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Blinded by the Light: Addressing the Growing Light Pollution Problem

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BLINDED BY THE LIGHT: ADDRESSING THE GROWING LIGHT POLLUTION PROBLEM

By Andrea L. Johnson[†]

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I. INTRODUCTION

Car alarms blaring, dogs barking, light flooding in a bedroom window—this is pollution; pollution of the senses. Imagine a time when silence dominated, the stars were visible no matter the location, and sleep went uninterrupted. This scenario sounds like a fantasy world, and to many it is, because of the magnitude of this unique type of pollution. Sensory pollution occurs when an activity that benefits some harms others through the senses and, in some cases, interferes with a person’s enjoyment and use of his or her property. Sensory pollution includes noise, light, and visual pollution. This pollution is welcome by some (those who are benefitting from the activity causing the pollution) but unwelcome to others (those whose senses are being harmed and land affected).

This Article will analyze light pollution that trespasses from one property onto another’s property, and the lack of an amicable way to resolve this issue through existing laws. The growth of oil production in West Texas has led to issues with individual landowners and research organizations regarding light emitted from oil rigging lights.

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Specifically, the McDonald Observatory is one research facility that has been negatively impacted by the increased nightglow from artificial lighting.

Light pollution has been described as being “wildly inefficient, overly bright, poorly targeted, improperly shielded, and, in many cases, completely unnecessary.”¹ Light pollution occurs when outdoor lighting used in areas with poorly designed systems illuminate everything around it, including the sky, rather than the specific area originally intended to be lit.² Light pollution also occurs when unnecessary lights are left on outside.³ When every homeowner and business owner continues to use outdoor lighting in this manner, the light emitted into the sky becomes abundant—leading to light pollution.

Light pollution often has a negative effect on real property owners, as well as wildlife, which are in the vicinity of the light pollution. Light pollution can affect wildlife, people’s health, and people’s property.⁴ The main issue regarding these categories is the increased glow in the night sky by artificial light. The increased glow in the night sky is attributed to light pollution from certain entities, such as businesses, other private property owners, and more recently, oilrig lighting. This is an issue because it interferes with the landowner’s private enjoyment and use of his or her land. It is also a problem because it can have a negative impact on our ecosystem when certain wildlife patterns are interrupted.⁵ Artificial light can affect an individual’s health and it can interfere with scientific research that is important in understanding our planet and space as a whole.⁶

Part II of this Article discusses sensory pollution and gives a factual background about light pollution. It also discusses light pollution in West Texas as an exemplar that will be readdressed throughout the Article. Part II further discusses the negative effects of light pollution and explains why light pollution is a problem. Part II will also look at issues from light pollution in regard to wildlife, health, and property issues. Part III of this Article discusses problems that have resulted from nuisance and trespass claims and looks at specific case law and its inadequacy. Also, Part III looks at current legislation enacted in the area of light pollution and the benefits of this legislation. Part IV discusses the recommendation that this Article puts forth as a way to

1. Mark Binelli, *How Light Pollution Clouds the Night Sky*, MEN’S J. MAG. (Dec. 2013), <http://www.mensjournal.com/magazine/print-view/where-did-all-the-stars-go-20131115>.

2. *Id.*

3. *Id.*

4. Kristen M. Ploetz, *Light Pollution in the United States: An Overview of the Inadequacies of the Common Law and State and Local Regulation*, 36 NEW ENG. L. REV. 985, 987 (2002).

5. *Id.* at 998.

6. *Dark Skies Initiative*, McDONALD OBSERVATORY (2015), <http://mcdonaldobservatory.org/darkskies>.

remedy the light pollution problem across the globe. These recommendations include ordinances, legislation, best lighting practices through technological advancements, and education. Part V is a conclusion on the topics covered in the Article.

II. SENSORY POLLUTION: A FACTUAL BACKGROUND

Sensory pollution is a type of pollution that invades the senses. Sensory pollution was first nationally recognized as a major issue when the Noise Control Act was enacted in 1972.⁷ This law analogized noise pollution to that of water and air pollution.⁸ This idea of sensory pollution has expanded into areas of odor pollution, visual pollution, and light pollution.⁹ Light pollution is the focus of this Article and will be explored in more depth in this Section. Specifically, this Section defines light pollution and discusses the negative effects that result from it. The negative effects discussed in this Section include wildlife concerns, health issues with humans, and property issues. Wildlife concerns include the problems associated with artificial light confusing and disrupting the natural instincts of birds, turtles, frogs, fireflies, and moths. The health issues that affect humans include the tampering with “internal clocks” (i.e., twenty-four hour daily activity cycle) and hormone levels, myopia, and the disruption of the circadian clock, which may lead to sleep disorders, cancers, obesity, and diabetes. The property issues addressed in this Section look at specific issues with individual owners, business owners, and the effect on observatories and astronomers.

A. *Light Pollution*

Light pollution has been defined as “any adverse effect of artificial light, including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste.”¹⁰ This definition shows that light pollution encompasses a large area of study. Light pollution is not limited to large areas, such as urban light glow, but can also occur from one neighbor to the next. Any type of light that has a negative effect can be considered light pollution. Light development and its continued and increased use helped coin the phrase, “light pollution.”¹¹ Light pollution is something that has become apparent over the years in the United States, as well as worldwide. The glare from

7. John Copeland Nagle, *The Idea of Pollution*, 43 U.C. DAVIS L. REV. 1, 17 (2009).

8. *Id.*

9. *Id.*

10. *Light Pollution*, INT’L DARK SKY ASS’N, <http://darksky.org/light-pollution/> (last visited July 21, 2015) [hereinafter INT’L DARK SKY ASS’N].

11. Ploetz, *supra* note 4, at 993.

light pollution can easily be seen when looking at space satellite images without the use of visual aids.¹²

Light pollution is also an important property issue because of the effects it has on property owners and businesses. As will be discussed in Section III, these effects include, but are not limited to, depreciation of property value, business interference, and scientific research interference.¹³ These are extreme and diverse issues that need to be addressed in an efficient statewide manner in Texas, as well as nationally and globally.

Light is considered a necessity in today's world, and most cannot imagine a life without electric light. Light existed prior to the invention of electricity and the light bulb, but these inventions created an outpouring of light into the world. Thomas Edison's invention of the incandescent light bulb in 1879 led to the type of light society is accustomed to today.¹⁴ Although it is highly unlikely that society will ever again live in a world without electric light, there are ways to limit the way light is used to help reduce light pollution. This Article focuses on the issue of light pollution and how to efficiently handle it so that everyone benefits, including those who use artificial lights.

B. *Effects of Light Pollution*

Light pollution has a number of effects on wildlife, health, and property issues. These issues, while diverse, ultimately deal with the same principle of light pollution and its effect in these specific areas.

The term "light pollution" was coined because that is the most accurate way to describe what is happening to the night skies. Artificial light has historically been used without a thought about the effect of its use. The use of unnecessary nighttime lighting leads to the night sky being unrecognizable and leads to a waste of energy.¹⁵ According to the Dark Skies Initiative, the U.S. spends tens of billions on energy costs each year on wasted light use.¹⁶ However, satellite images indicate that light pollution problem is a global issue and not limited to the U.S.¹⁷ For example, scientists have predicted that within twenty-five years stars will not be visible in northern Europe.¹⁸

The visibility of the nighttime sky is not the only concern that comes from light pollution. The next few Sections will describe other specific concerns incident to light pollution.

12. *Id.*

13. *Id.* at 993, 1005.

14. *Id.* at 985.

15. Binelli, *supra* note 1.

16. McDONALD OBSERVATORY, *supra* note 6.

17. Ploetz, *supra* note 4, at 994.

18. *Id.*

1. Wildlife Concerns

One concern of light pollution is the effect it has on migratory birds and their reliance on constellations to fly.¹⁹ Migrating birds have begun to use artificial light sources as a way to guide their flight pattern rather than natural constellations.²⁰ This leads to many birds being killed by either flying off course or colliding with these artificial light sources.²¹

Light pollution has also disrupted other wildlife patterns. It has been found that artificial lighting on the beach can fatally misguide baby sea turtles when they try to make their way back to sea.²² The newly hatched turtles are naturally attracted to light and can wander on the beach and are eaten by predators when they are confused by artificial light.²³ To protect these turtles, certain counties in Florida have enacted ordinances requiring residents to turn off beachfront lights during turtle nesting season.²⁴ Also, the increase of artificial light in the habitat of certain animals can disrupt their natural hormone levels, which can lead to problems with reproduction and survival.²⁵ This hormonal disruption has been seen in tree frogs, bats, fireflies, and moths.²⁶ The artificial light affects their natural behaviors and allows them to fall victim to predators more easily and frequently.²⁷

In *City of Chula Vista v. Superior Court*, the court determined whether certain urban developments were appropriate due to their impact on wildlife.²⁸ The court discussed light pollution as one of the issues regarding a species of Least Tern birds.²⁹ The *Chula Vista* court discussed how the light pollution from the development “adversely impact[ed] native species and affect[ed] the balance of predation.”³⁰ The court also discussed the possible effect on the Belding’s Savannah sparrow, an endangered species.³¹ An increase in the level of light could permanently impact these birds, which were an important part of the marsh complex in question in the case.³²

19. *Id.* at 997–98.

20. *Id.*

21. *Id.* at 998.

22. *Id.*

23. Ploetz, *supra* note 4, at 998.

24. Sharon Guynup, *Light Pollution Taking Toll on Wildlife, Eco-Groups Say*, NAT’L GEOGRAPHIC NEWS (Apr. 17, 2003), http://news.nationalgeographic.com/news/2003/04/0417_030417_tvlightpollution.html.

25. Ploetz, *supra* note 4, at 999.

26. Guynup, *supra* note 24.

27. *Id.*

28. *Chula Vista v. Superior Court*, 133 Cal. App. 3d 472, 476 (1982).

29. *Id.* at 493.

30. *Id.*

31. *Id.* at 492.

32. *Id.*

The problem with adversely affecting one type of wildlife with light pollution is that the chain of the entire habitat can be harmed. In other words, “[the] disturbance of one [species] disturbs all.”³³ Biologists are concerned about the current lack of protection for these animals and the ultimate impact on the ecosystem from light pollution.³⁴ There have been some measures taken to help preserve wildlife by adjusting light use during migration seasons.³⁵ One example is the Fatal Light Awareness Program, which is an organization that has worked in Toronto with dimming or turning off excess lights during migration seasons.³⁶

2. Health Issues

Light pollution can also lead to certain health issues affecting humans. The increase in artificial light can interrupt sleeping patterns and cause harmful consequences.³⁷ This is evidenced by studies that show light present during one’s sleep may disrupt internal clocks and hormone levels.³⁸ According to a study conducted by researchers at the University of Pennsylvania Medical Center and The Children’s Hospital of Philadelphia, children between the ages of two to sixteen who were exposed to ambient light during sleep had a higher risk of suffering from myopia.³⁹ The study also theorized that an increase in myopia over the last few centuries is partially caused by the higher nighttime light levels caused by industrialization.⁴⁰

It has also been theorized that repetitive interruptions in melatonin production, like those that occur by sleeping in a room invaded by light, can lead to certain types of cancers.⁴¹ Breast cancer is an example of one type of cancer that can possibly be attributed to outside light pollution of a bedroom.⁴²

Another issue relating to light pollution and people’s health is the effect on the circadian clock. The circadian clock is the twenty-four-hour day-to-night cycle that affects people.⁴³ One researcher contends “the circadian cycle controls from ten to fifteen percent of our

33. *Id.*

34. Guynup, *supra* note 24.

35. *Id.*

36. *Id.*

37. Ploetz, *supra* note 4, at 1000.

38. *Id.*

39. Press Release, The Univ. of Pa. Health Sys., Near-Sightedness in Children Linked to Light Exposure During Sleep Before Age Two (May 12, 1999), http://www.uphs.upenn.edu/news/News_Releases/may99/myo.shtml.

40. *Id.*

41. Joe Bower, *The Dark Side of Light*, AUDUBON MAG. (2000), <http://archive.audubonmagazine.org/darksideoflight.html>.

42. *Id.*

43. Ron Chepesiuk, *Missing the Dark: Health Effects of Light Pollution*, 117 ENVTL. HEALTH PERSPS. 1, A20, A24 (Jan. 2009), <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2627884/>.

genes.”⁴⁴ This is a large percentage and shows that the disruption of this cycle can lead to serious health issues. Some of the health issues related to an interruption in the circadian clock include sleep disorders, breast and prostate cancers, obesity, and early onset diabetes.⁴⁵

In a study conducted in Israel, satellite images were used to compare the level of nighttime artificial light to the number of breast cancer cases in women.⁴⁶ The study found that women who resided in areas with a significant amount of nighttime light pollution were 73% more likely to develop breast cancer than those who lived in an area with low artificial nighttime light.⁴⁷

More research is needed to completely understand the harmful effects of light pollution to humans, but studies that have been done show that there is a definite link between light exposure during sleep and serious health issues. The exposure to light is necessary for humans, but a high rate of exposure during the time a person should be sleeping can have adverse health effects.⁴⁸ Putting light where it is needed, and not letting it seep into one’s house during sleep is the best way to prevent these possible health issues.⁴⁹

3. Property Issues

Property owners experience unique issues regarding the negative effects light pollution has on their land. Light pollution can affect the private property owner’s quiet use and enjoyment of his or her land because of unwanted light spilling onto the property. Commercial property owners also face problems when light is emitted from someone else’s property onto their own and interferes with their business. This is especially apparent in businesses such as drive-in theatres, apartment complexes, and other business entities.⁵⁰

Light pollution also affects the scientific world in regards to observatories that are conducting research and are being limited in their observations by light pollution. This is especially apparent in West Texas where the oilfield lighting is becoming an increasing problem.⁵¹ The oilfields in West Texas and the McDonald Observatory are great exemplars of growing light pollution issues. The lighting used by these oilrigs has become a problem and has undoubtedly caused light pollu-

44. *Id.*

45. *Id.*

46. *Id.* at A27.

47. *Id.*

48. *Human Health*, INT’L DARK SKY ASS’N, <http://www.darksky.org/light-pollution-topics/ill-health> (last visited July 21, 2015).

49. *Id.*

50. See *Weber v. Mann*, 42 S.W.2d 492 (Tex. Civ. App.—Waco 1931).

51. See William Wren, *Oilfield Lighting Threatens Dark Skies*, McDONALD OBSERVATORY, http://mcdonaldobservatory.org/sites/default/files/pdfs/Oilfield_lighting_best_practices_final.pdf (last visited Aug. 22, 2015) [hereinafter *Oilfield Lighting Threatens Dark Skies*].

tion. Satellite images taken from the McDonald Observatory in the Permian Basin show the increase of light being emitted from the oilfield.⁵² The increase from 2010 to 2012 shows how the glow from the oilfield in West Texas has increased drastically within two years.⁵³ The McDonald Observatory was founded almost seventy-six years ago in the Davis Mountains located in West Texas.⁵⁴ It was built there because of its desirable location due to the better weather and visibility in West Texas.⁵⁵ The observatory, which is a part of the University of Texas at Austin, has made some of the most important discoveries about space, including finding the first evidence of water on Mars and discovering the most massive black hole that has been found thus far.⁵⁶ This area of West Texas still remains one of the darkest in the state; however, this area has recently had to deal with issues since its opening, and these issues come from light pollution.⁵⁷

The rapid oil boom in West Texas, specifically in the Eagle Ford Shale and the Permian Basin, is a leading factor in the lighting pollution problem for the McDonald Observatory.⁵⁸ The drilling operations were not designed to take into account the lighting pollution issue and the negative impact it can have on surrounding residents and research programs.⁵⁹ The inefficient design of these oilrig lighting systems has led to a waste of light upwards into the once pristine night sky.⁶⁰ The observatory and people closely connected to the area have been educating oil companies and others on how to reduce light pollution and glare.⁶¹ The Dark Skies Initiative is one way in which they hope to educate people and companies.⁶² This program is designed to educate the public, explain light pollution, and give suggestions on how people can help with the issue of light pollution in their area and globally.⁶³

The International Dark-Sky Association (“IDA”) is another organization that promotes the reduction of light pollution through education and suggested practices.⁶⁴ The IDA was founded in 1988 and works to call attention to the problems associated with light pollution

52. *Id.*

53. *Id.*

54. Sonia Smith, *Afraid of Losing the Dark*, TEX. MONTHLY (Jan. 9, 2014, 12:00 PM), <http://www.texasmonthly.com/story/afraid-losing-dark>.

55. *Id.*

56. *Id.*

57. *Id.*

58. *Id.*

59. *Id.*

60. Smith, *supra* note 54.

61. *Id.*

62. McDONALD OBSERVATORY, *supra* note 6.

63. *Id.*

64. *About IDA*, INT’L DARK SKY ASS’N, <http://www.darksky.org/about> (last visited Aug. 24, 2015).

and reduce it. The idea is simply to “light what you need, when you need it.”⁶⁵

The IDA has an information sheet describing the effects of sky glow on large telescopes.⁶⁶ This information sheet indicates that the issues regarding light pollution and telescopes are not unique to the McDonald Observatory and, in fact, it is a much bigger issue.⁶⁷ The report shows a table that indicates the amount of sky glow level that the natural sky has in contrast to the sky glow caused by artificial light glow.⁶⁸ The term “sky glow” is a “result of fixtures that emit a portion of their light directly upward into the sky where light scatters, creating an orange-yellow glow above a city or town.”⁶⁹ The natural sky glows at a level of 1.0 on the table.⁷⁰ The report looks at four different telescopes: one located at Kitt Peak in Arizona, one located at Mount Palomar in California, one located at Lick Observatory in California, and one located at Mount Wilson Observatory in California.⁷¹ The telescope in Kitt Peak measured a 1.06 on the scale.⁷² The telescope in Mount Palomar measured a 2.0 on the scale.⁷³ The telescope at Lick Observatory measured a 3.0 on the scale.⁷⁴ The telescope in Mount Wilson measured a 5.0 on the scale.⁷⁵ The costs associated with the lighting differences are millions of dollars, showing that the amount of artificial light glow is a significant loss to astronomy research.⁷⁶ The increase in lights and costs associated with the artificial lights is a real problem, both economically and scientifically.⁷⁷

The IDA has done research showing that, in addition to limiting light use and shielding lights, low sodium pressure lighting is more easily filtered out than broad-spectrum white light or white light with a high content of blue wavelengths.⁷⁸ Therefore, the low sodium pressure lighting is preferred for use around observatories.⁷⁹ Pima County in Arizona has also looked at the effects of light pollution on observatories in their area, including the one mentioned previously at Kitt

65. *Id.*

66. INT’L DARK SKY ASS’N., *supra* note 10.

67. *Sky Glow Effect on Existing Large Telescopes*, Int’l Dark Sky Ass’n, <http://www.darksky.org/assets/documents/is020.pdf> (last visited July 21, 2015) [hereinafter *Sky Glow Effect on Existing Large Telescopes*].

68. *Id.*

69. *Frequently Asked Questions*, INT’L DARK SKY ASS’N (July 15, 2015, 1:25 GMT) (on file with author).

70. *Sky Glow Effect on Existing Large Telescopes*, *supra* note 67.

71. *Id.*

72. *Id.*

73. *Id.*

74. *Id.*

75. *Id.*

76. *Id.*

77. *Sky Glow Effect on Existing Large Telescopes*, *supra* note 67.

78. INT’L DARK SKY ASS’N., *supra* note 10.

79. *Id.*

Peak.⁸⁰ The key actions the IDA emphasizes are: (1) to rigorously enforce existing outdoor lighting codes in all jurisdictions; and (2) minimize growth in the critical zones adjacent to major astronomical observatories so that increased development will not lead to variances or relaxation of the existing outdoor lighting requirement codes.⁸¹ Looking at the Pima County suggestions, it is obvious that city ordinances and regulations seem to be the best way to reduce and eliminate light pollution.⁸² Challenging goals but minimizing light pollution would be a benefit to everyone involved and can be achieved more easily with education and regulation.

III. PROBLEM HAS RESULTED IN NUISANCE AND TRESPASS CLAIMS AND LEGISLATION

Current case law addressing these issues is sparse. In order for there to be a set standard and precedent for property owners to look to for a remedy, it is important that there be city ordinances and uniform judicial decisions regarding light nuisance issues. Cases are generally decided based on two separate legal concepts: light nuisance and light trespass. In essence, it is the same type of problem; however, the law has taken to different tort claims to address the problem.

This Section looks at the different types of cases that have been decided in the area of light pollution. An analysis of these cases shows the need for a more uniform lighting policy so that outcomes can be more predictable and issues more easily solved. This Section then looks at local ordinances that have been passed in some areas regarding light pollution. Many of these ordinances are great exemplars as to what type of solution could be used in all areas of the world to help curb the growing light pollution issue.

A. Case Law

In *Weber v. Mann*, the appellee, Mann, alleged that the appellant, Weber, erected a root beer stand with many lights shining during the day and night and also constructed a red neon sign in front of the stand.⁸³ Mann stated that these lights reflected into his home.⁸⁴ Mann asked that Weber be permanently restrained from operating the root-beer stand and that he receive damages because he and his wife suffered impaired health and depreciation in the value and use of their

80. D.R. Davis et al., AN ASSESSMENT OF THE IMPACT OF GROWTH ON THE DARK SKIES OF PIMA COUNTY 1, INT'L DARK SKY ASS'N (Oct. 6, 2006) (on file with author).

81. *Id.*

82. *Id.*

83. *Weber v. Mann*, 42 S.W.2d 492 (Tex. Civ. App.—Waco 1931).

84. *Id.*; *Seinfeld: The Chicken Roaster* (NBC television broadcast Nov. 14, 1996) (showing the similarities between this case and the “The Chicken Roaster” episode in *Seinfeld* where a neon red chicken sign shone into Kramer’s bedroom window severely disrupting his sleeping schedule).

home.⁸⁵ The jury found the light did constitute a nuisance, but that Mann was not materially impaired.⁸⁶ The trial court entered judgment permanently enjoining Weber from using the neon sign and the lights as they currently were being used.⁸⁷ They permitted him to have lights if they were “colored or shaded globes of a lesser candle power than is produced by a 25-kilowatt globe and that would not reflect light into appellee’s home.”⁸⁸ The appellate court reversed the decision due to errors made by the trial court.⁸⁹ The appellate court held that the trial court made conflicting findings and that it likely misused the word “kilowatt.”⁹⁰

The important takeaway from the *Weber v. Mann* case is that in 1922 the trial court was willing to establish a type of light pollution and a reasonable remedy for it. This willingness to acknowledge light pollution is an important step for litigation in Texas on the issue of light pollution and light trespass. Although the decision was ultimately reversed, the findings of the trial court in this case helped shape the law for the increasing problems relating to light pollution and light trespass. It also shows that a reasonable remedy can be established.

In *169 East 69th Street Corp. v. Leland*, the lessee Leland sought discounted rent based on breach of warranty of habitability due to the construction of an illuminated awning outside his bedroom window.⁹¹ Leland brought the case to court to enforce his nonpayment of rent, but the court had to decide whether the lessor 169th East 69th Street Corporation breached the warranty of habitability.⁹² The illuminated awning was directly below and outside Leland’s bedroom window and cast a bright light into it.⁹³ At the time of trial, the awning turned off at 10 p.m. each night.⁹⁴ Leland alleged that the light greatly affected him and his wife and that they could not close the blinds because his wife was claustrophobic.⁹⁵ The court decided the validity of a private nuisance cause of action in light cases by determining that the light must be strong enough to “seriously, disturb a person of ordinary sensibilities or interfere with an occupation which is no more than ordinarily susceptible to light.”⁹⁶ It further stated that the courts will “not afford protection to hypersensitive individuals or industries.”⁹⁷ In this case, the court found that Leland knew he was living above a

85. *Weber*, 42 S.W.2d at 492.

86. *Id.*

87. *Id.* at 493.

88. *Id.*

89. *Id.*

90. *Id.*

91. *See* 169 E. 69th St. Corp. v. Leland, 594 N.Y.S.2d 531, 531 (N.Y. Civ. Ct. 1992).

92. *See id.*

93. *Id.*

94. *Id.* at 532.

95. *Id.*

96. *Id.* at 533.

97. 169 E. 69th St. Corp., 594 N.Y.S.2d at 532.

commercial space and that Leland and his wife could have reasonably expected something like this to occur.⁹⁸ Thus, the court decided the disruption was minimal and within Leland's reasonable expectations. For a light disturbance to be offensive it must "demonstrate a substantial and serious interference with a claimant's use of premises to be actionable."⁹⁹ The court gave examples of nuisance, such as a glaring floodlight on a neighbor's property, a brightly illuminated sports arena with flashing lights, and a large illuminated sign opposite a hotel wing.¹⁰⁰

The *Leland* case provides a good, basic rule for defining whether light invading a residential space should be construed as an actual nuisance. The court here decided that the light must be a substantial and serious interference with a person's use of his or her land.¹⁰¹ This is important because there is a difference between what is reasonable and what is not reasonable when looking at light pollution, nuisance, and trespass. Without a bright line rule, the problem then becomes determining whether a certain illumination is considered "substantial and serious." It is hard to determine from the courts if an individual case will meet the threshold or not.

In addition to residential claims due to light pollution, competing commercial interests can also result in allegations of light nuisance or trespass. For example, in *Lynn Open Air Theatre, Inc. v. Sea Crest Cadillac-Pontiac, Inc.*, the plaintiff, Lynn Open Air, brought suit to enjoin the defendant, Seacrest Cadillac-Pontiac's, use of floodlights on its property.¹⁰² Lynn operated an open-air drive-in theatre, and the defendant's floodlights interfered with the quality of the projection of the movies.¹⁰³ Lynn contended that, in some areas, the floodlights shined directly into patrons' eyes.¹⁰⁴ A justice of the Superior Court in Massachusetts dismissed the case and Lynn appealed.¹⁰⁵ The court stated "the casting of light upon the property of another person may constitute a nuisance and be enjoined when it interferes with that person's reasonable and customary use and enjoyment of his property."¹⁰⁶ The court determined, however, that this was not the case in a highly commercial, lighted area.¹⁰⁷ It said the character of the locality is of extreme importance when determining whether there is a nuisance.¹⁰⁸ The court ultimately affirmed the dismissal because Lynn

98. *Id.* at 534.

99. *Id.*

100. *See id.*

101. *See id.*

102. *Lynn Open Air Theatre, Inc. v. Sea Crest Cadillac-Pontiac, Inc.*, 294 N.E.2d 473 (Mass. App. Ct. 1973).

103. *Id.*

104. *Id.*

105. *Id.*

106. *Id.* at 473-74.

107. *Id.* at 474.

108. *Lynn Open Air Theatre*, 294 N.E.2d at 474.

had an unusually sensitive business and the conduct by the defendant would not be considered harmful in other circumstances.¹⁰⁹

In a similar, more recent case, *Blue Ink, Ltd. v. Two Farms, Inc.*, the plaintiff Blue Ink, also owned a drive-in theatre and brought suit against the neighboring business for negligence, trespass, and nuisance related to lights coming onto their property from the defendant, Two Farms.¹¹⁰ Blue Ink alleged that light was inadvertently thrust onto their property and interfered with their business.¹¹¹ At the trial court level, the jury found in favor of the drive-in theatre on a private nuisance claim.¹¹² The court stated that the interference with Blue Ink's property right by Two Farms must be (1) both unreasonable and substantial to recover for nuisance; and (2) view the plaintiff's alleged harm and determine if the inconvenience or harm is objectively reasonable.¹¹³ The court found that the theatre failed to satisfy the second part of the test.¹¹⁴ Blue Ink did not present enough evidence to show that any objectively reasonable harm or inconvenience actually occurred.¹¹⁵ Therefore, the court ultimately held that there was not a nuisance claim.¹¹⁶

B. Local Ordinances

Some municipalities have attempted to address the issue of light pollution through ordinances. This Section reviews ordinances in the cities of San Angelo and Presidio, Texas. These ordinances specifically create standards for outdoor lighting to help "minimize light pollution, glare and light trespass caused by inappropriate or misaligned light fixtures, while improving nighttime public safety, utility, and security."¹¹⁷ The ordinances give definitions, standards, exemptions, procedures, compliance methods, enforcement, and what happens in cases of a violation.¹¹⁸

San Angelo's proposed ordinance sets out five specific compliance methods: redirection of the luminaire; shielding of the light source; redesign or relocation of the luminaire; replacement of the luminaire with a conforming luminaire; or removal of the luminaire.¹¹⁹ The penalty for violation of this ordinance states that any person violating any

109. *Id.*

110. *Blue Ink, Ltd. v. Two Farms, Inc.*, 96 A.3d 810, 812–15 (Md. Ct. Spec. App. 2014).

111. *Id.*

112. *Id.*

113. *Id.* at 812–13.

114. *Id.*

115. *Id.*

116. *Blue Ink*, 96 A.3d at 818.

117. *Ordinance Draft of San Angelo, Texas Amending Chapter 8, Offenses & Nuisances To Add New Article 8.1200*, HILL COUNTRY ALLIANCE, <http://www.hillcountry-alliance.org/uploads/HCA/SanAngelo.pdf> (last visited Aug. 28, 2015).

118. *See id.* §§ 8.1201–.1204, .1208–.1211.

119. *Id.* § 8.1208.

provision shall “be guilty of a misdemeanor, punishable, upon conviction, by a fine”¹²⁰ The ordinance also states that each day a violation happens will be considered a separate offense.¹²¹ The ordinance also lays out specific definitions to define the following terms: adequately shielded, light source, light trespass, luminaire, and outdoor luminaire to avoid confusion as to what these terms pertain to.¹²²

The City of Presidio also passed its Outdoor Lighting Ordinance during the summer of 2014, which went into effect on January 1, 2015.¹²³ Presidio’s ordinance requires that lights are shielded by pointing them downward and not up past the horizon.¹²⁴ In addition, Presidio requires that all illuminated signs be turned off by 11 p.m., or when a business closes.¹²⁵ Any noncompliance will result in a \$25 fine per day of noncompliance.¹²⁶

In 2011, Governor Rick Perry signed House Bill 2857, which instructs seven counties around the McDonald Observatory in West Texas to adopt outdoor lighting ordinances.¹²⁷ The Act took effect beginning on January 1, 2012.¹²⁸ These ordinances sought to limit light pollution and to help keep the skies clear of this pollution in order to aid in ongoing astronomical research.¹²⁹ The Bill applies to any municipality in a county within fifty-seven miles of the McDonald Observatory.¹³⁰ The Act basically states that counties in these areas shall establish requirements for the shielding of lights and to limit outdoor lighting that interferes with the observations at the McDonald Observatory.¹³¹ The penalty for violating this Act will be that a person has committed a Class C misdemeanor.¹³²

Other areas in Texas are independently coming up with ways to help limit light pollution. For example, the City of Austin is raising

120. *Id.* § 8.1211.

121. *Id.*

122. *See id.* § 8.1201.

123. Alicia Neaves, *Presidio Passes Ordinance Dedicated to Preserving Night Skies*, NEWSWEST 9 (June 27, 2014, 10:25 PM), <http://www.newswest9.com/story/25892398/presidio-passes-ordinance-dedicated-to-preserving-night-skies>.

124. *Id.*

125. *Id.*

126. *Id.*

127. Wren, *supra* note 51.

128. Act of June 17, 2011, 82nd Leg., R.S., ch. 1166, § 1, sec. 229, 2011 TEX. SESS. LAW SERV. (West).

129. Wren, *supra* note 51.

130. Tex. H.B. 2857, 82nd Leg., R.S. (2011).

131. *Id.*

132. *Id.* sec. 229.055(b); *see also* Linda Longo, *Dark Sky: Protecting the Night Sky*, ENLIGHTENMENT (January 27, 2015), <http://www.enlightenmentmag.com/inside-lighting/the-dark-sky-project> (Where in January 2015, Senator Carl L. Marcellino in Long Island, NY had his legislation to reduce light pollution signed into law by the Governor. The law will require the use of fully and partially shielded lights on State Buildings, and streetlights to be directed downward onto streets, walkways, and other public spaces. This is a new law for this area and the Senator is excited that New York is starting to take light pollution seriously.).

funds to decrease light pollution by using smart streetlights instead of the standard bulb.¹³³ By automating their streetlights, Austin's streetlights will be dark sky compliant.¹³⁴ Dripping Springs, Texas, has also taken steps to keep their night sky clear from light pollution and is recognized by the International Dark-Sky Association as a "Dark Sky Community."¹³⁵

IV. RECOMMENDATION

The area of light pollution is a new concept to many, and it is important that people understand what it is, what they are being required to do, and why. As discussed above, current law is a mishmash of case law and local ordinances. While the actions are great first steps, to be effective states need to develop a comprehensive set of laws to govern this ever-growing issue. Regulation at the state level is necessary to ensure that minimum standards are met across the state. It is important to have these minimum standards, but it is also important to give local areas a chance to formulate their own additional rules and regulations. Each area is different, and having the flexibility to add-on to the minimum requirements will ensure that each community gets the best possible protection from light pollution. Legislation should incorporate technological advancements and education as the top methods of addressing statewide light pollution.

A. *States Should Adopt Legislative Guidelines to Address Light Pollution*

This Article recommends that all states adopt statewide legislation that requires each municipality to establish clear guidelines for property owners, such as requirements for redirection of light, shielding of light, redesign or relocation of the light, replacement of the light, or removal of the light completely.¹³⁶ These regulations should be statewide and should have minimum requirements. Each different municipality or location can then tailor the requirements to their needs by following what is required and adding to it in order to accomplish what is most necessary in their area. For example, a rural area will not need the same regulations that a large city, such as Dallas, will need. However, areas in West Texas may need specific regulations for the oilrigs that are present but are not present in downtown Dallas.

A way to structure a light-pollution-regulating body is to look at programs that have similar regulations. For example, the Texas Commission on Environmental Quality ("TCEQ") regulates outdoor burn-

133. Edwin Delgado, *Light Pollution Threatening McDonald Observatory*, MIDLAND REP. TELEGRAM (Aug. 13, 2014, 11:30 PM), http://www.mrt.com/top_stories/article_beebd66e-236b-11e4-a200-001a4bcf887a.html.

134. *Id.*

135. *Id.*

136. See *Ordinance Draft of San Angelo*, *supra* note 116, § 8.1208.

ing.¹³⁷ There is a specific Outdoor Burning Rule that is in the Texas Administrative Code.¹³⁸ This Outdoor Burning Rule gives the general requirements for outdoor burning in Texas.¹³⁹ It also gives information on what is allowed and what is not, along with certain exceptions.¹⁴⁰ This rule is similar to what the state regulation of light pollution should look like. Light pollution regulation should give specifics on what is allowed and what is not. Spelling out these requirements statewide will ensure compliance.

The Outdoor Burning Rule is also a good example because it allows for local ordinances or county regulations to make their own requirements and restrictions in addition to the general rule.¹⁴¹ For example, in the TCEQ educational handout it states: “Your compliance with TCEQ regulations does not mean that other, stricter laws, regulations, or ordinances cannot be enforced by cities, counties, or other jurisdictions. You must comply with all such regulations (e.g., county burn bans) as well as the TCEQ rules.”¹⁴² This allows for local areas to determine what will best fit their community. For example, a rural area will likely have different burning restrictions and regulations than an urban city. The rural area will likely have burning regulations pertaining to the burning of fields for farmers and brush-burning for ranchers. In a big city, they will not have the same type of regulations and may have to regulate the vicinity of neighbors and the problems arising from someone burning something too closely to someone else. These types of issues are similar to the light pollution issues. People in a rural area will likely need different types of lighting regulations and requirements than people in the city. However, having a specified general requirement rule or regulation ensures that all areas in the state meet minimum requirements.

TCEQ also has information regarding penalties for not following the requirements of burn bans.¹⁴³ A person can face \$500 in fines and a Class C misdemeanor if he or she disobeys the rule.¹⁴⁴ There is a hotline for people to report others that are not following the rule.¹⁴⁵ This is a great way to help ensure compliance across the state, especially in areas that are more remote. Local law enforcement officials are another great way to help enforce these regulations. Educating

137. See *Outdoor Burning In Texas*, TEX. COMMISSION ON ENVTL. QUALITY (2008), <https://www.tceq.texas.gov/publications/rg/rg-049.html> (article revised Feb. 2015).

138. *Id.*

139. *Id.*

140. *Id.*

141. *Id.*

142. *Id.* at 9.

143. See *Outdoor Burning: Rules, Regulations and Guidance*, VICTORIA COUNTY TEX., <http://www.victoriacountytx.org/pdf/TFS%20outdoor-burning.pdf> (last visited July 21, 2015).

144. *Id.*

145. *Id.*

law enforcement on the area and training law enforcement to diligently enforce light pollution violations will help ensure compliance.

At a minimum, statewide anti-light pollution acts should include the following guidelines: (1) redirection of lights; (2) shielding of light sources; (3) redesign or relocation of lights; (4) replacement of lights with conforming lights if necessary; (5) or removal of the light completely.¹⁴⁶ Any such legislation should require each municipality to implement ordinances establishing compliance methods and other requirements deemed necessary to the specific area.¹⁴⁷ The municipal ordinance should be required to spell-out specific penalties for violation of the provisions.¹⁴⁸ For example, an appropriate penalty would include the issuance of misdemeanors and fines.¹⁴⁹ Each violation should be considered a separate offense, and each day the provision is consistently violated should also be considered a separate offense.¹⁵⁰ The proposed Act should require local ordinances to define key terms that could be confusing or unknown to the general public so as to educate the public and encourage compliance in helping reduce light pollution. This type of legislation could reduce light pollution and benefit all parties involved.¹⁵¹

B. *Technological Advancements Can Help Address Light Pollution*

Statewide legislation should also encourage the use of the best available technology. Use of more technological advancements and light positioning will help address light pollution. For example, there are numerous ways to remedy the issue of light pollution in the West Texas oilfield. These include glare shields, re-aiming fixtures, and LED lights.¹⁵² There are also revolutionary lighting inventions. One example is the Halo Crown Mount lighting that allows for an extremely focused lighting area that does not disturb adjacent property.¹⁵³ Each of these lighting solutions is a win-win for the sky and for the individual needing the light. The light would not be wasted and create sky glow, but also the visibility on the ground would be en-

146. See *Ordinance Draft of San Angelo*, *supra* note 116, § 8.1208.

147. See generally *id.* § 8.1208 (San Angelo Draft Ordinance establishing compliance methods and other requirements).

148. See generally *id.* § 8.1211 (San Angelo Draft Ordinance creating specific penalties for violation of the provisions of the Draft Ordinance).

149. See generally *id.* (San Angelo Draft Ordinance penalizing violators via misdemeanors and fines).

150. See generally *id.* (San Angelo Draft Ordinance making each violation a separate offense).

151. See generally *id.* § 8.1201 (San Angelo Draft Ordinance defining key terms).

152. Wren, *supra* note 51.

153. APOLLO ENERGY SERVICES, CORP., <http://www.apolloenergy.ca> (last visited July 21, 2015).

hanced.¹⁵⁴ Better ground visibility can lead to fewer accidents and safety hazards.¹⁵⁵

The McDonald Observatory was granted a unique opportunity in July 2013 to work on Pioneer Drilling Rig #29 and install shields, re-aim floodlights, and evaluate effectiveness every time the working rig was moved to a new location.¹⁵⁶ The drilling rig had to take into account the need for adequate lighting on the rig at night so that work could be done safely with good visibility, while still limiting the amount of light pollution.¹⁵⁷ The observatory found that shielding certain lights gave better lighting on the ground, reduced glare, and was a convenient practice.¹⁵⁸ They also found that getting visors or shields for directional floodlights reduced glare and reflected wasteful light downward that previously polluted the sky.¹⁵⁹ They looked at the light towers and determined that mounting height is a major factor in how much light will cover an area and lessen the amount emitted into the night sky.¹⁶⁰ The observatory also determined that LED lights could improve safety and costs and reduce light pollution.¹⁶¹ The overall conclusion was that, with certain practices on the oilrigs, nighttime glow and light pollution could be limited, while adequate lighting and safety can still be maintained.¹⁶²

C. *Education is an Important Tool in Addressing Light Pollution*

Statewide legislation should also encourage education. Education is a big part of making sure the requirements are followed. Currently on the McDonald Observatory website, there is an area called “Dark Sky Initiative.”¹⁶³ There is information on the site that discusses what light pollution is, what can be done about it, and what types of negative effects light pollution can cause.¹⁶⁴ This type of website is important to have for the public to get a better grasp on what is being regulated and what they are expected to do. This Article suggests that on a state website, there are links to this website as well as a state-created website that spells-out specifically what light pollution is and how to comply with regulations. This will aid people in more easily following the lighting requirements and reporting violations.

Another great tool is to use electricity companies to help spread the word. Education for the electricity companies will be important and

154. McDONALD OBSERVATORY, *supra* note 6.

155. *See id.*

156. Wren, *supra* note 51.

157. *Id.*

158. *Id.*

159. *Id.*

160. *Id.*

161. *Id.*

162. *See* Wren, *supra* note 51.

163. McDONALD OBSERVATORY, *supra* note 6.

164. *Id.*

having them on board with the initiative will help get the word across more quickly and efficiently. Car insurance agencies give discounts to good drivers; it would be great if electricity companies gave incentives to people who have no light violations.

Light pollution affects everyone, and there are ways to lessen and even prevent it. If nighttime oilrigs can successfully reduce glare and light pollution while maintaining safety standards and adequate lighting, then the same can be true for many businesses that require artificial lighting at night. The key is to look to the methods that have been proven to be successful and implement them into regulations and standards that can crossover to any industry and residential setting. Ordinances and laws can help with this goal by ensuring that people and businesses are not only educated but are held accountable for their lighting practices. Requirements and penalties are the quickest and most effective way to get the light pollution issue under control. Not only will these requirements and penalties lead to more beautiful night skies, but will also lead to better wildlife systems, individual human health, and quick resolutions of property issues.

V. CONCLUSION

All states should enact statewide legislation because light pollution is an issue that is becoming progressively worse and needs to be solved. Light pollution affects wildlife negatively, specifically migratory birds and sea turtles.¹⁶⁵ It also affects tree frogs, fireflies, and moths.¹⁶⁶ All of these creatures are beneficial to the ecosystem and disruptions in their lives can lead to a much bigger disruption overall.¹⁶⁷ Light pollution negatively affects the health of individuals and can possibly lead to serious medical conditions.¹⁶⁸ These medical conditions can lead to myopia and issues with the circadian clock, such as sleep disorders, breast and prostate cancers, obesity, and early onset diabetes.¹⁶⁹ Light pollution affects property owners because they do not have an appropriate remedy and way to determine if light pollution constitutes a nuisance or a trespass. Light pollution is an issue that currently does not have a significant remedy or way to avoid it when looking at case law. City ordinances and legislation are a more effective way to curtail the issue of light pollution.

The best remedy is to follow what has been done in the West Texas area, and other areas of Texas, that have city ordinances, regulations, and guidelines for outdoor nighttime lighting. To be effective, these ordinances should include specific regulations and penalties for viola-

165. Verlyn Klinkenborg, *Our Vanishing Night*, NAT'L GEOGRAPHIC (Nov. 2008), <http://ngm.nationalgeographic.com/2008/11/light-pollution/klinkenborg-text/1>.

166. Guynup, *supra* note 24.

167. *Id.*

168. See Ploetz, *supra* note 4.

169. Near-Sightedness in Children, *supra* note 39; Chepesiuk, *supra* note 43.

tions of the regulations. A few types of quick and easy solutions to implement in almost any setting are the use of shields, direction of lighting, and LEDs. This will help reduce costs of wasted lighting and will reduce light pollution while maintaining the necessary lights for some areas. Overall, the statewide legislation will help maintain a consistent approach for reducing light pollution and help those who may have a potential claim.