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## A Gap in Causation? Punishing Polluters for Contributing to Climate Change & Increasing Violent Crime

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## NOTE

### A Gap in Causation? Punishing Polluters for Contributing to Climate Change & Increasing Violent Crime

NICOLETTE PELLEGRINO\*

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## I. INTRODUCTION

We are our own worst enemy. Humans are expediting climate change, destroying Earth and each other.<sup>1</sup> Not only does climate change cause the increase in spans of heat but also increases the likelihood of natural disasters such as earthquakes, severe flooding, and tropical storms.<sup>2</sup> Surprising to some, Earth is not the sole victim of climate change: the human race is in danger too. While there is unease regarding a social science approach to environmental exploration, health and climate scientists at the World Health Organization and the University of Wisconsin at Madison have found that one hundred fifty thousand deaths and five million illnesses are caused by climate change annually.<sup>3</sup> “If the melting sea ice causing the ocean to flood [. . .] doesn’t kill us, we’ll kill each other.”<sup>4</sup> These numbers could double by 2030.<sup>5</sup>

In addition to natural disasters and illnesses, studies reveal that rising temperatures naturally cause civil unrest, which leads

1. Andrew K. Jorgenson, *Global Warming and the Neglected Greenhouse Gas: A Cross-National Study of the Social Causes of Methane Emissions Intensity*, 1995, 84 SOC. FORCES 1779 (2006); *Global Climate Change*, NASA, <https://perma.cc/7DFG-TKWC> (last updated Mar. 27, 2017) [hereinafter *Global Climate Change*]; *What Sparked Global Warming? People Did*, ENVTL. DEFENSE FUND, <https://perma.cc/TFE2-VHFL> [hereinafter *Sparked*].
2. VICTORIA PARADE, UN WOMEN, CLIMATE CHANGE, DISASTERS AND GENDER-BASED VIOLENCE IN THE PACIFIC (2014), <https://perma.cc/ASE4-VPNQ>.
3. Barbara Adam, *Running Out of Time: Global Crisis and Human Engagement*, in *SOCIAL THEORY & THE GLOBAL ENVIRONMENT* 92–112 (Ted Benton & Michael Redclift eds., 1994); Larry West, *Global Warming Leads to 150,000 Deaths Every Year*, THOUGHTCO. (June 15, 2014), <https://perma.cc/ADX7-XXYF> [hereinafter *Deaths Every Year*].
4. Ashe Schow, *Study: Global Warming Will Cause Murders and Rapes*, WASH. EXAMINER (Feb. 27, 2014, 12:00 AM), <https://perma.cc/4L4V-PXGC>.
5. *Deaths Every Year*, *supra* note 3.

to acts of aggression.<sup>6</sup> Such aggressive acts include increased rates of violent crimes such as rape and murder.<sup>7</sup> Climate change will cause “temperatures to flare worldwide,” resulting in rape, murder, and war becoming more commonplace.<sup>8</sup>

Generally, rape and sexual assault occur more often during the summer when temperatures are warmer.<sup>9</sup> As climate change increases stressors on individuals, it also increases the likelihood of a woman being victimized via sexual assault and other gender-based violence.<sup>10</sup> Both “during and after disasters, women are at greater risk of violence, including rape, sexual exploitation, and assault.”<sup>11</sup> Climate change and natural disasters also lead to migration, which creates instability and dramatically increases the likelihood of a woman becoming a victim of sexual assault.<sup>12</sup>

Climate change will lead to an increase in violent crime. More rapes and violent felonies occur during the warm summer months than in cooler temperatures. As climate change progresses, there will be longer summers, higher temperatures, and thus, more violent crime. This Note examines whether American sanctions of environmental crimes<sup>13</sup> that contribute to climate change should become more stringent given what we now know about the violent consequences of climate change. Part II of this Note describes the history and scientific evidence which proves that rising temperatures increase the rate of violent crimes. Part III reviews current regulations that deal with environmental crimes. Part IV suggests alternatives for how the government can combat environmental

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6. Than, *Wars, Murders to Rise Due to Global Warming?*, NAT'L GEOGRAPHIC (Aug. 1, 2013), <https://perma.cc/A4GV-8LLG>.
  7. JANET L. LAURITSEN & NICOLE WHITE, U.S. DEPT OF JUSTICE, NCJ 235959, SPECIAL REPORT: SEASONAL PATTERNS IN CRIMINAL VICTIMIZATION TRENDS 1 (2014), <https://perma.cc/3URJ-JVCH>.
  8. Than, *supra* note 6.
  9. LAURITSEN & WHITE, *supra* note 7, at 1.
  10. SUREKHA GARIMELLA, WORLD HEALTH ORG., GENDER, CLIMATE CHANGE, AND HEALTH 10–11, 17–18 (2005) <https://perma.cc/B9D5-GSDG>.
  11. *Id.* at 10 (“[W]omen and girls are at higher risk of sexual violence” during and after natural disasters.).
  12. Paul Bancroft, *Making the Connections Between Climate Change and Sexual and Relationship Violence*, MOVE TO END VIOLENCE (July 19, 2016), <https://perma.cc/M83R-KFG9>.
  13. For the purposes of this Note, “environmental crimes” refers to acts that contribute to global warming. Examples of such acts include deforestation and logging and the emission of fossil fuels. *See Sparked*, *supra* note 1.

crimes that contribute to climate change and damage the public well-being. There is a causal link between environmental crimes and climate change. Further, climate change increases the rate of violent wrongdoings. Thus, the perpetrators of environmental crimes must be punished for the long-term effects of their actions: the increased rates of violent crimes. Part V analyzes the most realistic regulations and punishment schemes to promote conservation and public health. While there are many causes of climate change and greenhouse gas (“GHG”) emissions, this Note refers to the every-day use of aerosol cans as an example when proposing how to handle the global problem of climate change. Finally, Part VI acknowledges some difficulties and consequences of the author’s analysis, but still presents an alternative framework for further inquiry into these issues.

## II. HISTORY & SIGNIFICANCE OF CLIMATE CHANGE

### A. History of Climate Change and America’s Attempt to Prevent Harm

Earth’s climate has naturally varied throughout the last 650,000 years due to minute changes in its orbit.<sup>14</sup> Today, scientists believe that Earth’s current warming is human induced.<sup>15</sup> For centuries, the carbon dioxide level in Earth’s atmosphere has never exceeded 300 parts per million (“ppm”).<sup>16</sup> However, since the Industrial Revolution in the mid eighteenth century, carbon dioxide levels have risen, particularly in the 1950s, when levels soared to 400 ppm—a forty-percent increase.<sup>17</sup>

Throughout the twentieth century, to promote conservation and public health, Congress passed legislation to penalize those who pollute the environment.<sup>18</sup> Some of the most commonly noted

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14. *Global Climate Change*, *supra* note 1.

15. *Id.*; see *Sparked*, *supra* note 1.

16. *Global Climate Change*, *supra* note 1.

17. *Id.*; *Sparked*, *supra* note 1.

18. Examples of legislation to protect the environment and human health include: the Lacey Act of 1900, Pub. L. No. 97-79, 95 Stat. 1074 (1900) (codified as amended at 16 U.S.C. §§ 3371–78 (2012)); the Endangered Species Act of 1973, 93 Pub. L. No. 93-205, 87 Stat. 885 (1973) (codified as amended at 16 U.S.C. §§ 1531–44 (2012)); the Federal Water Pollution Control Act

environmental offenses include deforestation, air pollution, wild-life poaching, logging, and more.<sup>19</sup> The offenses have many dangerous repercussions, such as contributing to climate change.<sup>20</sup> However, perpetrators of environmental crimes are causing more than just climate change.

### B. Increase in Temperature, Increase in Crime

We know that “the indiscriminate burning of fossil carbon and hydrocarbons has a catastrophic effect on our climate and pollutes our atmosphere, affecting it in a highly lethal way, influencing the health of the global human population.”<sup>21</sup> A team of researchers including Solomon Hsiang, an economist at Princeton University in New Jersey, agrees that climate change has various consequences, such as increased violence.<sup>22</sup> Hsiang and his team analyzed a total of “60 studies on subjects related to climate, conflict, temperature, violence, crime, and more” throughout the world and evaluated each through a statistical framework.<sup>23</sup> The study accounted for differences in temperature and rainfall throughout the world’s different regions.<sup>24</sup> The study concluded that even slight departures from average “temperatures or rainfall amounts substantially increased the risk of conflict on a variety of levels, ranging from individual aggression, such as murder and rape, to country-level political instability and international wars.”<sup>25</sup>

Seasonal patterns of crime also exist in America.<sup>26</sup> In the United States, the rate of assaults, rapes, intimate partner

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Amendments of 1972 (the Clean Water Act), 80 Pub. L. No. 845, 62 Stat. 1155 (1972) (codified as amended at 33 U.S.C. §§ 1251–1388 (2012)); and the Clean Air Act of 1970, Pub. L. No. 88-206, 77 Stat. 392 (1970) (codified as amended at 42 U.S.C. §§ 7401–7671q (2012)). Such legislation includes criminal penalties, civil penalties, or both.

19. EILEEN SKINNIDER, U.N. COMM’N ON CRIME PREVENTION & CRIMINAL JUSTICE, EFFECT, ISSUES AND CHALLENGES FOR VICTIMS OF CRIMES THAT HAVE A SIGNIFICANT IMPACT ON THE ENVIRONMENT 6 (2013), <https://perma.cc/4JAM-FJHC>.

20. *Id.*

21. Rhodes W. Fairbridge, *Global Warming and the Tipping Point*, 63 INT’L J. OF ENVTL. STUD. 361, 368 (2006).

22. Than, *supra* note 6.

23. *Id.*

24. *Id.*

25. *Id.*

26. *See generally* LAURITSEN & WHITE, *supra* note 7.

violence, and murders increase with warmer temperatures<sup>27</sup>: “Statistical analysis of seasonal rates [show] that serious violence was significantly higher during the summer than during the winter, spring, and fall seasons.”<sup>28</sup> Increases in crime extend to nonviolent offenses as well, including property crimes like household burglary, motor vehicle theft, and household larceny.<sup>29</sup> As Mother Jones points out, climate change will make “Americans more likely to kill each other.”<sup>30</sup>

A recent scientific study conducted by the Intergovernmental Panel on Climate Change gathered data of violent crimes committed from the 1950s to 2008.<sup>31</sup> The authors approximate that “if the average temperature in the U.S. increases by 8 degrees Fahrenheit (4.4 degrees Celsius), the country’s murder and assault rate will jump by about a hundred thousand cases a year.”<sup>32</sup> Such data of increased violence during warmer temperatures are demonstrated below.

Chart 1 and Chart 2 depict the increased rates of crime in the summer—or warmer—months.<sup>33</sup> Within the charts, temperature is the independent variable and crime rates are the dependent variable.<sup>34</sup> Both charts clearly depict the upsurge in crimes during the summer months.<sup>35</sup> Additionally, the charts convey the general decrease in crime rates over time due to law enforcement.<sup>36</sup> While the overall rate of violent crime and sexual assault is decreasing, both types of crime continue to fluctuate depending on temperature.<sup>37</sup>

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27. *Id.* at 1.

28. *Id.* at 2.

29. *Id.* at 1.

30. Jeremy Schulman, *Study: Global Warming Will Cause 180,000 More Rapes by 2099*, MOTHER JONES (Feb. 27, 2014), <https://perma.cc/W3ZA-4H26>.

31. Ker Than, *Global Warming Making People More Aggressive?*, NAT’L GEOGRAPHIC (Mar. 26, 2010), <https://perma.cc/7YPB-WPEC> [hereinafter *More Aggressive*].

32. *Id.*

33. LAURITSEN & WHITE, *supra* note 7, at 9, 16.

34. *Id.*

35. *See id.*

36. *See id.*

37. *See id.*

**Chart 1: Seasonal Rates of Serious Violent Crime  
Resulting In Injury, 1993–2010<sup>38</sup>**

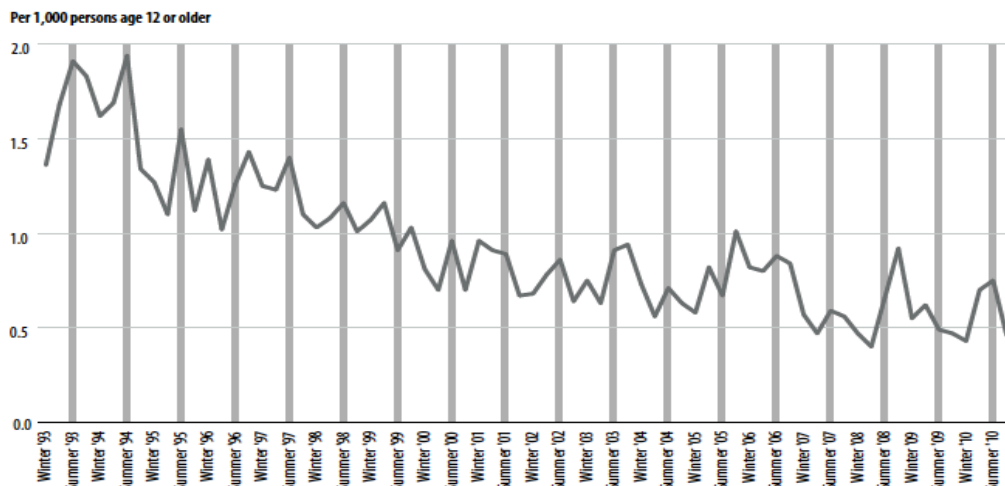


Chart 1, entitled “Seasonal Rates of Serious Violent Crime Resulting In Injury,” explains the increase in violent crime rates during the summer months.<sup>39</sup> The increase in violent crime resulting in injury averages an additional 7% in the summer months.<sup>40</sup> Thus, as this Note will further assert, as temperature increases during the warmer months, so does the rate of violent crime. Once the temperature begins to cool during the winter months, crime rates fall.

38. *Id.* at 16.

39. *Id.*

40. *Id.*



**Chart 2: Seasonal Rates of Rape & Sexual Assault, 1993–2010<sup>41</sup>**

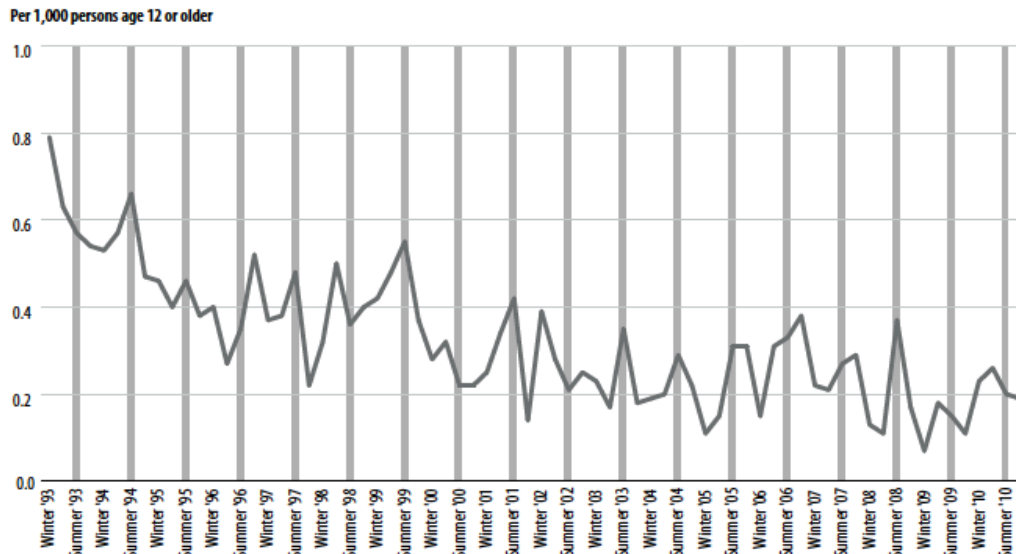


Chart 2, entitled “Seasonal Rates of Rape and Sexual Assault,” explains the increased rate in rape and sexual assault during the summer months.<sup>42</sup> The rate of rape and sexual assault was 9% higher in the summer than during the winter and spring months and was 10% higher in the summer than during the fall months.<sup>43</sup> As temperature increases during the summer months, the rate of rape and sexual assault also increases. Once the temperature begins to cool during the winter months, rape and sexual assault rates decrease.

### III. CURRENT PUNISHMENT SCHEMES

Environmental law exists to protect the Earth’s resources and promote public health. Some of these actions against the environment are regulated, while others are criminalized.<sup>44</sup> Activities

41. *Id.* at 9.

42. *Id.*

43. *Id.*

44. See generally David M. Uhlmann, *Environmental Crime Comes of Age: The Evolution of Criminal Enforcement in the Environmental Regulatory Scheme*, UTAH L. REV. 1223, 1232 (2009).

such as the emission of GHGs are most commonly regulated to minimize emission, while those such as deforestation and logging are criminalized when executed without the proper authorization.<sup>45</sup>

However, the criminal punishment of environmental law is complex. Although some states are taking steps towards regulating GHG emissions, “the federal government . . . has failed to produce domestic strategies to address the problem in any meaningful way.”<sup>46</sup> While criminal law requires perpetrators to violate clear legal duties, environmental law imposes dense regulatory requirements.<sup>47</sup> Even so, various enforcement methods exist pertaining to environmental crimes: civil administrative actions, civil judicial actions, and criminal actions.<sup>48</sup> Administrative actions include “a notice of violation, a Superfund notice letter, or an order (either with or without penalties) directing an individual, a business, or other entity to take action to come into compliance, or to clean up a site.”<sup>49</sup> Civil judicial actions, or “formal lawsuits,” include ordering entities to “comply with statutory or regulatory requirements, comply with an administrative order,” or ordering them to “pay [the Environmental Protection Agency (“EPA”)] the costs for cleaning up a Superfund site or commit to doing the cleanup work.”<sup>50</sup> These cases are often filed by the U.S. Department of Justice on behalf of the EPA or by state Attorneys General.<sup>51</sup> Criminal actions occur when either the EPA or a state wishes to enforce a regulation against a person or company and “are usually reserved for the most serious violations, those that are willful, or knowingly committed.”<sup>52</sup> Congress has even inserted provisions into environmental statutes that apply “both civil and criminal sanctions” for the same offense.<sup>53</sup> Those offenses that impose criminal sanctions require

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45. 16 U.S.C. §§ 3372, 3373(d) (2018).

46. Kevin Haroff & Jacqueline Hartis, *Climate Change and the Courts: Litigating the Causes and Consequences of Global Warming*, 22 NAT. RES. & ENV'T 50, 50 (2008).

47. Uhlmann, *supra* note 44, at 1232.

48. *Enforcement Basic Information*, EPA, <https://perma.cc/ES33-94H8> (last updated Feb. 1, 2017) [hereinafter *Basic Information*].

49. *Id.*

50. *Id.*

51. *Id.*

52. *Id.*

53. DANIEL RIESEL, ENVIRONMENTAL ENFORCEMENT: CIVIL AND CRIMINAL 6-5 (2008), <https://perma.cc/9EFZ-RDQG>.

“scienter,” or the element of *mens rea*.<sup>54</sup> Thus, those who are punished criminally for perpetrating an environmental crime must have been aware of their criminal conduct. A conviction following criminal actions can result in fines or imprisonment.<sup>55</sup>

### A. Air Pollution & The Burning of Fossil Fuels

The burning of fossil fuels directs “carbon dioxide, methane and other heat-trapping ‘greenhouse gases’ into the atmosphere,” causing temperatures to progressively rise.<sup>56</sup> Such burning of coal or petroleum creates a seemingly “thermal blanket” around Earth, causing it to constantly trap heat.<sup>57</sup>

The United States government administers various statutes to impose penalties on pollution-causing activities.<sup>58</sup> In 1970, the Clean Air Act (“CAA”) was enacted to, among other goals, “protect and enhance the quality of the Nation’s air resources” in the name of public health, as well as “achieve the prevention and control of air pollution.”<sup>59</sup> The Act has been mostly successful, resulting in major settlements. An example is the EPA’s recent settlement with auto manufacturers Hyundai and Kia, which assessed a \$100-million fine for, among other wrongdoings, “emission credits” earned from underreported GHG emissions and included over \$50 million to enforce compliance measures, which “help[ed] level the playing field for responsible companies and reduce greenhouse gas emissions fueling climate change.”<sup>60</sup>

In 2007, the Supreme Court decided in *Massachusetts v. EPA*<sup>61</sup> that the EPA can promulgate regulations “specifically addressing

54. *Id.* at 6-10. *Mens rea* is known as the “guilty mind.” Richard M. Thompson II, Cong. Research Serv., R44464, Reform: A Brief Overview Mens Rea 1 (2016), <https://perma.cc/DJ7W-4UZ9>.

55. *Basic Information*, *supra* note 48.

56. *Sparked*, *supra* note 1.

57. *Id.*

58. See U.S. DEP’T OF JUSTICE, U.S. ATTORNEYS’ MANUAL § 5-11.101 (2008), <https://perma.cc/9YB7-Z6TD>.

59. 42 U.S.C. § 7401(b)(1)–(2); see also *Summary of the Clean Air Act*, EPA, <https://perma.cc/GN9F-FBUB> (last updated Oct. 17, 2016).

60. *Hyundai and Kia Clean Air Act Settlement*, EPA (Nov. 3, 2014), <https://perma.cc/FX46-HG7M> [hereinafter *CAA Settlement*]; MILTON P. DENTCH, THE ISO 14001:2015 IMPLEMENTATION HANDBOOK: USING THE PROCESS APPROACH TO BUILD AN ENVIRONMENTAL MANAGEMENT SYSTEM app. D, at 2 (2016).

61. 549 U.S. 497 (2007).

carbon emissions from motor vehicles and other sources, although the scope and timing of any federal regulatory action is not at all yet clear.”<sup>62</sup> Some businesses are voluntarily “going green” and making changes to reduce their “carbon footprint,” despite such changes not being mandatory.<sup>63</sup>

## B. Illegal Logging and Deforestation

Mainly driven by the timber and agriculture industries, deforestation contributes to climate change. Trees naturally consume carbon dioxide.<sup>64</sup> Thus, the fewer trees there are, the higher the carbon dioxide levels that exist in the atmosphere—which increases the rate and severity of climate change.<sup>65</sup> It has also been proven that illegal timber trade is linked “to drug smuggling, money laundering and organized crime networks.”<sup>66</sup> Additionally, the process of deforestation accounts for roughly twenty percent of the pollution that contributes to climate change.<sup>67</sup> While most deforestation is legal, illegal logging often occurs when “timber is harvest[ed], transported, processed, bought or sold in violation of” laws.<sup>68</sup>

In 2008, the United States—one of the largest consumers of wood products—amended the Lacey Act, making it the first statute in the world to forbid illegally obtained plants and wood from entering a national market.<sup>69</sup> While this does not seem like a punishment or criminal sanction, the Lacey Act created a legal incentive against logging and timber trafficking.<sup>70</sup>

62. Haroff & Hartis, *supra* note 46, at 50.

63. *Id.* at 55.

64. *Sparked*, *supra* note 1.

65. *Deforestation*, NAT’L GEOGRAPHIC, <https://perma.cc/2HA5-MNKX>; *Sparked*, *supra* note 1.

66. Sierra Club, *Illegal Logging is a Major Contributor to Global Warming*, ORGANIC CONSUMERS ASS’N (Sept. 29, 2007), <https://perma.cc/C5AU-Q3D2> [hereinafter *Illegal Logging Major Contributor*].

67. Jake Schmidt, *Illegal (B)Logging and Climate Change*, NAT. RES. DEF. COUNCIL (Oct. 6, 2008), <https://perma.cc/65F4-9ATQ>.

68. *Illegal Logging*, WWF GLOBAL, <https://perma.cc/WP5R-QPML>; *Illegal Logging Major Contributor*, *supra* note 66.

69. *Logging and the Law: How the U.S. Lacey Act Helps Reduce Illegal Logging in the Tropics*, UNION OF CONCERNED SCIENTISTS (Apr. 2012), <https://perma.cc/C8A9-VV28> [hereinafter *Logging and the Law*]; *Illegal Logging Portal*, CHATHAM HOUSE, <https://perma.cc/H3AX-3WEX>.

70. *Logging and the Law*, *supra* note 69.

### C. Non-Criminal Causes of Climate Change

The expansion of resource production and consumption greatly escalates Earth's levels of waste.<sup>71</sup> In fact, production and industrial activities raise GHG emissions and are higher in urban areas.<sup>72</sup> Emissions are typically not criminally punished unless the offenses are egregious.<sup>73</sup> Some scientists insist that this can be easily rectified by modernization and economic development, which will make industries more ecologically resourceful through eco-efficient production methods.<sup>74</sup> Conversely, other national studies do not support the idea that GHG emissions will decrease from modernization.<sup>75</sup>

Another noncriminal perpetrator of climate change is the use of aerosols.<sup>76</sup> Aerosols contain high concentrations of carbon dioxide, which leads to climate change and rising temperatures.<sup>77</sup> Therefore, while legal to use, the abusive use of aerosols must be addressed. For the remainder of this Note, keep in mind the example of aerosols when considering how we can create a framework for enforcing individual responsibility for pollution and climate change, ultimately increasing the rate of violent crimes.

## IV. NECESSITY FOR GREATER SANCTIONS AGAINST PERPETRATORS OF ENVIRONMENTAL CRIME

The Supreme Court has begun to view climate change as a public health concern. The Court held that the EPA's "refusal to regulate GHG emissions presented an 'actual' and 'imminent' risk of harm to public health and the environment."<sup>78</sup> In response to the

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71. Jorgenson, *supra* note 1, at 1781.

72. *Id.* at 1780–81.

73. *See, e.g.*, the Clean Air Act of 1970, Pub. L. No. 88-206, 77 Stat. 392 (1970) (codified as amended at 42 U.S.C. §§ 7401–7671q (2012)); *see also Criminal Provisions of the Clean Air Act*, EPA, <https://perma.cc/JG3Y-VWK7> (last updated Mar. 12, 2018) (listing criminal penalties for violating the Clean Air Act, such as up to five years' incarceration for violating stratospheric ozone protection provisions pursuant to 42 U.S.C. § 7413(1)).

74. *Id.* at 1781, 1783.

75. *Id.*

76. *See generally* Gerald E. Marsh, *Climate Change: Sources of Warming in the Late 20<sup>th</sup> Century*, 23 ENERGY & ENV'T 95 (2012).

77. *Id.* at 9.

78. Haroff & Hartis, *supra* note 46, at 51.

government's failure to regulate GHG emissions, many public interest groups and local and state governments are seeking "redress for both the causes and effects of [climate change] in the courts."<sup>79</sup> One category of redress focuses on common-law theories such as public nuisance.<sup>80</sup> Such "actions have been brought against both U.S. and foreign automobile manufacturers and major electrical power producers in the Midwest, seeking both damages and injunctive relief for alleged climate change impacts around the country."<sup>81</sup> However, common-law claims have little success and will unlikely influence the government's implementation of federal or state climate change policies.<sup>82</sup> Instead, it could be more beneficial to not only view polluting as a crime against the environment and public health, but to also treat violent crime as a public health concern. Thus, promoting environmental conservation and public health can be more easily accomplished through punishing polluters whose actions ultimately increase the rates of violent crimes.

While existing laws criminalize acts that contribute to climate change, many perpetrators remain undetected. In fact, "more than 64,000 facilities are currently listed in agency databases as being in violation of federal environmental laws, but in most years, fewer than one-half of one percent of violations trigger criminal investigations, according to EPA records."<sup>83</sup> Moreover, if government investigations are pursued, many result in civil enforcement rather than criminal prosecution.<sup>84</sup> Meanwhile, besides the obvious increases in heat and natural disasters, climate change affects many aspects of public health such as "clean air, safe drinking water, sufficient food and secure shelter."<sup>85</sup> Higher temperatures exacerbate harmful algal blooms, which scientists attribute to climate change.<sup>86</sup> The various algae species produce toxins, which are

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79. *Id.* at 50.

80. *Id.* at 55.

81. *Id.* at 50.

82. *Id.* at 50, 55.

83. Graham Kates, *Environmental Crime: The Prosecution Gap*, THE CRIME REPORT (July 14, 2014), <https://perma.cc/3EZA-9QHN> [hereinafter *Prosecution Gap*].

84. *Id.*

85. *Climate Change and Health*, WORLD HEALTH ORG., <https://perma.cc/YM92-7947> (last updated July 2017).

86. NAT'L WILDLIFE FED'N & FLA. WILDLIFE FED'N, AN UNFAVORABLE TIDE: GLOBAL WARMING, COASTAL HABITATS, AND SPORTFISHING IN FLORIDA 42 (2006), <https://perma.cc/ZD55-QL5S>.

injurious to fish, wildlife, and people.<sup>87</sup> Higher temperatures further contribute to: “deaths from cardiovascular and respiratory disease, particularly among elderly people”; an increase in “the levels of ozone and other pollutants in the air that exacerbate cardiovascular and respiratory disease”; and an increase of pollen and other aeroallergen levels, which triggers asthma and affects over 300 million people.<sup>88</sup> It is estimated that “between 2030 and 2050, climate change is expected to cause approximately 250,000 additional deaths per year, from malnutrition, malaria, diarrhoea and heat stress.”<sup>89</sup>

If nothing is done to stop climate change, we will reach the tipping point. Not only will Earth be destroyed and illnesses spread, but violence and havoc will break out amongst populations.<sup>90</sup> Heat intensifies the level of psychological stress felt by individuals.<sup>91</sup> Such stress elevates frustration, anger, and violence, which, in turn, has increased criminal activity such as food riots; arson; tree spiking, migration, and smuggling; gang warfare; homicide; and rape.<sup>92</sup> In fact, it is estimated that there will be an additional “22,000 murders, 180,000 cases of rape, 1.2 million aggravated assaults, [and] 2.3 million simple assaults” due to climate change.<sup>93</sup> Additionally, climate change will cause erratic changes in weather patterns, which will exacerbate “poverty, food insecurity, and malnutrition—all of which are risk factors for the development of aggression in violence-prone individuals.”<sup>94</sup> Furthermore, disasters caused by climate change will lead to mass migration, or “eco migration,” which will likely generate even more

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87. *Id.*

88. WORLD HEALTH ORG., *supra* note 85.

89. *Id.*

90. Global warming can cause “bilateral tipping”—when the Earth’s momentum switches from accelerating to decelerating. Fairbridge, *supra* note 21, at 368. This change will trigger seismic events such as earthquakes and other natural disasters. *Id.*; see also Jeremy Schulman, *supra* note 30 (citing Matthew Ranson, *Crime, Weather, and Climate Change*, 67 J. ENVTL. ECON. & MGMT. 274 (2014)).

91. *More Aggressive*, *supra* note 31.

92. Rob White, *The Criminology of Climate Change*, CLIMATE CHANGE FROM A CRIMINOLOGICAL PERSPECTIVE 5 (Rob White ed., 2012); Marshall Burke et al., *Climate and Conflict* (Nat’l Bureau of Econ. Research, Working Paper No. 20598, 2014), <https://perma.cc/LA8C-DFBH>.

93. Schulman, *supra* note 90.

94. Than, *supra* note 31.

human conflict.<sup>95</sup> An example of this was the aftermath of Hurricane Katrina, where many people moved from New Orleans to Houston.<sup>96</sup> Soon after, there was a spike in the number of homicides and gang violence in Houston.<sup>97</sup>

Psychologists and sociologists agree that “hot temperatures make people cranky and irritable” and “cranky, irritable people are prone to aggression.”<sup>98</sup> In fact, elevated temperatures also lead to “increased brain temperatures that result in cognitive dysfunction, emotional stress, and aggression,” thus increasing the rate of violent crime.<sup>99</sup> Heat also affects physiological conditions by, for example, “increasing heart rate . . . while simultaneously making people think they are less energetic.”<sup>100</sup> While this may seem irrelevant, it is the exact opposite. “The fact that hot people are more aroused but think they are less aroused means that they overreact to provocations.”<sup>101</sup> Specifically, for each “one standard deviation change in climate toward warmer temperatures or more extreme rainfall,” there is a fourteen-percent increase in conflict between groups and a four-percent increase in conflict between individuals.<sup>102</sup>

Not only does being warmer influence human behavior, but during warmer temperatures, individuals are more likely to go outside, which leads to more social interactions.<sup>103</sup> Sociologists agree that an increase in social interactions naturally provides additional opportunities for people to participate in crime.<sup>104</sup> Similarly, more social interactions heighten the likelihood of being a victim of criminal activity akin to the increase in the likelihood of suffering from a wild animal attack in the wild.

Even with such overwhelming data, however, the positive correlation between climate change and violent crime—though not farfetched—is still difficult to prove. Because we are aware of the

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95. *Id.*

96. *Id.*

97. *Id.*

98. *More Aggressive*, *supra* note 31.

99. *Id.*

100. *Id.*

101. *Id.*

102. Marshall Burke, Solomon Hsiang & Edward Miguel, *Weather and Violence*, N.Y. TIMES (Apr. 13, 2013), <https://perma.cc/7CKY-CF5W>.

103. *More Aggressive*, *supra* note 31.

104. *Id.*



causal link between pollution and increased violent crime, it is reasonable to protect the environment and public health by creating a regulatory framework that penalizes perpetrators of environmental crimes. Viewing pollution and violent crime as a public health issue will better enable governments to implement this much-needed regulatory punishment scheme.

To address the causality concerns, other areas of the world are proposing to coin the term *ecocide*: a crime against humanity punishable as both an environmental and international crime.<sup>105</sup> Perhaps it would be just as sufficient to increase the penalties on those who commit the already-established environmental crimes that lead to climate change. The United States has already recognized that one environmental crime could result in many sanctions, actions, and penalties, either criminal, civil, or administrative.<sup>106</sup> Often times, those who perpetrate environmental crimes will find themselves involved in “parallel proceedings.”<sup>107</sup> The United States sees punishment as fit not only when a perpetrator violates environmental laws but also when the perpetrator does so deliberately.<sup>108</sup> Punishing for climate change must be more than just punishing for pollution or for the emission of GHGs; it must also be for the increased rates of sexual violence, specifically against females.<sup>109</sup>

We now know that there is a causal connection between GHG emissions and violence. But who should be responsible for future increases in violence resulting from environmental crimes perpetrated in the present? There are multiple causes to climate change, and not all are illegal. For example, a company that is meeting its regulatory obligations of only emitting a certain amount of GHGs into the atmosphere is contributing to climate change; however, it is not acting illegally. The questions thus remain: Is the causal link between perpetrating environmental crimes and increasing the

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105. Ronald C. Kramer, *Climate Change: A State-Corporate Crime Perspective*, in ENVIRONMENTAL CRIME AND ITS VICTIMS: PERSPECTIVES WITHIN GREEN CRIMINOLOGY 23, 24 (Toine Spapens et al. eds., 2014).

106. U.S. DEPT OF JUSTICE, *supra* note 58, § 5-11.112.

107. *Id.* at 5-11.112; *see, e.g.*, 33 U.S.C. §§ 1319(a)–(d).

108. U.S. DEPT OF JUSTICE, *supra* note 58, § 5-11.112.

109. *See generally*, SKINNIDER, *supra* note 19 at 4 (questioning whether victims are accorded proper victim status in the criminal justice system when causes are nondirect or when “the full impact is not felt until long after prosecution”).

rate of climate change strong enough to hold polluters criminally liable for the future increase in violent crimes? Further, presuming that the answer is yes, how should governments handle these polluters? Multiple options exist to hold polluters accountable.

### **A. Option One: Implement Change Through Advocacy and Education**

Due to the complex causational chain, addressing the increase in violent crime rates affected by climate change may be most effective through advocacy and education. Many organizations already are attempting to raise awareness of the importance of stopping climate change. The Greenpeace Fund is a nonprofit that was “created to increase public awareness and understanding of environmental issues through research, the media and educational programs.”<sup>110</sup> Additionally, some schools in the United States participate in Earth Day, when individuals discuss the importance of maintaining sustainable campuses to safeguard the environment.<sup>111</sup> Furthermore, many websites such as Spare The Air exist as a “Climate Initiatives Program” to guide individuals, specifically children, and teach them how to become more sustainable.<sup>112</sup> To be successful, education and advocacy must continue and reach all generations to ensure that all individuals are aware of the various implications of climate change.

While some Americans seem indifferent to the planet’s future, perhaps they will care *more* if pollution did not just cause the temperature to rise but also caused their cars to be stolen and loved ones to be violently victimized.<sup>113</sup> It is vital that individuals become aware that “climate change spans many different domains of human activity, including conflict.”<sup>114</sup> Perhaps the term “ecocide” is an appropriate response to such a complex causational chain.

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110. *Fighting Global Warming*, GREENPEACE, <https://perma.cc/E35W-6RS7>.

111. See Clara Changxin Fang, *Why Higher Education Should Engage in Climate Advocacy*, RESIDENCE ON EARTH (Apr. 29, 2016), <https://perma.cc/2BNY-QMLW>.

112. *Climate Change Education*, SPARE THE AIR YOUTH (Mar. 27, 2017), <https://perma.cc/8Q5W-U6DS>; see also Susan Joy Hassol, *Teachers’ Guide to High Quality Educational Materials on Climate Change and Global Warming* (2000-2002), <https://perma.cc/FP27-FJ7T>.

113. See Schulman, *supra* note 30.

114. Than, *supra* note 6.

Naming the vast effects of climate change can promote awareness of the many negative repercussions of polluters' activities. Environmental crimes should be seen as crimes against not only the environment but also the public health.<sup>115</sup> Crimes against the public health are accompanied by a more holistic set of damages, adding to the importance of government action. As long as heat directly influences the way people act and think, climate change and the warming of the planet will cause an increase in violence.<sup>116</sup> However, there are options aside from educating the public.

### **B. Option Two: Criminalize All Activity that Contributes to Climate Change**

Another option to hold actors accountable for contributing to the vast consequences of climate change is criminalizing everyday actions that exacerbate climate change. For courts to hold an individual guilty of most criminal acts, the individual must have possessed intent to commit the act and the act must have caused the alleged harm.<sup>117</sup> However, some actors can be held criminally liable without acting with criminal intent; such crimes are deemed criminal based on the concept of strict liability, relieving the government of the burden of proving the offender's culpable state of mind.<sup>118</sup>

Examples of currently legal acts that have traditionally contributed to climate change include the use of certain aerosol cans and industry production and handling of waste.<sup>119</sup> It is well

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115. SKINNIDER, *supra* note 19, at 1.

116. See Burke, Hsiang & Miguel, *supra* note 102.

117. See Danyé Holley, *Culpability Evaluations in the State Supreme Courts from 1977 to 1999: A "Model" Assessment*, 34 AKRON L. REV. 401, 406 n.55 (2001) ("[T]he general intent of the accused to do the act is deemed to give rise to the presumption of intent to achieve the criminal result.").

118. State v. Black, 624 N.W.2d 363, 371 (Wis. 2001).

119. Jorgenson, *supra* note 1. See also *Bad Hair Day: Are Aerosols Still Bad for the Ozone Layer?*, SCIENTIFIC AMERICAN, <https://perma.cc/3NES-53B4> (noting that aerosols "contain hydrocarbons and/or compressed gases notorious for their contribution to global warming," and that "[e]very time you hit the button, then, you are raising your carbon footprint, albeit ever so slightly"). The author notes that not all uses of aerosol cans are harmful to the environment. In fact, some researchers suggest that the release of certain aerosols offsets climate change by reflecting the sun's rays off of Earth back to space. See *Just 5 Questions: Aerosols*, NASA (Dec. 7, 2009), <https://perma.cc/U9KX-YETJ>; see also Edward J. Larson, *The Red Dawn of Geoengineering: First*

documented that ozone depletion occurs when chlorofluorocarbons (“CFCs”)—formerly found in aerosol cans—raise carbon dioxide concentrations, contributing to climate change and rising temperatures.<sup>120</sup> However, someone who was using or producing an aerosol neither had the *mens rea* required for a criminal murder conviction nor intended for someone in the future to act violently. It would, therefore, seem unfair, even cruel, to hold such individual liable for climate change and the accompanying increase in violent crime rates, especially when the use of aerosol cans is legal. Thus, it would be unacceptable to hold individuals liable when they are using or producing a legal product. But by criminalizing the production or use of such products, an individual would be deemed to have a “criminal mind” if they chose to use or produce it. For example, if someone uses an aerosol can once a statute deems such use illegal, by virtue of intending to use the can and actually using it, they are breaking the law, and the individual will possess a criminal mind. Still, as the individual is using the can, they are not intending to increase the rates of violent crimes such as rape and murder. Yet, it is reasonable to create a statute that criminalizes the use and production of aerosol cans *because* it increases the rate of climate change, which increases the rate of violent crimes. Then, users and producers of such cans who illegally use or manufacture the products can face criminal sanctions for the prohibited use or production of aerosol cans.

Consider the following hypothetical to illustrate the point. Say a store clerk does not conduct a mandated background check before selling a gun to an individual without a gun permit. The clerk should be criminally sanctioned due to the risks associated with selling a gun to a person unfit to own a gun.<sup>121</sup> If the unlicensed

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*Step Toward An Effective Governance For Stratospheric Injections*, 14 DUKE L. & TECH. REV. 157, 161 (suggesting the use of sulfate aerosols to cool Earth).

120. *Global Warming FAQ*, UNION OF CONCERNED SCIENTISTS, <https://perma.cc/SW6C-CGA3> (last updated May 24, 2018) [hereinafter *Global Warming FAQ*]; Marsh, *supra* note 76.

121. This example assumes that the jurisdiction mandates background checks before an individual is permitted to purchase a gun. If there is no background check, there is a high risk of the lethal weapon entering the hands of someone who will commit violence with it. Thus, if the store clerk fails to follow protocol and sells a gun to an individual who was not permitted to have such sold to him, the clerk should be punished for increasing the chance that the customer—given his possession of a dangerous weapon—is a threat to the public.

customer killed someone with the weapon sold to him by the store clerk, the clerk would not be prosecuted for the murder; instead, the clerk is punished for failing to conduct a proper background check. Because guns are valuable in our society, governments have declined to ban their use. Guns are used for hunting—a large money-making industry—as well as by law enforcement and the military. Instead of banning their use, the clerk should be criminally punished for failing to conduct a proper background check *because* of the known dangers from an individual who cannot pass a background check yet owns a violent weapon. The government has weighed the benefits of guns and has decided to allow (but regulate) their use. Similarly, aerosol cans have a high value in our society. Individuals use Lysol cans to prevent flu-causing germs, for example.<sup>122</sup> However, using such cans will increase CO<sub>2</sub> emissions and, eventually, the rate of climate change.<sup>123</sup> Since it is valuable to curb the spread of germs and viruses such as the flu, governments should instead promulgate regulations specific to the use of such cans to minimize GHG emissions and impose criminal sanctions on those who do not comply with such guidelines. Because it is known that climate change increases the rate of violent crimes, governments could punish those who contribute to climate change—the same way a sales clerk would be contributing to the likelihood of death via the weapon he wrongfully sold. *Because* we are aware of the violent repercussions of climate change, it is plausible to impose criminal sanctions against individuals who disregard regulations that protect the environment and public health. Perpetrators of environmental crimes will not—nor should—be held criminally liable for murder. But the sanctions against them should escalate *because* of the many known repercussions of perpetrating environmental crimes and polluting the environment, such as exacerbating climate change, which ultimately increases rates of violent crimes.

While this causational chain may seem attenuated,<sup>124</sup> it is a logical option that can be deemed necessary by the United States

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122. See LYSOL, <https://perma.cc/98RD-VASY> (last updated Nov. 13, 2017).

123. *Global Warming FAQ*, *supra* note 120.

124. “In criminal proceedings, the attenuation rule provides that despite the illegality in obtaining evidence, such evidence may be admissible if the connection between the evidence and the illegal method is sufficiently remote or attenuated.” *Attenuation Doctrine Law and Legal Definition*, U.S. LEGAL, <https://perma.cc/A7EC-SQ5P>.

government and perhaps other governments across the globe. Power is given to the government to change the law. When technology and social norms change, it is natural for a legislature to recognize the deviations and advance the law to encompass them.<sup>125</sup> It is also natural for courts to notice such changes and evolve existing case law by interpreting it in a new light.<sup>126</sup> The system I recommend in this Note, however, is not for the court. Rather, it is to either inspire lawyers to make arguments in court when assessing damages or to spark legislative change by implementing new and separate penalties.

### **C. Option Three: Increase Sanctions for Currently Regulated or Criminal Activity**

Because climate change leads to migration and psychological stress, which increases the rates of rape and other violence, it is logical for the punishment of those who perpetrate environmental crimes that accelerate climate change to be greater. The vast consequences of environmental crimes that contribute to climate change authorize governments to enforce stricter sanctions.

Intensifying the repercussions of perpetrating environmental crimes is likely to promote awareness of the severity of climate change and, in turn, deter individuals and businesses from hurting the environment. Currently, if an individual partakes in illegal deforestation or logging, they will face a potential penalty.<sup>127</sup> However, if governments increase the severity of such punishments, individuals will be deterred from acting in damaging ways. The individuals participating in deforestation should not just face regulations and fines but should be criminally punished with prison time. Not only will jail time deter individuals from continuing their

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125. DUNCAN GREEN, *HOW CHANGE HAPPENS* 47 (2016) (“[N]orms provide stable standards of conduct to guide the choices of those subject to them. Yet, at the same time, norms are a continuously evolving system. Even law—the most codified, formal subset of norms—is constantly changing.”).

126. See Rebecca J. Rosen, *When Does Technology Change Enough that the Law Should Too?*, ATLANTIC (Dec. 27, 2013), <https://perma.cc/JN2H-M9GN>.

127. *Laws and Policies*, FOREST LEGALITY INITIATIVE, <https://perma.cc/T9XR-9KWW> (listing multiple initiatives that take different approaches to regulating deforestation or logging, while noting that “all share the same aim: to shift consumer demand, and thus production, to legal forest products through the power of market access and potential penalties”).

illegal acts, but it will also deter others from committing environmental crimes.

Regarding businesses, the Supreme Court in *Massachusetts v. EPA* permitted the EPA to regulate GHG emissions once the Agency confirmed that GHGs contributed to climate change.<sup>128</sup> Today, certain corporations are forced to pay large sums of money because of their emissions.<sup>129</sup> An example is when Hyundai and Kia violated the CAA and were mandated to pay a \$100 million fine and roughly \$50 million to combat the damage done.<sup>130</sup> Both large and small businesses wish to make a profit, not face sanctions or lose proceeds.<sup>131</sup> If companies are faced with massive fines upon hurting the environment, they will be less likely to act in a manner that carries harmful consequences. However, to take it further, not only should the businesses be held liable for damaging the environment, but the individual actors who are partaking in the environmental crimes must be held personally liable, too. If an individual believes that not only will his or her company be forced to pay a substantial fine, but that they will also face civil or criminal penalties, they will be less likely to enable the environmentally hurtful conduct.

In *United States v. Park*,<sup>132</sup> the U.S. Supreme Court held that individuals within corporate entities would be liable for the wrongdoings of the company when “the indirect actor” occupied “a position of ‘responsibility and authority’ with regard to the criminal act or transaction.”<sup>133</sup> Second, the “indirect actor” “must have had the

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128. 549 U.S. 497, 528 (2007).

129. Colin H. Cassedy, *Massachusetts v. EPA: The Causes and Effects of Creating Comprehensive Climate Change Regulations*, 7 J. INT'L BUS. & LAW 145, 158, 162–63, 165 (2008).

130. See *CAA Settlement*, *supra* note 60. In 2014, Hyundai and Kia settled with the EPA and the U.S. Department of Justice and were expected to pay a \$100-million civil penalty for violations of the Clean Air Act. *Id.* The penalty was the result of the carmakers selling over 1 million vehicles that were expected to emit over 4.75 million more metric tons of GHGs than what they reported to the EPA. *Id.* \$100 million divided by 4.75 million metric tons results in approximately a \$21-million fine per 1 million metric tons of GHGs. *Id.*

131. See John Redwood, *Companies Need to Deliver Profits and Dividends*, FIN. TIMES (Jan. 25, 2017), <https://perma.cc/A2PC-FV5T>.

132. 421 U.S. 658 (1975).

133. Paul F. Schaaff, Jr., *Indirect Criminal Conduct of Corporate Officers—Law in Search of a Fair and Effective Standard of Liability*, 13 DEL. J. CORP. L. 137, 139–40 (1988).

power to prevent the criminal occurrence through the exercise of the highest standard of foresight and vigilance.”<sup>134</sup> Thus, the government was able to hold individuals liable for actions for which it otherwise would have lacked the requisite element of scienter, and the individuals were allowed to prove themselves innocent if they had no power to stop the wrongful act.<sup>135</sup>

When considering the fines levied in the Hyundai-Kia settlement, it is clear that hefty fines already exist.<sup>136</sup> Thus, to make enforcement more stringent, perhaps the fines could increase to \$50 million per 1 million metric tons of GHG emissions.<sup>137</sup> To ensure that such heavy fines are fair, one must consider the *Park* individual liability analysis.<sup>138</sup> It would be unfair to hold an individual liable for something over which they had no control.<sup>139</sup> However, similar to government-enforced “mandatory reporters” of child sexual abuse,<sup>140</sup> governments should hold individuals liable who do not attempt to prevent their companies from participating in environmental crimes. For example, if an employee notices that their employer is violating EPA regulations, they will be mandated to report the violation to the proper authority. If they do not report, then they too will be held liable for the company’s violations. The vast implications of environmental crimes and the potential damage to public health permits such stringent punishment and regulation.

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134. *Id.*

135. *Id.* at 140.

136. *See CAA Settlement*, *supra* note 60.

137. Specifically, fines should increase from that imposed in the Hyundai-Kia settlement—only \$21 million per 1 million metric tons of GHG emissions. *See* discussion and calculations *supra* note 130.

138. *United States v. Park*, 421 U.S. 658 (1975).

139. *See id.* at 676 (supporting a statute which holds individuals responsible “who . . . have the power to prevent or correct violations of [the statute’s] provisions”).

140. Governments have mandated that certain individuals become “mandatory reporters” of child sexual abuse to help child victims and prevent further abuse. In this context, the government noticed a problem and proactively sought to combat it. *See Mandated Reporting of Child Sexual Abuse*, WASH. COAL. OF SEXUAL ASSAULT PROGRAMS, <http://perma.cc/9BFR-YSYQ> (last updated Mar. 22, 2016). Similarly, governments can recognize the immense harm of environmental crimes and hold bystanders with knowledge that an environmental crime is being committed to a higher standard. Governments can, for example, mandate that such bystanders prevent these crimes by reporting the violation to authorities like the EPA.



#### D. Option Four: Impose a Strict Liability or Negligence Standard

Alternatively, governments could apply either a “strict liability” or “negligence” standard when punishing for contributing to climate change and consequentially increasing the rate of violent crime. Strict liability can be used in tort to enforce civil fines or in the criminal realm to enforce criminal sanctions.<sup>141</sup> While the use of aerosol cans and producing goods are not deemed “abnormally dangerous” and are not “dangerous animals,” unless courts were to expand tort law, the strict liability standard could only be used criminally against environmental offenders.<sup>142</sup> New statutes could hold companies strictly liable for their GHG emissions, which would lead to companies being punished for polluting the environment. While emitting zero GHGs into the atmosphere may be impossible, statutes could include a cap on how many ppm may be emitted annually. The strict liability standard would be used dually to prevent, or reduce, the rate at which Earth is warming and, thus, also decrease the rates of violent crime attributable to heat.

A strict liability standard could also be used to limit Americans’ use of aerosol cans. Similar to how Congress regulated the sales of Nyquil and Claritin-D under the Controlled Substances Act, Congress could regulate the sale of aerosol cans.<sup>143</sup> Like how an individual is required to show identification when purchasing certain over-the-counter drugs, individuals could be mandated to show identification when purchasing aerosol cans.<sup>144</sup> The government could regulate how many cans may be purchased per individual. Salons and other individuals in the beauty business could be required to purchase permits, creating a give-and-take method. For example, the salons could use more aerosols only after

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141. *Strict Liability*, CORNELL LEGAL INFO. INST., <https://perma.cc/WV5G-9HCR>.

142. *See id.*

143. Congress noticed the many dangers of using certain legal drugs. Thus, Congress implemented the Controlled Substances Act to regulate legal drugs and prevent them from being either sold to minors or mixed in a way that creates an illegal substance. *See* Controlled Substances Act, 21 U.S.C. §§ 801–904 (2012). Because of the vast repercussions of the use of certain drugs, Congress was justified in imposing strict regulation. *See id.* § 801.

144. *Legal Requirements for the Sale and Purchase of Drug Products Containing Pseudoephedrine, Ephedrine, and Phenylpropanolamine*, U.S. FOOD & DRUG ADMIN., <https://perma.cc/JWX9-W5HB> (last updated Nov. 24, 2017) (referring to the Combat Methamphetamine Epidemic Act of 2005).

obtaining a permit, which would require them to comply with a stricter energy use standard or other environmentally friendly regulation. Another option is that someone could apply to use more cans if they, for example, drive an energy-efficient vehicle. If an individual were to exceed their allotted quota, a strict liability standard could criminally punish them.

Another option, of course, would be to ban the use of aerosol cans and instead use a pump or a refillable spray bottle to package products commonly sold in aerosol cans.<sup>145</sup> Dispersing hairspray, for example, through a pump rather than an aerosol can would greatly reduce the CO<sub>2</sub> that would otherwise be emitted into the atmosphere from an aerosol can.<sup>146</sup> Simple changes in the way we use everyday products such as hairspray could greatly help conserve our environment and protect public health.

Regarding production and industrial pollution, governments internationally have already begun to cap GHG emissions.<sup>147</sup> However, adding a strict liability standard could boost the success of such regulations. Individuals are more likely to obey and follow the rules under the threat of punishment.<sup>148</sup> This could still work for large companies, too. While a company cannot be sentenced to prison, the CEO and upper management can. Additionally, large monetary sanctions will directly hurt a corporation and provide a substantial incentive to obey the law.<sup>149</sup>

A negligence standard could similarly be used for both actions discussed above. Negligence is “the failure to behave with the level of care that someone of ordinary prudence would have exercised under the same circumstances” or “can also consist of omissions when there is some duty to act” (e.g., a duty to help victims of one’s previous conduct).<sup>150</sup> Negligence standards could hold individuals liable for emitting high levels of GHG into the atmosphere when

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145. See EPA, REFILLABLE SPRAY BOTTLES (1999), <https://perma.cc/887R-V9SP>.

146. *Id.* at 1.

147. *Fuel For Thought*, 22 ENERGY & ENVIRONMENT 1115, 1128–29 (2011) (noting that the Kyoto Protocol, an international agreement, bound “the world’s most industrialised nations to reduce their greenhouse emissions by 5% of their 1990 levels”).

148. TOM R. TYLER, WHY PEOPLE OBEY THE LAW 44 (1990).

149. Steven Shavell, *Law Versus Morality as Regulators of Conduct*, 4 AM. L. & ECON. REV. 227, 248 (2002).

150. *Negligence*, CORNELL LEGAL INFO. INST., <https://perma.cc/VH8S-LRT2> [hereinafter *Negligence*].

they knew or should have known that such emissions cause the expedited warming of Earth and increase the rates of violent crimes. While ignorance is traditionally not an excuse for disobeying the law, a *mens rea* requirement could be satisfied if the government publishes the vast consequences of environmental crimes. Thus, if individuals *should have known*<sup>151</sup> that their actions would lead to increased temperatures and increased rates of violent crime, then they could be found liable.

Similarly, if an individual is clearly aware of such risks and acts anyway, a recklessness standard can be used, which would hold individuals and corporations liable when they act in a way “that is so careless that it is considered an extreme departure from the care a reasonable person would exercise in similar circumstances.”<sup>152</sup> Currently, such a standard is probably unlikely because of the nationwide lack of knowledge regarding individual perpetration of climate change and the consequential increase of violent crime. However, a negligence or recklessness standard can be used if the government takes steps to inform the public of the violent effects of their environmentally careless actions. Once the public is on notice, it will become “ordinary” for individuals to act in a way that would not expedite climate change and increase the levels of violent crime.<sup>153</sup>

#### **E. Option Five: Tax Everyday Activities that Increase Rates of Climate Change**

Regulating people’s actions via taxes has been a common way of handling issues in the United States. A prime example of this is the taxation on cigarettes. The American government regulated smoking by enacting a law forbidding individuals under the age of eighteen from purchasing cigarettes and also by imposing a tax on cigarettes.<sup>154</sup> The aim of the tax was to decrease the number of

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151. *Id.*

152. *Reckless*, CORNELL LEGAL INFO. INST., <https://perma.cc/3XVY-PYJK>.

153. “Negligence” and “recklessness” standards require individuals to act outside of what is “ordinary” of a “regular, prudent person.” *See Negligence*, *supra* note 150. Thus, once knowledge is spread throughout the nation, it will become ordinary for individuals to act a certain way.

154. *See* ANN BOONN, CAMPAIGN FOR TOBACCO-FREE KIDS, RAISING CIGARETTE TAXES REDUCES SMOKING, ESPECIALLY AMONG KIDS (AND THE CIGARETTE COMPANIES KNOW IT) (2017), <https://perma.cc/4CGZ-D6SP>.

people who smoke, and studies suggest that such tax is indeed having that effect.<sup>155</sup>

Placing a tax on an item makes it more expensive. When an item is more expensive, individuals are less likely to purchase it, intending to save money.<sup>156</sup> Thus, if the government placed a tax on aerosol cans, individuals will think twice before purchasing because of the increased expense.

However, the tax will also serve another purpose. Not all individuals will be deterred from purchasing an aerosol can because of a mere tax. Thus, a sales tax will also serve the purpose of combatting climate change. For example, in New York, the state government implements additional taxes on certain purchases such as hotel purchases or parking in Manhattan.<sup>157</sup> Regarding parking services in Manhattan, New York City charges individuals an extra 6% tax for parking and the Borough of Manhattan imposes an additional 8% tax on the same service.<sup>158</sup> Thus, individuals who are parking in Manhattan are charged an additional 14%.<sup>159</sup> Governments levy taxes to raise funds to provide services to citizens and maintain cities.<sup>160</sup>

Currently, taxes are imposed on the sale of many items—including aerosol cans.<sup>161</sup> However, similar to how New York City applies additional taxes on certain products such as parking and hotel stays,<sup>162</sup> state governments can implement an additional tax on the use of aerosol cans. The tax can be used to directly combat climate change, helping both the citizens and the environment.<sup>163</sup> For example, if a 2% tax is imposed on a \$5.00 aerosol can of hair-spray, the government obtains ten cents per can. Those ten cents

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155. *Id.* at 1.

156. *See* Fang, *supra* note 111.

157. *Products, Services, and Transactions Subject to Sales Tax*, N.Y. STATE DEP'T OF TAX'N & FIN., <https://perma.cc/EDB7-3PS7> (last updated June 17, 2015).

158. *Id.*

159. *Id.*

160. *Id.*; U.S. DEP'T OF TREASURY, WHY DO I HAVE TO PAY TAXES?, <https://perma.cc/45FM-FC5N>.

161. *Quick Reference Guide for Taxable & Exempt Property & Services*, N.Y. STATE DEPT. OF TAX'N & FIN., <https://perma.cc/E4YM-ZZFG> (last updated Oct. 21, 2016).

162. *Sales and Use Tax*, N.Y. STATE DEPT. OF TAX'N & FIN., <https://perma.cc/S8DV-AJLC> (last updated Aug. 18, 2017).

163. *See, e.g., Environmental Taxation*, ORG. FOR ECON. CO-OPERATION & DEV., <https://perma.cc/HC64-G652>.

can be used to purchase seeds to plant trees which would combat CO<sub>2</sub> levels.<sup>164</sup> Similarly, such taxes could also assist with funding police departments, as the law enforcement officers will need to combat the increased rates of violence that will occur due to climate change. Thus, taxes are a realistic option to combat CO<sub>2</sub> emissions, which will conserve the environment and promote public health.

## V. THE MOST REALISTIC OPTIONS FOR COMBATING CLIMATE CHANGE

### A. Tax the Individual

While education is occurring in some parts of the country and is important to implement change for future generations, the change will be slow. Thus, more than education is needed. A more immediate resolution is to implement taxes. Taxes are both efficient and timely. As described above, a sales tax will apply to each aerosol can sold, and the funds raised through such tax can be used to control the pollutants emitted from using such aerosol cans. Thus, taxation is the most realistic option to control the amount of CO<sub>2</sub> emitted by American citizens.

Such tax can also be accompanied by regulations. For example, if aerosol can manufacturers can arrange to lower the amount of CO<sub>2</sub> emitted from their cans, then the government can provide an incentive to the companies. Such incentive would include a deal with the companies: The less CO<sub>2</sub> emitted from their cans, the lower the tax on their product. Thus, the less expensive their product will be and the more likely it will be that consumers will buy their product as opposed to competitors.

While the tax can be levied on every can sold, the tax can also be used on a limited number of cans available. If individual regulations via taxes do not sufficiently combat the amount of CO<sub>2</sub> being emitted, the federal government can also regulate market production. The United States could be permitted to only produce X number of aerosol cans per year. Each aerosol can will still have a

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164. Humans naturally breathe in oxygen and breath out CO<sub>2</sub>. Meanwhile, trees are "natural carbon eaters." Thus, the more trees that exist, the lower the CO<sub>2</sub> levels will be, which combats the emission of GHGs and slows climate change. See Ben Rummel, *How Planting Trees Can Help Reduce Your Carbon Footprint*, ONE TREE PLANTED (May 25, 2014), <https://perma.cc/M55M-995U>.

tax placed on it, and the funds collected will be used to plant trees and lower CO<sub>2</sub> levels. However, if the government limits the number of cans for sale, the government can hypothesize the exact amount of pollutants that will be emitted into the atmosphere from aerosol can use. Knowing the exact ppm of emissions will enable the government to directly combat such emissions with a precise tax on the CO<sub>2</sub>-emitting product.

### B. Tax the Corporation

Currently, the CAA enables the government to impose quotas on corporations to limit the GHG emissions from their production processes.<sup>165</sup> More often than not, the quota is not obeyed, and the corporations must pay fines.<sup>166</sup> But to further protect the environment, the quota should be accompanied by a tax. A fluctuating tax, for instance, would encourage corporations to minimize their GHG emissions. The amount of the tax will depend on how much CO<sub>2</sub> is emitted into the atmosphere. For example, for every ppm of CO<sub>2</sub> emitted by a company, that same company could be taxed 1% of their annual income. Such tax will surely inspire corporations to decrease the amount of GHGs emitted into the atmosphere.

## VI. LIMITATIONS

The author recognizes the broad implications of this discussion, but rather than making definitive conclusions about specific steps forward, the purpose of this Note is to elicit thinking regarding the many implications of climate change and the importance of combating it. It is known that polluters are increasing CO<sub>2</sub> levels, which accelerates climate change. This increase in heat naturally causes an increase in violent crimes.<sup>167</sup> It is beyond the scope of this Note to say exactly what proposed taxes should be, but this Note aims to encourage discussion regarding the vast implications of environmental crimes and to promote the idea that polluters

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165. Michael Burger et al., *Legal Pathways to Reducing Greenhouse Gas Emissions Under Section 115 of The Clean Air Act* 69 (UCLA Sch. of Law, Pub. Law Res. Paper No. 16-11, 2016), <https://perma.cc/7E7N-L3SF>. But see Daniel R. Mandelker & Felice Taub, *Constitutional Limitations on Emissions Quotas as an Air Pollution Control Strategy*, 8 *ECOLOGY L.Q.* 269 (1979).

166. *How Cap and Trade Works*, ENVTL. DEF. FUND, <https://perma.cc/PU2Q-4ES8>.

167. See *supra* Part IV.

must be held accountable because of the many effects resulting from emitting harmful chemicals such as CO<sub>2</sub>.

Even so, to hold an individual liable, he or she must be the proximate cause of an effect, for “the law arbitrarily declines to trace a series of events beyond a certain point.”<sup>168</sup> Realistically, the causal relationship between polluters’ actions and the increased rates of violent crime may be too far stretched. While polluters may be a cause of the increased rates of violent crime, they are probably not considered a *proximate*, or immediate, cause.

It is extremely difficult to identify perpetrators of environmental crimes due to the difficulties in establishing the chain of causation. For example, it is nearly impossible to precisely calculate whose CO<sub>2</sub> emissions caused the temperature to increase in Pennsylvania. However, “general causation” enables courts to find an individual liable of an environmental crime when the substance “*can* cause the harm” alleged.<sup>169</sup>

In 2007, the U.S. Supreme Court ruled that GHG emissions are air pollutants that could be regulated by the EPA *only* if a “thorough scientific investigation” demonstrated that the pollutants “endanger the public’s health and welfare.”<sup>170</sup> After two years of research, the EPA concluded that GHG emissions “present a danger to public health.”<sup>171</sup> The EPA has consistently worked to hold criminal violators accountable when their actions “threaten communities and the environment.”<sup>172</sup> Thus, there is a clear nexus between an environmental crime aiding climate change and endangering the public. Furthermore, federal courts have found that the

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168. See *Palsgraf v. Long Island R. Co.*, 162 N.E. 99, 103 (N.Y. 1928) (“... that of a stream. The spring, starting on its journey, is joined by tributary after tributary. The river, reaching the ocean, comes from a hundred sources. No man may say whence any drop of water is derived. Yet for a time distinction may be possible. Into the clear creek, brown swamp water flows from the left. Later, from the right comes water stained by its clay bed. The three may remain for a space, sharply divided. But at last inevitably no trace of separation remains. They are so commingled that all distinction is lost.”).

169. David B. Weinstein et al., *Challenging Causation in Environmental Crimes Cases*, 16 ENVTL. ENF’T & CRIMES COMM. NEWSLETTER 7, 9 (2016) (emphasis in original), <https://perma.cc/9UGX-ZSP4>.

170. *The Clean Air Act*, UNION OF CONCERNED SCIENTISTS, <https://perma.cc/Q9W6-TTWN>.

171. *Id.*

172. *Enforcement Goals*, EPA, <https://perma.cc/FCR5-5D9Q> (last updated Nov. 20, 2017).

EPA is required to implement cap-and-trade regimes for SO<sub>x</sub> and NO<sub>x</sub>.<sup>173</sup> Similarly, the Fifth Circuit in New Orleans decided that “victims of Hurricane Katrina have legal standing to sue over climate change-related damages.”<sup>174</sup> These examples of the expansion of causal links between cause and effect suggest that the argument to increase sanctions on polluters due to the later increase in violent crimes is not so far-fetched.

Finally, such consequential violence will be distributed unevenly throughout the nation. While some areas will become extremely warm, others will only become mildly warm. Thus, not all areas will experience the same rate of increased violence. While areas might not see specific increases in certain crime rates, there will likely be a general increase in violent crime rates as temperatures fluctuate.<sup>175</sup> The author’s intention is to look at the effects of climate change in the aggregate. The increase in heat will cause an increase in crime, and thus, an increased penalty is necessary.

Further questions still exist but are not addressed here. There is a great deal of room for further analysis. The author hopes that this Note will generate further discussion and inquiry regarding the many repercussions of climate change, such as how the many causal links lead to increased rates of violent crime. Specifically, the author hopes that this Note will lead to further scholarship regarding who should be responsible for the marginal increases of violence in the future as a result of the environmental crimes being perpetrated today.

## VII. CONCLUSION

Climate change is human induced. It is clear that climate change’s rising temperature will increase the rates of violent crimes, including rape and murder, throughout the world. While some of climate change’s causes are legal, such as using aerosol cans, many of the reasons for Earth’s heating are caused by illegal actions like prohibited deforestation and GHG emissions. The

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173. *Comer v. Murphy Oil USA*, 585 F.3d 855, 860 (5th Cir. 2009) (holding that the plaintiffs had standing to assert nuisance, trespass, and negligence claims, and that no claim presented nonjusticiable political questions).

174. *Id.*

175. Ranson, *supra* note 90, at 287 (“Across all categories of offenses, higher temperatures lead to higher crime rates.”); see LAURITSEN & WHITE, *supra* note 7.



question left for Earth's governments and populations is whether such harmful acts against our planet should be more severely punished because of the many consequences of such actions. This Note does not propose increasing the punishment for crimes against the environment solely because of the environmental harm, but for the ancillary impact of such harmful actions as well. While perpetrators of environmental crimes do not have the *mens rea* necessary for a murder conviction, if their actions that are hurting the environment are also leading to an increase in murder rates, the crime of hurting the environment could plausibly result in greater sanctions. If anything, increasing the harshness of one's punishment for committing an environmental crime because of the long-standing repercussions will only deter individuals from continuing such harmful actions against our planet. Deterrence will not only save the resources of Earth but also the lives of those who inhabit it.