawn Trindell and Christina Phillips recording field data on outdoor lighting PHOTO CREDIT: BOB PARKS

The survey has presented some unique challenges for IDA staff members working on the project. So far, there has been a broken bone, fire ants, a car accident and work delayed by the threat of a tropical storm. Initial findings from our surveys indicate that there is very little lighting on the conservation lands could negatively impact sea turtle nesting. The vast majority of lighting that does impact sea turtle nesting comes from private lands. IDA is making lighting recommendations for improvements and will re-survey the lands after retrofits have been performed.



PHOTO CREDIT: BOB PARKS



The photos here show two scenes from some of the more developed portions of the survey. They exhibit skyglow, glare, and other problems that can negatively impact sea turtles. PHOTO CREDIT: BOB PARKS



IDA at 25

LIGHTING ADVOCACY:
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**IDA 25th Annual General Meeting
November 15, 2013**

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PHOTOGRAPHY

Exciting Line Up for the IDA General Annual Meeting

On November 15, dark sky advocates will meet in Tucson, Arizona, to celebrate IDA's 25th anniversary at the 2013 IDA Annual General Meeting. A diverse range of presentations will be offered including updates from dark sky places in the U.S., Africa and China.

Author Paul Bogard will discuss his new book "The End of Night" and be on hand to sign copies. Members of the National Park Service Night Sky Team will discuss an important new night sky quality index. Robert Dick

from the Royal Astronomical Society of Canada will give us the low down on a new luminaire developed specifically for lighting in dark sky sites. Scott Kardel will share results from IDA's new sea turtle lighting project, and IDA's Executive Director Bob Parks will present a vision for the future of outdoor lighting. The meeting will conclude with award presentations, and a reception will follow.

The following day, the IDA Board of Directors will hold its annual public business meeting. Look for an an-

nouncement on the IDA website for the specific time and location. The full schedule of events and registration information can be found at <http://www.darksky.org/agm>.

Astronomy enthusiasts may want to stay through the weekend to attend the 2nd Annual Arizona Science and Astronomy Expo being held Nov. 16-17. For more information, see the Expo website: <http://www.scienceandastronomy.com/>.

IDA Chapter News

NEW CHAPTERS

IDA welcomes IDA México. The new chapter is led by Fernando Ávila Castro of Observatorio Astronómico Nacional. Their Spanish-language website on light pollution can be found here: <http://leydelcielo.astrosen.unam.mx/index.php/en/>.

Two of our chapters in Florida merged to better cover local lighting issues. The new chapter on the scene is IDA South Florida.

IDA Phoenix is rising from the ashes and getting re-organized while a new chapter is looking to get started in Toronto, Canada. If you are interested in helping with either chapter, send an email to ida@darksky.org with the city name in the subject line.

IDA SAN BERNARDINO COUNTY, CALIFORNIA

The High Deserts Region played a big role in the Annual Starry Nights Festival held September 17, in Joshua Tree, California. Chapter Leader Tom O'Key was part of the event that included IDA co-founder Tim Hunter, star parties, live video astronomy from the Southern California Desert Video Astronomers, food, music and more.

This was the first Starry Nights event to be held at the new venue provided by the Yucca Mesa Improvement Association. Their community center is located under darker skies than the previous locations, which have been tainted by the light pollution of growing urban development.

IDA DARK SKIES NORTHWEST

IDA/Dark Skies Northwest (DSNW) chapter leader Dave Ingram reports a significant up-tick of interest in light pollution in the Seattle area. Ingram attributes much of the credit for this interest to buzz created by the recent release of Paul Bogard's new book, "The End of Night, Searching for Natural Darkness in an Age of Artificial Light."

In September, Dave was interviewed by Martha Childress, host of the Seattle weekly program, "Where Sustainability Comes Live." Dave used the interview to enlighten radio and podcast listeners about the negative impacts of excessive outdoor lighting on the environment, human health, economies of the world, and safety and security. Ingram and the other guest described the efforts of DSNW and IDA to mitigate these local and regional problems and how the Northwest community can get involved.

The program aired on Sept. 13. A podcast of the program can be accessed at <http://www.naturalchoice.net/radio.php>.



Volunteers Jack and Beverly Sales represented IDA at the 2nd Annual Mt. Lassen Volcanic Park Dark Sky Festival.

IDA CALIFORNIA

IDA California's Jack and Beverly Sales, along with Curt Barnes, attended the 2nd Annual Mt. Lassen Volcanic Park Dark Sky Festival held August 9-11. The theme again this year was "Half the Park is after Dark." They set up an IDA display about light pollution and held daily showings of Ian Cheney's film, "The City Dark," followed by Q&A sessions. Many visitors and rangers were interested in learning about light pollution and its effects on animals, humans and ecology.

Their presentations were a big hit. Park staff used such terms as "enthusiastically presented," "outstanding contributions," "tremendous passion" and "friendly, helpful and kind."



JOIN US! Become an integral part of IDA's success, consider forming a chapter in your area. No experience necessary! The only qualification is a passion to advocate for keeping the night skies natural. Contact ida@darksky.org for more information.

Latest Trends in Light Pollution Research

by Dr. Chris Kyba

The 25th anniversary of IDA provides an opportunity to reflect on how our understanding of light pollution has advanced in the intervening years. When IDA was founded, few scientists outside the astronomy community understood that light could be a pollutant. According to Google Scholar, only 58 scientific articles published in 1998 contained the phrase “light pollution.” Of these, only eight were primarily about skyglow (including one by IDA co-founder Dave Crawford). This year alone, dozens of scientific articles have been published addressing skyglow or the effects of

light at night on organisms or the environment. A current count of articles containing the phrase “light pollution” is no longer possible on Google Scholar, because it only displays the first 1,000 entries. In this article, I’d like to introduce a couple research groups devoted to these issues, particularly those working to understand artificial skyglow.

Greater scientific inquiry into “light at night” is due in part to recent recognition of the importance of light and dark cycles for the health and behavior of many organisms. The 2006 book “Ecological Consequences

of Artificial Night Lighting” helped increase interest in the field. Edited by Catherine Rich and Travis Longcore, the book demonstrates the importance of diurnal cycles for vertebrates, invertebrates, and even plants, and also presents many cases where artificial light has disrupted natural processes.

Most biological studies consider the effects of direct light, rather than diffuse urban skyglow, because the effects of direct light are easier to observe and skyglow isn’t particularly well understood. One breakthrough in our understanding of skyglow came in 2001, when Italian astronomers

PHOTO CREDIT: NASA



Pierantonio Cinzano and Fabio Falchi, and Christopher Elvidge from the National Oceanic and Atmospheric Administration published the first “World Atlas” of artificial night sky brightness. The atlas, based on satellite observations of light emission from cities, uses a model of the atmosphere to predict how much wasted light returns to Earth.

In recent years, these models of “radiative transfer” have considerably improved. Two of the most active modelers, Miroslav Kocifaj from the Slovak Republic and Martin Aubé of Canada, published a study last year directly comparing the results of their two models for the region of the Canary Islands. This kind of work is critical for understanding the systematic uncertainties of skyglow models. Aubé’s model also produces maps that policymakers can use to identify areas contributing most to skyglow over protected areas.

Imaging of Earth from space has also improved remarkably. In 2011, the VIIRS, an instrument delivering nightly images of the Earth, was launched into space on the American Suomi NPP satellite. VIIRS is so sensitive it can even see clouds lit by airglow over the open ocean! In 2012, the European Space Agency installed the “Nightpod” platform on the International Space Station. Nightpod uses an on-board Nikon camera to take high-resolution images of Earth at night. These images are widely published by the popular press, and Spanish astronomers Jaime Zamorana, Alejandro Sánchez de Miguel and José Gómez Castaño, are producing a radiometric calibration for them.

Finally, groups like Verlust der Nacht in Germany and the Liveable Cities project in England have produced extremely high-resolution mosaic images of Berlin, Birmingham and London at night. These maps allow us

Hopefully, through increased monitoring, understanding, and public awareness of the problem, the next 25 years will herald the return of starry nights over efficiently lit cities.

to better understand the most prominent sources of upwardly directed light.

Improvements in digital photography have led many groups to produce all-sky images to document changes in light pollution. The most impressive campaign to date was undertaken for the U.S. National Park Service by Dan Duriscoe, Chris Luginbuhl, and Chad Moore.

Continuous monitoring of the night sky has also become common in the last few years, thanks to the development of the International Year of Astronomy Lightmeter and the Sky Quality Meter. Measurements of sky brightness have been published for many cities, including Hong Kong (Jason Pun and Chu Wing So); Perth, Australia (James Biggs and colleagues); and Plymouth in the U.K. (Kevin Gaston and colleagues).

Networks of lightmeters have been fielded by BuioMetria Partecipativa in Italy, Verlust der Nacht in Germany, and the National Institute of Public Health and the Environment in the Netherlands. IDA has also operated a network of night sky brightness monitors as part of a National Science Foundation project. These networks are greatly improving our understanding of the night sky, especially on cloudy nights, which are particularly important for nocturnal organisms.

The most widespread observations of skyglow have come through citizen science projects, and they offer the best chance for us to understand regional and global changes in sky

brightness. Projects such as How Many Stars (Günther Wuchterl, Austria), GLOBE at Night (U.S. National Optical Astronomy Observatory), and Star Count (England) use the naked-eye as a skyglow detector. These projects are now complimented by two mobile apps released in 2013. “Loss of the Night” for Android determines the naked eye limiting magnitude (tinyurl.com/vdn-app), and the “Dark Sky Meter” for iOS uses mobile device’s built-in cameras to measure sky radiance (darkskymeter.com). These projects only work thanks to the participation of people around the world. As a light pollution researcher, I urge you to take part by performing one or more measurements annually!

This article only scratches the surface of recent research into skyglow. The International Dark Sky Association helps make research into light pollution happen through its mission to raise public awareness (after all, researchers and funding agency members are also members of the public). The IDA also supports research by helping organize conferences like the annual European Symposium for the Protection of the Night Sky and the new Artificial Light at Night conference series.

Skyglow continued to increase during the first 25 years of IDA’s existence. Hopefully, through increased monitoring, understanding and public awareness of the problem, the next 25 years will herald the return of starry nights over efficiently lit cities.

Current Research on Light Pollution and Human Health

by Mario Motta, M.D.

Global awareness about the negative impacts of light pollution is increasing as more people recognize the loss of beautiful night skies. As a result, many localities are accelerating their efforts to address light pollution, often motivated by the economics of wasted energy and light usage. However, in the past 20 years, research studies have found considerable evidence indicating that the most important reason for controlling light pollution may be our own health and safety.

The most pervasive harmful effects of excess outdoor lighting comes from unshielded streetlights. They are so ubiquitous few people give any thought to the actual need or use of outdoor lighting. Proper lighting should help you see better and never impede vision. Unfortunately, the standard streetlight fails miserably in its design. Unshielded bright lights impede proper night vision by shining directly into our eyes causing our pupils to constrict. The common reaction is to add even more and brighter lights resulting in further pupillary constriction and diminished capacity to see unlit areas. Thus, as we drive at night, our pupils are constantly constricted, which diminishes contrast and our ability to adapt to the dark and see the darker areas between light poles.

In addition, direct bright light entering our eyes scatters in the lenses of our eyes and from the floaters, diminishing contrast and further eroding our night vision. This effect, called glare disability, is especially pronounced as we age and is the main reason why the elderly have trouble driving at night. To appreciate this effect, imagine bright sunlight scattering on a dirty windshield, impeding your vision. This is similar to what happens to our eyes when driving at night with unshielded lights. Further, imagine removing the shades from all the lights inside your home. You would quickly discover why unshielded lighting is poor for vision and creates poor contrast and glare. We do not tolerate this in our homes, and we should not tolerate it on our streets. When lighting is properly designed, the light bounces off objects that you want to see and does not directly shine into your eyes compromising vision. This is simply a matter of good lighting engineering that takes into account human eye physiology.

Another reason to be concerned about excessive nighttime lighting is its potential effect on human health. In

the 1980's researcher Richard Stevens of the University of Connecticut suggested excessive nighttime lighting as a possible explanation for the rise of certain unexplained increases in harmful health effects. Since then, a considerable amount of research has firmly placed this concept on the map as a real and very vexing problem. The proposed mechanism is that night lighting suppresses melatonin and disrupts circadian rhythms. Melatonin has a strong role in aiding the immune system in suppressing hormonally-induced cancers. In 2007, this research culminated with the International Agency on Research in Cancer (IARC) of the World Health Organization, concluding that shift workers, who are chronically exposed to melatonin suppression by nighttime light exposure, are at increased risk of cancers. The IARC classified melatonin suppression as a probable class 2A carcinogen, representing the same level of presumed risk of lung cancers from cigarette smoking.

Numerous research studies show a strong link between melatonin suppression and human cancers. Those who are frequently exposed to light at night, especially blue light, and have diminished sleep cycles, have an increased rate of breast cancer. Studies with sibling sisters, where one is blind and the other not, show a decreased rate of breast cancer in the blind sisters. In epidemiologic studies, breast cancer rates increase wherever there is excess nighttime

Numerous research studies show a strong link between melatonin suppression and human cancers. Those who are frequently exposed to light at night, especially blue light, and have diminished sleep cycles, have an increased rate of breast cancer.



PHOTO CREDIT: JIM RICHARDSON

lighting. This excess rate is not correlated with environmental toxins. For example, China has one of the world's lowest rates of breast cancers, and yet is heavily polluted. Genetics do play a role but according to these studies, Chinese women who emigrate to light-polluted Western nations have an unexplained rapid rise in breast cancer rates. Numerous animal studies show this link as well.

One well-reported study found that when human breast cancer cells were implanted into mice, mice that were exposed to light at night showed a marked increase in cancer growth rates than mice exposed to a 12-hour day/night cycle. Several Scandinavian studies dealing with large numbers of nurses who work through the night found increased rates of breast cancer. Other hormonally active cancers follow a similar pattern. Recently, Brigham and Women's Hospital in Boston Massachusetts found a high correlation of melatonin suppression and increased prostate cancer in men. These and multiple other studies draw the inescapable conclusion that nighttime suppression of

melatonin production from excess night lighting is a significant health risk.

Other studies have shown additional effects on increased obesity, depression, increased diabetes risk, and sleep disturbances on those who are frequently exposed to excess nighttime lighting. Dr. George Brainard at Thomas Jefferson Medical School in Philadelphia found that this effect is particularly marked with blue light. Blue light has 10 times the effect of red light in suppressing melatonin production. Unfortunately, our computer screens and televisions provide ample nighttime blue lighting. It should be noted that all mammals produce melatonin, and these human studies indicate that night lighting could also have a significant effect on wild animals in the environment.

While clearly it is not practical to imagine going back to a world without nighttime lighting, we can and should demand that night lighting have proper shielding for safe driving, and that our night lighting is designed in a way to minimize its harmful effects on all living creatures.

The 13th Annual European Symposium in Spain

The 13th Annual European Symposium for the Protection of the Night Sky was held September 12-14, in the historic city of Pamplona, Spain, known for the annual Running of the Bulls during the summer festival of San Fermín. Hosted by Spanish dark sky protection organization, Cel Fosc, Asociación contra la Contaminación Lumínica (Association against Lighting Pollution), the multi-disciplinary forum brought together a diverse group of dark sky researchers and advocates from across the globe.

The opening conference, by Maria de los Angeles Rol de Lama of the University of Murcia, addressed human health impacts of light at night. She pointed to the growing body of scientific evidence linking excessive

exposure to bright light at night – particularly blue light – to circadian disruption in mammals, which is associated with several pathologies. Much more needs to be done to prevent circadian disruption, she concluded, stating that blue light should be completely avoided at night.

Other presentations discussed light pollution laws and regulations. James and Grace Rickard, representing the Borrego Springs (Cal., U.S.) Dark Sky Coalition, said that the program was an “eye-opener” regarding excessive lighting in Europe and local efforts to reduce it. James Rickard, who presented a paper on the Borrego Springs Dark Sky Community, said that involvement in dark sky advocacy now includes acting as regional plan-

ners. “This seems appropriate since public lighting is a major part of the problem,” he said.

Lighting specialists also contributed their expertise regarding light pollution. According to Rickard, these experts addressed the current dilemma concerning LED lighting – most installed bulbs are “blue-rich,” which have negative effects on humans, animals and plants. The lighting experts agreed that longer wavelength, amber LED lights are preferable but unfortunately, not yet widely available.

Other topics addressed during the three-day event included measuring light pollution, public awareness, data collection and protected areas. Participants also had the opportunity to enjoy the premiere of the full-dome, Spanish-language version of “Losing the Dark,” a short educational film about light pollution created by IDA in collaboration with Loch Ness Productions.

During the closing ceremony, the Galileo Award was presented to Dr. Günther Wuchterl, IDA Austria chapter leader, for his outstanding work combating light pollution in Europe. “How Many Stars?”, a citizen science project, is one of Dr. Wuchterl’s several achievements. The 2014 symposium will be held in Lisbon, Portugal.



Dr. Günther Wuchterl (left) is presented with the IDA Galileo Award by IDA Board Member Chris Kyba.

James Rickard, who presented a paper on the Borrego Springs Dark Sky Community, said that involvement in dark sky advocacy now includes acting as regional planners.

Annual Southern California Astronomy Expo is a Winner

Last July's annual Southern California Astronomy Expo (SCAE), organized by Oceanside Photo & Telescopes (OPT), was a big event for IDA. Over 1,000 people attended. Many of the attendees stopped by the IDA booth to learn more about light pollution and sign up for IDA membership.

SCAE featured talks on astronomy, astro equipment demonstrations, and fun activities for kids, but the big draw for the day was the raffle with more than \$65,000 in prizes. Raffle proceeds were donated to IDA, bringing in more than \$12,000.

Big thanks go out to IDA volunteer Jim Traweek, who helped staff the IDA booth, and to Craig Weatherwax, OPT's owner, for choosing IDA as the recipient of the raffle proceeds.

OPT CEO Craig Weatherwax presenting a generous donation check to IDA Managing Director Scott Kardel

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PHOTO BY BEN CANALES



The Next 25 Years

CONTINUED FROM PAGE 7

off when not needed, newly installed lighting will be obsolete before it's even turned on.

Beyond this objective, we must push for national warranting standards to address "where" lighting should be installed. Because city officials fear being sued, lighting is often installed just to make it "appear" safer, with little attention to whether it actually improves visibility. We need to marshal science to develop new lighting designs that use vision science and new technologies to actually improve safety. New lighting designs for street intersections could reduce energy and lumens by 75 percent, and at the same time, dramatically increase drivers' ability to see pedestrians and avoid accidents. Current overhead lighting and too much uniformity actually reduces our ability see contrast, which is the basis for how we see.

New designs using retro reflectors, active marking with embedded LEDs, narrowly focused and low levels of LED lighting with improved vertical illumination have already been tested and can save lives. Now is the time to educate decision makers to use state-of-the-art lighting design and technology to illuminate the cities of the future. To this end, IDA is launching a new program called Smart Urban Lighting. Its goal is to inform and educate planning professionals with an aggressive outreach program that includes training seminars and an Outdoor Lighting Certification (OLC) program. Look for more details in the months to come. To fully implement this new initiative, we must commit to raising additional funds. The consequences of not reaching this new challenge are too great to delay. The nighttime environment will be transformed in the next few years, with or without us. It is imperative that we find innovative ways to dramatically increase our outreach and give decision makers a viable alternative to 20th century versions of "by the numbers" outdoor lighting design.

The Birth of IDA

CONTINUED FROM PAGE 8

because its somewhat monochromatic spectrum is easy to filter, which is fine with me as long as the light is shielded. Left unshielded, LPS fixtures are just as bad for amateur astronomers as any other poor lighting design. I met several times with Dave Crawford and Bill Robinson, Sr., of the Dark Sky Office to discuss my concerns about their lighting recommendations. What started off as a contentious discussion developed into friendship and a mutual goal of protecting night skies. We exchanged slides, and I began to learn about lighting, light trespass, and light pollution.

I came to realize that light pollution is a relatively easy environmental problem to solve, but no one was doing anything about it. Having recently completed the process of incorporating the Tucson Amateur Astronomy Association as a nonprofit corporation in Arizona, I suggested we form a nonprofit organization devoted to combating light pollution, radio frequency interference to astronomy, and space debris. Dave agreed, and we were on our way. I filed the papers for incorporation and came up with the IDA acronym.

The International Dark-Sky Association, Inc. (IDA) was incorporated in Arizona in 1987 as a tax-exempt, nonprofit organization, exclusively for educational and scientific purposes within the meaning of Section 501(c)(3) of the United States Internal Revenue Code of 1987, and received its 501(c)(3) approval from the U.S. Internal Revenue Service in 1988. Dave incorporated the new IDA goals into his professional work and thereafter, devoting years of his waking life growing IDA into the wonderful organization it is today. IDA has far outgrown its founders and surpassed our every hope for it.

This article first appeared on the Astronomers Without Borders Dark Skies Awareness blog <http://astronomerswithout-borders.org/blog/dark-skies-awareness-blog.html>.

Adventures with IDA

CONTINUED FROM PAGE 8

Night Sky. In 2004, the symposium was held in Paris.

In 2008, while serving as president of the IDA board of directors, I was invited by Audrey Fisher to visit Chicago, Illinois. Audrey was working with the science advisor to then-Lt. Governor Pat Quinn to arrange a press conference on light pollution. The Village of Homer Glen, which is just outside of Chicago, had recently passed a lighting code, and we were trying to get some good press coverage. I had never met anyone with as much enthusiasm as Audrey!

As the years passed, awareness grew. Hundreds, if not thousands, of communities passed outdoor lighting codes, and media attention increased. Light pollution made the front cover of *National Geographic*, as well as many other magazines and newspapers. IDA gained recognition through spots on National Public Radio and regional TV news programs. Thanks to the efforts of Czech Republic IDA Chapter President Dr. Jan Hollan, we were also on national television in the that country. We kept pushing, and if we felt any give, we would push harder. Now we have "Globe at Night" and so may other excellent programs around the world. Our message has always been the same: Use only the right amount of light when and where you need it. You'll save energy and protect the nighttime environment.

We are making progress, but there is more work to be done. If you are interested in stopping light pollution, I encourage you to study the issues in detail. As always, there is a wealth of information available at the IDA website: www.darksky.org. Good luck!

About the author: Lt. Col. Bob Gent is a retired USAF Space Systems Officer and past president of the Board of Directors of the International Dark-Sky Association as well as past president of the Astronomical League, an educational federation of more than 250 astronomical societies and 15,000 members.



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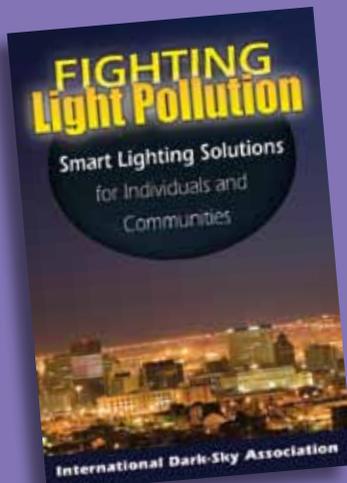
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