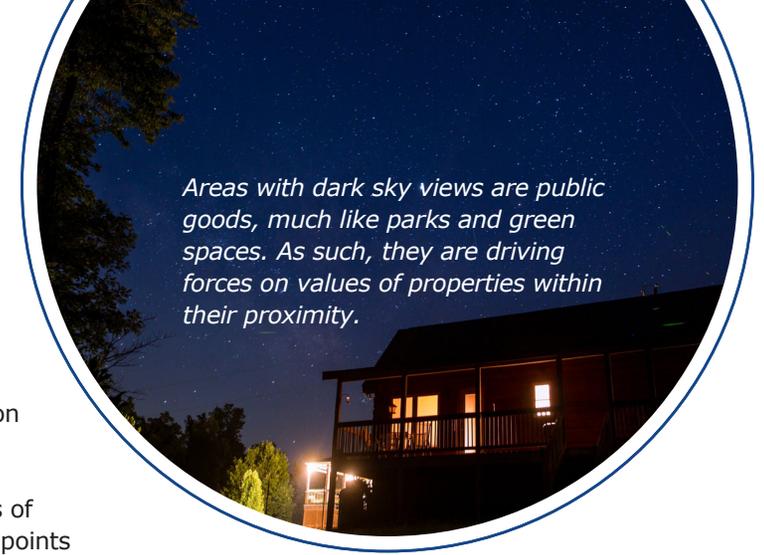


WHAT IS LIGHT POLLUTION?

Light pollution is any sort of adverse or unintended effect of the use of artificial light at night and has significant economic, ecological, and cultural implications for humans and the ecosystems on which we depend.

Over the past 25 years, light pollution has increased by at least 49% globally¹ and an estimated 99% of the continental United States and Europe live under light-polluted skies.² Even remote areas experience sky glow from distant cities and there appears to be nowhere left on earth where astronomers can view the stars without light pollution from space junk and satellites.³ Light pollution has become a global issue with important local implications.

This brief introduces the concept of “dark sky development” and outlines several economic benefits of dark sky conservation. The purpose of this document is to provide dark sky advocates with talking points for communicating the economics of dark skies with decision makers. This brief is part of a dark skies benefits series and additional resources can be found at cpdarkskies.org.



Areas with dark sky views are public goods, much like parks and green spaces. As such, they are driving forces on values of properties within their proximity.

WHAT IS DARK SKY DEVELOPMENT?

Dark Sky Development is the enrichment and optimization of natural night skies. Key components include:

1. Responsible use of outdoor lighting.
2. Implementation of effective lighting policy and management plans.
3. Proactive and holistic planning.
4. Outreach, education and inclusion.
5. Acknowledgment of necessary trade-offs.

From an economic standpoint, Dark Sky Development is a strategy for restoring nocturnal environments and decreasing wasted light resulting in economic and environmental benefits. The use of responsible outdoor lighting can create opportunities for enhanced **property values**, economic growth and diversification through **astronomy-based recreation and tourism**, and benefit a municipality's bottom line by **reducing energy waste**.

1

Enhanced property values

2

Economic growth and diversification through astrotourism

3

Reduced energy waste

1 ENHANCED PROPERTY VALUES

Light trespass, the unwanted or unneeded invasion of light, is an issue because it interferes with a property owner's private enjoyment and use of their own land. Protecting dark skies can increase property value and realtors are catching on with descriptions of “private sunbathing during the day and incredible red rock views and dark-sky telescope observations at night.”⁴

- Dark Sky Development **can enhance property values, tapping into a property ownership market that prizes dark skies.**
- According to ThinkRealty, the median 2017 home value in the Summit Sky Ranch development, a proactive dark sky preservation community in Colorado, was almost **double the median value** of homes in Denver.⁵



ECONOMICS OF DARK SKIES

COLORADO PLATEAU DARK SKY COOPERATIVE

DARK SKIES BENEFITS SERIES

2

ASTRONOMY-BASED RECREATION & TOURISM

Visitation of areas for the observation of night skies, or astrotourism, is a trend increasing in popularity. Astrotourism is a low-impact, sustainable form of tourism, which can be a great value-added product to any typical service that a tourism, leisure, or hospitality business can offer.

- A 2019 Missouri State University study examined the economic impact of dark sky tourism on the Colorado Plateau economy. According to the study, over the next decade astrotourism could lead to **\$5.8 billion in visitor spending** and support the creation of over **11,000 new jobs annually**.⁶
- Dark sky destinations have a demonstrated tourism draw. In 2016, over **5.5 million people** visited an International Dark Sky National Park just in the state of Utah.⁷
- Since dark sky observation mostly occurs at night, astrotourists are far more likely to make overnight stays. On average, **overnight visitors spend 3x more than day-only visitors**. This translates to a \$90 day trip becoming a **\$270 overnight stay** (for NPS lodging) up to a **\$380 overnight stay** (for non-NPS lodging).⁷



Dollars spent by day-only visitors



Dollars spent by overnight visitors

3

REDUCED ENERGY WASTE

According to the International Dark-Sky Association (IDA), approximately 30% of all outdoor lighting in the US is wasted, mostly in the form of unshielded lights. Property owners and municipalities are recognizing the benefits of controlling energy waste through better designed, more efficient, dark-sky-friendly lighting.

- Sensible lighting practices that keep light on the ground where it is needed, and out of the night sky, result in **tangible electricity savings, benefiting a municipality's bottom line**.
- The IDA estimates that at least **30% of all outdoor lighting in the U.S. is wasted**. That adds up to **\$3.3 billion** and the release of **21 million tons of carbon dioxide per year**.⁸
- Night sky friendly lighting also benefits people by improving nighttime visibility, reducing glare, and **contributing to the safety, security, and wellbeing of a city's residents**.
- A lighting management plan, including regular assessments and inventory updates, can help a community improve current and future lighting and **clarify expectations both for private property owners and the municipality itself**.

WORKS CITED

- 1 Sánchez de Miguel A, Bennie J, Rosenfeld E, Dzurjak S, Gaston KJ. First Estimation of Global Trends in Nocturnal Power Emissions Reveals Acceleration of Light Pollution. *Remote Sensing*. 2021; 13(16):3311. <https://doi.org/10.3390/rs13163311>
- 2 Falchi et al. 2016. The new world atlas of artificial night sky brightness. *Science Advances* 10 June 2016: Vol. 2, no. 6, e1600377.
- 3 M Kocifaj, F Kundracik, J C Barentine, S Bará, The proliferation of space objects is a rapidly increasing source of artificial night sky brightness, *Monthly Notices of the Royal Astronomical Society: Letters*, Volume 504, Issue 1, June 2021, Pages L40–L44, <https://doi.org/10.1093/mnrasl/slab030>
- 4 Trulia Real Estate Listing. Sedona, AZ. Dec. 2017
- 5 Ellis, Carole VanSickle. 2017. *Light Pollution, Stargazing, and Your Retirement RE Portfolio*. Retrieved from: <https://thinkrealty.com/light-pollution-stargazingretirement-re-portfolio/>
- 6 Mitchell, D. and Gallaway, T. 2019. "Dark sky tourism: economic impacts on the Colorado Plateau Economy, USA", *Tourism Review*, Vol. 74 No. 4, pp. 930-942. <https://doi.org/10.1108/TR-10-2018-0146>
- 7 UOT Partner Toolkit: Dark Skies Edition. 2021. Retrieved from: <https://travel.utah.gov/news/uot-partner-toolkit-dark-skies-edition>
- 8 International Dark Sky Association. *Light Pollution Wastes Energy and Money*. Retrieved from: <https://www.darksky.org/light-pollution/energy-waste/>



ECONOMICS OF DARK SKIES

COLORADO PLATEAU DARK SKY COOPERATIVE

DARK SKIES BENEFITS SERIES