

# The Fault in Our Stars: Challenging the FCC's Treatment of Commercial Satellites as Categorically Excluded from Review Under the National Environmental Policy Act

## ABSTRACT

*Mega satellite constellations, such as SpaceX's Starlink, have the ability to connect humans across the globe in a way never before possible. However, the unprecedented deployment of tens of thousands of satellites into orbit around Earth creates the risk of altering the night sky for astronomers and the public for decades to come, as well as the risk of polluting the environment through the use of toxic satellite components. The Federal Communications Commission considers commercial-satellite projects categorically excluded from environmental review despite the National Environmental Policy Act's requirement that federal agencies review projects for their environmental effects. A court would likely strike down the FCC's categorical exclusion for its lack of specificity and find that the agency is required to review commercial-satellite projects since they are likely to have direct, indirect, and cumulative effects on the environment. To prevent a challenge in court, the FCC should use NASA's satellite project review model and complete an environmental assessment of commonly used satellite components so that future commercial-satellite projects using those components do not need to go through an environmental assessment during their application process. This would create standards in the commercial-satellite industry that promote economic growth and stability while complying with Congress's mandate to the federal government to proactively consider the environmental impacts of its actions.*

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In 2015, SpaceX CEO Elon Musk announced that his company would launch a large network of communication satellites, with the goal of providing low-cost broadband internet service to consumers around the globe.<sup>1</sup> Musk initially intended to use the satellite constellation, now named Starlink, to generate revenue for a city on Mars.<sup>2</sup> However, SpaceX has since touted the practical benefits of Starlink, which include ensuring that areas affected by natural disasters remain connected to the outside world through the internet.<sup>3</sup> The Federal Communications Commission (FCC)—charged with approving the operation of commercial satellites launched from the United States—lauded the project, with FCC Chairman Ajit Pai calling Starlink “innovative technology [that could help] reach Americans who live in rural or hard-to-serve places” with no internet service.<sup>4</sup> Additionally, Starlink possesses the potential to increase SpaceX’s value as a company by \$20 billion, potentially making SpaceX the most valuable private company in the United States.<sup>5</sup>

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1. Jeff Foust, *Shotwell Says SpaceX “Homing In” on Cause of Falcon 9 Pad Explosion*, SPACENEWS (Oct. 10, 2016), <https://spacenews.com/shotwell-says-spacex-homing-in-on-cause-of-falcon-9-pad-explosion/> [https://perma.cc/X53S-PXLY]; Dominic Gates, *Elon Musk Touts Launch of ‘SpaceX Seattle’*, SEATTLE TIMES (Jan. 16, 2015, 10:04 PM), <https://www.seattletimes.com/business/elon-musk-touts-launch-of-lsquotspacex-seattlersquo/>.

2. Gates, *supra* note 1.

3. Jackie Wattles, *SpaceX Wants to Beam Internet Across the Southern U.S. by Late 2020*, CNN BUS. (Sept. 17, 2019, 4:33 PM), <https://www.cnn.com/2019/09/17/tech/spacex-internet-starlink-scen/index.html> [https://perma.cc/T84M-8QS8].

4. *Id.*

5. *Id.*

The Starlink network began launching in 2019 and will eventually consist of around twelve thousand satellites across the globe.<sup>6</sup> Unsurprisingly, other companies, such as OneWeb and Amazon, plan to launch large satellite constellations of their own.<sup>7</sup> As of December 16, 2019, only 2,218 satellites orbited Earth, meaning that the number of satellites surrounding the globe will increase by over five times in a few years.<sup>8</sup>

Already, the unparalleled brightness from some of these new satellites disrupts visual astronomical research of the night sky.<sup>9</sup> Astronomer Alice Gorman from Flinders University in Australia stated, “Radio astronomers are even more concerned as the satellites are transmitting in the 10.7-12.7 GHz band, which includes the spectral lines of water among other things. Radio astronomers fight daily to protect critical observation bands, and this is only going to get worse.”<sup>10</sup> Large satellite constellations also risk changing the aesthetic of the night sky.<sup>11</sup> Ronald Drimmel, a research astronomer at the Turin Astrophysical Observatory in Italy, warned that “Starlink, and other mega constellations, would ruin the sky for everyone on the planet.”<sup>12</sup>

Despite these concerns, the satellite industry is booming, leading to innovation in related satellite technology, such as in exploring how satellites propel and reposition themselves once in orbit.<sup>13</sup> Traditionally, satellites used electric xenon engines to propel themselves, but xenon’s scarcity led to a search for alternative fuel sources.<sup>14</sup> In November 2018, Bloomberg reported that one California startup, Apollo Fusion, tested the use of mercury as a satellite

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6. Jonathan O’Callaghan, *SpaceX’s Starlink Could Change the Night Sky Forever, and Astronomers Are Not Happy*, FORBES (May 27, 2019, 7:42 AM), <https://www.forbes.com/sites/jonathanocallaghan/2019/05/27/spacexs-starlink-could-change-the-night-sky-forever-and-astronomers-are-not-happy/#41bd54bc59b6> [https://perma.cc/GPS9-JSE5].

7. Wattles, *supra* note 3.

8. See *UCS Satellite Database*, UNION OF CONCERNED SCIENTISTS, <https://www.ucsusa.org/resources/satellite-database> [https://perma.cc/625S-F89C] (last updated Dec. 16, 2019).

9. O’Callaghan, *supra* note 6.

10. Satellites in constellations like Starlink emit radio signals on gigahertz (GHz) bands to communicate with Earth. These signals can interfere with radio astronomers’ research, which is sometimes conducted over the same bands. *Id.*

11. *Id.*

12. *Id.*

13. See Megan Ray Nichols, *Tech Innovations in the Satellite Industry Fuel Market Growth*, BORN2INVEST (June 3, 2019), <https://born2invest.com/articles/tech-innovations-satellite-industry-market-growth/> [https://perma.cc/9G5T-XEUV].

14. *Id.*

propellant.<sup>15</sup> While mercury is a tempting option due to its availability and effectiveness as a propellant, it is also a neurotoxin that can impair cognitive functions and motor skills in humans that come into contact with even tiny doses.<sup>16</sup> Mercury is also a heavy element, meaning that if used in the propulsion systems of proposed large satellite constellations, designed to orbit between 300 and 1,200 kilometers above Earth, it would sink back down to the surface over the course of several years and into the soil and water.<sup>17</sup> For these reasons, the National Aeronautics and Space Administration (NASA) stopped considering the use of mercury as a propellant in the 1970s.<sup>18</sup> Despite this, insiders reported that in 2018, Apollo Fusion pitched the use of mercury as a satellite propellant to potential customers.<sup>19</sup>

In 1969, Congress enacted the National Environmental Policy Act (NEPA), which “requires federal agencies to take a hard look at the environmental consequences of their projects before taking action.”<sup>20</sup> This “hard look” extends beyond the agency’s own policies to any projects or actions by third parties that the agency approves.<sup>21</sup> In light of this, one might assume that the FCC evaluates new commercial-satellite projects for their environmental impact, both to comply with NEPA and to avoid scenarios such as a company using mercury as a satellite propellant or permanently altering the aesthetic of the night sky, but this assumption would be incorrect.<sup>22</sup>

Instead, the FCC considers commercial-satellite projects categorically excluded from environmental impact reviews.<sup>23</sup> As Kevin Bell, staff counsel at the nonprofit advocacy group Public Employees for

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15. Ben Elgin, *This Silicon Valley Space Startup Could Lace the Atmosphere with Mercury*, BLOOMBERG BUSINESSWEEK (Nov. 19, 2018, 4:00 AM), [https://www.bloomberg.com/news/articles/2018-11-19/this-space-startup-could-lace-the-atmosphere-with-toxic-mercury?utm\\_medium=email&utm\\_source=newsletter&utm\\_term=181121&utm\\_campaign=climatechanged](https://www.bloomberg.com/news/articles/2018-11-19/this-space-startup-could-lace-the-atmosphere-with-toxic-mercury?utm_medium=email&utm_source=newsletter&utm_term=181121&utm_campaign=climatechanged) [<https://perma.cc/BBK8-WF8G>].

16. *Id.*

17. *Id.*

18. *Id.*

19. *Id.*

20. 42 U.S.C. § 4321 (2018); *Brady Campaign to Prevent Gun Violence v. Salazar*, 612 F. Supp. 2d 1, 13 (D.D.C. 2009).

21. *Scientists’ Inst. for Pub. Info., Inc. v. Atomic Energy Comm’n*, 481 F.2d 1079, 1088–89 (D.C. Cir. 1973).

22. *See* Elgin, *supra* note 15.

23. *See* Letter from Kevin H. Bell, Staff Counsel, Pub. Emps. for Env’tl. Responsibility, to Marlene H. Dortch, Sec’y, Fed. Comm’n’s Comm’n 9 (Nov. 19, 2018), [https://ef-sapi.fcc.gov/file/111998371507/11\\_19\\_18\\_FCC\\_complaint.pdf](https://ef-sapi.fcc.gov/file/111998371507/11_19_18_FCC_complaint.pdf) [<https://perma.cc/3RMN-KNGC>] [hereinafter Letter].

Environmental Responsibility (PEER), put it, “It’s a regulatory blind spot big enough to launch a satellite through.”<sup>24</sup>

This Note examines NEPA jurisprudence and argues that the FCC opened itself up to litigation when it did not follow NEPA’s requirements. It then proposes that the FCC adopt elements of NASA’s NEPA review process as a way to both comply with congressional intent and to avoid chilling activity in the commercial-satellite industry. Part I explores the background of NEPA and the FCC’s current categorical-exclusion regulation. Part II analyzes NEPA categorical-exclusion jurisprudence and suggests that the FCC faces litigation exposure for its noncompliance. Finally, Part III argues that the FCC could decrease its litigation exposure and address environmental concerns around commercial satellites by amending its categorical-exclusion regulation to align more closely with NASA’s and perform environmental assessments for commercial satellites in a way that does not overburden the agency or applicants.

## I. THE NATIONAL ENVIRONMENTAL POLICY ACT

When Congress passed NEPA in 1969, it was one of the legislative body’s first attempts to ensure that all parts of the federal government were evaluating the environmental impacts of their actions.<sup>25</sup> This Part discusses the background leading up to NEPA’s enactment, as well as how the law functions. Additionally, it details how the FCC has implemented NEPA, particularly with respect to the commercial-satellite projects that the agency considers for approval.

### A. Congress Takes Action

In the 1969 Senate report accompanying NEPA draft legislation, the Committee on Interior and Insular Affairs expressed concern that, while the US government’s programs and policies over the course of history maximized the profits of businesses and increased the wealth of the nation, they were not well suited to protect the environment and natural resources.<sup>26</sup> Recognizing that up until that point, congressional action to protect the environment had been piecemeal, legislators realized that the time had come for a “national comprehensive policy on

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24. Elgin, *supra* note 15.

25. *Summary of the National Environmental Policy Act*, EPA, <https://www.epa.gov/laws-regulations/summary-national-environmental-policy-act> [<https://perma.cc/N62F-MM7M>] (last visited Mar. 27, 2020).

26. S. REP. NO. 91–296, at 5 (1969).

environmental management.”<sup>27</sup> The goal of this new legislation, named the National Environmental Policy Act, was to prevent the federal government from relying on past inaction when it came to the environment to justify inaction going forward.<sup>28</sup> Further, NEPA requires agencies to proactively consider environmental risks rather than wait until an environmental issue reached crisis levels to act.<sup>29</sup>

To assist federal agencies in the implementation of NEPA, Congress created the Council on Environmental Quality (the “Council”) to operate out of the Executive Office of the President.<sup>30</sup> The Council instructed agencies that before implementing “major Federal actions significantly affecting the quality of the human environment,” agencies need to either complete an environmental assessment (EA), complete an environmental impact statement (EIS), or classify the action as categorically excluded from NEPA review.<sup>31</sup> An EA is a “concise public document” that provides evidence and analysis as to whether the agency’s action will have a significant impact on the environment.<sup>32</sup> If an agency determines that its action will have a significant environmental impact, the agency must prepare an EIS.<sup>33</sup> If not, the agency prepares a “finding of no significant impact” statement.<sup>34</sup>

When preparing an EIS, an agency should include the effects its proposed action will have on the environment, any unavoidable adverse environmental effects of the proposed action, alternatives to the proposed action, descriptions of how the short-term use of the environment to perform the action relates to the long-term maintenance of the environment, and determinations of whether there are irreversible environmental consequences from taking the proposed action.<sup>35</sup> An agency must examine both direct and indirect effects of the proposed action; indirect effects are “those that are later in time or farther removed in distance, but are still reasonably foreseeable.”<sup>36</sup> Indirect effects include those that are “ecological (such as the effects on natural resources and on the components, structures, and functioning

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27. *Id.*

28. *Id.*

29. *Id.* at 10.

30. 42 U.S.C. § 4342 (2018).

31. 42 U.S.C. § 4332(C) (2018); 40 C.F.R. § 1508.4 (2019).

32. 40 C.F.R. § 1508.9(a)(1).

33. *Id.*

34. *Id.*

35. 42 U.S.C. § 4332(C).

36. 40 C.F.R. § 1508.8.

of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative.”<sup>37</sup>

Agencies may forgo completing an EIS or EA if they have determined that their proposed action is categorically excluded from NEPA review.<sup>38</sup> A categorical exclusion is a “category of actions which do not individually or cumulatively have a significant effect on the human environment.”<sup>39</sup> If an agency determines through past experience that an action has no environmental impact and therefore does not require environmental review, it can establish a categorical exclusion for that action.<sup>40</sup> When an agency takes an action in the future, it can consult its established categorical exclusions, and if the action fits into one of the categorical exclusions, the agency need not complete an EA or EIS for the action.<sup>41</sup> Examples of actions that an agency might decide to categorically exclude include “payroll processing, data collection, conducting surveys, or installing an electronic security system in a facility,” since these likely have no significant impact on the environment.<sup>42</sup>

In the Council’s 2010 guidance to agencies on categorical exclusions, it noted that some agencies’ categorical exclusions were many years old and recommended that each agency review its categorical exclusions on a seven-year cycle to ensure they reflect current environmental circumstances and policies of the agency.<sup>43</sup> The Council also included a warning:

Since Federal agencies began using categorical exclusions in the late 1970s, the number and scope of categorically-excluded activities have expanded significantly. Today, categorical exclusions are the most frequently employed method of complying with NEPA, underscoring the need for this guidance on the promulgation and use of categorical exclusions. . . . If used inappropriately, categorical exclusions can thwart NEPA’s environmental stewardship goals, by compromising the quality and transparency of agency environmental review and decisionmaking, as well as compromising the opportunity for meaningful public participation and review.<sup>44</sup>

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37. § 1508.8(b).

38. § 1508.4.

39. *Id.*

40. Final Guidance for Federal Departments and Agencies on Establishing, Applying, and Revising Categorical Exclusions Under the National Environmental Policy Act, 75 Fed. Reg. 75,628, 75,631 (Dec. 6, 2010).

41. *Id.*

42. *Id.* at 75,632.

43. *Id.* at 75,637.

44. *Id.* at 75,631–32.

Despite providing clear guidance on the review of existing categorical exclusions, the Council acknowledged that agencies have “substantial flexibility” in implementing categorical-exclusion review procedures.<sup>45</sup>

### *B. The FCC’s Categorical-Exclusion Regulation*

The United States is a signatory of the International Telecommunication Union Radio Regulations, which stipulates that private entities cannot establish or operate a transmitting station without a license from the government of the country to which the station in question is subject.<sup>46</sup> To comply with the treaty, Congress amended the Communications Act of 1934 to require private entities to obtain a license for communications to and from the United States or to and from any US satellite; Congress gave the FCC the authority to grant these licenses and regulate commercial satellites.<sup>47</sup>

As discussed in Section I.A, NEPA allows for an agency to specify which regulatory activities it considers excluded from environmental review.<sup>48</sup> The FCC’s regulation on categorically excluded activities was initially promulgated in 1986 and was last updated in 2015.<sup>49</sup> Despite its relatively recent update, the regulation remains fairly sweeping in scope, stating that “Commission actions . . . are deemed individually and cumulatively to have no significant effect on the quality of the human environment and are categorically excluded from environmental processing.”<sup>50</sup> The regulation then goes on to specify three exceptions that are not categorically excluded from environmental review.<sup>51</sup> The first exception is when an applicant proposes a communications facility in a certain location, such as a designated wildlife preserve, designated wilderness area, designated critical habitat, wetland, historic site, or Native American religious site.<sup>52</sup> The second exception is when an applicant proposes a communications facility that would use high-intensity lighting near a residential area.<sup>53</sup> The third exception is when an applicant proposes a

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45. *Id.* at 75,638.

46. 1995 Revision of Radio Regulations art. S18.1, Nov. 17, 1995, S. TREATY DOC. NO. 108-28 (2008).

47. 47 U.S.C. § 301 (2018); § 303(r).

48. 40 C.F.R. § 1508.4 (2019).

49. 47 C.F.R. § 1.1306 (2019).

50. § 1.1306(a).

51. § 1.1306(b).

52. § 1.1306(b)(1); § 1.1307(a).

53. § 1.1306(b)(2); § 1.1307(a).

communications facility that would expose humans to radio-frequency radiation above the FCC's designated safety standards.<sup>54</sup>

Companies applying for a license to operate a commercial satellite must complete Form 312, the FCC's application for satellite space stations.<sup>55</sup> The form asks only one question of applicants regarding the environment: "Would a Commission grant of any proposal in this application or amendment have a significant environmental impact as defined by 47 CFR 1.1307?"<sup>56</sup> As none of the FCC's three exceptions to categorical exclusion apply to orbiting commercial satellites, applicants can simply answer "no," as SpaceX did when it initially applied for approval for Starlink's first 4,425 satellites.<sup>57</sup> Per the FCC's regulations, this negative response from the applicant completes the FCC's compliance with NEPA.<sup>58</sup>

Since 2004, the FCC has required commercial-satellite operators to mitigate the creation of orbital debris.<sup>59</sup> The agency defines "orbital debris" as artificial material orbiting Earth that is not a functioning spacecraft, ranging from flakes of paint from a spacecraft to an intact satellite that has stopped functioning.<sup>60</sup> The explosion of a spacecraft or the collision of two spacecraft can also create orbital debris.<sup>61</sup> The impetus for FCC regulations concerning orbital debris came from a larger recognition in the US government, since 2000, that orbital debris can often pose a significant risk to operating spacecraft by orbiting indefinitely.<sup>62</sup> In other cases, gravity can drag orbital debris down to Earth and pose a risk of damage or injury to people and property on the surface.<sup>63</sup> For these reasons, the FCC requires that commercial-satellite operators address control of debris during normal operations, minimization of debris generated by accidental explosions, operational

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54. § 1.1306(b)(3).

55. 47 C.F.R. § 25.114(a)(1) (2019).

56. *FCC 312: Application for Satellite Space and Earth Station Authorizations*, FCC, <https://transition.fcc.gov/Forms/Form312/312Fill.pdf> [<https://perma.cc/BE89-QJ6D>] (last visited Mar. 27, 2020).

57. See William M. Wiltshire et al., *Application for Approval for Orbital Deployment and Operating Authority for the SpaceX NGSO Satellite System*, FCC (Nov. 15, 2016), <https://fcc.report/IBFS/SAT-LOA-20161115-00118/1158349.pdf> [<https://perma.cc/487W-6WQY>]; *FCC 312: Application for Satellite Space Station Authorizations – Space Exploration Holdings, LLC*, FCC (Nov. 15, 2016, 9:03 PM), <https://fcc.report/IBFS/SAT-LOA-20161115-00118/1158353.pdf> [<https://perma.cc/SV6D-PTC4>].

58. See 47 C.F.R. § 1.1306(a).

59. Mitigation of Orbital Debris, 19 FCC Rcd. 11,567, 11,568 (2004).

60. *Id.* at 11,569.

61. *Id.*

62. *Id.* at 11,570.

63. *Id.* at 11,571.

standards that prevent collisions, and postmission disposal of space structures.<sup>64</sup> While the mitigation of orbital debris certainly addresses an environmental concern, the FCC's inquiry into it is not part of the NEPA review process.<sup>65</sup> Rather than have applicants include this information as part of an EA within the NEPA review process, the FCC has opted to require applicants to provide orbital debris mitigation information in a stand-alone exhibit that accompanies the Form 312 application.<sup>66</sup> Therefore, it is not part of the FCC's efforts to comply with NEPA.

One nonprofit advocacy group, PEER, openly criticized the FCC for its lack of environmental review concerning commercial satellites.<sup>67</sup> It noted in a 2018 open letter to FCC Secretary Marlene Dortch that, rather than tightening its oversight of commercial satellites, the FCC seemed to be stepping away from its responsibility.<sup>68</sup> In particular, PEER cited a 2015 FCC order titled *Comprehensive Review of Licensing and Operating Rules for Satellite Services*, which eliminated "any need for submission of confidential contract or design materials to the Commission to prove that the milestones have been completed."<sup>69</sup> PEER argues that a company could include nuclear weapon components on its satellites and the FCC would never be aware of it since there is no disclosure requirement for such information.<sup>70</sup>

Operators of commercial satellites, such as OneWeb, have also criticized the federal government for its lack of oversight when it comes to ensuring that commercial satellites do not harm the environment.<sup>71</sup> In October 2017 testimony before the Senate Committee on Commerce, Science, and Transportation, OneWeb's founder argued that while "thoughtful, common-sense rules" possibly increase operating and engineering costs for commercial-satellite operators, they protect the environment and ensure that the commercial-satellite industry in the United States continues to grow.<sup>72</sup> While environmental groups and commercial-satellite operators may want to see the FCC perform

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64. *Id.* at 11,573.

65. *See* 47 C.F.R. § 25.114(d)(14) (2019).

66. § 25.114(a)(1).

67. Letter, *supra* note 23.

68. *Id.* at 1.

69. *Id.* at 9–10.

70. *Id.* at 10.

71. *See The Commercial Satellite Industry: What's Up and What's on the Horizon: Hearing Before the S. Comm. on Commerce, Sci., and Transp.*, 115th Cong. 5 (2017) (statement of Greg Wyler, Founder and Executive Chairman, Worldvu Satellites Limited (OneWeb)) [hereinafter *Statement of Greg Wyler*].

72. *Id.* at 5–6.

environmental reviews of commercial-satellite projects, the question remains: Is the FCC *required* to perform them under NEPA? Based on the body of jurisprudence that has built up around NEPA in the past several decades, discussed in the next Part, the answer appears to be yes.

## II. NEPA IN THE COURTS

Since its inception, NEPA has been the subject of much litigation.<sup>73</sup> This Part will examine four federal cases, which together indicate that the FCC's sweeping categorical exclusion of most of its actions, including approval of commercial-satellite projects, from NEPA review is unlawful and would likely be set aside in court. In *Foundation on Economic Trends v. Heckler*, the court held that NEPA review is especially important when agency action involves new and expanding technology with unknown environmental impacts.<sup>74</sup> In *Friends of the Earth, Inc. v. U.S. Army Corps of Engineers*, the court established the importance of an agency thoroughly evaluating the direct, indirect, and cumulative effects its actions will have on the environment, as well as avoiding conclusory findings of no environmental impact.<sup>75</sup> In *Sierra Club v. Bosworth*, the court set aside an agency's categorical exclusion because it lacked specificity and thorough consideration.<sup>76</sup> Finally, in *Brady Campaign to Prevent Gun Violence v. Salazar*, the court held that an agency is responsible for NEPA review of its actions if it is reasonably foreseeable that those actions could lead a third party to engage in activity that could significantly impact the environment.<sup>77</sup> The principles in these four cases apply to the FCC's approval of commercial-satellite projects as categorically excluded from NEPA review.

### A. *Foundation on Economic Trends v. Heckler*: *Evaluating the Unknown*

*Foundation on Economic Trends v. Heckler* arose during a period of advancement in the field of genetic engineering.<sup>78</sup> In the early 1970s,

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73. See *infra* Sections II.A–D.

74. See *Found. on Econ. Trends v. Heckler*, 756 F.2d 143, 147 (D.C. Cir. 1985).

75. See *Friends of the Earth, Inc. v. U.S. Army Corps of Eng'rs*, 109 F. Supp. 2d 30, 42–43 (D.D.C. 2000).

76. See *Sierra Club v. Bosworth*, 510 F.3d 1016, 1032 (9th Cir. 2007).

77. See *Brady Campaign to Prevent Gun Violence v. Salazar*, 612 F. Supp. 2d 1, 16 (D.D.C. 2009).

78. See *Found. on Econ. Trends*, 756 F.2d at 145.

scientists discovered a method of cloning DNA segments from the genes of one organism and inserting the cloned segments into the genes of another organism, resulting in what scientists termed “recombinant DNA.”<sup>79</sup> After a body of international scientists met in 1975 to discuss the implications of genetic engineering, the National Institutes of Health (NIH) completed an EIS on the subject and began providing oversight for NIH-backed projects through guidelines allowing for experimentation with recombinant DNA under certain specified conditions and banning it under others.<sup>80</sup> Included in the ban was the deliberate release of recombinant DNA into the environment.<sup>81</sup> The NIH warned in its EIS that recombinant DNA could create a harmful organism that, if released into the environment, might find a way to reproduce and thrive on its own.<sup>82</sup> Despite this danger, after reviewing public comments and a recommendation from the NIH’s Recombinant DNA Advisory Committee (RAC), the agency changed its guidelines in 1978 to allow the NIH director to grant waivers for otherwise banned experiments, including ones that would introduce recombinant DNA into the environment.<sup>83</sup> An EA produced by the NIH supported the change, assuring the evaluation of any waivers for environmental impact.<sup>84</sup> Despite the NIH director’s suggestion at the time of the change that the agency should develop definitive guidelines for waiver grants, none were ever produced.<sup>85</sup>

In 1982, scientists at the University of California submitted a request for approval to the NIH for an experiment to introduce genetically modified bacteria to crops in northern California in an effort to make the crops frost resistant.<sup>86</sup> The NIH announced the request and a call for public comments.<sup>87</sup> After receiving no comments, the RAC met to discuss the request and highlighted several concerns before recommending approval to the director.<sup>88</sup> The director asked the University of California’s scientists to consider the RAC’s concerns, which they did before submitting a modified proposal of the experiment.<sup>89</sup> The RAC unanimously recommended approval for the

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79. *Id.* at 147.

80. *Id.* at 148.

81. *Id.*

82. *Id.* at 148–49.

83. *Id.* at 49

84. *Id.*

85. *Id.*

86. *Id.* at 152.

87. *Id.*

88. *Id.*

89. *Id.*

modified plan and the director approved it.<sup>90</sup> In September 1983, three environmental groups and two individuals sued both NIH and the Department of Health and Human Services, under which NIH operates, in federal district court; the plaintiffs alleged failure to comply with NEPA in approving the project and requested that the court enjoin NIH from approving this or any other project involving the deliberate release of recombinant DNA.<sup>91</sup> The district court granted both the injunction against the University of California project as well as an injunction against NIH approval of future projects involving the deliberate release of recombinant DNA into the environment.<sup>92</sup>

The NIH appealed to the US Court of Appeals for the District of Columbia Circuit.<sup>93</sup> While the circuit court found the injunction against future approvals overbroad, it upheld the injunction for the University of California project, stating that it “emphatically agree[d] with the District Court’s conclusion that NIH ha[d] not yet displayed the rigorous attention to environmental concerns demanded by law.”<sup>94</sup> The court highlighted that Congress’s goal in creating NEPA was to specifically address the threat to the environment that “new and expanding technology” posed by having agencies carefully consider these potential threats.<sup>95</sup> In the case of the deliberate release of recombinant DNA into the environment, the NIH itself had noted in its initial EIS that the results of release were unknown and potentially hazardous.<sup>96</sup> Yet, when considering the University of California project, the NIH’s RAC only observed that the release of recombinant DNA was unlikely since the number of genetically modified cells used in the experiment was small and precautions were being taken to limit their survival.<sup>97</sup> The court held that the NIH abdicated its duties under NEPA by not considering what environmental impacts would occur if the recombinant DNA escaped into the environment, no matter how small the chances were of such an event occurring.<sup>98</sup>

The court foresaw that agencies might attempt to avoid performing environmental reviews under NEPA by arguing that certain actions involving new technology have unknown environmental

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90. *Id.* at 152–53.

91. *Id.* at 146.

92. *Id.*

93. *Id.* at 143.

94. *Id.* at 146.

95. *Id.* at 147.

96. *Id.* at 147–48.

97. *Id.* at 153.

98. *Id.* at 154.

impacts, making them unreviewable.<sup>99</sup> To combat this line of reasoning, the court pointed to the Council's requirement for an EIS when "the possible effects on the human environment are highly uncertain or involve unique or unknown risks."<sup>100</sup> The court concluded with an excerpt from the opinion of *Scientists' Institute for Public Information v. Atomic Energy Commission*, in which that court stated that it "must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as 'crystal ball inquiry.'"<sup>101</sup> Thus, *Foundation on Economic Trends* makes clear that an agency's responsibility for environmental review is heightened, not diminished, when considering action that involves new technology with unknown environmental impacts.<sup>102</sup>

*B. Friends of the Earth, Inc. v. U.S. Army Corps of Engineers:  
Direct, Indirect, and Cumulative Impacts*

In 2000, the US Army Corps of Engineers (the "Corps") provided agencies with more guidance on the specific types of effects to evaluate during a NEPA review.<sup>103</sup> *Friends of the Earth, Inc. v. U.S. Army Corps of Engineers* involved floating casinos off the Mississippi coast, which, according to state law at the time, was the only place that gambling establishments could operate.<sup>104</sup> Since these casinos are on navigable US waters, they must obtain a permit from the Corps, under section 404 of the Clean Water Act, to operate.<sup>105</sup> In *Friends of the Earth*, the legal dispute centered on the Corps' permitting process for three casinos.<sup>106</sup>

The first was Casino World, which consisted of two 600-foot-long barges on the water as well as a 450-room hotel, 2,000-seat entertainment facility, tennis-court complex, parking garage, and golf course built on the land adjacent to the floating casino.<sup>107</sup> In 1996, the Corps issued a public notice that it had received a permit application from Casino World, resulting in multiple agencies, including the US

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99. *See id.* at 155.

100. *Id.*; 40 C.F.R. § 1508.27(b)(5) (2019).

101. *Found. on Econ. Trends*, 756 F.2d at 160; *Scientists' Inst. for Pub. Info., Inc. v. Atomic Energy Comm'n*, 481 F.2d 1079, 1092 (D.C. Cir. 1973).

102. *See Found. on Econ. Trends*, 756 F.2d at 144–45.

103. *See Friends of the Earth, Inc. v. U.S. Army Corps of Eng'rs*, 109 F. Supp. 2d 30, 36 (D.D.C. 2000).

104. *Id.* at 32.

105. 33 U.S.C. § 403 (2018); *Friends of the Earth*, 109 F. Supp. 2d at 32–33.

106. *Friends of the Earth*, 109 F. Supp. 2d at 32.

107. *Id.* at 33.

Environmental Protection Agency, US Fish and Wildlife Service, and Mississippi Department of Marine Resource, recommending that the Corps conduct an EIS due to shared concerns about the environmental impact of the project.<sup>108</sup> The Corps chose instead to complete an EA, which led to a finding of no significant impact for the Casino World project.<sup>109</sup> The Corps then granted the permit in 1998.<sup>110</sup> The second and third casinos, Circus Circus and the Royal D'Iberville, followed similar routes to permits.<sup>111</sup> Like Casino World, each consisted of large barges on the water with significant on-land development adjacent to the casinos.<sup>112</sup> Also, like Casino World, each faced opposition from other agencies for environmental concerns, which the Corps dismissed through an EA and finding of no significant impact.<sup>113</sup>

In its suit against the Corps, Friends of the Earth alleged that the Corps failed to examine the direct, indirect, and cumulative impacts that the casino projects would have on the environment in contravention of NEPA, and the court agreed.<sup>114</sup> The court first looked at direct impacts to the environment, which the Council defines as those that are “caused by the action and occur at the same time and place.”<sup>115</sup> The court found the Corps’ statements in its EAs, that the impact the casinos’ shade would have on aquatic wildlife would be minimal and that displaced wildlife would simply move to other areas, to be conclusory.<sup>116</sup> Additionally, the court found it unacceptable that the Corps performed no analysis on the effects to the ecosystem after learning that the casino barges would destroy communities of benthic organisms living underneath them.<sup>117</sup> Finally, as to the impact the projects would have on nearby wetlands, the court found that the Corps conducted no analysis at all.<sup>118</sup>

The court also found the Corps’ examination of indirect and cumulative effects of the casino projects lacking.<sup>119</sup> The Council defines indirect effects as those “caused by the action and are later in time or

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108. *Id.*

109. *Id.*

110. *Id.*

111. *See id.* at 33–34.

112. *See id.*

113. *See id.*

114. *Id.* at 36, 43.

115. *Id.* at 36; 40 C.F.R. § 1508.8(a) (2019).

116. *Friends of the Earth*, 109 F. Supp. 2d at 38.

117. *Id.*

118. *Id.*

119. *See id.* at 40–42.

farther removed in distance, but are still reasonably foreseeable,”<sup>120</sup> while cumulative effects are those that result “from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency . . . or person undertakes such other actions.”<sup>121</sup> The court classified the adjacent land development of the casino projects as well as the growth the project would spur in surrounding areas as sources of indirect effects on the environment and held that the Corps failed to examine them.<sup>122</sup>

The court noted that the goal of examining the cumulative impacts of a project is to prevent an actor from engaging in an activity that has a minimal impact on the environment but, when combined with the activity of other actors, results in a significant impact on the environment.<sup>123</sup> The Corps argued that it devoted nine-to-ten pages to discussing cumulative effects in each EA, but the court found these discussions to be nothing more than a recitation of the history of casino barges on the Mississippi coast along with a statement that the barges have had minimal cumulative effects on the environment.<sup>124</sup> This conclusory statement, with no analysis to back it up, did not comply with NEPA; the court noted that “[c]onclusory remarks . . . do not equip a decisionmaker to make an informed decision about alternative courses of action or a court to review the Secretary’s reasoning.”<sup>125</sup> *Friends of the Earth* put agencies on notice as to the importance of fully examining the direct, indirect, and cumulative effects of their actions.<sup>126</sup> Additionally, it made clear that statements by an agency that its actions have no significant environmental impact that lack supporting evidence and analysis can be rejected by the court.<sup>127</sup>

### C. *Sierra Club v. Bosworth: Characteristics of a Categorical Exclusion*

In 2007, the Ninth Circuit had an opportunity to address the characteristics that an agency’s categorical exclusion should possess.<sup>128</sup> *Sierra Club* involved a 2003 decision by the US Forest Service to establish a categorical exclusion for fuel-reduction projects under 1,000

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120. § 1508.8(b).

121. § 1508.7.

122. *Friends of the Earth*, 109 F. Supp. 2d at 40–41.

123. *Id.* at 41 (citing *Nat. Res. Def. Council, Inc. v. Hodel*, 865 F.2d 288, 297 (D.C. Cir. 1988)).

124. *Id.* at 42.

125. *Id.* (citing *Hodel*, 865 F.2d at 298).

126. *Id.* at 43.

127. *See id.* at 42.

128. *See Sierra Club v. Bosworth*, 510 F.3d 1016, 1026 (9th Cir. 2007).

acres or prescribed fuel-burn projects under 4,500 acres in national forests (the “Fuels CE”).<sup>129</sup> The Fuels CE responded to President George W. Bush’s Healthy Forests Initiative, which intended to address the 2000 fire season, the worst in fifty years in terms of the number of forest fires that occurred as well as the number of acres burned.<sup>130</sup> Fuel-reduction projects and fuel-burn projects reduce the amount of hazardous fuel in a forest, such as grass, leaves, or trees that are particularly prone to igniting or fueling a forest fire.<sup>131</sup> In 2002, the deputy chief of the Forest Service announced the agency’s intent to establish the Fuels CE and issued a call for data on fuel-reduction and fuel-burn projects.<sup>132</sup> After receiving thirty-nine thousand comments in response, the US Forest Service published the final Fuels CE in June 2003.<sup>133</sup>

The Sierra Club filed suit against the Forest Service to challenge three fuel-reduction projects scheduled to occur in the Eldorado National Forest in 2004 and requested a national injunction against the use of the Fuels CE.<sup>134</sup> Specifically, the Sierra Club argued that the Forest Service’s Fuels CE was invalid because data did not support its use, it included activities that had a significant effect on the environment, and it lacked specificity as to which activities fell within it.<sup>135</sup> Additionally, the Sierra Club argued that to establish a categorical exclusion, the Forest Service was first required to complete an EA or EIS that supported its promulgation.<sup>136</sup> The district court ruled that the Fuels CE complied with NEPA and that completing an EA or EIS is unnecessary to establish a categorical exclusion, at which point the Sierra Club appealed to the Ninth Circuit.<sup>137</sup>

While the Ninth Circuit agreed with the district court that agencies do not need to complete an EA or EIS to establish a categorical exclusion, it sided with the plaintiff in finding that the Forest Service’s Fuels CE was invalid.<sup>138</sup> The court cited three issues in particular with the Fuels CE: improper post hoc decision-making in establishing the Fuels CE, a failure to properly assess the significance that activities within the Fuels CE would have on the environment, and a lack of

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129. *Id.* at 1018.

130. *Id.* at 1019.

131. *Id.*

132. *Id.*

133. *Id.*

134. *Id.* at 1021.

135. *Id.* at 1021–22.

136. *Id.*

137. *Id.* at 1022.

138. *Id.* at 1025–26.

specificity as to what activities fell within the Fuels CE.<sup>139</sup> In its discussion of the first issue, the court noted that the call for data regarding fuel-reduction and fuel-burn projects came *after* the agency had already announced its decision to move forward on establishing a Fuels CE.<sup>140</sup> According to the court, this violated the purpose of NEPA, which requires agencies to first gather information that aids in subsequent decision-making, rather than allow agencies to start with a decision and then ask the public to bolster it with data.<sup>141</sup>

Second, the court noted that an agency must be able to show that it has considered the activities that fall within a proposed categorical exclusion and found their impact environmentally insignificant, or else the activities would trigger the requirement for an EIS.<sup>142</sup> In establishing the Fuels CE, the court found that the Forest Service never considered the unique geographical characteristics of proposed fuel-reduction and fuel-burn project sites, the degree to which the effects of the activity were controversial or unknown, how the activity would affect endangered species, the cumulative effects of the activity, or whether the Fuels CE would set a precedent for future activity that might have a significant impact on the environment.<sup>143</sup>

Finally, the court addressed the Forest Service's lack of specificity as to what activities fell within the Fuels CE.<sup>144</sup> For example, the Forest Service noted that some fuel-reduction and fuel-burn projects had characteristics that either individually or cumulatively created significant effects on the environment but never specified what those characteristics were.<sup>145</sup> Additionally, the Fuels CE did not specify a limit to the types of trees removed during a fuel-reduction or fuel-burn project, allowing for the removal of fire-resistant trees that posed no threat of creating or sustaining forest fires.<sup>146</sup> The Forest Service also did not specify a limit to how many fuel-reduction and fuel-burn projects could take place in proximity to one another.<sup>147</sup> For these reasons, the court held that the Forest Service's Fuel CE was not in compliance with NEPA and granted an injunction against the future use of the Fuels CE "pending [the Forest Service's] completion of an adequate assessment

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139. *Id.* at 1026.

140. *Id.*

141. *Id.*

142. *Id.* at 1027.

143. *Id.*

144. *Id.* at 1032.

145. *Id.*

146. *Id.*

147. *Id.*

of the significance of the categorical exclusion from NEPA.”<sup>148</sup> *Sierra Club v. Bosworth* established that a court can set aside an agency’s categorical exclusion if the agency cannot defend that the activities within the categorical exclusion do not have a significant impact on the environment and if the language of the categorical exclusion lacks specificity.<sup>149</sup>

*D. Brady Campaign to Prevent Gun Violence v. Salazar:  
Environmental Impacts of Agency Approval*

In 2009, the US District Court for the District of Columbia examined whether an agency’s approval of a third-party action can have an environmental impact, thus requiring NEPA review.<sup>150</sup> The case revolved around the reversal of a twenty-five-year-old rule prohibiting national-park visitors from possessing firearms unless they were unloaded and packed away to prevent ready use by the Department of the Interior (DOI).<sup>151</sup> The change was precipitated by a December 14, 2007, letter from forty-seven US senators requesting a change in the DOI rule that would allow visitors to carry concealed, loaded, and operable firearms within national parks.<sup>152</sup> The department responded in 2008 by proposing a rule in line with the senators’ request, stating that the rationale behind the change was to bring the DOI in line with forty-eight states that allow individuals to carry concealed firearms.<sup>153</sup> The department felt it should defer to the states on this issue and the proposed change accomplished this.<sup>154</sup>

In response to the proposed rule, the DOI received 125,000 public comments.<sup>155</sup> Many of these comments indicated that visitors would use concealed firearms within national parks, particularly for self-defense, if the proposed rule was finalized.<sup>156</sup> In 2009, the DOI finalized a slightly modified form of the rule allowing for visitors to possess concealed firearms in national parks located within states that allowed the public to possess concealed firearms.<sup>157</sup> The department

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148. *Id.* at 1034.

149. *See id.* at 1032.

150. *See Brady Campaign to Prevent Gun Violence v. Salazar*, 612 F. Supp. 2d 1, 6–7 (D.D.C. 2009).

151. *Id.* at 6.

152. *Id.* at 8.

153. *Id.*

154. *Id.*

155. *Id.* at 9.

156. *Id.*

157. *Id.*

held that the rule change authorized no impact to the environment and, therefore, was categorically excluded from NEPA review.<sup>158</sup> The Brady Campaign to Prevent Gun Violence and the National Parks Conservation Association filed suit against the DOI, alleging that the department failed to comply with NEPA by not performing an environmental review of its rule change.<sup>159</sup>

Citing *Friends of the Earth* and *Sierra Club* for support, the court stated that an agency's "burden is greater than simply examining whether environmental impacts are *authorized* by the Final Rule—the DOI was required to consider all direct, indirect, and cumulative impacts that were *foreseeable* as a result of the Final Rule."<sup>160</sup> Though the DOI's rule change did not mandate that park visitors carry concealed loaded firearms, the public comments overwhelmingly indicated that the foreseeable result of the rule change was that some park visitors would carry concealed, loaded firearms to defend themselves against wildlife or other individuals.<sup>161</sup> The court held that the department's incorrect review of what the rule authorized, rather than a review of the rule's foreseeable results, was enough to overturn the rule change as arbitrary and capricious.<sup>162</sup>

Additionally, the court made clear that agencies "must evaluate foreseeable environmental impacts even if they are the result of the yet-unknown actions of third parties."<sup>163</sup> Citing *Scientists' Institute for Public Information*, which held that NEPA review extends to when "a federal agency approves a lease of land to private parties, grants licenses and permits to private parties, or approves and funds state highway projects," the court held that the DOI could not shirk its NEPA review responsibility simply because the rule change applied to the unknown actions of park visitors and not to the actions of the department itself.<sup>164</sup> *Brady Campaign to Prevent Gun Violence* affirmed that an agency must review any foreseeable environmental impacts its actions cause, even if the impacts are caused by third parties and not directly by the agency.<sup>165</sup>

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158. *Id.*

159. *Id.* at 6–7.

160. *Id.* at 16–17.

161. *See id.* at 20–21.

162. *Id.* at 17.

163. *Id.* at 22.

164. *Id.* (citing *Scientists' Inst. for Pub. Info., Inc. v. Atomic Energy Comm'n*, 481 F.2d 1079, 1088–89 (D.C. Cir. 1973)).

165. *Id.* at 23–24.

*E. NEPA Jurisprudence and the FCC's Commercial-Satellite  
Categorical Exclusion*

In light of the jurisprudence that has developed around NEPA, it is hard to imagine the FCC successfully defending its decision to treat commercial satellites as categorically excluded from NEPA review.<sup>166</sup> In *Foundation on Economic Trends*, the court held that the need for agency review is heightened when “expanding technology” with unknown environmental impacts is involved.<sup>167</sup> In that case, the NIH first determined that the release of recombinant DNA into nature involved unknown and potentially significant risks, but it then approved an experiment that could result in that release without addressing the agency’s initial concerns.<sup>168</sup> In contrast, the record does not indicate that the FCC has ever considered the environmental risks commercial satellites pose to the environment, neither when the FCC first promulgated its sweeping categorical-exclusion regulation nor during any subsequent update of the regulation.<sup>169</sup>

The advent of mega satellite constellations will skyrocket the number of orbiting satellites from under fifteen hundred to tens of thousands within a few years.<sup>170</sup> Along with this increase comes the issue of collisions between satellites,<sup>171</sup> as well as the potential of

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166. See *supra* Sections II.A–D.

167. Found. on Econ. Trends v. Heckler, 756 F.2d 143, 147 (D.C. Cir. 1985).

168. *Id.* at 148–49.

169. The FCC’s 1986 final rule promulgating its categorical-exclusion regulation does not discuss orbiting commercial satellites. The FCC simply states that based on its experience, it “determined that the telecommunications industry does not generally raise environmental concerns” and “[t]he comments filed in this proceeding support the Commission’s determination.” Subsequent final rules updating the regulation are equally silent on the subject. See Environmental Rules in Response to New Regulations Issued by the Council on Environmental Quality, 51 Fed. Reg. 14,999 (Apr. 22, 1986); see also Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies, 80 Fed. Reg. 1,238 (Jan. 8, 2015); National Environmental Policy Act Compliance for Proposed Tower Registrations; Effects of Communications Towers on Migratory Birds, 77 Fed. Reg. 36,177 (June 18, 2012); National Environmental Policy Act Compliance for Proposed Tower Registrations; Effects of Communications Towers on Migratory Birds, 77 Fed. Reg. 3,935 (Jan. 26, 2012); Radio Broadcasting Services; Randolph and Brandon, VT, 56 Fed. Reg. 13,414 (Apr. 2, 1991); Amendment of the Commission’s Environmental Rules, 53 Fed. Reg. 28,393 (July 28, 1988); Environmental Rules in Response to New Regulations Issued by the Council on Environmental Quality, 51 Fed. Reg. 18,889 (May 23, 1986).

170. See Letter, *supra* note 23, at 6.

171. On September 2, 2019, a satellite within the Starlink constellation nearly collided with European Space Agency satellite Aeolus despite an earlier warning from the US military to the two operators that a collision was likely. Jonathan O’Callaghan, *SpaceX Says a ‘Bug’ Prevented Its Starlink Satellite Avoiding a Collision with a European Satellite*, FORBES (Sept. 3, 2019, 1:23 PM), <https://www.forbes.com/sites/jonathanocallaghan/2019/09/03/spacex-says-a-bug-prevented->

satellite operators using a toxin, like mercury, as a fuel source.<sup>172</sup> Given these rapid changes in the industry, the FCC would be hard-pressed to explain to a court why it does not review commercial-satellite projects for environmental impacts. The mere possibility of tens of thousands of satellites propelled by toxic fuel triggers the FCC's duty to perform NEPA review, since the Council's NEPA regulation requires an EIS when the "possible effects on the human environment are highly uncertain or involve unique or unknown risks."<sup>173</sup> Even though some of the risks may be speculative or unknown, the FCC must review commercial-satellite projects for their environmental impact, just as the *Foundation on Economic Trends* court required the NIH to review the resulting impact of the escape of recombinant DNA into the wild despite the fact that it had never before occurred.<sup>174</sup>

A court would also likely find the FCC's conclusory statement that its actions have no significant individual or cumulative effect on the environment unacceptable, based on *Friends of the Earth*.<sup>175</sup> The US Army Corps of Engineers' conclusion that casino barges had no direct effect on the environment was rejected because the Corps failed to analyze their effect on aquatic wildlife and nearby wetlands.<sup>176</sup> Similarly, the FCC's conclusion that commercial-satellite projects have no environmental effect cannot withstand judicial scrutiny when the agency has never analyzed the direct effects of mercury-fueled satellites on Earth's ecosystems below or large satellite constellations' impact on the aesthetic of the night sky for researchers and stargazers.<sup>177</sup> And just as the *Friends of the Earth* court criticized the Corps for failing to analyze the indirect and cumulative environmental effects of the economic growth and development the barges would bring to the area, the FCC would face similar criticism for failing to analyze the indirect and cumulative impacts of commercial satellites as more and more large satellite constellations are launched by competing US companies as well as international operators not under the FCC's oversight.<sup>178</sup>

The FCC's categorical exclusion of commercial satellites suffers from two of the same flaws that were fatal to the US Forest Service's

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its-starlink-satellite-avoiding-europes-aeolus-satellite-in-orbit/#4a328897ff57  
[<https://perma.cc/SR8W-6YRX>].

172. See Elgin, *supra* note 15.

173. 40 C.F.R. § 1508.27(b)(5) (2019).

174. See *Found. on Econ. Trends v. Heckler*, 756 F.2d 143, 155 (D.C. Cir. 1985).

175. See *Friends of the Earth, Inc. v. U.S. Army Corps of Eng'rs*, 109 F. Supp. 2d 30, 42 (D.D.C. 2000) (citing *Nat. Res. Def. Council, Inc. v. Hodel*, 865 F.2d 288, 298 (D.C. Cir. 1988)).

176. *Id.* at 38.

177. See *supra* text accompanying note 169.

178. *Friends of the Earth*, 109 F. Supp. 2d at 40–41.

Fuels CE in *Sierra Club v. Bosworth*.<sup>179</sup> The first is the FCC's failure to properly assess the significant effects that activities within its categorical exclusion will have on the environment.<sup>180</sup> In the case of the US Forest Service, the court noted that the agency allowed for a categorical exclusion of fuel-reduction and fuel-burn projects without ever considering the geographical characteristics of sites, the possibility of unknown and cumulative effects, and if the agency was setting a precedent that would have future impacts on the environment.<sup>181</sup> Likewise, the FCC has allowed for commercial-satellite projects to be categorically excluded without ever considering the potential environmental risks of dramatically increasing the amount of satellites in the sky, the threat of toxic satellite payloads and propellants, or the possibility of setting a precedent through its approval of the Starlink constellation that could harm the environment in the future.<sup>182</sup> The second flaw is the FCC's lack of specificity as to what activities fall within its categorical exclusion.<sup>183</sup> While the Forest Service in *Sierra Club* had some guidance on which fuel-reduction and fuel-burn projects were categorically excluded, the court was unsatisfied with their lack of specificity.<sup>184</sup> The FCC's categorical exclusion is far more general and sweeping than the Forest Service's Fuels CE, with its declaration that all FCC activity has no significant impact on the environment, except in three narrow exceptions.<sup>185</sup> If specificity is a hallmark of categorical exclusions, then the FCC's clearly fails.<sup>186</sup>

*Brady Campaign* affirmed that NEPA review is required not just for an agency's actions but for any third-party actions that an agency is responsible for approving.<sup>187</sup> In light of this, the FCC might argue that within its approval of commercial-satellite projects, there is no authorization for third parties' impact on the environment. This line of

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179. See *Sierra Club v. Bosworth*, 510 F.3d 1016, 1026 (9th Cir. 2007).

180. See *id.* at 1027.

181. *Id.* at 1021–22.

182. See *supra* text accompanying note 169.

183. See *Sierra Club*, 510 F.3d at 1032.

184. The court held that, among other things, the Forest Service should have provided criteria for which fuel-reduction and fuel-burn projects had significant effects on the environment, if certain fire-resistant tree species were exempted from projects, and if there were limits to how many projects could occur in proximity to one another. *Id.* at 1032.

185. See 47 C.F.R. § 1.1306 (2019).

186. In Public Employees for Environmental Responsibility's letter to the FCC secretary, it stated, "FCC's NEPA regulations unlawfully and categorically exclude entire swaths of their activities under 47 C.F.R. § 1.1306, which should be immediately rewritten." Letter, *supra* note 23, at 9.

187. See *Brady Campaign to Prevent Gun Violence v. Salazar*, 612 F. Supp. 2d 1, 22 (D.D.C. 2009).

reasoning was rejected in *Brady Campaign*, however, when the court held that an agency must look beyond what its actions authorize to the environmental impacts that are foreseeable from its actions.<sup>188</sup> While the DOI's rule in *Brady Campaign* did not authorize visitors to use concealed, loaded firearms in national parks, based on public comments it was foreseeable that by allowing visitors to carry these weapons, visitors would use them as well.<sup>189</sup> Similarly, while the FCC's approval of commercial-satellite projects does not authorize using toxic propellants or changing the aesthetic of the night sky, enough evidence exists that makes it reasonably foreseeable that third parties could engage in this behavior,<sup>190</sup> making a NEPA review by the FCC necessary.<sup>191</sup>

Comparing the FCC's categorical-exclusion regulation with NEPA jurisprudence, it is clear that the agency would have trouble defending in court the regulation's broad scope and lack of specificity, which allows commercial-satellite projects to escape review despite the very foreseeable impacts they might have on the environment.<sup>192</sup> Rather than wait to be challenged in court, the FCC should act now to correct its deficient categorical-exclusion regulation. To begin the process, it need look no further than another agency that has experience with both categorical exclusions and satellites: NASA.

### III. NASA'S CATEGORICAL EXCLUSION: A PATH FORWARD FOR THE FCC

In contrast to the FCC's categorical-exclusion regulation, which operates on the assumption that all FCC activity, barring a few exceptions, has no environmental impact and is categorically excluded from NEPA review, NASA's regulation operates on the assumption that NASA's actions *do* have environmental impacts.<sup>193</sup> In its regulation, NASA enumerates in detail the five areas of activity that it considers categorically excluded from NEPA review.<sup>194</sup> The first area is administrative activities, which includes personnel actions, organizational changes, preparation of documents, information gathering, and software development.<sup>195</sup> The second is operation and management activities, including routine maintenance, minor

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188. See *id.* at 16.

189. *Id.* at 20–21.

190. See *supra* pages 923–26.

191. See *Brady Campaign*, 612 F. Supp. 2d at 16.

192. See 47 C.F.R. § 1.1306 (2019); *supra* pages 923–26.

193. See 14 C.F.R. § 1216.304 (2019); 47 C.F.R. § 1.1306.

194. § 1216.304(d).

195. § 1216.304(d)(1).

construction, installation and removal of equipment, and NASA ceremonies and events.<sup>196</sup> Third is research and development activity, including the use of small amounts of radioactive material and lasers in compliance with applicable federal and state law.<sup>197</sup> Real and personal property activity is fourth and includes the acquisition and disposal of personal property, as well as real property if it is being acquired or disposed of for a reason that is already categorically excluded.<sup>198</sup> Finally, aircraft and airfield activities are excluded when they are routine and comply with local, state, and federal laws.<sup>199</sup>

The launch and operation of satellites do not fall within NASA's categorically excluded activities.<sup>200</sup> This is made clear in a subsequent NASA regulation on environmental assessments, which states that "[t]ypical NASA actions normally requiring an EA include . . . [s]pecific spacecraft development and space flight projects/programs (as defined in Appendix A to this subpart)."<sup>201</sup> Appendix A defines space flight projects and programs as "[t]hose NASA actions that develop products intended for use in space and/or that support ground and space operations for products in space."<sup>202</sup> Consistent with its regulations, NASA has in practice performed an EA for its satellites, including for its Geostationary Operational Environmental Satellite mission and Polar-orbiting Operational Environmental Satellite mission.<sup>203</sup> And in compliance with the Council's 2010 guidance to agencies to review and update their categorical exclusions,<sup>204</sup> NASA's categorical-exclusion regulation states that "[t]he NASA [senior environmental officer] will review the categorical exclusions at least every seven years, in accordance with [Council] guidance, to determine whether modifications, additions, or deletions are appropriate, based upon NASA's experience."<sup>205</sup>

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196. § 1216.304(d)(2).

197. § 1216.304(d)(3).

198. § 1216.304(d)(4).

199. § 1216.304(d)(5).

200. See § 1216.304.

201. § 1216.305(b)(1).

202. 14 C.F.R. app. § 1216.3.

203. See NAT'L AERONAUTICS & SPACE ADMIN., ENVIRONMENTAL ASSESSMENT FOR LAUNCH OF NASA ROUTINE PAYLOADS ES-4 (2011), [https://www.nasa.gov/pdf/603832main\\_FINAL%20NASA%20Routine%20Payload%20EA%20Resized.pdf](https://www.nasa.gov/pdf/603832main_FINAL%20NASA%20Routine%20Payload%20EA%20Resized.pdf) [<https://perma.cc/YL8E-GGPR>].

204. See Final Guidance for Federal Departments and Agencies on Establishing, Applying, and Revising Categorical Exclusions Under the National Environmental Policy Act, 75 Fed. Reg. 75,628, 75,637 (Dec. 6, 2010).

205. § 1216.304(f).

Rather than performing an EA for the launch of every new satellite, NASA completed a routine payload EA in 2002 and updated it in 2011.<sup>206</sup> Recognizing that many of NASA's missions use similar equipment and components, the agency completed these comprehensive routine payload EAs to review commonly used equipment and components for their environmental impact in the following areas: mechanical structure; propulsion; communication; control, avionics, data storage; power generation, storage, and distribution; and science and engineering instrumentation.<sup>207</sup> The EAs examined and compared the equipment and components used in NASA's routine payloads to alternatives and found that the agency's routine payloads do not have a significant impact on the environment.<sup>208</sup> Subsequent missions, satellite or otherwise, using equipment or components from the routine payload EA then receive a finding of no significant impact from NASA,<sup>209</sup> which allows the agency to avoid the cost associated with completing EAs for every mission while remaining compliant with NEPA.<sup>210</sup>

One possible argument against the FCC performing environmental reviews of commercial-satellite projects is that the time and cost of performing them might chill industry activity. However, to avoid having to perform lengthy EAs for every project, the FCC could conduct an EA similar to NASA's routine payloads EA that would review the most commonly used components in commercial-satellite projects.<sup>211</sup> Once complete, future projects involving components that were determined not to have a significant impact on the environment by the FCC's routine payloads EA would not need to go through the NEPA review process. This would reduce the burden on both the FCC and commercial-satellite operators to conduct NEPA review for every project while ensuring that novel satellite components (such as a mercury fuel source) still receive an environmental assessment.<sup>212</sup> Additionally, research looking at past industry regulation suggests that the environmental regulation of commercial-satellite projects could

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206. See National Environmental Policy Act; Final Environmental Assessment for Launch of NASA Routine Payloads on Expendable Launch Vehicles from Cape Canaveral Air Force Station Florida and Vandenberg Air Force Base California, 67 Fed. Reg. 41,525 (June 18, 2002); NAT'L AERONAUTICS & SPACE ADMIN., *supra* note 203, at ES-3.

207. See NAT'L AERONAUTICS & SPACE ADMIN., *supra* note 203, at 1-3, 2-2.

208. See *id.* at ES-9.

209. See National Environmental Policy Act; NASA Routine Payloads on Expendable Launch Vehicles, 76 Fed. Reg. 72,218, 72,219 (Nov. 22, 2011).

210. See NAT'L AERONAUTICS & SPACE ADMIN., *supra* note 203, at 1-3.

211. See *id.* at ES-4.

212. See *id.* at 1-3.

spur growth in the industry, rather than chill it.<sup>213</sup> A Pew study found that in the case of nearly a dozen industries, the cost of implementing new regulations was less than estimated while the economic benefits were greater than estimated.<sup>214</sup> Further, the regulations did not significantly interfere with the economic competitiveness of the industry.<sup>215</sup> Environmental regulations would even the playing field for commercial-satellite operators and, as OneWeb's founder stated, keep the industry growing.<sup>216</sup> Perhaps more importantly, environmental review of commercial satellites would bring the FCC into compliance with the law.<sup>217</sup>

#### IV. CONCLUSION

Mega satellite constellations, such as SpaceX's Starlink, have the ability to connect humans anywhere on the globe with each other in a way never before possible. To accomplish this feat, however, requires the unprecedented deployment of tens of thousands of satellites into orbit around Earth. With this comes the risk of altering the night sky for astronomers and the public for decades to come, as well as the risk of polluting the environment through the use of toxic satellite components. Currently, the FCC does not review the environmental impact of commercial-satellite projects it approves, despite NEPA's requirement that federal agencies review the environmental effects of their actions and the actions of third parties that agencies approve.

The FCC has stated that the majority of its activity, including the approval of commercial-satellite projects, is categorically excluded from NEPA review. However, a review of NEPA jurisprudence suggests that a court would likely strike down the FCC's categorical exclusion for its lack of specificity. Further, a court would likely find that the FCC is required to review commercial-satellite projects under NEPA, since these projects are likely to have direct, indirect, and cumulative effects on the environment. To prevent a challenge in court, the FCC should assess the environmental impact of commercial-satellite projects using NASA as a model. Just as NASA completed an environmental assessment for all routine payloads used in its space missions so that

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213. See *Government Regulation: Costs Lower, Benefits Greater than Industry Estimates*, PEW CHARITABLE TRS. (May 26, 2015), [https://www.pewtrusts.org/-/media/assets/2015/05/industry/government\\_regulation\\_costs\\_lower\\_benefits\\_greater\\_than\\_industry\\_estimates.pdf](https://www.pewtrusts.org/-/media/assets/2015/05/industry/government_regulation_costs_lower_benefits_greater_than_industry_estimates.pdf) [<https://perma.cc/7WWV-KLH8>].

214. *Id.*

215. *Id.*

216. See Statement of Greg Wyler, *supra* note 71, at 6.

217. See *supra* Part II.

the agency did not have to complete new assessments for future missions using those same payloads, the FCC should complete an environmental assessment of commonly used satellite components so that future commercial-satellite projects using those components do not need to go through an environmental assessment during their application process. By doing so, the FCC would create standards in the commercial-satellite industry that promote economic growth and stability while complying with Congress's mandate to the federal government to proactively consider the environmental impacts of its actions.

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