



Blinded by the Light

Presentation for the
Colorado Municipal League
Breckenridge, Colorado
June 26th, 2025

Richard OBrien
Boulder, Colorado

Mark Lauren
Silverthorne, Colorado

Julia Puester
Breckenridge, Colorado

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| | | |
|------------|--------------------------|---|
| 15 minutes | Richard OBrien | What is Light Pollution? What is its impact on the environment? What can we do to limit the impact of light pollution? What is <i>DarkSky Colorado</i> ? |
| 15 minutes | Mark Lauren | What is Dark Sky Place certification? How can towns and parks get help with the certification process? |
| 15 minutes | Julia Puester | What dark-sky work is the Town of Breckenridge doing? |
| 20 minutes | Questions and Discussion | |

About Richard

- I'm a volunteer for *DarkSky Colorado*
- I serve as Northeastern Colorado Coordinator for *DarkSky Colorado*, and enjoy talking with people about light pollution
- I live in the city of Boulder and work for NOAA
- I love to hike and spend time outdoors (including birdwatching and stargazing)



About Richard's presentation

What is light pollution?

What are the impacts of light pollution?

Overview

Specific case: nocturnal bird migration

What can we do to limit the impact of light pollution?

About DarkSky Colorado





SKYGLOW



GLARE



LIGHT TRESPASS

Impacts of Light Pollution

View of the Stars

Most Americans alive today have never seen the Milky Way

Ecological Impacts

Most species of plants and animals are adversely affected by artificial light

Human Health

Researchers have found serious health problems related to artificial light

Ecological Impacts

Artificial Light exposure impacts almost every species (over 160) studied by scientists.





TREES

bud earlier and lose
their leaves later
under artificial light

MOST BIRDS IN NORTH AMERICA ARE MIGRATORY

70%

of terrestrial recurring
birds are migratory.

80%

of those birds migrate
at night.



INTERNATIONAL DARK-SKY ASSOCIATION



Migratory Birds

2.5
BILLION
MIGRATORY BIRDS
LOST SINCE 1970

-28%
POPULATION LOSS
IN MIGRATORY
BIRD SPECIES
SINCE 1970

2 IN 5

BALTIMORE ORIOLES
LOST SINCE 1970



Courtesy of the Cornell Lab of Ornithology. Source: Science, 2019

Illustration of a Baltimore Oriole by Chris F. Smith for the Cornell Lab of Ornithology

Artificial lights can attract and disorient birds
resulting in an inability to navigate to their
destination



Lights Out
—COLORADO—



To help migratory birds by limiting light pollution

Blue Grosbeak photo by Kyle Horton

What can we do to
mitigate light
pollution?

Five Lighting Principles for Responsible Outdoor Lighting



1 Useful



Use light only if it is needed

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

2 Targeted



Direct light so it falls only where it is needed

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

3 Low Level



Light should be no brighter than necessary

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

4 Controlled



Use light only when it is needed

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

5 Color



Use warmer color lights where possible

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



**MYTH: MORE
LIGHTING IS SAFER**



**REALITY: WELL DESIGNED
LIGHTING IS SAFER**



About *DarkSky Colorado*



DarkSky
COLORADO

[HOME](#)[WHY](#)[OUR WORK](#)[ABOUT](#)[NEWS & EVENTS](#)[CONNECT](#)[DONATE](#)

Restoring the Night

Protecting the night sky for the heritage, health and wellbeing of the people, wildlife and environment of Colorado.

★ Wildlife and Ecosystem Conservation

The night sky plays a key role in virtually every domain of environmental conservation.

[LEARN MORE](#)

★ Public Health and Well-Being

The way the natural arc of day and night synchronizes our behavior and benefits our health is incredibly strange and beautiful.

[LEARN MORE](#)

★ Cultural Heritage and Scientific Inquiry

People across generations, cultures, and continents have bonded under the beauty and solace of the night sky.

[LEARN MORE](#)

About *DarkSky Colorado*



- A Colorado nonprofit organization
- The Colorado chapter of *DarkSky International*
- Many volunteers and a few paid staff
- Mission to “restore the nighttime environment”
- Flagship programs
 - Certification for “Dark Sky Places” (parks and towns)
 - Certification of approved light fixtures
 - *Lights Out Colorado*
 - *Colorado Pollinator Network*
 - Public Outreach
 - Governmental Policy



About *DarkSky Colorado*



Highlights of DarkSky Colorado work

2001 - Colorado state law enacted, regarding outdoor lighting owned by the State

2003 - City of Boulder “Outdoor Lighting Ordinance”

2015 - First certified Dark Sky Places in Colorado

Black Canyon of the Gunnison National Park
Hovenweep National Monument
Westcliffe/Silvercliff

2019 - First “Dark Sky Month in Colorado” proclaimed by Governor Polis (June)

2022 - Colorado state law enacted; state funding for *DarkSky Colorado* to mentor local dark-sky certification application efforts (<https://oedit.colorado.gov/colorado-dark-sky-certification-mentor-program>)



Dark Sky Certification Mentor Program

Mark A. Laurin



Dark Sky
COLORADO

Mark A. Laurin
Dark Sky Certification Mentor

ASTRO MARK

(303) 378-4077

[Why Dark Skies Matter](#)

Topics

1. What is the Dark Sky Certification Mentor Program?
2. What are the elements of achieving the International Dark Sky Place (IDSP) Community certification?
3. What Colorado communities are in the IDSP certification pipeline?
4. Thinking about it? Words of wisdom
5. Where CML can help

The Dark Sky Certification Mentor Program Partnership



- May 2022: Colorado State House signed into law HB22-1382
- Bill provided funding to enhance promotion and stewardship of Colorado stargazing. The bill was renewed in 2023, 2024, and 2025.
- Colorado Tourism Office partnered with DarkSky Colorado to create the Dark Sky Certification Mentor Program
- Two mentor programs:
 - certification mentor program
 - on-demand technical assistance

Dark Sky Certification Mentor Program Deliverables

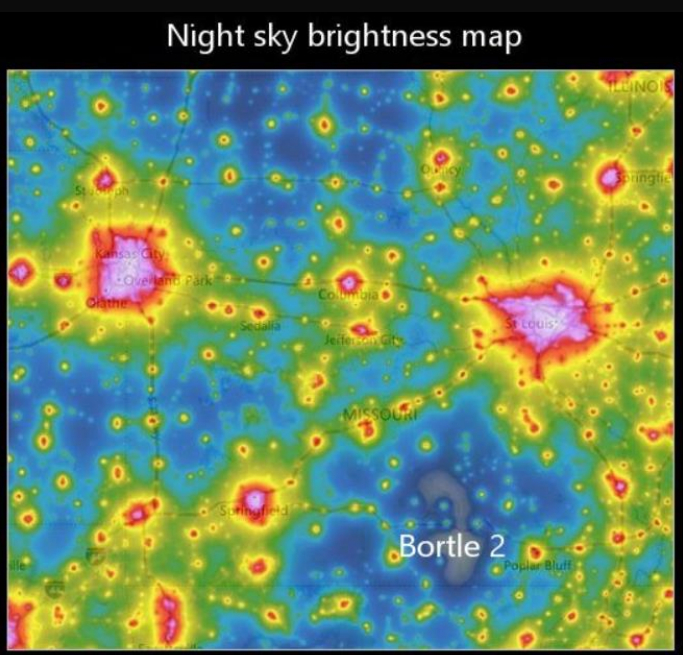
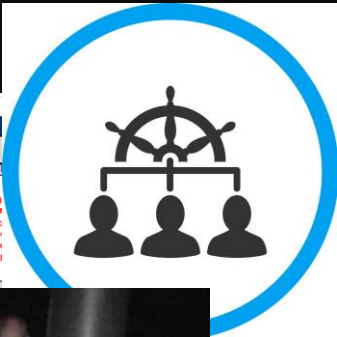


- community outreach and education. ALAN's impact on wildlife, birds, pollinators, and you and me. Public events workshops, dark sky events, speakers, demonstrations, etc.
- development of steering committee of community advocates to advance certification efforts
- sky quality metering plans and activities
- development of lighting inventories
- development of local lighting ordinances
- development of draft application content

Elements in Achieving IDSP Community Certification

- convene a project steering committee of volunteer advocates
- conduct a sky brightness measurement program
- engage the community with dark sky education and outreach
- develop a lighting management plan / lighting ordinance
- set up a policy planning framework
- inventory municipal outdoor lighting
- submit IDSP community application, and then maintain certification

| PAGE ONE | | | | | | | |
|----------|-------------------|-------------------|--|---|--|---|--|
| FIXTURE | | | | | | | |
| # | Date / Fixture ID | Location | Function | No. of Fixtures | Lamps per Fixture | Fixture Type | Lamp Type |
| | Date of Inventory | Sequential number | Address is optional as additional location identifier | What is the purpose of this light? Are there steps, a walkway, an entrance? | Number of multiple identical fixtures. | A fixture may have multiple lamps or sources of light | Refer to your Lamp Type Guide for examples |
| 1 | 3/25/2025 | 1 | TOWN HALL: Town Hall, west main entrance | Signage | 3 | | |
| 2 | 3/25/2025 | 2 | Town Hall, west main entrance | Entry lighting | 3 | | |
| 3 | 3/25/2025 | 3 | Town Hall: south attached drive-through. Balcony light above | unknown | 4 | | |
| 4 | 3/25/2025 | 4 | Town Hall: south attached drive-through. Balcony light above | security | 2 | | |



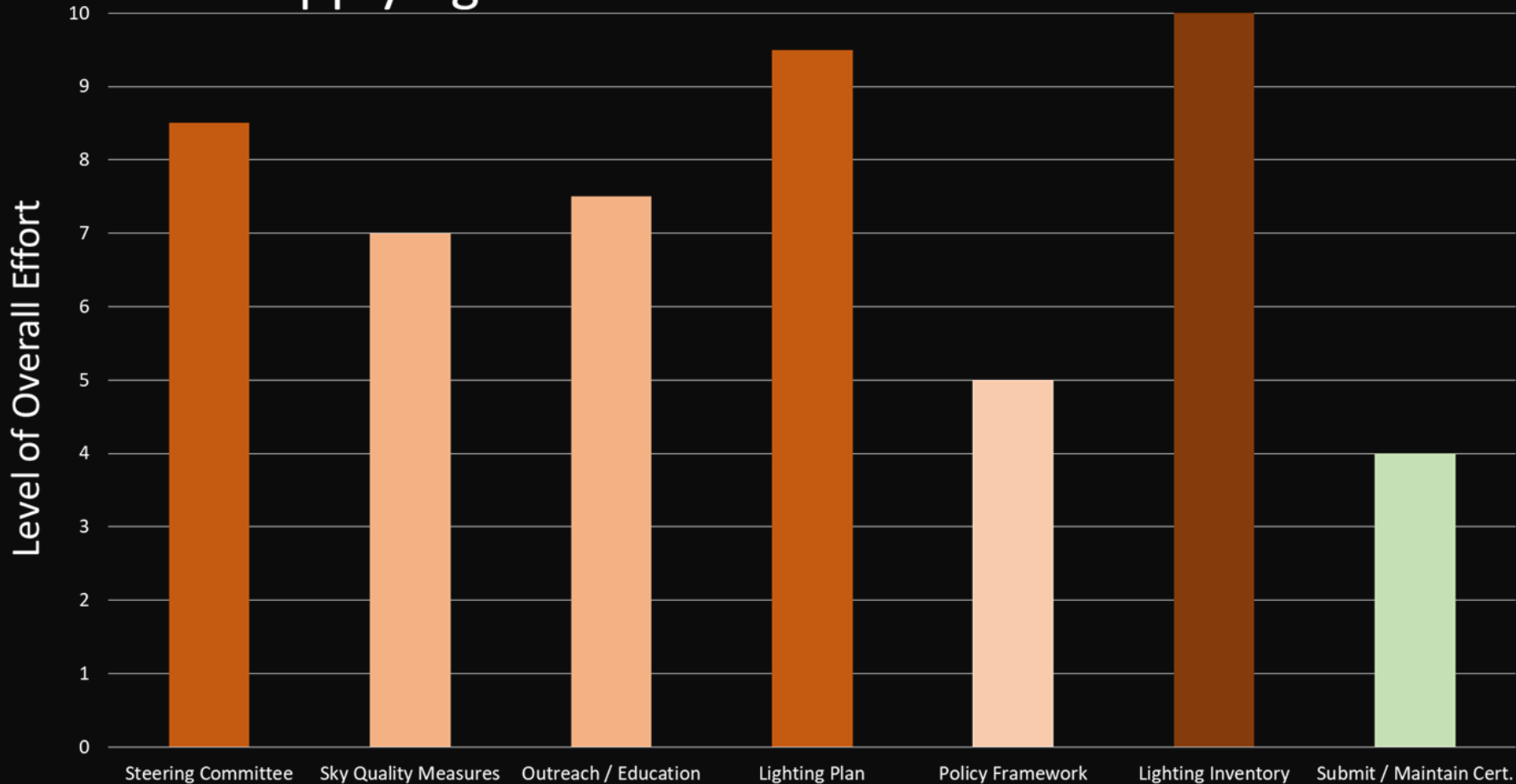
ORDINANCE BENEFITS

A good lighting ordinance:

- Prevents excessive and under lighting
- Protects citizens, drivers, the environment and the night sky from glare and light pollution
- Sends a clear message that bad lighting will not be tolerated.



Applying In One Year: LOE Per Certification Element



Certification Tools & Resources

creating a dark sky compliance lighting code or ordinance:

darksky.org > menu > Creating Codes / Statues > DarkSky Municipal Template

<https://darksky.org/what-we-do/advancing-responsible-outdoor-lighting/darksky-recognized-codes-and-statutes/>

applying for IDSP community certification:

darksky.org > what we do > IDSP Places > Apply (scroll down) > Hyperlinks to Guidelines and Checklist

<https://darksky.org/what-we-do/international-dark-sky-places/apply/>

DarkSky International Policy

Outdoor Lighting – Municipal Ordinance Template and User Guide

October 11, 2024 – Version 1.0

Overview

This DarkSky International (DarkSky) Policy provides a template of outdoor lighting requirements for any county, city, municipality, or township seeking to implement a responsible outdoor lighting ordinance [Some regions will use the term “code” or “bylaw”]. The language and requirements contained herein are a proven approach to mitigate Light Pollution and misuses of artificial light at night (ALAN), which threaten human visual performance and safety at night, brighten the naturally dark sky, cause adverse biological health disruptions, damage nocturnal ecosystems, and waste significant amounts of energy and taxpayer money each year. The requirements herein work together holistically to meet the Five Principles for Responsible Outdoor Lighting co-authored by DarkSky and the Illuminating Engineering Society.

Instructions for Use

Narrative written in *Blue + italicized font* are instructions intended for the user, including why a topic is being addressed, and, when applicable, optional requirements or choices. The language within this template will assist advocates, before community passion complete

Before community passion complete

DarkSky

For any question

Program guidelines

Each certification category has its own set of Guidelines (see table below) with the complete set of rules and requirements to establish and ensure night sky conservation for each of the five International Dark Sky Place categories.

The Checklists, also provided via the table below, are supplementary documents to help applicants address the requirements and organize the materials needed for a complete application.

| | | |
|------------------------------------|----------------------------------|---------------------------------|
| International Dark Sky Sanctuaries | Guidelines (PDF) | Checklist (PDF) |
| International Dark Sky Reserves | Guidelines (PDF) | Checklist (PDF) |
| International Dark Sky Parks | Guidelines (PDF) | Checklist (PDF) |
| International Dark Sky Communities | Guidelines (PDF) | Checklist (PDF) |
| Urban Night Sky Places | Guidelines (PDF) | Checklist (PDF) |

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POST-1

REASS

REIN

REVC



Community (IDSC) - Applicant Self-Checklist (Sept. 2023)

[Link to 2018 IDSC Guidelines \(updated Sept. 2023\)](#)

This Checklist has been designed to allow you to easily identify what your application must include. Column 2 shows each 'Compliance Requirement' in abbreviated form. Column 6 shows a cross-reference to the full 'Compliance Requirement' in the Guidelines.

Please proceed as follows:

1. *Where your application meets a 'Compliance Requirement':* In Column 3 enter 'Y'; in Column 4 identify the relevant page number(s) in your application; and in Column 5 include comments or brief application extracts that show how you comply.
2. *Where your application does not meet a 'Compliance Requirement' but you have a plan for how to comply:* In Column 3 enter 'N'; in Column 5 state what steps you intend to take to ensure compliance and the expected time frame.
3. *Where your application cannot meet a 'Compliance Requirement':* In Column 3 enter 'N'; in Column 5 state why you cannot comply; and if you consider this a serious issue, please contact DarkSky and we will work with you to see how best to proceed.
4. *When your Checklist is completed:* Send it to DarkSky with your completed application.

Please complete your Checklist as thoroughly as possible, as it will be used by DarkSky when reviewing your application.

Why Colorado Communities Participate

- residents and visitors are asking for it
- influence the community's existing culture, quality of life, sense of place
- a community commitment culture; rather than code enforcement culture
- every day has a night
- economic benefits
 - overnight stays
 - meals
 - purchases
 - return trips

2023 Communities participating in Dark Sky Certification Mentor Program

Durango

Sangre de Cristo Dark Sky Reserve (Alamosa)

Browns Canyon National Monument

Ridgway State Park

2024 Communities participating in Dark Sky Certification Mentor Program

Rangely

Bayfield

San Miguel County Dark Sky Reserve (Norwood, Ophir, Telluride, and Mountain Village)

Grand Lake

Estes Park

Silverton

2025 Communities participating in Dark Sky Certification Mentor Program

Frisco

Berthoud

Leadville

Rangely

State Parks Mentor Program (12 State Parks + 1 additional park)

Colorado Communities Technical Support

- | | | |
|-----------------|--|---------------------|
| 1. Fort Collins | 14. Estes Park | 24. Mancos |
| 2. Salida | 15. Gunnison | 25. Pagosa Springs |
| 3. Silverton | 16. Redstone | 26. Morrison |
| 4. Marble | 17. Durango | 27. Nederland |
| 5. Palisade | 18. Old Snowmass | 28. Lyons Ridge HOA |
| 6. Meeker | 19. Mountain Village | |
| 7. Ophir | 20. Telluride | |
| 8. Rico | 21. Mesa County | |
| 9. Timnath | 22. Eagle Valley Land Trust (Edwards) | |
| 10. Dillon | 23. Lyons Ridge HOA | |
| 11. Grand Lake | | |

Colorado Certified Dark Sky Parks and Communities

PARKS

Black Canyon of the Gunnison National Park
Curecanti National Recreation Area
Dinosaur National Monument
Florissant Fossil Beds National Monument
Great Sand Dunes National Park and Preserve
Hovenweep National Monument
Jackson Lake State Park
Mesa Verde National Park
Slumgullion Center (a.k.a., Lake Fork Earth and Sky Center)
Top of the Pines

COMMUNITIES

Crestone, Colorado
Norwood, Colorado
Nucla/Naturita, Colorado
Ridgway, Colorado
Westcliffe/Silver Cliff, Colorado
Paonia, Colorado

Thinking About It?

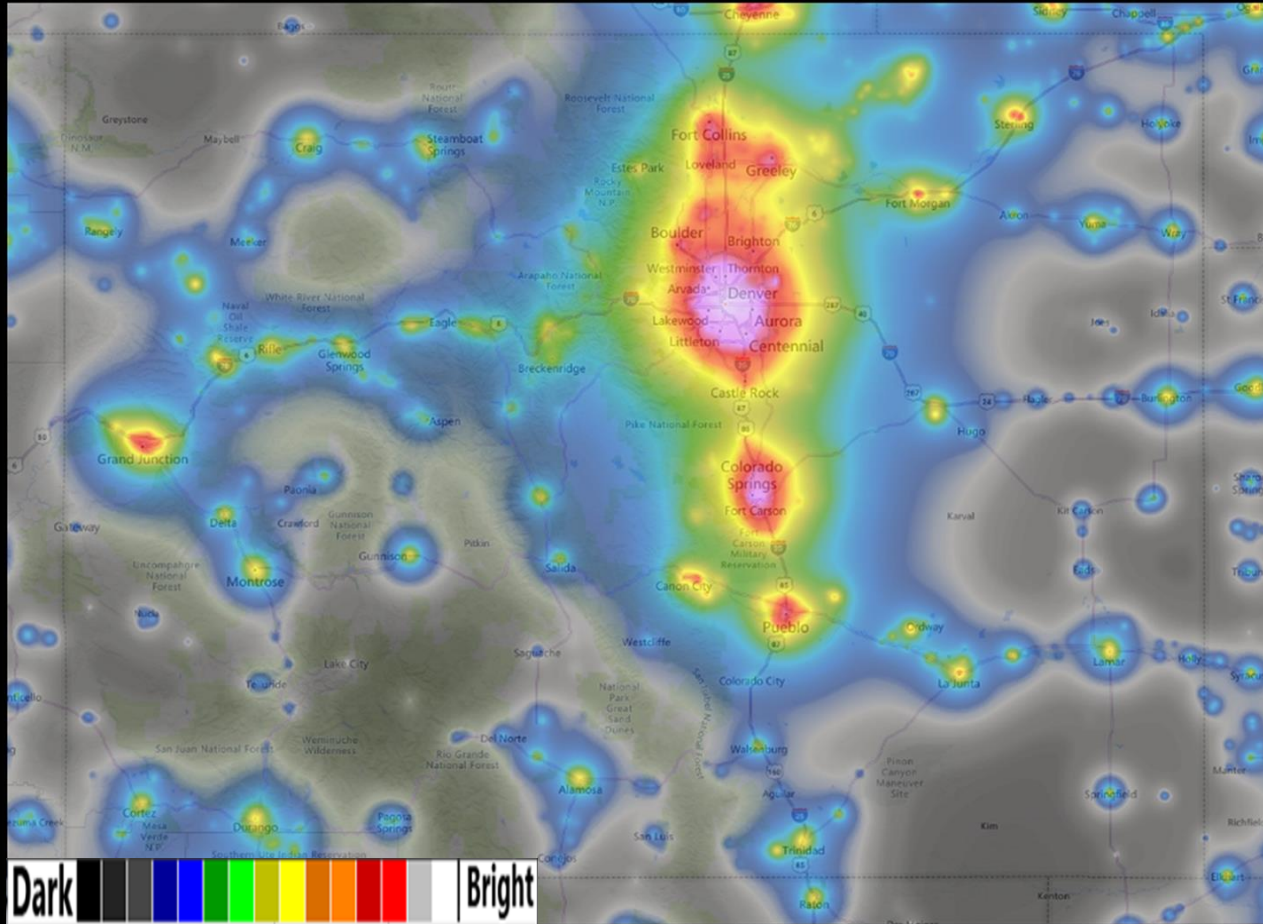
Lessons From the Mentors

- keep your implementation simple
- use existing resources and templates
- keep messaging positive and personally promote the project
- form a steering committee, so it's community driven
- add IDSP certification and maintenance tasks to a job description
- keep the application process in focus and a priority across officials and elections. Create a town resolution
- various and varied “perception” of what a dark sky is
- *“Have you walked your town at night?”*

Colorado Municipal League

create opportunities for municipalities to:

- meet and formally discuss dark sky issues
- help one another use existing and consistent tools and templates
- share best practices that work for them
- establish a CML dark sky think tank to create effective and consistent dark sky policies, practices, and information sharing



Why Should Lighting Codes be Considered?

80% of North Americans cannot see the Milky Way.

99% of the U.S. and European populations live under light polluted skies.

Science Advances, Vol. 6, Issue 5, June 10, 2016.

2015 Light Pollution Map

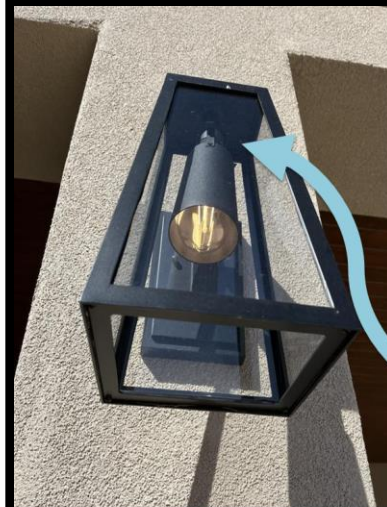


Before

After



Eiweiler, Germany, International Dark Sky Community



Breckenridge Street Lights

Conversions required for Community Certification within 5 yrs

- 1,264 Town owned (678 complete by 2025), 188 Xcel owned*
- \$3.6M over 5 yrs.

Savings

- **Energy.** Before LED conversion, 579 kWh/yr. Providence fixture 248 kWh/yr=
418,636 kWh/yr in energy savings.
- **Labor.** 145 service requests per year currently. Project a **25% reduction in annual service requests** due to less maintenance (fewer components, aesthetic damage, and primarily fixture age).
- **Recycle & Reuse.** Fixtures, electronic waste and wire were either **auctioned off, recycled, or taken to the scrap metal yard.**
 - Out of all new and old packaging, only 1.1% went into the landfill!



Community Outreach & Education

18 events and counting

Monthly Drop In Events

**Stargazing Snowshoe with
Astrophysicist**

Film & Speaker Night

Boy Scout Skyglow readings

Tables at Town events

HOA meetings

Recycle month



Lessons Learned...

- Work with Your Community, Elected Officials, and Staff Departments
- Listen and be Adaptable
- Meet People Where They Are
- Develop an Educational Materials/Resources/FAQs
- Outreach Early and Often regarding Conformance
- Have Patience!
- Have Fun!

***And Don't
Forget...***



“Kelvin!”



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juliap@townofbreckenridge.com

Thank you for attending!

- Please don't forget to rate this session in the CML conference app.
- In the app, navigate to this session and click on SURVEY.
- Each time you evaluate a session, you are entered into a drawing to win a 2-night stay in a Junior Suite at Hotel Alpenrock.
- We appreciate your feedback!

