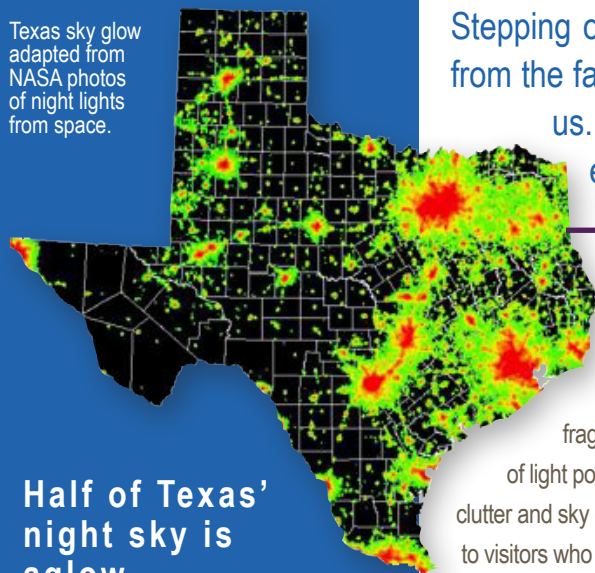




HCA is a passionate community caring for the unique features, spring-fed streams, heritage ranch lands, spectacular beauty and culture of the Texas Hill Country for the benefit of future generations.

Issue: Preserving The Night Skies

Texas sky glow
adapted from
NASA photos
of night lights
from space.



Half of Texas' night sky is aglow

Population growth in Texas cities, towns and transportation corridors has greatly increased light pollution to the extent that most Texans can no longer see the Milky Way at night.

The darkest skies in North America can be found above the McDonald Observatory, located in the Davis Mountains of West Texas. As responsible neighbors, the Hill Country is obliged to help protect this unique scientific and cultural resource.

There is something magical about the starry night sky in the Hill Country. Stepping outside on a crisp clear night to gaze at the stars helps us escape from the fast pace of our daily lives and connect with the natural world around us. It is essential to ensure that our lovely night sky is not lost due to ever increasing light pollution.

Outdoor lighting has carelessly, and often unintentionally, increased light pollution. The trend goes hand in hand with population growth and land fragmentation. The undesirable effects of light pollution – glare, light trespass, light clutter and sky glow – make our region less attractive to visitors who play an important role in many local economies.

There is good news, however, this problem is relatively easy to control and easy to “fix.” Unlike other forms of pollution that seem so insurmountable to cure, once we learn how to use proper lighting, the starry night can easily be restored.

“The stars are the jewels of the night, and perchance surpass anything which day has to show.”

– Henry David Thoreau

Modern and appropriately directed fixtures can keep light on the property and eliminate energy waste. This simple approach exemplifies energy conservation, respect for private property rights and makes for good business and good neighbors.

The HCA Night Sky Team has worked with communities, businesses, State Parks, electricity providers, and individual landowners to address light pollution. Many Hill Country cities have already passed lighting ordinances advancing the momentum to protect our starry nights. Our Hill Country region is on its way to being known as a place where the “stars at night shine big and bright” for perpetuity. The benefits go far beyond beauty, health, and tourism appeal – reducing light pollution reduces electric bills and saves money!



hill country alliance

How to Preserve Night Skies

- **Aim lights down** – light should project below and out to the sides of the fixture, not letting any light escape above the horizon. Install lights so the fixture is above the area to be illuminated. Light an area from below only when all of the light will be blocked from shining above the horizontal plane.
- **Shield every light** – all lights should be installed and shielded to hide the source of light from any normal viewing point. Eliminate glare and protect eyes from directly viewing the light source. Light trespass is usually solved when outdoor lights are shielded so the source of light cannot be seen from neighboring properties. Shielded, concentrated light requires less wattage than an unshielded fixture to achieve the same amount of illumination to light the area of interest. Thus, it saves money.
- **Reduce the amount of light** – select the light's wattage, or more accurately, the number of lumens, for the desired application. Consider that very bright light can make nearby areas dangerously dark, actually degrading security.
- **Use lighting only when needed** – leaving lights on when no one is there to use them wastes energy and money. Use a switch, timer, or motion detector to conserve valuable resources. Lighting unoccupied areas has not been shown to keep criminals away and may even attract them. But all lights, even those on timers or switches, still need to be shielded.
- **Work with electric power suppliers and local governments** – encourage utilities and local governments to take steps now to reduce light pollution and implement smarter night lighting policy as a standard business practice. Help educate citizens, consumers, elected officials, institutions and businesses on the importance of preserving the quality of the Hill Country's night sky.

Communities Working to Preserve Night Skies

Ordinances and Resolutions Affirm Commitments to Night Skies

In recent years, Hill Country towns including Blanco, Boerne, Bulverde, Dripping Springs, Fredericksburg, Johnson City, Llano, Mason, and Wimberley have adopted ordinances that control light pollution from all new construction. For now, counties do not have authority to adopt these kinds of standards, but several counties, including Bandera, Blanco, Burnet, Kerr, Kimble, Mason, Real and Uvalde have adopted resolutions affirming their support for the regional effort and committing themselves to "using available technologies for efficient, cost-effective, non-intrusive lighting" and to "educating and encouraging landowners, businesses, resident communities and public entities to join this commitment." Throughout the region, many Chambers of Commerce, businesses, parks, and not-for-profits have similarly dedicated themselves to keeping the skies over our region star-filled and inspiring. Sample ordinances and resolutions are available at hillcountryalliance.org

State Parks Leading the Way

Texas State Parks are leading the country in their efforts to preserve the night skies in and around the parks. In recent years, Enchanted Rock State Natural Area and South Llano River State Park earned designations from the International Dark Sky Allocation (IDA) as Dark Sky Parks. Earning the designation requires parks to provide night-sky related educational programming and events, regularly measure the quality of the night sky at the parks, and improve park lighting. Increasingly, the Texas State Parks in the Hill Country are becoming treasured destinations for stargazing. Protecting them and their surrounding areas is more important than ever.

Electric Providers Stepping Up to Help

The Pedernales Electric Cooperative (PEC) and the Central Texas Electric Cooperative (CTEC) have both adopted board policies to minimize light pollution and its adverse effect on the night skies, humans, and wildlife. PEC now has lighting shields available on request for PEC Co-op members and both co-ops are providing shielded fixtures along roadways and to their members as existing fixtures are replaced. Email info@hillcountryalliance.org to help get your electricity provider on board.

Local Chambers Recognize Businesses



The Blanco Chamber of Commerce created a Business Recognition Program to acknowledge local businesses committed to night sky friendly lighting in 2012. This voluntary program, endorsed by HCA, recognizes

businesses that strive to eliminate light trespass from their properties. More recently, chambers in other towns have started similar programs. These programs are an easy and inexpensive way to get business owners involved in night sky preservation. A "Program in a Box" which includes all of the resources necessary to replicate this simple program is available at hillcountryalliance.org, along with a list of the recognized businesses across the region.

Dripping Springs' Commercial Properties Taking Care of the Night Sky

The Hill Country town of Dripping Springs has created development agreements for several large commercial additions built within the community. The agreement calls for shielded lighting to reduce glare and light trespass. Reducing glare not only increases safety on the developed property, but also enhances traffic safety on nearby roadways. At the HEB's fuel service station, the flush mounted, under canopy lights in the fuel pump area use about 1120 watts, compared to the 2538 watts in the original conventional lighting plan, saving over 50% in energy costs. The pumps and under canopy area are attractive and safely lit. Home Depot reduced their outdoor lighting installation from about 47,700 watts in the original lighting plan to about 37,400 watts. Besides realizing significant cost savings, control of glare and light trespass onto neighboring properties is virtually eliminated.



Friendly Outdoor Lighting Saves Money

FACT: Approximately 30% of the energy cost powering unshielded bulbs is uselessly illuminating the night sky. This wasted energy costs \$2.2 billion annually in the United States alone. Locally, the immense volume of wasted light contributes to light pollution and the steady loss of a treasured Hill Country resource, our brilliant starry skies.

PROBLEM: Consider the popular outdoor halogen floodlight. We commonly see these everywhere, aimed willy nilly, often illuminating areas that neither need nor want the light ...such as a neighbor's bedroom window or the night sky.



Typical floodlighting with two 90-watt halogen bulbs

Floodlights can be a big problem, even if you live out in the country.



SOLUTION: By taking a couple of simple steps, this homeowner could do his neighbors and the night sky a big favor...and save money in the process! The homeowner could shield the light, redirect it to shine downward inside his own yard, reduce the wattage of the light bulbs and still have the same amount of usable light within the desired area.

In this example, the homeowner could replace the two 90 watt halogen floodlights with two 50 watt halogen bulbs, put on a couple of Parashield Glare Visors and aim fixtures downward. These simple steps would concentrate light where it is needed and save energy.

So not only would glaring light trespassing onto the neighbor's property and up into our night sky be eliminated, he would also save a large amount on his electric bill.

Be considerate to your neighbors- turn off or shield your lights. It's easy!



Learn how to make your outdoor lighting night sky-friendly while saving yourself money, visit <http://www.hillcountryskies.com/>

DOLLARS AND SENSE:

If the homeowner in our example is a customer of the Pedernales Electric Co-operative (PEC), he is paying 7 cents per kilowatt-hour for his electricity. Every hour the two 90W lights are on costs him 1.3 cents (180 watts/1000 watts times 7 cents). Assuming the light is on dusk-to-dawn all year, it would be on some 4100 hours and he would pay PEC almost \$52 a year to run it. Wow! Those cents add up quickly. Now how many of these lights does he have around his house? You do the math for multiple lights.

But this homeowner is smart. He shielded and redirected the light and was able to replace the two 90 watt halogen bulbs with two 50 watt bulbs. Now every hour it shines only costs him 7/10th of a cent. Big difference. If he still runs it all night all year, his electric bill will be \$28.70 – almost half of what he was paying before just by having the light properly sized, aimed and shielded. He stopped wasting energy by not shining it into the sky or onto his neighbor's property. If he used 15 watt LED bulbs instead of the halogens, his annual cost would tumble to just \$8.61.

The homeowner saves even more energy and money if he puts the light on a timer or, better yet, a motion detector. Shining a light all night might make you feel safer, but studies show that it does not stop crime. Studies also show that artificial night-lights stop almost all living creatures, including humans, from producing melatonin needed for health. Why light all night when it's so easy to save money, make better neighbors, protect wildlife and preserve the night sky? Anyway you cut it, it's a "win-win" situation.

SAVE ENERGY, SAVE MONEY, SAVE WATER:

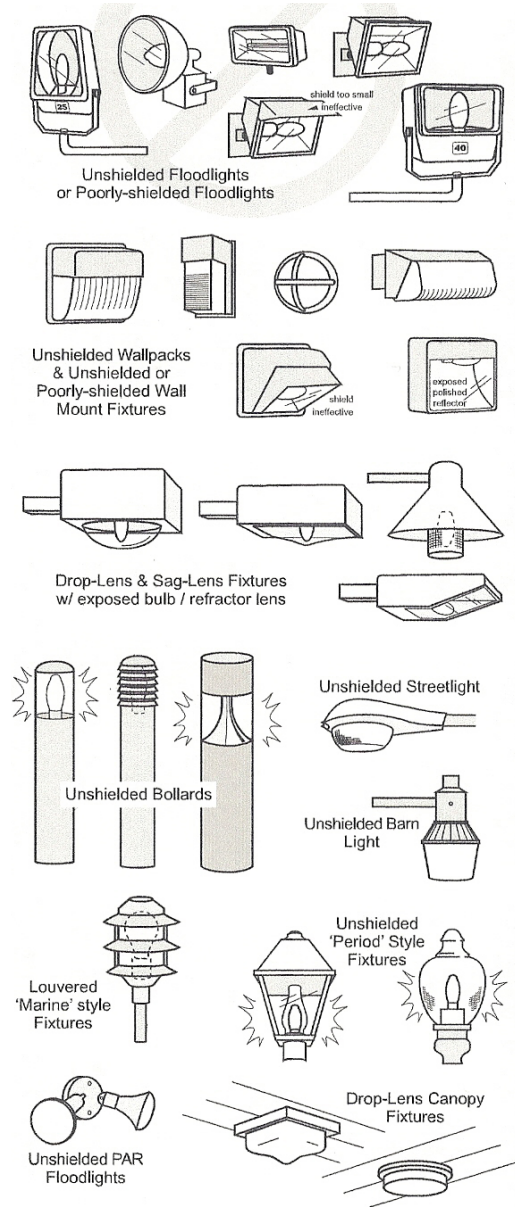
Homeowners might also be happy to learn that, in the big scheme of things, having proper outdoor lighting also saves water. Forty percent of all surface water in Texas, at some point along the way, is used for cooling or for generating steam for electricity provided on the state's grid. Every watt saved actually translates to water conservation. So, by curbing light pollution, we're also helping preserve another precious Hill Country resource, our water.

Better Lights for Better Nights

Help eliminate light pollution. Select the best fixture for your application using this guide. Use the lowest wattage bulb appropriate for the task and turn off the light when it's not being used. If you are considering LEDs, select one that emits light with a color temperature at or below 3200K. See the column to the right for more information.

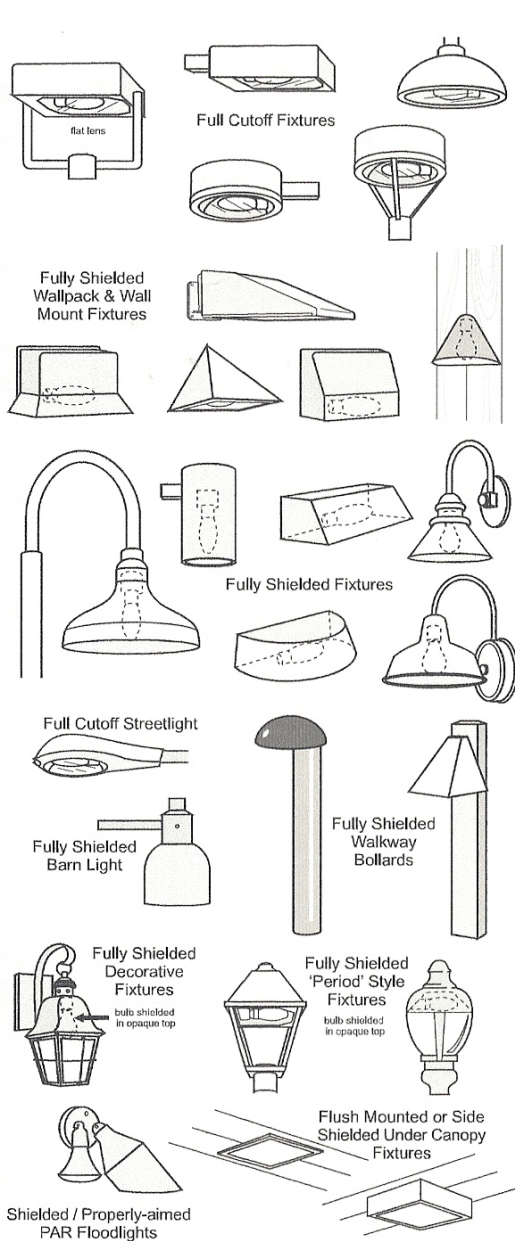
Unacceptable/Discouraged

Fixtures that produce glare and light trespass.



Acceptable

Fixtures that shield the light source to minimize glare and trespass.



Are LEDs good for Night Sky Preservation?

Many LEDs on the market are labeled "Dark Sky Compliant." Unfortunately, that label is applied far too broadly and often neglects a very important characteristic of the light: the correlated color temperature (CCT), or more simply, the light's color.

CCT is a measure of how amber or blue the light appears. Light that is more amber (warmer) is significantly better than light that is more blue (cooler). Although it appears brighter, bluer light actually decreases visibility because it produces more glare. It is more disruptive of starry nights, of melatonin production in humans and wildlife, and of a relaxed nighttime streetscape.

CCT is measured in degrees kelvin (K). Lower numbers correspond to warmer—that is, less intrusive—light. LEDs that emit light at or below 3200K are significantly better than those that emit light above 3200K. LEDs that emit light at 4000K or higher really should be avoided.

The good news is that amber LEDs are on the market and are just as efficient as the bluer LEDs. The Hill Country Alliance is here to work with electric utility providers to make sure that Night Sky-friendly LEDs are used wherever LEDs are installed.

Helpful Resources

You can find more information about preserving the Night Sky in the Hill Country at www.hillcountryskies.org. For more information about preserving the Night Sky generally, including a list of recommended lighting fixtures, visit our partners in Night Sky protection, the International Dark-Sky Association, at www.darksky.org.

HCA's Night Sky Team is full of knowledgeable volunteer leaders ready to help you do your part at home, on your land, at your business and in your community. For assistance contact info@hillcountryalliance.org.

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