

## TURN OFF THE LIGHTS!

### I. Introduction

Light pollution has not only become a serious threat to human health, but scientists now know that losing the darkness of the night is affecting the living and nonliving components of our watersheds in serious ways. Our proposal creates an annual 30-minute "Turn Off The Lights!" blackout period where Arlington residents and public areas turn off (or dim) their lights to raise awareness of this growing danger to our local watershed. We plan to do this during International Dark Sky week in April to coincide with the peak migration period of birds over our area. During the blackout, we will educate the public by showing the movie "Losing The Dark," following it up with a Q&A, and ending with a Star viewing party during the 30 minute blackout. How does light pollution affect our watershed? Read on!

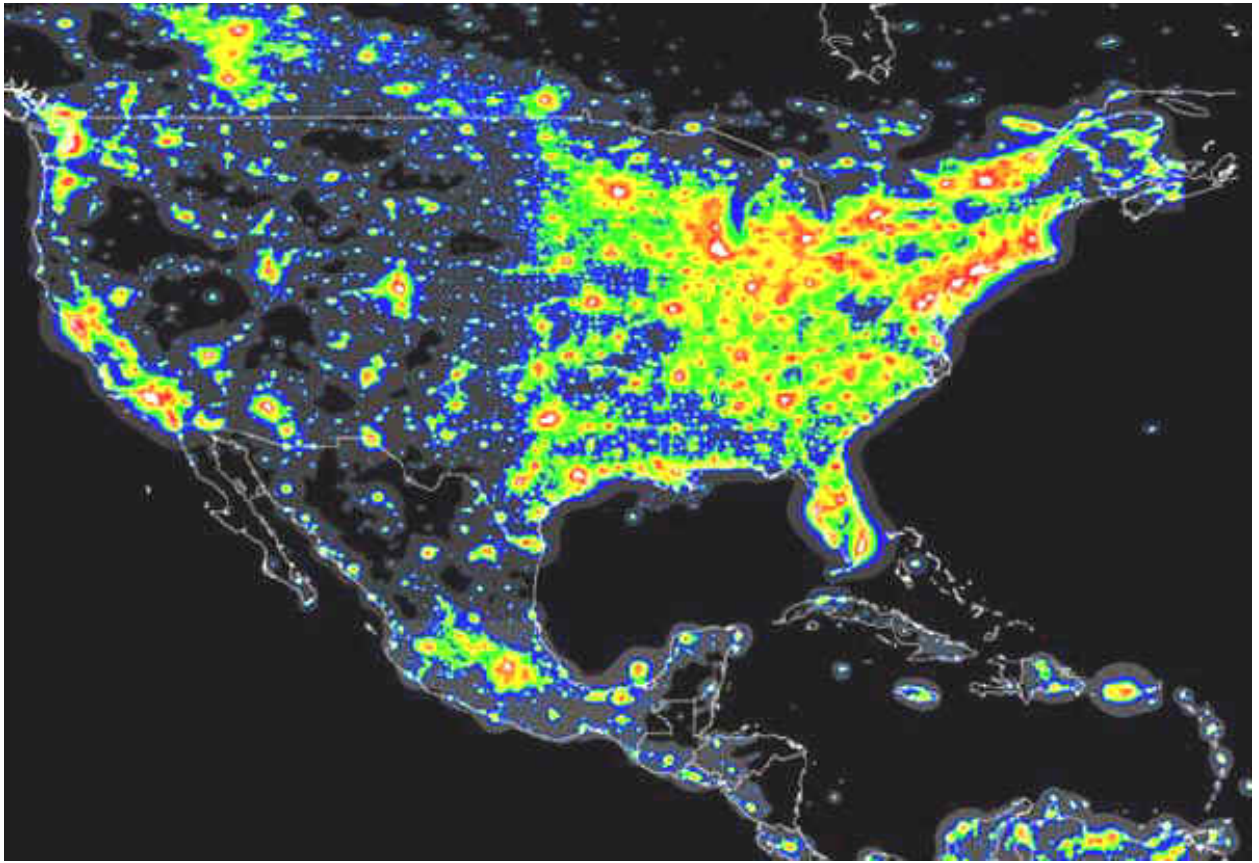
### II. Background on local watershed

We live in the Potomac River Watershed in Virginia. It covers the Appalachian Plateau, Basin and Range, Blue Ridge, Piedmont, and Coastal Plain regions or 14,670 square miles. Only a measly 5% are the river and tributaries, other bodies of water, and wetlands. 55% is forested, 28% is agricultural, and the other 12% is either developed or not in use. There is an average population of 395.4 people per square mile with 8,435 people per square mile in Washington D.C. The total length of the Chesapeake Bay's tributaries is 12,878.8 miles. Each day, 486 million gallons of water from the Potomac river are used by the approximately 5.8 million residents of the Potomac River Basin. The water flows at a rate of 10,800 cubic feet per second and supplies 90% of Washington D.C. area's drinking water.

### III. Identify an issue or concern:

Light pollution is a growing problem. Not only does it have detrimental effects on our views of the night sky, but it also disrupts the natural environment, wastes energy, and has the potential to cause health problems in humans and other animals. There are long term impacts of artificial light at night on ecosystems. When energy is used, it creates greenhouse gases that rain acid rain onto our waterways. Light pollution endangers birds by causing them to crash into buildings at night. Green sea turtle hatchlings get lost on the way to the ocean because of the skyglow from nearby buildings. Closer to home, skyglow affects the mating habits, feeding patterns, navigational skills, and circadian rhythms of nocturnal mammals, birds, amphibians, reptiles, and insects. It even affects the sleep of our number one species in Arlington Virginia - Humans! <sup>(1)</sup>

Unwanted light entering surrounding natural areas not only disturbs but can also attract nearby wildlife. Nighttime lights even cause some trees to shed their leaves out of cycle, disrupting the basis of the food chain. It has recently been shown that light pollution also contributes to smog.<sup>(1)</sup> Nitrates (NO<sub>3</sub>) are compounds which normally builds up in the darkened sky. They are supposed to neutralize some of the other nitrogen compounds that foul daytime air with ozone (O<sub>3</sub>). This nightly cleansing action isn't as effective as it could be any more because nitrate radicals are being destroyed by light beamed into the sky by outdoor lighting on the ground.<sup>(1)</sup> The burning of lights at night also contribute to greenhouse gas buildup, which leads to acid rain in the watershed, not to mention its contribution to global warming.



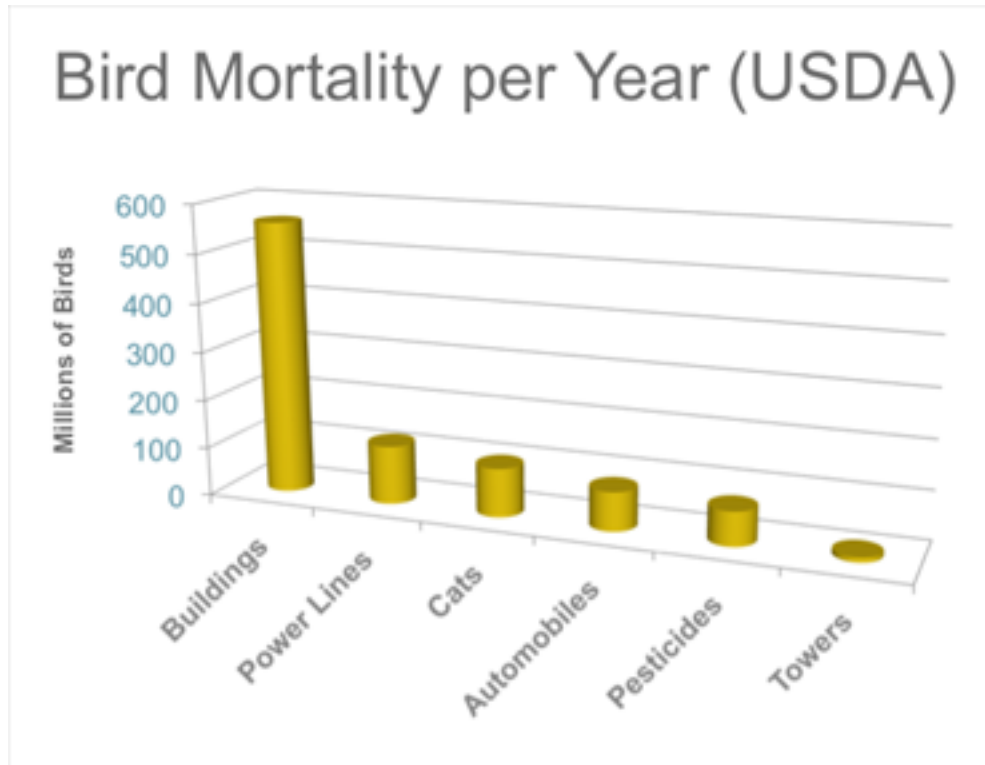
Map of light pollution predominantly in East Coast  
<http://www.inquinamentoluminoso.it/worldatlas/pages/fig2.htm>

What about wildlife in the watershed? Think about frogs. Frogs usually come out about 60 minutes after dusk. When the lights are kept on, the frogs came out an hour later ( ) and the later they come out, the less food they get to eat. Tree frogs use mating calls to find a frog of the opposite sex to mate with, but they do not call out in brightly lit areas. If the males stop calling, then they aren't reproducing. Lab studies show that the amount of light exposure affects DNA synthesis and the production of hormones in frogs that regulate everything from how much fat the frogs store for the winter to when they produce eggs. A recent experiment done at Utica college found that when lights are on, all amphibians they studied stayed hidden for an additional hour. The later they come out, the less food they may be able to eat.

Michael Mesure of the Fatal Light Awareness Program (FLAP) in Toronto, estimates that at least 100 million birds are killed annually by lights from manmade structures. "More birds die each year through collisions than died in the Exxon Valdez spill," he says. A tall building in the path of a migration can claim hundreds of lives. One example: From 1982 to 1996, 1,500 migrating birds have smacked into Chicago's McCormick Place Exposition Center. According to Mesure, songbirds are at most risk because they fly at low altitudes

dominated by artificial light.

Millions of nocturnal insects are killed each year by night lights according to City Wildlife - and we know that nocturnal animals like bats rely on these insects, especially in our watershed.



The US Forest Service estimates that 550 million birds die yearly from collisions into lit buildings  
<http://citywildlife.org/lights%20out.html>

### III. Proposed solution

Imagine looking up at the sky and instead of seeing harmful city lights, getting your light from the stars. The goal that we are striving for in this project is to raise awareness about Light Pollution and its effect on our watershed. We would like that for 30 minutes one day during April all Arlington citizens participate in this event by shutting off any artificial lighting and any electronic devices, to make it a blackout. We would like Arlington County to create a voluntary 30 minute blackout period to coincide with International Dark Sky Week and the annual peak bird migration from March 15 - May 30 (City Wildlife) We would like all Arlingtonians to enjoy 30 minutes of unobstructed viewing of the beautiful night sky at this time. We hope by this simple one night action, that people will become aware of the problem and think about all the lights they keep on at night that aren't necessary. We hope the city will continue to have this night year after year.

### IV Explanation of Solution

We plan to advertise this idea in newspapers, on the news, at School Board and online. We are in the process of presenting this idea to the Arlington County Board without whose support this project will not gain traction. We also plan to partner with the Lights Out DC Initiative and Jonathon Harmon who runs our Planetarium has agreed to hold a star viewing on that night. We have already contacted Jay Fisette, chairman of the Arlington County Board. We have been in touch with the International Dark Sky Society, our Planetarium, and Jennifer Soles, head naturalist at Gulf Branch and with Alonso Abugattas Natural Resources Manager Arlington County Parks. We plan to contact Anne Lewis of the Lights Out initiative in Washington DC.

We feel the 30 minute blackout in Arlington is crucial to making a dent in the greenhouse gases in the air. The population is growing and so is pollution. This puts our watersheds in danger. The air that the gases are polluting is the same air that the plants of our watersheds are taking in and we all know you can't have a good watershed without plants, fertile soil, and animals. Animals are another thing. If there are no plants for food there are no animals, the animals also need clean air to breath.

#### V Explain nature and scope of the unique idea

Our unique idea is to get Arlington County residents and business to turn off their lights and electronic devices for 30 minutes during International Dark Sky Week & peak migration time. Astronomers noticed that there was light pollution in the air over 100 years ago, it's time we take action. We are hoping this will catch on in years to come and spread to different countries. We want to reduce light pollution. This will impact our watershed greatly. It will help inhabitants in our local watershed, as well as the water that helps us to.

To inform people of our project we will put up posters and flyers where we can, such as street lamps, park bulletin boards, at schools, in newspapers and so on. We hope they will participate and realize maybe they can turn of a light here and there to conserve energy and help reduce light pollution at the same time.

#### VI Define environmental benefits

By doing this project, the environment will benefit greatly for many reasons. First and foremost, light pollution disrupts the natural environment. If artificial lighting and energy is greatly reduced, greenhouse gases will not occur, therefore stopping acid rain. Birds flying over Arlington may stop losing their way, frogs & salamanders may not get confused, and mating and nocturnal habits of all night animals might be restored. Chemical cleansing of the night sky may become more effective. All of this will help all of our living components of our ecosystem.

#### VII Budget

It is hoped that Caring For Our Watersheds implementation money can be used to fund our innovative & unconventional project. We can also do bake sales if necessary. What we need help with is advertising. Here's what we found out:

Arlington Connection - 1 half page advertisement = \$505  
1 Full page ad = \$952.

The Sun Gazette c - \$585 for a half page ad  
1 full page is \$910.

30 18 x 20 posters \$485.59 (without tax) at <http://posterprintfactory.com/pricing/>

Total budget for 2 half page ads and 30 professional posters ~ \$1090 + \$500 ~ \$1590

## VIII Conclusion

In conclusion our proposal is to create a 30-minute "Blackout" period where all Arlingtonians turn off their artificial lighting. We'd like this to be an annual occurrence. We are doing this with hope that we can raise awareness about light pollution and the damage that it does to our watershed.

### Citations:

(1) <http://www.gallinaswatershed.org/light-pollution.html>

(2) Article from National Geographic about the effects of light pollution in Virginia  
[http://news.nationalgeographic.com/news/2003/04/0417\\_030417\\_tvlightpollution\\_2.html](http://news.nationalgeographic.com/news/2003/04/0417_030417_tvlightpollution_2.html)

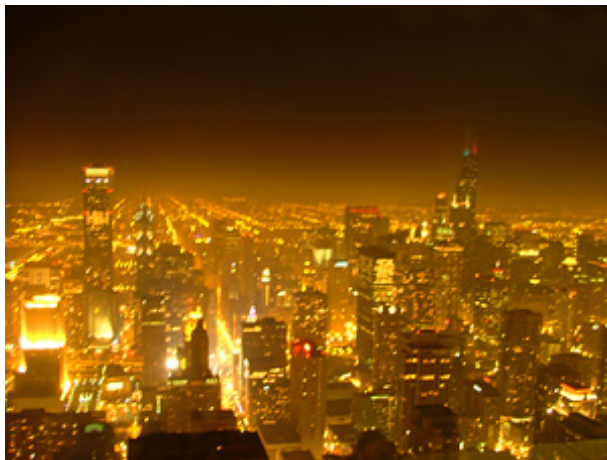
(3) <http://all-that-is-interesting.com/light-pollution-united-states>  
<http://archive.audubonmagazine.org/darksideoflight.html>

(4) International Dark Sky Association  
<http://www.darksky.org/>

(5) Jennifer Soles  
Chief Naturalist at Gulf Branch Park, Arlington, VA

(6) Alonso Abugattas - chief naturalist for Arlington County VA

(7) Anne Lewis, President of City Wildlife Lights Out DC - initiative. <http://citywildlife.org/lights%20out.html>



"I'm so confused - which way is North?"



"Dad, tell me the story of how you met mom at night again..."