Oracle Dark Skies Committee Minutes, November 13, 2014 6:30 pm
Oracle State Park - Kannally Living Room

In attendance: Mike Weasner, Evaline Auerbach, Wendy Ostander, Stan Bembenek, Charlotte Poole, Chip Parfet

Minutes of the October 9, 2014 meeting were approved.

Outreach

- Yesterday (November 12) Weasner participated in a follow-up telecon conference to address the items to be in the final report for the Conference Weasner attended in Flagstaff. No one proposed any changes. The report is attached to these minutes.Items of Interest:
  - 2015 is the "International UNESCO International Year of Light". <http://www.light2015.org/Home.html> Every month, at least one event will be sponsored by the group. Most of the items are about lights; there is just one little line on the website about astronomy. IDA is forming a steering committee to tweak the message of "more bright lights" This steering committee doesn't have a leader as yet, but that might be all right. IDA will be working on it. Weasner volunteered to be on the steering committee. Something needs to be in place for January when the year starts.
  - IDA announced the designation of Oracle State Park as an International Dark Sky Park.
  - The group discussed having another conference somewhere next year.
- Next Monday night, Nov. 17, Weasner will be at El Rancho Robles. Zach Nichols has invited him for a talk and star party. The ranch is hosting 50 travel agency CEOs from around the USA and Bermuda there to see what's available in Oracle.
- There will be a meeting at the Oracle Fire Station on Wed. 19th at 10 am. Pinal County Code compliance and code enforcement. Weasner will attend and present information on the lighting code during the question and answer session.
- Next Friday, 21st, Weasner and Auerbach will be attending the Copper Corridor EDC, where Bryan Martyn, Arizona State Parks Executive Director, will be talking. <http://coppercorridor.org>
- Gov. - elect Ducey has put out a call for input into items for administration of the state. Weasner, in the name of the Oracle Dark Skies Committee, suggested a "Artificial Light at Night Summit" with emphasis on cost savings for governmental agencies.
- Sat., Jan. 10 - South Koreans who are interested in the IDA and dark skies will be at International Dark-Sky Association headquarters in Tucson. Scott Kardel and John Barentine of IDA had met them when in South Korea to talk about dark skies. When in Tucson, they may come to Oracle State Park to see the Dark Skies environment there.

Old business

- The Oracle State Park Star Party will be Jan. 24 and the ODSC pot luck will be held there in conjunction with that.
- Auerbach and Weasner met with the management of Oracle Inn. They agreed that they would make a phone call to the Billboard company asking them to consider making their lighting more dark-skies friendly.
- There is nothing new on Circle K lighting.
- Weasner is capturing the articles and newscasts about the Dark Skies designation.
- There is supposed to be a logo from IDA on the sign at the road and also on the website for Oracle State Park.

- Steve Haas is working with ADOT to get the road signs about the Dark Skies designation installed on the Oracle State Park signs.

- Astronomy Outreach Foundation will be represented by IDA at the March 21 event.
- Weasner participated in the Arizona Science and Astronomy Expo at the Tucson Community Center on November 1 &2. He had a "show and tell" at this committee meeting from there:
  - a Light Meter for OSP: Weasner got to buy a light meter at a discount and with no shipping (purchased by OSP).
  - A green laser pointer was donated to the OSP for Star Parties by Oceanside Photo & Telescope (OPT), the dealers booth where Weasner worked at the Expo
  - Four Telescopes: Companies donating telescopes to OSP in honor of the IDSP award, as follows:
    - Meade -
    - Celestron -
    - Explorer Scientific -
    - Vixen - donated a telescope on the spot- from the President of the company. (Committee clapped!) The telescope took a side trip to California.
- Copies of the Proposal have been published. One was shown at this committee meeting. The copy for Arizona State Parks has been sent.

<u>New Business</u>
- Auerbach will coordinate the potluck in conjunction with the Star Party on Jan. 24.
- Concepts for POSTER BOARD - the ODSC members present brainstormed ideas to be on a poster board display. Two copies would be made: (1) On display at the Oracle Visitor's Center; (2) Traveling to different events. The design could be a banner also.
  - **eye-catching**
    - cool effect
    - color - black background with blue coloring popping out
    - "functional glitz"
    - Illustrating telescope viewing - telescope and eye_eye-catching
  - **message**
    - Who are we?: First internationally-recognized Arizona state park. but other parks have other designations. Use the words from the IDA designation letter: "**Honored** to name Oracle State Park as an International Dark Sky Park" We were **20th** in the world.
    - Goal for Park: going for the gold - improving what we have.
    - Goal for Park and community: Preserving the dark sky as a resource.
    - Community education: Why is "reducing light pollution" important? Actually "smart lighting" is what's important.

USE Logos: OSP, IDA, Arizona State Parks; Park's URL
(See attached for a separate PDF showing the ideas discussed.)

<u>Next Meeting:</u> Dec. 4 at 6:30 at the Kannally Ranch House. Another meeting may be scheduled for Dec. 11 if needed and then none until after the first of the year.

<u>Notes:</u>
- Arizona is now tied with Texas in number of such parks. we need to have a "friendly" competition with Texas
- We need to work with Arizona State Parks to clarify the kinds of designations that the various parks have in regard to dark skies. Some committee members attended a star party at

Karchner Caverns and were informed that that park and some others had designations for dark skies so that the announcement for Oracle State Park as the “first state park” was at best confusing. OSP is the first IDA park designation. Other parks have other designations from other organizations.

Signed,

Evaline J. Auerbach, Recorder

Signed,

Mike Weasner, Chair

DARK SKIES AND EMERGING TECHNOLOGIES
A SUMMIT AND CALL TO ACTION TO PROTECT OUR NIGHT SKIES
FLAGSTAFF, ARIZONA AUGUST 18-20, 2014

Final Report

This report of the Dark Skies and Emerging Technologies Summit was prepared by David Wessel, City of Flagstaff & Jeffrey Hall, Lowell Observatory

I. Overview of Summit

The Dark Skies Summit held in Flagstaff, Arizona on August 18-20, 2014 was a great success. More than 150 people of diverse backgrounds participated in dynamic discussions about the future of lighting as LEDs (light emitting diodes) enter increasingly widespread outdoor use. An impressive mix of astronomers, traffic engineers, city and county planners, public lands managers, health officials, lighting industry professionals, and others learned the basics of lighting and shared the latest research on lighting impacts to health, astronomical pursuits, and traffic safety. This multi-disciplinary gathering then explored issues and defined actions related to supply of dark-sky-friendly lighting, demand for such lighting, and plans and policies to guide their use. Many agreed that "it will take a true expansive partnership to mindfully manage for dark skies."

> *"Each participant was, I think, improved by the experience and learned information and different perspectives from other disciplines."*
>
> Dr. Richard Stevens
>
> Professor and Cancer Epidemiologist, University of Connecticut

This catalytic event has already spurred important activities at all levels of government.

- An ordinance in southern Arizona, already in progress, was pushed across the finish line by a conference attendee.
- Flagstaff, a leader in dark sky protection, is convening local practitioners - most of whom attended the conference - to evaluate the range of lighting technologies and select its next generation of street lighting.
- Bureau of Land Management and National Park Service leaders, after finding common ground on the value of dark skies, are initiating internal conversations about policies for public lands under their care.
- Arizona State Parks will now be more effectively lobbied by a conferee to submit state parks for dark sky designation by the International Dark-Sky Association (IDA).

Further actions called for at the conference include:

- Coalition Building – the International Dark-Sky Association (IDA) (*Underway!)*

    - The active and strategic pursuit of interconnected IDA designations, offering a large landscape scale system of IDA recognized dark sky resources across the Colorado Plateau.
- Model Lighting Ordinances options to choose from for Cities and Counties (*Underway!)*
    - Developing a range of dark skies ordinances suited to a broad-array of needs
        - Small cities and counties lacking significant resources for lighting analysis or implementation.
        - Cities in close proximity to observatories that support lower lighting levels and a narrower light spectrum to support that industry.
        - Larger cities and counties with resources to administer more sophisticated ordinances.
- Integrating mindfulness of dark skies across a full range of regulatory activities including NEPA, OSHA, MSHA, and FAA.

The Colorado Plateau was presented – and acknowledged by conferees – as a valuable dark-sky resource worthy of preservation, and with the potential for serving as a model across the Southwest and nation. The Colorado Plateau Dark-Sky Cooperative is under development as an initial implementation of this model

II. Conference Summary: Invited Speakers

"The Flagstaff Keystone conference was a perfect storm for navigating diverse perspectives to a common destination for promoting aesthetic benefits, scientific pursuits, and human biological need that only a dark sky at night can provide."

Deborah Burnett

Consultant, Benya Burnett Consultancy

The event started Monday, August 18, with an education session. Three expert speakers provided participants with a common understanding and language about light and lighting.

Deborah Burnett of Benya Burnett Consulting explained the health impacts of exposure to light at night. This exposure disrupts circadian rhythms and may be associated with Alzheimer's, Parkinson's, diabetes, and more. Cell phones and computers disrupt interior settings. Lights at night can affect fish, bats, and plants. Even blind people can be impacted by this exposure.

Chris Luginbuhl of the US Naval Observatory described the physics of light, how visible sky glow is caused by atmospheric scattering of all colors of light, and how the eye perceives light and color. He noted that blue light – prevalent in white LED lights - scatters more than other colors, and he discussed the spectral differences of various types of luminaires. He also presented an overview of the City of Flagstaff lighting ordinance, successfully implemented since 1989.

Jim Benya, also of Benya Burnett Consulting, discussed basic lighting and the terminology used to quantify light levels. He characterized many light sources including several alternatives to white LED, including filtered LED (FLED), phosphor-coated amber LED (PCALED), and narrow-band amber LED (NBALED).

Tuesday, August 19, was a full and inspiring day kicked off with welcoming remarks and affirmations of the value of dark skies by Flagstaff Mayor **Jerry Nabours** and U.S. Representative **Anne Kirkpatrick.**

Chad Moore, Night Skies Program Manager for the National Park Service, inspired the audience describing the influence of dark skies on humans over time and its critical role in defining culture and ecosystems. He noted that dark skies are the least protected resource but that solutions – though difficult – can have immediate benefits. Dramatic before-and-after photos from Yosemite National Park underscored that point. He concluded by pointing to the Colorado Plateau as a "proving ground" for innovative solutions in the LED era.

Carl Rountree, Director of the Bureau of Land Management National Landscape Conservation System, spoke at lunch and provided equally stunning night sky images. He expressed great opportunity in promoting "Landscapes at Night" and reinforced Moore's concluding message by noting the Colorado Plateau Dark Sky Cooperative as an example of collaboration between resource agencies and nearby communities.

Dr. Richard Stevens, an epidemiologist from the University of Connecticut, expanded on the circadian discussion from the previous day. He emphasized that a small set of light-sensitive genes directly influence 5-10% of the full mammalian genome! An important distinction is that darkness – not sleep – is what influences important hormones like melatonin. Artificial light – too dim during the day and too bright at night – can adversely affect our body's natural processes and may be causing DNA damage. The connection between light, circadian rhythms and hormones associated with breast cancer, obesity, diabetes, and moods is now established. The next step is to test if long-term exposure has a causative effect.

Ron Gibbons, Director for the Center for Infrastructure-Based Safety Systems at Virginia Tech, explained the relationship between street lighting and safety. His team collected data from a half-dozen states in urban and rural locations with various levels of light and of different colors. It was made clear that most pedestrian deaths occur at night (evaluation of crashes during the change in daylight savings time are fairly definitive). What is not fully established is the influence of how much light is needed – including its uniformity over space - or what color of light is needed to mitigate the effects of darkness for pedestrian and driver safety. Results suggest that there are optimal light levels, often lower than the over-lighting that is sometimes prescribed; that non-uniform (but not *too* non-uniform) light is better than strictly uniform; that controlling glare reduces crash rates; and that data are more telling when road functional classification is factored in. More light is needed on urban arterials than on freeways, for instance. He believes "adaptive lighting" that responds to time, traffic flow and other conditions is both possible and can be incorporated into standards.

The diverse panel explored and explained the need for more dark skies related information and commonly understood facts to better do their jobs. Opportunities to partner with utilities were mentioned. The justification for lighting ordinances and enforcement was tied to the impact of trespass light on property values. A need for quantifiable measures of light pollution or impact was mentioned by more than one speaker. Many panelists cited the value of the conference and the information provided as a big step forward in helping communicate to diverse cultural perspectives and needs.

Conferees, brimming with new found understanding, endeavored in the next one and one-half days to identify aspects of supply, demand and policy implementation of darks skies friendly lighting.

III. Conference Summary: Breakout Sessions

The conference's principal questions were framed around the topics of supply (how do we promote and inspire the supply of dark-sky-friendly LED lighting), demand (how do we ensure researchers and manufacturers realize sufficient return on their supply investment), and policy (how do we capture and promote the use of emerging LED technology in the public sector, including but not limited to ordinances and regulation.

> *"It was heartening to hear of the tools already at our disposal and that there are relatively simple and inexpensive ways to address some of the problem areas."*
>
> Shelley Smith
>
> Deputy State Director of Natural and Cultural Resources, Bureau of Land Management Utah

SUPPLY: *Given the proliferation of white LED lights that are not dark sky friendly but are inexpensive, how can society ensure or create supply of dark sky friendly lighting?* These discussions revealed several opportunities and challenges. Dark sky lighting needs to address illuminance (light striking a surface), luminance (reflection leading to up glow and glare), and spectrum (narrowest band practical) – the three-legged stool of environmentally friendly lighting. Participants noted that the broader market is shifting to LED lights because they are cheaper, more energy efficient, and with more readily controllable light direction and level. That control is good news, as is the fact that LED lights can support dark skies. The challenge is that most LED lights on the market don't. They often produce light levels far greater than needed for even general night time activities and that are extremely detrimental to dark skies. Another challenge: this market shift is resulting in decreased LPS (low pressure sodium) production, a traditional source of dark sky lighting. Furthermore, blue light is especially prevalent in most of the LED products on the market today. This group was pleased to report that newer LED products are available that are better for dark skies and eliminate some or most of the blue light. A drawback is that energy and lighting efficiency for these lights is lower than that for white LED. Industry participants explained that real improvements have been achieved recently, although serious questions remain about how much further improvement to efficiencies is possible. Reducing up-glow and glare would have tremendous benefits, too, so increasing the supply of attractive, *well-shielded* lights for residential, commercial and institutional use would be helpful.

DEMAND: *What efforts can be undertaken to increase demand for dark sky friendly lighting products?* Education, inspiration, and outreach were the watchwords for this breakout group. Demand for dark sky lighting is growing, and it is hoped that the lighting industry continues to respond with better and more cost-effective products. Communities across the Colorado Plateau are organizing to set expectations for the protection of this common resource. The National Park Service described communities surrounding a historic battlefield site in Pennsylvania that collectively agreed to keep lighting levels to those experienced during the revolutionary war era. More examples like these, and model ordinances and engineering standards tailored to the needs of like-minded communities, need to follow to keep demand growing. More recommendations from this group included:

- Strengthen coalitions through the IDA.
- Create incentives like receiving a "Seal of Approval" from prominent groups like IDA.
- Promote activities like "Earth Night" to complement Earth Day.
    - Capitalize on the International Year of Light with promotions through groups like the American Medical Association, AARP, and others.

- Encourage wide adoption of codes that create a market for environmentally responsible lighting.
- Work with Home & Garden shows to promote friendly lighting for homes and businesses.

POLICY AND IMPLEMENTATION: *What is needed to make policies more effective and more widely adopted?* Policies and supporting regulation and implementation of dark sky lighting is an arena with great potential. Model lighting ordinances exist and more are coming, because "one size does not fit all" when it comes to brightness or spectrum management. What is also needed is model policy language across the many aspects of city and county life influenced by lighting. This includes economic development, safety and security, land use, and transportation *not just the environment and science fields.* Justifications for standards and ordinances need to be well-grounded in the service of "*public health, safety, and welfare,"* the traditional basis for governmental action. Helping communities appreciate the full value of healthy lighting will better ensure more and more successful dark sky lighting applications. This group enthusiastically endorsed the wider application of lighting zones like those employed in Tucson and Flagstaff. These zones define appropriate lighting levels for different areas. Brightness and spectrum are both influenced by distance. Zones near observatories, natural areas, and open space require the lowest levels of light. Meanwhile, zones near places like a downtown activity center permit higher levels. Standards for environmentally responsible lighting, life-cycle costs for lighting, and the influence of light on the afore-mentioned policy arenas – all supported by science - are needs identified by this group. Some notable practices appreciated by this group included:

- Illuminating Engineering Society Standards BUG (backlight, uplight, glare) practice for application makes enforcement fairly straightforward.
- Pima County standing outdoor lighting committee to monitor conditions and make recommendations.
- Incentives such as awards and other public acknowledgements.

IV. Wrap-up and Takeaways

The conference concluded on August 20 with further breakouts and a plenary discussion on basic conclusion, next steps, and takeaways. Attendees identified a number of key items as topics for further action. The conference organizers look forward to seeing the work and the progress this conference will generate.

"There were many good ideas generated; the question is follow-through."

Lance Diskan

Co-founder, Flagstaff Dark Skies Coalition

SUPPLY:

- What are the prospects for improvement of efficiency of NBALED?
- We should work to identify which of the various types of LED lighting that are appropriate for different communities (whether NBALED, PCALED, or FLED; everyone agreed white LED is fundamentally at odds with any kind of dark-sky concerns).

DEMAND:

- How much demand do we need to get the industry's attention?
- What do suppliers need to have adequate motivation to put R&D and/or production behind different types of lighting, especially in regard to spectrum management?

POLICY:

- What is our real tolerance for non-uniformity; more broadly, what are the sky studies underway or needed to resolve outstanding questions about roadway lighting and safety?
- How do we best handle exceptions to policy (central business district, sports, etc.) for both color and spectrum?
- How can we work with the IDA to establish more local efforts, such as a "Coalition for Responsible Lighting," as multi-stakeholder advocacy groups.
- A guiding principle of good policy is: "Do no harm, reduce impact."

> *"We must all be stewards, so our youth don't ask, 'Why?' Let's give them that chance to see a starry night sky."*
>
> Rosie Pepito
>
> Superintendent, National Park Service

Please visit www.keystone.org/darkskies for videos and presentations from the Summit as well as a resources page with links to other information on the topic.

11/13/14

ODSC Display ideas

Eye-catching

- Cool effect
- Color
  - Black background
  - Blue theme
- Functional
- Logos
  - OSP, ASP
  - Include OSP URL

Message

- Astronomy/Telescope
- Who “we” are - not just ODSC
- Play up 20th IDSP award in world for OSP
- Preserving Arizona Natural Resources
- Community Involvement
- Ongoing “Go for the Gold” at OSP
- Light Pollution impacts
  - Human health (breast & prostrate cancers), obesity, diabetes, blood pressure problems, Parkinson’s, Alzheimers
  - Effects on wildlife
  - Culture
  - Energy costs & wastes
  - Environment