NOTES:

Light Pollution in the United States:
An Overview of the Inadequacies of the
Common Law and State and Local
Regulation

I. INTRODUCTION

“[T]he typical urban or suburban observer might only see a few hundred of the brightest stars, and none of the more elusive objects. We have abused the darkness. We have lost the faint lights.” – Chet Raymo

In the late nineteenth century, Thomas Alva Edison and other scientists engineered what could possibly be one of the greatest inventions of all time – the electric light bulb. Today, the options available in electric illumination have advanced significantly since the first rudimentary bulb. See Collier’s Encyclopedia 719, 722 (MacMillan Educational Co., 1992).

When Edison invented the first practical electric light bulb in 1879, he could hardly have anticipated its transformative effect on American life in the 20th century. Joe Rey-Barreau, Illuminating America’s Century, HFN The Weekly Newspaper for the Home Furnishing Network, May 31, 1999, at 65. The Chairman and CEO of General Electric, Jack Welch, believes “it is impossible to imagine a world without the electric light bulb [and] street lights...” Ann Chambers, GE Backs Edison Preservation Effort, Power Engineering, Mar. 1, 2000, at 16. More than 100 years ago in 1893, the newly established General Electric Company boasted that “its lamps extended ‘in an unbroken line around the earth; they shine in the palace of the Mikado as well as in the Opera House of Paris.’” Thomas F. O’Boyle, At Any Cost: Jack Welch, General Electric and the Pursuit of Profit 23 (1998). Even today, General Electric manufactures more than fifty percent of the lightbulbs sold in the United States. See id. at 57. As this Note will argue, Mr. Welch’s cast of a rosy glow on the lighting industry may not be as harmless as he and his company portrays it to be. See infra notes 44-94 and accompanying text.

The various modes of lighting are of crucial importance because electric illumination is used in virtually all areas of daily life, including in the home and automobile, for commercial purposes, and within the community.4

The proliferation of outdoor light use, particularly that light projecting into the night skies, has developed into a relatively new area of environmental degradation—light pollution.5 Astronomers first noticed light pollution approximately one century after Edison’s historical accomplishment.6 Often described as “the presence of excessive illumination in locations where it is not desired,”7 light pollution has been discovered to have

4. See id. at 720.
5. See April Reese, Take Back the Night, E MAGAZINE, May 2000, at 22. See also Penny Jewkes, Light Pollution: A Review of the Law, J. PLAN. & ENV’T L., Jan. 1998, at 10 (describing the non-legal treatment of light pollution in England). “In law, however, the term ‘light pollution’ is not recognised, although the potential and actual consequences of inappropriate lighting may be subject to various legal responses.” Id. Across the United States, there is a growing awareness of and reaction to light pollution as an environmental problem. See, e.g., Doug Irving, Mayor Wants to Tone Down Glow, THE OREGONIAN, Nov. 21, 2000, at D2 (Portland, Oregon); Graeme Zielinski, Astronomers Try to Illuminate Region on Threats to Night Skies, WASH. POST, Sept. 25, 2000, at B1 (Washington, D.C., Virginia, and Maryland); Jay Apperson, Dim View of Life’s Bright Lights, THE BALT. SUN, Sept. 17, 2000, at 1A (Maryland); Dimming Light Pollution, PROVIDENCE J.-BULL., Dec. 18, 2000, at 4B (Block Island, Rhode Island); Terri Williams, Astronomer Fights for ‘Good Sky,’ THE DALLAS MORNING NEWS, Dec. 22, 2000, at 1M (Mesquite, Texas); Dark Crusade: Flower Mound Urged to Curb Light Pollution, THE DALLAS MORNING NEWS, Aug. 10, 2000, at 1H (northern Texas); Chris Reinolds, Bright Lights in Need of Dimmer Switch, THE ATLANTA J. & CONST., Nov. 9, 2000, at 9 (Atlanta, Georgia and surrounding areas); Juliet V. Casey, Report Critical of Night Lighting, ALBUQUERQUE JOURNAL, Aug. 26, 2000, at 1 (New Mexico); Arthur H. Rotstein, Stargazers Call for Lights Out, THE DETROIT NEWS, Sept. 1, 2000, at 12 (reporting on developments in Arizona); Mary Giunca, Glaring: We’re Being Blinded By Our Own Light, WINSTON-SALEM J., Oct. 22, 2000, at 1 (North Carolina); Let There Be Less Light, THE CAP. TIMES, Oct. 15, 1999, at 10A (editorial describing light pollution in Wisconsin); Joe Bauman, Active Group in Utah Valley Scans the Skies, DESERET NEWS, July 5, 2000, at B2 (Utah); Keri Buscaglia, Light Pollution is a Glowing Concern, Chi. TRIB., Jan. 31, 2001, at 4 (noting light pollution concerns of suburban Chicago residents, elected government officials and community planners).
6. See Joe Bower, The Dark Side of Light, AUDUBON, Mar.-Apr. 2000, at 94 (one of the more recent articles published about light pollution, this featured article provides general light pollution information as well as specific data related to how birds are affected by lights).
7. Michael J. Brown, Light Pollution, ENVT L. N.Y., Apr. 1998, at 49. The British Astronomical Association and other organizations in England have identified three categories of light pollution: sky glow, glare and light trespass. See Jewkes, supra note 5, at 10. In addition to the three aforementioned problems associated with light pollution, energy waste is considered a fourth problem. See Brown, supra this
negative effects on many things, including humans, wildlife, the environment and energy consumption. As a result, some states and several cities and towns are beginning to react with legislation aimed to curb light pollution.

In Part II, this Note will outline the development of electric light and its uses. Despite the benefits of electric lighting, Part III will address the harmful impacts of light on our natural environment. Part IV discusses the history of early and more recent common law claims of excessive lighting, argued as either trespass or nuisance claims. Part V surveys the recent developments in state statutory legislation and local ordinances that have begun to alleviate the problem of excessive light.

Since the results and remedies of light as trespass or nuisance claims under the common law have been inconsistent and insufficient, and state and local regulations have been relatively slow to react to the growing problem of light pollution, this Note will argue that many of the issues associated with excessive light will increase and persist without more uniform and more stringent legislation across jurisdictions. Part VI of this Note suggests that because results and remedies in the more familiar types of pollution cases argued under the common law will not likely be sufficient, and that because state and local regulations for light pollution are too inconsistent among jurisdictions, there may soon be a need for federal legislation regarding light pollution similar to some provisions of the Noise Control Act of 1972. Minimally, federal legislation should (1) aim to study more adequately the effects of light pollution as it relates to humans, wildlife, and dark skies as a natural resource, and (2) provide for a more

2002] LIGHT POLLUTION 987

8. See Marina Murphy, Revealing the Dark Side of Light: Artificial Light, CHEMISTRY AND INDUS., Oct. 2, 2000, at 627 (stating that “[e]xcessive artificial lighting squanders resources, fouls the air, blocks our view of the night sky and has adverse effects on both animal and human health”). See also Reese, supra note 5, at 23; Bower, supra note 6, at 94-96 (highlighting some bird species, such as passerines and an endangered Hawaiian seabird, that have been negatively affected by light pollution).

9. See, e.g., infra note 188-89 and accompanying text. See also Daniel M. Nonte, Summerfield Decides to Turn Down Lights, Keep Small-Town Feel, GREENSBORO NEWS & RECORD, Sept. 6, 2000, at B7 (announcing a recently enacted Summerfield, North Carolina ordinance aimed at curbing light pollution).

10. See infra notes 17-43 and accompanying text.

11. See infra notes 44-94 and accompanying text.

12. See infra notes 95-184 and accompanying text.

13. See infra notes 185-262 and accompanying text.


15. See infra notes 295-300 and accompanying text.
uniform system of regulating light pollution, which will be crucial as it relates to reducing harm to humans and the environment around the nation and the world. 16

II. DEVELOPMENT OF ELECTRIC LIGHT

Society has used light in various forms including fire, torches, candles and oil lamps for many millenniums, 17 but it was not until the latter part of the nineteenth century that scientists began having success with electrical means of illumination. 18 Although the first incandescent lamps were rudimentary and unsuitable for commercial use, in 1879 Thomas Alva Edison pioneered a practical incandescent light bulb that has served as a model for modern lighting. 19 Today, the three major sources of electrical illumination are the incandescent, electric-discharge and fluorescent lamps. 20

16. See infra notes 301-03 and accompanying text.
18. See COLLIER’S ENCYCLOPEDIA, supra note 2, at 719, 722. In 1802, Sir Humphry Davy first demonstrated that electric current passed through strips of metal could create incandescence from the heat created. See id. At that point in 1802, however, there was no efficient way to utilize this source of light. See id.
19. See MARIL, supra note 17, at 73-74. “October 21, 1879 is cited as the date of the invention of the first successful incandescent light bulb.” Id. at 74. Interestingly, the light bulb was looked upon as a novelty item which was to be seen and admired but not to be taken seriously. The earliest electric fixtures either used broad flat shades which did nothing to shield the bulb’s glare, but rather either framed the light or prevented it from escaping towards the ceiling. Some used no shades at all. The major difference in the light offered by the electric bulb was that it focused downward, rather than upwards like the gas fixtures and the kerosene fixtures generally in use.
Id. This is somewhat ironic given that we appear today to be in the predicament that too much light is, in fact, still shining upwards. See infra notes 44-94 and accompanying text. For an interesting account of one modern day historian’s attempt to study pre-industrial age, pre-electric light nighttime hours, see Joyce Wolkomir & Richard Wolkomir, “When Bandogs Howle & Spirits Walk”: Studying the Nighttime Hours Across the Centuries, Says Historian Roger Ekirch, Sheds Light on Preindustrial Society, SMITHSONIAN, Jan. 1, 2001, at 38. In his studies, Ekirch has discovered the meaning of a dark, light-free night to people throughout history, including the consideration of night as a separate season or a time when spirits did evil things. See id. at 40-41.
20. See COLLIER’S ENCYCLOPEDIA, supra note 2, at 722-24. Incandescent lighting is the primary source of light for residential use. See id. at 720. See also Energy Efficiency and Renewable Energy Network (EREN), U.S. Department of Energy, Energy Efficient Lighting, available at http://www.eren.doe.gov/erec/facsheets/eelight.html (last visited Apr. 19, 2002). This type of lighting is the least expensive to buy, most expensive to operate and is more inefficient than other types. See id. In
The development of electric illumination has allowed individuals, communities, and commercial entities to conduct activities that were once restricted to daylight hours. Personal use of electric lighting includes indoor and outdoor residential use, as well as interior and exterior lighting of automobiles. In fact, residential consumption of electricity for lighting has increased forty percent since 1970. Additionally, communities use lighting on streets and buildings to help provide for additional safety at night. Lighting roadways aims to minimize dangers to drivers and pedestrians, while lighting buildings, parking lots and other outdoor areas is intended to increase safety at night by discouraging crime.

Commercial use, indoor lighting is primarily comprised of fluorescent lamps. See id. Outdoor lighting for safety and commercial use is largely attained through high-intensity discharge and low-pressure sodium lamps. See id. Many of today’s lighting regulations designate what kind of light bulbs and fixtures may be used. See, e.g., N.M. STAT. ANN. § 74-12-6 (Michie 2000) (“[n]o new mercury vapor outdoor lighting fixtures shall be sold or installed after January 1, 2000”); ARIZ. REV. STAT. ANN. § 49-1104 (West 1999) (“[n]o new mercury vapor outdoor light fixtures shall be installed after the effective date of this section. No replacement equipment other than bulbs for mercury vapor light fixtures shall be sold . . . .”). Phaedra Haywood, New Lights Installed to Keep Skies Dark and Stars Bright, SANTA FE NEW MEXICAN, Jan. 17, 2001, at P1.

In order to demonstrate to the public that electric lighting was practical, Edison developed the first power company to provide current for lights installed in New York City in 1882. Electric incandescent light spread through the country. The demand for light encouraged the formation of power companies, and the availability of current encouraged greater use of electric light.

RAMSEY, supra note 17, at 5.

The average single-family home currently consumes 1,500 kilowatt-hours a year for lighting . . . .” Id.

See Bower, supra note 6, at 96. “The average single-family home currently consumes 1,500 kilowatt-hours a year for lighting . . . .” Id.

There are an estimated fifteen million street lights in the United States, and over sixty million worldwide. See Andrew Meadows, Street-Light Device Company to Relocate to Lexington, S.C., THE STATE, July 9, 1999, at CS.

25. See Brown, supra note 7, at 58. However, “[m]unicipalities often install numerous street lights without clear criteria for how much lighting is warranted. A major goal of increased light is typically enhanced traffic safety, but safety can actually be compromised by glare . . . .” Id.

26. See id. at 58-59. Generally, people feel that increased light means increased safety, and as a result municipalities are often asked to provide additional lighting in the community. See id. at 59. However, there does not appear to be an increase of
Commercial entities also use electric lighting for various business-related purposes such as safety, advertising and emphasizing architectural features.\(^\text{27}\) Certain entities, such as airports,\(^\text{28}\) sports arenas,\(^\text{29}\) parking

crime at night when it is dark. \textit{See id.} See also U.S. DEPT. OF JUSTICE, CRIMINAL VICTIMIZATION IN UNITED STATES, 1998 STATISTICAL TABLES: NATIONAL CRIME VICTIMIZATION SURVEY, NCJ 181585 at Tables 59-60 (2000). (reporting that of the incidents for which there is known data, 54.6% of violent crimes occurred during the daytime while only 44.2% occurred at night, and 37.2% of property crimes occurred during the day while only 36.8% occurred at night); Reese, \textit{supra} note 5, at 23 (A representative of the International Dark Sky Association (IDA) pointed out that “overly bright security lights can actually force neighbors to close shutters, which means that if any criminal activity” occurs, it will go unnoticed). Further, glaring lights can prevent drivers from seeing clearly, thus diminishing safety on the roads. \textit{See Brown, supra} note 7, at 49.

\(^\text{27}\) \textit{See COLLIER’S ENCYCLOPEDIA, supra} note 2, at 722. Ironically, Discovery Communications, the parent company of a cable television channel that airs science programs, will build its new global headquarters near Washington, D.C. with a 300-foot tower shooting a strong beam of light into the evening sky. \textit{See Bill Triplett, Astronomers Fume Over Night Light, 405 NATURE 987, 987 (June 2000)} (discussing how the addition of Discovery Communications’ light shooting tower will only add more light pollution to the already overlit Washington, D.C. area).

\(^\text{28}\) \textit{See, e.g., Ivanpah Valley Airport Public Lands Transfer Act: Hearing on S. 930 Before the Subcomm. on Forests and Public Land Management of the Senate Comm. on Energy and Natural Resources, 106th Cong., (1999) (statement of John Reynolds, Regional Director, Pacific West Region, National Park Service, U.S. Department of the Interior). Mr. Reynolds, in his testimony to persuade the subcommittee to veto a bill that would allow an airport on certain public lands, stated that, among other things,}

Another potentially significant impact to the Mojave National Preserve from the proposed airport is the deterioration of the natural quiet and the current night sky darkness that visitors enjoy at the park. Light pollution is becoming a recognized problem to many rural and rustic areas, such as the Mojave Desert. Currently, opportunities to enjoy natural quiet and the natural darkness of the nighttime are being slowly impacted by development ... a nearby airport with runway lights, tower lights, and other lighting requirements would adversely change the dark night landscape and quiet character of the Mojave National Preserve.

\textit{Id.}

\(^\text{29}\) \textit{See, e.g., Hansen v. Indep. Sch. Dist., 98 P.2d 959 (Idaho 1939) (involving night baseball games at a high school field); Bd. of Educ. v. Klein, 197 S.W.2d 427 (Ky. 1946) (involving night football games at a high school field); Rhudy v. Fairfield Univ., 2000 WL 1269296, at *5 (Conn. Super. Ct. Aug. 18, 2000) (granting injunctive relief for individuals who lived adjacent to Fairfield University’s University Field which used lights bright enough “as though a team of searchlights [were] pointed directly at [the plaintiff’s home]”); Amphitheatres, Inc. v. Portland Meadows, 198 P.2d 847 (Or. 1948) (involving nighttime racing at a race track, discussed infra at notes 124-40, 182-84); Fuentes v. Bd. of Supervisors, 2000 WL 1210446 (Va. Cir. Ct.
LIGHT POLLUTION

lots, shopping centers and gas stations, are notorious for using a significantly greater amount of outdoor lighting for business than other industries due to the nature of their activities. In fact, "in commercial buildings, more electricity is now used for lighting than anything else." Despite the many beneficial uses of electric light, there are some economic drawbacks. Certainly, the amount of money spent to keep the lights on is costly. According to the U.S. Department of Energy, an estimated $37 billion is spent on electricity for lighting annually in the United States. This figure represents one-quarter of all money spent on electricity. Furthermore, since many lighting structures are either poorly constructed or give off light that is aimed in the wrong direction, much of what the United States spends on outdoor lighting is wasted. Estimates

2000) (involving up to fourteen lighted athletic fields to be built under special permit in a residential-conservation district).

30. See, e.g., Essick v. Shillam, 32 A.2d 416 (Pa. 1943) (involving a parking lot as part of a supermarket business in a residential area that would be illuminated at night). See also Jay Apperson, Dim View of Life’s Bright Lights, BALT. SUN, Sept. 17, 2000, at 1A. “The lights in the Towson Place parking lot – described as the aurora borealis of Baltimore County by one government official – have brought complaints from [local residents].” Id. See also infra note 157 and accompanying text (noting the outcome in Hansen v. Indep. Sch. Dist. No. 1).

31. See, e.g., Richard Turcsik, Blinded by the Light: Reducing Exterior Lighting Makes for Lower Energy Costs and Better Neighbors, PROGRESSIVE GROCER, Aug. 1, 2000, at 57 (stating that “supermarket and mall operators are putting in lamps . . . which are completely inappropriate for the majority of parking lots,” and “some businesses – notably restaurants, gas stations and convenience stores – are now lighting their properties with [more light than they need]” for customers to feel safe).

32. See, e.g., Indian Ref. Co. v. Berry, 10 S.W.2d 630 (Ky. 1928) (concerning adjacent filling station’s lights shining on plaintiff’s property); Sprout v. Levinson, 148 A. 511 (Pa. 1930) (involving a filling station in a commercial area allowed to operate at night with outdoor lights); B.J.’s Wholesale Club, Inc. v. Hutchings, No. CA 99-00732, 2000 Mass. Super. LEXIS 430 (Mass. Super. Ct. Sept. 27, 2000) (involving abutters to a B.J.’s Wholesale Club store who were concerned that the addition of a gas station would bring several problems, including glaring lights).

33. Bower, supra note 6, at 96. In the mid-1990s, U.S. commercial buildings used more than 350 billion kilowatt hours per year in electricity for lighting, although the predominant use of light is indoors. See Energy Information Administration, U.S. Department of Energy, At Home and at Work: What Types of Lights are we Using?, available at http://www.eia.doe.gov/emeu/cbecs/lit-type.html (last visited Apr. 19, 2002).

34. “Lighting accounts for 20% to 25% of all electricity consumed in the United States. An average household dedicates 5% to 10% of its energy budget to lighting, while commercial establishments consume 20% to 30% of their total energy just for lighting.” See Energy Efficient Lighting, supra note 20.

35. See id.

36. See id.

37. See Let There Be Less Light, CAPITAL TIMES, Oct. 15, 1999, at 10A (stating
show that one-third to one-half of all light emitted in outdoor use shines somewhere other than on its intended target. Because this light is being cast into areas where it is not needed, the United States is expending approximately one to two billion dollars a year on wasted energy. Additionally, it not only costs the United States actual dollars to keep the lights on, but doing so also requires depletion of precious natural resources. The Environmental Protection Agency indicates that the majority of lights are illuminated through the burning of coal and oil. Not only are these non-renewable energy sources, they also create atmospheric pollution.

III. IMPACTS OF LIGHT POLLUTION

A. Development of Light Pollution as a New Environmental Concern

Since the 1970s, there has been a growing concern about the amount of light emitted from various sources. Astronomers and others have coined the phrase “light pollution” to describe the phenomenon of wasted light that lights are either too bright or the light is not directed where it is needed).

38. See Reese, supra note 5, at 23 (estimating that “50 percent of the light emanating from street lamps misses its intended target”); see also Bower, supra note 6, at 96 (reporting that one-third of light is wasted due to shining upward or sideways rather than down where it is needed).

39. See Reese, supra note 5, at 24 (citing International Dark Sky Association’s statistics of dollars wasted due to inefficient lighting); see also Mary Giunca, Glaring: We’re Being Blinded By Our Own Light, WINSTON-SALEM JOURNAL, Oct. 22, 2000, at 1.

40. See Bower, supra note 6, at 96.


42. See Bower, supra note 6, at 96. One of the primary uses of electricity for residential, commercial, and industrial end-users was for lighting, and in order to generate this electricity, United States utilities consumed fossil fuels. See U.S. EMISSIONS INVENTORY – 1999: INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-1997, at 2-8 (EPA 236-R-99-003, April 1999). Electric utilities generally rely on carbon intensive coal for the majority of their primary energy output, and used 87% of all coal consumed in 1997. See id. at 2-10.


44. See Bower, supra note 6, at 94. “By the accounts of local and state legislators, light pollution has gained prominence in recent years and has become affixed to the larger debate over sprawl.” Graeme Zielinski, Astronomers Try to Illuminate Region on Threats to Night Skies, WASH. POST, Sept. 25, 2000, at B04.
being cast into the atmosphere, which ultimately hinders astronomical observations. This relatively new and lesser known environmental concern has been described as “the artificial light that illuminates more than its intended target area,” “sky glow caused by the scattering of artificial light in the atmosphere” or, in more descriptive words, “sky glow, [or] the eerie radiance that emanates from settled areas.” In fact, the United States generates so much wasted and upward shining light that the nation’s borders and major metropolitan areas appear visible on satellite images taken at night.

Light pollution is not limited to the United States. Normally, 2,000 stars would be visible in northern Europe if it were not for light pollution;
Unfortunately, most individuals can only see ten percent of those stars.51 Scientists in northern Europe warn that within twenty-five years, no stars will be visible at all.52 Similar to satellite photographs taken of the United States, there are many other areas around the globe that appear as bright white dots, revealing that light pollution is a worldwide phenomenon.53 In addition to astronomers, others around the United States have begun to recognize light pollution as an environmental concern.54 Organizations within the United States and abroad, including the International Dark-Sky Association55 and the Fatal Light Awareness Program,56 have officially organized to study light pollution, educate others about its impact, and push for increased legislation that would reduce the “eerie radiance.”57

B. Harmful Effects of Artificial Light and Light Pollution58

51. See Geary, supra note 45, at 38.
52. See id.
53. See Daly, supra note 49, at 18-19. Lights in Japan, England, Scotland, France and Spain appear clearly on satellite photographs, while some areas such as Antarctica and interior South American forests do not reflect any light. See id.
54. See, e.g., Doug Irving, Mayor Wants to Tone Down Glow, PORTLAND OREGONIAN, Nov. 21, 2000, at D02 (mayor of rural community has recognized light pollution as a growing problem).
55. See generally International Dark-Sky Association, at http://www.darksky.org/ida/index.html (last visited Apr. 19, 2002). The mission of the International Dark-Sky Association (IDA), a membership-based nonprofit organization, is “[t]o preserve and protect the nighttime environment and our heritage of dark skies through quality outdoor lighting.” Id. On its website, the IDA maintains a large supply of information sheets to educate the public about light pollution, as well as a resource of links to other websites that can provide additional information. See Information Sheets, at http://www.darksky.org/ida/infoshts.html.
56. See generally Fatal Light Awareness Program, at http://www.flap.org/home2.htm (last visited Apr. 19, 2002) (stating the mission of the Fatal Light Awareness Program (FLAP) is “[w]orking to preserve the lives of migratory birds in urban areas”). Information and links on this website include a listing of birds at risk, as well as mortality reports and photos from recent collisions due to illuminated structures. See id.
57. See Local & Regional IDA Sections, at http://www.darksky.org/ida/ida_2/info140.html (last visited Apr. 19, 2002) (providing a list of dark sky protection and light pollution prevention advisory groups and councils). Formal and informal groups have organized to reduce light pollution in countries such as Australia, Canada, Japan and several European countries. See id. More than seventeen state and regional chapters of IDA exist in the United States. See id.
58. For purposes of this Note, the various negative impacts of light will focus only on how light harms humans, wildlife and the dark sky as a natural resource. However, when drafting new legislation to reduce light use, all factors should be considered by the legislature. Pollution and economic waste generated as a result of electricity used to keep lights on are also significant side effects of light pollution, but
Scientists are just now beginning to realize the impacts of light and light pollution in various contexts. Over the past thirty years, astronomers were among the first to recognize that light pollution has impaired our visibility of the heavens. Because many, if not most, astronomical observatories are relatively near areas emitting some light, almost all astronomers have been affected by light pollution. The nature of an astronomer’s work – observing the night skies – requires a relatively light-free environment. Otherwise, stars and other astronomical phenomena cannot be seen by earth-bound devices, even with the most powerful instruments.

Under normal light-free conditions, there are approximately 2,500 stars that are visible in the night sky in the United States. Unfortunately, only ten percent of Americans today can actually see the majority of these stars.
from where they live.65 In suburban areas, only ten percent of the stars in the Milky Way are visible, and even less can be seen from more urban areas.66

Many consider the night sky and its contents a natural resource.67 For the National Park Service (NPS)68, this natural resource is a vital part of the activities sought by visitors to its parks.69 To determine whether and how light pollution was impacting star gazing within the NPS parks, the National Parks and Conservation Association (NPCA)70 conducted a survey of parks within the NPS and found that of those responding to the survey, ninety-four percent stated that “a dark night sky is important to that

65. See Bower, supra note 6, at 94.

66. See Reese, supra note 5, at 22-23 (attributing reduced visibility of stars in suburbs to factors such as overlit shopping center parking lots); see also Graeme Zielinski, Astronomers Try to Illuminate Region on Threats to Night Skies, WASH. POST, Sept. 25, 2000, at B1 (in an area forty miles from Washington, D.C., at least fifty degrees of constellations in the night skies are obscured by light pollution).

67. See Apperson, supra note 5, at 1A. Both amateur and professional astronomers are now realizing the importance of the dark sky to their night observations, and according to one amateur astronomer, “[t]he stars are as much a part of nature as the trees are.” Dana Tofig, Roswell May Dim Lights to Brighten Stars, THE ATLANTA JOURNAL, Oct. 15, 2000, at C1. Believing this natural resource to be important enough to protect with legislation, New Mexico has passed legislation to protect the dark skies. See John Buting, The Starry Night: Santa Fe’s Summer Milky Way Among World’s Best, THE SANTA FE NEW MEXICAN, July 28, 2000, at C2. Even rural Vermont is trying to protect its dark skies that have yet to be impacted by light pollution. See Clair Wood, Light Pollution Has Unknown Consequences to Nature, BANGOR DAILY NEWS, Aug. 3, 2000, available at 2000 WL 22131087. “[Local opponents] are vigorously opposed to a proposed new prison in Springfield[, Vermont] for fear that its lights will diminish stargazing from nearby Breezy Hill. Stellafane, a celebrated festival of the stars that attracts thousands, has been held at Breezy Hill since 1926.” Id.

68. The National Park Service is a bureau of the U.S. Department of the Interior, and its mission has been codified at 16 U.S.C. §§ 1-4 (1994). See also Richard J. Ansson, Jr., Funding Our National Parks in the 21st Century: Will We be Able to Preserve and Protect Our Embattled National Parks?, 11 FORDHAM ENVTL. L.J. 1, 5-7 (1999) (providing a brief description of the NPS mission and some of the problems it faces today, including noise pollution).

69. See NPCA Survey Finds Light Pollution Threatens National Park System, supra note 64. “Star gazing is a connection to humanity’s earliest curiosity about our place in the universe. It is practically impossible to see the stars from most cities, but now, clear night vistas in our national parks are an important resource that is literally fading from sight.” Id. (quoting NPCA President, Thomas Kiernan).

70. See id. The National Parks and Conservation Association, the United States’ only private nonprofit citizen organization, is the leading park advocacy group in the United States that is “dedicated solely to preserving, protecting and enhancing the U.S. National Park System.” Id.
2002] LIGHT POLLUTION

park’s purpose and visitor experience.”71 More importantly, approximately seventy percent of those responding to the survey indicated that light pollution is a problem in four of the five United States regions within the NPS.72 In the Northeast, Southeast and Midwest regions of the United States, light pollution is an even greater problem due to the higher concentration of urban areas.73

In addition to diminishing the dark sky as a natural resource for amateur and professional astronomers alike, light pollution harms other aspects of our natural world as well. Since many species of migrating birds depend on the constellations to guide them during their migrations,74 “artificial light will cause them to fly off course, often with disastrous results.”75 The Fatal Light Awareness Program (FLAP), an organization based in Toronto, Canada estimates that “at least 100 million birds are killed annually by flying into manmade structures.”76 It is believed that the birds are using the manmade light sources as a guide rather than the constellations upon

71. Id.
72. See NPCA Survey Finds Light Pollution Threatens National Park System, supra note 64. “One-third . . . of these parks consider light pollution a moderately serious or very serious problem.” Id.
73. See id. The NPS concentrates more of its efforts to curb light pollution in the Pacific and Rocky Mountain areas so that it can take a proactive approach in these areas where light pollution is not quite as prevalent. See id. As a result of the NPCA studies on light pollution, the NPS is currently collecting data that will measure the brightness of light that is interfering with stargazing at five national parks. See William A. Updike, Agency Begins Light Pollution Monitoring: NPS Initiates a Program to Address the Loss of Dark Skies, NAT’L PARKS CONSERVATION ASS’N MAG., Sept.-Oct. 2000, at 11. This and other data resulting from the survey may help park officials to work with local communities to develop legislation that will reduce light pollution. See id. See also Chad Moore, Light Pollution to be Studied in Parks, IDAHO STATESMAN, Oct. 20, 2000, at 10 (reporting that the NPS will take its studies nationwide, and will conduct research in at least eight parks in order to determine how best to deal with light pollution that is affecting the view of many stars).
It seems unlikely that a young bird could recognize the star pattern of the whole sky, and indeed, research suggests that only one small part of the sky is being used. Experiments with North American indigo buntings have shown that young birds need to watch the starry sky and to find out which part apparently rotates the least. Id. at 132.
75. Wood, supra note 67. In 1954, 50,000 birds were killed after following an Air Force beacon and ultimately flying into the ground; in 1981, 10,000 birds similarly died when they were guided by the floodlights of a smokestack in Canada. See id. See also Bower, supra note 6, at 94-95.
76. Bower, supra note 6, at 95. Of the 1,500 birds that have crashed into Chicago’s McCormick Place Exposition Center, there were 141 different species identified. See Wood, supra note 67.
which they would ordinarily rely.\textsuperscript{77}

Migrating birds are not the only wildlife that rely on natural nighttime light sources for specific life functions\textsuperscript{78} or that are otherwise negatively affected by artificial light.\textsuperscript{79} Sea turtles rely on “visual brightness cues to find the sea.”\textsuperscript{80} Along a large portion of Florida’s coast, a region of the continental United States where sea turtles occur in the greatest numbers,\textsuperscript{81} there is prolific artificial beachfront lighting.\textsuperscript{82} This artificial lighting and an accompanying “urban skyglow” from bright and concentrated inland light sources misleads nesting females from the ocean and often fatally misguides hatchlings trying to make their way back to the ocean once born.\textsuperscript{83}

Still other wildlife can be affected by artificial light sources.\textsuperscript{84} Moths, one of the great nighttime pollinators in nature,\textsuperscript{85} are also attracted to

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{77} See Bower, supra note 6, at 94.
  Night-migrating birds may also be attracted to large, bright lights and in North America huge flocks of wood warblers are sometimes killed as they swarm about lighthouses or airport searchlights, apparently unable to escape from the beam. . . . Why they should be attracted to the lights is not known, unless they too navigate by means of light-compass orientation.
  Cloudsley-Thompson et al., supra note 74, at 135.

\item \textsuperscript{78} See generally Cloudsley-Thompson et al., supra note 74. For example, some fish species are also believed to use astral or star navigation as a means to migrate. See id. at 24.

\item \textsuperscript{79} In one of the few cases where a court has used the phrase “light pollution,” the court in City of Chula Vista considers the least tern bird species, which might be impacted by “[n]oise and light pollution from development,” as it decides whether a development project was appropriately denied. City of Chula Vista v. California Coastal Commission, 183 Cal. Rptr. 909, 921-22 (Cal. Ct. App. 1982).

\item \textsuperscript{80} Katherine R. Butler, Comment, Coastal Protection of Sea Turtles in Florida, 13 J. LAND USE & ENVTL. L. 399, 413 (1998).

\item \textsuperscript{81} See id. at 400.

\item \textsuperscript{82} See id. at 412.

\item \textsuperscript{83} See id. at 412-13. When sea turtle hatchlings do not make it to the ocean due to their reliance on the artificial light, they can die from exhaustion, dehydration and predation. See id. See also Bower, supra note 6, at 96 (quoting a marine scientist who stated, “[the sea turtles’] reliance on light is so strong that they’ll continue heading to a light source, even if it’s an abandoned fire that burns them alive”).

\item \textsuperscript{84} See, e.g., Steve LaRue, Biologists Survey How Well Local Reptiles and Amphibians Are, THE SAN DIEGO UNION-TRIB., Dec. 27, 2000, at F1. The California glossy snake and the western long-nosed snake, both nocturnal species, have been found to be “missing from coastal areas where there is a lot of light pollution from cars and houses.” Id. Scientists believe that predators may have been better able to catch these prey, once very common in the region during the 1920s and 1930s, due to the abundance of light in the snakes’ natural habitats. See id.

\item \textsuperscript{85} See Cloudsley-Thompson et al., supra note 74 at 140-41. “Moths are the main agents of nocturnal pollination in the temperate regions.” Id. at 140.
\end{itemize}
\end{footnotesize}
lights. Wasted time at these light sources creates a loss in energy that would otherwise be used to attract a mate. For other animals, disrupted foraging, reproduction, circadian rhythms, and hormone levels may all find their causes to be in excessive artificial light in their natural environment. As the awareness of light pollution grows, the need for additional research and findings indicating the potentially adverse effects on wildlife will also increase.

86. See id. at 135. Some animals use “light-compass orientation” as a way to navigate at night. Id. By keeping a light source, such as the sun or moon, “in the same part of their field of vision, [animals] maintain a constant angle to it as they move.” Id.

It is this which causes moths to collide with street lamps and lighted windows at night, for they tend to apply light-compass navigation to any source of light . . . [If the moth] orientates to a nearby source of light, it must correct its angle as it goes past the light and consequently begins to move in a circle around it, then in a steadily diminishing spiral until it finally strikes the light. Id. See also Geary, supra note 45, at 38. Although the death’s-head hawk moth’s normal nocturnal migratory route stretches from Africa to Scandinavia, this species has been observed to fly off course over France and Belgium. See id. This diversion, believed to be caused by the moths’ attraction to brightly lit sports complexes and shopping centers, often results in death to those moths flying too close to the heat generated by the intense lights. See id. See generally, Kenneth D. Frank, Impact of Outdoor Lighting on Moths, 42 J. LEOPIDOPTERISTS’ SOC’Y 63-93 (1988) excerpt available at, http://www.darksky.org/ida/info109.html (last visited Apr. 19, 2002).

87. See Bower, supra note 6, at 96. This attraction to light may be what is causing some species’ populations to decline in the United States. See id. Moths may lay their eggs in areas where they will not survive. See Wood, supra note 67. See also Kathleen Daminger, Shedding Light on Moth Behavior, LANCASTER NEW ERA, July 12, 2001, at 11 (noting that male moths waste precious time when attempting to find female mates due to their erroneous reliance on street lights rather than the moon or bright stars).

88. For example, firefly populations are facing reduction due to the interference of light pollution with their mating patterns. See Susan Okie, A Spotlight on Fireflies, ORLANDO SENTINEL, July 22, 2001, at G6. Photoperiodic behavior, abnormal responses to artificial light, can affect not only migrating patterns, but also reproduction and foraging behavior. See Wood, supra note 67. Hormonal levels of animals may be altered by exposure to light and “‘anything that alters the hormonal levels will bring enormous changes.’” Id. See also Geary, supra note 45, at 38 (stating that research conducted by the French Astronomical Society has indicated that “exposure to powerful floodlights can interfere with the circadian rhythms of plants and disorient migratory birds and insects”). See generally CLOUDSLEY-THOMPSON ET AL., supra note 74, at 12-22 (discussing the role and mechanics of circadian rhythms in wildlife).

89. See Aili Petersen, Night Lights, AM. SCIENTIST, Jan. 1, 2001, at 24. For all the buzz, little research has been done on other ecological effects of light pollution – for instance, its impact under water. One aquatic ecologist, however, is currently investigating the effects of light pollution in lakes . . . [T]hese areas, along with coastal waters, are at higher risk than other habitats in developed areas because they are unshielded and openly exposed to light.
Scientists also believe that humans are adversely affected by excessive light as well. \footnote{See Wood, supra note 67. Two separate scientific journals have recently published articles that identify humans as being more sensitive to light than what was previously believed, and that human circadian rhythms can be disrupted by exposure to light. \textit{See id.}} Drivers may be temporarily blinded by glare given off by lights and thus prone to accidents. \footnote{See \textit{Reese}, supra note 5, at 23.} Studies also indicate that light present during sleeping hours may disrupt internal clocks and hormone levels. \footnote{See \textit{Bower}, supra note 6, at 95. Disruption of circadian rhythms can create changes in blood and urine chemistry, behavior and melatonin production. \textit{See id.} Furthermore, some scientists believe that “chronic disruptions in melatonin production – such as those caused by sleeping in a room that’s bathed in a streetlight’s glow – might contribute to the development of ‘hormone-related’ cancers, including breast cancer.” \textit{Id. See also N.A. Kerenyi et al., Why the Incidence of Cancer is Increasing: The Role of ‘Light Pollution,’ 33 MED. HYPOTHESES 75 (1990) (hypothesizing that the rapid growth rate of cancer incidences correlates to the increase in exposure to light, which reduces melatonin production, over the last 100 years).}} Sleeping patterns themselves may have changed over the course of the post-Edison era due to the increase of artificial light. \footnote{See \textit{Wolkomir & Wolkomir}, supra note 19, at 38. While most people would assume that prior to the invention of artificial light people slept continuously throughout the night, the contrary might be true. \textit{See id.} A study done by a National Institute of Mental Health psychiatrist indicated that when “[d]eprived of artificial light, [research volunteers] reverted to the preindustrial pattern” of segmented sleep. \textit{Id.} It is believed that “[w]ithout the stimulus of artificial light, people secrete more prolactin, a pituitary hormone that seems to promote a state of quiet restfulness,” and prior to the industrial age, “people slept differently because they had less artificial light recalibrating their hormone production.” \textit{Id.}} Because this is a relatively new area, the research available on human effects of light pollution is minimal, however it appears persuasive enough that some negative effects may result. \footnote{See \textit{Bower}, supra note 6, at 95.}

IV. AN OVERVIEW OF COMMON LAW CLAIMS INVOLVING LIGHT

Although scientists are just now discovering the harmful physiological and psychological impacts of light on humans and wildlife, other unwanted and disturbing aspects of light existed well before the modern problem of light pollution existed. \footnote{See, e.g., \textit{Akers v. Marsh}, 19 App. D.C. 28 (1901) (involving one of the first litigated complaints about a non-electric source of light, torch lamps, shining onto plaintiff’s property).} In fact, despite the much-awaited discovery of

\textit{Id.} One research study conducted at five lakes in urban and rural areas indicated that the migration of Daphnia, a species of freshwater zooplankton, is significantly impacted by light pollution. \textit{See id. at 24-25.}
electric illumination and its benefits, individuals were relatively quick to react with lawsuits to enjoin light cast by others upon their property, long before anyone recognized “light pollution” as a distinct environmental problem.97

Using common law claims in all types of pollution cases has been a tool for many landowners both past and present.98 Perhaps the two most frequent common law claims brought in environmental litigation cases have been nuisance and trespass.99 While there are differences between these

96. See Shelburne, Inc. v. Crossan Corp., 95 N.J. Eq. 188 (1923) (involving an early instance of electric light shining on to an adjoining property). See also 58 A.M. JUR. 2D Nuisances § 153 (1989) (listing several cases where light cast upon another’s property were brought into court under the theory of nuisance). See generally K.J. Roberts, Annotation, Casting of Light on Another’s Premises as Constituting Actionable Wrong, 5 A.L.R. 2d 705 (1949) (providing a comprehensive overview of early twentieth-century cases involving various sources of light that were complained about in court).

97. See supra notes 44-94 and accompanying text for a discussion on the problem of light pollution.

98. See Frona M. Powell, Trespass, Nuisance and the Evolution of Common Law in Modern Pollution Cases, 21 REAL ESTATE L.J. 182, 183 (1992). Despite all the current statutory environmental law, “the common law provides the only legal recourse to individual plaintiffs in the environmental pollution cases.” Id. at 183 n.2. “Common-law theories protecting interests in real property focus on two essential questions: First, the nature of the legal interest protected, and second, the kind of invasion of interest which gives an owner or possessor the right to a legal remedy.” Id. at 184 (emphasis added). See also Arnold W. Reitze, Jr., A Century of Air Pollution Control Laws: What’s Worked; What’s Failed; What Might Work, 21 ENVTL. L. 1549, 1554-57 (1991) (providing a brief overview of the common law claims of nuisance and trespass generally in air pollution cases); Bradley v. American Smelting and Refining Co., 709 P.2d 782 (Wash. 1985) (cause of action in trespass due to copper smelter’s deposits of particulate arsenic and cadmium falling on another’s land); Bolland v. Sanders Lead Co., 369 So. 2d 523, 529 (Ala. 1979) (cause of action in trespass against lead smelter for emissions of lead particulates and sulfide deposits on another’s land); Martin v. Reynolds Metals Co., 342 P.2d 790 (1959) (cause of action in trespass against aluminum manufacturer causing fluoride gases and particulates to fall on another’s property).

99. See Roger Meiners & Bruce Yandle, Common Law and the Conceit of Modern Environmental Policy, 7 GEO. MASON L. REV. 923, 926 (1999). “Before federal environmental statutes became dominant, the common law doctrines most frequently relied upon in environmental litigation were nuisance and trespass.” Id. “The legal theories of nuisance and trespass were developed long before the birth of [the United States]” and can be traced back to twelfth century England. G. Nelson Smith, III, Nuisance and Trespass Claims in Environmental Litigation: Legislative Inaction and Common Law Confusion, 36 SANTA CLARA L. REV. 39, 41 (1995). Since that time, however, the theories have evolved and been applied by the courts in a much different way. See PATTON, BOGGS & BLOW, ENVIRONMENTAL LAW HANDBOOK 25-26 (BNA 1994). See also Powell, supra note 98, at 183 (stating that in addition to trespass and
two causes of action, the theories behind both are considered related, and, particularly in pollution cases, these common law theories stem from property and tort law. Despite the predominance of legislation as a mode of dealing with environmental protection, these common law doctrines continue to have a place in environmental protection. Before the

nuisance, the common law claims of negligence and strict liability have also been used in environmental pollution cases); DANIEL P. SELMI & KENNETH A. MANASTER, STATE ENVIRONMENTAL LAW 2-1 (Release #8, Nov. 1997) (noting that the public trust doctrine is an additional common law doctrine that is frequently used in environmental law). But see THOMAS M. HOBAN & RICHARD O. BROOKS, GREEN JUSTICE: THE ENVIRONMENT AND THE COURTS 11 (2d ed. 1996) (stating that “today a purely common-law cause of action is rare”).

100. “Nuisance law traditionally protected the right of a landowner or occupier to the use and enjoyment of property, while trespass provided compensation for unpermitted physical intrusion upon property rights.” SELMI & MANASTER, supra note 99, at 2-2 to 2-3. Furthermore, “[a] claim of trespass contemplates actual physical entry or invasion, whereas nuisance liability arises merely by virtue of an activity which falls short of tangible, concrete invasion but interferes with the use and enjoyment of land.” Smith, supra note 99, at 54. Just because an individual may have a claim under nuisance, it does not follow that he or she will simultaneously have a claim under trespass. See id. at 55.

101. See Meiners & Yandle, supra note 99, at 935. “Trespass, when invoked in pollution cases, is a common law theory closely related to nuisance.” Id. “A primary distinction between the actions of trespass and nuisance is the difference in the legal right protected.” Powell, supra note 98, at 185. “[Trespass and nuisance] can be distinguished by comparing the interest invaded; an actionable invasion of a possessor’s interest in the exclusive possession of land is a trespass; an actionable invasion of a possessor’s interest in the use and enjoyment of his land is a nuisance.” Martin v. Reynolds Metals Co., 342 P.2d 790, 792 (Or. 1959).

102. See BRUCE YANDLE, COMMON SENSE AND COMMON LAW FOR THE ENVIRONMENT: CREATING WEALTH IN HUMMINGBIRD ECONOMIES 88 (1997). The common law-theory that applies to pollution is a part of the law of property and torts, a body of law that protects life and property from harm caused by others. Based on rights, the common law emerges in rulings announced by judges on a case-by-case basis. The law is formed from specific controversies, claims for actual damage, and requests for injunctions against the threat of damage. The rules of tort law that relate to the environment are found in a component of common law that deals with nuisance and trespass. The latter property right violation is associated with uninvited physical invasion of property, while the former relates to harms, like odors . . . , that do not reflect a physical crossing of a property boundary.

Id.

103. See SELMI & MANASTER, supra note 99, at 2-2. “Statutes have not totally eclipsed the common law doctrines for several reasons,” including the incorporation of common law concepts into the statutory scheme, the use of common law analysis by courts in interpreting a statute, the inadequacy of statutes to deal with a particular environmental problem, insufficiency of statutory remedies, and the tendency of courts to be receptive to common law actions. Id. at 2-6 to 2-9. See generally THE COMMON LAW AND THE ENVIRONMENT: RETHINKING THE STATUTORY BASIS FOR
phrase “light pollution” was coined, plaintiffs complaining about intruding light reached the courts by bringing a claim against a neighboring individual or entity in one of two ways: light as nuisance or light as trespass. As Part IV will reveal, neither of these claims were very successful for aggrieved plaintiffs seeking to dim a neighbor's light. Given the modern problem of light pollution and its many sources of light, as well as the nature of the pollutant itself, there may need to be another more reliable and effective source of relief for both humans and wildlife.

A. Nuisance in Environmental Pollution and Light as Nuisance Cases

Landowners seeking damages for pollution to their property may bring a nuisance claim since a property owner's right to use and enjoy his property is protected by the law of nuisance. While there are two types of nuisance claims, private and public, both “relate to the unreasonable interference with the use and enjoyment of land.” In a private nuisance case, the plaintiff must show that the defendant, typically a neighboring

MODERN ENVIRONMENTAL LAW (Roger E. Meiners & Andrew P. Morriss eds., 2000) (providing several articles on the use and benefits of the common law over statutory legislation in protecting the environment).

104. See Amphitheaters, Inc. v. Portland Meadows, 198 P.2d 847, 850 (Or. 1948) (light as trespass claim); Shelburne, Inc. v. Crossan Corp., 95 N.J. Eq. 188, 191 (1923) (light as nuisance claim). See also infra notes 124-40, 182-84 and accompanying text for a discussion of Amphitheaters, Inc.

105. See Powell, supra note 98, at 183. See also Amphitheaters, Inc., 198 P.2d. at 851 (plaintiff's second assignment of error in his appeal was that the trial court erred in denying his claim of nuisance to go forward).

106. See Powell, supra note 98, at 188.

107. See Ronald J. Rychlak, Common-Law Remedies for Environmental Wrongs: The Role of Private Nuisance, 59 Miss. L.J. 657, 658-61 (1989). Private nuisance “is an unreasonable interference with the plaintiff’s enjoyment of his property,” while public nuisance is an “unreasonable interference with the right of, or a threat to, the general public.” Id. at 658, 660. In many jurisdictions, public nuisances are statutory. See id. at 658. “[P]rivate nuisance is an invasion of another’s interest in the private use and enjoyment of land.” PATTON, BOGGS & BLOW, supra note 99, at 26. “The invasion will be actionable only if (1) the conduct giving rise to the invasion is tortious and (2) an interest associated with the use and enjoyment of the plaintiff’s land has been invaded.” Id. (relying on the RESTATEMENT (SECOND) OF TORTS §§ 821, 822). “A public nuisance . . . is an interference with a right of the public at large, which is not limited to the use and enjoyment of land.” Id. “[T]he plaintiff must prove both tortious conduct and an actionable invasion resulting therefrom.” Id. at 27. See also Smith, supra note 99, at 50-53 (describing the difference between private and public nuisance).

108. Smith, supra note 99, at 50.
individual or entity, \textsuperscript{109} invaded the plaintiff’s interest in his property either intentionally and unreasonably, negligently, recklessly or, in the case of abnormally hazardous activities, under the theory of strict liability. \textsuperscript{110} Furthermore, the invasion must be substantial, \textsuperscript{111} but this has not been interpreted to mean that the invasion must have a physical or tangible impact. \textsuperscript{112} Once the plaintiff has met his or her burden, “the burden shifts to the defendant to establish that its use was reasonable or the interference inconsequential,” but the defendant’s conduct will not be excused merely because it was “necessary, modern or efficient.” \textsuperscript{113} The courts essentially use a balancing test to determine whether the defendant’s activities are sufficient to constitute a nuisance to the plaintiff’s enjoyment of his or her property. \textsuperscript{114} The most common forms of environmental nuisance have included noise pollution, dust, smoke, vibrations and odors, \textsuperscript{115} and remedies for the

\textsuperscript{109} “Often the environmental plaintiff is an individual or small group, and the defendant is a large corporate entity.” Rychlak, supra note 107, at 661.

\textsuperscript{110} See Smith, supra note 99, at 50. “A private nuisance cause of action arises when the injury inflicted either diminishes the value of [plaintiff’s] property, continually interferes with the power or control of that property, or causes a material disturbance or annoyance to the person in the use or occupation of that property.” Id. “A private nuisance is a nontrespassory invasion of another’s interest in the private use and enjoyment of land.” RESTATEMENT (SECOND) TORTS § 821D (1979).

One is subject to liability for a private nuisance if, but only if, his conduct is a legal cause of an invasion of another's interest in the private use and enjoyment of land, and the invasion is either

(a) intentional and unreasonable, or

(b) unintentional and otherwise actionable under the rules controlling liability for negligent or reckless conduct, or for abnormally dangerous conditions or activities.

RESTATEMENT (SECOND) TORTS § 822 (1965). See also Rychlak, supra note 107, at 674 (stating that a defendant’s mere knowledge that an interference with plaintiff’s enjoyment of the land may be sufficient to establish intent).

\textsuperscript{111} See PATTON, BOGGS & BLOW, supra note 99, at 27. “An invasion will not be actionable in nuisance unless it is substantial, i.e., if it offends normal persons in that particular locality.” Id. See also Rychlak, supra note 107, at 676-77. “[M]inor interferences of a short duration will not amount to a nuisance.” Id. at 676.

\textsuperscript{112} See PATTON, BOGGS & BLOW, supra note 99, at 27. “Unlike trespass, nuisance does not require a physical invasion of the property but occurs if a condition is maintained on the defendant’s land that interferes with the plaintiff’s use and enjoyment of the plaintiff’s property.” Powell, supra note 98, at 188-89.

\textsuperscript{113} See Rychlak, supra note 107, at 678.

\textsuperscript{114} See Reitze, supra note 98, at 1555. See also Andrew Jackson Heimert, Keeping Pigs Out of Parlors: Using Nuisance Law to Affect the Location of Pollution, 27 ENVTL. L. 403, 410-12 (1997) (describing the shifting view of the courts over the years to at least recognize some sort of relief for plaintiffs even if the defendant’s pollution-creating activity was considered more socially valuable).

\textsuperscript{115} See Rychlak, supra note 107, at 660-61 & nn. 17-21. Arguably, some of these types of pollution, and perhaps adding light to the list, would require a showing
plaintiff can include monetary and equitable injunctive relief.\textsuperscript{116}

It was not until the early twentieth century that courts began hearing nuisance claims from individuals complaining of light being emitted from an adjacent property onto theirs.\textsuperscript{117} In \textit{Shelburne, Inc. v. Crossan},\textsuperscript{118} some of the plaintiff’s hotel rooms were subjected to light shining in from the defendant’s property upon which a large sign emitting the light was affixed.\textsuperscript{119} Because the lights were turned on from dusk until midnight, and on at least one occasion until after midnight, the illumination disturbed guests of the hotel and allegedly lowered the value of the rooms.\textsuperscript{120} In its holding, the court reasoned “that the amount of light radiating from the sign does illuminate or ‘light up’ many of the rooms facing it, and in some instances, at least, to such an extent as to be objectionable to the guests.”\textsuperscript{121}
The court found that the defendant’s light is better considered a nuisance, and provided relief for the plaintiff.

There are few cases aside from Shelburne, Inc. that have light emissions as the exclusive factor declared as a nuisance by the plaintiff. The court in Amphitheaters, Inc. reasoned that although light emitted from a neighboring race track onto a drive-in theater’s property might not constitute trespass as the plaintiff had claimed, there may be a legitimate claim in nuisance. In Amphitheaters, Inc., the plaintiff was a drive-in theater operator whose theater abutted a parcel of land that included a one-mile outdoor racing track. That the track would be lighted for night racing was featured extensively in local newspapers. The floodlights were generally aimed at the track, but there was substantial evidence that the emitted light spilled onto the theater’s premises and had “a serious effect...

122. See id. at 191. “There can be little, if any, doubt that light radiating from lamps of the intensity, and, when placed in the position of those in the sign in question, may become a nuisance, if it (the light) materially interferes with the ordinary comfort, physically, of human existence.” Id. (citation omitted).

123. See id. at 192. The defendant was ordered to limit the sign’s hours of operation to the hours before midnight. See id.

124. See, e.g., Amphitheaters, Inc. v. Portland Meadows, 198 P.2d 847 (Or. 1948) (discussed infra at notes 126-40, 182-84); Shepler v. Kansas Milling Co., 278 P. 757 (Kan. 1929) (reflected sunlight from defendant’s grain storage tanks). See also Dean N. Alterman, Comment, Reflected Sunlight Is a Nuisance, 18 ENVTL. L. 321, 330-31 (1988) (noting a few cases, including Shepler, that have dealt with reflected sunlight as a nuisance). For cases that have light as at least one factor in a nuisance claim, see 58 AM. JUR. 2D Nuisances § 153 (1989) (listing several cases where light cast upon another’s property was brought into court under a nuisance claim); K.J. Roberts, Annotation, Casting of Light on Another’s Premises as Constituting Actionable Wrong, 5 A.L.R.2d 705 (1949) (providing a comprehensive overview of early twentieth-century cases involving various sources of light that were complained about in court).

125. See Amphitheaters, Inc., 198 P.2d at 850.

126. See infra notes 182-84 and accompanying text. See also John-Mark Stensvaag, State Regulation of Nuclear Generating Plants Under the Clean Air Act Amendments of 1977, 55 S. CAL. L. REV. 511, 536 n.131 (1982) (stating that Amphitheaters, Inc. “address[es] a nuisance which might today be called ‘light pollution’”).

127. See Amphitheaters, Inc., 198 P.2d at 848. Amphitheaters, Inc.’s lease on the property allowed the construction of a drive-in outdoor movie theater, but also provided that the theater’s activities could not interfere with the race track which was located on the same property. See id. Some of the theater promoters knew that the neighboring race track would be illuminated to some extent, but regardless, the construction of the theater was completed fifteen days before the completion of the race track. See id.

128. See id. The racetrack was equipped with “approximately 350 1500-watt lights” mounted and clustered on 80-foot poles around the track. See id. at 850.
on the quality of pictures shown on the screen."129 As a result, the theater operator brought a claim of trespass against the race track operator.130

The court, while acknowledging that the line between trespass and nuisance claims was blurry, held that the theater operator’s claim was governed by the law of nuisance and not trespass.131 In analyzing this case of first impression, the court found that nuisance cases tended to fall in one of four categories,132 and that the plaintiff’s claim may possibly be analogous to only the first category.133 However, the court found itself in a difficult position when it was time to analyze why light should be considered parallel to the cases involving smoke, odors and flies; “no one can contend that light is inherently harmful to persons in the ordinary enjoyment of property.”134 Instead, the court decided to use a balancing test of weighing the plaintiff’s complaint against the defendant’s activities135 and looked to

129. Id. at 850. Not only did the light reduce the quality of movie pictures, but the theater suffered a financial loss due to this invasion of light. See id. There was evidence that the light cast upon the theater’s property was equivalent to that of a full moon. See id.

130. See infra notes 182-84 and accompanying text. On his appeal from the circuit court ruling, the plaintiff contended that the defendant’s light was, in fact a trespass, and “error [should be] assigned by reason of the failure of the court to submit to the jury the question of trespass.” Amphitheaters, Inc. v. Portland Meadows, 198 P. 2d 847, 850 (Or. 1948).

131. See Amphitheaters, Inc., 198 P. 2d at 850. “The mere suggestion that the casting of light upon the premises of a plaintiff would render a defendant liable without proof of any actual damage, carries its own refutation. Actions for damages on account of smoke, noxious odors and the like have been universally classified as falling within the law of nuisance.” Id.

132. See Amphitheaters, Inc., 198 P.2d at 851. The court delineated the four classes of nuisance as follows:

(1) Cases involving harm to human comfort, safety or health by reason of the maintenance by a defendant upon his land of noxious or dangerous instrumentalities causing damage to the plaintiff in respect to legally protected interests of the plaintiff in his land. (2) Cases involving illegal or immoral practices, most of them being public as distinct from private nuisances [i.e. gambling, abortions, lotteries]. (3) Cases involving obstructions to streets, public ways, common rights, access to property and the like. (4) Cases involving damage to the land itself, as by flooding. Id. The court also listed several Oregon cases that fell into the first class. See id.

133. See id. The court likened previous cases involving noxious odors, ashes, smoke, dynamite and stream pollution to the type of case being brought by the theater operator. See id.

134. Id. at 851-52. In previous cases, the factor that was held to be a nuisance was held to be both inherently harmful and an unreasonable and substantial interference with the plaintiff’s ordinary use and enjoyment of his property. See id. In fact, in another part of the opinion the court states that the “case [at bar] differs fundamentally from other cases, all typical cases of nuisance, in that light is not a noxious, but is, in general, a highly beneficial element.” Id. at 858 (emphasis added).

135. See id. at 852. The interference with the use and enjoyment of land must
other jurisdictions to determine whether the race track’s lights did indeed constitute a nuisance. 136

After much analysis of other courts’ decisions on similar issues, the Oregon Supreme Court ultimately held that the defendant’s race track lights cast upon the plaintiffs did not constitute a nuisance. 137 The court reasoned that a drive-in theater is of a sensitive nature, not one of the ordinary person, 138 and in analogous cases finding light as nuisance, light was but one of many other factors comprising the nuisance. 139 In its dicta, the court indicated its willingness to classify light as nuisance in other more appropriate cases. 140

Hildebrand v. Watts is another, more recent case that also indicates a court’s unwillingness to classify light as nuisance in certain instances. 141 In this case, the plaintiffs and defendants were neighbors in a residential area of Connecticut. 142 The plaintiffs objected to the defendants’ placement of a security and recreational light on the roof of their house because when it was in use at night, it illuminated the plaintiff’s driveway and parts of the house. 143 The court, not convinced by the plaintiff’s arguments,
found that they had not met their burden of proving by a preponderance of the evidence that the light was a sufficiently impermissible interference so as to be enjoined. The court reiterated that a “balancing of equities is involved in determining whether an interference with one’s use of property is such an impermissible interference that it should be enjoined as a nuisance.” In this case the court held,

absent stronger evidence than has been presented here – for example, that sleep is interfered with – the plaintiffs have not made out a case, by a preponderance of the evidence, that the intrusion of light onto their property unreasonably outweighs the legitimate interests of the [defendants] in lighting their own property for purposes of safety and for the recreation of their children.

neighborhood and that they placed the light on their house in an effort to protect themselves against vandalism and theft.” Id. The plaintiffs contended that the light shined into their kitchen, bathroom and screened-in porch during the period from dusk until around 9:30 p.m. or later and interfered with their enjoyment of these areas. See id. at *12-13. They also alleged that the light was frequently turned on and off by defendant in order to harass them. See id. at *13.

144. See id. at *14-21. The court, upon review of the videotaped evidence, was not persuaded that the light was unreasonable or too obtrusive in the kitchen and bathroom. See id. at *15. Furthermore, the court did not find that there was any injury to the plaintiffs from the light being cast upon the driveway and front lawn since “they do not use these places for relaxation.” Id. at *16. In terms of the back porch, the court stated that the plaintiffs were also not entitled to relief because no claim as to the specific light fixture that was causing such light was before the court (only the roof light was before the court), and because there was not sufficient evidence to determine whether the defendants were really turning the light on and off purposely. See id. at *16-18.

145. Id. at *19. In referring to a previous case that cited the Shelburne, Inc. decision, the court noted that “generally courts have been hesitant to enjoin the use of outside lights.” Id. at *19.

146. Id. at *20-21. But see Rhudy v. Fairfield Univ., No. CV-990368012S, 2000 WL 1269296, at *1, *5 (Conn. Super. Ct. Aug. 18, 2000) (court found that the activities being conducted on University Field were sufficient to constitute a nuisance that warranted injunctive relief). In Rhudy, the plaintiffs, four families living adjacent to and abutting University Field at Fairfield University, claimed noise and light from the field were creating a nuisance. See id. at *2-5. The lighting along University Field consisted of “eight light towers, four on each side of the field, with clusters of floodlights . . . [with each floodlight consisting of] a 1500-watt metal halide lamp” which, according to one expert, is the biggest lamp source of this kind available in commerce. Id. at *4. It created a light on some plaintiffs’ property up to 30 times brighter than a full moon and reached various rooms, including bedrooms. See id. The court issued an injunction that lights be turned off by 7:00 p.m. during the week, by 5:00 p.m. on weekends and light fixtures could not directly shine towards plaintiffs’ property. See id. at *6.
While Shelburne, Inc., Amphiheaters, Inc., and Hildebrand dealt with light being cast upon a plaintiff’s property by one other defendant, the problem of light pollution is created by many sources of light, some of which are not located on adjacent property. To date, there have been no cases brought under the theory of private nuisance to combat light pollution, but predictably, such plaintiffs would not prevail. First, the nature of the interest protected by nuisance is “the private use and enjoyment of land.” It is hard to imagine that, given the unsuccessful claims of the drive-in theater operator combating a significant source of adjacent light, or the neighbor complaining of a security light shining in an area not traditionally considered an area used for relaxation, a particular individual or group would be successful in combating multiple defendants who are creating a more diffuse “sky glow.” Further, it is likely that the glow of light pollution that would be complained about would be produced by multiple and distant defendants, thus creating more legal difficulties in bringing a lawsuit.

Courts have indicated that “[t]he hypersensitive user will not recover for the actual harm he suffers, but only (if at all) for the harm that a normal person would suffer from the same invasion.” For example, astronomers, who require the darkest of skies, may find themselves in the same position as drive-in theater owners. Finally, since light pollution can be found without other nuisances such as noise, it is uncertain whether light alone will be sufficient for a plaintiff to prevail in the majority of cases.

In contrast to the private nuisance claims, “a public nuisance is an unreasonable interference with a right common to the general public.”

147. See supra Part III.A.
148. Falcone, III & Utain, infra note 162, at 68.
149. Even if there were one significant building creating light pollution, it is unlikely that courts would find this to be a nuisance since adjacent property owners fighting one building have had difficulty prevailing in lawsuits. See Dean N. Alterman, Comment, Reflected Sunlight Is A Nuisance, 18 ENVTL. L. 321, 323 (1988). “Buildings in urban areas often invade the property rights of adjacent landowners (i.e., by causing noise or emitting artificial light). However, courts usually consider these invasions to be reasonable because buildings are socially useful.” Id.
150. Id. at 325 (citing the example of Amphiheaters, Inc.).
151. But see infra notes 189-90, 196 and accompanying text (indicating that in at least some areas statutes are being drafted to protect the night sky for astronomical observatories).
152. The lack of cases where light was the sole nuisance factor does not help a plaintiff in determining whether his claim will prevail. See, e.g., supra note 124 and accompanying text. Most of the cases that have involved light as a nuisance have also had other factors such as noise, odors, or smoke. See also sources cited supra note 96 (indicating that light is usually one of many factors in a nuisance suit).
153. Smith, supra note 99, at 52. A private nuisance, therefore, is not necessarily created from a public nuisance and, in order for an individual to have standing to
Public nuisance claims are often used to help abate environmental pollution that may harm public health or the general quality of life for the community. To prevail, “a plaintiff must show that the defendant's conduct constitutes substantial and unreasonable interference with the public or with public property.” Usually plaintiffs in public nuisance claims are seeking injunctive relief to prevent defendant’s continued nuisance activity. Bright lights, in combination with other activity, have constituted a public nuisance in some jurisdictions.

recover under a private nuisance claim, he or she must also have an injury distinct from that of the public. See id. See also RESTATEMENT (SECOND) OF TORTS § 821B (1977) (defining of public nuisance).

(1) A public nuisance is an unreasonable interference with a right common to the general public.

(2) Circumstances that may sustain a holding that an interference with a public right is unreasonable include the following:

(a) Whether the conduct involves a significant interference with the public health, the public safety, the public peace, the public comfort or the public convenience, or

(b) whether the conduct is proscribed by a statute, ordinance or administrative regulation, or

(c) whether the conduct is of a continuing nature or has produced a permanent or long-lasting effect, and, as the actor knows or has reason to know, has a significant effect upon the public right.

Id. at 776. The plaintiff must show that the requested injunction would be the only adequate remedy, and granting of the injunction is of greater benefit than the impact of the injunction on the defendant. See id. Most courts that do issue injunctions usually require only a modification in the defendant’s behavior, and not a complete cessation of activity. See id. at 783.

Id. at 776-77.

See id. at 777. The court must find that the defendant’s conduct substantially damages public property, or significantly disturbs, offends, or endangers the health of members of the public with ordinary physical stature and “sensibilities.” Furthermore, the court must find that the defendant’s conduct decreases the environmental quality of the affected property to a level lower than that which the public reasonably expects.

Id. at 776-77.

See id. at 791 & n.298 (citing Brough v. Ute Stampede Ass’n, 142 P.2d 670 (Utah 1943) and Hansen v. Indep. School Dist. No. 1, 98 P.2d 959 (Idaho 1939)). In Hansen, the court considered both how an injunction would impact the defendant’s night baseball games, as well as the fact that the field was in a residential area. See Hansen, 98 P.2d at 962. The court required an injunction to prevent any lights from...
Whether a public nuisance claim would be more successful than a private nuisance claim in a light pollution case is uncertain. For example, given the relatively recent and few research findings that light pollution may be harmful to the public health, it may be unlikely that light pollution is yet to be accepted as harming public health. In addition, usually only attorneys general or district attorneys have standing to advance public nuisance claims. In either type of nuisance claim, however, the inconsistency and insufficiency of court holdings across jurisdictions does not seem adequate to deal with the modern problem of light pollution.

B. Trespass in Environmental Pollution and Light as Trespass Cases

Trespass can generally be described as “an [intentional] intrusion or invasion of tangible property, either real or personal, which interferes with the possessor’s interest in the right of exclusive possession of the property.” Nuisance and trespass, because they are so closely related, often further shining onto the plaintiffs’ premises. See id. The court noted that while night baseball games are not nuisances per se, they “become such under circumstances such as here where they are conducted in such a manner as to greatly interfere with legitimate and necessary use and enjoyment of the property of others.” Id. The dissent argued that whether the baseball games constituted a nuisance in this particular case was a question of fact that should have been determined at trial. See id. at 963.

158. See supra notes 90-94 and accompanying text for a discussion of the developing data surrounding public health impacts of light pollution.
159. See Meiners & Yandle, supra note 99, at 927.
160. See, e.g., Patton, Boggs & Blow, supra note 99, at 28 (listing some drawbacks to common law nuisance; such as, the courts’ unwillingness to allow “trifling inconveniences” to advance as claims, claims barred by statutes of limitations where the defendant’s activity is not continuing, the inability of plaintiffs to prevail in court’s balancing test, and the defendant’s compliance with laws and permits); David Schoenbrod, Protecting the Environment in the Spirit of the Common Law, in The Common Law and the Environment 4-6 (Roger E. Meiners & Andrew P. Morriss, eds., 2000). While this article, and in fact the entire book, suggests that the common law plays an important role in environmental law, there are some notable drawbacks to the common law: liability in modern day pollution cases is more difficult to define, unsatisfactory remedies and unenforcement. “Science has progressed so that we think about pollution as a matter of degree as well as of kind.” Id. at 5. “Even if the court can adjudicate liability, it will have trouble providing satisfactory remedies for many kinds of modern pollution problems” since typically only harms that are proven will be given remedies. Id.
161. The requisite intent can be shown by a plaintiff in one of two ways: proving that “the defendant acted for the purpose of causing the invasion,” or “the defendant [knew] that there [was] a substantial certainty that its actions [would] result in the invasion.” Patton, Boggs & Blow, supra note 99, at 29-30. However, there may also be liability shown in cases where the defendant has acted negligently or recklessly. See id. at 29.
162. Powell, supra note 98, at 185.
result in confusion for plaintiffs as to which cause of action is best advanced in a particular case.163

In pollution as trespass cases, one of the main issues that courts have struggled with has been to what degree the invasion must be tangible or physical.164 There are three cases that have served as a model for courts requiring this analysis and may be helpful in analyzing light as a pollutant: Martin v. Reynolds Metals Co.165 Borland v. Sanders Lead Co.166 and Bradley v. American Smelting and Refining Co.167 Briefly, these cases

One is subject to liability to another for trespass, irrespective of whether he thereby causes harm to any legally protected interest of the other, if he intentionally

(a) enters the land in the possession of the other, or causes a thing or a third person to do so, or

(b) remains on the land, or

(c) fails to remove from the land a thing which he is under a duty to remove.

Id. at 185 n.10 (quoting RESTATEMENT (SECOND) OF TORTS § 158 (1965)). The harm suffered by the plaintiff in a trespass claim must be substantial. See PATTON, BOGGS & BLOW, supra note 99, at 30. “The degree of substantiality will depend, as in nuisance, on the facts of the case and the outlook of the court that is examining those facts.” Id. In addition, “courts have held that the definition of ["thing"] requires something larger and more substantial than smoke, dust, gas, or fumes.” Meiners & Yandle, supra note 97, at 936. See also Joseph F. Falcone, III & Daniel Utain, Comment, You Can Teach an Old Dog New Tricks: The Application of Common Law in Present-Day Environmental Disputes, 11 VILL. ENVTL. L.J. 59, 71-72 (2000) (providing a historical overview of how harmful an intrusion had to be in order for a plaintiff to prevail in trespass cases).

163. See Smith, supra note 99, at 57-67 (providing a general discussion of some considerations for plaintiffs seeking to recover under either theory: statute of limitations, whether the defendant’s actions are of a continuing or permanent nature, burden of proof, discovery rule, and damages that can be recovered).

164. Several tests have been developed by courts to determine whether an invasion should be classified as a trespass or instead as a nuisance. See infra notes 169-71 and accompanying text. See also Falcone & Utain, supra note 162, at 71-72. “That the traditional rule of trespass required some kind of physical invasion was undisputed; the real debate was grounded in how tangible or visible the invasion need be.” Id. Advances in science, and subsequently a better understanding of potential environmental hazards rendered the “dimensional” test unworkable. See id. at 72. Today, most courts utilize a “balancing” test in pollution trespass cases. See id. at 73.

165. 342 P.2d 790, 791 (Or. 1959) (landowners brought action against defendant aluminum reduction plant, alleging that defendant caused airborne fluoride gases and particulates to settle upon landowners’ property and thus constituted a trespass).

166. 369 So. 2d 523, 526 (Ala. 1979) (landowners brought action against defendant that recovered lead from used automobile batteries, alleging that lead particulates and sulfoxide deposits were falling on landowners’ property and thus constituted a trespass).

167. 709 P.2d 782 (Wash. 1985) (landowners brought claims against defendant copper smelter, alleging that “microscopic, airborne particles of heavy metals” were
represent the courts’ development of an appropriate analysis for cases involving something less than the physical touching that is typically seen in trespass cases. Initially, some courts used a “dimensional” test, but ultimately more workable tests were created in order to deal with modern pollution problems. Today, most courts use a “balancing test” similar to falling on landowners’ property and thus constituted either a trespass or nuisance).

168. See Falcone, III & Utain, supra note 162, at 70-71. “[T]he tort of trespass requires an ‘intrusion;’ some physical, tangible invasion of the plaintiff’s land. This intrusion can occur ‘on, beneath or above the surface’ of the land.” Id.

169. See id. at 72 & nn.58-59. The intrusion under the “dimensional” test was classified based on its visibility such that any invasions not detectable by the unaided eye were nuisances and visible invasions were trespasses. See id. This dimensional test was rejected by the Martin court. See Martin, 342 P.2d at 794.

If, then, we must look to the character of the instrumentality which is used in making an intrusion upon another’s land we prefer to emphasize the object’s energy or force rather than its size. Viewed in this way we may define trespass as any intrusion which invades the possessor’s protected interest in exclusive possession, whether that intrusion is by visible or invisible pieces of matter or by energy which can be measured only by the mathematical language of the physicist.

Id. In Martin, the court ultimately held that intrusion of fluoride particles qualified as a trespass, and distinguished the case from Amphitheaters, Inc. where it had earlier indicated that light could not be considered a trespass when it noted the difference between “a cannon ball and a ray of light.” See id. The court explained that its statement in Amphitheaters, Inc. was not “a pronouncement that a trespass can never be caused by the intrusion of light rays or other intangible forces,” and rather it meant that “the conduct of the defendant in a particular case may not be actionable if it does not violate a legally protected interest of the plaintiff.” Id. For further analysis of the Amphitheaters, Inc. decision in Martin, see id. at 794-97. See also Powell, supra note 98, at 197-201 (providing a further analysis of the Martin decision).

170. See Falcone & Utain, supra note 162, at 71-74 & nn.58-62. “[W]ith the evolution of science, and consequently a deeper understanding of potential environmental hazards, the continued application of the ‘dimensional’ test by courts became infeasible.” Id. at 72. “In Borland v. Sanders Lead Co., the Alabama Supreme Court expressly acknowledged the problem of limiting the scope of liability under the Martin test.” Powell, supra note 98, at 201. In Borland, the court found there was a trespass by the defendant’s lead reduction activities which caused harm to the plaintiff’s farm. See Borland v. Sanders Lead Co., 369 So. 2d 523, 529 (Ala. 1979). The court stated that:

whether an invasion of a property interest is a trespass or a nuisance does not depend upon whether the intruding agent is ‘tangible’ or ‘intangible.’ Instead, an analysis must be made to determine the interest interfered with. If the intrusion interferes with the right to exclusive possession of property, the law of trespass applies. If the intrusion is to the interest in use and enjoyment of property, the law of nuisance applies.

Under the modern theory of trespass, the law presently allows an action to be maintained in trespass for invasions that, at one time, were considered indirect and, hence, only a nuisance. In order to recover in trespass for this type of invasion . . . a plaintiff must show 1) an invasion affecting an interest in the exclusive possession of his property; 2) an inten-
that of nuisance cases.\textsuperscript{171}

The most recent case that may provide some insight as to how these types of pollution cases will be handled is found in \textit{Bradley}.\textsuperscript{172} In \textit{Bradley}, the court accepted the elements of trespass that were set forth by the \textit{Borland} court.\textsuperscript{173} However, as this decision relates to light as trespass, the court appeared to indicate that light should appropriately be considered a nuisance.\textsuperscript{174} It appears that this court and others will require an actual and substantial damage to be present in trespass claims – perhaps something that a ray of light cannot achieve.\textsuperscript{175} These cases may guide plaintiffs who advance light as trespass claims in jurisdictions where there have been few cases where light is the sole factor claimed in the trespass.

Again, defined as “an intrusion or invasion of tangible property, either real or personal, which interferes with the possessor’s interest in the right of exclusive possession of the property[,]”\textsuperscript{176} claims in trespass have been used by plaintiffs disturbed by a neighbor’s source of electric illumination.\textsuperscript{177} In trespass cases, not only must a plaintiff show the defendant was acting intentionally, negligently or recklessly,\textsuperscript{178} he “must also show that...

\textit{Id.} at 529. It is perhaps this last requirement that may halt light as trespass cases, and more likely light pollution as trespass cases, in their tracks: how much does light really damage the res? \textit{See Powell, supra} note 98, at 202 (posing “[a]t what point does the injury become so ‘substantial’ that a cause of action arises?”).\textsuperscript{179}

\textsuperscript{171.} \textit{See Falcone & Utain, supra} note 162, at 73. The weight of the defendant’s activity is measured against the character and substantiality of the harm. \textit{See id.}\textsuperscript{172.} \textit{Bradley v. American Smelting and Refining Co.,} 709 P.2d 782 (1985).\textsuperscript{173.} \textit{See id.} at 790.\textsuperscript{174.} \textit{See id.} at 791. “When airborne particles are transitory or quickly dissipate, they do not interfere with a property owner’s possessory rights and, therefore, are properly denominated as nuisances.” \textit{Id.} (citing several cases, including Amphitheaters, Inc. v. Portland Meadows).\textsuperscript{175.} \textit{See id.}\textsuperscript{176.} \textit{Powell, supra} note 98, at 185. “One is subject to liability to another for trespass, irrespective of whether he thereby causes harm to any legally protected interest of the other, if he intentionally (a) enters land in the possession of the other, or causes a thing or a third person to do so, or (b) remains on the land, or (c) fails to remove from the land a thing which he is under a duty to remove.” \textsc{Restatement (Second) of Torts} § 158 (1965). An actor’s intent does not necessarily have to be hostile or possess a harmful motive, but “is an intent to bring about a result which will invade the interests of another in a way that the law will not sanction.” \textit{Bradley}, 709 P.2d at 786 (citing W. \textsc{Prosser, Torts}, § 8, at 31-32 (4th ed. 1971)). “Intent may be established if the defendant knows that there is a substantial certainty that its actions will result in the invasion.” \textit{Patton, Boggs & Blow, supra} note 99, at 29-30.\textsuperscript{177.} \textit{See Amphitheaters, Inc.}, 198 P.2d at 850.\textsuperscript{178.} \textit{See Powell, supra} note 98, at n.22. “[I]nterests in land are protected under
the harm suffered is substantial.”179 Although most courts initially required the intruding object to be visible to the unaided eye in order for it to be considered a trespass rather than a nuisance,180 many jurisdictions may have begun to abandon this rule in modern air pollution cases.181

Perhaps the leading and only model case for light as trespass, albeit an unsuccessful one for the plaintiff, is Amphitheaters, Inc. v. Portland Meadows.182 The court was not convinced that the cases relied upon by the plaintiff in his trespass claim were analogous to the case at bar,183 and held that nuisance was the more appropriate claim for the plaintiff since the race track’s operations were not substantial enough to constitute a trespass.184 Given the relatively unsuccessful holding for the

tree theories: The defendant intentionally invaded a legally protected interest; the defendant negligently or recklessly brought about an invasion of the plaintiff’s interest; or the defendant accidentally caused an invasion in the course of engaging in an activity for which strict liability is imposed.” Id.

179.   PATTON, BOGGS & BLOW, supra note 99, at 30. “The degree of substantiability will depend, as in nuisance, on the facts of the case and the outlook of the court that is examining those facts.” Id. In many cases, a court will consider direct invasions with less scrutiny as they would indirect invasions in trespass claims. See id. “The distinction between injuries which were direct and substantial and those which were considered indirect and less substantial eventually evolved into a fictitious ‘dimensional’ test: ‘[i]f the intruding agent could be seen by the naked eye, the intrusion was considered a trespass.’” Powell, supra note 98, at 186. Otherwise, invisible objects were considered a nuisance as they were indirect and less substantial. See id. See also Borland, 369 So.2d at 527 (stating that “[t]he modern action for trespass to land stemmed inexorably from the common law action for trespass which lay when the injury was both direct and substantial”).

180. See Powell, supra note 98, at 186.

181. See id. “The traditional rule limiting trespass to invasion of things that can be seen with the naked eye is an arbitrary one that has been discarded in some modern airborne pollution cases.” Id. But see Michael C. Anibogu, The Future of Electromagnetic Field Litigation, 15 PACE ENVT'L. L. REV. 527, 593 n.443 (1998) (noting the rule of a 1982 California Supreme Court decision that “actionable trespass may not be predicated upon non-damaging noise, odor or light”). See also Wilson v. Interlake Steel Co., 32 Cal.3d 229, 233 (1982) (“All intangible intrusions, such as noise, odor, or light alone, are dealt with as nuisance cases, not trespass.”).

182. 198 P.2d 851 (Or. 1948). For facts of this case see supra notes 124-29 and accompanying text.

183. See Amphitheaters, Inc., 198 P.2d at 850-51. The plaintiff relied upon one case which involved a trespass claim where the United States was “continuously firing artillery over the petitioners’ land[,]” to which the Oregon Supreme Court replied, “[w]e need not argue the distinction between a cannon ball and a ray of light.” Id. at 851. Furthermore, the plaintiff’s reliance on Shelburne, Inc. v. Crossan Corp., 95 N.J. Eq. 188 (1923), and another case involving light cast upon an individual’s property resulted in the court pointing out that those cases were decided under the theory of nuisance, not trespass. See id. at 851.

184. See id. at 850-51.
plaintiff in *Amphitheaters, Inc.*, as well as in the traditional pollution cases mentioned above, it is unlikely that light pollution, let alone light crossing one property owner’s boundary to another, will ever constitute a trespass. As such, statutes and regulations providing for such types of claims may be required in order to address the growing problem of light pollution.

V. MODERN DEVELOPMENTS IN LIGHT POLLUTION LEGISLATION

Given the increased levels of light use around the country, and the relatively minimal and unpredictable success of common law claims for plaintiffs seeking to curb their neighbors’ light use, additional sources of law governing light use are needed if we are to curb light pollution as a larger problem. To date, there is no federal, and relatively little state, legislation in place to reduce light pollution and its impacts, and the majority of legislation for reducing this relatively new type of pollution largely exists at the county and municipal levels.

There are a few pioneer states that have enacted statewide or partially statewide light pollution or light reduction statutes. The goal, scope and

---

185. *See supra* notes 95-184 and accompanying text.
186. *See, e.g., infra* notes 189-239, 242-51 and accompanying text for examples of state and local regulations that are geared towards further reducing light pollution that is different from the typical property owner versus property owner dispute over misdirected light.
187. *See Brown, supra* note 7, at 62. The United States Environmental Protection Agency’s Green Lights Program is designed to promote voluntary energy conservation, but largely as it relates to indoor lighting and not outdoor lighting. *See id.* There is nothing currently in the federal Clean Air Act or other federal legislation to regulate light pollution. *See 42 U.S.C. §§ 7401-7671* (Clean Air Act provisions). But see John-Mark Stensvaag, *State Regulation of Nuclear Generating Plants Under the Clean Air Act Amendments of 1977*, 55 S. CAL. L. REV. 511, 535 n.131 (1982) (suggesting that if “air pollution agent” under the Clean Air Act is interpreted broadly, then the Clean Air Act could conceivably cover nonionizing electromagnetic radiation which includes, among other things, visible light).
188. *See Brown, supra* note 7, at 49. “[L]egislation, regulations, or government policies to control the adverse effects of lighting are being implemented at the federal, state, and especially the local levels.” *Id.*
189. Arizona, Connecticut, Maine, Michigan, New Mexico and Texas have state statutes that in some way regulate the use of light within all or a portion of the state. *See ARIZ. REV. STAT. ANN. §§ 49-1101-06* (2001) (specifying what types of light fixtures can be used in outdoor lighting, such as fully or partially shielded fixtures, automatic shutoff devices and prohibition of mercury vapor fixtures); CONN. GEN. STAT. ANN. §§ 13a-110-110a (2001) (providing the types of roadway light fixtures that may be paid for with state funds); CONN. ACTS. 01-134 (Reg.) (repealing and amending § 13a-110a to include municipal roads and municipal funds in addition to
purpose of these statutes varies widely. In Arizona, the legislature found that “the continued existence of astronomical observatories in Arizona is in the best interests of the state,” thus requiring a tighter control on nearby outdoor lighting.\textsuperscript{190} Connecticut, through its statute, tries to “maximize energy conservation and to minimize light pollution, glare and light trespass” from roadway lighting.\textsuperscript{191} Similarly, a Maine statute was drafted to minimize “glare and light trespass” from publicly funded lights along roadways.\textsuperscript{192} A Michigan statute governs a limited region near Lake Hudson\textsuperscript{193} where specific sections of Lenawee County in Michigan have been designated as a “dark sky preserve.”\textsuperscript{194} Some of the activities the legisla-

\begin{itemize}
\item[\textsuperscript{190}] ARIZ. SESS. LAWS CH. 236 §1 (West 1999). “[T]he legislature requests the cooperation of public and private utilities, billboard owners, counties, municipalities and others owning or operating outdoor lights to reduce light pollution which interferes with the successful operation of such observatories.” \textit{Id}.
\item[\textsuperscript{191}] CONN. GEN. STAT. § 13a-110a (West Supp. 2001). The title of this section, which falls under the Highway and Bridges title, is “Highway lighting designed to maximize energy conservation and minimize light pollution.” \textit{Id}.
\item[\textsuperscript{192}] See ME. REV. STAT. ANN. tit. 23, § 708 (West Supp. 2001).
\item[\textsuperscript{193}] See MICH. COMP. LAWS ANN. §§ 324.75102-.75105 (West 1999).
\item[\textsuperscript{194}] See id. §§ 324.75101-.75102. “‘Dark sky preserve’ means the area desig-
ture intended to protect in those areas includes those that require darkness, such as “enjoyment of the night sky, nighttime photography, and wildlife photography.”\textsuperscript{195} One Texas statute clearly is aimed at protecting the livelihood of the state’s astronomers\textsuperscript{196} and gives a wide range of options for county commissioners,\textsuperscript{197} while the other statute appears to consider certain factors similar to Maine and Connecticut when allowing the use of state funds for lighting.\textsuperscript{198}

Perhaps the most comprehensive state statute belongs to New Mexico.\textsuperscript{199} Titled the “Night Sky Protection Act,”\textsuperscript{200} the purpose of this statute “is to regulate outdoor night lighting fixtures to preserve and enhance the state’s dark sky while promoting safety, conserving energy and preserving the environment for astronomy.”\textsuperscript{201} By enacting this statute, New Mexico became the only other southwestern state to join Arizona in actively trying...
to preserve the night sky for its astronomers. While Texas also has legislation designed to protect astronomical observations, the Texas statute is more limited than the New Mexico statute in that commissioners can only enact orders if the area is within fifty-seven miles of a major astronomical observatory. Despite being enacted to protect the astronomers in each state, the positive result of these statutes – reduced nighttime light – potentially benefits wildlife and people as well.

Of the six state statutes regulating light pollution within at least a portion of the state’s boundaries, only Texas actually defines light pollution. Instead, most of these statutes define and regulate types of acceptable or unacceptable light fixtures installed or repaired with state funds, or other factors that contribute to light pollution. The comprehensive and statewide New Mexico statute defines “outdoor lighting fixture” as “an outdoor artificial illuminating device, whether permanent or portable, used for illumination or advertisement, including searchlights, spotlights and floodlights, whether for architectural lighting, parking lot lighting, landscape lighting, billboards or street lighting.” Beginning January 1, 2000, the New Mexico Night Sky Protection Act took effect and required virtually all newly installed outdoor lighting fixtures to be shielded, and no

202. See supra note 190 and accompanying text.
203. See TEX. LOC. GOV’T CODE ANN. § 240.032(a). See also VA. CODE ANN. § 15.2-920, supra note 189 (allowing localities to regulate outdoor lighting only in areas within one-half mile around such observatories).
204. See TEX. HEALTH & SAFETY CODE ANN. § 425.001(2). “Light pollution’ means the night sky glow caused by the scattering of artificial light in the atmosphere.” Id.
205. See, e.g., ARIZ. REV. STAT. ANN. § 49-1101 (providing definitions only for types of lighting fixtures); CONN. GEN. STAT. ANN. § 13a-110a(6) (providing only a definition of “light trespass” to mean “light emitted by a luminaire that shines beyond the boundaries of the property on which the luminaire is located”); ME. REV. STAT. ANN. tit. 23, § 708(1) (defining only “Commissioner” and “roadway lighting”); ME. REV. STAT. ANN. tit. 5, § 1769 (defining “light trespass” identical to Connecticut’s definition); MICH. COMP. LAWS ANN. § 324.75101 (defining only “dark sky preserve” and “fully shielded”); N.M. STAT. ANN. § 74-12-3 (defining only “outdoor lighting fixture” and “shielded”).
206. N.M. STAT. ANN. § 74-12-3(A) (Michie 2000). Arizona defines “outdoor lighting fixture” in almost identical terms. See ARIZ. REV. STAT. ANN. § 49-1101(2) (West 1999) (adding lighting for recreational areas to the list). See also TEX. HEALTH & SAFETY CODE ANN. § 425.001(3) (excluding from its list -- but otherwise similar to Arizona and New Mexico -- “lighting equipment that is required by law to be installed on motor vehicles or lighting required for the safe operation of aircraft”).
207. N.M. STAT. ANN. § 74-12-4 (Michie 2000). The Act does not require that incandescent fixtures of 150 watts or less and all other sources of light up to 75 watts be shielded. See id.
mercury vapor outdoor lighting fixtures can be sold or installed. Furthermore, “an outdoor lighting fixture not meeting these provisions shall be allowed, if the fixture is extinguished by an automatic shutoff device between the hours of 11:00 p.m. and sunrise.” The broad scope of the New Mexico statute becomes quite apparent when compared to other statutes – the regulations are not restricted to state funded activities or lighting fixtures.

Arizona’s statute also applies equally to most public and private lighting and is quite similar to the New Mexico statute. One difference between the Arizona and New Mexico statutes is that Arizona exempts streetlight fixtures from being shielded if a shielding device is not available from the light manufacturer. Additionally, the Arizona statute, while allowing automatic shutoff devices for nonconforming light fixtures, does not mention the requirements for outdoor recreational facilities. In this way, the Arizona statute appears to be slightly more lenient in regulating light use outdoors.

In contrast, Maine merely regulates state-funded permanent outdoor “luminaires,” defined as “the complete lighting system, including the lamp and the fixture,” on highways, or “roadway lighting.” Similarly, Con-
necticut also regulates which state-funded “luminaires” can be used on roadways. Two feasible limitations to these two states’ statutes are that they only pertain to state funded lighting, and the lighting is limited to roadway lighting. Furthermore, Michigan’s statute is even more restricted in that it regulates very localized lighting activity near Lake Hudson. Although these statutes may be a step in the right direction, the proliferation of light use leading to light pollution has not been limited to state highway lighting or to small regions of a state.

In addition to defining what types of fixtures are to be regulated, the statutes in the six states – Arizona, Connecticut, Maine, Michigan, New Mexico and Texas – all generally provide a minimum indication of how much light should be emitted and where, unless an exemption exists. For example, in its dark sky preserve areas, Michigan requires that “lighting shall be directed downward,” and when possible and/or appropriate, “fully shielded fixtures” or “motion sensor fixtures” should be used. In Connecticut, in addition to being required to “maximize energy conservation and minimize light pollution, glare and light trespass,” no state funds will be used to install or replace permanent outdoor lights unless the light emitted from the luminaire is adequate for its intended purpose, and is a “full cutoff” luminaire on secondary roads or primary roads where safety will not be compromised. Connecticut also requires that state-funded light fixtures be allowed only in areas where “the purpose of the lighting installation or replacement cannot be achieved by reducing the speed limit in the area to be lighted or by installing reflectorized roadway

mizing glare and light trespass. Id. § 708(2).

215.  See CONN. GEN. STAT. ANN. § 13a-110a(a)(8), (b) (Supp. 2001).
216.  See id. § 13a-110(a), (b).  See also ME. REV. STAT. ANN. tit. 23, § 708(1)(B), supra note 214 and accompanying text.
217.  See MICH. COMP. LAWS ANN. § 324.75102 (West 1999).
218.  See, e.g., supra notes 27-33, 44-57 and accompanying text.
219.  See infra notes 220-29 and accompanying text.
220.  MICH. COMP. LAWS ANN. § 324.75104(a) (West 1999).  The county commission is responsible for ensuring that only lighting for safety, security or the reasonable use and enjoyment of the property is used within the preserve, and that it does not reasonably interfere with activities requiring darkness. See id. § 324.75103.
221.  See id. § 324.75104(b), (c).  “Fully shielded” fixtures must be “shielded or constructed so that no light rays are emitted by the installed fixture at angles above 15 degrees below the horizontal plane and also constructed so that the filament or light source is not visible to the naked eye when viewed from a point higher than 15 degrees below the horizontal plane.” Id. at § 324.75101(b).
223.  See id. § 13a-110a(b)(2).
224.  See id. § 13a-110a(b)(3)-(4).  “Full cutoff luminaire” is defined as a “luminaire that allows no direct light emissions above a horizontal plane through the luminaire’s lowest light-emitting part.” Id. § 13a-110a(a)(2).
markers, lines, warnings, informational signs or other means of passive or reflective lighting.\textsuperscript{225} Similarly in Maine, no state funds will be used to replace or install any outdoor luminaire unless it is a “full cutoff luminaire,” and the “maximum illuminance does not exceed the minimum illuminance recommended for that purpose.”\textsuperscript{226}

In Arizona, all outdoor lighting fixtures are required to be fully or partially shielded if over a certain wattage.\textsuperscript{227} If outdoor lights do not meet this requirement or fall under other exemptions, they may use automatic shutoff devices to keep lights off from midnight through sunrise.\textsuperscript{228} The New Mexico statute, while similar to the Arizona statute, provides further explanation for permissible use of lighting for private and public outdoor recreational facilities.\textsuperscript{229}

In some states, certain exemptions from the statute may apply thus limiting the extent of how much light is being reduced or regulated.\textsuperscript{230} For instance, in the Texas statute regulating light use within fifty-seven miles of observatories, there is an exemption for “outdoor lighting in existence or under construction on September 1, 1975.”\textsuperscript{231} In its other light pollution statute, Texas exempts temporary emergency lighting, temporary lighting necessary for nighttime work, special events requiring additional lighting, lighting used solely to enhance the “aesthetic beauty of an object” or any compelling safety interest not addressable by other means.\textsuperscript{232} Despite New Mexico’s extensive legislation in this area, there are many exemptions from the statute, including “fixtures on advertisement signs on interstates and federal primary highways,”\textsuperscript{233} “fixtures existing and legally installed prior to the effective date of the [statute],”\textsuperscript{234} lighting required for “worker

\begin{itemize}
\item \textsuperscript{225} Id. § 13a-110a(b)(7)
\item \textsuperscript{226} See ME. REV. STAT. ANN. tit. 23, § 708(2) (West 1999); ME. REV. STAT. ANN. tit. 5, § 1769(2) (West 2002). Consideration should also be made to minimize glare and light trespass. \textit{See id.}
\item \textsuperscript{227} See ARIZ. REV. STAT. ANN. § 49-1102 (West 1999). Streetlights are exempt if the manufacturer does not provide a shielding device. \textit{See id.} In addition, airport navigational lighting is also exempt from this statute. \textit{See id.} § 49-1105.
\item \textsuperscript{228} See ARIZ. REV. STAT. ANN. § 49-1103 (West 2001).
\item \textsuperscript{229} See N.M. STAT. ANN. § 74-12-5(B) (Michie 2000). “No outdoor recreational facility, whether public or private, shall be illuminated after 11:00 p.m. except for a national or international tournament or to conclude any recreational or sporting event which is in progress prior to 11:00 p.m. at a ballpark, outdoor amphitheater, arena or similar facility.” \textit{Id.}
\item \textsuperscript{230} \textit{See infra} notes 231-36 and accompanying text.
\item \textsuperscript{231} TEX. LOC. GOV’T CODE ANN. § 240.034 (Vernon 2002).
\item \textsuperscript{232} \textit{See} TEX. HEALTH & SAFETY CODE ANN. § 425.002(c)(2)-(5) (Vernon 2002).
\item \textsuperscript{233} N.M. STAT. ANN. § 74-12-7(1) (Michie 2000).
\item \textsuperscript{234} \textit{Id.} at § 74-12-7(2). “[H]owever, when existing lighting fixtures become unrepairable, their replacements are subject to all the provisions of the Night Sky
safety at farms, ranches, dairies, feedlots or industrial, mining or oil and gas facilities, and lights required for navigation at airports and aircraft safety. Ironically, these types of exemptions are also some of the larger and more harmful sources of light pollution.

Only two states provide for any kind of penalty for violations in their statutes—New Mexico and Texas. In New Mexico, “[a]ny person, firm or corporation violating the provisions of the Night Sky Protection Act shall be punished as follows: A. for a first offense, the offender may be issued a warning; and B. for a second offense or offense that continues for thirty days from the date of the warning, [the offender will be charged $25.00] minus the replacement cost for each offending fixture.” In Texas, a violator may be sued by the county or district attorney for an injunction, and is found to have committed a misdemeanor.

Over the past few years, several state bills have been introduced to state legislatures to enact statutes that will reduce light pollution or prompt studies of light pollution. Perhaps the increasing introduction of these bills
is due in large part to organizations such as the International Dark Sky Association and its local chapters that provide information for citizens seeking to introduce legislation at the state or local level. While it is encouraging that some states are becoming increasingly aware that the night sky is a viable natural resource and are providing for the study of light pollution, many states repeatedly fail to pass statewide light pollution laws. Whether or not these bills pass now or in the future may depend on increased awareness and research findings regarding the effects of light pollution, and the determination that this kind of pollution should be regulated.

Municipal and county legislation is currently the most abundant source


243. See, e.g., H.S.B. 574, 78th Gen. Assem., 2d Sess. (Iowa 1999). In this House Study Bill, the General Assembly found that

[the night sky is an important part of the natural heritage of the citizens
of Iowa] and steps should be taken to minimize the amount of terrestrial
light that shines up into the night sky. Uplight from terrestrial light
sources is wasteful and has made it increasingly difficult for the citizens
of the state to enjoy the night sky because celestial objects are obscured.
Id. “Celestial objects” includes “stars, constellations, the milky way, meteors, comets, the northern lights, star clusters, nebulae, galaxies, the moon, and the planets.” Id.


245. See supra note 241 and accompanying text.
of light regulation.\textsuperscript{246} Traditionally, these bylaws have mandated that emitted light does not extend visibly beyond the property line or create significant glare, and they represent the codification of light as trespass or nuisance.\textsuperscript{247} More recently however, as awareness and appreciation of the harmful effects of light pollution has grown, municipalities have been enacting regulations specifically to reduce light pollution.\textsuperscript{248} Regions within

\textsuperscript{246} “Most towns have zoning bylaws with some provisions related to lighting, intended to avoid nuisance conditions such as bright light from commercial properties spilling onto residential properties.” Brown, \textit{supra} note 7, at 59. For purposes of this Note, however, only a small and general sampling of the myriad of lighting regulations will be highlighted.

\textsuperscript{247} See id. at 60. See, e.g., NEWPORT, R.I., CODIFIED ORDINANCES ch. 17.96, \textsection 17.96.020(H), \textit{available at} http://ordlink.com/codes/newportr/maintoc.htm (last visited Apr. 19, 2002) (“All external illumination shall be directed or shielded in such a manner that the illuminated areas are confined essentially to the property on which the illumination originates”).

\textsuperscript{248} See Brown, \textit{supra} note 7, at 61. For example, Bisbee, Arizona has entitled one of its ordinances the “Light Pollution Code.” BISBEE COUNTY, ARIZ., ORDINANCE 0-98-10, art. 7.10 (1998), \textit{available at} http://c3po.cochise.cc.a3.us/astro/pollution05.htm (last visited Apr. 19, 2002). The purpose of this ordinance is to:

A. Minimize light pollution and light trespass for the enjoyment and use of property and the night environment by the citizens of the City of Bisbee, and

B. Encourage the use of types, kinds, construction, installation and uses of outdoor light fixtures, lighting practices and systems which will reduce light pollution and light trespass, and

C. Benefit astronomical research and observations, and

D. Conserve energy while increasing nighttime visibility, utility, security and productivity.

\textit{Id.} at art. 7.10.1. In the city of Ketchum, Idaho, there exists an ordinance known as the “Dark Sky Ordinance.” See KETCHUM, ID., ORDINANCE 743 (June 21, 1999), \textit{available at} http://darksky.org/~pai/valIDA/ords/ketadrlo.html (last visited Apr. 19, 2002). Recognizing that Ketchum’s dark nighttime sky is a natural resource to be enjoyed by both residents and tourists to this resort area, the purpose of the ordinance is worded more extensively than the Bisbee ordinance:

1.2 Purposes - The general purpose of this Ordinance is to protect and promote the public health, safety and welfare, the quality of life, and the ability to view the night sky, by establishing regulations and a process of review for exterior lighting. This Ordinance establishes standards for exterior lighting in order to accomplish the following:

a. To protect against direct glare and excessive lighting;

b. To provide safe roadways for motorists, cyclists and pedestrians;

c. To protect and reclaim the ability to view the night sky, and thereby help preserve the quality of life and the tourist experience;

d. To prevent light trespass in all areas of the City;

e. To promote efficient and cost effective lighting;

f. To ensure that sufficient lighting can be provided where needed to promote safety and security;

g. To allow for flexibility in the style of lighting fixtures;

h. To provide lighting guidelines;
the United States where astronomical observatories are more common have been some of the first communities to enact light pollution prevention legislation.249 However, areas that do not have local astronomical research stations have also taken into account the night sky when enacting ordinances.250 Some communities specify design requirements for certain lighting activities,251 the maximum output of light from a fixture,252 or sug-

i. To provide assistance to property owners and occupants in bringing nonconforming lighting into conformance with this Ordinance; and,

j. To work with other jurisdictions within Blaine County to meet the purposes of this Ordinance.

Id. at § 1.2.

249. See Brown, supra note 7, at 60. “A small number of municipalities developed more focused outdoor lighting regulations as early as the 1970s, primarily to reduce adverse effects on astronomical research.” Id. In Arizona, one of the states that also has a statewide light pollution prevention statute, there are two major observatories in the Tucson area. See id. Because of its local regulations, “Tucson is reputed to be the only city in the United States with a population exceeding 500,000 where the Milky Way is visible from the city center . . . .” Id. Similar legislation was later passed in Boxborough and Harvard Massachusetts, two towns close to the Oak Ridge Observatory, the largest telescope east of the Mississippi River. See id.

250. See id. at 60-61. For some localities, the incentive to reduce light use may be purely economic and not environmental. See Keri Buscaglia, Light Pollution is a Glowing Concern, CHIC. TRIB., Jan. 31, 2001, at 4 (noting that some dark sky advocates often point out that with a few simple modifications to current lighting, a savings of $200,000 a year could be attained in a city of 600,000 residents); Let There Be Less Light, CAPITAL TIMES, Oct. 15, 1999, at 10A (turning off 1,200 street lights in Madison, Wisconsin would have saved $50,000 annually). While many of these towns also see the economic incentive in reducing the number of lights or increasing the energy efficiency in the bulbs that are used, the aesthetic benefits of reducing light pollution may also be a driving factor. See Brown, supra note 7, at 61-62.

251. See Brown, supra note 7, at 62. Atlanta, Georgia requires billboards to be lit from the top of the sign facing down rather than lights on the bottom of the sign facing up. See id. In Limerick, Pennsylvania, the town ordinance requires, among other things, that “[d]irectional fixtures such as flood lights, spot lights and sign lights shall be installed or aimed so that they do not shine directly into the window of a neighboring residence, directly into a roadway, or skyward.” LIMERICK TOWNSHIP, PA, ORDINANCE ch. 180 § (C)(3)(b) (Nov. 6, 1996). Limerick also has a provision for illuminated signs as well: “Externally illuminated signs shall be lighted by fixtures mounted at the top of the sign and aimed down rather than by fixtures mounted at the bottom of the sign and aimed up.” Id. at § 3(f). In Moab, Utah the requirement is more of a performance standard rather than a specific design standard. See MOAB, UTAH, CITY CODE § 15.44.070 (2001). “Lighted signs shall have stationary and constant lighting . . . . A lighted sign on a property that abuts a residential zone shall be subdued and shall not be allowed to penetrate beyond the property in such a manner as to annoy or interfere with the adjacent residential properties.” Id. at § 15.44.070 (A)-(B). If a person complains about any light that reaches a residential property, the city council can either dismiss the complaint as unreasonable or require the offending party to use shielded lights. See id. at 15.44.070 (B). In Bisbee, Arizona, outdoor lights of
gest or require certain periods during which exterior lights should be turned off.253 Other communities have enacted ordinances with the local habitat and wildlife in mind.254 Penalties for violations can also be found in some ordinances.255

greater than 150 watts are required to be either fully or partially shielded, with an exemption created for streetlights if such lights are not available from the manufacturer, and a general exemption for outdoor sporting events (which are required to use shielded fixtures) that have started prior to 11:00 p.m. See Bisbee County, Ariz., Ordinance 0-98-10, art. 7.10, §§ 7.10.3, 7.10.7 (May 5, 1998).

252. See, e.g., Ketchum, Id., Ordinance 743 §§ 3.2, 3.6 (June 21, 1999) (providing certain exemptions from using shielded fixtures where the wattage or lumen output is below a specified amount); Limerick Township, Pa., Ordinance 180 § 3(C)(1)(a) (Nov. 6, 1996) (providing a chart for the intensities of light allowed in certain areas such as parking lots and roadways). Pima County, Arizona is one of the first communities to establish a lumens per acre restriction on lighting in a metropolitan area, it is only the third law in the country to limit lumens per acre. See Rotstein, supra note 61, at A2 (noting also that Flagstaff and Cottonwood, Arizona are the other two communities with such stringent requirements for lighting output).

253. See, e.g., Ketchum, Id., Ordinance 743 § 3.5 (June 21, 1999) (encouraging community members to turn off “[a]ll non-essential exterior commercial and residential lighting . . . after business hours and/or when not in use. Lights on a timer are encouraged. Sensor activated lights are encouraged to replace existing lighting that is desired for security purposes”); Boulder, Colo., Boulder Rev. Code, tit. 10, ch. 11, § 10-11-3(c)(5)(D)(1981) (requiring indirectly or internally lit signs in a residential area to be turned off between 11:00 p.m. and 7:00 a.m., unless required for safety); Boulder, Colo., Boulder Rev. Code, tit. 10, ch. 11, § 10-11-3(c)(5)(E) (1981) (requiring any illuminated sign visible from and located within 300 feet of residentially zoned property to be turned off between 11:00 p.m., or one-half hour after the use of which is completed, and 7:00 a.m.).

254. See, e.g., Maui, Haw., County Code, ch. 19.7, § 19.70.100(O) (2001) (providing in its zoning statute for the Lanai Project District of Maui, Hawaii that “lighting shall be established in a manner so as to not adversely impact the surrounding areas including the shoreline and ocean”); Fla. Admin. Code Ann. r. 62B-55.001 (2000) (requiring the Florida Department of Environmental Protection to “designate coastal areas utilized, or likely to be utilized, by sea turtles for nesting, and to establish guidelines for local government regulations that control beachfront lighting”). For a recent case involving the Florida ordinance, see Loggerhead Turtle v. County Council of Volusia County, 148 F.3d 1231 (11th Cir. 1998), cert. denied, 526 U.S. 1081 (1999). See also Katherine R. Butler, Comment, Coastal Protection of Sea Turtles in Florida, 13 J. Land Use & Envtl. L. 399, 423-26 & nn.236-54 (providing a detailed overview of the state of Florida’s and its several coastal counties’ attempts to protect sea turtles through lighting ordinances); Cece Von Kolnitz, Oak Island/Providing an Improved Habitat, MORNING STAR, Sept. 28, 2000 (describing a Wilmington, North Carolina project to create a sea turtle nesting area and the recent approval of a “lighting ordinance meant to reduce light pollution for the turtles”).

255. See, e.g., Bisbee County, Ariz., Ordinance 0-98-10, art. 7.10, § 7.10.9 (1998) (imposing a minimum fine of $100 to a maximum of $1,000 for each day there is a violation of the ordinance).
Notwithstanding the benefits of the state and local regulations that have been passed, there are also many impediments that have been encountered. One of the problems with many regulations is that they are often too vague, difficult to enforce or remain completely unenforced by law enforcement officials. In other cases, they do not appear to be stringently or sufficiently worded to prevent light pollution. Fears of crime and reduced safety also seem to inhibit cities and towns from enacting more rigorous regulations. Certain enacted or proposed regulations,  

256. See infra notes 257-62 and accompanying text.  
257. See Brown, supra note 7, at 59. Many light fixtures, even those that are shielded, often emit some amount of light that may cross a property line, and often there is not an adequate definition of what constitutes glare so it is difficult to prohibit such activity. See id. “Because of the imprecision and unintended stringency of such bylaws, they are rarely enforced.” Id. Furthermore, residents have expressed fears that individual freedoms may be compromised by the “light police.” See id. at 61. In Deschutes County, Oregon, one of the region’s first dark sky preservation ordinances was enacted six years ago, imposing maximum allowable lighting intensities. See Doug Irving, Mayor Wants to Tone Down Glow, PORTLAND OREGONIAN, Nov. 21, 2000, at D02. Despite its presence on the books, the county had only recently begun enforcing this ordinance in September of 2000, and has yet to issue the $250 fine for violations. See id. But see Peter H. Lehner, Act Locally: Municipal Enforcement of Environmental Law, 12 STAN. ENVTL. L.J. 50, 55-66 (1993) (arguing that municipalities are perhaps in the best position to enforce environmental law against polluters because they “have great incentive to act, knowledge about which of the numerous local violators present the greatest threat, flexibility to pursue those violators under a variety of laws, [standing and credibility,] and the ability to respond quickly”).  
258. See, e.g., ANN ARBOR, Mich., CITY CODE, ch. 61, § 5:510 (1998). This zoning ordinance provides that signs may be illuminated by artificial lights, provided they are white, but does not require any specific output or placement of the lights. See id. In residential areas of Quincy, Massachusetts, “no outdoor decorative or flood-lighting shall be permitted except lighting primarily designed to illuminate walks, driveways, parking areas, doorways, outdoor living areas or outdoor recreational facilities, . . . except temporary holiday lighting, and except decorative floodlighting of institutions, public or historic buildings.” QUINCY, MASS., CITY CODE tit. 17, § 17.36.010 (1999).  
259. See, e.g., LAS VEGAS, Nev., CITY CODE § 18.12.260 (2001). In a city generally known for its thousands of outdoor electric lights, Las Vegas’ street lighting ordinance only vaguely requires that “[s]treet lighting for public streets shall be designed, installed or upgraded in accordance with City standards.” Id.  
260. See, e.g., Terri Williams, Astronomer Fights for ’Good Sky,’ DALLAS MORNING NEWS, Dec. 22, 2000, at 1M (quoting Mesquite, Texas Mayor Mike Anderson as saying that, when asked to consider changing the types of bulbs in the retail and business areas of the city, it was not feasible because “[i]t’s important we provide enough lights for our citizens for their public safety”); Let There Be Less Light, CAPITAL TIMES, Oct. 15, 1999, at 10A (safety concerns of residents were seen to outweigh the economic savings that would have resulted from proposed legislation to turn off over 1,000 lights in residential neighborhoods and along busy roads). But see
denounced as illegal, unfair or inapplicable in some cases, have been the center of controversy in lawsuits or town meetings. Finally, convincing supra note 26 and accompanying text (showing, for example, that a U.S. Department of Justice study indicates that crime does not increase at night when there is less light than during the day).

261. For recent litigation involving the Tucson, Arizona Outdoor Lighting Code (OLC), which designates how billboards must be illuminated, see Whiteco Outdoor Advertising v. City of Tucson, 972 P.2d 647, 648 (Ariz. Ct. App. 1998) (involving the ability of a charter city in using its police powers to ban light fixtures mounted on the bottom of billboards and whether the nonconforming use statute in an outdoor lighting code precludes it from doing so) and Eller Media Co. v. City of Tucson, 7 P.3d 136, 139 (Ariz. Ct. App. 2000) (subsequent case related to Whiteco Outdoor Advertising [business name changed to Eller] that heard constitutional issues of the OLC). The controversy in Whiteco Outdoor Advertising involved the changing of the original OLC enacted in 1985 (which required billboards to be illuminated from the top, but exempted those that were already in existence and designed with lights elsewhere) to a more recent version of the OLC enacted in 1994 which required all lighting to be mounted on top of billboards without exception. See Whiteco Outdoor Advertising, 972 P.2d at 648. Whiteco was notified by the City of Tucson that its lights were in violation of the 1994 OLC, and subsequently Whiteco argued that the City’s ability to regulate such lighting was granted under the state’s zoning statutes which had a non-conforming use provision (a provision that stated no new ordinance could affect property that was already in existence). See id. at 649. The court ultimately decided that the City did in fact have police powers to regulate billboard lighting, and is not restricted by the state zoning laws in regulating illumination of signs. See id. at 650. Subsequently in Eller Media Co., the court considered Eller Media Company’s claims that the injunction granted by the lower court to stop illuminating signs from the bottom violates substantive due process and equal protection rights. See Eller Media Co., 7 P.3d at 139. Because the OLC requirement does not affect free speech or any other fundamental right (there was no claim by Eller that its billboard messages were inhibited by top rather than bottom mounted lights), and Eller Media Company is not a member of suspect class, the court held the appropriate test is the rational basis test. See id. at 139-40. Under this test, the court held that the OLC’s stated purpose of reducing light shining upwards to better astronomical observations is rationally related to the requirement of top-mounted lights. See id. at 140. Furthermore, the court also disputed that Eller Media Company was denied equal protection under the law simply because other light sources, such as parking lots, are permitted to use other lights. See id. at 140-41. “This suggestion would preclude the City from regulating all but the brightest bulb in the night sky . . . it presumes that all light sources should and must emit the same amount of light.” Id. at 141. See also Howard Fischer, Cities the Boss on Lighting Can Regulate Businesses, ARIZ. BUS. GAZETTE, Jan. 18, 2001, at 1 (reporting on the most recent activity in the Whiteco Outdoor Advertising and Eller Media cases). “Arizona cities have broad rights to regulate outdoor lighting by businesses, even for purely aesthetic reasons . . . the Arizona Supreme Court upheld a 16-year old Tucson ordinance that requires billboards to be lighted from the top.” Id. See also Daniel M. Monte, Summerfield Decides to Turn Down Lights, Keep Small-Town Feel, GREENSBORO NEWS & RECORD, Sept. 6, 2000, at B7 (some residents believed that the proposed ordinance, which was ultimately passed, would be costly for
the general public that light pollution is even an environmental problem, and more importantly, that it can be solved, is yet another hurdle in advancing legislation. 262

VI. THE NOISE POLLUTION MODEL: A RECOMMENDATION FOR FEDERAL ASSISTANCE IN REDUCING LIGHT POLLUTION

Given that the common law, 263 state legislation, and local regulation 264 of light do not appear to be adequately dealing with the growing modern problem of light pollution, there may be a need for some additional federal legislative guidance as to how we deal with this relatively new environmental concern. To date, there is no federal regulation of light pollution as it is not explicitly mentioned in the federal Clean Air Act. 265 Until there is at least some uniformity of laws among the states, there may be difficult hurdles for organizations and individuals attempting to curb light pollution without some federal legislation. 266

262. See Zielinski, supra note 66, at B1. Despite the growing prominence of light pollution as an environmental concern and something of great importance to astronomers and non-astronomers alike, light pollution appears to remain low on the list of priorities for anti-sprawl and environmental activists. See id. Gaithersburg, Virginia Councilmember-at-Large, Ann Somerset, who was elected to a platform that had members who were opposed to light pollution legislation, said, “I think [light pollution] has been below the radar, because I don’t think the average person is aware anything can be done. I think you just assume that if you want to see the beauty of the night sky, you have to go to the mountains.” Id. However, there may be a growing appreciation for light pollution as akin to other more widely accepted forms of pollution such as air and water pollution. See Chris Reinolds, Bright Lights in Need of Dimmer Switch, ATLANTA JOURNAL & CONSTITUTION, Nov. 9, 2000, at 9 (quoting a local astronomy club member).

263. See supra notes 95-184 and accompanying text.

264. See supra notes 185-260 and accompanying text.

265. But see supra note 187 and accompanying text.

266. For example, standing, as required by Article III of the United States Constitution, may be an issue for individuals, advocacy organizations or astronomical
An analogue to light pollution can be found in noise pollution. There are several parallels to be drawn between light pollution and noise pollution, which occupied a similarly uncertain territory prior to 1960. Light has the potential to cause distress and is an equally insidious pollutant.

research labs wishing to stop the problem of too much light being emitted from too many sources. See, e.g., Lehner, supra note 257, at 62 & n.42 (referring to what the Supreme Court held in 1992 in Lujan v. Defenders of Wildlife, this article noted that “[l]ack of standing is a growing problem for non-profit environmental groups and local environmentalists”). See also Lujan v. Defenders of Wildlife, 504 U.S. 555 (1992). In Lujan, the plaintiffs were members of an environmental advocacy group that were attempting to stop activities abroad that might have been in violation of the Endangered Species Act. See id. at 562-63. Under the Lujan dicta stating that “of course, the desire to use or observe an animal species, even for purely esthetic purposes, is undeniably a cognizable interest for purpose of standing,” it is uncertain whether individuals who are members of astronomy groups, or nonprofit organizations that study and promote particular nocturnal species, would be considered as possessing Article III standing to argue that light pollution activities must be stopped without some sort of federal legislation. See id. See also Friends of the Earth, Inc. v. Laidlaw Envtl. Serv., 528 U.S. 167, 174-75, 183-85 (2000) (a suit similar to Lujan which held that an environmental group had standing to sue under the citizen suit provision of the Clean Water Act and also reaffirmed that recreational and aesthetic reasons are sufficient for standing). See generally Peter Van Tuyn, Thirtieth Anniversary Edition Essays: “Who Do You Think You Are?”: Tales from the Trenches of the Environmental Standing Battle, 30 ENVTL. L. 41 (2000) (offering a pre-Friends of the Earth look at standing in environmental suits as well as a short interpretation of the Friends of the Earth decision); David R. Hodas, Standing and Climate Change: Can Anyone Complain About the Weather?, 15 J. LAND USE & ENVTL. L. 451, 454-55 (2000) (offering an interesting discussion of standing and the required degree of injury from pollutants responsible for global warming).

Must the plaintiff be directly harmed by the pollutant itself, as is the case in the classic nuisance and pollution cases? Or, may the plaintiff complain about the impact of climate change that will be widespread and suffered by all persons where the threatened impact is only a statistical artifact rather than a particular event or effect that is harmful to the plaintiff? Thus, the climate change standing problem goes to the central question of what is injury, how particularized it must be, and is standing to be essentially a constitutionalization of the special injury rule in public nuisance?

Id. On the other hand perhaps there is some indication that federal legislation is not necessary to give the required standing for light pollution cases. See, e.g., Texas Dep’t Transp. v. City of Sunset Valley, 8 S.W.3d 727, 728 (Tex. 1999) (reaffirming a lower court decision that the municipality of Sunset Valley had standing to sue for the physical taking of its streets, had standing derived from injuries that may result from the increased travel on the expanded highway as well as resultant noise and light pollution, and that the Texas Department of Transportation was not immune from such a lawsuit). This Note does not consider the issues of standing that may arise under federal or other legislation, but recognizes that it may, in fact, be another hurdle in preventing light pollution.

267. See Jewkes, supra note 5, at 10.
Noise and light are both intangible and ephemeral. ... It is the perception of the relative degree, frequency and effect of the problem which causes noise pollution to be more regulated than light pollution rather than any technological differences.268

Under this assumption, we may find potential solutions and ideas on how best to deal with light pollution, and perhaps avoid some of the mistakes that have already been made, by looking to the federal regulation of noise.

Described as unwanted sound,269 noise is considered an environmental pollutant270 with several harmful effects—similar, in many aspects, to light pollution.271 The generally recognized sources of unwanted sound include airplanes and airports,272 automobiles,273 sonic booms,274 and a myriad of

---

268. Id. (making this analogy as part of an analysis of light pollution in England).


270. See GRAD, supra note 269, at 5-2. “[Noise] is nonetheless unique among ‘pollutants’ in that it leaves no residual accumulations. It dissipates very rapidly, and even very loud noises are rather limited in the geographic area they affect. Nonetheless, noise has become a substantial problem, especially in urban areas where three-fourths of the nation’s people live. In spite of its rather limited geographic reach, noise has become a national problem in terms of the control strategies that must be applied.” Id.

271. See CLIFFORD R. BRAGDON, Preface to NOISE POLLUTION: THE UNQUIET CRISIS xvii (1970). “A threat to physical and psychological well-being, the sounds of our technology follow us through our working, leisure, and sleeping hours.” Id. Some of the negative effects of noise include hearing loss, annoyance, psychological problems, physiological stress, and interference with sleep. See id. at 63-80. See also generally KUPCHELLA & HYLAND, supra note 43, at 499-505 (highlighting the various harmful effects of noise, including impacts on wildlife); Jason A. Lief, Note, Insuring Domestic Tranquility Through Quieter Products: A Proposed Product-Nuisance Tort, 16 CARDOZO L. REV. 595, 598-600 (1994) (noting that hearing loss to older individuals may be related to noise encountered during younger ages and the psychological stress resulting from noise may be linked to some cancers). Many of the same or similar health impacts stemming from light pollution are discussed supra at notes 90-94 and accompanying text.

272. See generally Kristen L. Falzone, Comment, Airport Noise Pollution: Is There a Solution in Sight?, 26 B.C. ENVTL. AFF. L. REV. 769, 769 (1999). “Since the introduction of commercial jets in 1958, the noise problem generated from airport operation has become increasingly widespread, affecting millions of Americans.” Id. See also Herbert Tenzer, Jet Aircraft Noise: Problems and Their Solutions, 13 N.Y.L.F. 465 (1967), reprinted in NOISE POLLUTION AND THE LAW 114 (James L. Hildebrand ed., 1970) (noting that, despite the advantages of the commercial jet industry, noise pollution is a primary disadvantage, particularly for those living in prox-
general everyday products. Noise pollution began to receive significant legal and media attention during the 1970s. In terms of environmental priority, like light pollution, noise pollution is not foremost in most people’s minds. While the various sources of modern noise control laws include local, state and federal legislation as well as the common law,

---

273. See generally Steven N. Brautigam, Note, Rethinking the Regulation of Car Horn and Car Alarm Noise: An Incentive-Based Proposal to Help Restore Civility to Cities, 19 COLUM. J. ENVTL. L. 391, 393-95 (1994). Since its debut in the late nineteenth century, the automobile has contributed to noise pollution through engines, horns and most recently, electronic burglar alarms. See id. Analogous disturbances can be said to have occurred since the development of the light bulb which was also developed around the same time. See supra notes 17-43 and accompanying text.


275. See generally James L. Hildebrand, Preface to NOISE POLLUTION AND THE LAW 8-20 (James L. Hildebrand ed. 1970); KUPCHELLA & HYLAND, supra note 43, at 506 (noting that several products used in the home can produce a significant amount of noise, as well as city noise generated by traffic). Similar to noise pollution, light pollution also has several notorious sources of unwanted light. See supra notes 24, 28-33 and accompanying text.

276. See Hildebrand, supra note 272, Preface at v. “Noise pollution and its legal implications is becoming a relevant, current, and important topic for discussion in our technologically expanding society. This is the first book concerning noise pollution and the law to be published in the United States.” Id. (referring to the book which was published in 1970). Light pollution was also becoming a noticeable problem around the 1970s, and today there is significant media coverage of this phenomenon. See supra notes 5-6 and accompanying text.

277. See Brautigam, supra note 273, at 401-02. “With the exception of airport noise, environmental groups have generally ignored noise pollution. This relative neglect of the noise issue may be due to the fact that other, more visible sources of pollution such as air and water pollution have been viewed as more threatening to human and ecological health.” Id. at 401. In comparison, light too is not very high on environmentalists’ priority list either. After the early 1980s when President Ronald Reagan cut funding for the Office of Noise Abatement and Control, noise pollution began to receive less federal attention. See Brad Cooper, Cities Respond to Clamor for Peace and Quiet with Ordinances, KANSAS CITY STAR, Apr. 15, 2001, at B1 (noting that noise “is getting heightened attention across the country,” particularly since the mid-1990s).

278. See Albert J. Rosenthal, Noise Control and the Law, in HANDBOOK OF NOISE CONTROL, 37-3 to 37-5 (Cyril M. Harris, ed., 2d ed., 1979) (outlining the development of various types of noise pollution laws through the mid-1970s); see generally GRAD, supra note 269, at 5-35 to 5-101 (describing in detail the federal regulation of noise since the enactment of the first federal noise pollution statutes in the 1970s). See also supra notes 95-255 and accompanying text as these kinds of pollution control have been utilized to control light pollution.
this was not always the case.
Common law was initially the only source of relief for individuals who wanted to stop nearby noise.279 Nuisance claims comprised the earliest methods of dealing with noise.280 Products liability claims have also been used in many instances.281 In relation to airport noise pollution in particular, inverse condemnation has been another means by which plaintiffs have sought judicial action.282 Eventually, however, these types of claims became inadequate in addressing the growing public need of dealing with sources of noise other than a disruptive neighbor.283
Similar to current light pollution activities, state and local governments began enacting or strengthening local ordinances to deal with noise.284 However, these forms of controlling noise have not been without problems. Some hurdles include enforcement, which remains largely intermittent or impossible;285 vaguely drafted ordinances, which often renders them

279. See Rosenthal, supra note 278, at 37-3. “The earliest forms of noise control law were the creation of the judiciary, well before sufficient public interest was generated in the subject to impel legislatures to enact statutes.” Id.
280. See Lief, supra note 271, at 609-10. However, “[t]he need to protect industrial development has justified new limits on nuisance law just as the industrial age is spawning the most powerful instruments of nuisance.” Id. at 611. “Even when nuisance law provides a remedy against a particular user of a noisy product, it creates no incentive for manufacturers to make a quieter product.” Id. at 612. See also Brautigam, supra note 273, at 417-20 (providing a background of nuisance cases as they relate to car horns and alarms).
281. See, e.g., Brautigam, supra note 273, at 420-21; Lief, supra note 271, at 612-14. This Note will not address products liability claims since they do not appear to have relevance to light pollution.
282. See Falzone, supra note 272, at 777-79. This type of action is “based on the Fifth Amendment of the U.S. Constitution, which requires compensation for the ‘taking’ of private property.” Id. at 777. This Note will not address inverse condemnation claims since most sources indicate that it is not government actors who are generating light pollution, which arguably would constitute a taking.
284. See id. at 37-3 to 37-4. This is similar to what has been happening with light pollution. See supra notes 185-258 and accompanying text. See also GRAD, supra note 269, at 5-101. “Meaningful governmental regulation aimed at securing a quieter environment is a relatively new development.” Id. The legal basis for regulating noise originates from the police powers doctrine. This allows state and local governments to act through legislation to protect their constituents’ health. See id. “If any support for the exercise of the police power were at all necessary, that support is now more readily available” than when state and local governments first addressed noise pollution issues. Id. at 5-102.
285. See Rosenthal, supra note 278, at 37-3. Often ordinances are too vague to enforce, do not provide adequate deterrence to violators since many penalties are mis-
subjectively enforced; and lack of funding to combat noise pollution. Additionally, there has been some indication from the United States Supreme Court that it may consider anti-noise ordinances to be unconstitutional.

On the federal level, there has been some involvement in alleviating noise pollution. The Noise Control Act of 1972 was enacted to “promote an environment for all Americans free from noise that jeopardizes their health or welfare.” Unlike other environmental statutes, the Noise Control Act did not provide specific abatement goals for the Environmental Protection Agency (EPA), the agency charged with overseeing this Act. In 1978, additional federal grant support was provided for with the addition of the Quiet Communities Act. While the EPA Office of Noise Abatement and Control (ONAC) was eliminated in 1981 due to the permanent termination of funding for the Office, this provision of the Act

demeanor penalties, and the authority to control noise has not been granted to a specialized agency. See GRAD, supra note 269, at 5-104 to 5-105. While street and traffic noise are usually left to police, and health laws that deal with air and water pollution are delegated to some official body, there is rarely a noise-specific agency that can handle noise pollution issues at the state or local level. See id. at 5-105. For example, in 1999, the Lexington, Massachusetts, police department had to respond to more than 300 noise-related calls, comprising roughly 2.3 percent of its total calls that year. See Alice Hinkle, Towns Propose Noise Regulations in Quest for Quiet, BOSTON GLOBE (Northwest Weekly Edition), Mar. 25, 2001, at 1.

286. See Falzone, supra note 272, at 780. “[M]ost noise ordinances prohibit ‘unreasonable’ or ‘unusual’ noise. Due to their subjective nature, ordinances utilizing this language are difficult to enforce.” Id. With the advent of technology which now can more adequately measure sound, some ordinances were drafted to have maximum decibel outputs. See id. However, at least with aircraft, although some sounds may be loud and disruptive, they do not last long enough to violate the ordinances. See id.

287. See Lieb, supra note 271, at 616. “[D]espite recent renewed interest in noise, the withdrawal of funding for federal anti-noise efforts may have reduced the incentive to regulate noise at the local level.” Id.

288. See id. at 619-21. (noting that in minority opinions, Justice Frankfurter did not find “aural aggression” to be protected by the Constitution).

289. See Brautigam, supra note 273, at 425-26. “The federal role in noise control has generally been modest, and non-existent [in certain areas of noise control]” Id. at 425. The Federal Aviation Agency is charged with regulating airport noise. See id. at 425-26.


292. See Brautigam, supra note 273, at 426. Due to the lack of specific guidance, there was no legal reason for states and local governments to address noise pollution and as a result, efforts to curb noise pollution were absent. See id.


294. See Brautigam, supra note 273, at 426. With the elimination of ONAC, the federal role in noise pollution also ended, however during its active involvement,
would provide for a good model to begin understanding and reacting to the problem of light pollution on a national scale.

Perhaps the greatest feature of the Quiet Communities Act was the provision for funding public education about noise pollution, research to discover the effects of noise pollution and technical assistance to state and local governments. By replacing “noise” with “light” in most, if not all, provisions of the Quiet Communities Act, one can imagine a “Dark Communities Act.” For instance, given the relatively little research about the harmful effects of light pollution on humans, a provision for funding additional research as to what kinds of harm may occur with the increasing problem of light pollution may be necessary. Furthermore, a “Dark Communities Act,” if drafted in the same way, would also allow for the study of harmful effects on wildlife. As we have seen, some scientists and bird advocacy groups have already begun to see the harmful effects of

the federal government had been limited to research and grants. See id. Upon closing of ONAC, it is estimated that more than 1,000 community noise abatement programs had to shut down due to the cessation of funding. See Falzone, supra note 272, at 785-86. Despite the elimination of ONAC, the Noise Control Act remains in effect. See Lief, supra note 271, at 621-22. “This has created a situation where the federal government is essentially incapable of regulating noise, while the states are preempted from setting their own standards for those products already regulated by the EPA.” Id. at 622. Within the last ten years, there have been some attempts to re-open ONAC, but not everyone has supported the idea for various reasons. See id. In March 2001, a bill was introduced in the 107th Congress aiming to reestablish ONAC and provide for studies and an annual appropriation of $21 million for ONAC activities. See Quiet Communities Act of 2001, H.R. 1116, 107th Cong. (2001).

295. [T]he Administrator [of the Environmental Protection Agency] shall … (a) develop and disseminate information and educational materials to all segments of the public on the public health and other effects of noise and the most effective means for noise control, through the use of materials for school curricula, volunteer organizations, radio and television programs, publication, and other means …

Id.

296. Funding through this provision could be used to conduct or finance research directly or with any public or private organization or any person on the effects, measurement, and control of noise, including but not limited to — (1) investigation of the psychological and physiological effects of noise on humans and the effects of noise on domestic animals, wildlife, and property …

Id.

297. Under this provision, funding could be used to help “develop and implement a national noise environmental assessment program to identify trends in … ambient levels, and compliance data.” Id.

298. See supra notes 90-94 and accompanying text.

299. See supra notes 74-89 and accompanying text.
light on migratory birds and other animals, but they have relatively little control on stopping those light sources. Arguably, unless one of these animals qualifies for protection under an endangered species statute, there may be no incentive to find out to what degree light pollution is affecting wildlife or what kinds of standards should be set for illumination.

Furthermore, as we have seen in Part V, states and local governments have intermittently and non-uniformly regulated light pollution. By providing grants and other federal actions to these state and local governments, there could be a more coordinated effort to reduce light pollution. Since many areas of the nation are urban and have always dealt with excessive light or are suburban and have accepted urban sprawl as a way of life, states, cities and towns may continue to enact (or not) legislation that will not deal with the problem adequately so as to solve it nationally. By enacting a “Dark Communities Act,” or some degree of federal legislation to deal with this type of pollution in the same way that other federal legislation deals with keeping our air and water clean, we may be able to understand the problem of light pollution before it becomes too great.

VII. CONCLUSION

This Note has revealed that light pollution is a growing problem with

300. See supra notes 74-89 and accompanying text for a discussion on the known harmful effects of light pollution on animals.

301. See supra notes 185-258 and accompanying text.

302. See 42 U.S.C. § 4913(c) (1994). Administration of a nationwide Quiet Communities Program was to include, but not be limited to

(1) grants to States, local governments, and authorized regional planning agencies for the purpose of –

(A) identifying and determining the nature and extent of the noise problem within the subject jurisdiction;

(B) planning, developing, and establishing a noise control capacity in such jurisdiction, including purchasing initial equipment;

(C) developing abatement plans for areas around major transportation facilities (including airports, highways, and rail yards) and other major stationary sources of noise, and, where appropriate, for the facility or source itself; and

(D) evaluating techniques for controlling noise (including institutional arrangements) and demonstrating the best available techniques in such jurisdiction;

Id.

303. See supra note 258 and accompanying text.

304. See GRAD, supra note 269, at 5-91. “The Quiet Communities Program appears to be a first step in the direction of a state implementation plan similar to other pollution control legislation.” Id. Conceivably, the same thing could be said if a similar Act were drafted to deal with light pollution.
At first glance, it is viewed as more of a problem for astronomers and backyard stargazers than the general public; but as we have seen, light pollution does, in fact, injure many facets of our natural world and general quality of life. The common law does not appear to have the answers for organizations, communities, or those individuals seeking a darker sky. Furthermore, only a handful of states have enacted effective legislation, and local regulations vary widely or do not exist at all. Now is the time for the federal government to become “enlightened” about the potential scope of this growing national problem by funding initial research and providing public education about light pollution.

Kristen M. Ploetz

---

305. See supra Part III and accompanying notes.
306. See id.
307. See supra Part IV and accompanying notes.
308. See supra Part V and accompanying notes.