

Flagstaff, AZ and Coconino County show how to save the night sky for astronomy, people, and nature

James Lowenthal

Smith College, Dept. of Astronomy

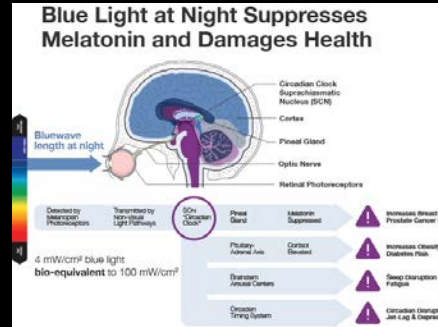
Vice-chair, AAS Sub-Comm. on Light Pollution

Vice President, International Astronomical Union Comm. C.B7 on Site Protection

President, Dark-Sky Massachusetts

Why is light pollution a problem?

Natural darkness at night is essential for:



Human health

Most life on Earth



Research astronomy



Cultural heritage in the skies

Light pollution is growing worse 10% per year



Much of U.S. losing stars rapidly: **as fast as 1 star per day**

Dark-sky Advocacy Comes of Age

LIGHT TO PROTECT THE NIGHT

Five Principles for Responsible Outdoor Lighting



Illuminating
ENGINEERING SOCIETY



USEFUL



ALL LIGHT SHOULD HAVE A CLEAR PURPOSE

Before installing or replacing a light, determine if light is needed. Consider how the use of light will impact the area, including wildlife and the environment. Consider using reflective paints or self-luminous markers for signs, curbs, and steps to reduce the need for permanently installed outdoor lighting.

TARGETED



LIGHT SHOULD BE DIRECTED ONLY TO WHERE 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.

LOW LIGHT LEVELS



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.

CONTROLLED



LIGHT SHOULD BE USED ONLY WHEN IT IS USEFUL

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.

COLOR



USE WARMER COLOR LIGHTS WHERE POSSIBLE

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

New alliances between

- Astronomy
- Lighting industry
- Conservation
- Public health
- Urban / regional planners
- Public policy experts



AAS COMPASSE

The Committee to Protect Astronomy and the Space Environment (COMPASSE)

- Bigger, reorganized, more active.
- Activity spurred by low-Earth orbit satellite constellations (SatCons)
- But recognizes growing damage from ground-based light pollution



Aparna Venkatesan



Teznie Pugh

Lucie Afko
Lori Allen
Doug Arion
John Barentine
Ed Bertshchinger
Aaron Boley
Sarah Marie Bruno
Dan Caton
Roohi Dalal
Yaswant Devarkonda
Bethany Johns
Richard Green

Jeff Hall
Ruskin Hartley
Jessica Heim
Samantha Lawler
Harvey Liszt
Jonathan McDowell
Dan McKenna
Charles Mudd
Savannah Pobre
Meredith Rawls
Pat Seitzer
Connie Walker
Michelle Wooten

AAS 242: Most attention ever to light pollution

(c) 2015 Flagstaff Dark Skies Coalition

Three 90-minute sessions in a Meeting-in-a-Meeting:

Recent Successes in Dark Skies Preservation: Flagstaff and Beyond

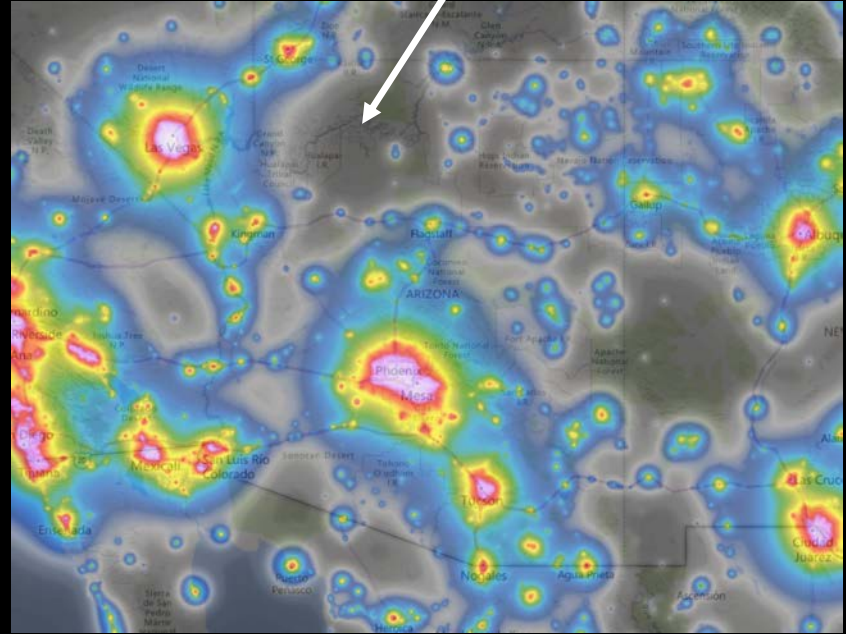
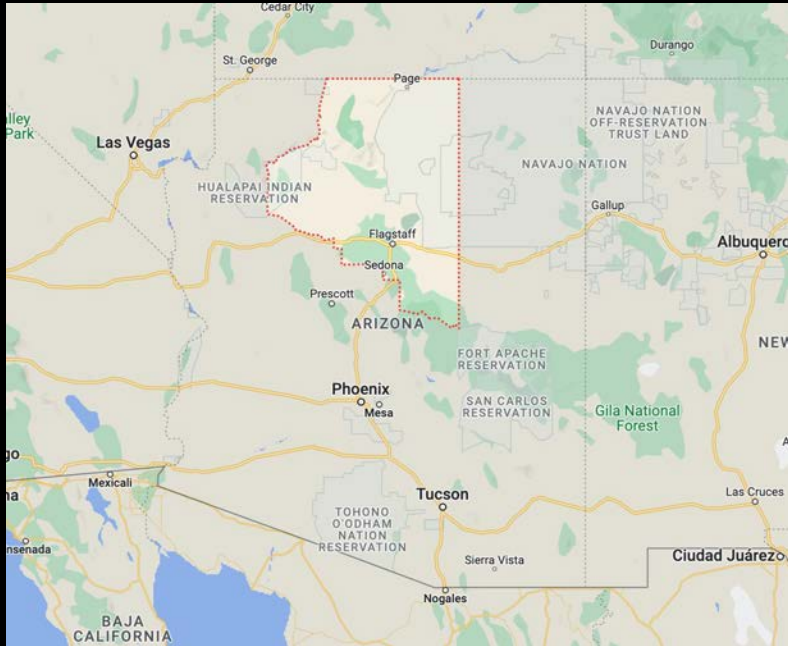
- Tue 10-1130 (Flagstaff)
- Tue 2-3:30 (Flagstaff)
- Wed 10-1130 (...and Beyond)
Meeting Room 20

Tue 6-9 pm: COMPASSE reception with screenings of 2 documentary films
on dark skies (Minnesota, Maine)

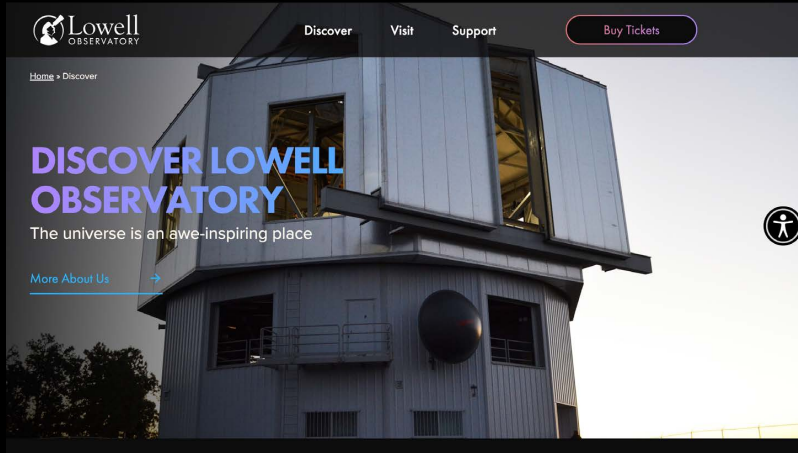
Meeting Room 220

Flagstaff, Coconino County, and Arizona

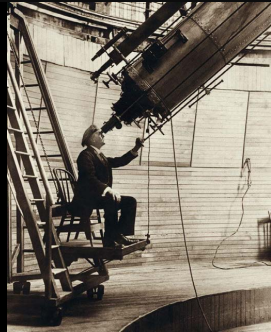
Dark!



Observatories near Flagstaff



Discovery of Pluto



Flagstaff and Coconino County lighting: controlled!



2015-2023

Street Lighting for Enhancing Dark Skies

SLEDS

Intergovernmental agreement:
Flagstaff City Council
Arizona DOT
Monrad Engineering
Flagstaff Metropolitan Planning Org.

Flagstaff outdoor lighting standards and zones

Division 10-50.70: Outdoor Lighting Standards

Sections:

- [10-50.70.010](#) Purpose
- [10-50.70.020](#) Compliance with the Zoning Code and Permit Requirements
- [10-50.70.030](#) Applicability
- [10-50.70.040](#) Establishment of Lighting Zones
- [10-50.70.050](#) General Requirements – All Lighting Zones
- [10-50.70.060](#) Special Uses
- [10-50.70.070](#) Prohibited Outdoor Lighting
- [10-50.70.080](#) Exceptions
- [10-50.70.090](#) Nonconforming Outdoor Lighting
- [10-50.70.100](#) Violations and Enforcement

10-50.70.010 Purpose

The City was recognized as the world's first International Dark Sky City on October 24, 2001, for its pioneer implementation of lighting codes that balance the need to preserve Flagstaff's dark sky resource with the need for lighting practices. This division is to help assure that dark skies remain a resource to be enjoyed by the Flag visitors, minimize light pollution and Light Trespass across property lines, maintain an environment that the City depends upon, reduce energy consumption, minimize the potential disruption to nocturnal ecosystems, and efficient outdoor lighting.

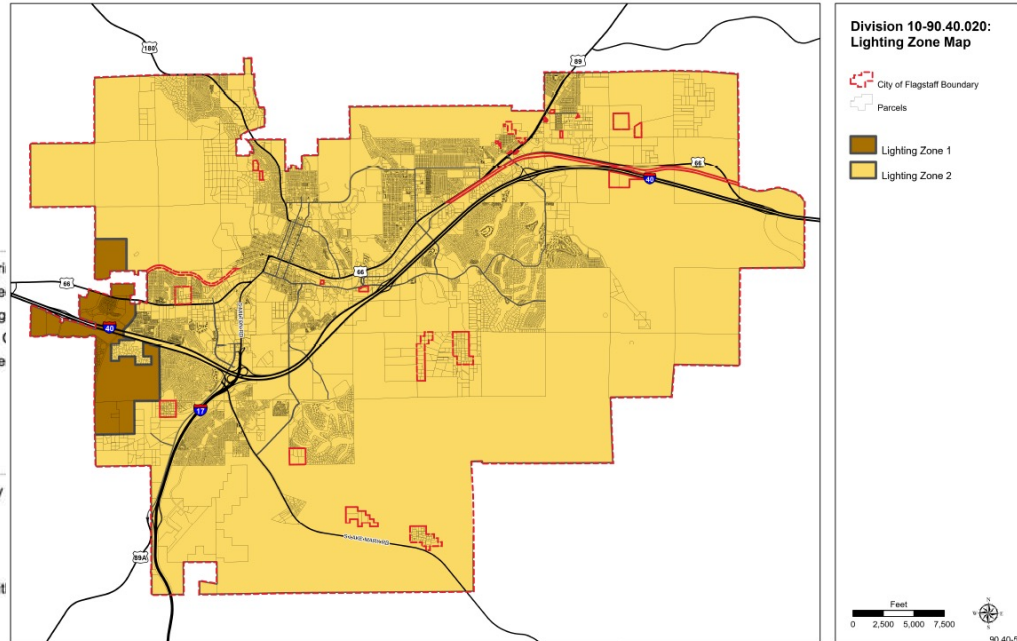
(Ord. 2022-27, Amended, 11/15/2022 (Res. 2022-51))

10-50.70.020 Compliance with the Zoning Code and Permit Requirements

A. An outdoor lighting permit shall be obtained prior to the installation, modification, or replacement of any subject to Section [10-20.40.100](#).

1. Any modification of an existing Outdoor Light Fixture shall comply with this division.
2. All outdoor lighting shall be installed in compliance with the provisions of this Division [10-50.70](#); Title 5, Fire Code, of the City Code.

(Ord. 2022-27, Amended, 11/15/2022 (Res. 2022-51))



Flagstaff: World's first Int'l Dark Sky City (2001)

Flagstaff Dark Skies Coalition
To celebrate, promote and protect the glorious dark skies of Flagstaff and northern Arizona

HOME ABOUT FDSC DONATE THE FLAGSTAFF STAR PARTY FDSC LIGHTING RECOMMENDATIONS

DARK MATTERS!
DARK SKY SOLUTIONS
INTERNATIONAL DARK SKY CITY
CRITICAL DARK SKY ISSUES
RESOURCES
TRENDING NEWS ON FLAGSTAFF'S NIGHT SKY
CONTACT US
BECOME A MEMBER OF THE COALITION

HOME

When the great earth, abandoning day, rolls up the deeps of the heavens and the universe, a new door opens for the human spirit, and there are few so clownish that some awareness of the mystery of being does not touch them as they gaze.
— Henry Beston, *The Outermost House* (1928)

for 2015 Flagstaff Dark Skies Coalition

Venus sets in a protected Night Sky over Flagstaff, Arizona

ALERT: What dark skies protection is missing by focusing on LED CCT... to read more click '+' →

Coalition of

- Astronomers at Lowell, USNO
- City planners and elected officials
- County planners
- Dark sky advocates

CITY OF FLAGSTAFF GOVERNMENT RESIDENTS BUSINESS VISITOR

Abandoned / Junked Vehicles
Bulk Trash Collection
Civic & Non-Profit Banner Reservations
Graffiti Busters
International Dark Sky
Litter
Safe Sidewalks

Home > Government > History & Community Development > Community Code Compliance > International Dark Sky

International Dark Sky

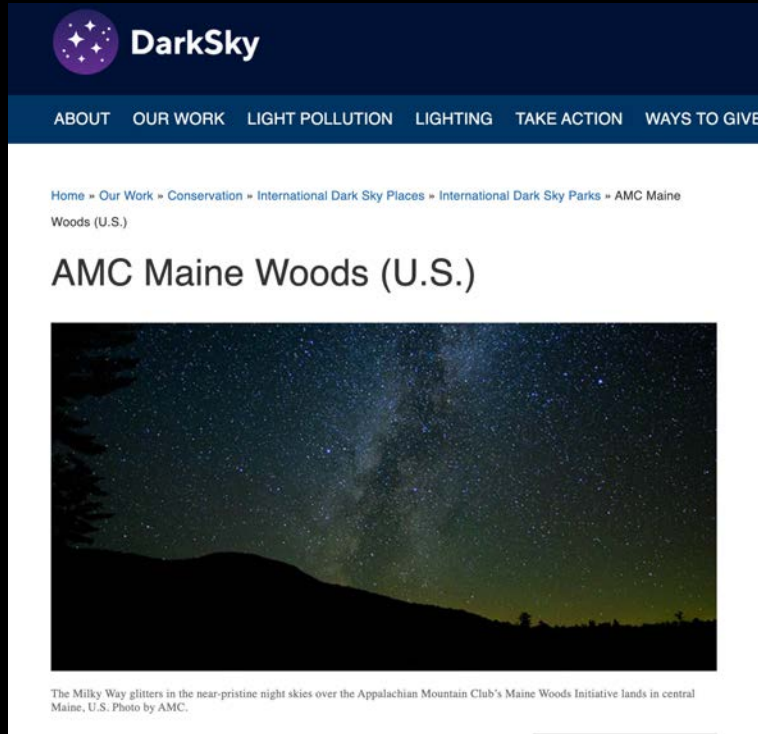
The City of Flagstaff and the northern Arizona region have achieved worldwide recognition for innovative leadership in the protection of dark skies. Beginning with Ordinance 400 in 1988 that addressed searchlights, over a half-century of policy decisions and implementations have fostered an astronomy industry that now includes Lowell Observatory, the U.S. Naval Observatory, the Navy Prototype Optical Interferometer, the National Undersea Research Observatory, the U.S. Geological Survey Astrogeology Center, and the new Discovery Channel Telescope. Public support for protection of the night sky for both general enjoyment and professional deep space research has become an established element of community and regional identity.

Zoning Codes that restricted the amount of light per acre in outdoor lighting installations were approved by both the City and the County in 1989, and since then the codes have been periodically updated and strengthened.

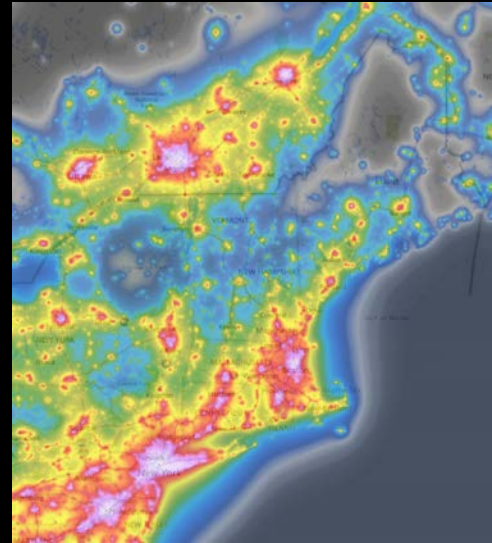
For more information about Flagstaff Zoning Code and Lighting Standards applicable to these efforts, please visit Division 10-50.70: Outdoor Lighting Standards.

World's First International Dark Sky City

AMC Maine Woods Int'l Dark Sky Park: 2022



The image shows a screenshot of the DarkSky website. At the top left is the DarkSky logo, which consists of a purple circle with white stars and the text "DarkSky" in white. Below the logo is a navigation menu with the following items: "ABOUT", "OUR WORK", "LIGHT POLLUTION", "LIGHTING", "TAKE ACTION", and "WAYS TO GIVE". Below the navigation menu is a breadcrumb trail: "Home » Our Work » Conservation » International Dark Sky Places » International Dark Sky Parks » AMC Maine Woods (U.S.)". The main heading is "AMC Maine Woods (U.S.)". Below the heading is a photograph of a night sky with the Milky Way visible over a dark landscape. Below the photograph is a caption: "The Milky Way glitters in the near-pristine night skies over the Appalachian Mountain Club's Maine Woods Initiative lands in central Maine, U.S. Photo by AMC."



Nearby: Kathadin Woods and Waters National Monument, Int'l Dark Sky Sanctuary (2020)

Now 201 Int'l Dark Sky Places worldwide



Thank you!

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Photo: Dan and Cindy Duriscoe