



**Light Pollution Impact on State Parks** – Over 95% of Missouri State Parks and Class 1 Areas analyzed have moderate to severe light pollution problems. 75% of Missouri State Parks fell into the severe category and several state parks showed sky brightness over 900% normal. The severe category has lost the ability to see around half its visible stars and the Milky Way.<sup>1</sup> Light Pollution is increasing in the United States at 5%-10% annually.<sup>2</sup> In 2006 Missouri voters overwhelmingly approved the Parks & Soil sales tax, this gives a clear message that voters want their state parks preserved for future generations.

**Energy Waste** – About 1% of our total electrical production is wasted on bad lighting. In 2001 this represents about 732 million kilowatt hours per year. Kansas City and St. Louis Metropolitan areas waste an estimated 164.5 million kWh per year just in light shining into the sky. That is 71.5 Million kWh per year for Kansas City and 93 Million kWh per year for St. Louis. In Kansas City alone, it is estimated that the excess light (light shining into the sky) results in the production of 29,720 tons of CO<sub>2</sub>, 63 tons of Oxides of Nitrogen, 23 tons of Sulphur Dioxide and the usage of 53.6 million gallons of water each year.<sup>3</sup> At 8 cents/kWh this results in a waste of \$13.6 million annually.

**Ecological Consequences** – All living beings exposed to the sun have evolved to expect periods of darkness. These circadian rhythms govern when they rest, when they feed and cell regeneration. Extensive research has shown that artificial night lighting can have an effect upon all living things.<sup>4</sup>

**Nuisance and Health Problems** – Exposure to light at night has been shown to cause suppressed melatonin production in humans. Melatonin is a hormone made by a part of the brain called the pineal gland. It has antioxidant properties and is a subject of extensive research for its possible benefits.<sup>5</sup> Suppressed melatonin production has been proposed as a potential risk factor in breast cancer.<sup>6</sup> Light shining into windows is a nuisance and leads to the poor sleep. Research also had linked insufficient sleep to such health problems as high blood pressure, diabetes, depression and obesity.<sup>7</sup>

**Safety** – Bright, badly shielded lights, and glare are major issues in road and boating safety. Criminals use floodlights to put law enforcement officials at a disadvantage.<sup>8</sup>

**Loss of Revenue** – Astronomy and the exploration of space is over a 25 billion dollar business. We are losing our share of this revenue as quickly as we are losing our natural night skies.<sup>9</sup>

**Legislative Loophole** – Current pollution definitions exclude light from being regulated.<sup>10</sup> Over half of the states either have state laws or proposed legislation to address light pollution.<sup>11</sup>

**Summary** - Addressing light pollution is about placing light on the ground where it is useful, not into the sky or driver's eyes. Simple, effective measures are all that is needed to make our state more enjoyable to all residents - including wildlife - and visitors.

<sup>1</sup> <http://www.trianglealumni.org/mcrol/mo.html> 2007, based on 1997 figures

<sup>2</sup> <http://www.lightpollution.it/dmsp/predictions.html>

<sup>3</sup> IAU Symposium 196 proceedings, "Educating the Public about Light Pollution" Isobe and Hamamura, 2001

<sup>4</sup> Ecological Consequences of Artificial Night Lighting, - Catherine Rich and Travis Longcore, Editors. 2006. Island Press, Washington, D.C.

<sup>5</sup> [http://www.mayoclinic.com/health/melatonin/NS\\_patient-melatonin](http://www.mayoclinic.com/health/melatonin/NS_patient-melatonin)

<sup>6</sup> [http://www.apollolight.com/pdf\\_files/NEL.pdf](http://www.apollolight.com/pdf_files/NEL.pdf)

<sup>7</sup> <http://www.sleepeducation.com/Article.aspx?id=217> American Academy of Sleep Medicine

<sup>8</sup> <http://www.britastro.org/dark-skies/floodlights.html>

<sup>9</sup> <http://curious.astro.cornell.edu/question.php?number=684>

<sup>10</sup> RSMO 643.020 Definition 4.

<sup>11</sup> <http://www.serconline.org/darkSkies.html>