This Guide was prepared by the Sustainable Lighting Committee (SLC) which was formed in the Fall of 2004. The committee is comprised of the University of Arizona College of Architecture and Landscape Architecture (www.architecture.arizona.edu) in collaboration with the local chapter of the Illuminating Engineering Society of North America (www.IESNA.org) and the Southern Arizona Section of the International DarkSky Association (SA-IDA.org).

Project Benefits Include:

- Saving energy which also reduces pollution from the power generating plants and saves water. The US wastes more than $2 billion a year due to inefficient light fixtures which radiate light skyward causing light pollution.
- Making a safer and more secure night time environment by reducing glare and harsh lighting shadows which improves visibility.
- Preserving dark skies necessary for our astronomers and optical sciences industry to continue to prosper - grants exceed $40M/year.
- Developing educational materials, studios, short-courses, and workshops to effectively convey sound lighting principles.
- Minimizing the harm to human health, our plants, insects and wildlife by not disrupting their daily and seasonal cycles and habitat with excessive and unneeded artificial light.
- Enhancing the beauty of our campus, cities and neighborhoods and facilitating the continued enjoyment of night skies by everyone.

We need good uniform outdoor lighting for our safety and to only use appropriate levels of light which will provide a healthier environment for humans, wildlife, and plantlife while saving energy.

For More Information
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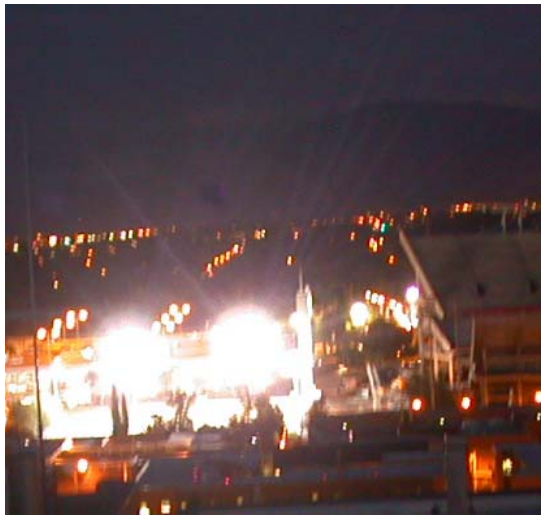
Revised 3-23-05 jmf

Evaluation of U of A Campus Light Pollution...



An Innovative Project Proposal by the Sustainable Lighting Committee

INTRODUCTION

On May 5, 2004, The Southern Arizona Section of the International DarkSky Association presented an Excellence in Outdoor Lighting Award to University of Arizona President, Peter Likins, for several campus parking lots and facilities that were recently retrofitted with improved light fixtures that reduced glare, light trespass, and sky glow. Further discussions with the University and College of Architecture led to the formation of the Sustainable Lighting Committee.

GOAL

To develop an evaluation methodology for assessing light pollution on the U of A main campus and its effects on energy use and public safety and to disseminate educational materials related to this topic.

OBJECTIVES

- Initiate a Light Pollution research foundation on campus to foster future possibilities.
- Strengthen collaboration between the U of A, the community, businesses, and other organizations to apply collective knowledge and wisdom towards a comprehensive solution.
- Provide educational opportunities and promote community awareness of light pollution issues and its effects on energy, safety, astronomy, human and animal health, and plant life so that the public can benefit and help implement solutions.

PROBLEM STATEMENT

Light pollution is a major environmental and sustainability concern for everyone. While poor outdoor lights have negative biological effect on plants and animals, light trespass, glare, and sky glow affects our nighttime view of the stars, wastes energy, water, and natural resources, and can have an adverse effect on nighttime safety.

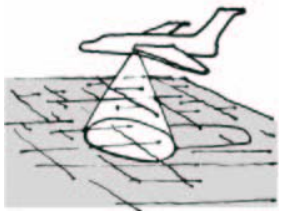
Up-light (sky glow) has major economical effects when astronomical observatories lose parts of the night sky or have their telescope power greatly diminished in viewing capability.

Light trespass can especially effect our sleeping conditions. Dark sleeping rooms are needed to assure proper levels of melatonin are generated each night. Melatonin is important due to its anti-oxidant properties which helps fight off disease, especially cancers. Dark nights and bright days are needed for your body clock (circadium rhythm) to be reset.

Migrating birds are often driven off coarse by sky glow from poor outdoor lights. Millions are killed every year by getting disoriented and sometimes crashing into lighted buildings. Outdoor lights can interfere with night time pollinators and the health and survival of wildlife.

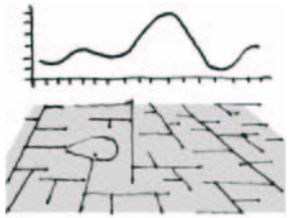
The U of A campus is part of a unique natural environment with one of the highest clear sky conditions in the world. The U of A should demonstrate the highest level or research and consciousness with regards to dark sky conditions and should integrate state-of-the-art technologies that mitigate light pollution. This not only yields economic benefits for the whole community, but makes the campus a safer place at night due to better and more uniform lighting.

SCOPE OF WORK



Stage I.
Preliminary Assessment of Campus Outdoor Light Pollution

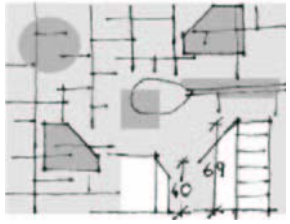
Obtain nighttime aerial images of the main campus to determine general locations of light pollution problems. This will facilitate and expedite the process to identify study areas.



Stage II.
Targeting Light Pollution Areas

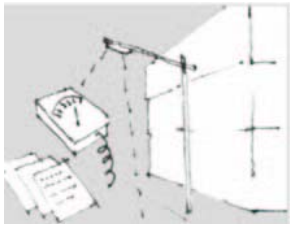
Evaluate nighttime aerial photos both visually and using GIS technology through an iterative filtering of brightness and intensities. Six typologies to be identified include:

a circulation space, a parking lot, a general activity space, transitional space at a building entrance, a roof, & a minor sports activity area



Stage III.
Acquiring Detailed Data

Acquire detailed data for each of the six typological specified problem areas. Students and research assistants to conduct quantitative inventories of luminaries and document physical elements of each area.



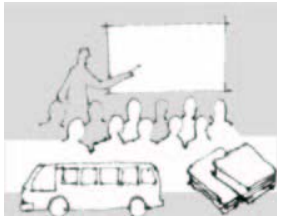
Stage IV.
Spatial Data Interpretation & Analysis Using GIS

Further development of the six typologies using design studios within the U of A College of Architecture and landscape Architecture.

Stage V.
Developing Design Solutions and Recommendations

Introduction of solutions and recommended design modifications as part of the design studio process, physical models to be created. Categories to be studied include:

Sources, Receivers, Spatial Geometry, Atmospheric Condition, and Activities



Stage VI.
Dissemination of Materials, Short-Courses, and Workshops

Dissemination of materials and knowledge acquired during the first five stages with presentation and lecture material being prepared. Materials to be presented to other Arizona Universities.