These days, as human civilization and electric lights spread across the globe, few places on Earth remain truly dark. For astronomers, trying to collect the faint light of distant objects, this “light pollution” from human activity has become a serious problem. Some of our light fixtures are worse than others in terms of the glare and wasted light they produce and the number of colors (wavelengths) they block from celestial objects. Recently, swarms of satellites in low orbit through which commercial companies are competing to provide internet service have also begun to interfere with astronomical observations. In this introductory guide, we list a selection of the resources that describe the efforts of astronomers and environmentalists to educate policy makers and the public about light pollution (and also, in a separate section, the crowding of radio channels needed for astronomy.)

Dedicated Web Sites

The International Dark Sky Association: http://www.darksky.org  The primary organization devoted to the issue of preserving the dark skies and installing good lighting. Their site has lots of educational and informational material, plus help with advocacy efforts.

Dark Skies Awareness Project: http://www.darkskiesawareness.org/ This is an international site, created during the 2009 International Year of Astronomy, with links that bring together information and educational activities around the world. It was last updated in 2011, but can still be useful.

British Astronomical Association Commission for Dark Skies: http://www.britastro.org/dark-skies/ (Organization in Great Britain; its site has information sheets, newsletters, examples, links, etc.)
The McDonald Observatory Dark Skies Initiative: [http://mcdonaldobservatory.org/darkskies/](http://mcdonaldobservatory.org/darkskies/) (Useful information and a video from the University of Texas’ observatory.)

Globe at Night: [http://www.globeatnight.org/](http://www.globeatnight.org/) (A major citizen science project to measure the amount of light pollution, with good instructions and materials.)


Light Pollution Pages from Florida Atlantic University: [http://cescos.fau.edu/observatory/lightpol-astro.html](http://cescos.fau.edu/observatory/lightpol-astro.html) (includes both non-technical and technical materials)

**Light Pollution Articles on the Web**

Guides from the International Dark-Sky Association: [http://www.darksky.org/resources/public-outreach-materials/](http://www.darksky.org/resources/public-outreach-materials/) (see the section on information guides for a clear introduction to the key issues and solutions)


Web Information on Swarms of Satellites on Low-Earth Orbit

American Astronomical Society page on the issue with updates and links:
https://aas.org/posts/advocacy/2020/12/impacts-large-satellite-constellations-astronomy-live-updates

(also see the IAU report cited in the previous section)


Tyson, A. & Parriott, J. “Dark Skies and Bright Satellites” An editorial in Science, 25 Sep 2020: https://science.sciencemag.org/content/369/6511/1543

Wall, M. “Astronomers Hope UN can Help Protect Dark skies against Megaconstellation Threat” Oct. 9, 2020 on Space.com: https://www.space.com/satellite-megaconstellations-threat-dark-skies-un


Books


Bogard, Paul The End of the Night: Searching for Natural Darkness in the Age of Artificial Light. 2013, Back Bay Books. Prizewinning, literate examination of light pollution and its effects on the spirit as well as the physical world.


Mizon, Bob Light Pollution: Responses and Remedies, 2nd ed. 2012, Springer Verlag. Explains the science behind light pollution and suggests objects to observe at different local light levels.


Children’s Books


Crelin, Bob *There Once Was a Sky Full of Stars*. 2007, Sky Publishing. Ages 4-8

**Articles in Print**

Bakich, M. “Can We Win the War Against Light Pollution” in *Astronomy*, Feb. 2009, p. 56. Good overview of the problem and solutions.
How an amateur astronomer convinced the town of Branford, CT to pass a law to reduce light pollution.
O’Meara, S. “Dark Nights are Safe Nights” in *Sky & Telescope*, Sep. 1998, p. 84. On ways you can help safeguard the night in your community.

**Videos**

*Losing the Dark* (2013, 6-min video by the International Dark-Sky Association and Loch Ness Productions): A brief overview of light pollution:
https://www.youtube.com/watch?time_continue=2&v=dd82jatzFl0
De-light the Night (2015, 19-min TED-x Talk by astronomer Diane Turnshek): A personal discussion of light pollution and solutions: https://www.youtube.com/watch?v=-xSy33prmGY

The City Dark (2012, 60-min documentary shown on PBS) For the full story and excerpts, see: https://www.pbs.org/pov/citydark/

The Earth at Night (2013, 3-min NASA video using images from the Suomi satellite) Narrated footage showing the Earth at night, with a number of close-ups showing the effect of human lights: https://www.youtube.com/watch?v=pG4TAExWK8 (A 30-second version, without narration, called “The Black Marble” is at: https://www.youtube.com/watch?v=wADkJiMbmTQ)

Light Pollution 101 (2018, 3 min, National Geographic) A short primer, well produced: https://www.youtube.com/watch?v=V_A78zDBwYE

Light Pollution: The Disappearing Darkness (2017, 43 min, DW Documentaries) A film that examines the effects of light pollution on not just astronomy, but on animals and our health: https://www.youtube.com/watch?v=9NyQqHGF1NM

Preserving Dark Skies (2010, 3-min video from the McDonald Observatory at the U. of Texas) Nice, narrated primer: https://www.youtube.com/watch?v=time_continue=27&v=kYCQZJt26zQ

Activities for Teachers and Students

Dark Skies Rangers Lessons: https://www.globeatnight.org/dsr/ (Led by the team at the National Optical Astronomy Observatories, this is a great sequence of activities for classroom and museum use.)

International Dark Sky Association Material for Teachers: https://www.darksky.org/our-work/grassroots-advocacy/resources/educators/

The Quality of Light Teaching Kit (with videos and downloadable materials): https://www.noao.edu/education/qltkit.php

Chuck Bueter’s Light Pollution Education Activities (from the Paper Plate Astronomy Site): http://analyzer.depaul.edu/paperplate/lights.htm


======================================================================

Quiet Skies: Dealing with Radio-wave Interference

Radio astronomer search for “faint” radio static from cosmic objects. Increasingly, the signals they are searching for are lost in the “din” of terrestrial radio communications, particularly the requirements of cellular phones and other modern communications devices that use towers and satellites. Major political battles loom as the demands of business clash with the need to protect certain important channels for radio astronomy. Here are a few selected resources about this topic:
Web Sites:

Quiet Skies Webpage from the International Astronomical Union from 2009: http://www.darkskiesawareness.org/quiet-skies.php
Committee on Radio Frequencies of the European Science Foundation: https://www.craf.eu/
List of Protected Frequencies: https://britastro.org/node/9118 (A more detailed and technical discussion is at: http://www.naic.edu/~rfiuser/smarg-act.html
Be an Interference Detective (an educational activity from the National Radio Astronomy Observatory): http://www.gb.nrao.edu/epo/interf.html

Readings


(The author would like to thank David Crawford, Connie Walker, and Johanna Duffek for suggestions for this guide.)

The World at Night (from Satellite Imaging)