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Submitted via email and certified mail (w/ attachments on USB drive)

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Re: Center for Biological Diversity Comments on FAA's Draft Programmatic Environmental Assessment and Biological Assessment for SpaceX

Thank you for the opportunity to comment on the Draft Programmatic Environmental Assessment (DPEA) and Biological Assessment (BA) for the SpaceX Starship/Super Heavy Launch Vehicle Program at Boca Chica, TX. These comments are submitted on behalf of the Center for Biological Diversity (the Center) and our over 1.7 million members and online activists dedicated to the protection of endangered species and wild places.

While the Center is certainly not opposed to space exploration, we are concerned about the impacts of SpaceX's activities at the Boca Chica site, particularly given the sensitive ecosystems and imperiled species that are directly affected by the proposed activities. The Federal Aviation Administration (FAA) has a duty to ensure that SpaceX's exploratory efforts do not come at the expense and undue sacrifice of our current home and the wildlife that relies on the habitat in the Boca Chica area; yet, the FAA has failed to take the requisite hard look at the proposed use of the Boca Chica Launch Site for Starship/Super Heavy launch operations, and has failed to require SpaceX to implement reasonable measures to mitigate its impacts and ensure that endangered wildlife will not be jeopardized by the SpaceX Launch Vehicle Program.

As set forth below, the FAA's failure to fully consider and ensure adequate mitigation for the full range of impacts associated with the proposed action—including the impacts to wildlife refuge lands and protected wildlife, as well as the tremendous use of energy and releases of methane that contribute to the current climate crisis—render the FAA's analyses inadequate, arbitrary and capricious, in violation of the National Environmental Policy Act, the Endangered Species Act, the National Wildlife Refuge System Administration Act, the Migratory Bird Treaty Act, and the Department of Transportation Act.

I. Violations of the National Environmental Policy Act

A. The FAA Must Prepare an EIS

The National Environmental Policy Act (NEPA) requires all agencies of the federal government to prepare an environmental impact statement (EIS) for all “major Federal actions significantly affecting the quality of the human environment.”¹ To determine whether a proposed action significantly affects the environment and thus requires an EIS, the lead federal agency may first prepare an environmental assessment (EA).² An environmental assessment must provide sufficient evidence and analysis to determine whether to prepare an EIS.³ The lead agency must take a “hard look” at the relevant environmental concerns and alternatives to the proposed action.⁴ If an environmental assessment concludes that there are no potentially significant impacts to the environment, the federal agency must provide a detailed statement of reasons why the project’s impacts are insignificant and issue a finding of no significant impact (FONSI).⁵ However, if an agency action may have significant impacts on the environment, then an EIS must be prepared.⁶

Since 1979 and until the Trump Administration, the CEQ NEPA regulations required that the “significance” of an agency action be evaluated through a consideration of the context and intensity of the proposed action. Despite recent regulatory changes that have attempted to withdraw the CEQ regulations regarding “significance” (which are now being challenged in court and that CEQ has recently indicated it is revisiting), the nature of the impacts of a project on the environment must still be deemed relevant to whether the project is “significant” for purposes of NEPA. Where, as here, the proposed activity will undoubtedly have significant adverse impacts on sensitive habitats and listed species, a full EIS is required.

Indeed, the longstanding NEPA regulations required agencies to consider ten “significance factors” in determining whether a federal action may have a significant impact, thus requiring an EIS.⁷ Among other factors, agencies have considered the beneficial and adverse impacts of the action, the effect on public health and safety, unique characteristics of the geographic area impacted (such as park lands, wetlands, or ecologically critical areas), the degree to which possible effects are highly controversial, uncertain, or involve unique or unknown risks, cumulatively significant effects, whether the proposed action will violate any laws or standards

¹ 42 U.S.C. § 4332(2)(C).

² 40 C.F.R. § 1508.9.

³ *Id.*

⁴ *Id.* See also *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989).

⁵ 40 C.F.R. § 1508.13.

⁶ *Id.* § 1501.4.

⁷ See prior version of 40 C.F.R. § 1508.27 set forth in 43 Fed. Reg. 56003 (Nov. 29, 1978), 44 Fed. Reg. 874 (Jan. 3, 1979).

of environmental protection, and whether it may adversely affect an endangered or threatened species.⁸

The FAA’s decision to prepare an EA rather than an EIS for the proposed use of the Boca Chica site for Starship/Super Heavy launch operations is inconsistent with the requirements of NEPA and calls into question whether the agency truly understands the scope of what SpaceX plans to do at the Boca Chica site, and the incredible environmental harm that is likely to occur – and indeed has already occurred – to an area that provides essential habitat for wildlife, including protected migratory birds and sea turtles. SpaceX activities not only have the potential for significant adverse environmental impacts, but those impacts would occur in essential habitat areas (including designated critical habitat) with unique characteristics that are easy to destroy, and very difficult to replace. Furthermore, such activities would certainly have cumulative impacts on the area and the climate, and recent correspondence from the U.S. Fish and Wildlife Service (FWS) indicates that the impacts of the SpaceX activities to the surrounding habitat is not only detrimental to several species, but is highly controversial given that SpaceX has been operating in violation of the prior Biological Opinion and Incidental Take Statement for the facility, which has led to the take of protected wildlife in violation of the ESA.⁹

The FAA itself acknowledges that the construction and operation of the project would result in adverse impacts from noise, light, traffic, heat and debris from rockets (that can explode and cause wildfires), and is therefore likely to adversely affect several ESA-listed species, including piping plovers, red knots, northern aplomado falcons, gulf coast jaguarundi and ocelots, as well as Kemp’s ridley, loggerhead, green, hawksbill, and leatherback sea turtles, requiring formal ESA consultation with FWS. That admission alone undermines any argument that the impacts of the project are not “significant” for purposes of NEPA. Furthermore, the DPEA acknowledges the potential for significant environmental harm from SpaceX activities due to the unique and/or unknown risks of rocket launches (including “anomalies”), further undermining any argument that an EA alone is sufficient.

Put plainly, there can be no doubt that the proposed SpaceX activities at the Boca Chica site would have significant environmental impacts, requiring an EIS. The Boca Chica site is a small property surrounded by some of the most important habitat for migratory birds in the U.S. As the U.S. Fish and Wildlife explains, the Lower Rio Grande Valley Refuge (LRGV) — directly adjacent to the Boca Chica launch site — “is considered one of the most biologically diverse

⁸ *Id.*

⁹ See Letters from Manuel “Sonny” Perez III, Complex Refuge Manager, South Texas Refuges Complex, U.S. Fish & Wildlife Serv. & Charles Ardizzone, Project Leader, Texas Coastal Ecological Service Office, U.S. Fish & Wildlife Serv. to Daniel P. Murray, Manager, Safety Division, Federal Aviation Administration dated Oct. 2, 2020, Dec. 14, 2020, and Jan. 22, 2021 (attached hereto).

regions in North America.”¹⁰ During migration, species from the Central and Mississippi flyway converge on this area, making it an essential stopover for migratory birds. However, much of the habitat in the region has been lost, relegating these birds to remnant tracts. The Lower Rio Grande Valley National Wildlife Refuge was established in 1979 specifically to connect and protect these isolated tracts of habitat. And the Boca Chica tract of the NWR is “an important link of the Lower Rio Grande Valley ‘Wildlife Corridor’.”¹¹ Not only does the Boca Chica tract provide habitat for migratory birds, such as ESA-listed piping plovers and red knots, but it “is one of the few places where the Kemp’s Ridley sea turtle, the most critically endangered sea turtle in the world, comes ashore to nest on refuge beaches in the spring and summer.”¹²

Other lands in the vicinity of the SpaceX facility that the FAA acknowledges would be impacted by SpaceX activities likewise provide important habitat for wildlife, including federally listed species. For example, the Laguna Atascosa NWR provides habitat for the endangered ocelot, jaguarundi, and northern aplomado falcon as well as threatened and endangered sea turtles and shorebirds.¹³ It is also a “premier bird-watching destination with more recorded species of birds than any other refuge in the National Wildlife Refuge System.”¹⁴ The Service explains that “today, there is an expanded emphasis [at Laguna Atascosa] that includes endangered species conservation and management for shorebirds.”¹⁵ The refuge also provides habitat for the largest population in the United States of ocelots, “making it the center for conservation and recovery efforts for this endangered cat.”¹⁶ The nearby South Bay Coastal Preserve, with its wind-tidal flats, shallow depths, associated vegetation, and unique location likewise “provides excellent feeding, resting and wintering habitat for numerous types of migratory bird species.”¹⁷

Simply put, the area surrounding the SpaceX facility at Boca Chica is not some wasteland that can be sacrificed for a private corporation’s aspirations of interstellar travel, as Elon Musk appears to believe.¹⁸ Rather, it is a biologically diverse and essential habitat area for many species, including imperiled migratory birds and sea turtles. For the FAA to suggest that an EIS is not warranted for permitting SpaceX to launch the largest rockets known to humankind—

¹⁰ https://www.fws.gov/refuge/Lower_Rio_Grande_Valley/about.html

¹¹ https://www.fws.gov/refuge/Lower_Rio_Grande_Valley/visit/boca_chica_beach.html

¹² *Id.*

¹³ See Laguna Atascosa NWR Comprehensive Conservation Plan, available at <https://www.fws.gov/doiddata/dwh-ar-documents/1266/DWH-ARZ000415.pdf> (attached hereto).

¹⁴ https://www.fws.gov/refuge/Laguna_Atascosa/about.html

¹⁵ *Id.*

¹⁶ *Id.*

¹⁷ <https://tpwd.texas.gov/landwater/water/conservation/txgems/southbay/index.phtml>

¹⁸ In a “SpaceX Update” (May 7, 2020 Via Microsoft Teams), which was released via a Freedom of Information Act request, Mr. Musk is quoted on a slide which shows two large pieces of rocket debris in high value wetlands as stating “We’ve got a lot of land with nobody around, and so if it blows up, it’s cool. – Elon Musk, 2018” (attached hereto).”

which may explode causing catastrophic harm to adjacent habitat, and require the burning and/or venting of methane, a potent greenhouse gas—along with ancillary facilities including a desalination plant, power plant, LNG pretreatment system, and other energy intensive infrastructure, with the related noise, lighting, traffic, and other construction and operational harms, is simply ludicrous, and certainly the very definition of arbitrary and capricious agency action.

It also remains entirely unclear why the FAA now believes that an EA is sufficient when it previously prepared an EIS for SpaceX's activities at the Boca Chica facility, particularly given that the proposed activities are even more environmentally damaging than what was previously considered, with larger rockets and more infrastructure. And the issuance of a prior EIS does not provide any basis for an EA/FONSI for the proposed new use of the site for Starship/Super Heavy launch operations. While supplemental EA's *may* have been warranted for prior proposed changes to the SpaceX operations, the new proposed uses of the Boca Chica site are much different from the past use due to the difference in rocket size and technology and the addition of infrastructure including a power plant and desalination plant. Moreover, FAA's regulations implementing NEPA define when a Supplemental EIS is needed or whether an EA will suffice. This was referenced in the 2014 Record of Decision for SpaceX operations at Boca Chica (FAA Order 1050.1F, Sec. 902), which specifically stated that a supplemental EIS is not needed only if one of the following three conditions applies:

- The proposed Action conforms to plans or projects for which a prior EIS has been filed and there are no substantial changes in the Proposed Action that are relevant to environmental concerns;
- Data and analysis contained in the previous EIS are still substantially valid and there are no significant new circumstances or information relevant to environmental concerns and bearings on the Proposed Action or its impacts;
- All pertinent conditions and requirements of the prior approval have, or will be, met in the current actions.

SpaceX's activities proposed use of the Boca Chica site for Starship/Super Heavy launch operations do not meet any of these conditions. SpaceX is seeking to conduct activities that were not planned and included in the 2014 EIS, which only authorized up to 12 launches of Falcon 9 or Falcon Heavy rockets each year. The use of the site for Starship/Super Heavy launch operations – including up to 20 launches per year – and additional infrastructure is therefore a substantial change to the use of the area.

It is also evident that SpaceX has not complied with all of the pertinent conditions and requirements of the prior approvals, and that there is new information relevant to environmental

concerns regarding SpaceX's operations at Boca Chica. As FWS noted in its January 22, 2021, letter to the FAA¹⁹:

Since 2014, SpaceX has undertaken activities not covered in FAA's 2014 EIS which addressed only 12 launches per year, not continual experimentation related to the Starship/Super Heavy proposal as is currently being carried out. SpaceX activities not covered include a higher frequency of road closures extending well beyond 180 hours, large explosions from reported anomalies, the appearance of significantly large staffing, 24/7 operations, traffic, and construction activities not analyzed in the 2014 EIS. In addition, SpaceX rocket debris falling onto the Refuge has damaged the sensitive wind tidal flats. And, the vehicles or machinery used to retrieve rocket debris have created ruts and caused other damage that interrupts water sheet flow across these flats. Two SpaceX incidents on July 25, 2019 and again in August 2019 resulted in wildfires of 130-acres and 10-acres respectively burned through coastal prairie and dune habitats on refuge managed land. Anomalies resulting in explosions on November 20, 2019, February 28, 2020, and December 9, 2020 resulted in debris scattered onto refuge managed lands. Retrieval methods damaged the sensitive alkaline flat and refuge cable fencing installed to protect the area from disturbance.

FWS further found that:

Due to operations by SpaceX, the FWS's ability to maintain the biological integrity, diversity and environmental health of Refuge resources, as well as our ability to ensure the viability of the six wildlife-dependent recreational uses, has been significantly diminished at the Boca Chica tract. This occurs by preventing or constraining public access year-round, hampering biological and monitoring studies including sea turtle patrols, sea turtle cold-stunning responses, hampering refuge management and law enforcement patrol, increased observations of road mortality of wildlife at all hours of daytime and nighttime, damage to sensitive habitats such as the wind tidal flats and to the salt prairie from explosions and fires, as well as adversely impacting nesting habitat for sensitive species.²⁰

Hence, even if SpaceX were not seeking to drastically expand its activities at the Boca Chica site – resulting in additional environmental harm – a supplemental EIS would have been necessary because mitigation measures previously committed to were not being carried out and significant

¹⁹ Letter from Manuel "Sonny" Perez III, Complex Refuge Manager, South Texas Refuges Complex, U.S. Fish & Wildlife Serv. & Charles Ardizzone, Project Leader, Texas Coastal Ecological Service Office, U.S. Fish & Wildlife Serv. to Daniel P. Murray, Manager, Safety Division, Federal Aviation Administration at 2 (Jan. 22, 2021) ("FWS Jan. 22, 2021 Letter").

²⁰ *Id.*

environmental harm is occurring that was not previously considered.²¹ With the new activities being proposed, it is even more evident that an EIS is required.

In sum, the FAA is proposing to authorize a new, expanded version of the SpaceX program at Boca Chica, which includes activities that have proven to result in significant harm to the environment, including to endangered species. Courts have specifically held that under NEPA and its implementing regulations, courts “cannot accept [an EA] as a substitute for an EIS — despite the time, effort, and analysis that went into their production — because an EA and an EIS serve very different purposes.”²² “To treat an EA as if it were an EIS would confuse these different roles, to the point where neither the agency nor those outside it could be certain that the government fully recognized and took proper account of environmental effects in making a decision with a likely significant impact on the environment.”²³ Under the circumstances here, an EA cannot suffice. Indeed, an EA aims simply to identify (and assess the “significance” of) potential impacts on the environment to see whether an EIS is needed, but it is not intended to provide the full analysis – the “hard look” – that NEPA requires for major federal actions with significant environmental effects.²⁴ Where, as here, there clearly are significant effects, officials must make their decision “in light of an EIS.”²⁵ Therefore, the FAA’s failure to produce an EIS is arbitrary, capricious, and in clear violation of NEPA.

B. The FAA failed to take the requisite “hard look” at the environmental impacts of the project

Even if an environmental assessment would suffice for this project, which it clearly cannot, the FAA has failed to provide a sufficient analysis of the impacts of the proposed action in the DPEA and has therefore failed to take the hard look required under NEPA to fully consider the environmental impacts of the proposed SpaceX activities.²⁶

As discussed above, the SpaceX facility is surrounded by publicly owned conservation, park, and recreation lands including Boca Chica State Park, Brazos Island State Park, the Lower Rio Grande Valley National Wildlife Refuge, the South Bay Coastal Preserve, and the Las Palomas Wildlife Management Area (Boca Chica Unit). These lands are of incredible conservation value for a range of federally and state listed species and other protected species such as migratory

²¹ See 40 C.F.R. § 1501.29 (providing that a supplemental EIS is required when there are “significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts”).

²² *Sierra Club v. Marsh*, 769 F.2d 868, 875 (1st Cir. 1985) (Breyer, J.).

²³ *Id.*; See also *Massachusetts v. Watt*, 716 F.2d 946, 951 (1st Cir. 1983).

²⁴ *Id.*

²⁵ *Sierra Club v. Marsh*, 769 F.2d 868, 875 (1st Cir. 1985) (noting that “the purpose of an EA is simply to help the agencies decide if an EIS is needed”).

²⁶ See *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989).

birds. The DPEA, however, does not provide a full analysis of the environmental impacts to these areas and the wildlife that rely on them. Rather, it provides only cursory statements about the potential for environmental harm – including passing reference to potentially catastrophic harm from rocket explosions that may cause extensive wildfires – but fails to provide any real analysis of the actual impacts to the people, habitats and wildlife that will be adversely affected.

For example, as discussed in the attached documents obtained through FOIA,²⁷ there have been several explosions of rockets at the SpaceX facility, and the DPEA acknowledges that FAA anticipates further “anomalies” from the SpaceX Starship/Super Heavy Launch Vehicle Program at Boca Chica. In fact, the DPEA states that SpaceX is proposing to conduct approximately 10 tank tests of its rockets per month and estimates a 10 percent rate of anomalies during tank testing, which “would result in an explosion and the spread of debris. The distance for which debris could spread is considered the blast danger area,” which includes the adjacent wildlife refuge and park lands.²⁸ However, the DPEA totally glosses over what the actual environmental impacts of these explosions could be. It merely mentions offhandedly that there may be monthly explosions but provides no in-depth analysis of how debris from such explosions would affect nearby wildlife and habitats, other than conclusory statements regarding the potential for some unknown amount of harm. The DPEA fails to address the direct harm to wildlife and habitats from the debris, as well as debris recovery efforts, which FWS has stated – as set forth above – are causing undue adverse impacts to wildlife, including listed species.²⁹ However, “general statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided.”³⁰

The DPEA also fails to address the potential for devastating wildfires and hazardous material contamination from these anomalies.³¹ It only briefly notes that “[c]hanges to terrestrial habitat structure might occur from fire in small areas adjacent to the launch mount and landing pad. Vegetative land cover in these areas is classified as barren or grasslands, both of which would recover quickly post-fire.”³² However, SpaceX’s activities have resulted in several fires in areas immediately adjacent to the launch site, such as two fires in the LRGV which burned 140 acres of refuge habitat. Moreover, SpaceX’s operations are located within piping plover critical habitat, yet the DPEA fails to address how piping plovers would be impacted as a result of these fires. Rather, the FAA merely discusses how SpaceX would respond to a fire, but this does not

²⁷ The Center incorporates these documents by reference and asks that they be included in the administrative record for this matter.

²⁸ DPEA at 16.

²⁹ Photos of impacts to piping plover critical habitat from removing rocket explosion debris are attached hereto.

³⁰ *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1213 (9th Cir. 1998).

³¹ A discussion of the potential harm from these incidents can be found in the letter to FAA from Charles Ardizzone, FWS Field Supervisor, dated March 2, 2020 (attached hereto).

³² DPEA at 112.

provide a “hard look” at the potential for catastrophic damage to surrounding habitat from an anomaly. This is clearly not enough to satisfy NEPA.³³

In addition, the FAA failed to address the impacts of SpaceX’s activities on the ozone layer. It is well established that the ozone layer plays an important role in protecting the earth (and its inhabitants) from the sun’s harmful rays. The EPA has stated that “the ozone layer in the stratosphere absorbs a portion of the radiation from the sun, preventing it from reaching the planet’s surface. Most importantly, it absorbs the portion of UV light called UVB. UVB has been linked to many harmful effects, including skin cancers, cataracts, and harm to some crops and marine life.”³⁴ In the DPEA, the FAA claims that it need not consider the impacts of SpaceX activities on the ozone layer, since “the proposed launch activities do not generate ozone depleting substances;”³⁵ however, the FAA provides no support for this contention. In fact, studies have shown that rocket engine emissions *do* adversely affect the ozone layer. Rocket engine exhaust contains gases and particles that can have important impacts on climate and ozone because rocket engines emit various amounts of submicrometer-sized particles of soot (or black carbon, BC) and alumina (aluminum oxide) directly into the stratosphere.³⁶ The FAA’s failure to consider the impacts of rocket emissions on the ozone layer is a glaring violation of NEPA.

Finally, the FAA violated NEPA because the DPEA does not provide an analysis of all reasonable alternatives to the proposed action. The alternatives analysis is the heart of the NEPA process,³⁷ and the FAA’s own NEPA implementing regulations explicitly state that “The FAA decision-making process must consider and disclose the potential impacts of a proposed action and its alternatives on the quality of the human environment.”³⁸ Yet the only alternative provided for analysis was the proposed action. FAA failed to analyze other options, including a less-intensive use of the Boca Chica site (i.e., fewer launches per year), or the use of other sites for the proposed launches, such as the Kennedy Space Center. The failure to consider a full range of alternatives renders the FAA’s NEPA analysis arbitrary and capricious.

³³ See *Ocean Advocates v. U.S. Army Corps of Eng’rs*, 402 F.3d 846, 864-66 (9th Cir. 2005) (holding the agency failed to take a “hard look” where its assessment included only conclusory assertions and did not discuss contrary evidence); *Alaska Wilderness League v. Kempthorne*, 548 F.3d 815, 831 (9th Cir. 2008) (“This is the type of ‘conclusory assertion’ that is disfavored by this court because the agency has not provided any scientific data that justifies this position.”).

³⁴ EPA, Basic Ozone Layer Science. Available at <https://www.epa.gov/ozone-layer-protection/basic-ozone-layer-science>.

³⁵ DPEA at 43.

³⁶ M.N. Ross and D.W. Toohey, The Coming Surge of Rocket Emissions. EOS, Sep. 24, 2019) available at <https://eos.org/features/the-coming-surge-of-rocket-emissions> (attached hereto).

³⁷ See 40 C.F.R. § 1502.14.

³⁸ FAA Order 1050.1E at 1-8.

C. The FAA failed to consider SpaceX's contribution to the climate crisis

NEPA necessitates a consideration of climate impacts because it requires that federal agencies consider the reasonably foreseeable direct and indirect impacts of their actions, even if the extent of these impacts is not known.³⁹ Climate impacts are an indirect result of the proposed SpaceX activities, and therefore must be considered in the NEPA analysis.⁴⁰ However, the FAA has failed to analyze the impacts of SpaceX's emissions on the environment. Indeed, the FAA failed to even include all of the emissions associated with the project in its cursory discussion of climate – such as the methane emissions from the fracking of natural gas to supply the fuel for the rockets and power plant – and therefore its analysis is woefully incomplete.

It is notable that Elon Musk, the CEO of SpaceX, has acknowledged that climate change is the “biggest threat facing humanity.”⁴¹ Yet, his company is using an incredible amount of energy and greenhouse gasses to fuel the activities at Boca Chica. Regardless of that inherent contradiction, the FAA certainly has a duty to fully analyze the contribution of the proposed activities to the current climate crisis. However, the FAA provides no analysis in the DPEA as to the impacts the proposed SpaceX activities would have on our climate and how such changes will impact people and the environment, instead claiming that the emissions will not be significant, based only on comparing SpaceX to the total GHG emissions of the US.⁴² However, the emissions from SpaceX are certainly not discountable, and the FAA's approach ignores that every contribution of GHGs to the atmosphere causes cumulative harm. Ignoring the incremental

³⁹ See 42 U.S.C. § 4332(2)(C), 40 C.F.R. § 1508.8.

⁴⁰ See *Center for Biological Diversity v. Bernhardt*, 982 F.3d 723, 736 (9th Cir. 2020) (holding GHG emissions are a ‘reasonably foreseeable’ indirect effect). Federal agencies evaluating climate impacts of their proposals have frequently claimed that science has not developed the tools to analyze climate impacts of individual proposals. This is not accurate. The social cost of carbon and social cost of methane are two reliable tools that are available and should be utilized by BLM in the PEIS process. Under NEPA's implementing regulations, where “information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known,” NEPA regulations direct agencies to evaluate a project's impacts “based upon theoretical approaches or research methods generally accepted in the scientific community.” 40 C.F.R. § 1502.21. The social cost of carbon and social cost of methane are based on generally accepted research methods and years of peer-reviewed scientific and economic studies. As the D.C. Circuit recently explained in invalidating the Federal Energy Regulatory Commission's review of a fossil fuel infrastructure project, 40 C.F.R. § 1502.21 requires federal agencies to evaluate the social cost of carbon as one potentially available, scientifically accepted tool for analyzing climate impacts. *Vecinos para el Bienestar de la Comunidad Costera v. Fed. Energy Regul. Comm'n*, 6 F.4th 1321, 1329 (D.C. Cir. 2021).

⁴¹ <https://www.npr.org/2021/02/08/965372754/elon-musk-funds-100-million-xprize-for-pursuit-of-new-carbon-removal-ideas>

⁴² DPEA at 47.

contribution of a project like SpaceX will only lead to death by a thousand small cuts, which the FAA has failed to properly consider.⁴³

As SpaceX itself notes, the Super Heavy Rocket is the World's most powerful rocket. It holds up to 3,700 metric tons of propellant, while the Starship holds up to 1,500 metric tons. The Raptor engines on these rockets use liquid methane, a potent greenhouse gas that may also need to be vented into the atmosphere by SpaceX. According to the FAA, burst testing would include the "deliberate release" of LN2 and/or LOX to the environment, and such tank tests would occur 10 times per month, releasing a significant amount of greenhouse gasses into the atmosphere.⁴⁴ Similarly, the FAA states that during pre-flight operations it is possible that the rocket would not be able to connect to reconnect to the ground systems, requiring the release of up to 814 tons of methane propellant into the atmosphere. While SpaceX claims this would be a rare, unplanned event, the FAA must still assess the impacts of such events on the environment, yet the agency is silent as to the climate impacts of these releases. Same with releases following suborbital launches that would occur 20 times per year, where approximately 10 metric tons of propellants would be vented to the atmosphere after each launch, with the potential for significantly more if there is an "anomaly."

And the "proposed action" includes not only the launching of methane-fueled rockets, but the construction and operation of a desalination plant, a new LNG-fueled power plant to generate power for activities at all SpaceX facilities,⁴⁵ and a natural gas pretreatment facility, all of which are energy and greenhouse-gas intensive. Yet, the DPEA is silent as to the implications of the action on climate change. The FAA failed to even address where the methane fuel/LNG is coming from, how it will be shipped, and the upstream impacts associated with fracking or other methods required to obtain the fuel needed for SpaceX rockets and infrastructure. And the FAA ignored emissions from anomalies, which could result in significant methane releases.

⁴³ See *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1216-17 (9th Cir. 2008) (holding that, under NEPA, agencies must "discuss the *actual* environmental effects resulting from . . . emissions").

⁴⁴ DPEA at 15-16.

⁴⁵ The power plant is itself a major action with significant environmental consequences that requires review in an EIS. According to the FAA:

The power plant would be approximately 5.4 acres in size. Power for the power plant would be generated using a large natural gas turbine and a steam turbine running in a combined cycle, and a small natural gas turbine and a steam turbine running in a combined cycle. The power plant would be comprised of multiple structures, including air intake, compressors, expanders, reflux tanks, surge tank, cold box, and cooling tower. Some of these structures would be less than 30 feet tall; however, some structures would be up to 150 feet tall.

BA at 23.

This is a critical error because methane emissions are particularly alarming. Immediate, deep reductions in methane emissions are critical for lowering the rate of global warming in the near-term, preventing the crossing of irreversible planetary tipping points, and avoiding harms to species and ecosystems from methane's intensive near-term heating effects and ground-level ozone production.⁴⁶ Methane is a super-pollutant 87 times more powerful than CO₂ at warming the atmosphere over a 20-year period,⁴⁷ and is second only to CO₂ in driving climate change during the industrial era.⁴⁸ Methane also leads to the formation of ground-level ozone, a dangerous air pollutant that harms ecosystems and species by suppressing plant growth and reducing plant productivity and carbon uptake.⁴⁹

Because methane is so climate-damaging but also comparatively short-lived with an atmospheric lifetime of roughly a decade, cutting methane has a relatively immediate effect in slowing the rate of temperature rise in the near-term. Critically, deep cuts in methane emissions of ~45% by 2030 would avoid 0.3°C of warming by 2040 and are considered necessary to achieve the Paris Agreement's 1.5°C climate limit and prevent the worst damages from the climate crisis.⁵⁰ Deep cuts in methane emissions that reduce near-term temperature rise are also critical for avoiding the crossing of planetary tipping points—abrupt and irreversible changes in Earth systems to states wholly outside human experience, resulting in severe physical, ecological and socioeconomic harms.⁵¹ The FAA's failure to fully consider the implications of SpaceX's activities, particularly when those activities will result in significant LNG and methane emissions, is a clear violation of NEPA.

⁴⁶ United Nations Environment Programme and Climate and Clean Air Coalition, *Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions*, Nairobi: United Nations Environment Programme (2021) [hereinafter *Global Methane Assessment*], <https://www.unep.org/resources/report/global-methane-assessment-benefits-and-costs-mitigating-methane-emissions>, at 11.

⁴⁷ Myhre, G. et al., *Anthropogenic and Natural Radiative Forcing*. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F. et al. (eds.)] (2013), *available at* <https://www.ipcc.ch/report/ar5/wg1/> at Table 8.7.

⁴⁸ *Global Methane Assessment* at 11.

⁴⁹ *Id.* at 11, 69.

⁵⁰ *Id.* at 11.

⁵¹ Hoegh-Guldberg, O. et al., *Impacts of 1.5°C Global Warming on Natural and Human Systems*, In: *Global Warming of 1.5°C, An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V. et al. (eds.)] (2018), <https://www.ipcc.ch/sr15/chapter/chapter-3/>, at 262.

In sum, the FAA’s failure to consider the human health and environmental impacts of SpaceX’s emissions in the context of the current climate crisis renders the FAA’s NEPA analysis arbitrary and capricious.

D. The FAA failed to adequately address the impacts of storm damage on aboveground storage tanks.

The FAA states that launch propellant and commodities (including gaseous and liquid methane) will be stored in aboveground tanks at the Boca Chica site. This includes thousands of metric tons of propellants, which by definition are explosive, but also have been shown to be carcinogenic and toxic. The Boca Chica site has the potential to be hit by hurricanes coming off the Gulf of Mexico, which have been increasing in recent year. Furthermore, FEMA’s flood risk map (attached hereto) clearly shows that all SpaceX facilities at Boca Chica are at risk of flooding. However, the FAA has failed to consider the potential impacts of storm damage, including from a worst-case scenario tank rupture, and the harm that would result in the habitat areas surrounding the SpaceX site. The FAA has therefore failed to take a “hard look” at the environmental impacts of storing dangerous and toxic chemicals in above-ground tanks at the Boca Chica site.

II. The Proposed Mitigation is Insufficient

As set forth herein and in the attached documents – including several letters and emails to FAA from FWS and EPA detailing the agencies’ concerns, which are attached and incorporated by reference – there is no doubt that the SpaceX activities at Boca Chica have resulted, and will continue to result, in environmental harm, including to ESA-listed wildlife. FWS has averred that SpaceX already has exceeded the traffic, construction, personnel levels, lighting, noise, and vibration impacts that were contemplated for the prior use of the Boca Chica site, resulting in a violation of the Incidental Take Statement.⁵² FWS further stated that rocket launch failures have impacted migratory birds, with “documented evidence that the debris and its removal has impacted and scarred various habitats in the area, including tidal flats which are foraging habitat for the threatened piping plover and red knot.”⁵³ FWS made it very clear that more must be done to mitigate such impacts.⁵⁴

⁵² FWS Jan. 22, 2021 Letter.

⁵³ *Id.*

⁵⁴ *Id.* See also email from Bryan Winton Re: DRAFT REPORT SN11 Anomaly - Rocket engine explosion @ 0.5-1 mile above the launch site (Mar. 30, 2021) (attached hereto) (describing the impacts of an anomaly); email between Bryan Winton and Mary Orms Re: Information for Informal Scoping FWS Response Letter to FAA per proposal to Draft a new EA (Jan. 21, 2021) (attached hereto) (listing anomalies).

Likewise, EPA has found that SpaceX's activities at Boca Chica have caused "substantial and unacceptable adverse impacts to aquatic resources of national important (ARNI)," due to the impacts to mudflats, estuarine and non-tidal wetlands, which "support benthic invertebrate communities which make them essential foraging habitats for wintering and migrating shorebirds, including the threatened piping plover and red knot."⁵⁵ The EPA further noted that the affected wetland complex "was designated by the Western Hemisphere Shorebird Network as a Site of International Importance," and is "critical to the survival of many species of shorebirds and waterfowl."⁵⁶ The EPA expressed concern over the "direct, secondary, and cumulative impacts associated with destruction of the rare and valuable aquatic habitats within the project area," and questioned "whether adequate compensatory mitigation will be provided for project impacts."⁵⁷

These impacts have not been adequately mitigated. Indeed, the Texas Parks and Wildlife Commission has stated that SpaceX has failed to even comply with several of the basic avoidance and minimization measures set forth in the 2014 EIS and ROD for the Boca Chica Launch Site, including limiting construction to 8 a.m. – 5 p.m. to mitigate noise impacts, avoiding lateral light spread and uplighting, and limiting vehicles to 25 mph.⁵⁸

SpaceX is now proposing an even more intensive use of the Boca Chica site, with larger rockets that would cause even more damage if/when they experience launch failures, and that would increase the noise and light pollution already impacting the neighboring habitats, including critical habitat in wildlife refuge lands. And SpaceX intends to build additional infrastructure including a desalination plant, power plant, and LNG processing facility, increasing not only the direct impacts to the area, but also contributing to the climate crisis.

As one of the wealthiest individuals in the world and one of the most well-funded commercial operations in this country, Mr. Musk (the wealthiest person in the world, worth ≈ \$250 Billion) and SpaceX (which has raised more than \$6 billion in equity to date⁵⁹) have the capacity – and indeed the duty – to ensure that the impacts of their operations are mitigated to the fullest extent possible. Indeed, as discussed further below, 23 U.S.C. § 138 precludes the Secretary of Transportation from approving a program or project unless the action includes all possible planning to minimize harm to an affected refuge. Likewise, the ESA requires the application of reasonable and prudent measures necessary or appropriate to minimize impacts to listed

⁵⁵ Letter from Maria L. Martinez, EPA, to Joe McMahan, U.S. Army Corps (April 7, 2021) (hereinafter, EPA April 7, 2021 Letter) (attached hereto).

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ Texas Parks & Wildlife Commission, NEPA Scoping Comments at 3 (January 27, 2021) (attached hereto).

⁵⁹ <https://spacenews.com/spacex-adds-to-latest-funding-round/>

species.⁶⁰ And the Clean Water Act Section 404(b)(1) Guidelines, which are also applicable to SpaceX's activities at Boca Chica, require SpaceX to incorporate all appropriate and practicable measures to avoid impacts to wetlands, streams, and other aquatic resources and to minimize unavoidable impacts. As the EPA has stated, "given that the proposed project site is located in an environmentally sensitive area with high quality habitats, emphasis should be placed on the importance of avoiding and minimizing impacts to these distinctly sensitive aquatic resources."⁶¹

However, the mitigation measures outlined in the DPEA and BA are simply inadequate to compensate for the significant impacts that SpaceX is having on the Boca Chica area. As discussed above, this area provides some of the most important habitat for migratory birds in the U.S. The Lower Rio Grande Valley Refuge is one of the most biologically diverse regions in North America, and species from the Central and Mississippi flyway converge on this area, making it an essential stopover for migratory birds. Not only does the Boca Chica tract provide habitat for migratory birds, such as ESA-listed piping plovers, but it is one of the few places where the Kemp's Ridley sea turtle, the most critically endangered sea turtle in the world, nests.

Yet SpaceX is proposing to take very few measures to protect the species that rely on the surrounding habitat, and it remains unclear whether SpaceX will even adhere to those measures.⁶² For example, the BA acknowledges that light from the facility would negatively affect nesting sea turtles because it could cause adult females to false crawl or hatchlings to become disoriented and reduce nesting success and hatchling survival. Yet it does not suggest ways to mitigate the effects of that lighting, such as season/time lighting restrictions during the crucial hatching season. Rather, it claims that there may be times when white lights would need to be used continually for several days. Laughably, the BA includes as an "operational measure" to "minimize lighting effects on wildlife" such routine things as "turning the lights off when not needed,"⁶³ which is meaningless given that SpaceX appears to need such lighting nearly all the time.

At the very least, SpaceX should have to follow the same mitigation as the Kennedy Space Center (KSC) / Cape Canaveral Spaceport, which is likewise situated in an area that provides habitat for sensitive bird and turtle species that are adversely affected by noise and light

⁶⁰ 50 C.F.R. § 402.14.

⁶¹ EPA April 7, 2021 Letter.

⁶² FWS has stated that SpaceX has not adhered to the measures in the 2013 Biological Opinion, but rather "continue[s] to do whatever they want with no concern for the impacts to the natural world their activity causes." Email from Bryan Winton to Chris Perez Re: Boca Chica monitoring (Sep. 16, 2020) (attached hereto).

⁶³ BA at 27.

pollution.⁶⁴ According to the Cape Canaveral Spaceport Development Manual,⁶⁵ the KSC Exterior Lighting Requirements include positioning of lights so that the light source and any reflective surface are not visible from beach areas, and that all lights be shielded and/or recessed. It also specifically requires that areas seaward of the frontal dunes (where turtle nests would be located) are not illuminated. Moreover, the KSC manual states that all facilities that are in close proximity to the beach and/or cause significant sky glow must prohibit the use of exterior lights between 9 p.m. and dawn from May 1 through October 31 to protect turtles, and that certain types of lights (such as metal halide and mercury vapor lights with wavelengths between 320-560 nm) should not be used for external lighting. KSC requires a plan showing the proposed location of all exterior lights, with each type of fixture to be used, along with a proposed operation schedule. The applicant may seek a variance from these requirements, including the May 1 – October 31 prohibition on exterior lights, if there is a compelling need, but that requires a process wherein FWS has the opportunity to consider the impacts of any variance on listed species, and provides that the applicant must mitigate any negative effects that may result from the variance.

It remains unclear why the FAA has not required the same mitigation measures for the Boca Chica site, which is no less ecologically important than Cape Canaveral. As discussed further below, the FAA does not even have the specific information required to analyze light impacts because no lighting plan has been provided; however, the BA does state that SpaceX would require “bright spotlighting for periods of time (sometimes days) when illuminating the launch vehicle on the launch pad,” and that “white lighting” would be needed 24 hours a day, 7 days a week throughout the year for ground support operations.⁶⁶ The BA even states that these spotlights would be metal halide, precisely the type of lighting that has been deemed too detrimental to wildlife for use at the KSC. The BA does include, as an operational measure, that low pressure sodium lights could be used, “to the extent practicable,” during sea turtle nesting season, but it qualifies this with by saying that brighter, white lights would be necessary “for ground support operations performed 24/7 throughout the year,” making this a meaningless mitigation measure.

While SpaceX certainly can do more to protect imperiled birds and sea turtles from light pollution by, at minimum, following the protocols for the KSC, it can and must go farther than

⁶⁴ See, e.g., NASA, Environmental Assessment for Exploration Park North at the John F. Kennedy Space Center, Kennedy Space Center, Florida (August 2021). Attached hereto and available at https://netpublic.grc.nasa.gov/main/ExpParkNorth_FINAL%20EA%2007-27-21.pdf.

⁶⁵ Space Florida, Cape Canaveral Spaceport Development Manual (Feb. 2, 2016) (“KSC Development Manual”). Available at https://www.spaceflorida.gov/wp-content/uploads/2018/12/ccs_development_manual_2-2-16_revision-1-1-withsigjk.pdf. (Attached hereto).

⁶⁶ BA at 9.

that. The best way to protect the listed species in the area is to give them a fighting chance by protecting as much of their habitat as possible. That is particularly the case where ecologically sensitive habitats are being impacted, making compensatory, out-of-kind mitigation less useful. As the EPA noted, “there are concerns if non-contiguous and out-of-kind mitigation through preservation is proposed,” and that restoration and enhancement is preferred over creation of new habitat, due to the higher likelihood of success.⁶⁷ SpaceX, however, has failed to take any action to increase the habitat available for listed species by protecting and/or enhancing additional lands in the vicinity of the areas that are adversely affected by its activities.

Additional mitigation is also warranted to address the impacts of increased vehicle traffic, which exposes jaguarundis and ocelots to the increased potential for vehicle collisions (according to the BA there will be an extra 505 vehicles per day through potential travel corridors for the Gulf Coast jaguarundi and the ocelot), and is clearly not being controlled by SpaceX.⁶⁸ The project will harm Gulf Coast jaguarundis and ocelots by causing them to avoid areas and seek other north-south travel corridors through the lomas, expending additional energy and increasing the potential for vehicular mortality. Protecting additional north-south travel corridors is essential to offset the impacts of the proposed increase in vehicle traffic, yet SpaceX does not appear to have taken any steps to provide for additional protections.

In sum, SpaceX is in a position to mitigate its impacts by expanding and enhancing the surrounding conservation lands and available habitat in the vicinity of Boca Chica, providing additional protection to areas that sensitive species like plovers, ocelot and jaguarundi can move into when they are harassed by the Noise and Light from SpaceX, and to avoid the increased vehicle traffic that the FAA acknowledges may harm these species. SpaceX should work with FWS to determine where land could be purchased to extend the protections of the NWRs and reduce the impacts to the listed species in the region by protecting the habitat functions and values these species rely on. It is simply absurd that a company with the resources of SpaceX and Mr. Musk would not do more to ensure that the conservation values of the surrounding wildlife habitat are protected.

III. The FAA’s Biological Assessment is inadequate

ESA Section 7 is a vital safeguard that requires each federal agency to “insure”—at the “earliest possible time”—that “any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification” of designated critical habitat.⁶⁹ To effectuate

⁶⁷ EPA April 7, 2021 Letter.

⁶⁸ See email from Ernesto Reyes (FWS) to Steve Davis (SpaceX) (Feb. 12, 2016) (attached hereto).

⁶⁹ 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14.

that duty, Section 7 and the ESA’s implementing regulations provide a detailed process that agencies must follow before approving actions that “may affect” listed species.

First, the action agency must prepare a biological assessment to evaluate whether the proposed action is likely to adversely affect listed species or critical habitat in the “action area.”⁷⁰ The biological assessment should include the results of on-site inspections, the views of recognized experts, a review of literature and other available information, an analysis of the effects of the proposed action on listed species and habitat including cumulative effects, and an analysis of alternatives to the proposed action.⁷¹ If the agency concludes in the biological assessment that the action is “not likely to adversely affect” listed species, it must seek a concurrence from FWS to complete the consultation process.⁷² Conversely, if the action is “likely to adversely affect” listed species, the agency must enter into “formal consultation” with FWS, a more extensive and protective process to consider the action’s impacts.⁷³

For either a request for concurrence or the initiation of formal consultation, the action agency must provide sufficient information in the biological assessment for FWS to make an informed determination as to the potential impacts to listed species from the proposed action. The regulations therefore require the action agency to provide a description of the proposed action along with any measures intended to avoid or mitigate impacts, which must provide “sufficient detail to assess the effects of the action on listed species and critical habitat.”⁷⁴ That description must provide not only basic background information—such as the purpose, duration, timing, and location of the action—but also details regarding the “specific components of the action and how they will be carried out,” as well as “maps, drawings, blueprints or similar schematics” detailing the specific components, along with any other information pertinent to the action’s effects on listed species and critical habitat.⁷⁵ The regulations make clear that the action agency *must* provide a “map or description of all areas to be affected,” as well as all information that the agency has in its possession, “including available information such as the presence, abundance, density, or periodic occurrence of listed species and the condition and location of the species’ habitat, including any critical habitat.”⁷⁶ Furthermore, the action agency must provide a “description of the effects of the action and an analysis of any cumulative effects.”⁷⁷ That

⁷⁰ 50 C.F.R. § 402.02; *see also id.* § 402.12.

⁷¹ 50 C.F.R. § 402.12(f).

⁷² 50 C.F.R. § 402.13(c).

⁷³ 50 C.F.R. §§ 402.12(k), 402.14(a).

⁷⁴ 50 C.F.R. § 402.14(c)(1).

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ *Id.*

analysis must be based on the “best scientific and commercial data available” in order to properly evaluate impacts to listed species.⁷⁸

As set forth below, the FAA has failed to provide sufficient detailed information in its biological assessment and has not relied on the best available scientific information to determine whether listed species will be jeopardized or critical habitat will be adversely modified by the proposed action, in clear violation of the ESA.⁷⁹

The Center remains very concerned about the impacts to imperiled wildlife from the proposed SpaceX activities, which pose significant risk to Eastern black rails, northern aplomado falcons, piping plovers, red knots, Gulf Coast jaguarundi, ocelots, West Indian manatees, and several sea turtles, including greens, hawksbill, Kemp’s Ridley’s, leatherbacks and loggerheads. Indeed, SpaceX’s activities are completely incompatible with and directly threaten the integrity of the adjacent refuge and park lands that listed species rely on, due to a wide range of direct and indirect adverse impacts to nationally significant shorebird and waterbird habitats. The Starship/Super Heavy program now being considered includes a massive amount of construction activity which would result in a significant increase in the already existing adverse environmental impacts from SpaceX activities. The increased use of the Boca Chica site for rocket launches will cause significant harm to important habitat that listed species rely on, including designated critical habitat, which the FAA has failed to adequately analyze.

While the Center understands that the reinitiated ESA Section 7 consultation process remains ongoing and FWS will eventually provide a biological opinion for the project, the Center provides the following comments regarding the FAA’s analysis, which fails to fully analyze the impacts to listed species at Boca Chica using the best available science, including from noise and light pollution, traffic, rocket explosions, wildfires, and water withdrawals.

In addition, the issues discussed below also constitute a violation of NEPA, since the FAA relied entirely on its BA to satisfy its duty to address impacts to listed species under NEPA in its DPEA. For the reasons set forth below, the FAA has not only violated the ESA, but has failed to take the requisite hard look at the impacts to listed species from SpaceX activities at the Boca Chica site.⁸⁰

⁷⁸ 16 U.S.C. § 1536(a)(2); 40 C.F.R. § 402.14(d).

⁷⁹ See *Resources Ltd. v. Robertson*, 35 F.3d 1300, 1305 (9th Cir., 1994) (invalidating a consultation where the action agency failed to provide the FWS with all of the data and information required by 50 C.F.R. § 402.14(d) – the best available science mandate).

⁸⁰ The EA itself, not a biological assessment, is where the agency’s “defense of its position must be found.” *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1211 (9th Cir. 1998).

A. The FAA did not, and could not, adequately analyze the impacts from noise and light pollution

The BA acknowledges that the operation of the SpaceX facility will harm listed species through noise and light pollution, including from the firing of booster rockets and intense lighting to support ground operations. As the BA acknowledges, noise and light associated with SpaceX operations can harm or harass listed species, including piping plovers in their critical habitat, sensitive ocelot and jaguarundi in some of their last remaining habitat, and Kemp’s Ridley sea turtles, the most critically endangered sea turtle in the world. For example, the Boca Chica Tract of the Lower Rio Grande NWR is one of the few places where the Kemp’s Ridley sea turtles comes ashore to nest. As the FAA notes, “[l]ighting could cause adult females to false crawl or hatchlings that were not relocated to become disoriented and reduce nesting success / hatchling survival.”⁸¹ Meanwhile, noise from rocket launches and construction activities would adversely affect ocelot and jaguarundi, since their “response to noise could potentially cause the species to expend energy, increase their risk of vehicular collision, or cause individuals to abandon their movements through the area and decrease opportunities to improve genetic diversity within the Texas populations.”⁸² As discussed above, these impacts have not been adequately addressed with sufficient mitigation.

Moreover, the FAA has not adequately analyzed the impacts of noise and light pollution on listed species, and in fact it could not do so because the FAA acknowledges that “[d]etailed information about some of the launch-related infrastructure (e.g., exact location and design) is not currently available. Therefore, the BA makes assumptions about these unknowns using best available information and professional expertise.”⁸³ However, as discussed above the Services’ regulations specifically require a request for concurrence or formal consultation to include a “description of the proposed action” with “sufficient detail to assess the effects of the action on listed species and critical habitat,” including not only the “specific components of the action,” but “maps, drawings, blueprints, or similar schematics,” so that the Service has the information it needs to make a well-reasoned jeopardy determination.⁸⁴ Consistent with this requirement, the only other major U.S. spaceport – the Cape Canaveral Kennedy Space Center (KSC) – has a development manual that specifically requires, at minimum, a plan drawing showing “all exterior lighting fixtures and other lights that may be visible at night,” which “must include details of each type of fixture to be used, such as lamp type, wattage, installation height, and proposed operation schedule”⁸⁵

⁸¹ BA at 69. *See also* NASA, Dark Skies Program <https://www.nasa.gov/content/kennedy-space-center-keeps-dark-skies-for-sea-turtle-nesting>.

⁸² *Id.* at 67.

⁸³ *Id.* at 3.

⁸⁴ 50 C.F.R. § 402.14(c)(1).

⁸⁵ KSC Development Manual, KSC Exterior Lighting Requirement at 3 (Section 5.1) (attached hereto). *See also* Kennedy NASA Procedural Requirements, Kennedy Space Center

Here, however, none of that information has been provided, and so the BA is incomplete. In fact, the BA states that “the number of pole lights would be finalized during the site design process,”⁸⁶ confirming that the information needed to analyze the impacts of the lighting has not yet been made available to the FAA or FWS.⁸⁷

Since the actual location of launch-related infrastructure remains unknown, the impacts from noise and light cannot have been fully addressed by the FAA, as these are very site-specific concerns with localized impacts that may defer based on placement of such infrastructure on the site. Moreover, since the SpaceX parcel is so small and is directly adjacent to essential habitat areas – including national wildlife refuges that provide critical habitat for listed species – the placement of infrastructure is of vital import when considering the potential for harm. Without the specific information the regulations require, the BA is incomplete, and the Service cannot make a fully informed jeopardy determination.

Furthermore, the analysis that the FAA does provide regarding noise impacts is woefully inadequate. For example, the BA concludes that noise from operations may temporarily disturb or displace piping plovers, but it does not appear to give appropriate consideration to the full impacts that noise disturbances may have on the species. Indeed, it notes that noise from nearby beachgoers has already existed in the area, implying that noise generated by beachgoers is comparable to the noise generated by construction activities and rocket launches. This ignores the louder, though more infrequent, noise impacts that would result from launches, sonic booms during landings, and noises related to engine testing.

It is undeniable that noise from the rockets is likely to displace sensitive species, and in fact the FAA states in the BA that red knots and piping plovers could be killed if they are within the heat plume created by engine ignition during testing and launches, but suggests that they would probably leave the area due to noise disturbances before that would happen, indicating that such noise *will* displace plovers from their critical habitat. In fact, a recent study submitted to FWS by the Coastal Bend Bays & Estuaries Program (attached hereto) indicates that the piping plover population at Boca Chica has experienced a significant decline, and indeed a rapid and substantial loss of the population, due to SpaceX, and that the area is functioning as a population sink due to the plover’s historic reliance on the area coupled with the increased harm from SpaceX activities. Yet the FAA provides no real analysis as to how that may affect the continued existence of the species and the use of the critical habitat.

Environmental Requirement (Mar. 6, 2017) (attached hereto) (requiring a lighting management plan to protect marine turtles) (attached hereto).

⁸⁶ BA at 9.

⁸⁷ In a letter dated March 2, 2020 (attached hereto), FWS confirmed that “lighting, parking, construction times, and anticipated traffic are not clear and not comparable to the original consultation documents.”

There are also significant gaps in the FAA’s analysis regarding the impacts of overpressure from SpaceX activities on listed species. For example, the BA notes that “overpressures less than 1 psf are not expected to adversely affect animals,” suggesting that pressures over that amount *would* result in adverse effects.⁸⁸ The BA goes on to state that overpressures greater than 1 psf would “extend about 13 miles from the launch pad” for Super Heavy booster landings.⁸⁹ This would result in overpressures above 1 psf on refuge lands and critical habitat areas. While the FAA admits that the noise would adversely affect listed species, and therefore formal consultation is required, it did not provide any analysis of the actual impacts of this noise pollution on plovers, ocelot, or jaguarundi, which may be forced away from some of their last remaining habitat by such noise.

The Center is hopeful that the FWS will provide a more thorough and complete analysis of noise and light impacts in its biological opinion; however, the FAA’s BA fails to provide the requisite information and analysis and is therefore inadequate.

B. FAA failed to adequately address the impacts to listed species from “anomalies”

The FAA acknowledges that a “Starship/Super Heavy test operation or launch could fail (referred to as an anomaly or mishap). An anomaly on the launch pad represents the greatest risk to the environment. If this occurs, a number of possible outcomes could result, the most likely being a fire on the launch pad. An explosion on the launch pad would spread debris.”⁹⁰ It further concedes that “in the event of an anomaly, an explosion could injure or kill wildlife species adjacent to the launch pad or within areas impacted by debris. In addition, fires could potentially start from an explosion that could result in a loss of habitat.”⁹¹ However, it discounts the impacts of such anomalies, stating only that SpaceX would adhere to its Fire Mitigation and Response Plan to prevent and respond to any fires. This provides no reassurance – particularly given the history of rocket explosions and wildfires discussed herein and in the attached documents.

Moreover, when setting forth the impacts to listed species from an anomaly — such as debris and fires that can kill or adversely modify habitat of piping plovers, ocelots and jaguarundi — the FAA provides no actual analysis of the impacts to listed species from debris and recovery or fires from launch anomalies (other than admitting they could affect the species), even though FWS has found that:

SpaceX rocket debris falling onto the Refuge has damaged the sensitive wind tidal flats. And, the vehicles or machinery used to retrieve rocket debris have created ruts and

⁸⁸ BA at 29.

⁸⁹ *Id.*

⁹⁰ *Id.* at 16.

⁹¹ *Id.* at 61.

caused other damage that interrupts water sheet flow across these flats. Two SpaceX incidents on July 25, 2019 and again in August 2019 resulted in wildfires of 130-acres and 10-acres respectively burned through coastal prairie and dune habitats on refuge managed land. Anomalies resulting in explosions on November 20, 2019, February 28, 2020, and December 9, 2020 resulted in debris scattered onto refuge managed lands. Retrieval methods damaged the sensitive alkaline flat and refuge cable fencing installed to protect the area from disturbance.⁹²

The FAA only spends a few pages discussing the possibility of rocket explosions and the adverse environmental impact of such explosions, but it provides no actual analysis of the impacts of these anomalies, and it fails to provide measures to prevent harm from fires, such as limiting or reducing rocket testing between March 15 and August 15, as FWS has suggested.⁹³ For example, while the FAA acknowledges that an anomaly could affect ocelot and jaguarundi, “particularly if a wildfire is started and burns many acres of suitable cat habitat,” and that the “loss of habitat could affect species movement and potentially affect migration corridors,”⁹⁴ it provides no analysis of how this would affect the survival and recovery of the species, such as the impact to the regional population, genetic diversity, and the species’ resiliency to climate change. Instead, the FAA appears to discount the potential for catastrophic wildfires by arguing that the loss of habitat is temporary because the vegetation will grow back,⁹⁵ ignoring that even short-term impacts could be catastrophic for these species, and further ignoring that the lost habitat may never regenerate due to climate change.

The Center is likewise concerned about the FAA’s inadequate consideration of the impacts of anomalies and debris collection on the threatened piping plover’s critical habitat. The FAA, while it notes that a launch failure may occur, dismisses the possibility of a crash as “unlikely,” regardless of the fact that SpaceX has had several launch failures. It is noteworthy that 8 of the last 10 launches have resulted in the destruction of the rocket. Of particular concern, massive uncontrolled explosions have taken place during the last four rocket launches.

The wide area covered by debris from failed launches raises significant concerns about adverse environmental impacts. The explosion of SN 11 on March 30, 2021, which occurred at altitude and not on the launch pad, merits particular attention, as large amounts of debris uncontrollably fell outside of SpaceX property on to public conservation lands, including high value, ecologically sensitive habitats that are used by the Piping Plover, Wilson’s Plover, and Snowy Plover. There was also at least one explosion in 2021 that scattered debris on the Refuge.⁹⁶

⁹² FWS Jan. 22, 2021 Letter.

⁹³ FWS Mar. 2, 2020 Letter (attached hereto).

⁹⁴ BA at 67.

⁹⁵ *Id.*

⁹⁶ See Email from Bryan Winton, Refuge Manager, Lower Rio Grande Valley National Wildlife Refuge, U.S. Fish & Wildlife Serv. (Mar. 30, 2021, 21:22 CST) (Attached hereto); *see also*

Operations to retrieve the debris have further damaged the refuge. According to FWS, “debris that has fallen onto the Refuge has damaged sensitive wind tidal flats. The vehicles or machinery used to retrieve debris have created rutting and damage that interrupts tidal water sheet flow across these flats.”⁹⁷ In the past, SpaceX has used high-capacity tow trucks and a construction dump truck to drag the debris through parts of the refuge. FWS personnel have noted that botched retrieval efforts have further damaged the refuge.⁹⁸ Because Service personnel are barred from the refuge following explosions, they have been unable to assess the full extent to which refuge wildlife are harmed. Last month, the Service asserted that “none of the damage to the sensitive tidal flats from debris pickup and motorized equipment and human access has been adequately addressed.”⁹⁹ Yet the FAA failed to assess the impacts to piping plovers or other listed species from explosions and debris cleanup in the BA.

In addition, while FAA maintains that in the event of an anomaly SpaceX would coordinate with FWS,¹⁰⁰ that is insufficient to meet the FAA’s duty to fully consider the impacts of the SpaceX project before it moves forward. Furthermore, the FAA has not indicated that it would undertake emergency ESA consultation in the event of an anomaly. The Services have established a specific consultation process in the case of “emergencies.” In an emergency, such as “situations involving acts of God, disasters, casualties, national defense or security emergencies, etc.,”¹⁰¹ initial consultation may be conducted informally through alternative procedures that are consistent with Section 7 of the ESA (*i.e.* by calling or emailing the Services to discuss the emergency action and any prudent mitigation), *id.*, and then “[f]ormal consultation shall be initiated as soon as practicable after the emergency is under control.”¹⁰² The Handbook explains that in the initial stages of emergency consultation, the Services “offer recommendations to minimize the effects of the emergency response action on listed species or their critical habitat,” and then a full, formal consultation is to take place after the emergency is under control. The emergency formal consultation “is treated like any other formal consultation.”¹⁰³ However, post-emergency consultations require the agency to provide additional information, including “an evaluation of the response to and the impacts of the emergency on affected species and their habitats, including documentation of how the Services’ recommendations were implemented,

Email from Stacey Zee, FAA (Mar. 3, 2021) (debris found and collected from LRGV, which was within the “ground hazard area”).

⁹⁷ FWS Jan. 22, 2021 Letter.

⁹⁸ *See e.g.* Email from Bryan Winton (Jan 21, 2021) (“April 21,22 -2019 - Space X employee(s) get stuck with 2 vehicles and a forklift in tidal flats. Causes significant damage to tidal flats”).

⁹⁹ FWS Aug. 2021 Letter at 3.

¹⁰⁰ BA at 17.

¹⁰¹ 50 C.F.R. § 402.05(a).

¹⁰² *Id.* § 402.05(b). The Services have expounded on the emergency consultation process in their ENDANGERED SPECIES CONSULTATION HANDBOOK 8-1 to 8-5 (1998) (“Handbook”).

¹⁰³ *Id.*

and the results of implementation in minimizing take.”¹⁰⁴ The FAA does not appear to have undertaken emergency consultation on prior anomalies, but should make clear that it will comply with this process in the event of a future anomaly.¹⁰⁵

Regardless, it is readily apparent that the FAA has failed to adequately address the impacts to listed species from anomalies, and therefore the BA is inadequate, arbitrary and capricious, in violation of the ESA.

C. The FAA failed to analyze the impacts to listed species from SpaceX’s contribution to climate change

As discussed above in the context of NEPA, the FAA has failed to consider SpaceX’s contribution to the climate crisis. The ESA, however, also requires that the FAA consider the impacts to listed species from SpaceX’s contribution to global climate change. “The plain intent of Congress in enacting [the ESA] was to halt and reverse the trend toward species extinction, *whatever the cost*.”¹⁰⁶ Because SpaceX’s activities will have an appreciable, cumulative impact on climate-threatened species, the FAA must include climate impacts as part of its consultation. Its failure to do so is a clear violation of the ESA.

Indeed, it is clear that the anticipated greenhouse gas pollution from SpaceX will harm listed species far beyond the immediate area of the proposed activity in a manner that is attributable to the agency action, which must therefore be addressed in the BA; yet, this issue was glossed over by the FAA, which claims that the GHG emissions from SpaceX are not significant (only when compared to total national GHG emissions), without sufficient support to ignore the project’s contribution to the climate crisis.

Regardless, the science is overwhelmingly clear that climate change represents a stark threat to the future of biodiversity within the United States and around the world. The Fourth National Climate Assessment warns that “climate change threatens many benefits that the natural environment provides to society,” and that “extinctions and transformative impacts on some ecosystems” will occur “without significant reductions in global greenhouse gas emissions.”¹⁰⁷ The best available science shows that anthropogenic climate change is causing widespread harm to life across the planet, disrupting species’ distribution, timing of breeding and migration,

¹⁰⁴ *Id.*

¹⁰⁵ See email from Sonny Perez dated Dec. 17, 2020 (discussing the need to undertake emergency consultation on rocket anomalies) (attached hereto).

¹⁰⁶ *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 184 (1978); *see also* 16 U.S.C. § 1532(3).

¹⁰⁷ U.S. Global Change Research Program, Climate Science Special Report - Fourth National Climate Assessment, Vol. I at 51 (available at https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf).

physiology, vital rates, and genetics—in addition to increasing species extinction risk.¹⁰⁸ Climate change-related local extinctions are widespread and have occurred in hundreds of species, including almost half of the 976 species surveyed.¹⁰⁹ Nearly half of terrestrial non-flying threatened mammals and nearly one-quarter of threatened birds are estimated to have been negatively impacted by climate change in at least part of their range.¹¹⁰ Furthermore, across the globe, populations of terrestrial birds and mammals that are experiencing greater rates of climate warming are more likely to be declining at a faster rate.¹¹¹

Furthermore, there are no defensible legal rationales for ignoring climate-threatened species that are harmed by the emissions that will result from this proposed action, such as piping plovers. Studies have found that “for small beach dependent populations such as Piping Plovers, even the most subtle changes could have profound affects on survivorship.”¹¹² It is therefore abundantly clear that activities that contribute GHG emissions, such as SpaceX, have real impacts that cross the “may affect” threshold, even if some of those impacts are still of an undetermined character at this point. The purpose of the consultation process, by design, is to allow the expert wildlife agencies to assess these impacts using the best available science, so that they can evaluate the harm that may be caused.

Species extinction risk will accelerate with continued greenhouse gas pollution, such as from SpaceX. One million animal and plant species are now threatened with extinction, with climate change as a primary driver.¹¹³ At 2°C compared with 1.5°C of temperature rise, species’ extinction risk will increase dramatically, leading to a doubling of the number of vertebrate and plant species losing more than half their range, and a tripling for invertebrate species.¹¹⁴

¹⁰⁸ Warren, Rachel et al., Increasing impacts of climate change upon ecosystems with increasing global mean temperature rise, 106 *Climatic Change* 141 (2011).

¹⁰⁹ Wiens, John J., Climate-related local extinctions are already widespread among plant and animal species, 14 *PLoS Biology* e2001104 (2016).

¹¹⁰ Pacifici, Michela et al., Species’ traits influenced their response to recent climate change, 7 *Nature Climate Change* 205 (2017). The study concluded that “populations of large numbers of threatened species are likely to be already affected by climate change, and ... conservation managers, planners and policy makers must take this into account in efforts to safeguard the future of biodiversity.”

¹¹¹ Spooner, Fiona E.B. et al., Rapid warming is associated with population decline among terrestrial birds and mammals globally, 24 *Global Change Biology* 4521 (2018).

¹¹² Ruth Boettcher, Tom Penn, Robert R. Cross, Karen T. Terwilliger, and Ruth A. Beck “An Overview of the Status and Distribution of Piping Plovers in Virginia,” *Waterbirds* 30(sp1), 138-151, (1 December 2007).

¹¹³ Brondizio, E.S. et al. (eds.), IPBES, Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, IPBES secretariat, Bonn, Germany (2019), available at <https://ipbes.net/global-assessment>.

¹¹⁴ IPCC Climate Change 2021, Summary for Policymakers.

Numerous studies have projected catastrophic species losses during this century if climate change continues unabated: 15 to 37% of the world's plants and animals committed to extinction by 2050 under a mid-level emissions scenario¹¹⁵; the potential extinction of 10 to 14% of species by 2100¹¹⁶; global extinction of 5% of species with 2°C of warming and 16% of species with business-as-usual warming¹¹⁷; the loss of more than half of the present climatic range for 58% of plants and 35% of animals by the 2080s under the current emissions pathway, in a sample of 48,786 species¹¹⁸; and the loss of a third or more of animals and plant species in the next 50 years.¹¹⁹ As summarized by the Third National Climate Assessment, “landscapes and seascapes are changing rapidly, and species, including many iconic species, may disappear from regions where they have been prevalent or become extinct, altering some regions so much that their mix of plant and animal life will become almost unrecognizable.”¹²⁰

The FAA's total failure to consider impacts to listed species from SpaceX's emissions in the context of the climate crisis renders the FAA's ESA analysis arbitrary and capricious.

D. FAA failed to address the impacts of water withdrawals on listed species

According to the BA, it is possible that SpaceX would require an enormous amount of water for its operation, particularly if it uses deluge water on the plume during launches to control temperature.¹²¹ The BA notes that “all water (including deluge and potable water) would be either delivered by truck or withdrawn from existing or new wells located adjacent to the launch pad.”¹²² The BA further states that the desalination plant would treat water “from two new source wells” that would extract groundwater at a rate of 40 gallons per minute.¹²³

However, BA is silent as to the impacts of such water withdrawals on listed species and critical habitat. Water withdrawals (onsite or offsite) may alter the adjacent habitat, including by reducing water availability or increasing salinity in certain areas. It is notable that EPA has found that SpaceX's activities at Boca Chica have caused “substantial and unacceptable adverse

¹¹⁵ Thomas, Chris. D. et al., Extinction risk from climate change, 427 *Nature* 145 (2004).

¹¹⁶ Maclean, Ilya M. D. & Robert J. Wilson, Recent ecological responses to climate change support predictions of high extinction risk, 108 *PNAS* 12337 (2011).

¹¹⁷ Urban, Mark C., Accelerating extinction risk from climate change, 348 *Science* 571 (2015).

¹¹⁸ Warren, Rachel et al., Quantifying the benefit of early climate change mitigation in avoiding biodiversity loss, 3 *Nature Climate Change* 678 (2013).

¹¹⁹ Román-Palacios, Cristian & John J. Wiens, Recent responses to climate change reveal the drivers of species extinction and survival, 117 *PNAS* 4211 (2020).

¹²⁰ Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program, 841 pp. doi:10.7930/J0Z31WJ2.

¹²¹ BA at 12.

¹²² *Id.*

¹²³ *Id.* at 23.

impacts to aquatic resources of national important (ARNI),” due to the impacts to mudflats, estuarine and non-tidal wetlands, which “support benthic invertebrate communities which make them essential foraging habitats for wintering and migrating shorebirds, including the threatened piping plover and red knot.”¹²⁴ Water withdrawals may further harm the adjacent wetland communities, harming these listed species. The FAA’s failure to consider the impacts of water withdrawals on listed species is a glaring violation of the ESA (as well as NEPA).

IV. The FAA has ignored interrelated actions and indirect effects, unlawfully segmenting its analysis

The FAA has failed to include interrelated and/or interdependent actions in its DPEA and BA and is unlawfully segmenting its analysis. Under both NEPA and the ESA, an agency must consider the full action, including any interdependent or interrelated actions.¹²⁵ Here, the FAA has stated in the DPEA and BA that SpaceX is still in the testing stages of the launch vehicle, including ongoing Starship prototype tests that have been approved under a separate license, and that SpaceX will also need to conduct similar tests of Super Heavy prototypes, which has not yet been approved under a separate license.¹²⁶ The testing of the Starship and Super Heavy rockets is clearly intertwined with the proposed action. Indeed, the BA specifies that these tests are the foundation for the development and operational phases of the project, since it can only move forward after the testing phase has been completed.¹²⁷ Therefore, the testing phase of the Starship and Super Heavy rockets *must* be included with the analysis of the development and operational phases in order to comply with NEPA and the ESA. Since the prior NEPA and ESA analyses were for the falcon rockets, the FAA cannot rely on those documents to fulfill their duty under these bedrock environmental laws.

Several other related actions that must be considered in these NEPA and ESA analyses were ignored by the FAA. For example, while the BA acknowledges that Starship and Super Heavy rockets would be delivered by barge to the Port of Brownsville, there is no discussion of the

¹²⁴ EPA April 7, 2021 Letter.

¹²⁵ See 40 C.F.R. § 1508.25 (providing that under NEPA, “connected actions” should be discussed in the same EIS). Connected actions must be considered in a single EIS even under the NEPA regulations promulgated by the Trump Administration. See 85 Fed. Reg. 43304, 43322 (stating that 40 C.F.R. §§ 1501.9(e) and 1502.4(a) providing that agencies must evaluate, in a single EIS, proposals or parts of proposals that are related closely enough to be, in effect, a single course of action). See also 50 C.F.R. § 402.02 (the “effects of the action” include all consequences to listed species caused by the proposed action, including the consequences of other activities that are caused by the proposed action); See *ESA Handbook* at 4-27 (directing agencies to apply a “but for” test to determine whether actions are interdependent or interrelated); see also *Ctr. for Biological Diversity v. BLM*, 698 F. 3d 1101, 1113 (9th Cir. 2012) (same).

¹²⁶ See BA at 8.

¹²⁷ *Id.*

impacts of that barge, including potential collisions with listed turtles and marine mammals. Similarly, the FAA does not include any analysis of the LNG and methane fuels that would be needed for the proposed launches, including impacts from fracking and transporting the fuel to Boca Chica. It is our understanding that this project will require the installation of a pipeline through the LRGV to transport LNG to the site, which was not discussed in the DPEA or BA. The FAA also seems to have ignored work by Mountain Valley Electric Cooperative to realign and upgrade a powerline from East Brownsville to the Boca Chica Beach area, intended to serve SpaceX.¹²⁸

All of these connected, interrelated and/or interdependent components of the SpaceX project must be analyzed within the DPEA and BA. The failure to do so is a blatant violation of the ESA and NEPA.

V. FAA has failed to show compliance with Section 4(f) of the Transportation Act

Because the operation of the Boca Chica facility for SpaceX rocket launches will result in intense noise and light pollution in adjacent National Wildlife Refuge lands – in particular, the Boca Chica Tract of the Lower Rio Grande Valley NWF – the action will result in a “constructive use” of refuge lands, subjecting FAA to Section 4(f) of the Department of Transportation Act.¹²⁹ The Section 4(f) regulations specifically “require rigorous exploration and objective evaluation of alternative actions that would avoid all use of Section 4(f) properties...that would avoid some or all adverse effects.”¹³⁰ Furthermore, 23 U.S.C. § 138 precludes the FAA from approving a program or project unless there is no feasible and prudent alternative to the using that land and the action includes all possible planning to minimize harm to the refuge.

Here, the FAA has not shown that these requirements have been met. It makes no effort to show that there is no prudent alternative to the Boca Chica site or alternative ways to utilize the site to reduce the impacts to the adjacent refuge lands. Regardless, even if expansion of that site were the only available alternative, the FAA must still consider the impacts to the refuge lands from SpaceX activities in the context of the Refuge’s purpose. The LRGV NWR, and the national Refuge System in general, maintains the biological integrity, diversity and environmental health

¹²⁸ <https://www.fws.gov/nwrs/threecolumn.aspx?id=6442470706>. See also email from Bryan Winton dated Feb. 4, 2021 (confirming that the Mountain Valley Electric Coop line is intended to serve SpaceX, and that the proposed line may adversely affect land administered by FWS) (attached hereto).

¹²⁹ Based on the Section 4(f) definitions, a “constructive use” occurs when there is “a temporary occupancy of land that is adverse in terms of the statute’s preservation purpose” or when “a project’s proximity impacts are so severe that the protected activities, features, or attributes of a property are substantially impaired.”

¹³⁰ OEPC Section 4(f) Handbook, 23 C.F.R. § 774.

of natural resources for the benefit of present and future generations of Americans.¹³¹ The LRGV was established in 1979, as a long-term program of acquiring lands to protect and restore the unique biodiversity of the Lower Rio Grande Valley of Texas. The stated purposes and legislative authorities for this Refuge are “for the development, advancement, management, conservation, and protection of fish and wildlife resources...”¹³² Using these lands as a sacrificial debris field when blowing up gigantic rockets would seem incompatible with the area’s intended use for conservation.

According to FWS, SpaceX’s use of the Boca Chica site has already resulted in “adverse” and even “severe” impacts to public use, management, wildlife, and habitat on refuge lands, with FWS going so far as to state that “Due to operations by SpaceX, the FWS’s ability to maintain the biological integrity, diversity and environmental health of Refuge resources, as well as our ability to ensure the viability of the six wildlife-dependent recreational uses, has been significantly diminished at the Boca Chica tract.”¹³³ These impacts certainly rise to the level of a substantial impairment and thus constitute a “constructive use,” as defined under Section 4(f); Yet, FAA has failed to address the Section 4(f) factors in its DPEA.

FAA must therefore undertake a new or supplemental analysis to provide the required “rigorous exploration” of alternatives to avoid the impacts to refuge lands and must ensure that SpaceX is undertaking all possible mitigatory actions to minimize harm to the adjacent wildlife refuge lands. As set forth above, it is readily apparent that FAA has failed to ensure that SpaceX considered all alternatives and will implement all reasonable mitigation at the Boca Chica site – including, for example, lighting and noise restrictions to protect birds and turtles as well as purchasing conservation lands to offset impacts from SpaceX activities – and therefore as proposed the action does not meet the requirements of Section 4(f).

VI. The Project Will Violate the National Wildlife Refuge System Improvement Act of 1997

The National Wildlife Refuge System is managed pursuant to the National Wildlife Refuge System Administration Act of 1966, Pub. L. No. 89-669, 80 Stat. 926 (1966), as amended by the National Wildlife Refuge System Improvement Act of 1997, Pub L. No. 105-57, 111 Stat. 1252 (1997) (“Refuge Act”). The primary Mission of the National Wildlife Refuge System is to administer lands and waters for the conservation of fish, wildlife, and plant resources and their habitats for the benefit of present and future generations of Americans.¹³⁴ To achieve the mission of the System, the Refuge Act sets forth one of the strongest legislative mandates for ecosystem protection on public lands and waters, directing the Service to “ensure that the biological

¹³¹ National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee.

¹³² 16 U.S.C. § 742f (a)(4).

¹³³ FWS Jan. 22, 2021 Letter.

¹³⁴ 16 U.S.C. § 668dd(a)(2).

integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans.”¹³⁵

To accomplish that mission, the law creates a presumption against public use,¹³⁶ and under subsection (d) of the Refuge Act the Service may only permit the use of refuge lands if it determines that such uses are “compatible with the purposes for which these areas are established.”¹³⁷ The Service therefore cannot “permit a new use . . . or expand, renew, or extend an existing use” without first determining whether that use is compatible.¹³⁸ For a use to be “compatible” it must be “a wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the [Service], will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge.”¹³⁹

SpaceX is proposing to use the adjacent refuge lands as a sacrificial debris field and is preventing FWS and the public from accessing important refuge areas, which is clearly an incompatible use. FWS has, in fact, explicitly stated that its “ability to maintain the biological integrity, diversity and environmental health of Refuge resources” has been significantly diminished at the Boca Chica tract,” because SpaceX operations prevent and constrain public access year-round, “hampering biological and monitoring studies including sea turtle patrols, sea turtle cold-stunning responses, [and] hampering refuge management and law enforcement patrol. . . .”¹⁴⁰ Once again, according to FWS these limitations have caused “both ‘*adverse*’ and ‘*severe*’ impacts to Refuge public use, management, wildlife, and habitat.”¹⁴¹ And while the Refuge Improvement Act prioritizes wildlife-dependent recreational uses of refuges (if they are deemed compatible) over other types of uses, such as economic uses,¹⁴² clearly SpaceX (a commercial operation) is interfering with priority recreational uses by forcing closures of the refuge during rocket launches.

FAA, however, has failed entirely to show that the SpaceX activities it is considering are consistent with these legal requirements, and it does not appear possible for it to do so. The Refuge Act requires the Service to administer the System to “ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans.”¹⁴³ However, the Service has explicitly stated: “Due to operations by SpaceX, the FWS’s ability to maintain the biological integrity, diversity and

¹³⁵ *Id.* § 668dd(a)(4)(B).

¹³⁶ 50 C.F.R. § 25.21(a).

¹³⁷ 16 U.S.C. § 668dd(d)(1)(B).

¹³⁸ *Id.* § 668dd(d)(3)(A)(i).

¹³⁹ *Id.* § 668ee(1).

¹⁴⁰ FWS Jan. 22, 2021 Letter.

¹⁴¹ *Id.*

¹⁴² 16 U.S.C. 668dd(a)(3)(C).

¹⁴³ 16 U.S.C. § 668dd(a)(4)(B).

environmental health of Refuge resources... has been significantly diminished at the Boca Chica tract.”¹⁴⁴ The proposed action is therefore inconsistent with the requirements of the Refuge Act. If the FAA were to authorize the action under these circumstances this is yet another reason why the agency’s decision would be arbitrary and capricious and contrary to law.

VII. The Project must obtain a permit for take under the Migratory Bird Treaty Act

In 1918, Congress enacted the Migratory Bird Treaty Act (MBTA) to implement a treaty for the protection of migratory birds between Great Britain (on behalf of Canada) and the United States. The objective of the treaty was to create a “uniform system of protection” to “insur[e] the preservation of such migratory birds,” because “a lack of adequate protection” for many migratory birds traveling through the United States left them vulnerable to extinction.¹⁴⁵ The MBTA has helped restore countless populations of birds once on the path to extinction, such as sandhill cranes, snowy egrets, and wood ducks. In fact, the Supreme Court has described the purpose of the MBTA as a “national interest of very nearly the first magnitude.”¹⁴⁶

As a “conservation statute[] designed to prevent the destruction of certain species of birds,”¹⁴⁷ the MBTA protects more than 1,000 species of birds found in the United States.¹⁴⁸ Under this law:

[u]nless and except as permitted by regulations . . . it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, [or] kill . . . any migratory bird [or] any part, nest, or egg of any such bird . . . included in the terms of the conventions¹⁴⁹

Although the Trump Administration adopted an interpretation of the MBTA that eliminated liability for “incidental” take and killing of migratory birds—at variance with decades of prior practice and policy—that interpretation was emphatically rejected by a federal court.¹⁵⁰ Accordingly, the Interior Department and FWS have recently completed a rulemaking that formally revokes the Trump Administration interpretation and reinstates the prior understanding of the statute, pursuant to which the foreseeable incidental take of migratory birds cannot proceed without formal authorization from the FWS.¹⁵¹

¹⁴⁴ FWS Jan. 2021 Letter at 2-3.

¹⁴⁵ Convention for the Protection of Migratory Birds, 39 Stat. 1702 (Aug. 16, 1916).

¹⁴⁶ *Missouri v. Holland*, 252 U.S. 416, 435 (1920).

¹⁴⁷ *Andrus v. Allard*, 444 U.S. 51, 52 (1979).

¹⁴⁸ See 50 C.F.R. § 10.13.

¹⁴⁹ 16 U.S.C. § 703(a).

¹⁵⁰ See *Natural Res. Def. Council v. U.S. Dep’t of the Interior*, 478 F. Supp. 3d 469 (S.D.N.Y. 2020).

¹⁵¹ See 86 Fed. Reg. 54643 (Oct. 4, 2021).

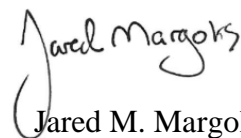
Here, there is little doubt that the proposed activities may foreseeably kill or take migratory birds. Indeed, the FWS in a Jan. 22, 2021, letter explained that “[o]n three separate occasions in 2020, rocket launch failures resulted in explosions and the spread of debris on and off Refuge lands” and that “[v]ideos of these events show evidence of different species of birds being impacted by the blast.” Although the FWS could not ascertain what species of migratory birds and/or birds listed as threatened or endangered under the ESA were harmed or harassed,” the Service found that “[t]here is documented evidence that the debris and its removal has impacted and scarred various habitats in the area, including tidal flats which are foraging habitat for the threatened piping plover and red knot.”

There is, therefore, a strong likelihood that the extensive activities in migratory bird habitat that are contemplated here—especially if undertaken during the breeding season—will result in the mortality and taking of migratory birds. For this reason, it would be unlawful for FAA to authorize the activities to proceed in the absence of authorization from the FWS pursuant to the MBTA.

VIII. Conclusion

For the foregoing reasons, the FAA has failed to comply with NEPA, the ESA, the Transportation Act, the Refuge Act, and the Migratory Bird Treaty Act. SpaceX’s activities at the Boca Chica site continue to have undue adverse impacts on surrounding habitat and the wildlife that relies on those areas, including federally protected species, and those impacts have not been adequately analyzed by FAA or mitigated by SpaceX. Please contact me if you have any questions regarding these comments.

Sincerely,



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