

Conserving the Wilderness of the Night Sky

Understanding And Solving The Problem Of Light Pollution

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Keweenaw Sustainable Tourism Series
10 November 2023

Four Questions

1. Why does this matter?
2. What is light pollution?
3. What are its effects?
4. What is the solution?

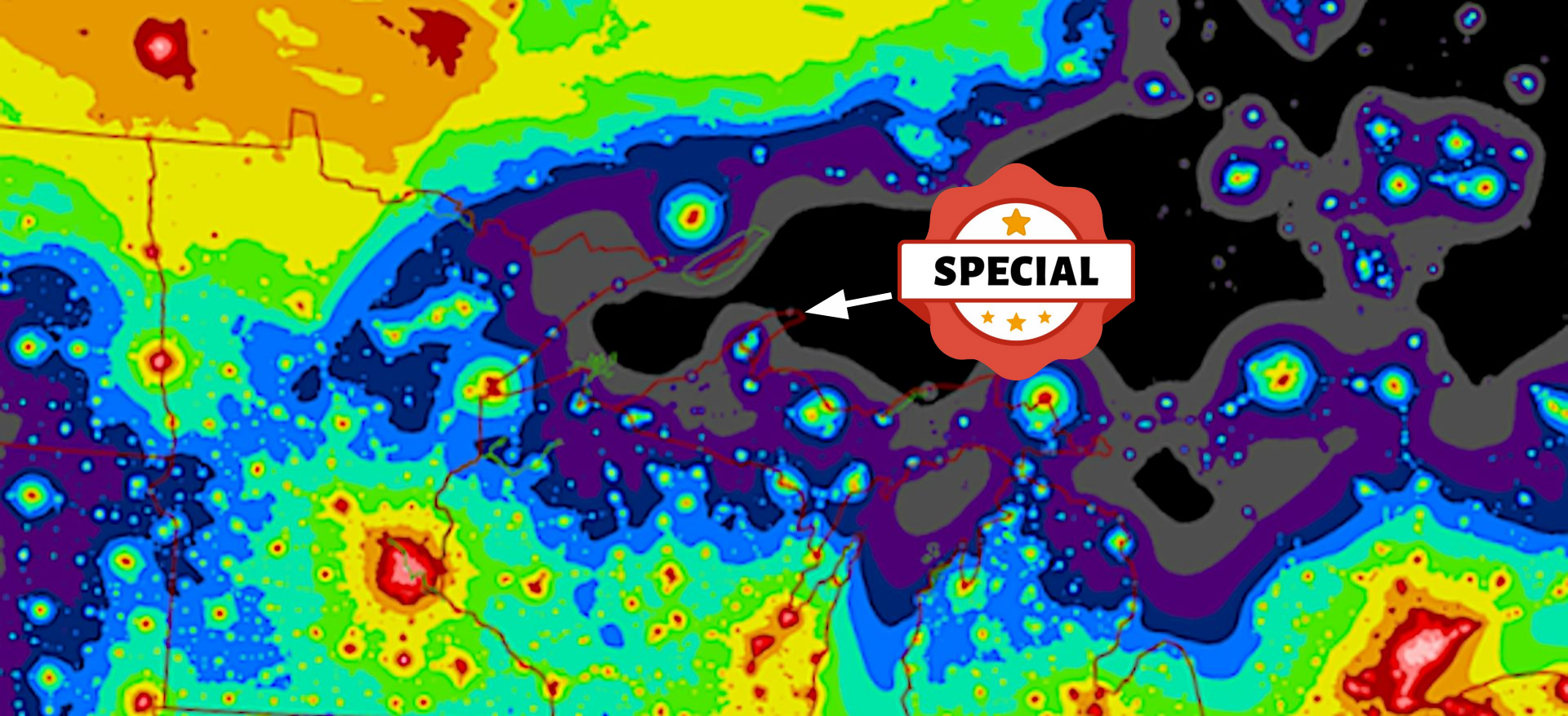


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The place you are in is special



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Every human once shared this experience





The natural night sky inspires



But now we see through a glass darkly...



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Light Pollution

Any adverse effect or impact attributable to the use of artificial light at night.



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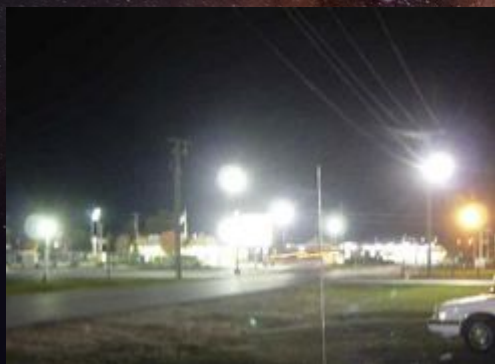
Examples of light pollution



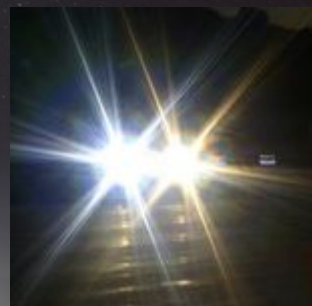
Light Trespass



Over-lighting



Light Clutter



Glare



"ALAN"

Artificial Light At Night



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ALAN Is “Unnatural”



SUNLIGHT



Quartz halogen



Fluorescent Tube



White light-emitting diode

High-pressure sodium vapor



Compact fluorescent



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ALAN is global

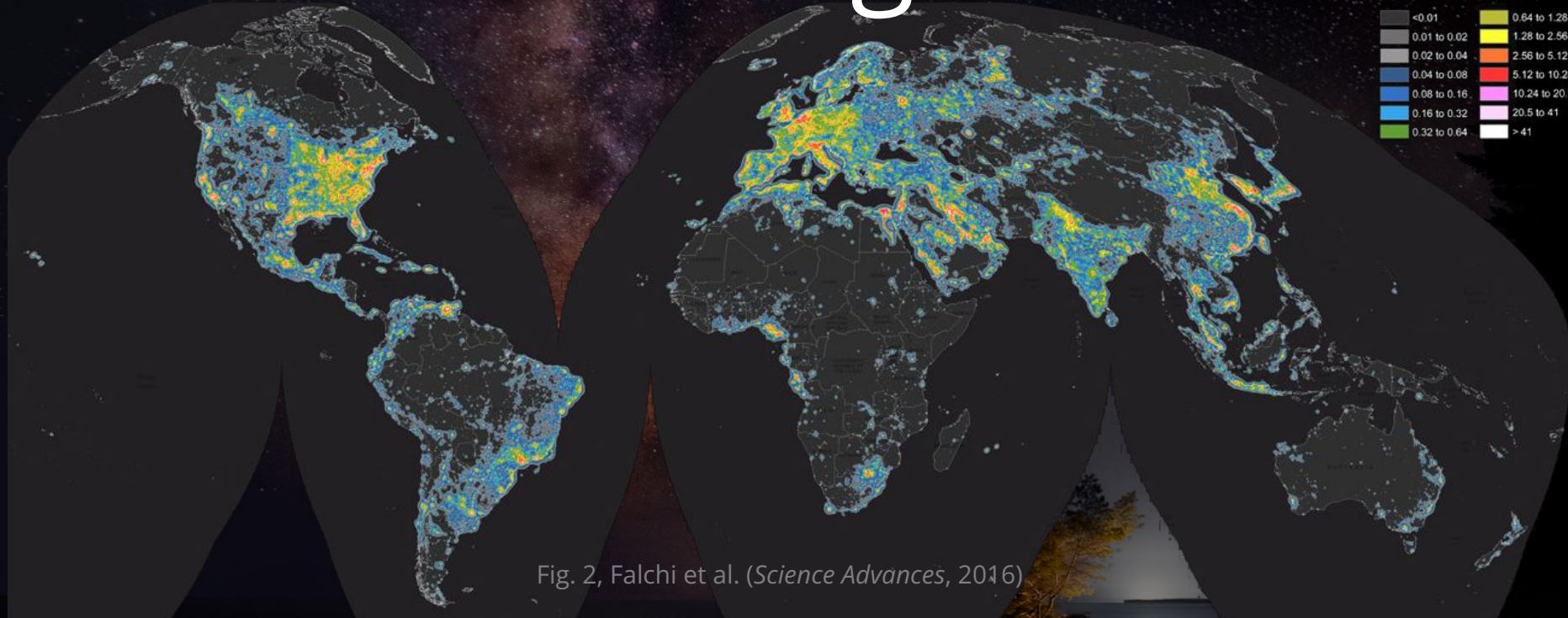


Fig. 2, Falchi et al. (*Science Advances*, 2016)



ALAN is increasing (almost) everywhere

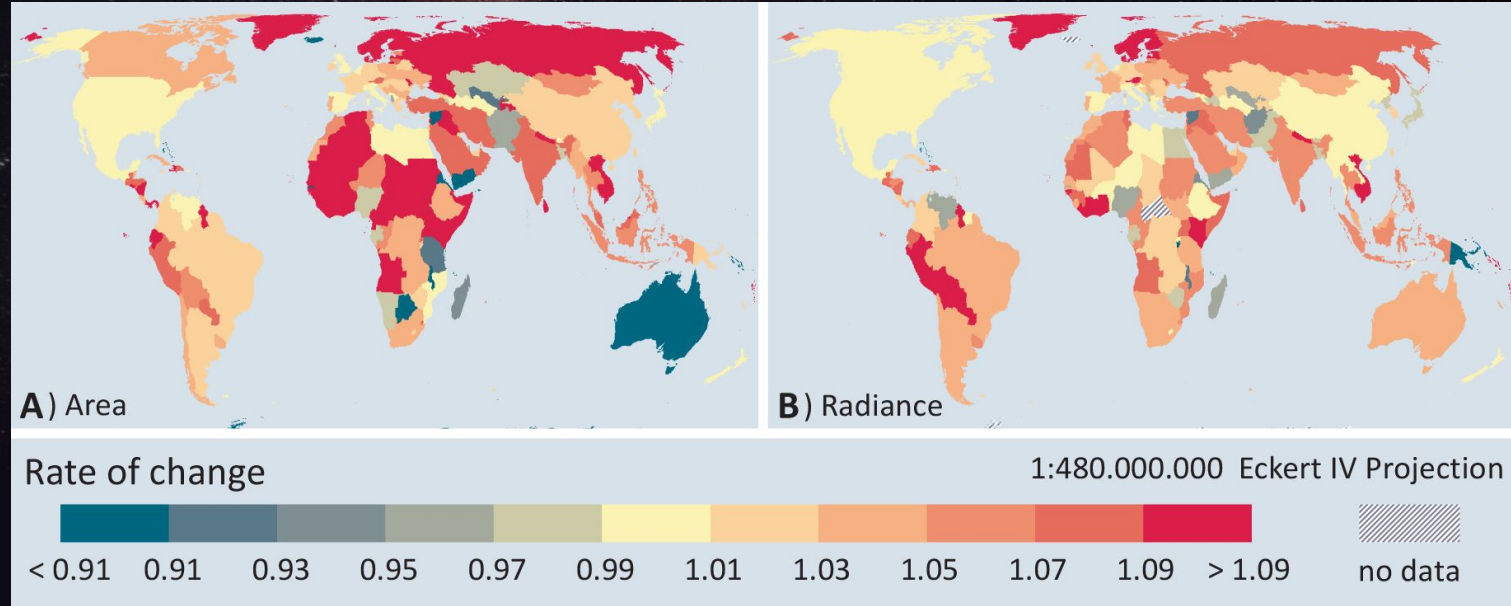


Fig. 1, Kyba et al. (*Science Advances*, 2017)



Light pollution: the bottom line

80% of the world lives under light-polluted skies.

The Milky Way is hidden from >1/3 of humanity.

88% of Europe and ½ of the U.S. experience perpetual twilight.

The night sky is getting brighter on average at 10% per year.

Figures from Falchi *et al.* (2016) and
Kyba *et al.* (2023)

Andrew Brown/AZPM

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ALAN threatens society and the environment



Energy Security



Crime



Traffic Safety



Wildlife



LED lighting

is making

the problem

worse

Spark OE Lighting

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Why Is All This Happening?

Light is overused relative to our legitimate needs.

Much of the overuse is simple wastefulness.

Wastefulness results from a lack of awareness.

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North Korea

Pyongyang

Seoul

South Korea

How Do We *Realistically* Solve This Problem?

1 Light only what you need



2

Use only as much light as you need



3

Shield lights and direct them down



4 Only use light when you need it



5

Choose warm white lamps



6

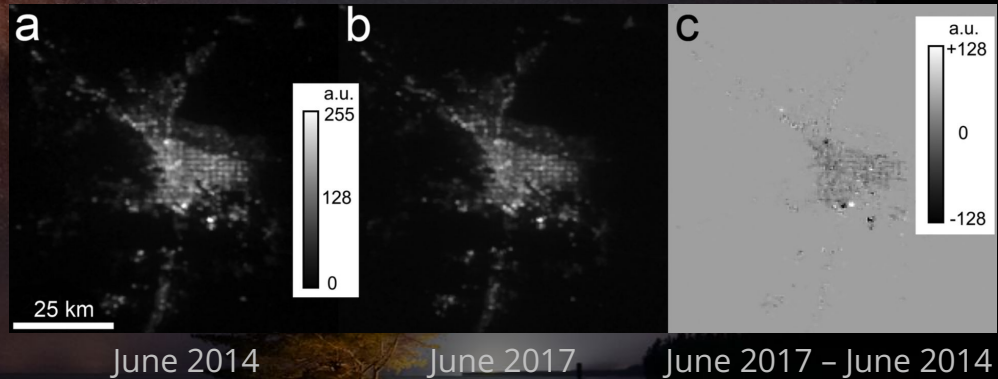
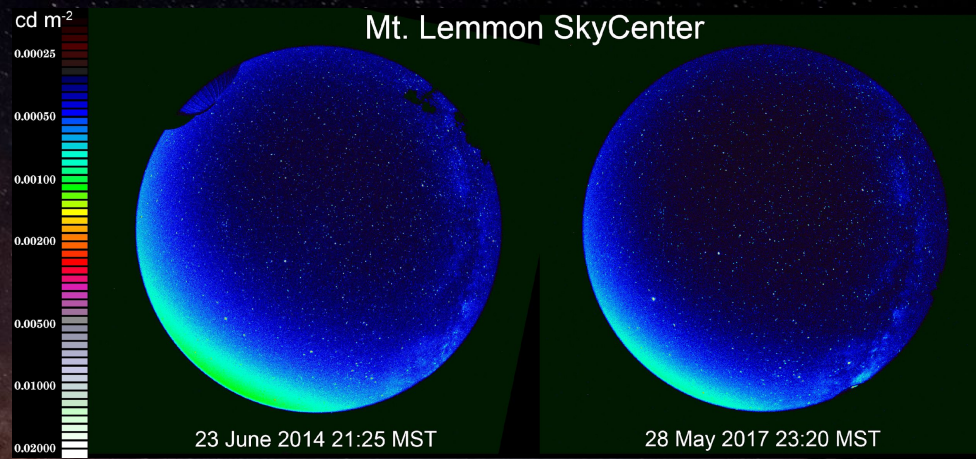
Keep your light on your own property



Does It Work??



The City of Tucson's LED conversion (2016-17) reduced the city's total nighttime light emissions by about 7% and skyglow at intermediate distances by up to 20%



Key takeaways

Light pollution is real pollution.

ALAN is a significant environmental and social threat.

Losing the night is not inevitable.

Solutions are simple, affordable and effective.

Everyone can do something to help.

