

How To Restore Dark Skies To Taos County: Safe Streets, Stellar Nights in 2026



Presenter: Stanley Yuen

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Light Pollution & How to Restore Dark Skies to Taos County

Presented by Stanley Yuen

UNM
TAOS
LIBRARY



Tuesday, April 14, 2026


7:30 PM | STEM Building Room 112

1157 County Rd. 110 Ranchos de Taos, NM 87557

Celebrate International Dark Sky Week with YOUR UNM-Taos Library and presenter Stanley Yuen! Learn the practical science around light pollution, the value of dark skies to human health, safety, and well-being, and policies and practices that can be adopted today to reduce light pollution in our communities.

Stanley Yuen is a member of Dark Sky New Mexico and a passionate believer in humans staying connected to nature.

Free and open to the community! Join us for a Star Party after the presentation at 8:30 PM with UNM-Taos instructor Dr. Colin Nicholls!



Goal #1: Encourage Taos County, Taos/Picuris Pueblos, municipalities, businesses & residents to protect & restore our Night Skies.

Goal #2: Educate our neighbors on the harms of Light Pollution & up-to-date lighting practices/Dark Skies policy.

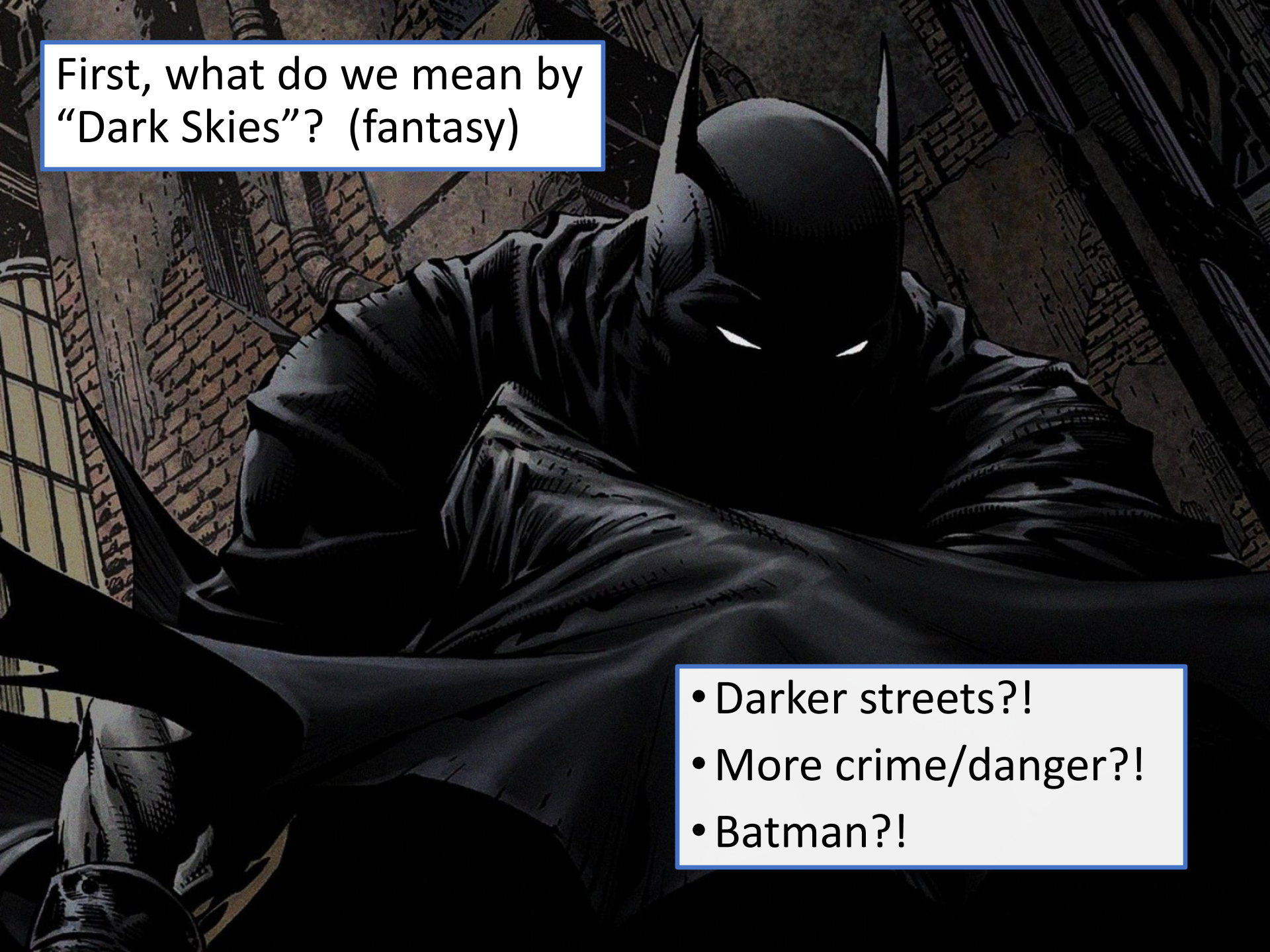


You may ask questions at any time (please raise your hand).

Be patient with people with different levels of experience.

There are no bad questions.

Take notes, focus on actions you can take right away.



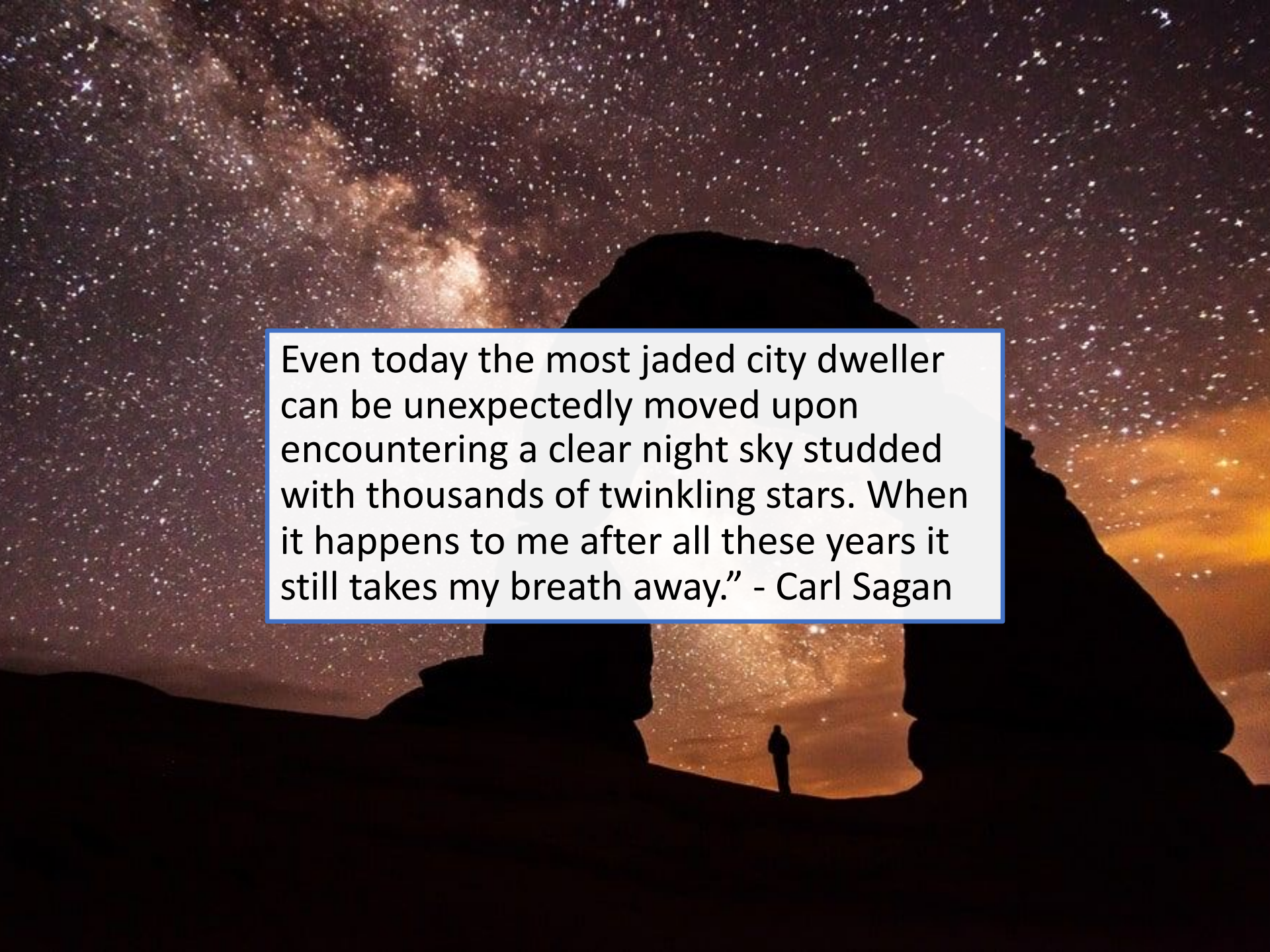
First, what do we mean by
“Dark Skies”? (fantasy)

- Darker streets?!
- More crime/danger?!
- Batman?!

Dark Skies = The Solution
To Light Pollution!

Dark Skies = umbrella term for policies, practices, technologies to combat harms caused by Light Pollution.

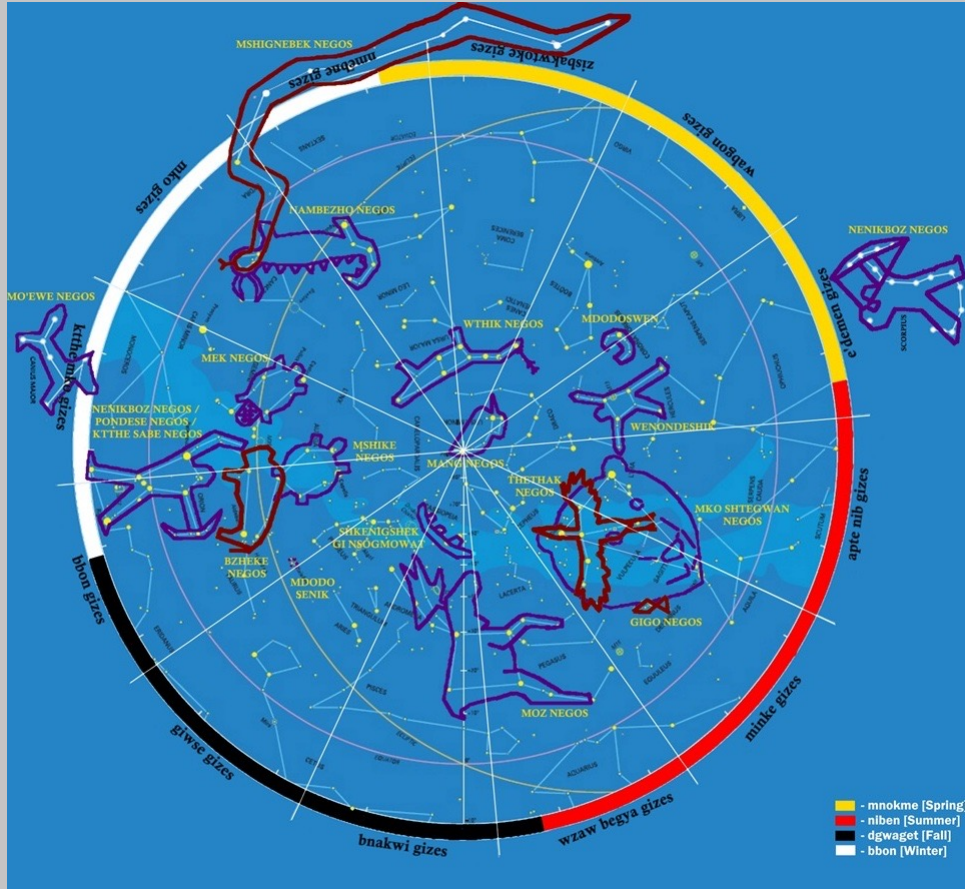


A night sky filled with stars and the Milky Way galaxy. In the foreground, the dark silhouette of a person is visible, looking up at the stars. The person is standing on a dark, rocky outcrop. The Milky Way is visible as a bright, hazy band of light stretching across the sky. The stars are scattered throughout the dark sky, with some appearing as bright points of light. The overall scene is a beautiful representation of a clear night sky.

Even today the most jaded city dweller can be unexpectedly moved upon encountering a clear night sky studded with thousands of twinkling stars. When it happens to me after all these years it still takes my breath away.” - Carl Sagan

Our Common Ancestral Heritage

Potawatomi star chart, 2019



Greek star chart, 1515



Tourism & the Taos Destination Stewardship Plan

(Goals from Taos Destination Stewardship Plan)

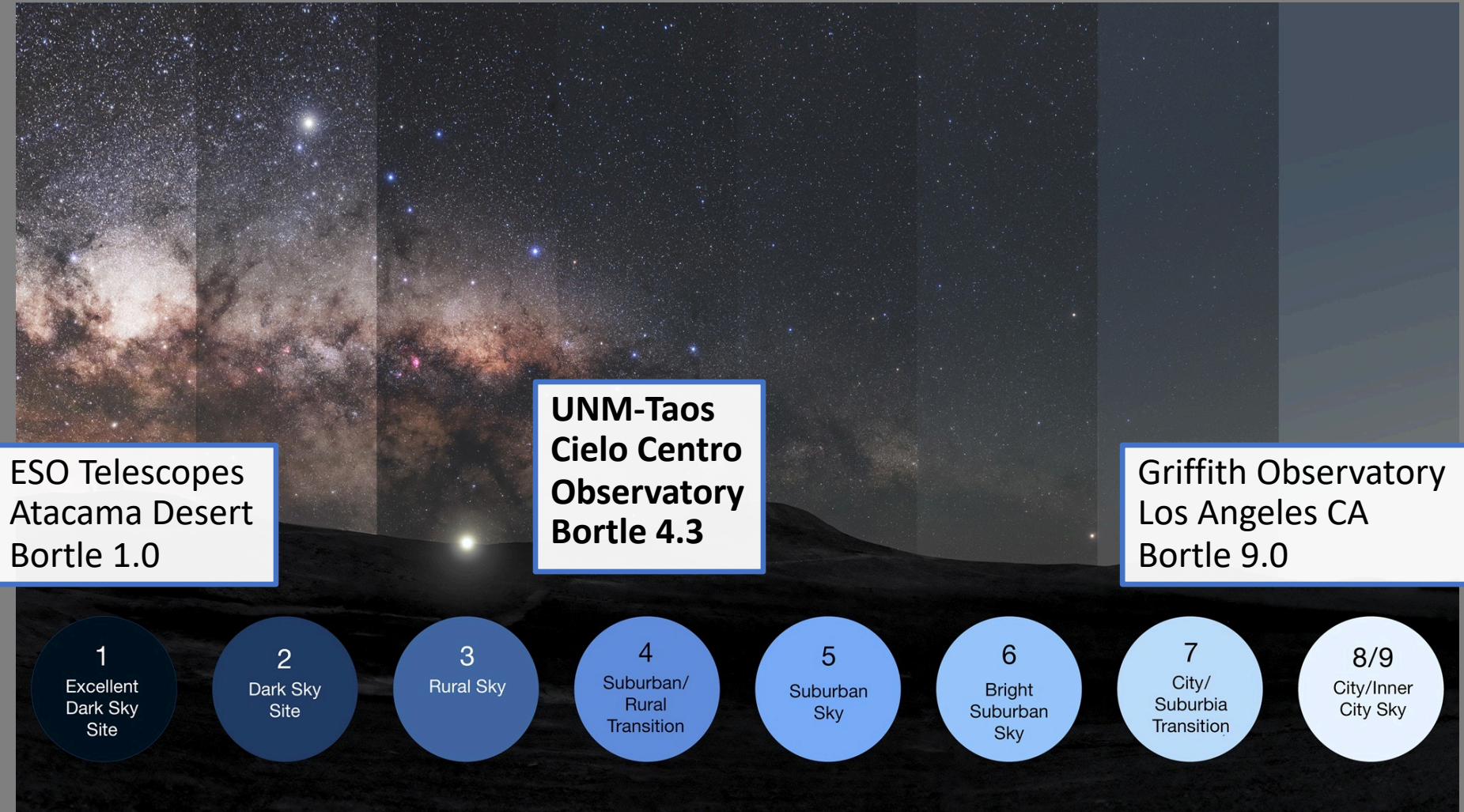
#4: Protect and elevate Taos' authentic character.

#7: Promote sustainable tourism practices and resilience to environmental risks.



Astronomy & STEM at UNM-Taos

Bortle Scale 1.0-9.0, measures visibility/clarity of celestial objects.
Light pollution directly impacts ground-based astronomy.



ESO Telescopes
Atacama Desert
Bortle 1.0

UNM-Taos
Cielo Centro
Observatory
Bortle 4.3

Griffith Observatory
Los Angeles CA
Bortle 9.0

1

Excellent
Dark Sky
Site

2

Dark Sky
Site

3

Rural Sky

4

Suburban/
Rural
Transition

5

Suburban
Sky

6

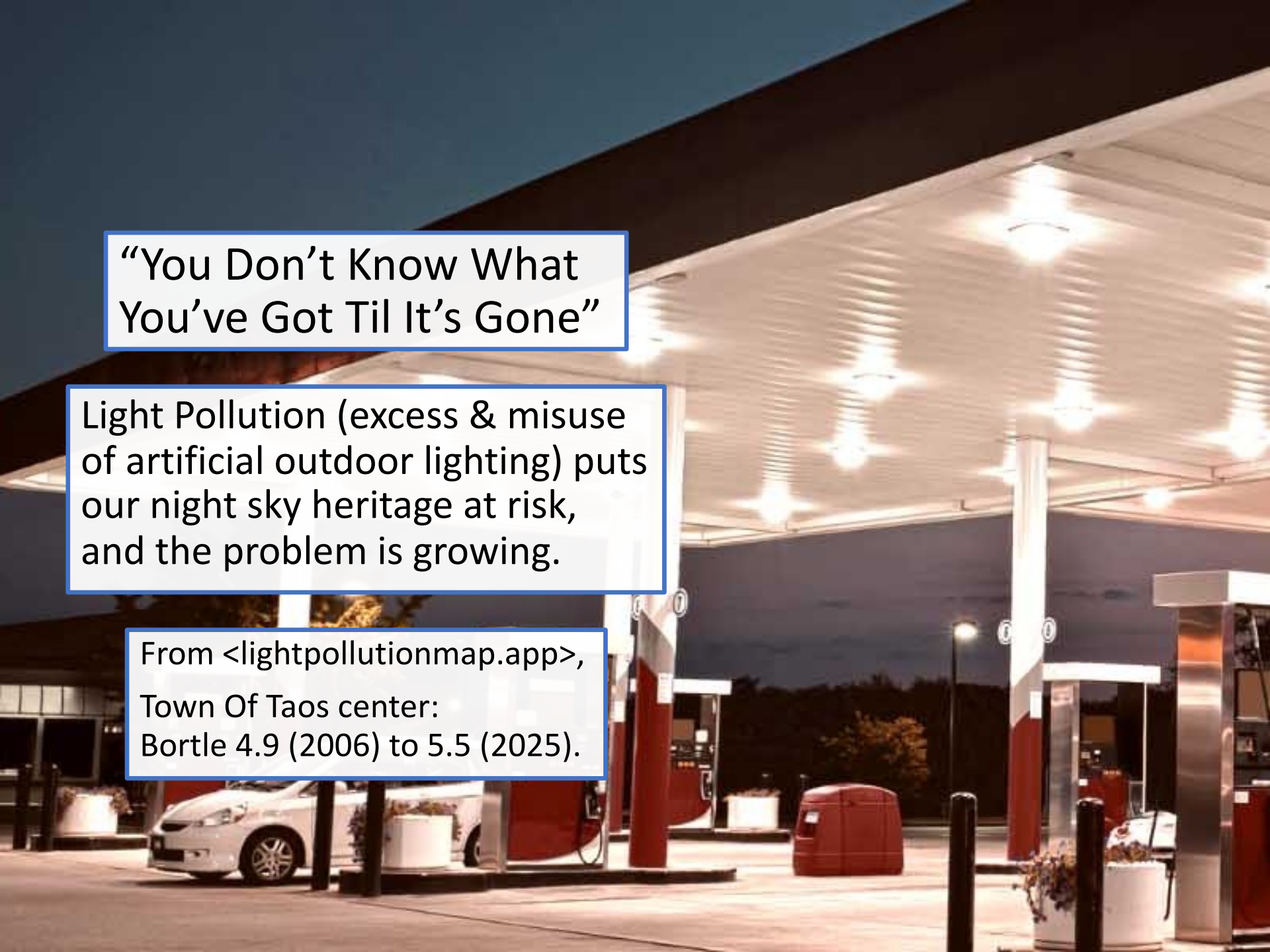
Bright
Suburban
Sky

7

City/
Suburbia
Transition

8/9

City/Inner
City Sky



“You Don’t Know What
You’ve Got Til It’s Gone”

Light Pollution (excess & misuse
of artificial outdoor lighting) puts
our night sky heritage at risk,
and the problem is growing.

From <lightpollutionmap.app>,
Town Of Taos center:
Bortle 4.9 (2006) to 5.5 (2025).



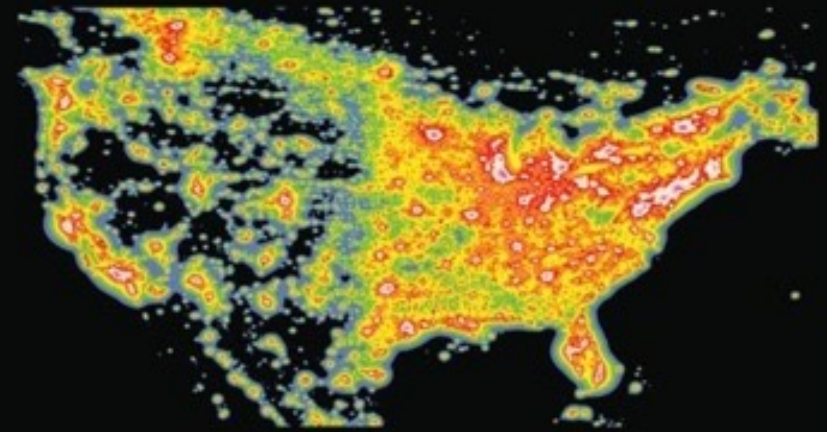
Late 1950s



Mid 1970s



1997



2025

From <lightpollutionmap.app>,
Town Of Taos center:
Bortle 4.9 (2006) to 5.5 (2025).

“You Don’t Know What
You’ve Got Til It’s Gone”

Light Pollution & Human Health

Affects human hormone cycles (melatonin) & circadian rhythm, increases sleep disorders & loss of sleep.

Affects scotopic (human low-light) vision, increases eye strain & reduces visibility.

Increased stress; risk of diabetes, Alzheimer's, insomnia.

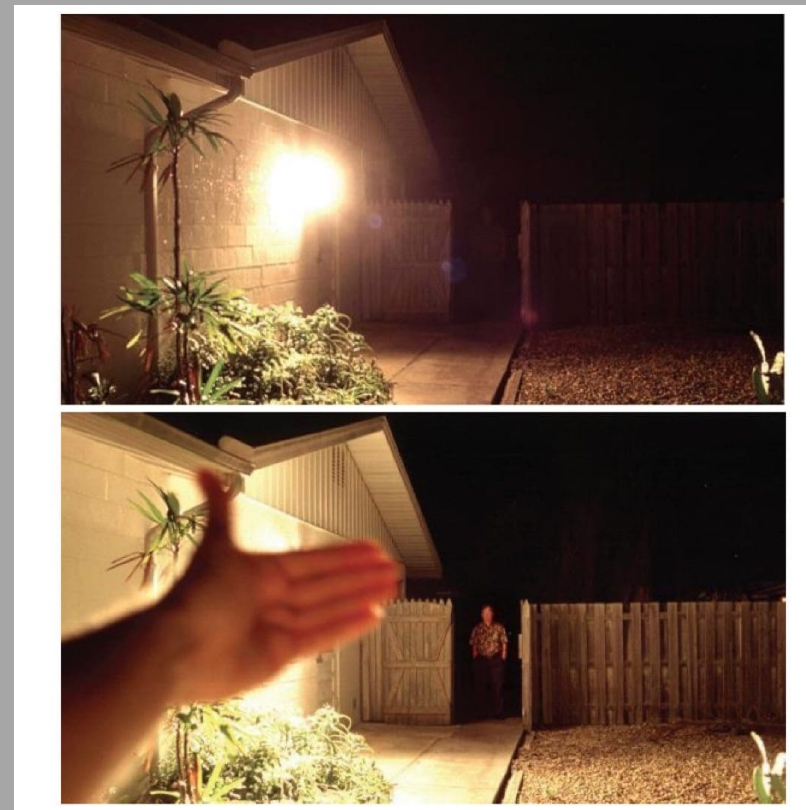


Light Pollution & Safety

Excess & misdirected lighting makes objects LESS visible.

Glare impacts driving visibility & safety.

“Light trespass” on other properties, where it is not intended, wanted or needed.



Light Pollution & Mother Nature

Disrupts wildlife:
reproduction,
migration,
nocturnal activity.

Disrupts plant
seasonal cycles.

Energy waste &
CO2 emissions.





Late 1950s

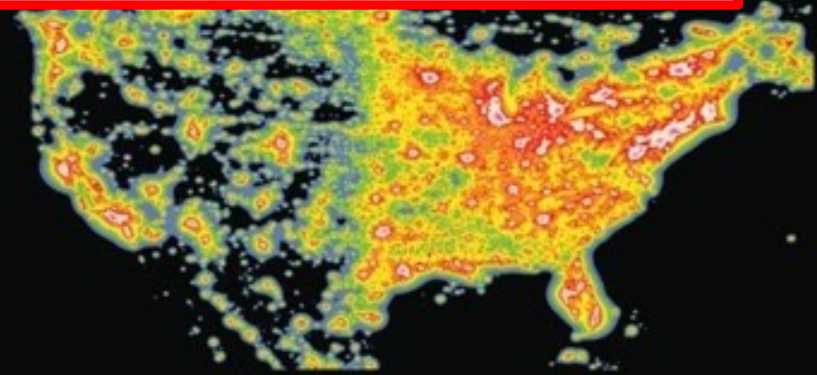


Mid 1970s

How do we restore our Night Skies?



1997



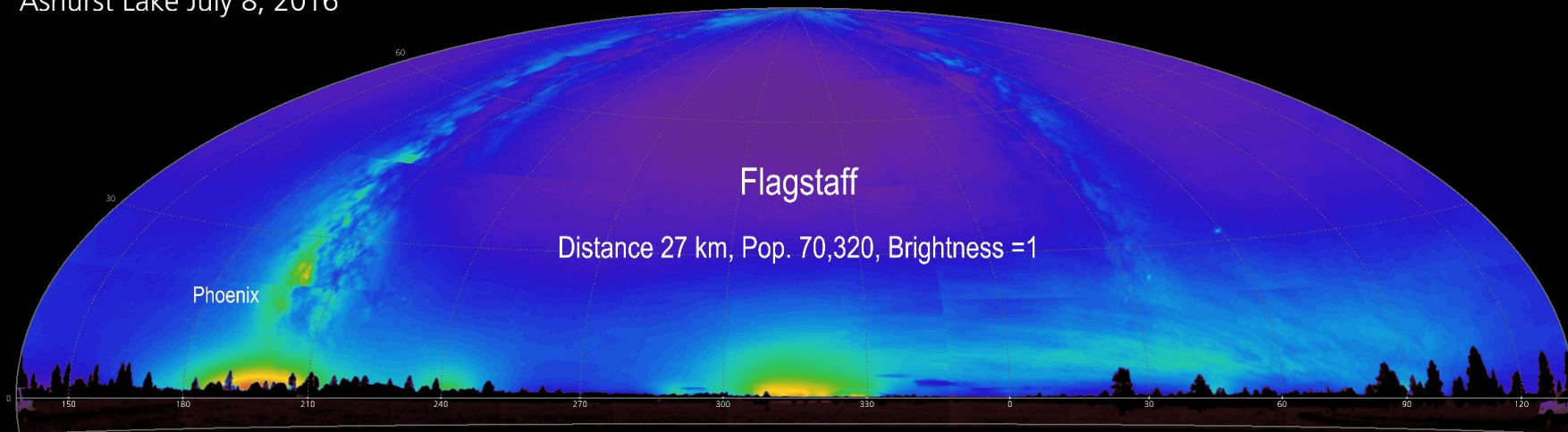
2025

“You Don’t Know What You’ve Got Til It’s Gone”

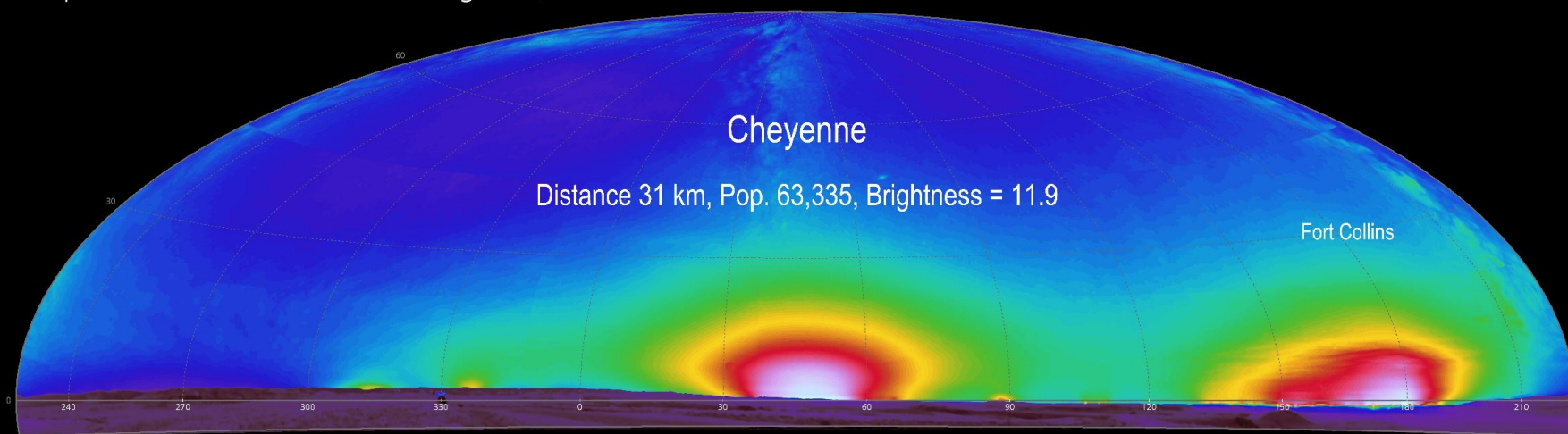
From <lightpollutionmap.app>,
Town Of Taos center:
Bortle 4.9 (2006) to 5.5 (2025).

Flagstaff AZ vs Cheyenne WY. Same population, 10x darker skies.

Ashurst Lake July 8, 2016

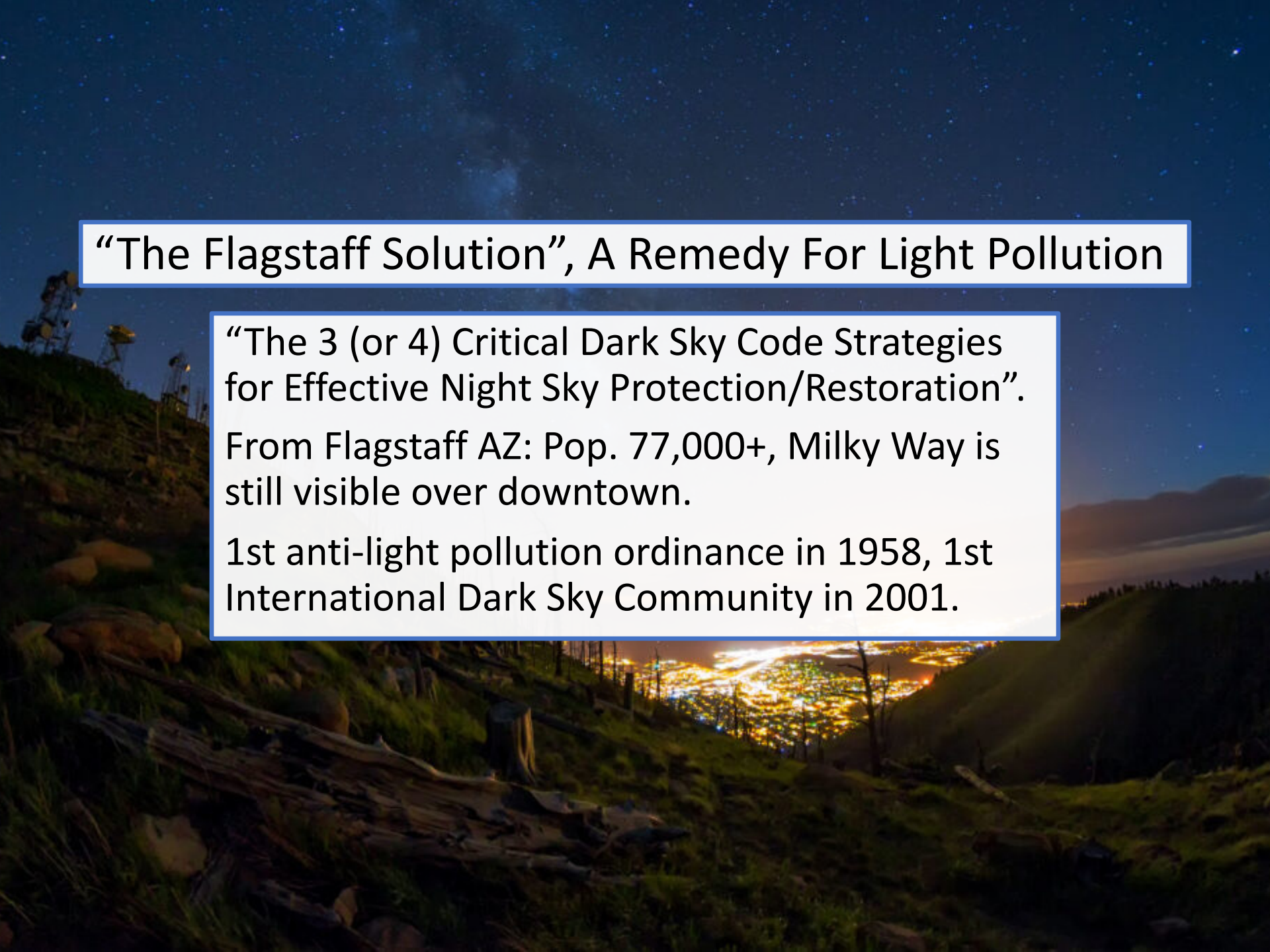


Soapstone Prairie Natural Area August 2, 2016



Visual Magnitudes per square arc-second





“The Flagstaff Solution”, A Remedy For Light Pollution

“The 3 (or 4) Critical Dark Sky Code Strategies for Effective Night Sky Protection/Restoration”.

From Flagstaff AZ: Pop. 77,000+, Milky Way is still visible over downtown.

1st anti-light pollution ordinance in 1958, 1st International Dark Sky Community in 2001.

The Flagstaff Solution

From most to least important...

#1) Use amber lighting (~1800k color temp) for general illumination (roadways, parking lots, etc.).

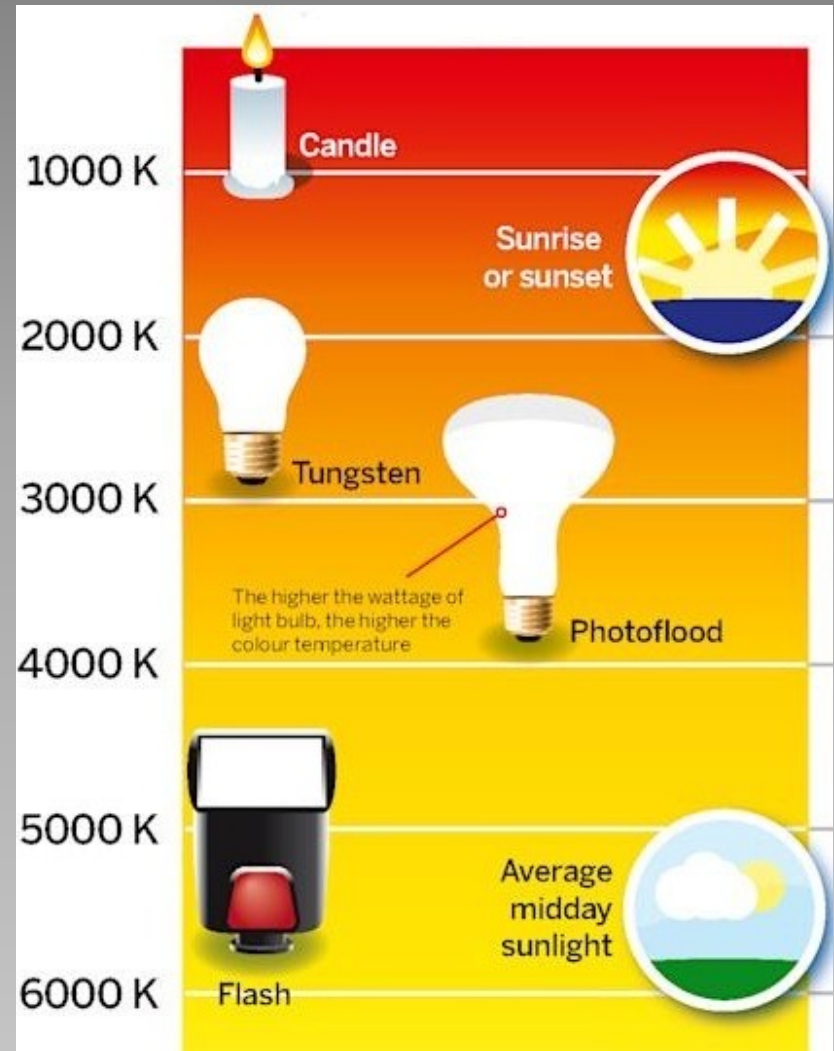
#2) Use only fully shielded lighting.

#3) Limit lighting on nonresidential properties to 35,000 lumens per acre.

#4) Avoidance of unenforceable and damaging loopholes such as exceptions for low-output lighting, motion-sensed fixtures, industry exemptions.

(from <https://flagstaffdarkskies.org/the-flagstaff-solution>)

#1) Use amber lighting (~1800k) for general illumination (roadways, parking lots, etc.)



70% reduction of artificial skyglow!

Largest gap in Taos County Ordinance 2006-9 & Town Of Taos Ordinance 15.28.

Gain the energy savings of LEDs without the blue light!

The problem with blue light

Early LED bulbs match color of fluorescent lights.

Common in office spaces & clinics, bad for living spaces.

Human eye more sensitive to blue light.

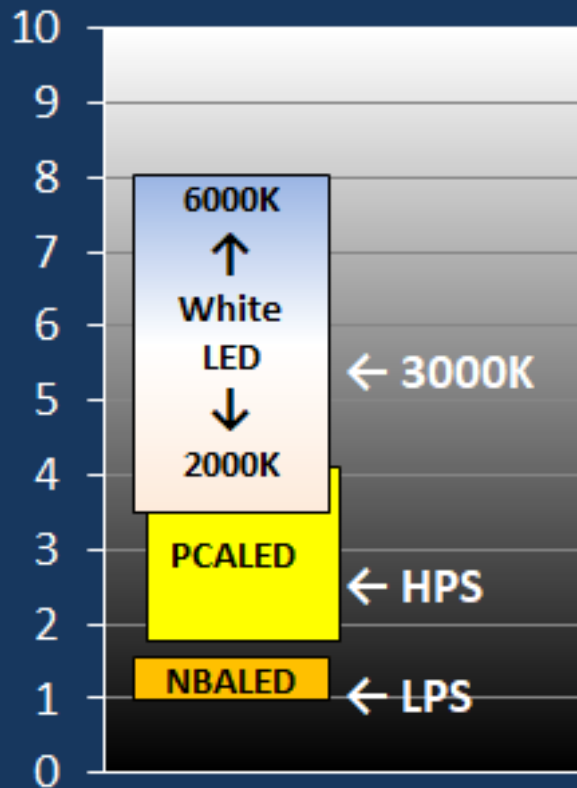
Poor visibility in snow & inclement weather.

More light scatter, more light pollution, more glare, more road blindness => More Accidents.



Why Amber (1800k-2200k) LEDs?

Relative Skyglow Impact



Flagstaff Dark Skies Coalition 01/2019

Less glare & less light pollution per lumen, better visibility in snow.

Preserves historical character & night-sky beauty of Taos.

“Farolitos > Fluorescents”.

Changing light bulbs is very low-cost/high-return.

PCA LED (Phosphor-Converted Amber) best for urban areas.

NBA LED (Narrow Band Amber) best for wildlife protection.

#2) Use only fully shielded lighting.

50% reduction of artificial skyglow!

“Fully shielded” = lights directed downwards, not upwards/across.

More efficiency, more safety/security.

Less glare/blindness, less light trespass/nuisance.

In town/county ordinances. Needs better awareness & enforcement.



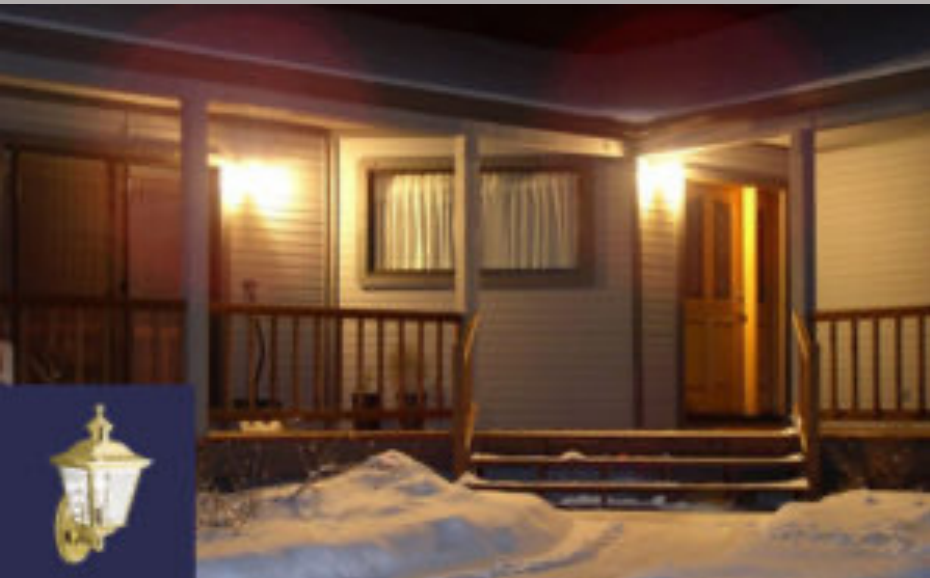
#3) Limit lighting on nonresidential properties to 35,000 lumens per acre.

25% reduction of artificial skyglow!

Use light only where it is needed.

More efficiency, more safety/security.

#1+#2+#3 = 89% reduction of artificial skyglow.



Action Steps (County, Municipalities, Pueblos)



Adopt/update Dark Sky/outdoor lighting ordinance to current standards.

Replace all outdoor bulbs & streetlamps with PC Amber or Narrow Band Amber LEDs.

Review outdoor light fixtures to be compliant with newest ordinance.

Replace vehicle headlights with warm or amber LEDs (2700k-3000k).

Community education campaign on outdoor lighting.

Encourage astronomy education & events.

3-5 year timeline for 100% of nonresidential properties to be compliant.

Together, become the **1st** International Dark Sky Community (IDSC) in NM!

Quick Wins: Updating ordinances, replacing light bulbs.

Medium-Term: Updating fixtures, community education, IDSC application.

More Reading:

<https://flagstaffdarks skies.org/the-flagstaff-solution/>

<https://darks sky.org/resources/public-outreach-materials/>



Action Steps (humans/citizens)



Replace my outdoor lights with amber LEDs (2200k or lower).

Replace my indoor light bulbs with warm LED bulbs (2700k or lower).

Use fixtures with bulb sockets, not disposable LED fixtures.

Review all outdoor light fixtures to be compliant with Dark Sky Ordinance/Flagstaff Solution.

(optional) Watch my electricity bill. Compare energy usage with the same month last year. (est. 5-10% savings from incandescent, 1-3% from CFLs)

Replace my vehicle headlights with warm or amber LEDs (2700k-3000k).

Attend stargazing events & astronomy-based activities/clubs.

Write my state representatives to expand Dark Sky protections throughout New Mexico.

More Reading:

<https://flagstaffdarks skies.org/the-flagstaff-solution/>

<https://darks sky.org/resources/public-outreach-materials/>





Thank
You!

Summary, Q&A

- 1) Dark Skies policy is low-cost/high-ROI with fast results.
- 2) Improves human safety & welfare, protects ecosystems.
- 3) Good for tourism, science, culture & environment.
- 4) Aligns with Taos Destination Stewardship Plan.
- 5) A win-win for residents, tourists & businesses.
- 6) Natural wonder & beauty worth protecting.
- 7) We can start to restore our Dark Skies today!

If you'd like me to make this presentation to your group, please speak to me now!

Why I Care

“Big Yellow Taxi” by Joni Mitchell was written in Honolulu.

Hawaii & New Mexico: two hubs for astronomy.

Urban Honolulu HI: Bortle 5-7+ & getting worse.

Home in Carson NM: Bortle 3.2, meteor showers at my front porch.



Frequently Asked Questions List

How Dark Is My Sky?

Why should Taos County & Town Of Taos update their ordinances?

What is the International Dark Sky Association?

What is “color temperature” (1800k, 2200k, 2700k etc)?

Why are my eyes sensitive to blue light?

Why are PC Amber LEDs best for urban areas?

Why are Narrow Band Amber LEDs best for wildlife protection?

How efficient are LEDs?

Are LEDs safe? (Yes)

How do I pick LEDs for my home or business?

What about motion sensors & timers?

How do I talk to my neighbor about light trespass?

Do small steps make a difference for the environment?

How Dark Is My Sky? (Bortle Scale)

Created in 2001 by John E. Bortle, amateur astronomer.
1.0-9.0 scale, visibility/clarity of celestial objects.



FAQ: Why should Taos County & Town Of Taos update their ordinances?

Taos County & Town Of Taos ordinances adopted in 2006-2007, ~20 years ago.

Currently missing key protections & innovations. New ordinance would:

- Cover Warm & Amber LEDs = 70% reduction of artificial skyglow!
- Add rules that cover service station canopies & outdoor sports facilities.
- Remove loophole for motion sensor-controlled lighting.
- Create a pathway to bring all nonresidential properties into compliance.





INTERNATIONAL DARK-SKY ASSOCIATION

What is the International Dark Sky Association?

Founded in 1987. Advocates to curb light pollution and improve access to night skies. Celebrates communities & lighting products that reverse light pollution & restore the night sky.

International Dark Sky Week April 13-20. Coincides with Lyrid meteor shower!

International Dark Sky Communities: Arizona (9), Texas (10), Colorado (7), Utah (6), New Mexico (ZERO*)

NM has one “Urban Night Sky Place”: Valle de Oro National Wildlife Refuge

FAQ: What is “color temperature”?

The color of light emitted by an idealized opaque, non-reflective body at a given surface temperature, measured in Kelvins (k).

Lighting industry standard; the color of light from a fixture/bulb.

Low color temperature (red/amber light) evokes warmth & comfort.

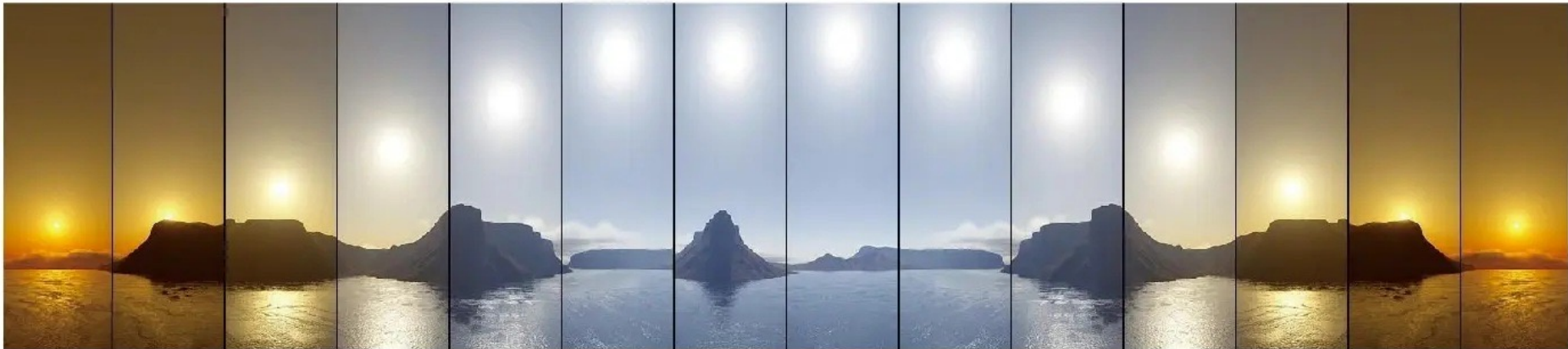
High color temperature (blue light) evokes coolness & concentration.

2700k for home indoors & indoor public spaces.

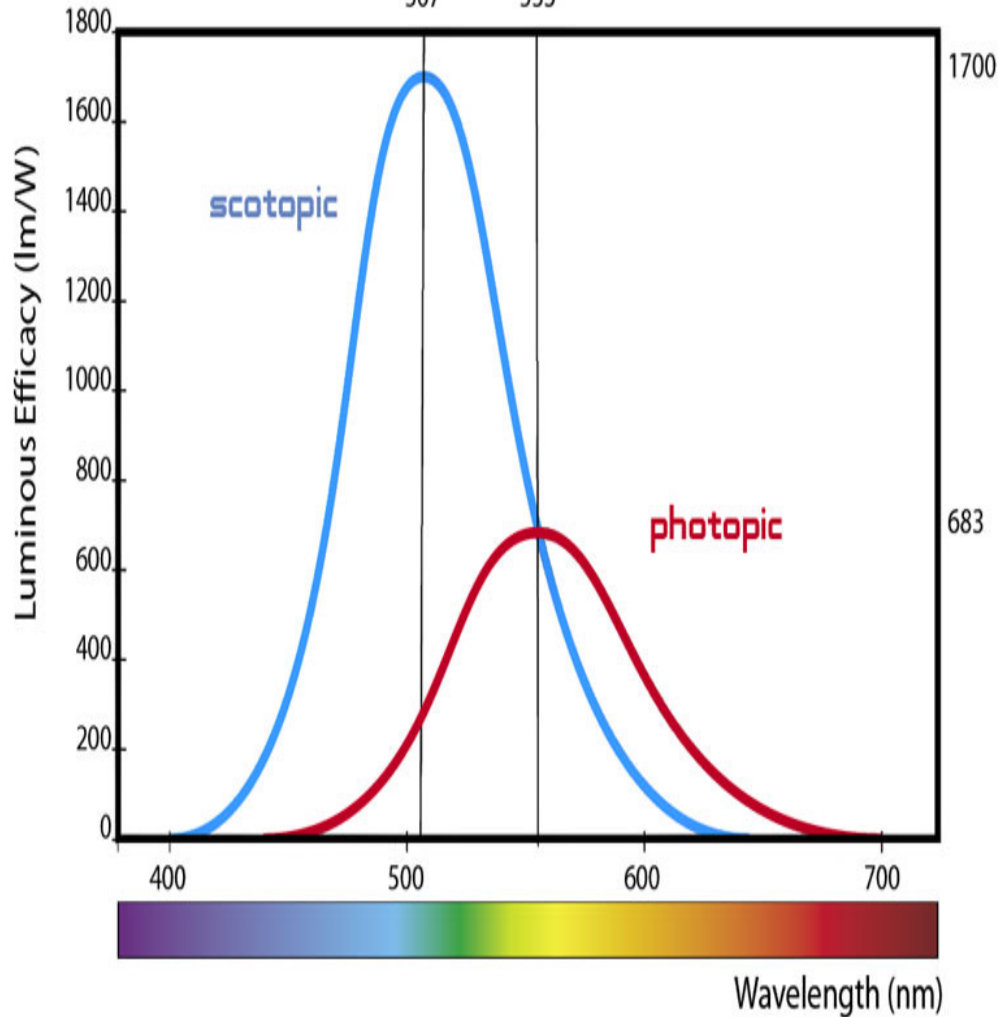
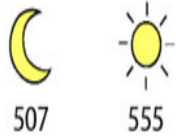
2200k for home outdoors.

1800k/PC Amber for streetlamps & outdoor public spaces.

590nm/Narrow Band Amber for wildlife protection. (wavelength, not k)



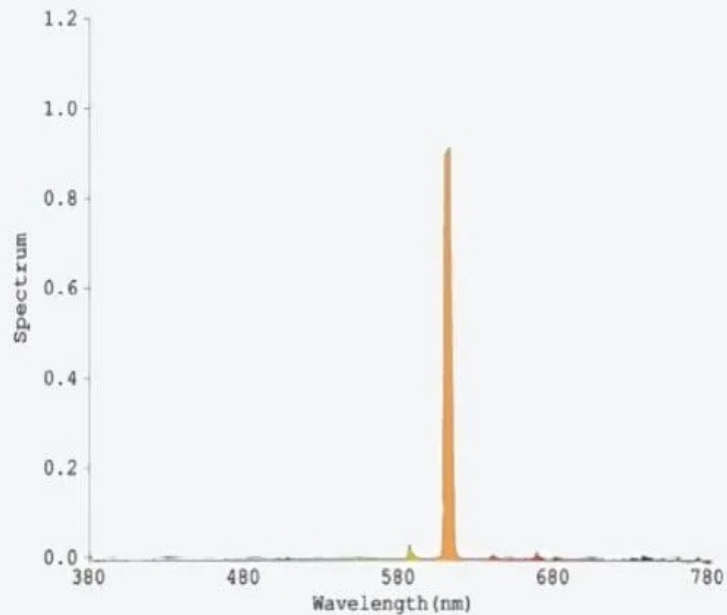
FAQ: Why are my eyes sensitive to blue light?



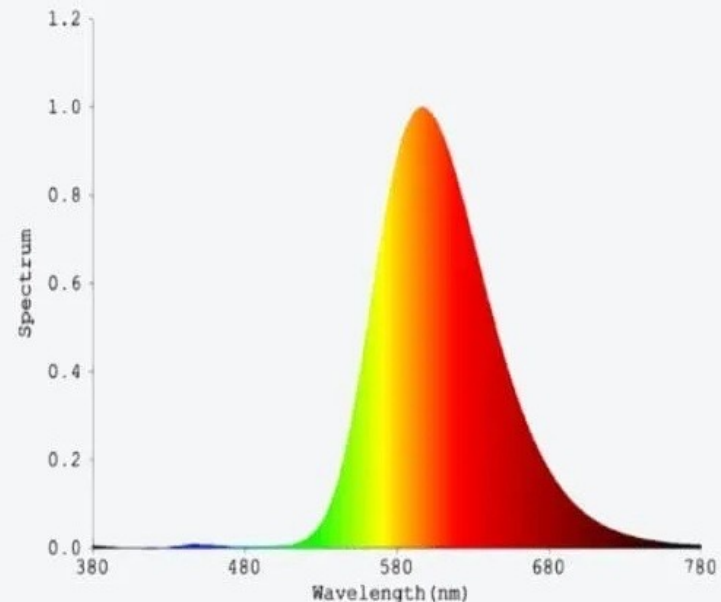
Scotopic = Night Vision = “Rods”
Photopic = Day Vision = “Cones”
120 million rods vs 6 million cones.
Rods more abundant, more sensitive to blue light.

FAQ: Why are (Phosphor-Converted) PC Amber LEDs best for urban areas?

Standard LEDs & traditional sodium-vapor lamps emit a narrow spectrum. Phosphor-conversion alters wavelength of the LED to warm, broad spectrum. Broad spectrum = Good color rendering, less color distortion. More energy efficient than equivalent LEDs/sodium-vapor lamps.



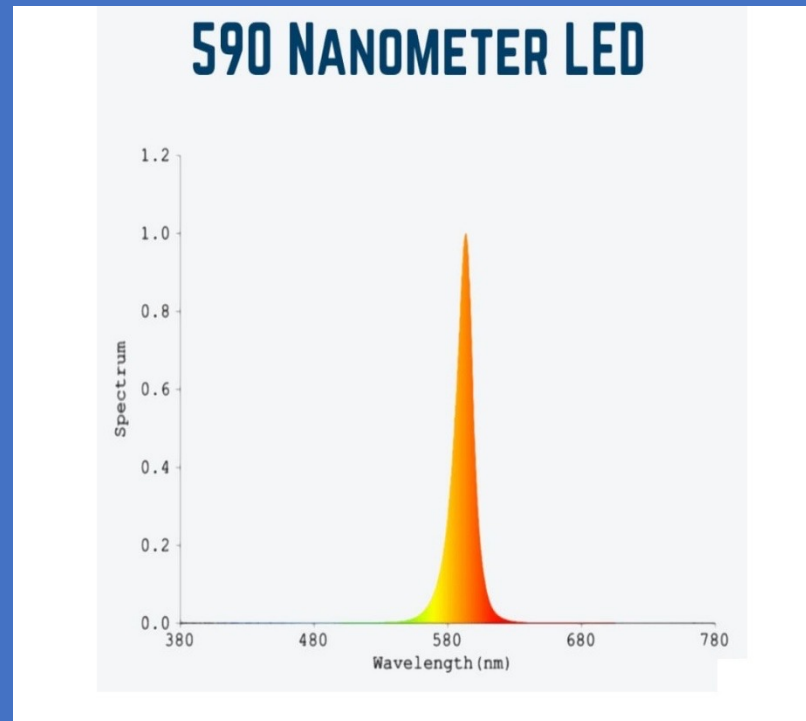
Low Pressure Sodium



PC Amber LED

FAQ: Why are Narrow Band Amber or "590nm" LEDs best for wildlife protection?

Narrow band eliminates all blue light, less visible to many animals.
Proven method, mandated in some coastal areas to protect turtle sanctuaries.
Good human visibility + low impact to wildlife; poor color rendering.



FAQ: How efficient are LEDs?



LEDs lighting comparison

	Incandescent Light Bulbs	Compact Fluorescents (CFLs)	Light Emitting Diodes (LEDs)
Life Span (average)	1,200 hours	8,000 hours	50,000 hours
Watts of electricity used <i>(equivalent to 60-watt bulb)</i>	60 watts	13-15 watts	6 - 8 watts
Kilo-watts of Electricity used <i>(30 Incandescent Bulbs per year equivalent)</i>	3285 kWh/yr.	767 kWh/yr.	329 kWh/yr.
Annual Operating Cost <i>(30 Incandescent Bulbs per year equivalent)</i>	\$328.59/year	\$76.65/year	\$32.85/year
	Incandescent Light Bulbs	Compact Fluorescents (CFLs)	Light Emitting Diodes (LEDs)
450 Lumens	40 Watts	9-13 Watts	4-5 Watts
800 Lumens	60 Watts	13-15 Watts	6-8 Watts
1,100 Lumens	75 Watts	18-25 Watts	9-13 Watts
1,600 Lumens	100 Watts	23-30	16-20 Watts
	Incandescent Light Bulbs	Compact Fluorescents (CFLs)	Light Emitting Diodes (LEDs)
Contains Mercury	NO	YES	NO
RoHS Compliant	YES	NO	YES
CO₂ emissions from energy consumption <i>(30 bulbs per year)</i>	4500 pounds/year	1051 pounds/year	451 pounds/year

- a 60-watt incandescent = 6-9-watt LED, 85-90% savings, or 1000% improvement!
- incandescent: 1200 hours; if we use it 10 hours a day, it would last 120 DAYS
- LED lights last 50,000+ hours; if we use it for 10 hours a day, it would last 13.7 YEARS
- Switching from incandescents to LEDs, you can expect a net savings of \$25-30, even with warm/amber LEDs.
- Switching from incandescents to LEDs is a net savings even for brand-new incandescents, even where utility rates are cheapest.

FAQ: Are LEDs safe? (Yes)

- Incandescent: trace amounts of lead/mercury; not considered toxic
- Compact Fluorescent: trace amounts of mercury; considered slightly hazardous if broken (watch batteries, dental fillings have more mercury)
- LED: no mercury, trace amounts of lead/nickel (AA batteries have more); not considered toxic; the least toxic light bulb



FAQ: How do I pick LEDs for my home or business?

Use Lumens: 800 lumens to replace 60W incandescent.

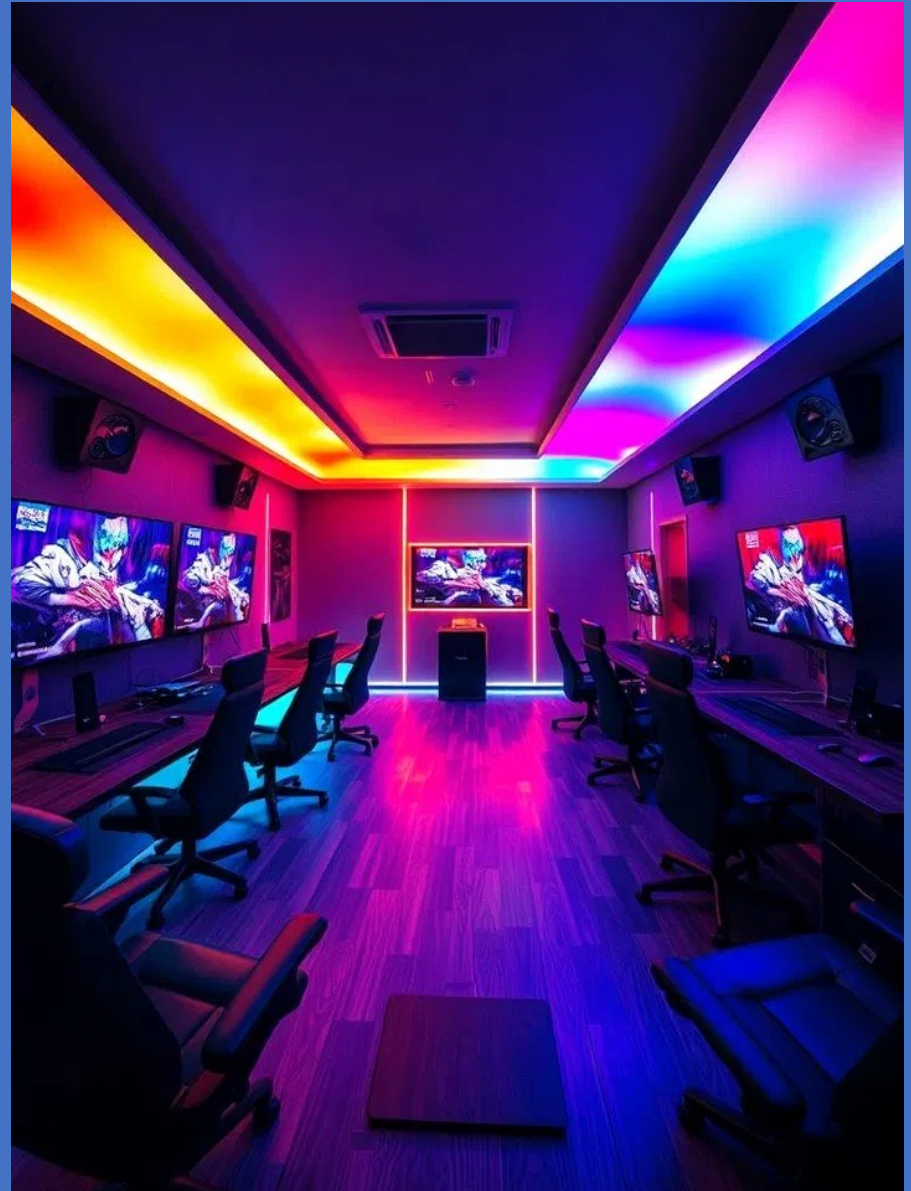
Indoor: 2200k-2700k (warm/soft).

Outdoor: 1800k-2200k (amber).

Use light bulbs + standard fixtures, not disposable LED fixtures.

Searchable database of IDA-approved outdoor light fixtures: (<https://darksky.org/what-we-do/darksky-approved/>).

Color LEDs allow for creative aesthetic choices!



FAQ: What about motion sensors & timers?

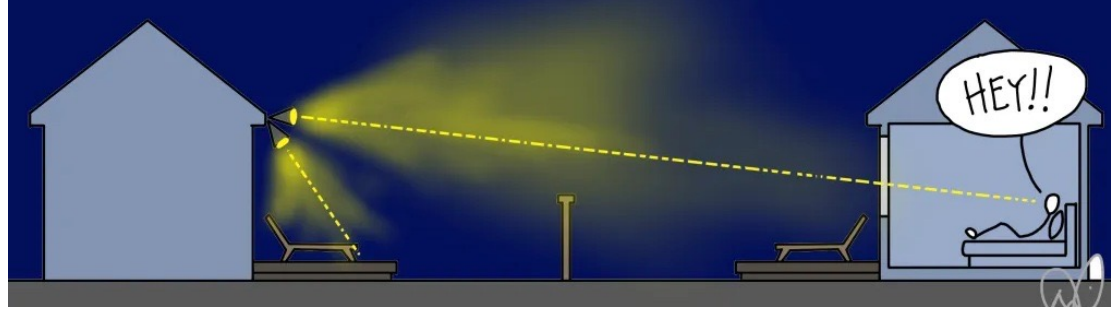
Cost-benefit not as good as top-3 strategies in The Flagstaff Solution.

Inconsistent results, but effective in some use cases.

Motion sensors: supports safety/security in public spaces, includes dimmers (bike paths, public parks).

Timers: enforce lighting curfews (stadium/outdoor event spaces).





FAQ: How do I talk to my neighbor about a “bad light”/light trespass?



(from <https://flagstaffdarkskies.org/dark-sky-solutions/dark-sky-solutions-2/how-to-talk-to-your-neighbor/>)

Always start by speaking with your neighbor in a friendly manner. Offer a constructive alternative. Your neighbor may be unaware that they are causing a problem.

Invite your neighbor over to see how their light affects your house.

Refer them to resources like Dark Sky International, Dark Sky New Mexico, or Flagstaff Dark Skies Coalition. (ex: <https://flagstaffdarkskies.org/dark-sky-solutions/dark-sky-solutions-2/residential-lighting-tips-2/>)

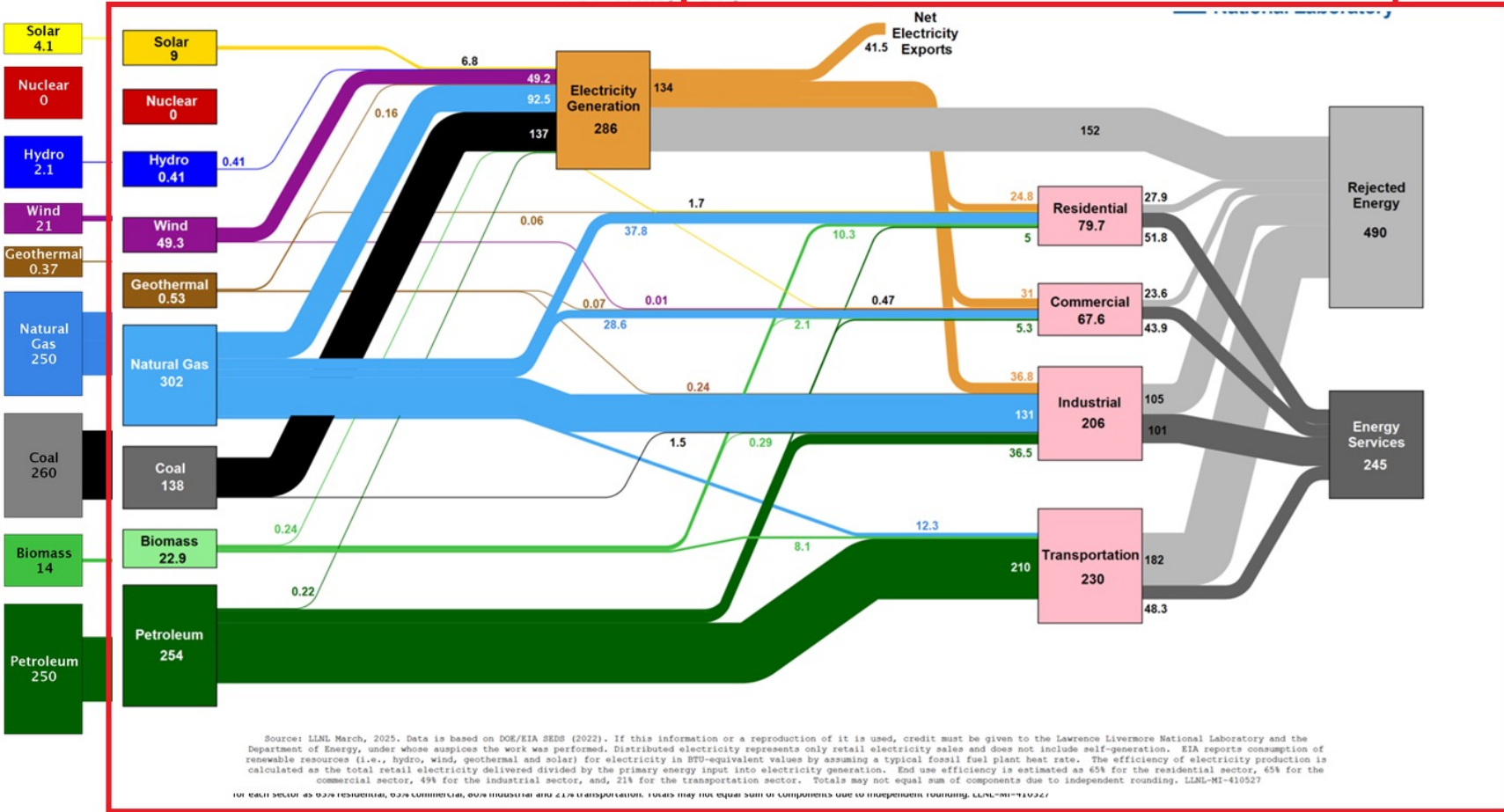
Look at your own outdoor lighting to make sure you aren't impacting your neighbors as well.

If all else fails, file a complaint with the town or county.

FAQ: Do small steps make a difference for the environment? YES!

Estimated New Mexico Energy Use In 2012
~810 Trillion BTU

New Mexico Energy Consumption in 2022: 777 Trillion BTU



Sources (page 1 of 2):

<https://flagstaffdarks skies.org/the-flagstaff-solution/> (The Flagstaff Solution)

<https://darks sky.org/> (International Dark Sky Association)

<https://skyandtelescope.org/astronomy-resources/light-pollution-and-astronomy-the-bortle-dark-sky-scale/> (Bortle Scale description)

<https://crossroadsled.com/dark-sky-matters/> (business perspective on 3000k/blue LEDs)

(Current Local Ordinances)

Taos County: Ordinance 2006-9

<https://www.taoscounty.org/207/Ordinances-and-Resolutions>

Town Of Taos: Ordinance 15.28

<https://ecode360.com/41965752>

Questa: none

Taos Ski Valley: none

Red River: none

(Articles, Local)

<https://news.unm.edu/news/unm-taos-gifted-new-mexicos-largest-public-telescope> (UNM-Taos building largest public telescope in New Mexico)

https://www.taosnews.com/news/local-news/questa-is-a-gateway-to-dark-skies/article_c70e7dca-3d72-509f-b6e1-9608662741d7.html (Questa proposed ordinance)

Sources (page 2 of 2):

(Articles, Local)

https://www.taosnews.com/news/environment/dark-sky-advocates-town-council-move-to-update-20-year-old-ordinance/article_c803f5ec-f349-55e9-af73-70fae5dc0191.html (Town Of Taos proposed ordinance update)

(Organizations in Taos & New Mexico)

<https://taos.unm.edu/community/observatory.html> (UNM Cielo Centro Observatory)

<https://www.facebook.com/groups/1560009417678336/> (El Valle Astronomers, amateur astronomy group in Taos County)

<https://www.nmdarksky.org/> (NM Dark Sky, state chapter of IDSA, advocacy)

(Dark Skies & Local Tourism)

"New Mexico Has the Most Impressive Skies in the US"

<https://matadornetwork.com/trips/new-mexico-impressive-skies-us/> (website specializing in viral travelogues)

<https://www.heritageinspirations.com/taos-stargazing-at-the-rio-grande-gorge> (local tourism company that does stargazing tours & glamping)

<https://app.advcollective.com/local-experts/night-sky-tours-taos-gorge-stargazing> (local stargazing tour)

Let's Celebrate International Dark Sky Week!

April 13-20, 2026

Watch the Lyrid meteor shower under a new moon.

Traveling?

At home? Turn off your lights to enjoy the night sky.

NM has one "Urban Night Sky Place": Valle de Oro National Wildlife Refuge