

The Importance of Dark Skies: From Global to Local

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Bear Valley Springs
Astronomy Club



- All life on Earth evolved with a natural day and night cycle, over millions of years.
- Humans have been inspired by the night sky for over ten thousand years.
- If we take away the dark of night many plant and animal species will be lost.
- Human health can also be negatively impacted.



Human Health

- Humans are not immune from the effect of bright nights. Studies indicate that disrupting the natural day and night cycles with artificial light affects our melatonin production, and subsequently, circadian rhythm.
- The ripple effect impacts our sleep, our immune and endocrine systems, and results in increased risks of depression, diabetes and breast cancer.





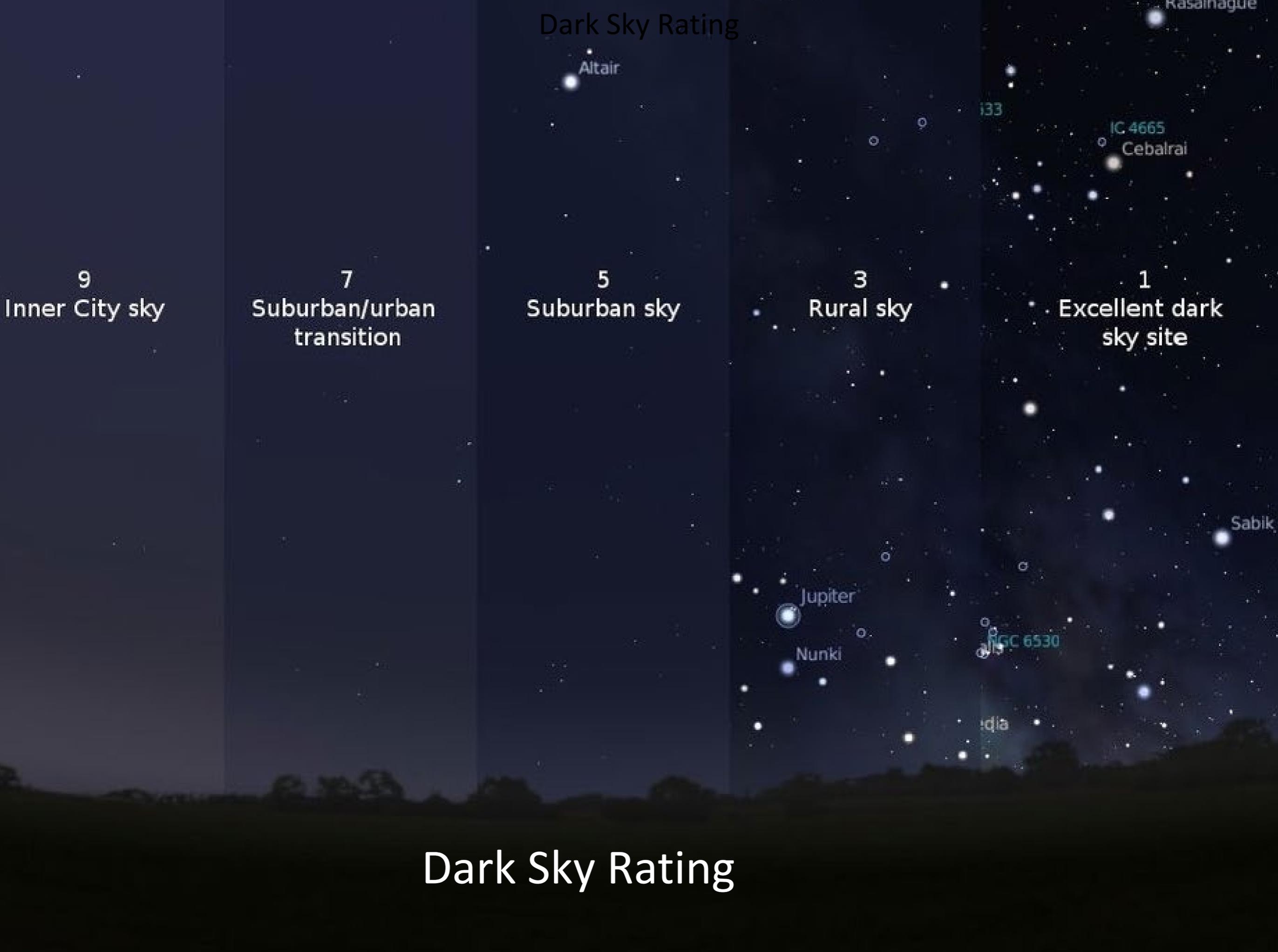
- Future generations will not experience the night sky like our ancestors once did
- We are genetically rooted to ponder upon the stars
- The night skies are a human inspiration

Nightscape

For many centuries the nightscape was the moon and stars. During a full moon it would be relatively bright and during a new moon, rather dark.



For urban dwellers over the last 100 years it has come to be described as lighting buildings, streets, and open spaces.



Dark Sky Rating

9

Inner City sky

7

Suburban/urban transition

5

Suburban sky

3

Rural sky

1

Excellent dark sky site

Altair

IC 33

IC 4665
Cebalrai

Rasalhague

Jupiter

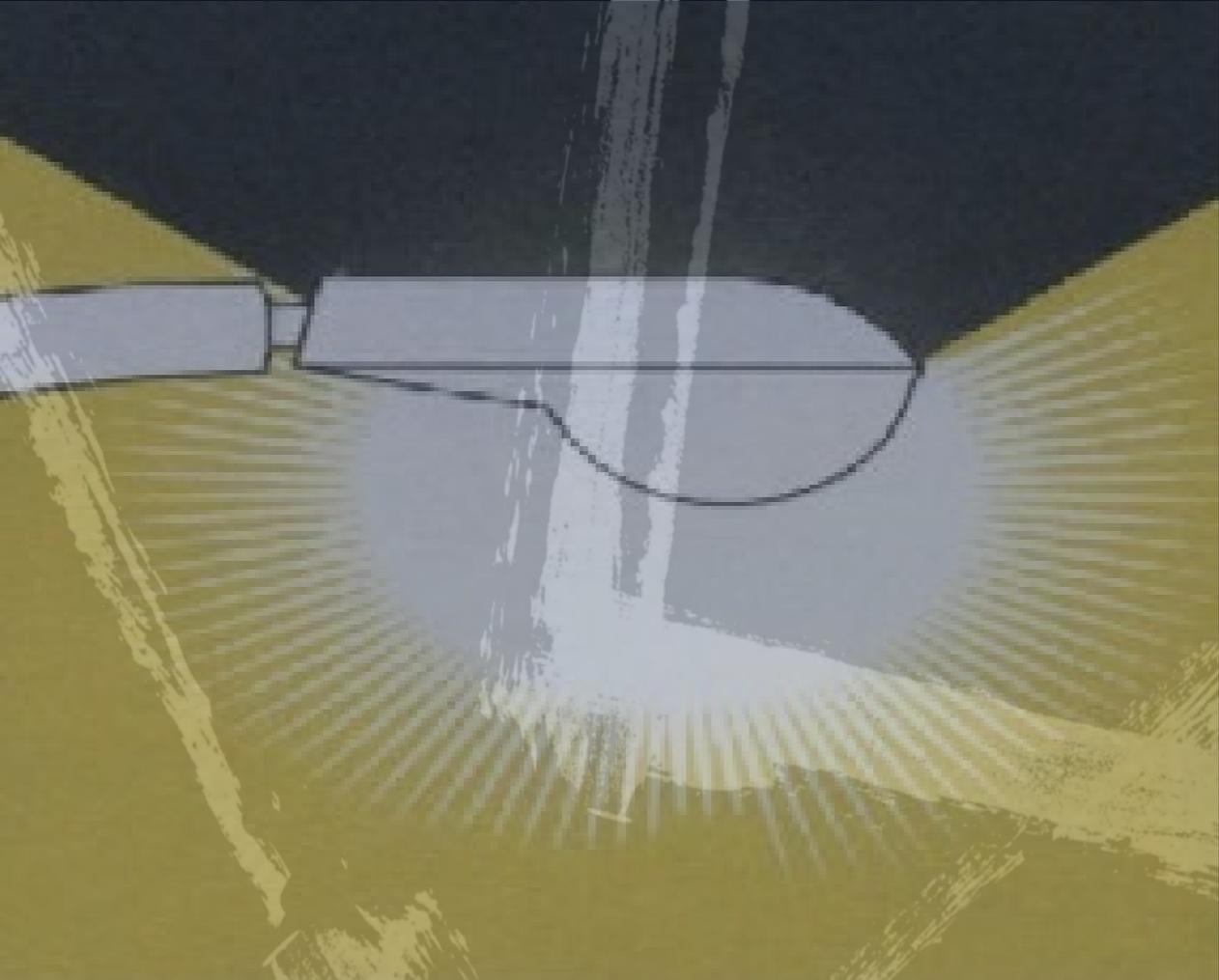
Nunki

NGC 6530

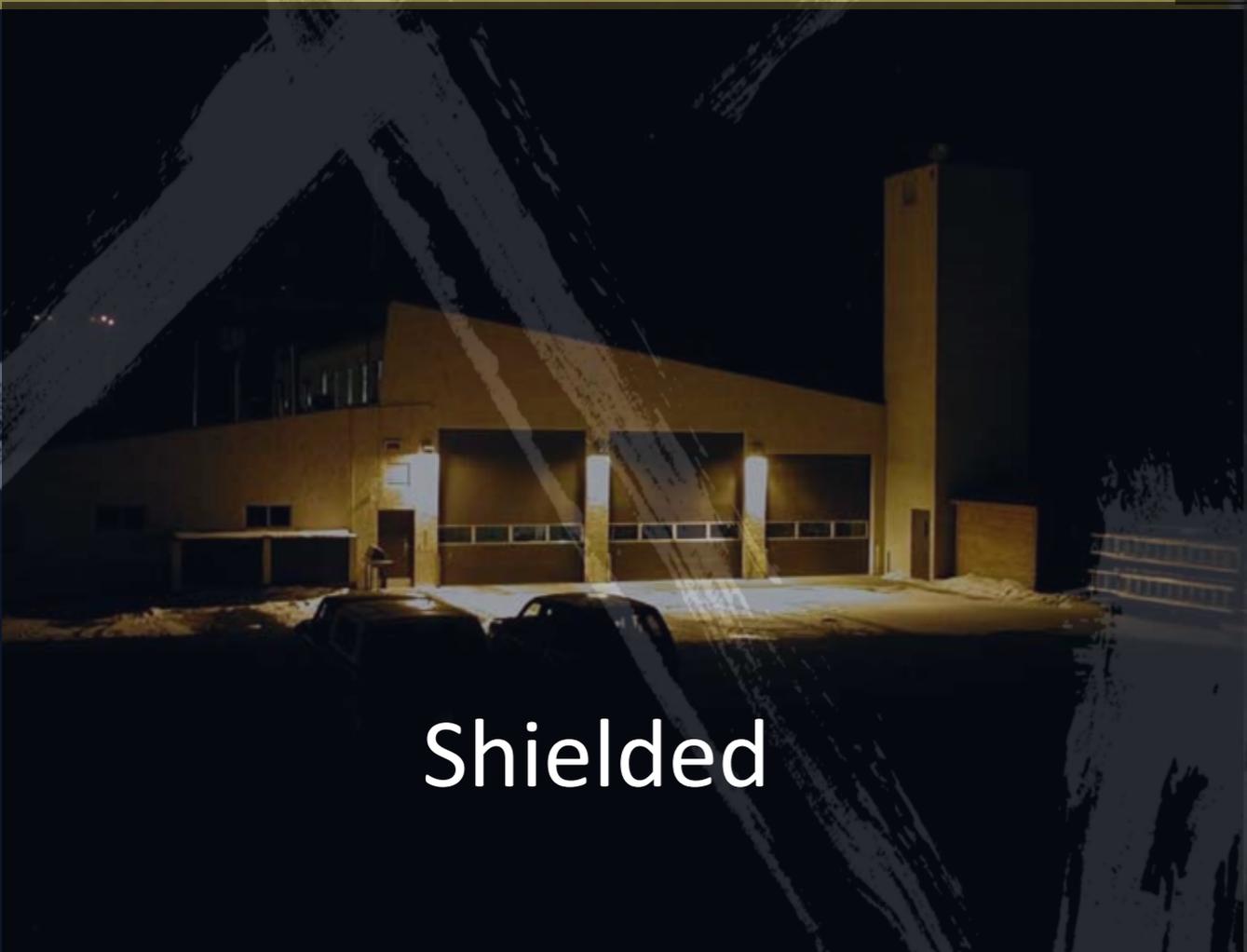
Idia

Sabik

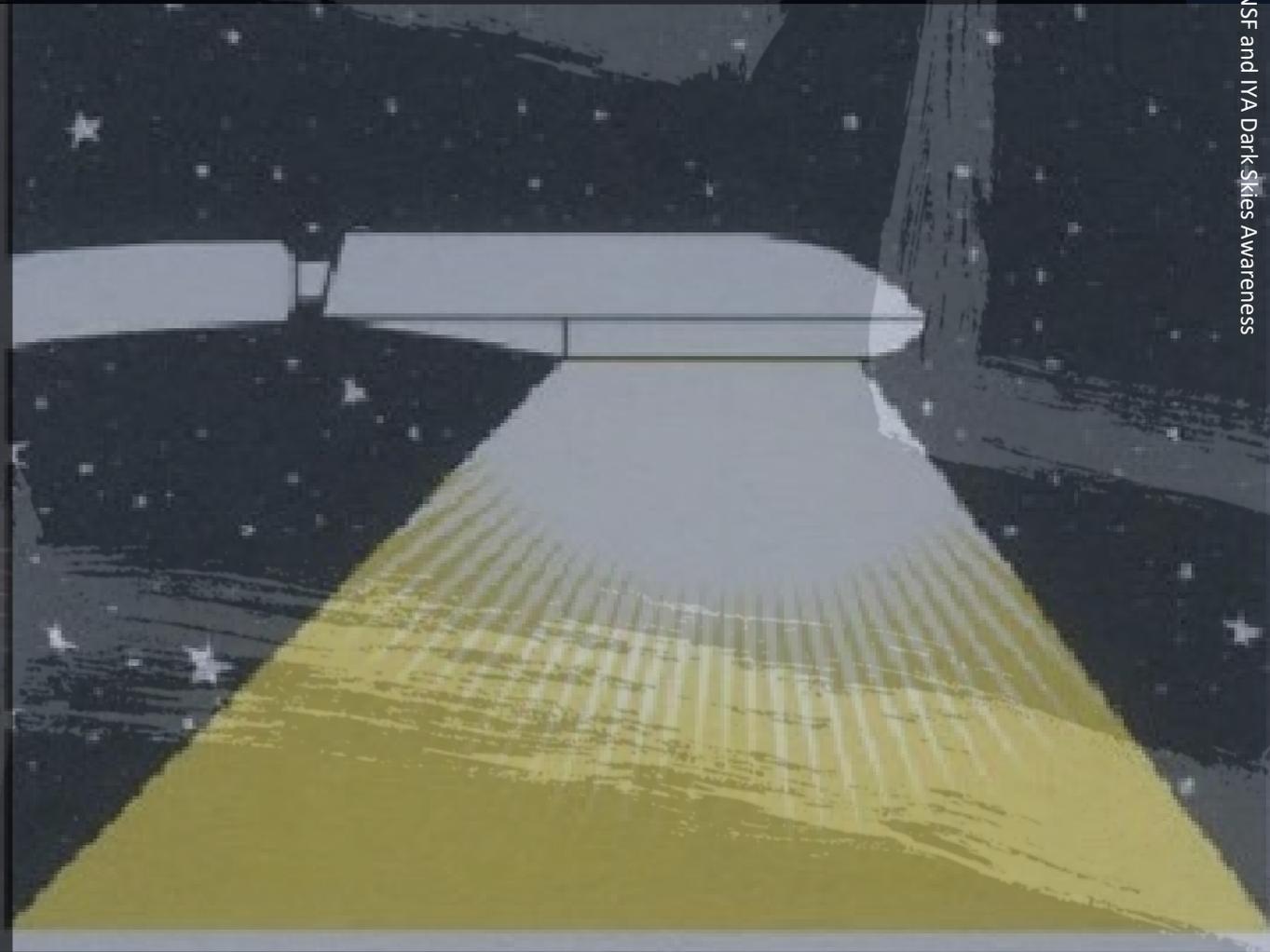
Dark Sky Rating



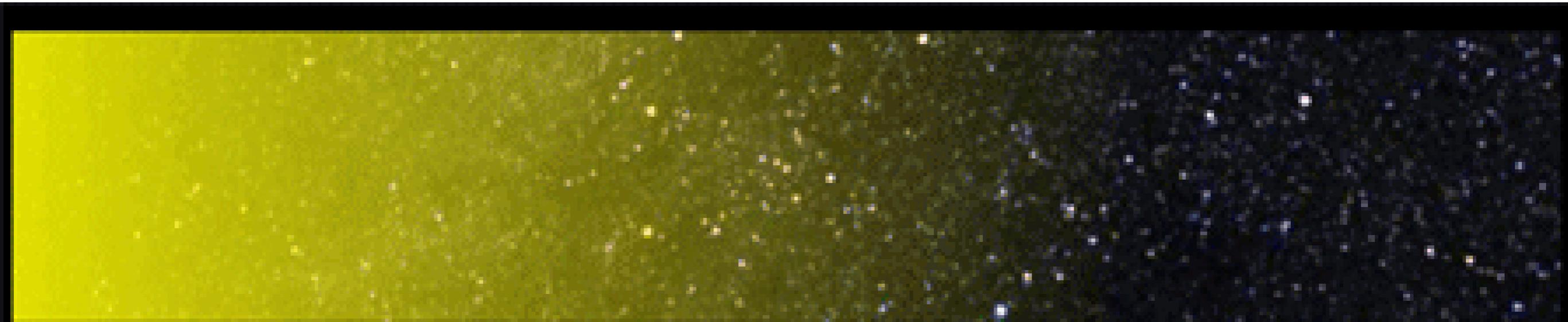
Unshielded



Shielded



Light Pollution and the Night Sky

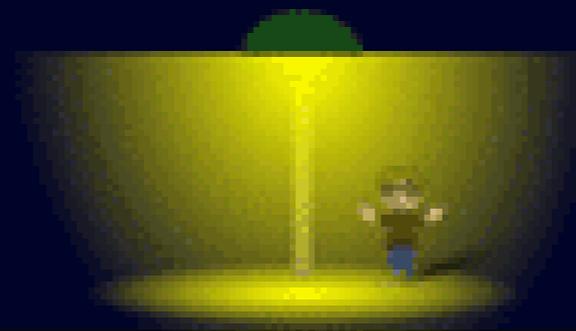
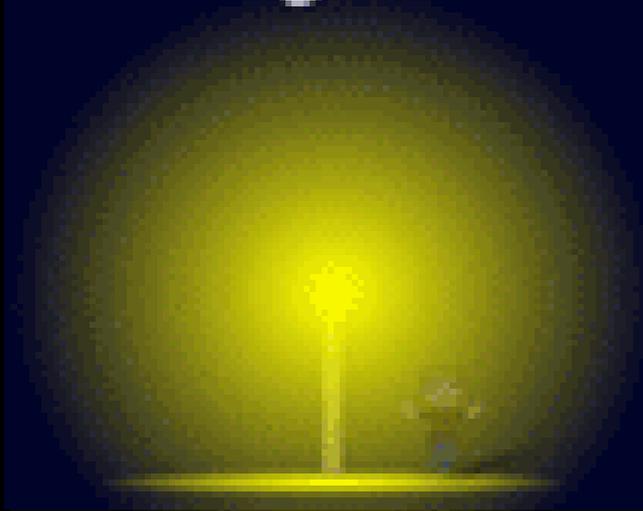


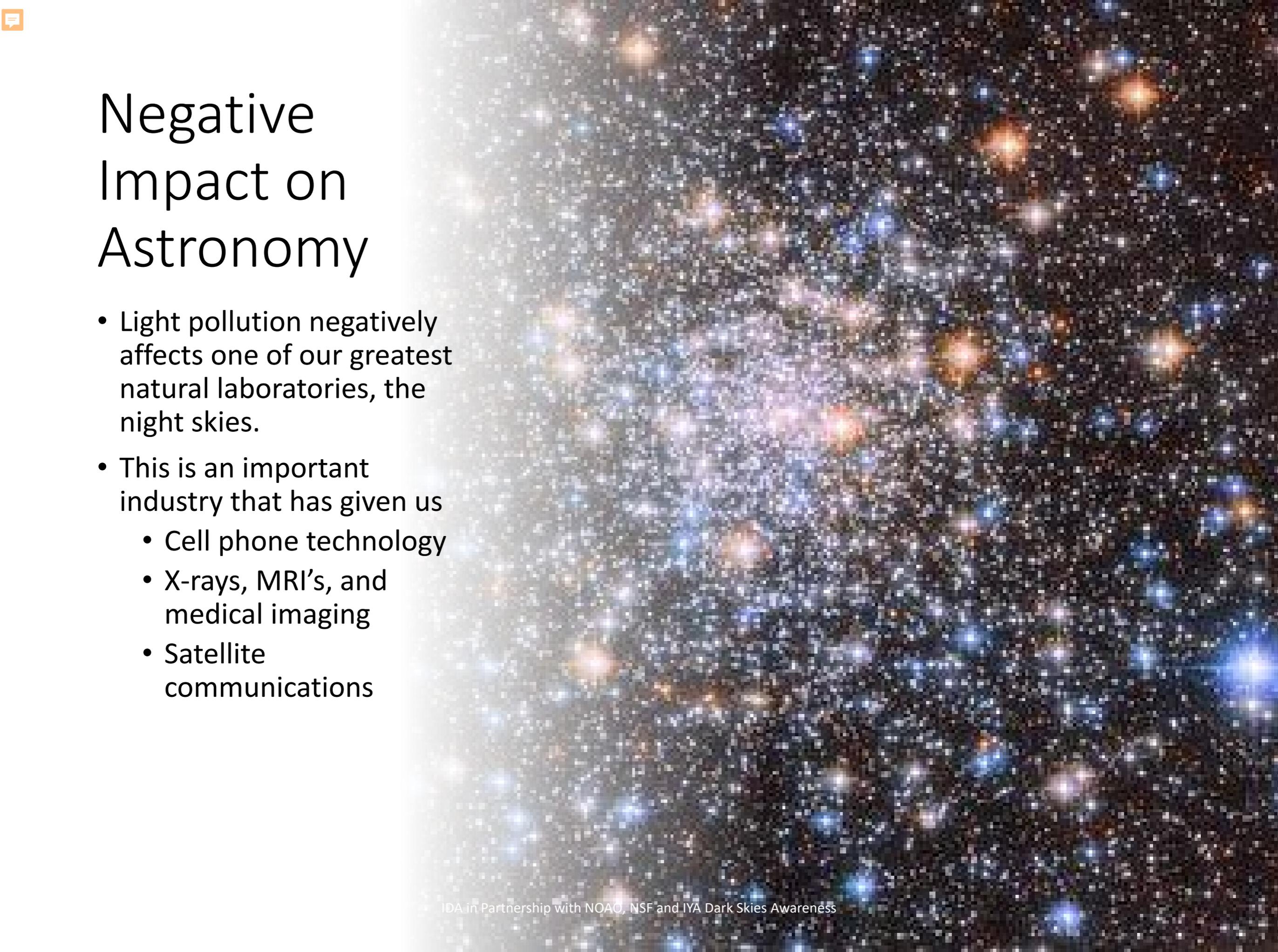
very bad

bad

better

best



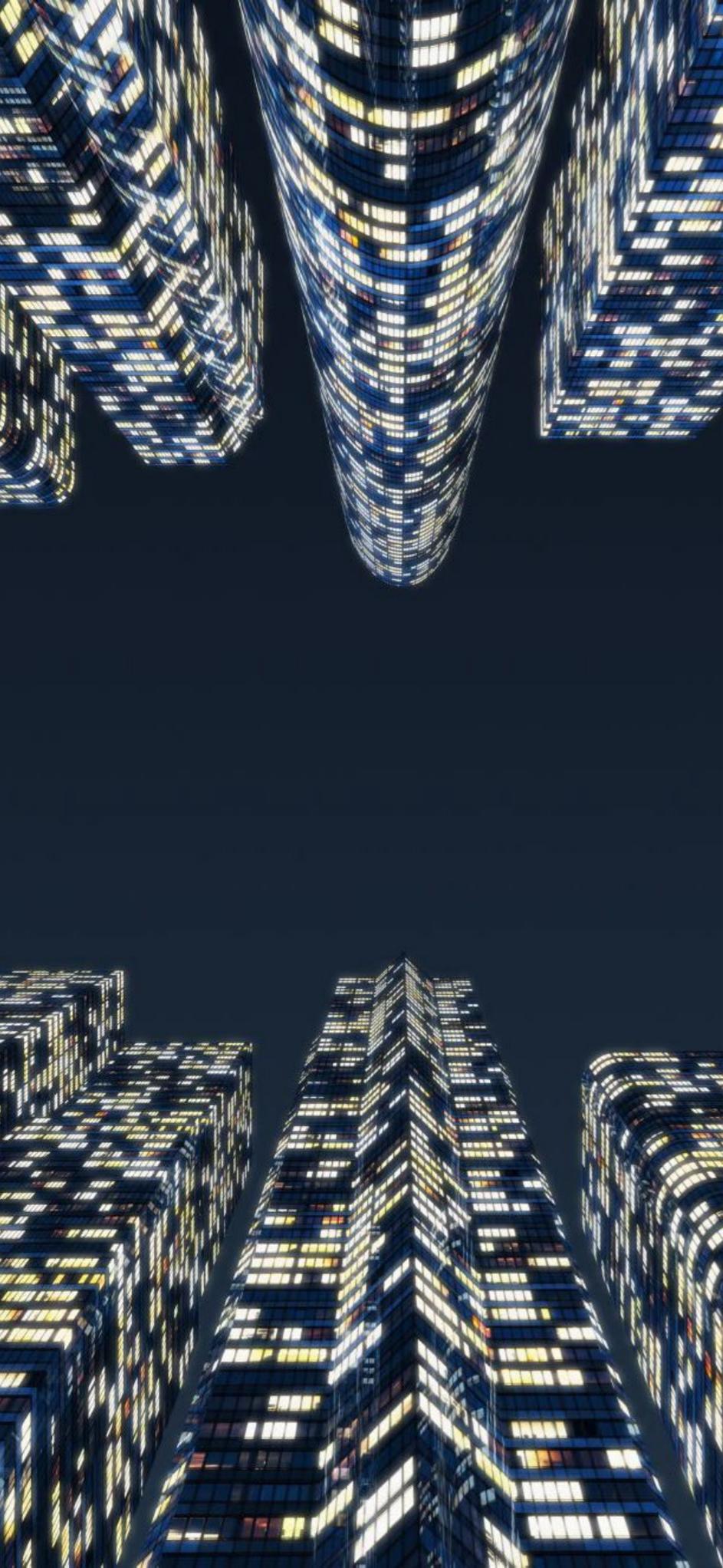


Negative Impact on Astronomy

- Light pollution negatively affects one of our greatest natural laboratories, the night skies.
- This is an important industry that has given us
 - Cell phone technology
 - X-rays, MRI's, and medical imaging
 - Satellite communications



Defining “Dark Sky” by International Dark-Sky Association



International Dark-Sky Association

- The International Dark-Sky Association (IDA) is the recognized authority on light pollution and is the leading organization combating light pollution worldwide.
- IDA works to protect the night skies for present and future generations and provides specific guidelines for becoming a dark sky city.
- For a comprehensive guide to becoming a dark sky city see: <https://www.darksky.org/wp-content/uploads/bsk-pdf-manager/2021/05/IDSC-Final-May-2021.pdf>

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- A “Dark Sky City” is a city that adopts specific light ordinances to prevent deterioration of the night sky for astronomical research and observation.
 - There are fewer than 20 dark sky cities in the US.
 - Flagstaff, Arizona was the very first “International Dark Sky City ,” this occurred in 1958
 - The following are 7 locations in California that have adopted dark sky ordinances:
 - Siskiyou County (away from city lights)
 - Mendocino
 - Death Valley National Park
 - Lake Tahoe
 - Alcatraz Island
 - San Diego County: Julian and Borrego Springs
 - Paso Robles
 - To learn more about these visit: <https://www.visitcalifornia.com/experience/7-great-places-california-stargazing/>



An IDA Comprehensive Lighting Policy

- Full shielding of all lighting fixtures over 1000 initial lamp lumens
- A limit on the emission of short-wavelength light
- A restriction on the total amount of unshielded lighting, such as a limit on lumens per net acre or a total site lumen allowance in unshielded fixtures (or equivalent wattages)
- A policy to address over-lighting

IDA Lighting Policy, Continued

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- Regulations of new installations of publicly-owned outdoor lighting, including illuminated signs
 - An amortization period, applicable to ALL publicly AND privately owned lighting, after which all non-conforming lighting extant at the time of enactment must be brought into compliance with the policy
 - Outdoor recreational and/or athletic field lighting may be exempted





Community Commitment to Dark Skies

- City owned lighting conforming with, or committed to conforming with, the lighting policy and municipal support of dark skies and quality lighting
- Broad support for dark skies from a wide range of community organizations
- Community commitment to dark skies and education
 - Planning and execution of at least two (2) community dark sky awareness events per year
 - Inclusion of dark sky awareness documents with other Community informational documents for residents and visitors
 - Inclusion of dark sky education in local schools



Community Commitment to Dark Skies

- Success in light pollution control
- A sky brightness measurement program
- Appropriate signage indicating International Dark Sky Community

The International Dark Sky Places Program offers five certification categories:

1. [International Dark Sky Sanctuaries](#)

Sanctuaries are the most remote (and often darkest) places in the world whose conservation state is most fragile.

2. [International Dark Sky Parks](#)

Parks are publicly- or privately-owned spaces protected for natural conservation that implement good outdoor lighting and provide dark sky programs for visitors.

3. [International Dark Sky Reserves](#)

Reserves consist of a dark “core” zone surrounded by a populated periphery where policy controls are enacted to protect the darkness of the core.

4. [Urban Night Sky Places](#)

Urban Night Sky Places are sites near or surrounded by large urban environs whose planning and design actively promote an authentic nighttime experience in the midst of significant artificial light at night.

5. [International Dark Sky Communities](#)

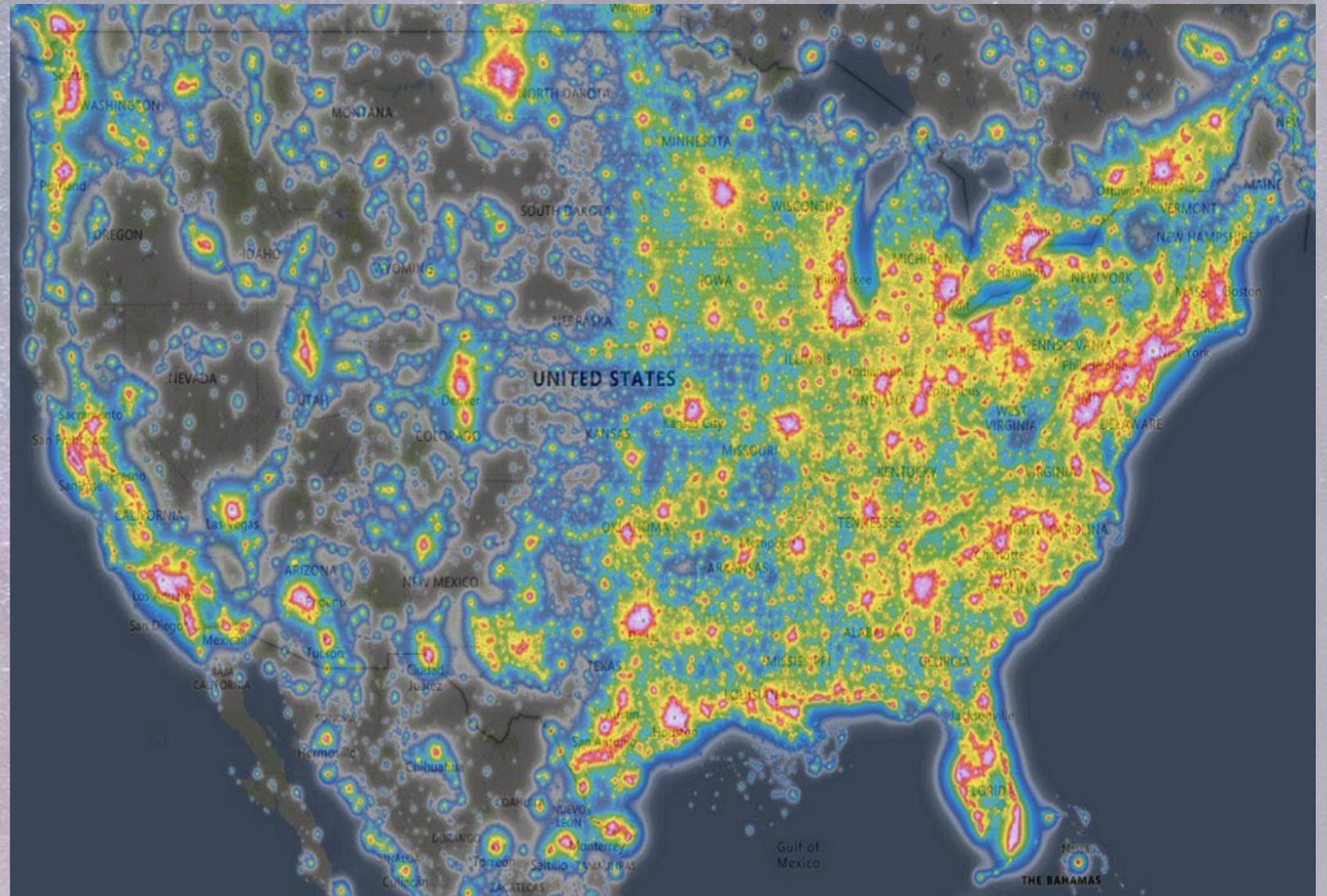
Communities are legally organized cities and towns that adopt quality outdoor lighting ordinances and undertake efforts to educate residents about the importance of dark skies.

Where are the International Dark Sky Places located?

- As of January 2023, there are 201 certified Dark Sky Places in the world. These include 115 Parks, 38 Communities, 20 Reserves, 16 Sanctuaries, 6 Urban Night Sky Places, and 6 Dark Sky Friendly Developments of Distinction (this category was retired in 2000).
- For an interactive map, go to:
<https://www.darksky.org/our-work/conservation/idsp/finder/>

Where we stand as a nation

- The U.S. has over 60 dark sky places certified by the International Dark-Sky Association. Nine are "sanctuaries," areas of remote wilderness specifically protected for exceptional stargazing. Hundreds more, while not certified, have low-enough light pollution to warrant a visit.



Top 10 US Dark Sky Places

1. **Big Bend National Park (International Dark Sky Park)** in southwest Texas.
2. **Great Sand Dunes National Park and Preserve (International Dark Sky Park)** in Colorado.
3. **Glacier National Park (International Dark Sky Park)** in Montana.
4. **Death Valley National Park (International Dark Sky Park)** in California.
5. **Central Idaho Dark Sky Reserve (International Dark Sky Reserve)** One of only two international Dark Sky Reserves in the U.S.
6. **Katahdin Woods and Waters National Monument (International Dark Sky Sanctuary)** in Maine.
7. **Grand Canyon National Park (International Dark Sky Park)** in Arizona.
8. **Great Basin National Park (International Dark Sky Park)** in Nevada.
9. **Cherry Springs State Park (International Dark Sky Park)** in Pennsylvania.
10. **Stephen C. Foster State Park (International Dark Sky Park)** in Georgia.

California's Response to "Dark Skies"

All outdoor fixtures need to be fully shielded, installed and maintained in such a manner that the shielding does not permit light trespass in excess of one-tenths foot-candles. Lighting Color: The correlated color temperature of all outdoor lighting shall be 3,000 Kelvin or less except for seasonal lighting.

California Energy

For decades, California has been a leader in adopting policies and regulations to protect the environment — often setting a valuable example for the rest of the country to follow. Title 20, also known as the Appliance Efficiency Program, and Title 24, California's Building Energy Efficiency Standards, are important measures in the state's efforts to be as energy efficient as possible

Title 20 is a product-specific standard, and Title 24 covers how a building is set up and controlled.

California Title 20

- Title 20 is a set of energy efficiency regulations established by the California Energy Commission (CEC) that defines standards for all types of appliances. It affects three main types of light bulbs, referred to in the regulations as “lamps”: general service lamps (GSLs), state-regulated LED lamps (SLEDs) and state-regulated small diameter directional lamps (SSDLs).
- The goal of Title 20 is to prepare the market for upcoming mandatory efficiency regulations by promoting lighting products that outperform current requirements. It details minimum quality and performance levels that LED bulbs need to meet to ensure consumer satisfaction and help the market transition to this more efficient technology.

California Title 24

- Title 24's outdoor lighting specifications depend on what lighting zone (LZ) a building is in. They range from LZ0, indicating a very low light level in an open, undeveloped area, to LZ3, indicating a moderately high light level in an urban area.
- Outdoor lighting uses the backlight, uplight and glare (BUG) rating system. This rating indicates how well the lighting minimizes backlight, uplight and glare to reduce light pollution and energy consumption. The best ratings are B0, U0 and G0, and the worst are B5, U5 and G5.
- Different lighting applications require different ratings. For instance, the maximum allowable uplight rating for outdoor area lighting in LZ3 is U0 — the strictest requirement. Business owners will want to determine their lighting zone and consult Title 24 or a contracting specialist to figure out the BUG ratings they need for their unique building configurations.

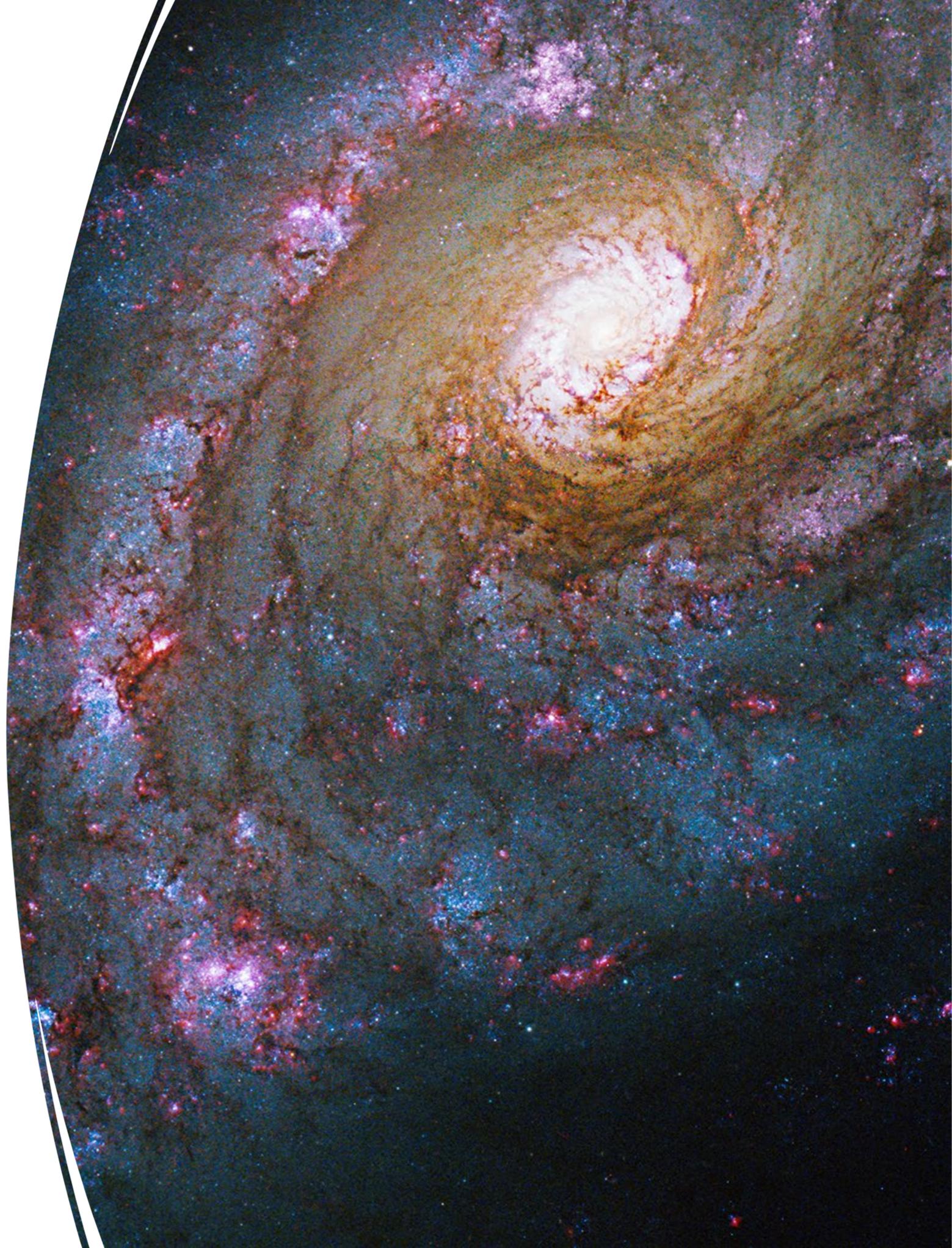
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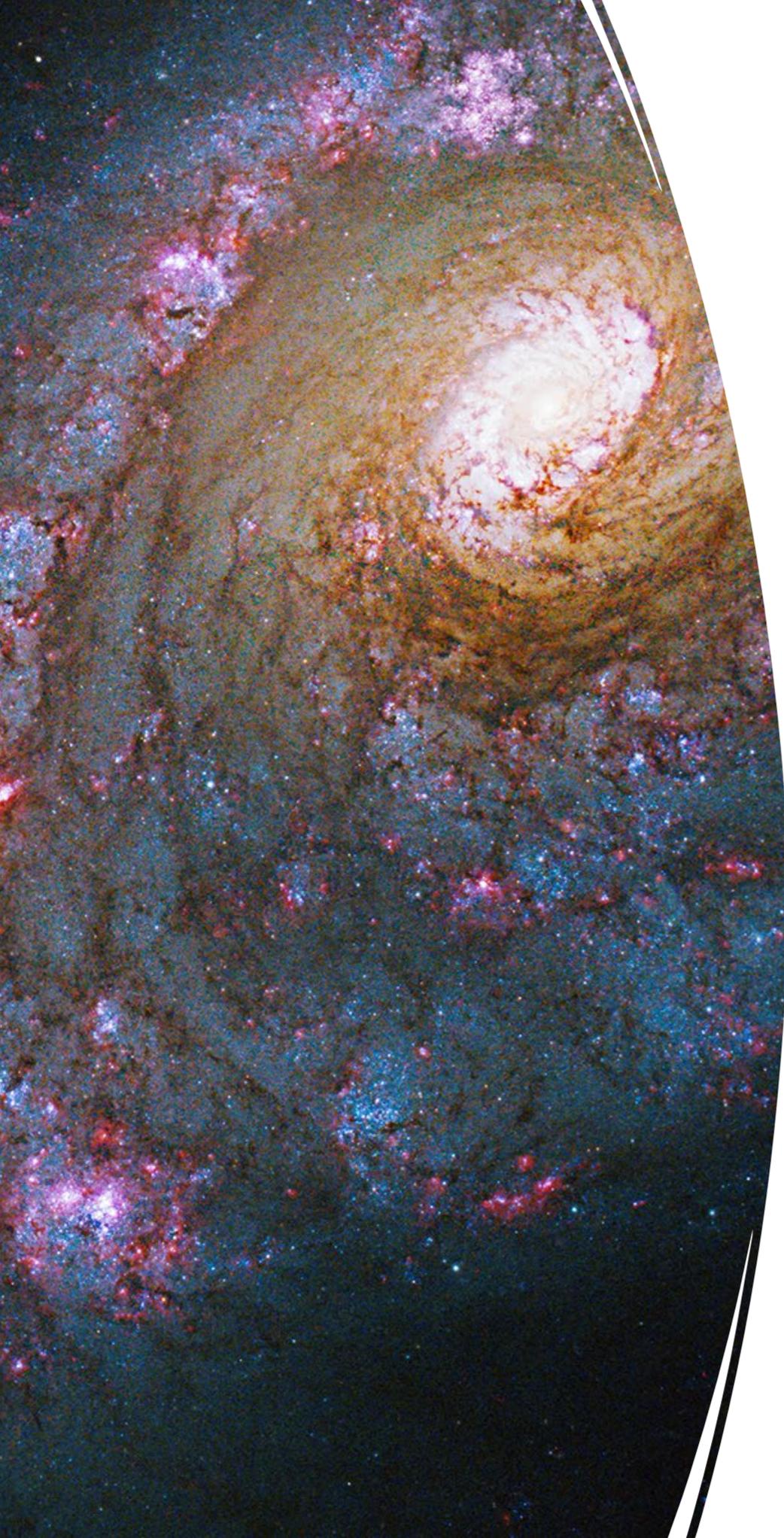
(CBS News San Francisco)

- In efforts to kickstart mindful artificial light usage in California, dark sky advocates reintroduced legislation in December 2022 that would dim the artificial light glowing from state buildings, following a previous veto from Gov. Gavin Newsom in September.
 - AB 38, a repackaged bill written by Assemblymember Alex Lee, D-San Jose, would put greater standards all outdoor lighting fixtures installed or replaced on state-owned, leased or managed property.
 - Building owners would have three eco-friendly options to choose from - installing external shields to prevent light from shooting into the sky, setting up shutoff timers or using motion-activated lights.
- Gov. Gavin Newsom shut down the bill despite its bipartisan support, saying it was expensive and "an overly broad mandate that raises concerns for health and safety, security, and crime prevention."
- Activists are bringing the bill back in hopes that this will be California's first step towards minimizing its light pollution.
 - If passed, California would follow the footsteps of 19 other states -- including Arizona, Texas and New York -- that have authorized "dark skies" legislation to some degree, whether that be for energy conservation, astronomical research purposes or human and environmental health.

Kern County Dark Sky Ordinance 19.81.010

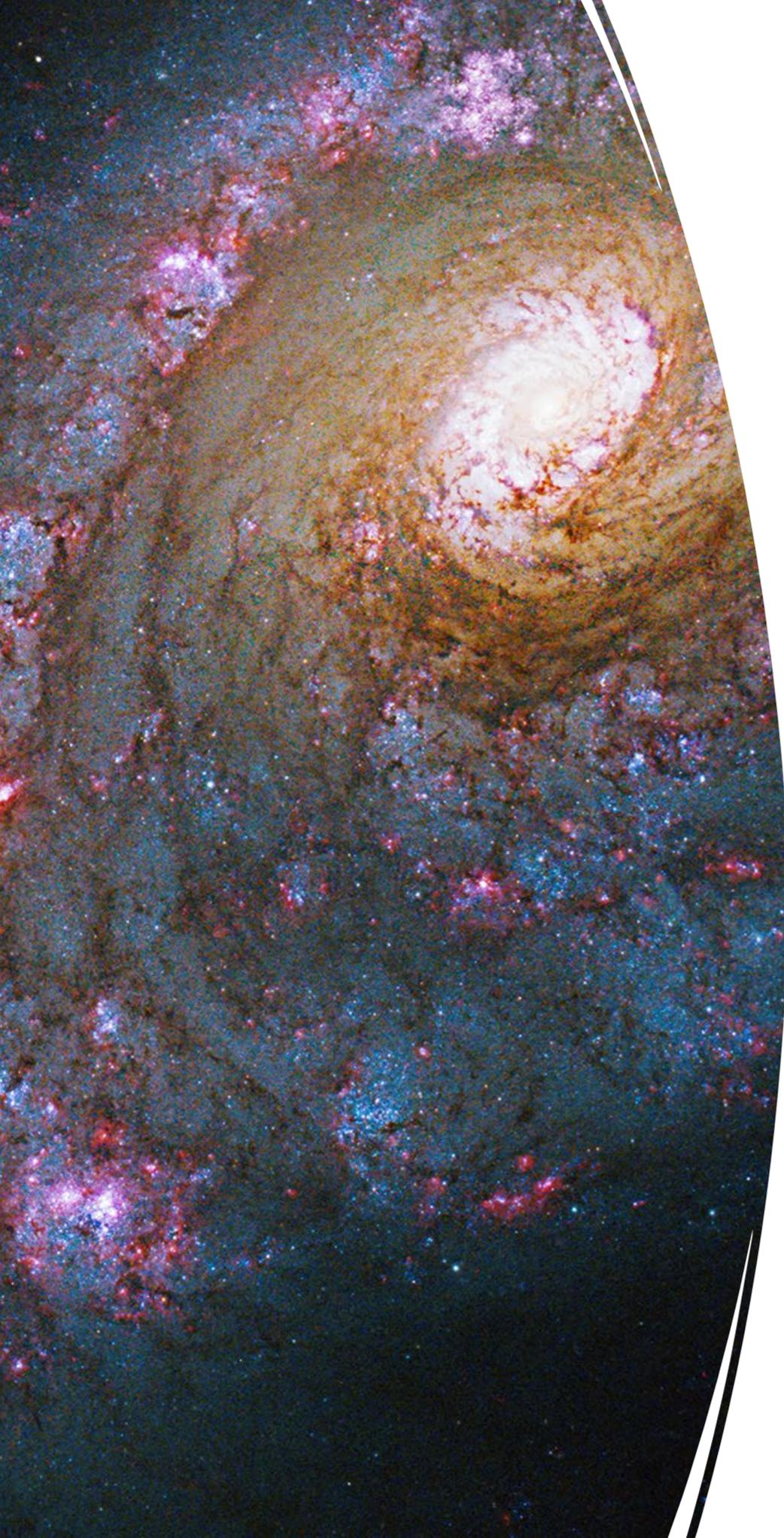
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- Residents in many areas of Kern County currently enjoy a dark night sky and have expressed interest in continued access to natural dark skies.
 - In order to maintain the existing character of Kern County, a minimal approach shall be taken to outdoor lighting, as excessive illumination can create a glow that may obscure the night sky and excessive illumination or glare may constitute a nuisance.
 - The purpose of this chapter is to provide requirements for outdoor lighting within specified unincorporated areas of Kern County in order to accomplish the following objectives:





Kern County Dark Sky Ordinance 19.81.010- Objectives

- Encourage a safe, secure, and less light-oriented nighttime environment for residents, businesses, and visitors.
- Promote a reduction in unnecessary light intensity and glare, and to reduce light spillover onto adjacent properties.
- Protect the ability to view the night sky by restricting unnecessary upward projections of light.
- Promote energy conservation and a reduction in the generation of greenhouse gases by reducing wasted electricity that can result from excessive or unwanted outdoor lighting.
- The figures/drawings incorporated in this chapter or shown on informational sheets produced by the county of Kern are provided as guidelines for the public and staff to use in meeting the intent of this chapter. The figures serve only as examples. The county of Kern does not endorse or discriminate against any manufacturer or company that may be shown, portrayed, or mentioned as examples.
- Should a conflict arise between this chapter and the California Green Building Standards Code, the more restrictive of the two shall apply.

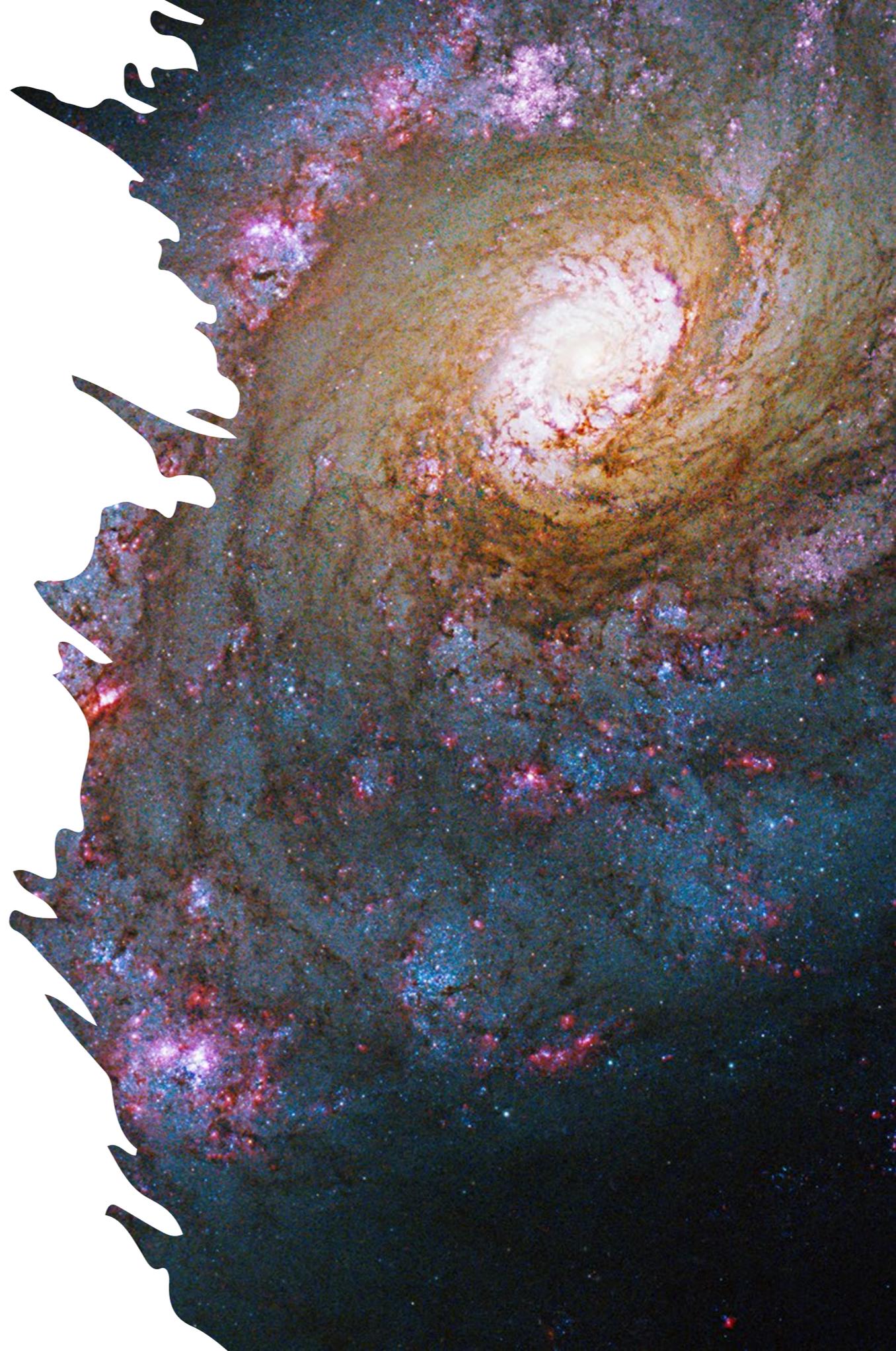


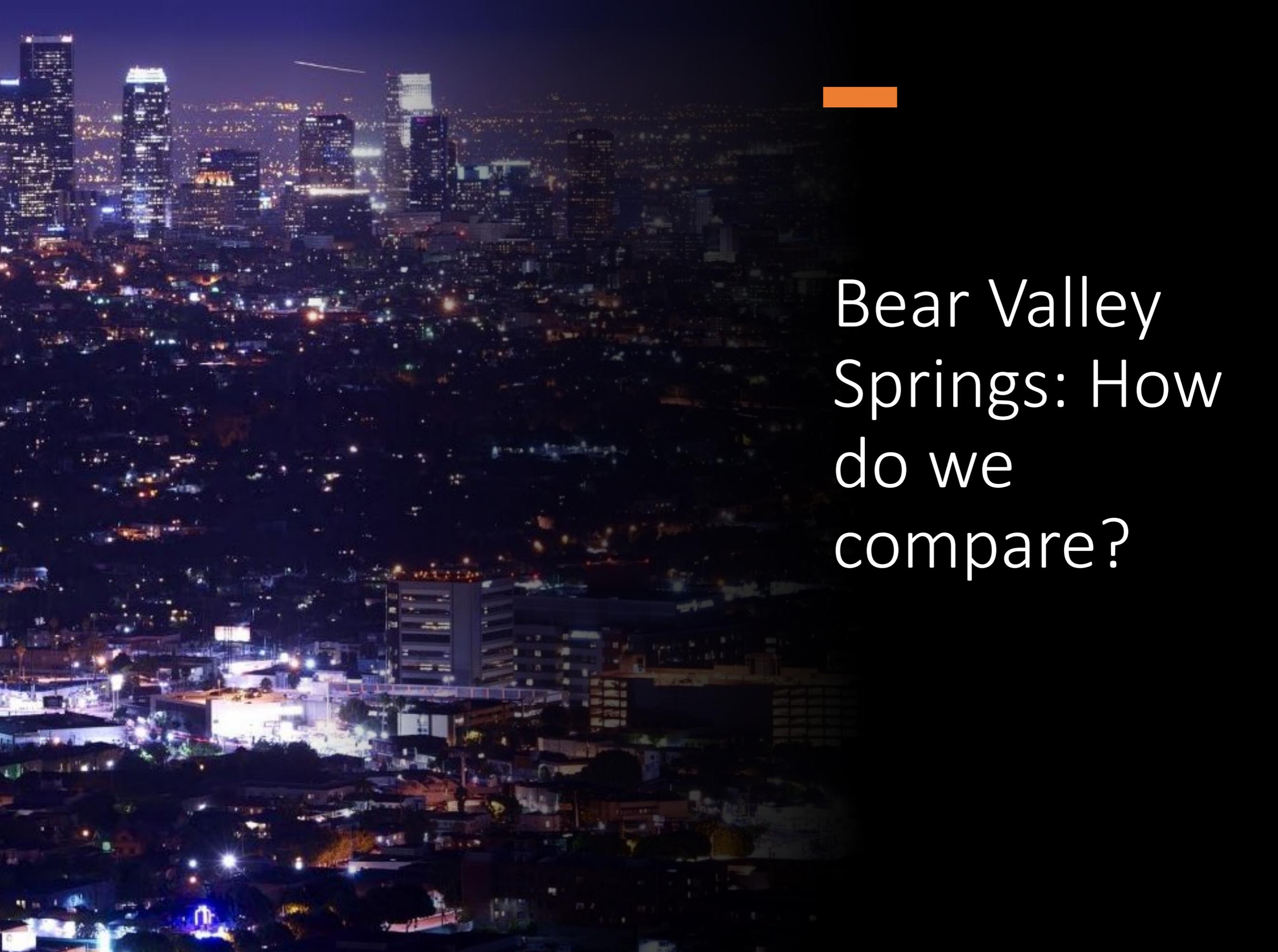
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Kern County Dark Sky Ordinance Violations and Complaints

- Complaints shall be filed with the Kern County Engineering, Surveying, and Permit Services Department/Code Compliance Division.
- Complaints shall be filed in writing and shall specifically cite the applicable provisions of this chapter for which the complaint is submitted.
- Photographic evidence may be submitted with written complaints.
- Any person, business, or owner or possessor of any property who violates this chapter, or who, with the lawful authority to prevent it, causes, permits or allows such a violation, is guilty of a misdemeanor and, upon conviction thereof, shall be punished by a fine of not more than one thousand dollars (\$1,000.00) or by imprisonment in the county jail for not exceeding six (6) months, or by both such fine and imprisonment. Each day the violation of this title continues shall be considered a separate offense.



A nighttime aerial view of San Francisco, showing the dense city lights and the illuminated skyline in the background. The foreground shows a mix of residential and commercial buildings, with some brightly lit areas. The overall scene is dark, with the city lights providing the primary illumination.

Bear Valley
Springs: How
do we
compare?

Environmental Control Committee: Covenants and Restrictions

SECTION 113. Lighting

One of the express purposes and intentions of the C&Rs is to preserve the natural environment of Bear Valley Springs to the maximum extent reasonably practicable. Consistent with that purpose and intent, **the intent of this rule is to require that exterior lighting be maintained on residential lots in such manner as not to constitute an annoyance to neighbors or the community and that exterior lighting be as unobtrusive as possible.**

The primary exterior lighting objective is to maintain subtle, low-level lighting that is in keeping with the semi-rural character of Bear Valley Springs. Exterior lighting is permitted to the extent required for safety, but glare or exposed filaments should be kept to a minimum so as to preserve the character and environment of the community.

Environmental Control Committee: Lighting

- **All exterior lighting**, except low wattage ($\frac{1}{4}$ watt or less) solar, shall be extinguished by 10:30 p.m. To facilitate the arrival or departure of family or guests, exterior lights may be turned on for short periods after 10:30 p.m. Lighting controlled by motion detectors shall be limited to a maximum of fifteen (15) minutes per cycle.
- **Exterior lights:** All 110/120-volt a/c exterior lights must be shielded, constructed or installed in such manner that the filaments are not visible from adjacent lots or any of the Common Areas. The number of lights visible on any one elevation (one side) of a residence or other improvement or structure shall not exceed five (5) and no exterior light shall exceed forty (40) watts, incandescent, 750 lumens.

Environmental Control Committee: Lighting

- **Driveway lights:** Shielded in fixtures in such manner that the illuminating filament is not visible from neighboring lots or any of the Common Areas. Light output shall be limited to a single twenty-five (25) watt bulb, or 120 lumens per fixture, spaced not less than eighteen (18) feet apart along the driveway. The height of lights along the driveway shall not exceed four (4) feet. Lights marking the entrance from the street shall not exceed seven (7) feet at the bulb.
- **Solar lights:** Quantity shall be kept to a minimum so as not to constitute an annoyance to neighbors. Low-wattage solar lights, no more than one-quarter ($1/4$) watt per fixture, may be utilized in the above applications (exterior or driveway lights).
- **Security lights:** Programmed to stay on continuously throughout the night are prohibited.

What to do if there is a violation/annoyance?

- Complaints can be made by filling out a complaint form and turning it into the Association office. There is an online ECC Complaint form or you may pick one up at the Association Office. The ECC Field Representative will then check on the complaint, and if found to be in violation, the ECC will send a Request for Cooperation letter to the Property Owner which begins the violation process outlined below.
- Unfortunately, due to BVSA Confidentiality Agreement, we are not able to disclose to you the outcome of your complaint.

Response to a Request for Cooperation

- 1.The property owner complies with the request.
- 2.The property owner may request more time to comply.
- 3.The property owner may dispute the request.
- 4.The property owner can ignore the request. Ignoring the request for compliance/cooperation which will result in a second notice. Eventually the file could be forwarded to the Board of Directors for a disciplinary hearing which may result in fines or suspension of amenity privileges.

What can we do? Recommendations from IDA

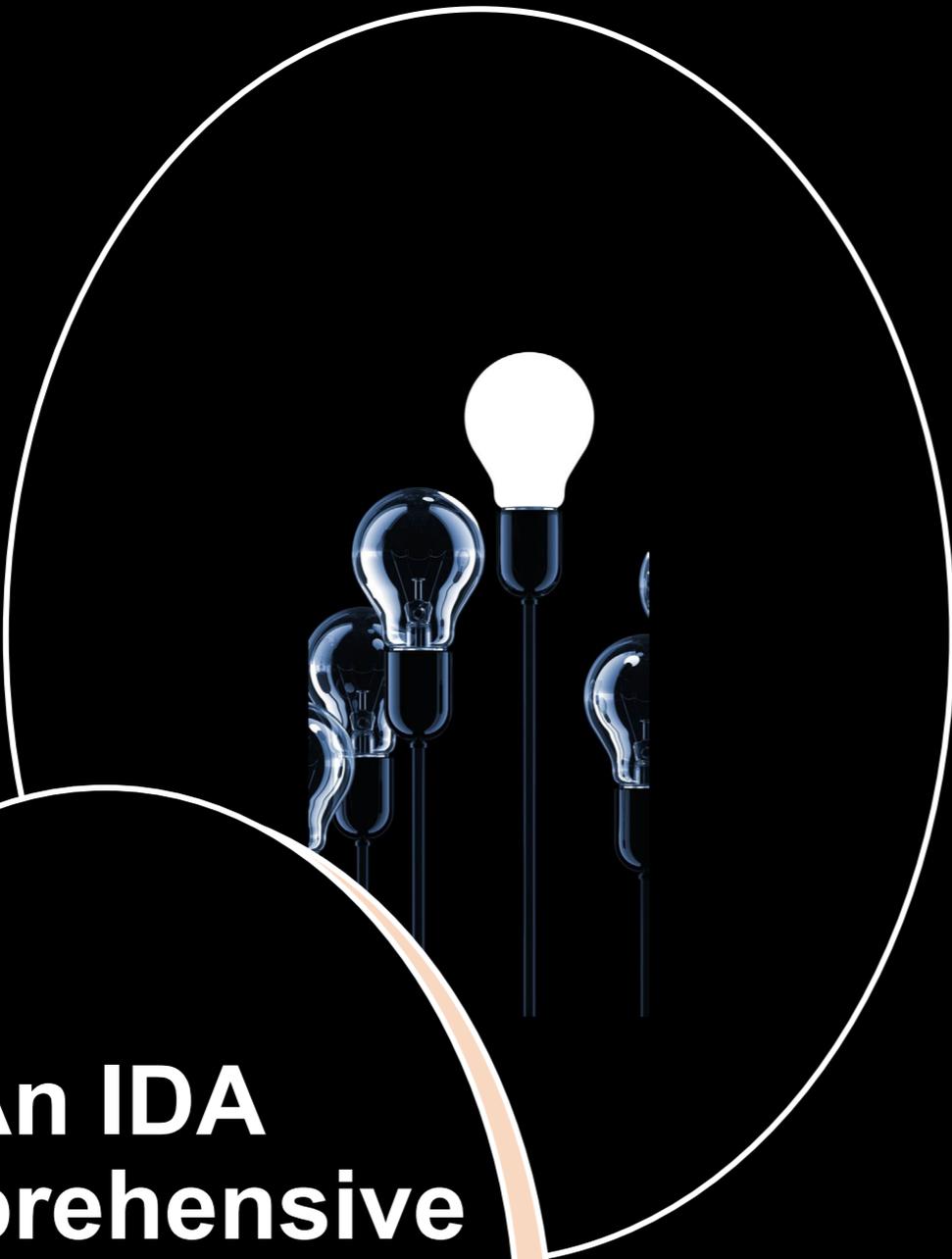
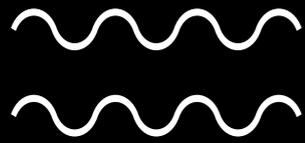
- Get alerted to calls to action by becoming a member of IDA!
- Assess the lighting around your residence.
- Use dark sky friendly lighting at your home and business.
- Look for the International Dark-Sky Association (IDA) Fixture Seal of Approval on any outdoor lighting you purchase..

What can we do? Recommendations from IDA

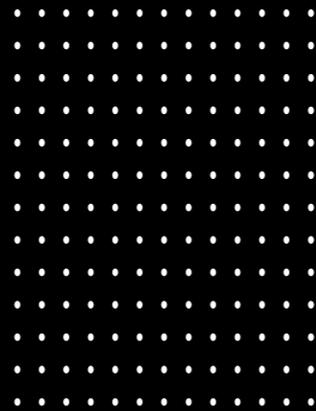
- Talk to your friends, family, and neighbors.
- Become a powerful dark sky advocate for your neighborhood, your city, and even your state and country.
- Spread the word online by engaging your online community regarding the importance of dark skies!
- Become a community scientist and be part of a global community.
- Set up an outreach table at a local event.
- Visit an International Dark Sky Place!

What can we do in Bear Valley Springs?

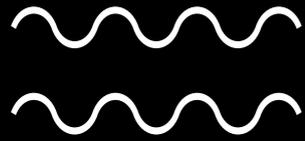
- Educate policy-makers and residents about the importance of dark skies
- Advocate for a lighting ordinance in Bear Valley Springs that follows IDA guidelines
- Advocate for specific steps for review and fines/sanctions for non-compliance



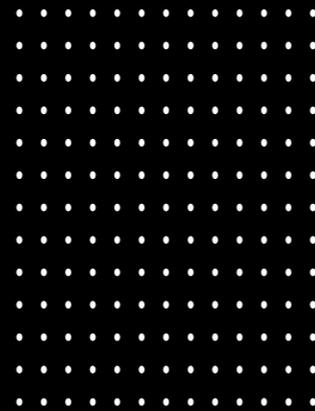
**An IDA
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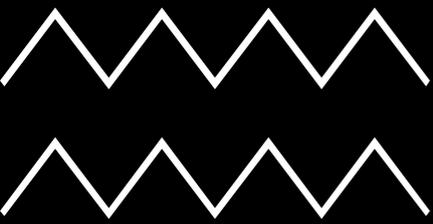
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- A limit on the emission of short-wavelength light
- A restriction on the total amount of unshielded lighting, such as a limit on lumens per net acre or a total site lumen allowance in unshielded fixtures (or equivalent wattages)
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IDA Lighting Policy for Bear Valley Springs



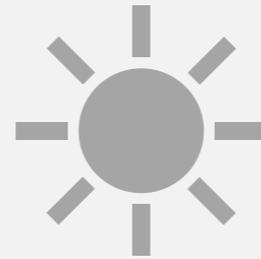
- Regulations for new installations of CSD-owned outdoor lighting, including illuminated signs
- An amortization period, applicable to ALL CSD AND privately owned lighting, after which all non-conforming lighting extant at the time of enactment must be brought into compliance with the policy. IDA recommends 10 years from date of adoption.
- Outdoor recreational and/or athletic field lighting, such as found at Beaubien Athletic Complex may be exempted.



Bear Valley Springs Community Commitment to Dark Skies



Success in light pollution control



A sky brightness measurement program



Appropriate signage indicating that BVS is an International Dark Sky Community



Dark is
Better.
Let's Get
Annoyed!

References

- International Dark-Sky Association
- <https://www.darksky.org>
- Flagstaff Dark Skies Coalition
- <https://www.travelandleisure.com/trip-ideas/space-astronomy/darkest-places-in-the-us>
- <https://databayou.com/stargazing/map.html>
- <https://www.goastronomy.com/dark-sky-sites.php>
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- <https://californiaoutdoorlighting.com/dark-sky-friendly-lighting-a-guide-to-outdoor-lighting-ordinances/>
- CBS News San Francisco
<https://www.cbsnews.com/sanfrancisco/news/bill-aims-to-dim-artificial-light-from-californias-night-skies/>
- Bear Valley Springs Environmental Control Committee