UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

CENTER FOR BIOLOGICAL DIVERSITY, *et al.*,

Plaintiffs,

v.

FEDERAL AVIATION ADMINISTRATION, *et al.*,

Defendants,

&

SPACE EXPLORATION TECHNOLOGIES CORP.,

Defendant-Intervenor.

Civil Action No. 1:23-cv-01204 (CJN)

MEMORANDUM OPINION

In 2022, the Federal Aviation Administration granted Space Exploration Technologies Corp.—popularly known as SpaceX—a license to test its new reusable launch vehicle at SpaceX's base in Boca Chica, Texas. A group of nonprofits sued, claiming (for present purposes) that the FAA violated the National Environmental Policy Act by granting SpaceX the license without first preparing an Environmental Impact Statement. SpaceX intervened as a defendant, and all parties now move for partial summary judgment. For the reasons that follow, the Court grants the government's and SpaceX's motions and denies Plaintiffs' motion.

I. BACKGROUND

A. Statutory Background

NEPA. The National Environmental Policy Act establishes "a national policy [to] encourage productive and enjoyable harmony between man and his environment." 42 U.S.C. § 4321. NEPA "imposes no substantive environmental obligations or restrictions" on agencies. *Seven Cnty. Infrastructure Coal. v. Eagle County*, 145 S. Ct. 1497, 1507 (2025). Rather, NEPA is a "purely procedural statute" created to ensure that agencies are fully informed of the environmental consequences of their decisions. *Id.* To that end, NEPA requires that an agency prepare a "detailed statement," commonly referred to as an Environmental Impact Statement (EIS), before undertaking "major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(2)(C). In conducting review under NEPA, the agency's obligation is to take a "'hard look' at the environmental consequences of its decision." *City of Grapevine. v. Dep't of Transp.,* 17 F.3d 1502, 1504 (D.C. Cir. 1994) (quoting *Nat. Res. Def. Council, Inc. v. Hodel*, 865 F.2d 288, 294 (D.C. Cir. 1988)).

As evident from the statute, only actions with a significant impact on the environment require the preparation of an EIS. Thus, "[a]n agency is not required to prepare an EIS for a proposed action that it determines, based upon a preliminary 'environmental assessment,' 'will not have a significant effect on the human environment.'" *Earthworks v. Dep't of the Interior*, 105 F.4th 449, 458 (D.C. Cir. 2024) (quoting *Food & Water Watch v. FERC*, 28 F.4th 277, 282 (D.C. Cir. 2022)). If the agency's environmental assessment determines that no EIS is needed, it must document that determination in a "finding of no significant impact." *Dep't of Transp. v. Pub. Citizen*, 541 U.S. 752, 757–58 (2004). Even if an agency determines that a proposed action would have a significant impact on the environment, though, the agency may prepare a so-called

mitigated finding of no significant impact (and therefore not prepare an EIS) "if the agency finds that changes or safeguards in the project sufficiently reduce the impact to a minimum." *Sierra Club v. Dep't of Transp.*, 753 F.2d 120, 127 (D.C. Cir. 1985).

Licensing. The Commercial Space Launch Act regulates the commercial space transportation industry. *See* 51 U.S.C. § 50901. It requires companies to obtain a license before launching or reentering a vehicle in the United States. *See id.* § 50904(a). It also requires the FAA to grant such a license within 180 days of accepting an application that complies with the requirements of the Act. *Id.* § 50905(a)(1). Granting a license is considered a major action under NEPA. *See Sierra Club v. U.S. Army Corps of Eng'rs*, 803 F.3d 31, 36–37 (D.C. Cir. 2015). Under the FAA's regulations, an application is not considered complete (and therefore is not accepted for purposes of starting the 180-day clock) until the applicant has given the FAA enough information for the FAA to prepare a NEPA-compliant environmental analysis. 14 C.F.R. §§ 413.11(a), 450.31(a)(5), 450.47.

B. Factual Background

SpaceX is a commercial space transportation company that designs, manufactures, tests, and launches its own rockets. FAA36349. SpaceX originally tested and launched most of its rockets (particularly its Falcon rockets) from existing, publicly owned launch sites. *See* FAA36352. Eventually, however, SpaceX determined that it would benefit from building a private launch site for its exclusive use, and chose Boca Chica, Texas, as its preferred site. *See* FAA36353. The FAA determined that SpaceX's construction and operation of a base in Boca Chica would

have significant impacts on the environment, so in 2014, it prepared an EIS exploring those impacts. *See* FAA36291–36682.

SpaceX built its Boca Chica base but decided not to use it to test Falcon rockets. Instead, around 2019, SpaceX retooled the Boca Chica site into a testing ground for its newest project: a reusable launch vehicle named Starship, which, at nearly 400 feet tall, is the largest rocket ever constructed.[1] *See* FAA9802; FAA9984. The FAA initially allowed SpaceX to test Starship prototypes from the Boca Chica base under the auspices of the 2014 EIS. *See* FAA9434–41. However, SpaceX eventually sought to conduct full-scale orbital launches of Starship, and the FAA determined that those launches would fall outside the scope of the 2014 EIS and that it would need to conduct new NEPA review. *See* FAA50989.

The FAA began that review in late 2020. During the scoping process—the first stage of NEPA review, during which other agencies and members of the public provide initial input on the proposed action—some signs indicated that this review would culminate in a new EIS. In particular, the U.S. Fish and Wildlife Service (FWS) and the Texas Parks and Wildlife Department (TPWD) indicated that they believed licensing Starship testing would have significant impacts on the environment and so should be accompanied by an EIS. *See* FAA13275 (June 2020 comment from FWS employee that "the NEPA level of review should be an EIS and not an EA"); FAA46275 (June 2021 letter from TPWD recommending that the FAA prepare an EIS); *see also* FAA51671 (June 2020 email from FAA employee stating that the FAA "plan[s] on conducting a new EIS").

[1] The Parties sometimes refer to SpaceX's reusable launch vehicle as "Starship/Super Heavy." Starship is the second stage of the rocket; Super Heavy is the first stage. *See* FAA11378. The Court will refer to the launch vehicle as a whole as "Starship."

However, before deciding whether to prepare an EIS, the FAA allowed SpaceX to prepare an environmental assessment under government supervision.

Following extensive comments from FWS, TPWD, other agencies, and members of the public, SpaceX drafted a Programmatic Environmental Assessment (PEA).[2] The PEA concluded that, absent mitigation, SpaceX's Starship launches would have a significant impact on the environment. However, the PEA also included approximately 75 mitigation measures aimed at reducing those impacts. The FAA then reviewed the PEA, determined that mitigation would reduce to a minimum any environmental impacts of SpaceX's activities, published a final version of the PEA and a mitigated finding of no significant impact, and granted SpaceX the license it had requested. *See* FAA9261–65; FAA9975–10156; FAA10295–10334; FAA12351.

C. Procedural History

Plaintiffs include four nonprofit environmental organizations and the Carrizo/Comecrudo Nation of Texas, Inc., a nonprofit organization dedicated to serving Native Americans, including the descendants of people indigenous to Boca Chica. ECF 45-2 at 2. In their amended complaint, they asserted a single cause of action against the FAA that raised three theories of relief. *See* ECF 36. The second and third of those theories concern the FAA's actions following its preparation of the PEA. Pending further developments relevant to those theories of relief, *see* ECF 44, Plaintiffs and the government requested (and the Court granted) permission to file motions for partial summary judgment as to Plaintiffs' first theory of relief, which challenges the FAA's 2022 PEA.

[2] The PEA is "programmatic" in that it lays out a general framework from which future environmental analyses can be tiered.

II. Analysis

To reiterate, NEPA requires an EIS before an agency undertakes "major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(2)(C). The Parties agree that issuing a license that allows SpaceX to launch Starship was a major Federal action.[3] They disagree, however, about whether the government was required to prepare an EIS before granting that license.

A. Standard of Review

Plaintiffs bring their suit under the APA, which requires courts to "hold unlawful and set aside agency action, findings, and conclusions found to be … arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2). Plaintiffs argue that the FAA's finding of no significant impact was arbitrary and capricious. In reviewing that question, the Court is "principally concerned with ensuring that [the FAA] has examined the relevant data and articulated a satisfactory explanation for its action including a rational connection between the facts found and the choice made, that the Agency's decision was based on a consideration of the relevant factors, and that the Agency has made no clear error of judgment." *Bluewater Network v. EPA*, 370 F.3d 1, 11 (D.C. Cir. 2014) (cleaned up) (quoting *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins.*, 463 U.S. 29, 43 (1983)).

The Parties' summary judgment briefs disagreed regarding the level of deference the Court must afford to the FAA's determinations. That dispute was resolved by the Supreme Court's recent decision in *Seven County Infrastructure Coalition v. Eagle County*, 145 S. Ct. 1497 (2025). There,

[3] SpaceX argues that the FAA nonetheless had no obligation to conduct a NEPA analysis, or at least not a full NEPA analysis, because the Commercial Space Launch Act prohibits the FAA from denying the license based on environmental concerns. *See* ECF 49-1 at 6–13. Because the Court holds that the PEA satisfied NEPA, the Court need not (and does not) reach SpaceX's argument.

the Court acknowledged that NEPA requires agencies to "make a series of fact-dependent, context-specific, and policy-laden choices about the depth and breadth of its inquiry." *Id.* at 1513. The Court therefore cautioned courts to "afford substantial deference" to the agency and to "not micromanage those agency choices so long as they fall within a broad zone of reasonableness." *Id.*

Plaintiffs argue that *Seven County* requires courts to defer only to an agency's choice about the level of detail to include in an EIS, not to its determination as to whether it must prepare an EIS in the first place. But that position finds no support in *Seven County*, which states that "the central principle of judicial review in NEPA cases"—not just in cases involving review of an EIS—"is deference." *Id.* at 1511; *see also id.* at 1513 ("'[I]nherent in NEPA ... is a 'rule of reason,' which ensures that agencies determine *whether* and to what extent to prepare an EIS based on the usefulness of any new potential information to the decisionmaking process." (emphasis added) (quoting *Pub. Citizen*, 541 U.S. at 767)). Plaintiffs' argument also runs headfirst into *Sierra Club v. FERC*, 145 F.4th 74 (D.C. Cir. 2025), which applied *Seven County*'s deference to an agency's environmental review, even though the agency had prepared an environmental assessment rather than an EIS. *Id.* at 80, 87.

B. Preliminary Arguments

Before reviewing the PEA's analysis of specific potential harms, the Court resolves two preliminary arguments.

First, Plaintiffs argue that the FAA unlawfully delegated its authority to SpaceX. *See Idaho v. ICC*, 35 F.3d 585, 596 (D.C. Cir. 1994) ("We have held that NEPA prohibits such an abdication of regulatory responsibility in favor of the regulated party."). The Court disagrees. Under the FAA's NEPA rules—which Plaintiffs do not challenge—the FAA may either prepare an

environmental assessment itself or "request that an applicant prepare" one. FAA57649. In the event that an applicant prepares the assessment, "[t]he FAA must advise and assist the applicant during preparation of the EA, and *must independently evaluate and take responsibility for the EA*." *Id.* (emphasis added). Following that independent evaluation, the FAA determines whether to issue a finding of no significant impact or prepare an EIS.[4] FAA51672. Plaintiffs' argument appears to be that the FAA failed to conduct an independent evaluation and that it merely accepted SpaceX's assertions as true. Putting aside the "presumption of legitimacy accorded to the Government's official conduct," *Nat'l Archives & Records Admin. v. Favish*, 541 U.S. 157, 174 (2004), Plaintiffs provide no evidence for their argument, *see* ECF 45-1 at 42–44—nor could they, given extensive evidence in the record of the FAA's involvement in the PEA drafting process. *See, e.g.*, FAA46923–26 (schedule listing supervisory tasks of FAA as to the PEA).

Second, Plaintiffs argue that, separate from the merits of the PEA's analysis of potential harms, comments from other agencies—particularly FWS and TPWD—required the FAA to prepare an EIS. For example, in June 2021, TPWD stated that "[a]s presented, the Draft Programmatic EA contains many information gaps," and that "[g]iven the larger scope of" the requested Starship license, "a Programmatic EA may be inadequate for subsequent environmental analysis." FAA46275. Similarly, in January 2021, FWS stated that SpaceX's activities were "already substantially impairing" both its own ability to manage federal lands and "the public's enjoyment of the Boca Chica Beach area." FAA51014.

That argument fails for two reasons. First, an agency leading a NEPA review "does not have to follow [other agencies'] comments slavishly—it just has to take them seriously." *Citizens*

[4] The same process was allowed by the Council on Environmental Quality's (now withdrawn) implementing regulations for NEPA. *See* 40 C.F.R. § 1506.5(a); 40 C.F.R. § 1507.3(c)(12).

Against Burlington, Inc. v. Busey, 938 F.2d 190, 201 (D.C. Cir. 1991). The record shows that the FAA met that burden; it did not brush aside concerns from other agencies, but rather took a hard look at the potential environmental harms the agencies had identified and crafted mitigation measures to both minimize the chance of those harms occurring and to remediate them if they did occur. *See, e.g.*, FAA46068 (January 2021 letter from TPWD recommending that the FAA "develop[] a new Lighting Management Plan"); FAA11263–75 (new Lighting Management Plan developed as part of the 2022 PEA).

And second, perhaps because the FAA took their concerns seriously and addressed them, TPWD and FWS ultimately were satisfied with—or at least did not object to—the FAA's decision not to produce an EIS. Despite its earlier concerns, in September 2021 TPWD ultimately signed a Memorandum of Agreement in which it agreed that the requirements imposed by the PEA on SpaceX "should provide appropriate compensation for" any damage caused by SpaceX's activities. FAA7574. As for FWS, its May 2022 final Biological and Conference Opinion on the PEA similarly concluded that issuing SpaceX's requested license "is not expected to significantly affect" wildlife around Boca Chica. FAA9887. Both agencies also concurred in the FAA's determination, made under Section 4(f) of the U.S. Department of Transportation Act, that SpaceX's launch activities would result in at most a *de minimis* temporary occupancy of federal and state land. *See* FAA10589 (TPWD concurrence); FAA10616 ("The U.S. Fish and Wildlife Service concurs in the FAA's Section 4(f) findings provided that mitigation measures already incorporated in the Programmatic Environmental Assessment, along with the measures described below, … are included in project plans, final environmental documents, and terms of SpaceX's permits and licenses.").

Plaintiffs' reliance on early statements by other agencies is therefore misplaced. To be sure, those statements are relevant when considering the potential impacts of SpaceX's activities, but they do not represent, as Plaintiffs paint them, "consistent and strenuous opposition," ECF 51 at 8 (quoting *Nat'l Parks Conservation Ass'n v. Semonite*, 916 F.3d 1075, 1086 (D.C. Cir. 2019)). Rather, they represent "the NEPA process work[ing] precisely as it should": The lead agency asked for input, other agencies provided frank advice about potential problems, and the lead agency took a hard look at those concerns and attempted to address them. *Mulgrew v. Dep't of Transp.*, 750 F. Supp. 3d 171, 237 (D.D.C. 2024); *see also* FAA57698–57701 (policy setting out the FAA's iterative NEPA process).

C. Potential Harms

The PEA analyzed the expected impact of Starship testing based on thirteen "environmental impact categories that ha[d] the potential to be affected by the" issuance of a license to SpaceX. *See* FAA11405. Before reviewing that analysis, the Court notes the scope of the FAA's (and the Court's) review. In deciding whether to grant SpaceX a license to test Starship, the FAA was not writing on a blank slate. Rather, under the "no-action alternative"—the world in which the FAA did not grant SpaceX the license it requested—SpaceX's facilities at Boca Chica would remain operational, and SpaceX could continue using the facilities to build rockets and to conduct non-launch tests. *See* FAA11399–11400; *see also Metro. Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766, 779 (1983) ("NEPA is not directed at the effects of past accidents and does not create a remedial scheme for past federal actions. It was enacted to require agencies to assess the future effects of future actions.").

The FAA therefore faced a relatively narrow question: Would granting SpaceX a license to conduct ten Starship launches a year—including "all reasonably foreseeable activities and

effects expected" to occur as a result of that license, such as ground tests of Starship's components and "the building of infrastructure to support the launch activities," and offset by mitigation measures aimed at reducing harm from those activities—have a significant impact on the environment when compared with not granting SpaceX the license? FAA9799; FAA11356. The FAA answered "no." That answer, rather than the impacts of all of SpaceX's activities at Boca Chica in general, is what the Court now reviews under the APA's arbitrary and capricious standard.

Plaintiffs do not challenge many of the types of harm analyzed by the PEA, such as potential impacts on local air quality and on energy resources. They focus on four aspects of SpaceX's activities that could cause environmental harm: lighting, noise, anomalies, and access closures. The Court takes them up in that order.

1. Lighting

The PEA found that, if unmitigated, lighting from SpaceX's activities could have adverse effects on local wildlife. *See* FAA11493. But the PEA also noted that, in collaboration with FWS, TPWD, the National Park Service, and the Texas Historical Commission, SpaceX had developed a "Lighting Management Plan" to mitigate the potential impact of lighting on wildlife. *See* FAA11433; FAA11506–07. The measures in the Plan, which limit lighting "to the minimum number and configuration required to achieve their functional roles," FAA10312, include "directing, shielding, or positioning lighting to avoid visibility from the beach, minimize lateral light spread, and decrease uplighting; … installing lighting with multiple levels of control (i.e., some, all, or none of the lights can be turned on); and installing lighting timers where appropriate." FAA11433; *see also* FAA11263–75. The PEA concluded that, when combined with other species-specific mitigation measures, SpaceX's adherence to the Lighting Management Plan (which is a

condition of SpaceX's license, *see* FAA9264) would reduce impacts on wildlife to a minimum. *See* FAA11434; FAA11500; FAA11502.

The PEA was not alone in reaching that conclusion. As mentioned above, FWS issued a final Biological and Conference Opinion that surveyed the existing conditions around Boca Chica, investigated the behavior of animals that could be affected by SpaceX's actions, and determined that granting SpaceX the license it requested was "not expected to significantly affect the species considered." FAA9887. In making that determination, FWS was "making predictions, within its area of special expertise, at the frontiers of science," and in "examining [that] kind of scientific determination," the Court must "be at its most deferential." *Balt. Gas & Elec. Co. v. Nat. Res. Def. Council*, 462 U.S. 87, 103 (1983). Plaintiffs nonetheless challenge the PEA's conclusion, claiming that it was arbitrary and capricious as to its findings about the potential impacts of lighting on migratory birds, sea turtles, and ocelots. *See* ECF 45-1 at 19–20.

Migratory birds. It is undisputed that Boca Chica is an important wintering ground for several species of migratory birds, *see* FAA51552, and Plaintiffs claim that SpaceX's activities will have significant impacts on those birds. Plaintiffs focus in particular on piping plovers, a small shorebird that nests in Boca Chica Beach. Although only "approximately 2 percent to 5 percent of the estimated range-wide breeding population" of piping plovers would be affected by SpaceX's launches, FAA40221, the species "exhibits a high degree of intra- and inter-annual wintering site fidelity," meaning piping plovers may be less likely to move on from a habitat that is destroyed, *see* FAA9837–39.

The PEA found no significant impact on piping plovers based in part on an April 2022 study by SWCA Environmental Consultants, which analyzed survey data collected by the University of Texas on various birds in the Boca Chica area, including piping plovers. *See, e.g.*,

FAA11494; *see also* FAA39556. That study found "little to no evidence of meaningful trends, either increasing or decreasing, in the number of birds observed" from 2014 to 2021. *See* FAA11494; FAA39556.

Plaintiffs respond with another study, released in April 2022, that estimated the population of piping plovers in Boca Chica from 2018 to 2021. That study found that the piping plover population decreased in 2019 and 2020, "the two years when launch operations were occurring frequently," and concluded that although "the viability of the site for wintering Piping Plovers remains high," "effects associated with rocket launch activity are the primary factors limiting the population there." FAA39572–73. The FAA did look at this study, but it identified various methodological issues with it and accordingly discounted its findings. *See* FAA12369 (FAA response to comment on draft PEA); FAA35084 (SWCA review stating that an earlier version of the study proffered by Plaintiffs "does not constitute a robust or reliable evaluation of population trend"). Thus, the FAA, when faced with two contradictory studies, seriously considered both; decided that one study was flawed; and chose to proceed based on the results of the other one. The Court cannot second-guess that "fact-dependent, context-specific, and policy-laden choice[]." *Seven Cnty.*, 145 S. Ct. at 1513.

Sea turtles. Several species of sea turtles nest in and near Boca Chica Beach, including the highly endangered Kemp's ridley sea turtle. FAA9829–30. Those turtles could be harmed by nighttime lighting, which can "disrupt hatchling emergence from sea turtle nests" by "disorient[ing] hatchlings as they emerge on the beach, directing them into the dunes rather than toward the ocean."[5] FAA11493; FAA51076. That risk is particularly pronounced during

[5] Nighttime lighting may be less likely to harm Kemp's ridley sea turtles because they, unlike other turtles known to nest in Boca Chica Beach, "are predominately daytime nesters." FAA9830. They also nest primarily on windy days, when SpaceX is less likely to launch rockets. *See* FAA11729.

nighttime launches, which require bright spotlighting. FAA11379. The FAA nonetheless determined that lighting from SpaceX's activities would have no significant impact on sea turtles, basing that conclusion partly on the Lighting Management Plan, which imposes more stringent requirements around the sea turtle nesting and hatching season. *See, e.g.*, FAA10312 (requiring a biologist to conduct weekly inspections from March 15 to October 1 to eliminate unnecessary lighting).

The central feature of the PEA's mitigation plan as to sea turtles, however, is SpaceX's collaboration with Sea Turtle Inc., a nonprofit organization headed by an expert on Kemp's ridley sea turtles. *See* FAA40120. During "sea turtle nesting season, it is Sea Turtle Inc.'s practice to conduct daily inspections of Boca Chica Beach, where … sea turtles may lay eggs, and identify nests and collect eggs and bring them to a facility until they hatch." FAA40224. "Sea Turtle Inc. then returns the hatchlings to Boca Chica Beach for release into the Gulf." *Id.* Because Sea Turtle Inc. collects eggs and releases hatchlings into the ocean in a safe, controlled way, the PEA concluded that "only nests that were missed by surveys would potentially be affected by the nighttime lighting." FAA11493. And indeed, perhaps as a result of its own efforts, Sea Turtle Inc. had found no meaningful changes in sea turtle nesting data from SpaceX's activities as of 2021. *See* FAA11489.

Ocelots. Ocelots are an endangered species, and south Texas is estimated to contain fewer than 80 individual ocelots. FAA9826. One study found that night lighting could "reduc[e] the availability of Ocelot prey and restrict[] movements of Ocelots themselves." FAA56556–57. The PEA nonetheless concluded that Starship launches were unlikely to harm ocelots because the last ocelot sighting near Boca Chica occurred in 1998—over a decade before SpaceX began its operations in Boca Chica—and because the nearest known ocelot population is about 20 miles

away from Boca Chica (and across a shipping channel from it), making ocelots less likely to reach the SpaceX launch base. *See* FAA11489. Despite finding a low risk of harm to ocelots, the PEA also included numerous measures intended to further mitigate any harm that might occur, including collaborating with FWS to protect and restore ocelot habitats; investigating "the feasibility of constructing wildlife crossings … to benefit the ocelot"; and making an annual $5,000 contribution to the Friends of Laguna Atascosa's Adopt-an-Ocelot Program.[6] FAA11505.

* * *

In sum, then, the PEA concluded that, based on preexisting studies, nearby birds were unlikely to suffer long-term harm from SpaceX's activities; that Sea Turtle Inc.'s efforts would largely keep turtle hatchlings away from SpaceX's lighting; that ocelots were unlikely to approach Boca Chica; and that any harm that nonetheless occurred from SpaceX's lighting could be mitigated through extensive preventative measures (including the Lighting Management Plan) and ameliorated by supporting the restoration efforts of federal and state agencies and local environmental groups. Those conclusions were supported by FWS's expert opinion that although SpaceX's activities could have "some incidental" effects on piping plovers, sea turtles, and ocelots, "the implementation of the conservation measures [adopted by the PEA] should ultimately result in avoidance and minimization of adverse effects." FAA40232. The FAA therefore satisfied its obligation to take a hard look at the effects of light on nearby wildlife.

[6] Plaintiffs do not claim that ocelots are likely to be struck by vehicles around the SpaceX launch base, although many ocelot deaths are caused by vehicle collisions (including six of the ten known ocelot deaths since 2007). FAA9825. In any event, the PEA requires mitigation measures to reduce the risk of that harm, including periodic mowing of grass in the area (to reduce vegetation cover near roads), regular trash clean-ups (to avoid attracting rats and other ocelot prey to the roads), and operation of an employee shuttle (to reduce the number of vehicles on the road). FAA11506; FAA11509.

2. Noise

Impacts on wildlife. As with lighting, Plaintiffs argue that noise from SpaceX's activities, particularly the loud noises and sonic booms generated by rocket launches and landings, could have a significant effect on sea turtles and piping plovers. The PEA found no impact on wildlife from noise for many of the same reasons it found no impact from lighting, including the documented lack of effects on bird populations from prior activity at Boca Chica, *see* FAA11495, and Sea Turtle Inc.'s practice of collecting turtle eggs and introducing hatchlings to the ocean under controlled conditions.

The PEA also analyzed additional information about the potential effects of noise on piping plovers, including scientific literature concluding that "it is physically impossible for a sonic boom to crack an egg." *See* FAA11708. More importantly, the FAA looked to prior studies of rocket launches at three other bases. *See* FAA11495. The first was a 1983 study at the Vandenberg Air Force Base in California, which "found no significant impact, including to the reproductive physiology, hatchability of eggs, viability of chicks, and nesting" from sonic booms. *Id.* The second, a 1998 study on the effects of rocket launches at Cape Canaveral (at a cadence of approximately 16 launches per year), found that "[n]o animal mortality has been observed that could be attributed to launches" and that the behavior of local birds "observed after launches has been normal, indicating no noise-related effects." FAA60285. And the third, a 2014 study analyzing the effects of 135 launches over a 30-year period at the John F. Kennedy Space Center, found that "[a]cute impacts of … launches to wildlife populations were minimal" and that "[r]esults of monitoring launch impacts have shown no long-term macro-scale negative responses." FAA64766. Although the rockets analyzed by those studies were smaller than Starship, they were sometimes launched at a substantially greater cadence; the FAA reasonably

relied on these studies in finding that noise would not have a significant impact on Boca Chica's bird population.

Impacts on humans and structures. Plaintiffs raise an additional potential environmental impact: the possibility that loud noise from launches and landings could injure people and damage structures around the launch area. SpaceX commissioned a study about those possible impacts.[7] *See* FAA11547–11602. The study used decibels (dB) as the unit for measuring noise as experienced by structures and A-weighted decibels (dBA) as the unit for measuring noise as experienced by humans. *See* FAA11416–17; FAA11554. Although the study analyzed the noise impacts of all of SpaceX's proposed activities, the Court will focus on the activity expected to produce the most noise: orbital launches. *See* FAA11555.

As to humans, the noise study noted that the Occupational Safety and Health Administration's guidelines allow daily exposure to a sound level of 115 dBA for 15 minutes or less. Because orbital launches would "last a few minutes at most, at a single location, with the highest noise levels occurring for less than a minute," the study used 115 dBA as a "conservative limit for hearing conservation." FAA11556. The study then drew the contours of sound expected to reach various areas from an orbital launch. The closest inhabited structures fell within the 110 dBA contour, *see* FAA11558; people in those structures would experience noises below OSHA's guidelines, so the study concluded that launches "are not expected to cause general annoyance or pose health concerns, though noise complaints may occur," FAA11592. Based on that finding, the low frequency and duration of orbital launches, the fact that access closures would keep visitors away from the launch area during loud operations, and SpaceX's practice of informing the public

[7] The study also analyzed the effects of SpaceX's activities on cumulative noise levels. *See* FAA11591–94. Plaintiffs challenge only the FAA's finding of no significant impact as to single-event noises, not its finding as to cumulative noise levels.

about upcoming launches and landings, the PEA concluded that sounds from SpaceX's activities would not have a significant effect on humans. FAA11421; FAA11430.

As to structures, the noise study surveyed existing literature and found that "approximately one damage claim will result per 100 households exposed at 120 dB and one damage claim [will result] per 1,000 households exposed at 111 dB." FAA11556. Again, the study drew contours of unweighted sounds expected to be heard around Boca Chica. The 120 dB contour includes small parts of the nearby city of Port Isabel and of South Padre Island, a large barrier island north of Boca Chica; the 111 dB contour encompasses all of Port Isabel, a small portion of the nearby town of Laguna Vista, "the southernmost 15 miles of South Padre Island, and the easternmost areas of Brownsville," a city west of Boca Chica. FAA11556; *see also* FAA11562.

The PEA's analysis of potential impacts to structures was more nuanced than its analysis as to impacts on humans. The PEA first characterized the noise study's damage-claim thresholds of 111 and 120 dB as "very conservative," reasoning that based on prior analyses of impacts from short-duration noises, "damage becomes improbable below 140 dB" and no damage is "expected below 134 dB." FAA11421–23. The PEA then noted that no structures were within the 140 dB contour for orbital launches.[8] FAA11423. The PEA further noted that, based on other studies, any damage that *did* occur from noises above 111 dB likely would be minor damage to glass and plaster. *See* FAA11422; FAA11424; FAA11429. Finally, the PEA went on to note that any such damage would be mitigated by SpaceX, which is required to carry insurance in an amount

[8] The only exceptions to this finding are two pilings that are the remains of a historic railroad in the area, as well as a marker describing one of the pilings. SpaceX agreed to monitor the pilings and to fix any damage that occurs to them, as well as additional measures to improve the pilings and the marker and to educate the public about their importance. FAA11443–44; FAA11446. The FAA therefore reasonably concluded that any damage to those structures would be mitigated.

"determined on a launch-by-launch basis by the FAA," up to a maximum of $500,000,000 per launch. FAA11430.

These conclusions were not arbitrary or capricious. The PEA reasonably used OSHA's 115 dBA limit as a conservative estimate of the noise that could be expected to cause damage to humans, and it found, based on a rigorous sound study, that no inhabited areas would experience that noise level. As to buildings, the PEA cited independent analyses supporting its conclusion that structural damage was unlikely to occur below 140 dB, that no structures were within the 140 dB contour, and that even under a conservative assumption that minor damage could occur to (at most) 1% of structures within the 111- and 120-dB contours, that damage would be remediated by SpaceX. NEPA allows after-the-fact remediation as a way to mitigate impacts to the environment, *see, e.g.*, *Nat'l Parks Conservation Ass'n v. United States*, 177 F. Supp. 3d 1, 28 (D.D.C. 2016), and damage to structures certainly is the type of injury that can be remediated.

3. Anomalies

Anomalies are unexpected explosions during tests or launches that can spread debris and cause fires around launch areas. The PEA found no significant impact from anomalies across various categories of potential harms. Plaintiffs focus their challenge to that finding on the potential impact of anomalies on algal flats in nearby land administered by TPWD. Plaintiffs are particularly concerned about the algal flats because debris, as well as efforts to remove debris, can cause "rutting, trampling, and compaction of algal flats." FAA46054. And algal flats provide "critically important feeding habitat to short-legged shorebirds, such as plovers." *Id.*

The PEA's analysis of the effects of anomalies has two potential flaws. First, the PEA states that anomalies are conservatively estimated to occur in 10% of static fire engine tests and are not expected to occur at all during pre-flight operations. *See* FAA11380–81. But the PEA has

little explanation (or scientific support) for why those numbers are reasonable, and it also does not explicitly estimate what percent of launches are expected to result in anomalies or how much damage could be caused by different types of anomalies. *See New York v. NRC*, 681 F.3d 471, 478–79 (D.C. Cir. 2012) ("[A]n agency conducting an EA generally must examine both the probability of a given harm occurring *and* the consequences of that harm if it does occur."). Second, the procedures to restore algal flats following an anomaly are experimental and unproven. *See* FAA7574.

The Court nonetheless concludes that the PEA's finding of no significant impact from anomalies is not arbitrary or capricious. The Court reaches that conclusion in part because the PEA *did* at least look to prior anomalies to create a "debris study area" in which "debris is expected to be contained," such that the FAA could ascertain which areas might be impacted by anomalies. FAA11460. Unlike in *New York v. Nuclear Regulatory Commission*—the primary authority that Plaintiffs rely on for this argument—it cannot be said that "the [FAA] did not undertake to examine the consequences of [anomalies] at all." 681 F.3d at 482. Much more important to the Court's conclusion, however, is the Memorandum of Agreement between SpaceX and TPWD.

That agreement acknowledges that methods of restoring algal flats are "as yet unproven," but it commits SpaceX and TPWD to "implementing, monitoring, and learning from such restoration efforts in order to develop adaptive management strategies that will minimize or offset long-term impacts to the natural, cultural, and recreational values of" the algal flats. FAA7574. As part of that commitment, the agreement requires SpaceX "to include monitoring protocols in the restoration plan, to adopt an adaptive management approach to restoration until the most beneficial restoration methodologies have been determined, and to apply those methodologies to restoration of habitats following any future impacts to the [algal flats] resulting from SpaceX

activities." FAA7576. To increase the likelihood of finding a restoration methodology that works, SpaceX must work with TPWD and Texas A&M University to evaluate the efficacy of restoration efforts and must hire an environmental firm to monitor the success of its efforts. FAA11464–65. Moreover, if all attempts at finding a successful restoration method fail, SpaceX must then meet with TPWD "in good faith to agree on other means of compensating TPWD for loss of fish, wildlife and recreation values resulting from damages to" the algal flats. FAA7576. The Memorandum of Agreement's adaptive management approach—combining monitoring with iterative improvements—maximizes the chance that SpaceX will be able to mitigate the effects of anomalies. *See Nat'l Audobon Soc'y v. Hoffman*, 132 F.3d 7, 17 (2d Cir. 1997) ("In the instant case, for example, had [the mitigation strategy] included a program to monitor and ensure its effectiveness, there would then have been substantial evidence to support it.").

The Court acknowledges the possibility that restoration of the algal flats will, beyond currently being unproven, ultimately prove to be impossible. Even if that occurs, however, the Memorandum of Agreement requires SpaceX to otherwise compensate TPWD for unmitigated harm. Under those conditions, TPWD ultimately concurred in the FAA's finding that although anomalies would "result in a *temporary occupancy* of" TPWD land, including the algal flats, "the impacts would be *de minimis*." FAA10589. As the "steward[] of the exact resources at issue," *Semonite*, 916 F.3d at 1085, TPWD is owed a great deal of deference, *see Balt. Gas & Elec.*, 462 U.S. at 103 (holding that when agency "is making predictions, within its area of special expertise, at the frontiers of science," "a reviewing court must generally be at its most deferential"). The Court therefore concludes that the PEA's analysis of anomalies, while perhaps imperfect, was not arbitrary and capricious.

4. Access Closures

SpaceX is required to close the area around its launch site, including Boca Chica Beach, when performing tests and launches. Based on SpaceX's estimates, the PEA assumed that access closures would not exceed 500 hours per year for regular operations and 300 hours per year for responses to anomalies. The PEA first assumed that areas impacted by the closures would otherwise be open 12 hours per day and 365 days per year. It then noted that 500 hours of access closures would leave the properties open for 89% of their regular operating hours and that if an additional "300 hours for anomalies were used (which is not expected), the properties would still remain accessible to the public 82% of the time." FAA11456–57. The PEA concluded that, with mitigation measures, that percentage of closure hours would not significantly impact the ability of any group to enjoy affected areas. Plaintiffs claim that finding was arbitrary and capricious as to its analysis of the harms of closing parts of the surrounding area on three groups of people: the general community, the agencies in charge of managing public lands, and the Carrizo-Comecrudo Tribe. *See* ECF 45-1 at 28–35.

Community access. To mitigate the harm of access closures, the PEA imposed strict limits on SpaceX's ability to perform test and launch operations during peak hours. Specifically, each year, SpaceX can close the beach only five times on Friday morning through Sunday (during warmer months) or on Saturday or Sunday (during colder months), and it is never allowed to close the beach on sixteen major holidays or on the weekends abutting those holidays.[9] FAA11387. Moreover, SpaceX is required to provide "a forecast of planned access restrictions one to two

[9] These restrictions apply only to planned access closures, not to closures associated with unexpected anomalies. FAA11387. Anomalies, however, would be expected to occur only during a test or launch, so anomaly closures are more likely to occur during weekdays, following planned closures. Moreover, closures from anomalies typically affect a smaller area than planned closures. *See* FAA11464.

weeks in advance of the access restriction on [Cameron] County's website" and to finalize and publicize closures at least 48 hours in advance, which will help members of the public plan their beach visits in advance. FAA11465–66. The PEA further requires that SpaceX compensate the public for access closures by providing increased fishing, photography, and educational opportunities. *See* FAA11467–68.

Plaintiffs do not argue that 800 hours of access closures, combined with the PEA's mitigation measures, have a significant impact on the public. Instead, they argue that the PEA arbitrarily and capriciously accepted SpaceX's 800-hour estimate, pointing to evidence that SpaceX exceeded the number of closure hours contemplated by the 2014 EIS. *See, e.g.*, FAA51015 ("In 2019, the FWS recorded over 1,000 closure hours."). But the 800-hour figure is more than just a non-binding estimate; it is a condition of SpaceX's license. *See* FAA9264; FAA11516. Moreover, under the FAA's regulations, SpaceX is required to provide an accurate representation of the scope of its planned activities and to "ensure the representations … are accurate for the entire term of the license," 14 C.F.R. § 417.11(a), and if SpaceX substantially exceeds its representation of 800 hours, the FAA may be required to conduct a new round of NEPA analysis, *see id.* § 417.11(f); *see also* FAA9904 (FWS Biological and Conference Opinion noting that, to be exempt from parts of the Endangered Species Act, "the FAA and/or SpaceX must comply with" mitigation measures in the PEA). Because SpaceX is prohibited from exceeding 500 hours for planned activities and 300 hours for anomaly responses, the PEA's conclusion that closures would not exceed 800 hours was not arbitrary or capricious.

Agency land management. Under the licenses granted to SpaceX pursuant to the 2014 EIS, SpaceX was allowed up to 180 closure hours per year. Plaintiffs argue that those closures significantly impaired the ability of FWS to access federal lands for wildlife monitoring and

management and that the greater number of closure hours allowed by the 2022 PEA would have an even greater impact. *See* ECF 51 at 21–25.

The PEA found that access closures "would not impede [FWS] staff or their contractors, partners, or guests from completing habitat or species management activities within Boca Chica State Park" for three reasons. FAA11457. The PEA requires SpaceX to notify agencies "of access restrictions 48 hours in advance of launch operations" to help them "plan for the access restrictions and avoid conflicts for special events or programs." *Id.* The PEA also requires SpaceX to provide "funding to [FWS] for the purpose of hiring an employee to assist with coordination between [FWS] and SpaceX," so that FWS can more easily plan around access closures. *Id.* And the PEA requires access closures to be divided into four "tiered" checkpoints, with the first two of four checkpoints being open to government personnel—such that FWS and other agencies retain "continued access to state and federal lands in the vicinity of the launch site at all times, except for a reasonable period associated with events that may present a safety risk or other unsafe conditions." *Id.*; FAA11386; *see also* FAA10589–90 (TPWD letter noting requirement that SpaceX "take all necessary measures to make TPWD-owned lands at Boca Chica accessible to researchers and all TPWD and/or [FWS]-authorized personnel at all times except during ignition events").

Presented with these mitigation measures, FWS concurred with the FAA's finding that, given the mitigation measures in the PEA, SpaceX's activities would constitute no more than a *de minimis* temporary occupancy of federal land around Boca Chica. *See* FAA10616. Plaintiffs point out that the FAA's determination (in which FWS concurred) was made under Section 4(f) of the Transportation Act, which is not coterminous with NEPA. *See Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 204 (D.C. Cir. 1991) ("[T]he agency should bear in mind the differences

between NEPA and the Transportation Act."). While true, the two are not so different: To concur in the FAA's Section 4(f) finding, FWS had to determine that granting SpaceX a license would "not adversely affect the activities, features, and attributes of" federal land. 49 U.S.C. § 303(d)(3). Thus, even assuming that Section 4(f) and NEPA analyses differ in this context, they are similar enough to make the PEA's reliance on the former the sort of minor deficiency that courts do not "flyspeck" in reviewing an agency's environmental analysis. *Nevada v. Dep't of Energy*, 457 F.3d 78, 93 (D.C. Cir. 2006).

Carrizo-Comecrudo Tribe. Plaintiffs also argue that the PEA does not sufficiently mitigate the impact of SpaceX's activities on members of the Carrizo-Comecrudo Tribe, who use Boca Chica Beach for religious ceremonies. *See generally* ECF 45-2. The record shows that the FAA took a hard look at the effects of closures on cultural resources in and around Boca Chica. Specifically, the FAA hired a third-party company to identify all structures and archaeological resources in the area (and to look for new resources); consulted the Texas State Historic Preservation Officer, Tribal Historic Preservation Officer, and various Native American tribes about the importance of those structures and resources to local indigenous people; studied the effects of access restrictions on those resources; and adopted 13 measures to mitigate those effects, including one adaptive measure aimed at protecting any new resources discovered during SpaceX's operations. *See* FAA11435–41; FAA11445–48.

Plaintiffs argue that those measures failed to identify and protect the Carrizo-Comecrudo Tribe's interests. But the FAA published a draft of the PEA for public notice and comment in September 2021, and although the Tribe had seven years of experience with SpaceX's operations in Boca Chica, the few comments submitted by the Tribe and its members on the draft PEA did little to alert SpaceX or the FAA about the Tribe's specific needs. For example, a comment letter

from the Tribe stated that although "there has been no archaeological study in the immediate construction site of SpaceX," "[i]t is likely that there are burials or artifacts or remains of villages in the construction site." FAA4089; *see also* FAA3260 ("There are multiple ancestral village sites throughout the region."). Putting aside the fact that SpaceX ultimately *did* commission such a study, vague speculation that resources of value to the Tribe might exist does not impose on the FAA a duty to craft measures beyond those already imposed to mitigate impacts on the general public. *See Pub. Citizen*, 541 U.S. at 764–65 ("Because respondents did not raise these particular objections to the EA, … [they] forfeited any objection to the EA on the ground that it failed adequately to discuss potential alternatives to the proposed action.").

The other concern raised by comments from members of the Tribe is that the FAA did not consult the Tribe about its needs. *See* FAA3260 ("One key issue overlooked in … the current process is the lack of consultation with the original indigenous people of the land upon which the SpaceX project occupies."); FAA4089. It is true that the FAA did not consult directly with the Tribe, but that was not for lack of trying. In March 2022—and perhaps in response to the comments from the Tribe's members—the FAA addressed a copy of the draft PEA to the Tribe's Chairman, along with a letter asking the Tribe to consult in the NEPA process and to identify any historic properties that could be affected by SpaceX's activities.[10] *See* FAA52526–27. The FAA received no response. FAA12360. Given that the FAA tried but was unable, through no fault of

[10] In a sworn declaration, the Tribe's Chairman stated that he had "*never* been contacted by SpaceX or the FAA regarding the impacts of these closures on the Tribe." ECF 45-2 at 5. But, "[a]s a general rule, the APA limits judicial review to the administrative record." *Transp. Div. of the Int'l Ass'n of Sheet Metal, Air, Rail & Transp. Workers v. Fed. R.R. Admin.*, 10 F.4th 869, 878 (D.C. Cir. 2021) (alteration adopted) (citation and internal quotation marks omitted). And the Chairman's statement that he was not contacted "regarding the impacts of these closures on the Tribe" does not expressly dispute that the FAA sent him a draft of the PEA and invited the Tribe to provide feedback generally. ECF 45-2 at 5.

its own, to ascertain the specific needs of the Tribe, the Court will not now fault the PEA for failing to tailor its mitigation measures to those needs. *Cf. Oglala Sioux Tribe v. NRC*, 45 F.4th 291, 306 (D.C. Cir. 2022) ("The Commission invited the Tribe's participation in the 2013 Survey … . The Tribe's refusal to participate in the 2013 Survey … do[es] not vitiate the reasonable opportunity the Tribe was, in fact, afforded.").

III. CONCLUSION

The PEA and the associated mitigated finding of no significant impact were not arbitrary or capricious. Most of the PEA's conclusions were well-reasoned and supported by the record, and while parts of its analysis left something to be desired, even those parts fell "within a broad zone of reasonableness," *Seven Cnty.*, 145 S. Ct. at 1513. The Court therefore grants partial summary judgment to the government and to SpaceX. An order will be issued contemporaneously with this decision.

DATE: September 15, 2025

CARL J. NICHOLS
United States District Judge