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STAFF REPORT: REGULAR CALENDAR

Consistency Determination No. CD-0003-24

Applicant: Department of the Air Force – U.S. Space Force

Location: Vandenberg Space Force Base (VSFB), Santa Barbara County

Project Description: Increase in Space Exploration Technologies Corporation's (SpaceX) Falcon 9 launch activities at VSFB from six to 36 per year as well as the addition of offshore landing locations in the Pacific Ocean.

Staff Recommendation: Objection

SUMMARY OF STAFF RECOMMENDATION

On May 5, 2023, the Executive Director of the Commission concurred¹ with a negative determination (Negative Determination No. ND-0009-23) by the Department of the Air Force (DAF), U.S. Space Force for the proposed expansion of the Space Exploration

¹ The Energy, Ocean Resources and Federal Consistency Deputy Director reported the concurrence at the June 2023 Commission hearing.

Technologies Corporation's (SpaceX) Falcon 9 space program. The SpaceX program's expansion included increasing launch activities from an existing launch complex at Vandenberg Space Force Base (VSFB) from six to 36 per year as well as carrying out up to 12 landings per year of the rocket's first stage at a second existing launch complex at VSFB, associated payload and rocket processing activities and the addition of offshore landing locations in the Pacific Ocean.

Shortly after the Executive Director's concurrence with DAF's ND-0009-23, Commission staff learned through discussions with staff from Santa Barbara County's Parks and Recreation Department that the number of temporary closures and evacuations of the beach and campground at Jalama Beach due to SpaceX launches within the first seven months of the year had already surpassed the annual maximum that DAF committed not to exceed in its negative determination. Further, Commission staff learned that public coastal access and recreation at Jalama Beach was being affected by more than just the temporary closure and evacuation of the beach and campground and that SpaceX and not DAF was directing Santa Barbara County to close the park and beach.

Commission and DAF staff worked collaboratively to understand and develop an approach to resolve these issues and, consistent with that approach, on December 15, 2023, the Commission approved a resolution² "re-opening" the Executive Director's prior concurrence³ by finding that the original negative determination made by DAF for the subject SpaceX launch activity was no longer applicable to the project as it was being carried out. The way the project was being carried out was substantially different than what DAF had originally described in its negative determination and, as a result, was adversely affecting coastal resources.

After receiving notification of the Commission's action to "re-open" the Executive Director's prior concurrence and receiving the Executive Director's letter requesting remedial actions, DAF prepared and submitted a consistency determination (CD) on March 7, 2024. The project described in the CD is the same as what was in the prior negative determination but it also includes a variety of measures to offset the adverse impacts to access and recreation that have been occurring.

Commission staff reviewed the information in the CD submittal, prepared a staff report, and added the project to the Commission's April 2024 meeting agenda. The Commission staff report for that hearing recommended that the Commission conditionally concur with the CD. However, subsequent to posting that staff report for public review, members of the public raised concerns regarding sonic booms generated during launches and their effects on coastal areas in Santa Barbara and Ventura

² This was presented to the Commission at the December 2023 Commission hearing.

³ Under the Coastal Zone Management Act's federal consistency regulations, 15 CFR § 930.45, federal consistency review may be revisited in several circumstances, including where a project was "Previously determined not to be a Federal agency activity affecting any coastal use or resource, but which the State agency later maintains is being conducted or is having an effect on any coastal use or resource substantially different than originally described and, as a result, the activity affects any coastal use or resource and is not consistent to the maximum extent practicable with the enforceable policies of the management program."

Counties. This aspect of SpaceX launch operations was not previously acknowledged or evaluated by DAF or included in its consistency determination or the NEPA Supplemental Environmental Assessment prepared to support it. During the April Commission meeting, additional questions and concerns were raised by the public and the Commission about the scope of effects on coastal resources from SpaceX launches and landings and the appropriateness of reviewing them as “federal agency activities,” as proposed by DAF. In order to provide more time for these issues to be evaluated further, the Commission voted unanimously to continue its consideration of the project to a future meeting and DAF provided an extension of the consistency determination review period.

Following the April 2024 meeting, DAF provided a briefing on operation of Vandenberg Space Force Base to the Commission on May 10, 2024, and submitted additional information on SpaceX activities to Commission staff on May 14th and 17th. However, significant questions about the proposed project and its coastal effects remain – particularly regarding the extent, severity, frequency and effects of sonic booms generated during launches - and as of the date of this staff report, DAF has not provided all of the information necessary for the Commission to determine whether the proposed project is consistent with the enforceable policies of the California Coastal Management Program (CCMP). Additional necessary information includes, but is not limited to: why the proposed SpaceX launches should be considered a federal agency activity; specifics on what areas are being affected by sonic booms and how; what sensitive species and habitats are known to inhabit these areas and how they are being affected; how the results of biological monitoring efforts support DAF’s conclusions that SpaceX launches are not adversely affecting sensitive species and habitats; if the proposed marine debris program is effectively mitigating for the amount and type of debris generated from launches; and if the type and intensity of artificial night lighting at the launch complex is adversely affecting sensitive species and habitats. A complete list of the information deemed necessary for the Commission to complete its consistency evaluation is included in Section III.B below. A complete list of the information deemed necessary for the Commission to complete its consistency evaluation is included in Section III.B below.

Given the absence of this information, the staff recommends the Commission object to DAF’s consistency determination, finding that DAF has not provided sufficient information to enable the Commission to determine the proposed project’s consistency with Sections 30230, 30231, 30234.5 and 30240 of the Coastal Act.

The motion and resolution are on page 5. The standard of review is the enforceable policies of the CCMP, consisting of the policies of Chapter 3 of the Coastal Act.

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I. FEDERAL AGENCY'S CONSISTENCY DETERMINATION

Space Launch Delta 30 of the United States Department of the Air Force (DAF), United States Space Force, has determined the project is consistent to the maximum extent practicable with the California Coastal Management Program (CCMP).

II. MOTION AND RESOLUTION

Motion:

*I move that the Commission **concur** with Consistency Determination CD-0003-24 on the grounds that the project described therein would be fully consistent, and thus consistent to the maximum extent practicable, with the enforceable policies of the CCMP.*

Staff recommends a **NO** vote on the forgoing motion. Failure of this motion will result in an objection to the determination of consistency, and adoption of the following resolution and findings. An affirmative vote of a majority of the Commissioners present is required to pass the motion.

Resolution:

*The Commission hereby **objects to** Consistency Determination CD-0003-24 made by the DAF for the proposed project, finding that the consistency determination does not supply sufficient information to determine if the project is consistent to the maximum extent practicable with the enforceable policies of the California Coastal Management Program.*

III. APPLICABLE LEGAL AUTHORITIES

A. STANDARD OF REVIEW

The federal Coastal Zone Management Act ("CZMA"), 16 U.S.C. § 1451-1464, requires that federal agency activities affecting coastal resources be "carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs." Id. at § 1456(c)(1)(A). The implementing regulations for the CZMA ("federal consistency regulations"), at 15 C.F.R. § 930.32(a)(1), define the phrase "consistent to the maximum extent practicable" to mean:

...fully consistent with the enforceable policies of the management programs unless a full consistency is prohibited by existing law applicable to the Federal agency.

This standard allows a federal activity that is not fully consistent with California's Coastal Management Program ("CCMP") to proceed, if full compliance with the CCMP would be "prohibited by existing law." In its consistency determination, the DAF did not argue that full consistency is prohibited by existing law or provide any documentation to

support a “maximum extent practicable” argument. Therefore, there is no basis to conclude that existing law applicable to the Federal agency prohibits full consistency. Since the DAF has raised no issue of practicability, as so defined, the standard before the Commission is full consistency with the enforceable policies of the CCMP, which are the policies of Chapter 3 of the Coastal Act (Cal. Pub. Res. Code §§ 30200-30265.5).

B. OBJECTION BASED ON LACK OF INFORMATION

The federal consistency regulations (15 CFR § 930.43) provide for state agency objections based on lack of information, as follows:

§ 930.43 State agency objection.

...

(b) If the State agency’s objection is based upon a finding that the Federal agency has failed to supply sufficient information, the State agency’s response must describe the nature of the information requested and the necessity of having such information to determine the consistency of the Federal agency activity with the enforceable policies of the management program.

(c) State agencies shall send to the Director a copy of objections to Federal agency consistency determinations.

(d) In the event of an objection, Federal and State agencies should use the remaining portion of the 90-day notice period (see § 930.36(b)) to attempt to resolve their differences. If resolution has not been reached at the end of the 90-day period, Federal agencies should consider using the dispute resolution mechanisms of this part and postponing final federal action until the problems have been resolved. At the end of the 90-day period the Federal agency shall not proceed with the activity over a State agency’s objection unless:

(1) the Federal agency has concluded that under the “consistent to the maximum extent practicable” standard described in section 930.32 consistency with the ‘enforceable policies of the management program is prohibited by existing law applicable to the Federal agency and the Federal agency has clearly described, in writing, to the State agency the legal impediments to full consistency (See §§ 930.32(a) and 930.39(a)), or

(2) the Federal agency has concluded that its proposed action is fully consistent with the enforceable policies of the management program, though the State agency objects.

(e) If a Federal agency decides to proceed with a Federal agency activity that is objected to by a State agency, or to follow an alternative suggested by the State

agency, the Federal agency shall notify the State agency of its decision to proceed before the project commences.

As described above, if the Commission's objection is based on lack of information, the Commission must identify the information necessary for it to assess the project's consistency with the CCMP.

Procedural Issues

Lack of Information Supporting DAF's Assertion that the Proposed Project is a Federal Agency Activity

Upon further review of relevant public information, Space Force's CD lacks adequate information to support its position that SpaceX's proposed project is a federal agency activity. The CZMA regulations define "federal agency action" as the following:

...any functions performed by or on behalf of a Federal agency in the exercise of its statutory responsibilities. The term "Federal agency activity" includes a range of activities where a Federal agency makes a proposal for action initiating an activity or series of activities when coastal effects are reasonably foreseeable, e.g., a Federal agency's proposal to physically alter coastal resources, a plan that is used to direct future agency actions, a proposed rulemaking that alters uses of the coastal zone....

(Title 15 Code of Federal Regulations, section 930.31, subd. (a).)

Since it is undisputed that SpaceX is not part of the federal government and thus would not be performing its launches as a federal agency, the only option for SpaceX's launch cadence to qualify as a federal agency activity is if SpaceX is performing its launches "on behalf of" Space Force. There is no definition of what it means to perform a function "on behalf of a Federal agency in the exercise of its statutory responsibilities" in the CZMA or its regulations. Thus, turning to the usual and ordinary meaning of the term is appropriate to interpret the provision. Blacks Law Dictionary defines "on behalf of" as "acting in the place of someone else."⁴ An agency relationship is established when someone (agent) acts on behalf of a government entity (principal), where "the principal becomes responsible for the acts of the agent, and the agent's acts are like those of the principal."⁵ Thus, under agency law, a principal becomes liable for its agent's actions. Therefore, to establish that SpaceX's launch and landing activities are a federal agency activity, Space Force must demonstrate that SpaceX is performing all its launch activities on behalf of the Space Force and that Space Force is responsible and accepts liability for all of SpaceX's launch activities at VSF.

Space Force's position that SpaceX's increased launch cadence to 36 launches per year is a function performed on behalf of Space Force is not supported by substantial

⁴ <https://thelawdictionary.org/on-behalf-of/>.

⁵

<https://dictionary.law.com/default.aspx?selected=2370>
<https://thelawdictionary.org/on-behalf-of/>.

evidence. Based on Commission staff's review, a very small fraction of SpaceX's total of 394 launches carried out in the U.S. over the past several years between its Falcon 9, Falcon Heavy and Dragon rockets/spacecraft have served Department of Defense ("DOD") contracts.⁶⁷⁸ This is true of launches from VSF as well, with only between 9 and 14 of the 71 SpaceX launches that have occurred between 2018 and June of 2024 identified as carrying U.S. government payloads, based on detailed launch and payload information provided by SpaceX on its website. In fact, the vast majority of SpaceX launches from VSF are to place SpaceX's expanding "Starlink" satellite constellation into orbit. This coordinated network of thousands of low Earth orbit satellites supports SpaceX's subscription-based satellite internet business⁹ as well as its partnership with cellular carrier T-Mobile to provide "direct to cellular" satellite-supported phone service worldwide¹⁰. As of May 2024, there are over 8,400 active satellites in orbit around the Earth, over 5,800 of which are owned by SpaceX and included within its Starlink system.¹¹ SpaceX currently has more active satellites in space than every other company (and country) combined and is moving at an accelerating pace to further establish its business advantage in this area. The typical SpaceX launch from VSF is used to place between 20 and 50 additional Starlink satellites into orbit.

Although DAF has stated that it also uses SpaceX's Starlink system and SpaceX occasionally launches DOD satellites into orbit, it has not submitted its contracts with SpaceX to Commission staff to support its position that SpaceX's operations are not a commercial enterprise and are instead a federal agency activity. Commission staff were able to find, however, that the Department of Defense (DOD) lists contracts between it and private companies on its website.¹² Based on a search of the DOD website for contracts with SpaceX,¹³ the last original contract (there have been modifications to older launch contracts after 2020) posted on the website between the Space Force and SpaceX for detailed launch services occurred in December 2020 for two launches from VSF, with final performance of the contract due by March 2023.¹⁴ On August 7, 2020, Space Force contracted with SpaceX for unknown amounts of launches between fiscal year 2022 and fiscal year 2027.¹⁵ Based on news reports, SpaceX and the Space Force entered into an agreement in October 2023 whereby SpaceX reportedly agreed to provide 10 launch missions for the Space Force between 2023 and 2026.¹⁶ The report of the 10 launch missions did not indicate if the launches will occur at VSF or in Florida

⁶ <https://www.spacex.com/vehicles/falcon-9/>.

⁷ <https://www.spacex.com/vehicles/falcon-heavy/>.

⁸ <https://www.spacex.com/vehicles/dragon/>.

⁹ <https://www.starlink.com/>

¹⁰ <https://www.t-mobile.com/news/un-carrier/first-spacex-satellites-launch-for-breakthrough-direct-to-cell-service-with-t-mobile>

¹¹ Based on the database maintained on this site, the total number of active Starlink satellites in May 2024 may exceed 6,000: <https://planet4589.org/space/con/star/stats.html>

¹² <https://www.defense.gov/News/Contracts/>.

¹³ <https://www.defense.gov/News/Contracts/StartDate/2015-05-27/EndDate/2024-05-31/?Search=%22Space+Exploration+Technologies%22>.

¹⁴ <https://www.defense.gov/News/Contracts/Contract/Article/2460438/>.

¹⁵ <https://www.defense.gov/News/Contracts/Contract/Article/2305454/>.

¹⁶ <https://www.cnbc.com/2023/11/01/space-force-awards-spacex-ula-with-2point5-billion-for-21-launches.html>.

and Commission staff could not locate the contract announcement on the DOD website to confirm the launch location, thus it is possible that some launches under this contract will occur at the Cape Canaveral Space Force Station in Florida. Again based on news reports, SpaceX and the Space Force entered into an agreement that SpaceX will provide defense related satellite internet services under its Starshield program, for one year, from September 1, 2023 to September 30, 2024; there is no indication that this contract provides Space Force with launch services from SpaceX at VSF and Commission staff could not locate the contract announcement on the DOD website.¹⁷ The National Reconnaissance Office, which is an agency within the DOD¹⁸ but separate from the Space Force, has relied on SpaceX for three Falcon 9 launches from VSF since 2020.¹⁹ Thus, as shown above, based on staff's independent review of available public information, the Space Force has contracted for approximately 12 known launch services reported in its contracts with SpaceX (the August 7, 2020 contract did not disclose a launch number) out of SpaceX's total of 394 launches carried out in the United States over the past several years. Therefore, unless Space Force can demonstrate with additional information that it had control over SpaceX's other launches and all future SpaceX launches at VSF, Commission staff cannot recommend that the Commission find that SpaceX is acting on behalf of the Space Force by increasing its launch cadence and the increased cadence is, thus, a federal agency activity that warrants submittal of a Consistency Determination under the CZMA.

Space Force also has not submitted information that demonstrates that it takes full responsibility and accepts liability for all of SpaceX's launch activities at VSF as a principal in an agency relationship with SpaceX. Based on the contract from August 7, 2020, the Space Force and SpaceX entered a "firm-fixed-price, indefinite delivery requirements contract for launch service procurements." The December 2020 launch services contract is also a firm-fixed price contract. The Federal Acquisition Regulations (FAR), title 48 Code of Federal Regulations, section 16.202-1²⁰, define a "firm-fixed-price contract" as the following, in part:

A firm-fixed-price contract provides for a price that is not subject to any adjustment on the basis of the contractor's cost experience in performing the contract. This contract type places upon the contractor maximum risk and full responsibility for all costs and resulting profit or loss. (emphasis added)

Thus, based on the FAR provision, the firm-fixed price contract is one where the contractor assumes "maximum risk and full responsibility for all costs" which presumably includes the costs associated with failed launches. Additionally, in its Falcon Payload User's Guide, SpaceX confirms that "[a]s part of any Falcon launch service, SpaceX will: ... Secure third-party liability insurance for the launch (Note:

¹⁷ <https://www.space.com/spacex-starshield-space-force-contract>.

¹⁸

https://www.nro.gov/Portals/135/Documents/10026_NRO_One_Pager_March2023.pdf?ver=DDEkGKAg5w2v3XkUAVCvFA%3d%3d.

¹⁹ <https://www.nro.gov/Launches/launches/#launch-list>.

²⁰ https://www.acquisition.gov/far/part-16#FAR_16_202.

Customer retains responsibility for satellite insurance at all times).²¹ Finally, SpaceX has a Multiple Award Schedule (MAS) listed with the U.S. General Services Administration's Federal Acquisition Service.²² The MAS is like a services and product catalog for SpaceX customers where it offers launch and Starlink services to "US Government customers."²³ In fact, the first page of the MAS is an overview of the "Customer Information" describing SpaceX's offerings, pricing and terms for government agencies. Additionally, SpaceX has independently sought and received its own authorization from FAA for its increased launch cadence and from the Santa Barbara County Air Pollution Control District for its launch activities, including a June 6, 2023, authorization that covered modifications to the Falcon 9 launch cadence and increased tugboat/barge operations. As such, it appears that DAF is selectively deciding when to seek authorizations for SpaceX activities itself and when to avoid doing so. It appears that DAF is not applying a consistent standard and is instead approaching the Commission's review process differently from how other federal and local authorizations are addressed. Finally, the Federal Aviation Administration ("FAA") regulations that govern the licensing and permitting process for space launches requires customers and licensees/permittees reciprocally waive and release claims against each other and assume financial responsibility for its losses as a condition of each license or permit.²⁴ Therefore, based on the foregoing evidence, it appears that SpaceX assumes all liability and costs associated with its launch services and is not acting as an agent for the Space Force when it launches Falcon 9 rockets from VAFB.

Unlike the present situation, DAF has not proposed that it is a federal agency activity when other major defense contractors propose projects that support DOD contracts. Boeing is one of the top five defense contractors for the DOD, amounting to over \$14 billion dollars' worth of contracts to build aircraft and other equipment for the DOD in fiscal year 2022.²⁵ Boeing has consistently applied as the sole applicant for various projects throughout the United States even though it builds aircraft for the DOD. Even though the federal government has substantial contracts with Boeing,²⁶ based on a review of Boeing projects throughout the country to expand operations, the DOD has never been listed as an applicant. For example, Boeing proposed a specific plan to create four planning areas within its property in the City of Seal Beach.²⁷ Two of the four planning areas included nearly 1,000,000 square feet of light industrial use to support its operations. In 2003, the City of Seal Beach certified an EIR and approved Boeing's proposed development to expand its light industrial facilities at its Seal Beach campus.²⁸

²¹ <https://www.spacex.com/media/falcon-users-guide-2021-09.pdf>.

²²

<https://www.gsaelibrary.gsa.gov/ElibMain/contractorInfo.do?contractNumber=47QRAA21D007N&contractorName=SPACE+EXPLORATION+TECHNOLOGIES+CORP.&executeQuery=YES>.

²³

https://www.gsaadvantage.gov/ref_text/47QRAA21D007N/0Z91GP.3UZEBD_47QRAA21D007N_PRICE_LIST20240401.PDF, page 10.

²⁴ Title 14 Code of Federal Regulations section 440.17.

²⁵ <https://about.bgov.com/top-defense-contractors/>.

²⁶ See, generally, <https://www.defense.gov/News/Contracts/Search/boeing/StartDate/2000-01-01/>. List of dates where the DOD entered into a contract with Boeing since 2000.

²⁷ <https://ceqanet.opr.ca.gov/2002031015/2>.

²⁸ <https://ceqanet.opr.ca.gov/2002031015/3>.

In 2011, the Arlington County (Virginia) Board approved Boeing's application to build a new 453,000 square-foot regional headquarters facility in the County, where it houses Boeing's Defense, Space & Security business unit, which builds products subject to existing or past contracts between the DOD and Boeing.²⁹ In 2020, the City of Mesa (Arizona) approved a Boeing facility that will build advanced weapons for the DOD.³⁰ While this is a fraction of Boeing's projects over time throughout the country, there does not seem to be a trend where the DOD joins Boeing in its effort to expand operations even though DOD is a major contractor for Boeing products and services. There is good reason that the DOD is not the applicant for Boeing projects: the DOD contracts represent a fraction of Boeing's total global revenue (\$66.6 billion in FY 2022³¹ and \$77.79 billion in FY 2023³²) such that giving the DOD authority to dictate how, when and where it decides to expand operations could severely affect its business operations outside of DOD contracts. While SpaceX is not a public company that is required to publicly report its annual revenue, it is safe to assume that based on the few launches that DOD has contracted with SpaceX, the revenue from launch contracts with Space Force are a small fraction of the revenue from all 394 launches that SpaceX has performed as of May 28, 2024 and, thus, does not establish that it is authorized to dictate SpaceX's operations.

The Space Force can submit evidence that demonstrates that it controls all of SpaceX's non-DOD launch activities and SpaceX is acting as an agent for the Space Force/DOD to address the current information deficiencies to support that position. As it stands, however, based on existing public information disclosed above, Space Force has not demonstrated that it is a principal in an agency relationship with SpaceX to support its position that SpaceX's proposed launch cadence is a federal agency activity. Therefore, the Commission does not currently have an adequate evidentiary basis to find that a Consistency Determination is appropriate for SpaceX's proposed project.

Coastal Development Permit is Required for SpaceX Launch Activities Absent Additional Information Demonstrating that SpaceX Launch Activities are Performed on Behalf of Space Force

If Space Force is not able to submit additional information to support its position that SpaceX's proposed launch cadence is a federal agency activity, then SpaceX must submit a coastal development permit ("CDP") application to authorize its increased launch cadence; a failure to do so may result in an enforcement action against SpaceX if it commences development without a Commission-approved CDP. Section 30106 of the Coastal Act defines development as the following:

²⁹ https://www.washingtonpost.com/local/arlington-approves-new-boeing-regional-headquarters/2011/10/19/gIQAyGOnyL_story.html.

³⁰ <https://azbex.com/planning-development/boeing-plans-fabrication-center-in-mesa/>; https://www.themesatribune.com/business/boeing-s-phantom-works-opening-high-tech-facility-here/article_4607fe14-3602-11ed-884d-3fe4d783a591.html.

³¹ https://s2.q4cdn.com/661678649/files/doc_financials/2022/ar/boeing-2022-annual-reportvF.pdf, page 16.

³² https://s2.q4cdn.com/661678649/files/doc_financials/2023/ar/Boeing-2023-Annual-Report.pdf, page 5.

...on land, in or under water, the placement or erection of any solid material or structure; discharge or disposal of any dredged material or of any gaseous, liquid, solid, or thermal waste; grading, removing, dredging, mining, or extraction of any materials; change in the density or intensity of use of land, including, but not limited to, subdivision pursuant to the Subdivision Map Act (commencing with Section 66410 of the Government Code), and any other division of land, including lot splits, except where the land division is brought about in connection with the purchase of such land by a public agency for public recreational use; change in the intensity of use of water, or of access thereto; construction, reconstruction, demolition, or alteration of the size of any structure, including any facility of any private, public, or municipal utility; and the removal or harvesting of major vegetation other than for agricultural purposes, kelp harvesting, and timber operations which are in accordance with a timber harvesting plan submitted pursuant to the provisions of the Z'berg-Nejedly Forest Practice Act of 1973 (commencing with Section 4511).

As used in this section, "structure" includes, but is not limited to, any building, road, pipe, flume, conduit, siphon, aqueduct, telephone line, and electrical power transmission and distribution line.

As described in this report, SpaceX's increased launch activities change the intensity of use of land, discharge and dispose of gaseous, liquid, and solid waste at the launch site and in the ocean and changes the intensity of use of water, or of access thereto. First, increasing the launch cadence increases the intensity of use of the land at and around SpaceX's launch facilities. Second, the Falcon 9 launches release gaseous waste and liquid waste during launch activities and dispose of solid waste in the form of weather balloons and associated hazardous battery materials. Finally, SpaceX's increased launch cadence has changed the intensity of use of water or access to water because its launch activities have severely affected the public's access to coastal beaches including Jalama Beach, a highly used day and overnight lower cost recreational facility that is part of the Santa Barbara County Park system as well as to Surf Beach and Ocean Park.

The requirement that SpaceX submit a CDP application for its increased launch activities on federal property is consistent with the U.S. Supreme Court's opinion in *California Coastal Commission v. Granite Rock Company* (1987) 480 U.S. 572 ("*Granite Rock*").³³ In *Granite Rock*, the U.S. Supreme Court found that a private mining company conducting mining activities on National Forest lands was subject to the Commission's CDP jurisdiction even though the CZMA excludes federal lands from its definition of the coastal zone. In making its decision, the U.S. Supreme Court relied on the following

³³ In the past to support its position that private company launches at VSFB are federal agency activities, DAF cited to *Manchester Pacific Gateway LLC v. Coastal Commission* (2008), but that case is inapposite because it addressed whether the development at issue was on federal land and did not address the issue of what constitutes a federal agency activity, which is a separate inquiry under the CZMA. (See Exhibit 3) *Manchester* is also an unpublished District Court case and only applies to the specific facts and parties of that case; it does not bind future Commission decisions under different facts and involving different parties and does not affect the binding holding in *Granite Rock* regarding the Commission's authority over certain private development on federal lands.

factors: (1) Congress did not show an intent to preempt the Commission's CDP authority over plans for unpatented mining claims in statutory language governing the Forest Service's permitting process for mining in National Forests; (2) the Forest Service regulations did not expressly or implicitly preempt the Commission's CDP authority; (3) the Commission did not seek to determine basic uses of federal land but, rather, sought to impose environmental protection permit conditions on unpatented mining claims; (4) and the CZMA does not preempt the Commission's CDP jurisdiction over a private party's development occurring on federal lands.

Based on a review of Space Force's document of the relevant federal statutory and regulatory authority governing space launch activities that it submitted to the Commission (**Exhibit 4**), the federal space launch licensing law does not preempt the Commission's authority to require environmental protection conditions in a CDP for SpaceX's proposed launch cadence. Under the Commercial Space Launch Act of 1984 ("Space Launch Act"), the Federal Aviation Administration ("FAA") regulates the launch and re-entry of commercial space vehicles from the United States. As part of the licensing process, the FAA requires that space launch operators conduct space launches in a manner that "protect[s] the public health and safety, safety of property, and the national security and foreign policy interests of the United States."³⁴ The Space Launch Act does not contain language that implicitly or explicitly preempts the application of state authority that addresses environmental impacts from a licensee's proposed launch activities on federal land.

The FAA regulations governing licensing processes also do not demonstrate that state environmental protection laws are preempted by the licensing process. In fact, the regulations that govern Launch Licenses, Launch Site Operation, Launch and Reentry of a Reusable Launch Vehicle and Reentry Site Operation, all of which apply to SpaceX, only require the applicants to submit environmental information for National Environmental Policy Act ("NEPA") compliance purposes.³⁵ Requiring environmental information for NEPA purposes, however, does not create a preemptive effect on state environmental review. The Council on Environmental Quality has, in fact, acknowledged that a proposed action can "require a NEPA review as well as compliance with State or local environmental reviews."³⁶ The California Environmental Quality Act ("CEQA") has long recognized this fact and has regulations to achieve a streamlined process when a project triggers both CEQA and NEPA.³⁷ Therefore, based on staff's review of relevant space launch laws and regulations, there does not appear to be an expressed or implied intent in statutory or regulatory provisions that preempt California's application of environmental protection laws to the activities authorized under FAA's various launch licenses.

³⁴ 51 U.S. Code Section 50905, subd. (b)(2)(B).

³⁵ Title 14 Code of Federal Regulations sections 415.201, 415.203, 420.15, 431.91, 431.93 and 433.7.

³⁶ <https://ceq.doe.gov/laws-regulations/states.html>.

³⁷ Title 14 California Code of Regulations section 15170 provides: A Lead Agency under CEQA may work with a federal agency to prepare a joint document which will meet the requirements of both CEQA and NEPA. Use of such a joint document is described in Article 14, beginning with Section 15220.

Finally, given the lack of information detailed above regarding Space Force’s position that SpaceX launch activities are a federal agency activity, and in the absence of correcting this information deficiency, the Commission’s recourse to ensure that SpaceX’s proposed development will not impact the coastal environment is through the CDP process. Historically, the Commission has conditioned projects through a CDP process on VSFB and other military installations along the California coast to address projects’ impacts on the coastal environment. The Commission used the CDP process to review and approve private development projects on VSFB by several oil production companies (installation and modification to the Platform Irene oil and gas pipelines - CDP No. E-85-010 and associated amendments E-85-010-A1 and -A2) and Pacific Gas & Electric Company (transmission line installation and modification - CDP No. E-09-001-W). Similar examples from other federal properties such as Marine Corps Base Camp Pendleton include over a dozen CDPs issued by the Commission over the course of roughly 30 years to Southern California Edison for activities associated with the construction, operation and decommissioning of the San Onofre Nuclear Generating Station (SONGS). SONGS is located on a portion of the federal property of Marine Corps Base Camp Pendleton that is leased to Southern California Edison from the Department of the Navy. Similarly, the Commission would propose environmental protection conditions in its review of SpaceX’s proposed development and would not be “seeking to *determine* basic uses of federal land.”³⁸ (emphasis in original.) Therefore, given the foregoing, if Space Force does not further support its position that SpaceX’s proposed project is a federal agency activity subject to the CD process, SpaceX must submit a CDP application to the Commission to authorize the project and the standard of review will be all of the Chapter 3 policies of the Coastal Act.

Conclusion and Summary of Information Needs

At the current time, however, the Commission does not have the information necessary to determine that SpaceX’s proposed launch and landing operations are a “federal agency activity” and must therefore object to DAF’s consistency determination based on a lack of information.

As described further below, this is only one area in which DAF has not provided the Commission with the information it needs to evaluate the proposed project’s consistency with the CCMP. Sections IV C, D, E and F of this report below, detail how DAF’s consistency determination also lacks the information needed for the Commission to determine whether the proposed project is fully consistent with Sections 30230, 30231, 30234.5, and 30240 of the Coastal Act. To determine the project’s consistency with the CCMP, the following information is necessary:

1. Sonic Booms

- What coastal areas will be affected by sonic booms?
- What is the severity of sonic booms that will affect these areas?
- What is the frequency of sonic booms in these areas?

³⁸ *Granite Rock*, supra, 480 U.S. at p. 587.

- What sensitive species are known to inhabit or migrate within the area of the sonic boom footprint?
- How sensitive are those species to sonic booms?
- Are there any alternatives or mitigation measures available that could help to avoid or minimize adverse impacts to sensitive species? Has the DAF asked SpaceX to investigate vehicle design parameters to attenuate noise and sonic booms?
- How will the species and habitats within areas affected by sonic booms be impacted?
- What launch trajectories are responsible for the sonic booms that impact coastal areas in Santa Barbara, Ventura, and western Los Angeles Counties?
- Does VAFB/SpaceX have a plan for notifying the public of launches that will likely cause sonic booms?

2. **Marine Mammal Monitoring**

- How is the marine mammal monitoring report able to conclude that launches had no effect on pinnipeds when harbor seals are noted to repeatedly flush during launches and during one event four dead harbor seal pups were observed? Additionally, elephant seals are noted to lift their heads and move erratically in response to launches.
- How is the report able to make conclusions without statistical analysis of the changes in populations trends using the historic data that DAF has collected?
- How did the equipment failures affect the monitoring and conclusions drawn from monitoring?
- Why can't the project pursue a more cautious and measured increase in launch cadence?
- Is the updated National Marine Fisheries Service Letter of Authorization (LOA) officially incorporated into DAF's consistency determination and if so, how do the updated conditions, mitigation, monitoring, and reporting requirements of that LOA affect the project scope?
- What information is available to support the report's assertion that the abandonment of marine mammal haul out sites along the Vandenberg coast cannot be attributed to space launch and landing activities?
- How will the proposed increase in frequency and intensity of activities at Vandenberg Harbor associated with rocket transport affect the marine mammal haul outs located in adjacent areas?

3. **Marine Debris**

- Have the mitigation payments from the 2016 report been adjusted for inflation?
- How well does the mitigation plan, which was originally drafted to address possible failed landings of the first stage, address other types of debris from the project?
- How was the total SpaceX payment to the U.C. Davis Lost Fishing Gear Recovery Project of \$7,774 calculated and what poundage of marine debris is that sum intended to account for?

- How much marine debris has been released as a result of SpaceX launches at VSFB pursuant to the subject CD?
- How well does the mitigation plan account for the electronic hazardous waste released as a result of the project?

4. **Monitoring of ESHA**

- How does the monitoring of the proposed increase of launch cadence compare to the historic monitoring of sensitive species at VSFB?
- Why doesn't the monitoring incorporate statistical analysis of population trends to infer whether the increase in launch cadence is potentially affecting sensitive species?
- How effective is the sensitive species monitoring if doesn't include appropriate controls/reference populations outside the influence of launches and sonic booms? For instance, during the only launch when bioacoustic monitoring was conducted during the California Red Legged Frog breeding season, there were significantly more breeding calls per hour on average at the Fitness Center Drainage after the launch (31.4) compared to before the launch (7.8). What is the rationale for the conclusion that noise from the launch did not negatively affect breeding behavior based on calls per hour?
- Is the monarch butterfly grove adjacent to the SpaceX launch and landing site sensitive to the types of sounds and peak overpressures associated with the Falcon 9 launching and landing activity?
- Has any monitoring of monarch butterflies on VSFB occurred? How was this monitoring carried out and what does it show?

5. **Mitigation for Adverse Impacts to ESHA**

- How is predator control intended to mitigate for adverse impacts to western snowy plover and California least tern?
- If predators are already being driven out of the project area by launches, is alternative mitigation available to quantifiably offset adverse impacts to western snowy plover and California least tern? How would this be achieved?
- Where and how would additional bat habitat be created?
- Are there any mitigation measures available for monarch butterflies?

6. **Artificial Night Lighting**

- What type and intensity of artificial night lighting is used at SLC-4E and SLC-4W?
- At what times is lighting used and for how long?
- What potential impacts could artificial night lighting have on the surrounding environment (light trespass or spill, sky glow, and glare)?
- Has the base monitored/recorded the specific lighting levels on Surf Beach during night launches to account for anticipated increased illuminance within the adjacent areas expected from rocket flare?
- How could these impacts be adversely impacting sensitive species?

- What Best Management Practices (BMPs) could be applied to minimize the effect of artificial night lighting at SLC-4E and SLC-4W infrastructure as well as Falcon 9 flare?
- 7. Commercial and Recreational Fishing**
- How would rescheduling of launches affect NOTMARs and coordination with fishermen?
 - Why can't DAF ensure SpaceX avoids timing its launches to avoid peak fishing times or avoid peak fishing periods of the year?
 - How would the updated safety calculations benefit coordination with fishermen?
 - How would the real-time radio communications with fishermen be implemented?
 - What additional measures would be implemented if adverse impacts to fishing occur?
 - How many past scheduled SpaceX launches have been delayed or altered to avoid potential hazards to vessels?
- 8. Wetlands**
- Is a formal wetland delineation available from before vegetation management occurred in the Spring Canyon area? What species and habitats are currently present within this area?
 - What information was used to determine that restoration of 2.6 acres was sufficient to compensate for the loss of wetland habitat associated with the vegetation removal in Spring Canyon?

These information needs, including the reasons the information is needed to determine the project's consistency with the applicable Coastal Act policies, are described in greater detail in Sections IV D, E, F and G of this report below. To assist in identifying these information needs in the findings of the staff report they will henceforth be referenced using the numbers identified above. In summary, the information is needed to fully analyze the project under the marine resource (30230), Environmentally Sensitive Habitat Areas (30240), commercial and recreational fishing (30234.5), and marine biological resources (30231) policies of the Coastal Act.

C. DECISION OPTIONS AND NEXT STEPS

As described above, Commission staff is recommending that the Commission object to DAF's consistency determination based upon a finding that the Federal agency has failed to supply sufficient information to determine either that SpaceX's proposed project is a federal agency activity or, if the Commission finds that there is sufficient information to support Space Force's position that SpaceX's project as a federal agency activity, that there is a lack of information to determine the proposed project's consistency of the Federal agency activity with the enforceable policies of California's Coastal Management Program (CCMP). However, this is only two of five decision options available to the Commission. The Commission may also (1) object to DAF's consistency determination based upon a finding that the Federal agency activity is not consistent with the enforceable policies of the CCMP; (2) concur with DAF's consistency

determination based upon a finding that the federal agency activity is consistent with the enforceable policies of the CCMP; or (3) conditionally concur with DAF's consistency determination based upon a finding that certain conditions must be satisfied to ensure consistency with specific enforceable policies of the CCMP.

Next Steps

If the Commission accepts the staff recommendation and objects based on a lack of information, Commission staff would work with DAF directly to obtain the information necessary to determine that the project is a federal agency activity, and if that occurs, obtain information necessary to determine the project's consistency with the CCMP, evaluate it, and bring a revised recommendation to the Commission for its consideration at a future hearing. To date, DAF has worked collaboratively with Commission staff to try to find a path to achieve CCMP consistency and avoid a Commission objection and it is reasonable to assume this approach will continue.

However, as with all federal consistency objections, DAF would also have the option of concluding, despite the Commission's objection, that the SpaceX project is a federal agency activity and its CD is correct in finding the activity is fully consistent with the enforceable policies of the CCMP and could proceed without providing the identified information or seeking the Commission's concurrence. In this situation, Commission staff would continue to work with DAF to attempt to address the issues that resulted in the objection, including by suggesting and exploring project modifications, protective measures and mitigation that could allow the proposed activity's adverse impacts to coastal resources to be avoided, minimized and/or offset. Such efforts could be informal or include formal mediation facilitated by the Secretary of Commerce or the National Oceanic and Atmospheric Administration's Office for Coastal Management. Separately, the Commission could also explore legal options and/or additional administrative or regulatory approaches, including application of its Coastal Act authority for development activities carried out by SpaceX, to prevent those activities from occurring or helping to ensure they proceeded consistent with the Coastal Act/CCMP.

If the Commission were to agree that the proposed project is a federal agency activity and conditionally concur with the DAF consistency determination, it would need to identify the conditions which must be satisfied, provide an explanation of why the conditions are necessary to ensure consistency with specific enforceable policies of the CCMP, and acknowledge that if the conditions are rejected by DAF or not met, then all parties shall treat the conditional concurrence as an objection.

Finally, if the Commission were to simply concur with the DAF consistency determination, the proposed activity could proceed as described in that CD. Commission staff would continue to work with DAF to track the activity and its effects, however, in order to help ensure that they continued to be undertaken in a manner that is fully consistent with the CCMP. If activities previously determined to be consistent with the CCMP are later revealed to be conducted or have an effect on any coastal use or resource substantially different than originally described and, as a result, are no

longer consistent with the enforceable policies of the CCMP, the Commission may request that DAF take appropriate remedial action. Such remedial action may include supplemental Commission review and/or implementation of project modifications, protective measures, or mitigation.

D. FEDERAL LANDS EXCLUDED FROM THE COASTAL ZONE

Under the federal CZMA, the Commission is authorized to review federal agency activities and actions that occur within or outside of California's coastal zone and that affect any land or water use or natural resource of the coastal zone. However, the Coastal Zone Management Act (CZMA) excludes from its definition of the coastal zone "lands the use of which by law is subject solely to the discretion of or which is held in trust by the Federal Government." (15 USC 1453(1)). Thus, in cases such as this where a proposed federal agency activity that is being reviewed under the Commission's federal consistency authority is to be located on federal land under the sole control of the federal government, the Commission's CZMA review is limited to evaluating whether the activities will result in effects that extend outside of the federal property and will "spill over" into the coastal zone. For example, sonic booms from rocket launches such as those that result from the current project have been occurring outside of VSF. Marine mammals outside of VSF have been experiencing the sound and pressure effects from sonic booms which has resulted in startle responses and other behavioral changes, even though the space launch complex where launches would take place is located on the federal land of VSF. Potential spillover effects from sonic booms will be discussed in the subsequent findings sections of this staff report. As such, the Commission has the authority to review federal agency activities on federal property like VSF.

IV. FINDINGS AND DECLARATIONS

A. PROJECT DESCRIPTION

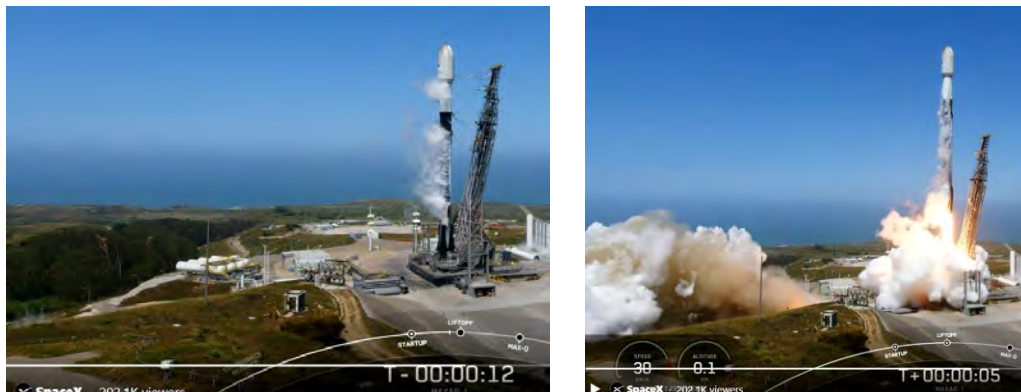
Launches

The proposed project would include launching the SpaceX Falcon 9 rocket from SLC-4E on VSF up to 36 times per year. The launches would follow a southerly trajectory between 140 and 210 degrees intended to deliver payloads to a specific polar and geostationary orbit. Depending on the trajectory and atmospheric conditions, the launches may result in as well as sonic booms affecting the counties of Santa Barbara, Ventura and Los Angeles. **Exhibit 4** provides a general estimate of the affected area but the Federal Aviation Administration and DAF are in the process of developing and refining predictive models and carrying out field verification to improve its accuracy. After launching the rocket, SpaceX would land the first stage either at VSF at SLC-4W or would land the first stage downrange on a dronship stationed offshore in the international waters of the Pacific Ocean. No more than a total of 12 first stage landings would occur at VSF on SLC-4W per year. These landings are also expected to generate sonic booms but due to the anticipated landing trajectory, the affected area would be limited to VSF and its immediate surroundings (as shown in **Exhibit 5**). Each

launch may be preceded by a static fire test of the engines lasting several seconds which would be conducted one to three days before the launch. The need to conduct a static fire test is mission dependent and there would be no more than 36 static fire events per year. Launch operations are proposed to occur at any time, day or night. Existing fueling, loading, launch and landing pad infrastructure at the SLC-4E and SLC-4W launch complexes on VAFB would be used to support SpaceX's proposed increase in launch frequency and no construction activities are proposed. All of the first stage processing protocols that SpaceX currently uses for launching rockets from SLC-4E would remain the same. However, the frequency of processing protocols would increase in order to support the increased launch frequency. The locations of the launch complexes are shown in **Exhibits 1 and 2**.

Vegetation Management

In order to avoid and minimize adverse impacts to nesting migratory birds within Spring Canyon from hot steam produced as a result of the deluge curtain, SpaceX has been removing vegetation within a 1.121-acre area of arroyo willow wetland habitat adjacent to the SLC-4E launch complex (the area adjacent to the launch pad on the left in which flame and steam is directed into in the before/after images below³⁹). Images of the steam are also included in **Exhibit 9**.



Some vegetation clearance has historically happened around the SLC-4E location, and Commission staff previously reviewed vegetation clearance up to 30 feet beyond the fence line (the Executive Director previously concurred that this amount of vegetation clearance would not result in new or additional adverse effects to coastal resources beyond what was included in CD-049-98 and ND-055-10). However, this vegetation management activity has expanded well beyond what was previously reviewed and concurred with. All of the first stage processing protocols that SpaceX currently uses for launching rockets from SLC-4E would remain the same. However, the frequency of processing protocols would increase in order to support the increased launch frequency. The locations of the launch complexes are shown in **Exhibits 1 and 2**.

³⁹ Images captured from video of May 2, 2024 SpaceX launch from SLC-4E, full video available at <https://twitter.com/i/broadcasts/1YqJDgypdRDGV>

Payload Fairing Recovery Operations

The Falcon 9 system includes a fairing to protect payloads until they can be delivered to their designated orbit. The fairings consist of two halves which separate to release the payload into space. After separating, the fairing halves would fall back to earth, and a built-in parachute system would slow the descent of each fairing and enable a soft splashdown so that the two halves can be recovered. The splashdown site would be outside of California's state waters and United States territorial waters. The parachute system consists of a drogue parachute and a parafoil which are approximately 110 sq. ft. and 3,000 sq. ft. in size, respectively.

SpaceX would attempt to recover both halves of the fairing after each launch using a salvage ship stationed in the area of the anticipated splashdown site. For safety reasons, the salvage ship could not be within 12 nautical miles of the splashdown site. Parachutes, parafoils, and their assemblies are made of Kevlar and nylon and would quickly sink once they become waterlogged after splashdown. SpaceX would attempt to recover all parafoils, but ocean conditions or weather conditions could prevent salvage operations from recovering the foil. As described in the CD, for the launches that took place in 2023 SpaceX was able to recover all fairing halves and approximately 75 percent of parafoils.

Weather Balloons

Prior to each launch, SpaceX would need to measure windspeeds in the landing area by releasing an average of six to ten weather balloons in order to create profiles of expected wind conditions during each landing. Each balloon unit would consist of a radiosonde, which is an instrument approximately the size of a shoebox powered by a 9-volt battery, attached to a weather balloon. The radiosonde would transmit data to SpaceX and the operating systems aboard the Falcon 9 rocket. The balloon is comprised of latex and would ascend to an altitude of 12 to 19 miles before the atmospheric pressures cause the balloon to burst. The balloon fragments and radiosonde would then fall back to earth and are assumed to land in the ocean. The radiosonde does not have a parachute and would not be recovered.

Landing

The SpaceX Falcon 9 rocket is reusable and includes a first stage section that would undergo a controlled descent and landing. Each landing of the first stage would occur either in the ocean atop the dronship offshore of Mexico or back at VSFb at SLC-4W, where it would produce a sonic boom that would affect VSFb and surrounding areas (as shown in the sonic boom estimate provided in **Exhibit 6**). Some payloads necessitate orbits or destinations which require additional transport from the first stage. In these instances, the use of additional propellant from the booster would prevent the first stage from being able to boost-back and land aboard the dronship or at VSFb. As such, first stages during these launches would be disposed of in the open ocean, outside of state and federal waters. These types of missions where the first stage is unable to boost back are rare and SpaceX has not done an expendable mission from VSFb since 2018, despite carrying out several dozen launches over that period. The CD submittal does not specify how many expendable missions may occur.

Booster Roll-On Roll-Off, Ground Operations, Support, and Transport

After salvage and landing operations are complete, any first stages, fairings and other materials would be transported via barge to the VSFB harbor. Transport would be accomplished via a “roll-on roll-off” (RORO) barge. The first stage would be transferred from the drone ship to SpaceX’s Self-Propelled Modular Transport (SPMT) that is positioned on a small, low draft barge. The first stage would be pulled by a tug using a Tier 3 (or higher) engine from the Port of Long Beach into the VSFB Harbor. A support tug would be launched from the Port of Hueneme and travel up the coast to assist the barge and primary tug in maneuvering into and out of the VSFB Harbor, the exact arrival time would depend on tide. On day two, the support tug would hotel (also known as berthing while producing in-port emissions while moored) at VSFB harbor for 24 hours. On day three, SpaceX would perform the RORO operation, requiring approximately 15 hours for the primary tug to execute the operation. The support tug would assist the operation, then hotel at the VSFB harbor for the remainder of the time. On day four, the support tug would remain hoteling at VSFB harbor for 24 hours. On day five, the support tug would travel back to the Port of Hueneme, with the exact departure time dependent on tide. The proposed project would include up to 36 events per year utilizing the RORO barge and tugs.

Once at the harbor, the rocket first stage, equipment and materials would be loaded onto trucks for transport back to processing facilities at VSFB. SpaceX would continue to use an existing fleet of specialized trucks for any overland transport of boosters and marine barges for transport of any boosters, fairings, and other materials.

To support the increased launch cadence, SpaceX would also add up to 100 personnel at VSFB.

B. OTHER AGENCY APPROVALS AND COORDINATION

United States Fish and Wildlife Service

DAF has completed a formal consultation with the U.S. Fish and Wildlife Service (USFWS) for federally listed species protected under the federal Endangered Species Act that may be affected by the proposed project. The Biological Opinion issued by the USFWS, dated April 24, 2023, found that the proposed project “may affect but is not likely to adversely affect” marbled murrelet, southern sea otter, California condor, unarmored threespine stickleback and tidewater goby. The USFWS further found that the proposed project is likely to adversely affect but would not likely jeopardize the continued existence of California red-legged frog, western snowy plover and California least tern. The USFWS made these determinations due to the protection and mitigation measures that DAF has agreed to implement. These protection and mitigation measures are provided in **Exhibit 7**. However, since the USFWS was not provided information on sonic booms occurring outside of VSFB and the Northern Channel Islands, the Biological Opinion issued did not analyze how sonic booms extending into Santa Barbara, Ventura, and western Los Angeles Counties might affect federally listed species.

National Marine Fisheries Service

DAF also consulted with the National Marine Fisheries Service (NMFS) regarding rocket and missile launches and aircraft operations at VSBF under the Marine Mammal Protection Act and received a Letter of Authorization (LOA) from NMFS in 2019. The LOA was valid for five years and allowed for up to 110 rocket launches annually across all launch facilities at VSBF. DAF indicates in its consistency determination that the proposed project falls within the scope of the activities covered by the LOA. Additionally, DAF has more recently consulted with the NMFS and completed Section 7 consultation. NMFS provided a Section 7 concurrence letter on January 20, 2023. On April 10, 2024, DAF received a LOA superseding the previous LOA. The new LOA is set to expire on April 9, 2029. DAF has not provided any information in its consistency determination regarding whether the proposed project falls within the scope of the activities covered by the new LOA. A copy of the previous LOA and the new LOA are included in **Exhibit 8**. Like the USFWS biological opinion, the NMFS was not provided information on sonic booms occurring outside of VSBF and the Northern Channel Islands. As such, the LOA does not include an analysis of how sonic booms extending into coastal Santa Barbara, Ventura, and western Los Angeles Counties might affect marine mammals in these areas.

Federal Aviation Administration

The Federal Aviation Administration (FAA) has a role in licensing commercial space launch operations and approving airspace closures for launch operations. FAA issues launch licenses that can cover multiple years of launches and can be modified as necessary. SpaceX has been launching Falcon 9 vehicles from SLC-4E under a launch license that was most recently modified on September 29, 2023. Based on discussions with FAA staff, it is Commission staff's understanding that the scope of activities authorized under this launch license are established by the associated document prepared by the U.S. Space Force (USSF) under the National Environmental Protection Act. In June of 2023, a Final Supplemental Environmental Assessment (SEA) was approved by FAA and USSF for an increase in SpaceX launches from VSBF from 12 to 36 per year.⁴⁰ As such, the launch license SpaceX received from FAA also covers this level of activity. However, it is unclear how the continuing lack of CZMA concurrence from the Commission for this activity and the absence of acknowledgement or evaluation in the SEA of the effects of launch-related sonic booms on the mainland coast of central and southern California may affect SpaceX's FAA license. Commission staff is continuing to explore these questions with FAA directly.

Regional Water Quality Control Board

Wastewater discharges that may occur during project activities, including accumulated stormwater and non-stormwater discharges, would continue to be managed in accordance with the Regional Water Quality Control Board (RWQCB) letter for

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https://www.faa.gov/space/environmental/nepa_docs/20230605_SpaceX_Falcon_9_VSBF_Cadence_Increase_FONSI_ROD.pdf

Enrollment in the General Waiver of Waste Discharge Requirements for SLC-4E Process Water Discharges.

Santa Barbara County Air Pollution Control District

The Santa Barbara County Air Pollution Control District (SBCAPCD) has locally adopted air emissions thresholds that are used to evaluate a project's impacts and applicable regulatory requirements under the District's rules and regulations. The project received two Authorities to Construct (ATC) on June 6, 2023, for the project's proposed increases in launch-related operations.

Tribal Outreach and Consultation

Pursuant to the National Historic Preservation Act and Section 106, DAF carried out government-to-government consultation with the Santa Ynez Band of Chumash Indians but did not receive an official response within the 30-day review period of CFR 800.3(c)4.

Consistent with the Commission's Tribal Consultation policy, Commission staff received a list of Tribes with potential cultural connections to the project area from the Native American Heritage Commission and completed outreach to those Tribes in March of 2024 after receipt of the DAF consistency determination. Consultation invitations were mailed to the Barbareño/Ventureño Band of Mission Indians, the Chumash Council of Bakersfield, the Coastal Band of the Chumash Nation, the Northern Chumash Tribal Council, the San Luis Obispo County Chumash Council, and the Santa Ynez Band of Chumash Indians.

Commission staff received a request for consultation from the Coastal Band of the Chumash Nation. Commission staff carried out this consultation with the Coastal Band of the Chumash Nation on Wednesday, March 27, 2024. Further discussion of this tribal consultation and potential project effects on cultural resources is available below in the Cultural Resources section of this report.

After the project was continued and rescheduled for the June 12, 2024, Commission meeting, Commission staff completed additional outreach to Tribes. Tribes contacted in May of 2024, include the Barbareño/Ventureño Band of Mission Indians, the Coastal Band of the Chumash Nation, the Northern Chumash Tribal Council, and the Santa Ynez Band of Chumash Indians. As of the date of this staff report Commission staff have not received any requests for additional consultation from the Tribes.

C. MARINE RESOURCES

Section 30230 of the Coastal Act states:

Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will

maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

Section 30231 of the Coastal Act states (in relevant part):

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through...controlling runoff, preventing depletion of ground water supplies and substantial interference with surface waterflow, [and] maintaining natural vegetation buffer areas that protect riparian habitats.

VSFB is located in unincorporated Santa Barbara County and encompasses 42 miles of coastline and an area of nearly 100,000 acres. The western side of VSFB is bordered by the Pacific Ocean. The Channel Islands National Marine Sanctuary (CINMS) is located approximately 40 miles south of the SLC-4 launch complex and the coastline adjacent to VSFB from Purisima Point to south of Point Arguello has been designated the Vandenberg State Marine Reserve.

There are approximately 14 marine mammal haul outs located along the VSFB coastline that are known to provide refuge for multiple species of pinnipeds including California sea lions (*Zalophus californianus*) and Pacific harbor seals (*Phoca vitulina*). More recently, increasing populations of northern elephant seals (*Mirounga angustirostris*) have been recorded at the haul outs. In addition to these species, the Channel Islands are known to support populations of northern fur seals (*Mirounga angustirostris*), more rarely Guadalupe fur seals (*Arctocephalus townsendi*) and Stellar sea lions (*Eumetopias jubatus*). Southern sea otters (*Enhydra lutris*) use habitat within the kelp beds located at the southern end of VSFB.

The Vandenberg State Marine Reserve (SMR) includes coves, rocky reefs, undersea pinnacles and sandy seafloor areas. Vandenberg SMR contains a variety of fishes, invertebrates, seabirds, and marine mammals typical of northern and central California⁴¹. Beyond the boundaries of VSFB and the Channel Islands, the area of the California coast and Pacific Ocean within the area of the launch trajectory includes the Santa Barbara Channel, and the coastal zones of Santa Barbara County, Ventura County, and western Los Angeles County. The Santa Barbara Channel (Channel) is known as a region of remarkably high biodiversity of marine organisms including marine mammals, seabirds, fish, invertebrates, plankton and algae. This high biodiversity is a result of the Channel being a transition zone between the cold nutrient rich waters of the California Current and the warmer waters of southern California⁴².

Notable areas along the Santa Barbara County coastline include Point Conception, where the California coast makes a dramatic turn to the east, the largely uninhabited Gaviota coastline, Devereux slough, Carpinteria marsh, and the Carpinteria harbor seal

⁴¹ <https://wildlife.ca.gov/Conservation/Marine/MPAs/Vandenberg>

⁴² <https://sbclter.msi.ucsb.edu/about/>

rookery. The Ventura County coastline includes the Ventura river estuary, the Santa Clara river estuary, Ormond beach and lagoon, and Mugu lagoon, that are of global importance for over 270 migratory bird species, including five endangered species. Southern Ventura County and western Los Angeles County include miles of coastline with rocky outcrops and reefs.

Sonic Booms

As described in the CD submittal, ascent of the rocket and each landing of the first stage, either in the ocean atop the drone ship or back at VSFB at SLC-4W, would produce a sonic boom. The original modeling and information provided to Commission staff stated that sonic booms during launch would be within a range of 1.0. to 5.0 pounds per square foot (psf). The hearing sensation of an overpressure of 1.0 to 5.0 psf is roughly equivalent to hearing a sound in the range of 128 to 140 decibels (dB). Based on the proposed southerly trajectory the footprint of the sonic booms during launches would only affect the Northern Channel Islands (Anacapa Island, San Miguel Island, Santa Cruz Island, and Santa Rosa Island). During boost back to SLC-4W the descent of the first stage would create a sonic boom between 2.0 and 5.0 psf that would extend approximately 10 miles from the landing pad (as shown in **Exhibit 6**). Originally, DAF recognized that although the modeling provided to Commission staff did not analyze other portions of the California coast outside of VSFB, certain unusual weather conditions could cause the sonic boom footprint to expand significantly to include other areas.

After publication of the staff report on March 28, 2024, for the April Commission meeting, a variety of public comments were received that strongly suggests that sonic booms were occurring much more frequently along the mainland coast during SpaceX launches and affecting areas far outside those identified in the initial modeling provided by DAF in its consistency determination and associated Supplemental Environmental Assessment. Multiple public comments submitted to the Commission for the April 10, 2024, hearing described experiencing sonic booms in Santa Barbara and Ventura County coastal communities and also inland Ventura County and western Los Angeles County, on the order of 100 miles from the launch site. The project was continued from the April 2024 hearing and tentatively rescheduled for the June 2024 hearing.

Although DAF initially rejected these comments and stated that no such sonic booms could be generated during launches that would affect the mainland coast, it has more recently carried out additional modeling and field verification that confirms the public comments received before and during the April Commission meeting on the full extent of the sonic booms generated from launch activities at VSFB. On May 17, 2024, DAF provided Commission staff with initial estimates from these recent modelling efforts. This is the first formal acknowledgement by DAF that sonic booms are indeed affecting Santa Barbara, Ventura and Los Angeles counties on a consistent basis and directly contradicts the information provided to Commission staff in the consistency determination. DAF also provided Commission staff with an explanatory document stating that:

The unique atmospheric conditions of the Central Coast, including the marine layer, add to the variance in sound levels experienced for each launch event. The marine layer results in a temperature inversion, which can cause sound waves to refract, or bend the sound waves back. Conditions such as cloud cover, fog, and rain attenuate sound waves as it passes through. Wind speed and direction also influence sound propagation. Thus, launch trajectories that may have historically occurred during the day can result in different levels of sound propagation when launched at nighttime, as atmospheric conditions can vary greatly between day and night.

Launches that have a southeasterly trajectory may result in the 'wings' of the sonic boom caused during the rocket's ascent to land in Santa Barbara, Ventura, and/or Los Angeles Counties...

DAF did additional sonic boom modeling with these atmospheric parameters and summarized the results of the modeling as follows:

In eastern Santa Barbara County, 15% of the model runs resulted in sonic booms and approximately 50% of these were less than 0.25 psf, pounds per square foot (psf) which is similar to distant thunder. Approximately 32.7% of the modeled sonic booms were between 0.25 and 1 psf. The highest predicted overpressure level was 2.13 psf, and 0.3% of the modeled booms were above 2 psf.

In Ventura County, 97% of the model runs predicted sonic booms and approximately 65% were less than 0.25 psf. Approximately 25.9% of modeled sonic booms were between 0.25 psf and 0.50 psf while 7.2% were between 0.5 psf and 1 psf. Approximately 1.4% of modeled sonic booms were above 1 psf and 0.04% were above 2 psf. The highest modeled overpressure level was 2.03 psf.

In Los Angeles County, 94% of model runs resulted in sonic booms and approximately 95% were less than 0.25 psf. Approximately 4.1% of modeled sonic booms were between 0.25 and 0.50 psf and no modeled sonic booms were above 0.75 psf.

In addition to working to develop refined predictive computer models that more accurately reflect public observations and reports of sonic booms, DAF has also begun collecting field measurements in select locations within the potential sonic boom footprint in order to verify and further improve the accuracy of the modeling. As of the date of this staff report, Commission staff is aware of only one launch event with subsequent monitoring of sonic booms that has occurred. DAF noted that if atmospheric conditions at the time of a launch differ from the parameters entered in the updated modeling, there would be discrepancies between the projected and actual sonic boom footprint. A figure depicting the updated sonic boom footprint for the areas along coastal Santa Barbra, Ventura and Los Angeles Counties is provided in **(Exhibit 5)**.

Lack of Information

Although the recently updated discussion of sonic booms and modeling from DAF does help to better describe the sonic booms resulting from Falcon 9 launches, DAF admits that any changes in atmospheric conditions can cause a sonic boom to deviate from the modeled footprint, and to date DAF has only been able to conduct real-time monitoring of a projected sonic boom for a single event. Also, Commission staff recently learned that the sonic boom modeling may have changed again in the time since DAF provided the updated discussion of sonic booms. Commission staff was notified that SpaceX may have recently started adding more fuel to the Falcon 9 rocket than was previously used and analyzed. The additional fuel results in more weight added to the Falcon 9 rocket which results in changes to the resulting sonic booms. Updated modeling for these changes to the sonic booms has not been provided directly to Commission staff. However, it is Commission staff's understanding that the updated modeling could show overpressures within the immediate area of SLC-4 increasing from 2-3 psf, to 4-5 psf. It is unclear how these increases in overpressures (a measure of sonic boom severity or intensity) may affect areas further downcoast in Santa Barbara, Ventura and Los Angeles Counties, the overall extent and contours of the sonic boom footprint, its frequency, or the effects the sonic booms will have on coastal species, habitats and resources. Lastly, DAF has not shared with Commission staff how the locations of the monitoring personnel were chosen, or how those locations would help to confirm the predictions made in the modeling. In other words, it is uncertain how effective the monitoring/field verification program will be in improving the predictive computer model and allowing the true extent of sonic boom effects to coastal resources to be understood and evaluated.

Between 2017 - 2021, VSFB supported an average of 4.4 rocket launches per year from all launch operators combined, with a maximum of 7 launches in both 2017 and 2018. The total launch frequency increased to 21 launches in 2022, and again to 36 launches in 2023. Over the first five months of 2024, there have been a total of 18 SpaceX rocket launches from VSFB, putting it on pace to exceed 36 by the end of the year. The subject CD requests a launch cadence of up to 36 SpaceX launches per year. DAF has not provided any information on how many of the previously authorized launches from VSFB resulted in sonic booms or where the footprints of those sonic booms may have been. Still, assuming a scenario in which all of the previously authorized launches from and landings at VSFB resulted in sonic booms within the same area of the coast as the project, the proposed increase in launch cadence represents an approximately eight-fold increase in the number of launches per year and resulting sonic booms as compared to the 2017 - 2021 period. Without information on the history of launches and sonic booms from VSFB it is impossible to understand what the baseline conditions were, how the proposed increase in launch frequency and resulting sonic booms differs from the baseline, and whether the new cadence would result in coastal effects.

Most importantly, DAF has not provided any analysis of how the changes in sonic boom frequency, footprints and severity may be adversely impacting coastal resources. As described above, the areas within the range of sonic boom effects from the proposed possible southern launch trajectories (140 degrees to 210 degrees) include the Santa

Barbara Channel, the Gaviota Coast, dozens of marine mammal haul outs, several ecologically sensitive estuaries and lagoons, and over a hundred miles of coastline with sensitive dune habitats, seabird colonies and nesting areas, rocky outcrops and reefs. Each of these locations is known to host or provide habitat for a number of sensitive species. Aside from these known biodiversity hotspots, any number of sensitive species may be migrating or inhabiting other portions of the coastline from Santa Barbara County down to northern Los Angeles County. DAF has not identified any of the sensitive species that may be within the newly modeled sonic boom footprint, nor has DAF analyzed how the effects of a sonic boom could adversely impact these species and their habitats. Lastly, DAF has not provided any discussion or analysis of possible alternatives or mitigation measures that could help to avoid or minimize adverse impacts to sensitive marine species, habitats and sensitive biological areas such as marine protected areas, areas of special biological significance, marine sanctuaries, and state and national parks.

Questions raised by the information provided on sonic booms are summarized below:

- What coastal areas will be affected by sonic booms?
- What is the severity of sonic booms that will affect these areas?
- What is the frequency of sonic booms in these areas?
- What sensitive species are known to inhabit or migrate within the area of the sonic boom footprint?
- How sensitive are those species to sonic booms?
- Are there any alternatives or mitigation measures available that could help to avoid or minimize adverse impacts to sensitive species? Has the DAF asked SpaceX to investigate vehicle design parameters to attenuate noise and sonic booms?
- How will the species and habitats within areas affected by sonic booms be impacted?
- What launch trajectories are responsible for the sonic booms that impact coastal areas in Santa Barbara, Ventura, and western Los Angeles Counties?
- Does VSFB/SpaceX have a plan for notifying the public of launches that will likely cause sonic booms?

This uncertainty and the fact that sonic booms generated during SpaceX launches have yet to be accurately modeled or understood could result in significant adverse impacts to sensitive species going undetected and unaccounted for. In order for the Commission to thoroughly analyze potential adverse impacts to marine biological resources from sonic booms, evaluate their consistency with the Sections 30230 and 30231 of the CCMP and ensure they are minimized and properly mitigated, the information identified above is necessary. This information is also necessary in order for the Commission to thoroughly analyze potential adverse impacts to ESHA from sonic booms and evaluate their consistency with Section 30240 of the CCMP, as discussed in Section IV.D below. As of the date of this staff report, DAF has not provided the information and Commission staff has not been able to evaluate the extent of project related impacts or the project's overall consistency with the CCMP. Similarly, the likelihood and magnitude

of potential offsets that would be provided through implementation of avoidance, minimization and mitigation measures has not been provided by DAF.

Vehicle Noise and Marine Mammal Monitoring

Each launch event generates in-air noise up to a maximum of 150 decibels (dB) for several minutes in the immediate area of the launch pad. This sound level would be generated during liftoff and boost-back landings. Vehicle launch and landing would also create sonic booms in the range of one to five psf on VSFB and up to four psf at the Northern Channel Islands. Based on modeling conducted by DAF, in-air noise levels directly off the coast where marine mammals could be located would be roughly 130 dB and would attenuate outward in all directions, reaching 100 dB up to 14.5 miles away. To the human ear, 120 dB would be as loud as a jet taking off, 110 dB would be as loud as amplified music at a concert, and 65 dB is the sound level of normal conversation. However, marine mammal hearing differs from human hearing in the frequencies they are receptive to and their sensitivity to loud sounds. To help evaluate potential adverse impacts to marine mammal hearing from elevated sound, Southall et al (2019) identifies threshold levels for various marine mammal species beyond which temporary threshold shifts (i.e. temporary hearing loss) would be expected to occur. Although elevated, the sounds anticipated to be produced by the proposed project are expected to fall below these threshold levels. To confirm this and evaluate the levels of disturbance and behavioral response triggered by launch noise, DAF has conducted monitoring of marine mammal responses to launch activities and previously found that launch activities have not had any observable long-term consequences for marine mammal populations or their use of habitat at and around VSFB. Specifically, the Supplemental Environmental Assessment (EA) prepared for the project found:

The USSF has also monitored pinnipeds on VSFB during many launches to characterize the effects of noise and visual disturbance on pinnipeds during numerous launches over the past two decades and determined there are generally no substantial behavioral disruptions or anything more than temporary effects to the number of pinnipeds hauled out on VSFB. Reactions between species are also different. For example, harbor seals and California sea lions tend to be more sensitive to disturbance than northern elephant seals. Normal behavior and numbers of hauled out pinnipeds typically return to normal within 24 hours or less (often within minutes) after a launch event. No observations of injury or mortality to pinnipeds during monitoring have been attributed to past launches. As a result, the Proposed Action's potential impacts on MMPA-protected pinnipeds are expected to be limited to brief behavioral reactions.

Similarly, DAF has also monitored southern sea otters during launches to document their reaction to sound. According to that monitoring, no abnormal behavior, mortality, or injury effects have been previously documented from launch-related noise. According to DAF, one reason that pinnipeds and sea otters are not significantly affected by noise is because of their ability to dive under water when exposed to launch noise generated from launches at SLC-4. Since little sound is transmitted across the air-water interface, any in-air sound would not physically damage or deafen pinnipeds and otters that are

below the water surface. In summary, it is DAF's position that on-going monitoring indicates that past levels of launch activities have not resulted in injury or mortality to pinnipeds or sea otters in the project vicinity, but may result in short-term behavioral changes, such as movement away from on-land haul-out areas and/or increased diving. DAF has repeatedly stated that under past launch cadences, there has been no indication that behavioral responses have translated into longer-term changes in habitat use or population levels.

National Marine Fisheries Service (NMFS) previously issued a Letter of Authorization (LOA) dated April 10, 2019, which required DAF to avoid launches which are predicted to produce a sonic boom over the northern Channel Islands during the harbor seal pupping season from March through June, whenever possible. Additionally, NMFS required increased monitoring when sonic booms are expected to exceed 2.0 pounds per square foot over the northern Channel Islands. NMFS issued a new LOA on April 10, 2024, which is the same day the project was first heard by the Commission before being continued to a later date. DAF has not updated its CD submittal to formally incorporate the new LOA.

In the CD and as part of its consultation with NMFS on the LOA dated April 10, 2019, DAF committed to monitoring pinnipeds located on VSFB and the northern Channel Islands during all launches, including those proposed by SpaceX. Between January 1 and June 30, pinniped monitoring at southern VSFB haul out locations is to occur at least 72 hours prior to a launch event and continue at least 48 hours after each event. As stated by DAF in its CD, if this monitoring demonstrates that launch activity results in injury or mortality to marine mammals, DAF would immediately cease launch activities and report the incident to NMFS. DAF further stated in its consistency determination that launch activities would not resume until NMFS is able to review the associated data and circumstances and work with DAF to determine the additional measures necessary to minimize the likelihood of further impacts to marine mammals. In addition, DAF committed to continuing its marine mammal monitoring program during launches, including monitoring of long-term habitat use and local species populations. If on-going marine mammal monitoring observed (a) injury or mortality or (b) significant changes in habitat use and/or local populations associated with launch activities, DAF would also notify the Executive Director and share relevant information to help determine if the activity is being conducted or is having an effect on any coastal use or resource substantially different than originally described in the consistency determination and, as a result, is no longer consistent with the enforceable policies of the CCMP.

Lack of Information

On May 17, 2024, Commission staff received from DAF the marine mammal monitoring results from the prior year. These are the first and only monitoring results provided to Commission staff in support of DAF's statements and conclusions that no adverse impacts have occurred as a result of launch activities. Commission staff have reviewed DAF's marine mammal monitoring program and have significant questions about the efficacy of the monitoring and the conclusions being drawn from it. First, the monitoring consistently concludes that there are no impacts on pinnipeds from launch activities,

despite observations showing pronounced behavior responses and acknowledgement that several haul outs have been entirely abandoned. The 2023 Annual Report provided to Commission staff includes video observations of 19 SpaceX Falcon 9 launches in 2023. The report concludes that there was no impact to harbor seals, California sea lions, or elephant seals from any of the launches. However, the report does not include a discussion as to why it determined no impact when on multiple occasions some or all of the harbor seals fled the beach during a launch and didn't return until some time after⁴³. Also, elephant seals routinely reacted with head lifts and in some instances erratic movement, but this reaction is not analyzed as a response to launches. In particular, during the surveys conducted for the April 2, 2023, launch, observers noted dead harbor seal pups that didn't exhibit any symptoms of emaciation. As such, it appears unlikely they were previously abandoned and died of starvation. The report documents harbor seals flushing during the launch when these dead seal pups were noted, so it is possible they were injured or killed during flushing. However, the report provides no in-depth analysis regarding the death of these pups. Additionally, the report contains no substantial analysis of the potential for adverse impacts resulting from more frequent disturbance and behavioral responses (e.g., more frequent flushing) under the proposed higher launch cadence.

Second, the monitoring lacks any kind of rigorous statistical analysis of the changes in population trends using the historic data that DAF has been collecting for decades. For example, the report identifies that the number of harbor seals using haul outs on VSFB is declining and that several haul outs have been abandoned entirely. The report anecdotally ascribes this change in population to several possible factors including landslides of coastal bluffs affecting haul out locations, predation risk from coyotes, increase in white shark (*Carcharodon carcharias*) predation, and increasing numbers of elephant seals in the region. However, a comprehensive statistical analysis that considers physical (oceanographic conditions, climate, storms, beach width, etc.), biological (population size, population location, behavior, etc.), temporal (frequency and time between launch events for species to recover, seasonal timing of launches and sensitive times of the year such as pupping), and anthropogenic (launches) variables to more accurately evaluate the likely causes of population trends was not included or completed. As discussed previously, DAF has been monitoring marine mammals for decades, but as of the date of this staff report they have not provided any of these historic monitoring reports to Commission staff that would allow for a more comprehensive evaluation of launch activities and their effects.

Third, equipment failure has resulted in incomplete monitoring. Pre-launch modeling predicted that sonic booms could impact the northern Channel Islands as a result of two launches during the 2023 reporting period (June 22nd and July 7th). Equipment failure resulted in the inability to capture the intensity of the actual sonic boom during these events. Equipment failure also occurred during monitoring of southern sea otters on two

⁴³ January 19, 2023 Starlink G2-4 launch; March 3, 2023 Starlink G2-7 launch; April 2, 2023 SDA-0A launch; April 27, 2023 Starlink G3-5 launch; May 10, 2023 Starlink G2-9 launch; May 20, 2023 Iridium OneWeb; July 7, 2023 Starlink G5-13; November 11, 2023 Transporter 9 launch; December 1, 2023 EROISat Launch.

occasions (April 2nd and 14th). As a result of those failures, no recordings of sea otters were obtained during the monitoring. Neither of the monitoring reports that documented equipment failure discussed how the loss of data could affect the analysis and conclusions drawn from monitoring.

Fourth, between 2017 - 2021, VSFB averaged approximately 4.4 launches per year from all launch operators combined, with an increase to 21 and 36 launches in 2022 and 2023, respectively. So far in 2024, there have been a total of 18 SpaceX rocket launches. The proposed project requests an increase of SpaceX launches to 36 launches per year, which is an approximately eight-fold increase over the 2017 – 2021 baseline of all of the cumulative launches at VSFB. The proposed 36 SpaceX launches would continue the accelerated launch cadence beyond the past two years of more frequent launches; this increase would be effective immediately. Under a more controlled and cautious scenario, such a significant increase in launch cadence would be spread out over a longer period of time with defined, stepwise increases in cadence along with thorough monitoring and evaluation to assess adverse impacts. At a minimum, this approach would provide sensitive species in the area a greater opportunity to adjust to the increase in launches. Crucially, this more measured approach could also be structured to provide sufficient time for monitoring to assess how species are reacting to the increase in disturbance and whether the increase is resulting in any significant adverse impacts. If significant impacts are detected, project changes and/or mitigation measures could be implemented and analyzed to determine whether they are effective, before continuing to increase the cadence. As of the date of this staff report, DAF has not provided Commission staff any information on why a more cautious and measured increase in launch cadence is not feasible.

Lastly, the original NMFS LOA referenced in the CD submittal was superseded on April 10, 2024. DAF did not notify Commission staff that the LOA had been updated nor did DAF provide a copy of the updated LOA. Nonetheless, Commission staff has reviewed a copy of an updated LOA provided by NMFS and it appears that the conditions, mitigation, monitoring, and reporting requirements differ from the LOA included in the CD submittal. DAF has not provided an updated CD, or any other commitments, to formally incorporate the requirements of the updated LOA in the Commission's review of the subject CD.

Questions raised by the lack of information on marine mammal monitoring are summarized below.

- How is the marine mammal monitoring report able to conclude that launches had no effect on pinnipeds when harbor seals are noted to repeatedly flush during launches and during one event four dead harbor seal pups were observed? Additionally, elephant seals are noted to lift their heads and move erratically in response to launches.
- How is the report able to make conclusions without statistical analysis of the changes in populations trends using the historic data that DAF has collected?

- How did the equipment failures affect the monitoring and conclusions drawn from monitoring?
- Why can't the project pursue a more cautious and measured increase in launch cadence?
- Is the updated National Marine Fisheries Service Letter of Authorization (LOA) officially incorporated into DAF's consistency determination and if so, how do the updated conditions, mitigation, monitoring, and reporting requirements of that LOA affect the project scope?
- What information is available to support the report's assertion that the abandonment of marine mammal haul outs along the Vandenberg coast cannot be attributed to space launch and landing activities?
- How will the proposed increase in frequency and intensity of activities at Vandenberg Harbor associated with rocket transport affect the marine mammal haul outs located in adjacent areas?

All of this uncertainty could mean that marine mammal monitoring is not effectively recording and analyzing potential adverse impacts to marine mammals. In order for the Commission to thoroughly analyze potential adverse impacts and determine the consistency of the proposed activity with the relevant policies of the CCMP, the information identified above is necessary. Without monitoring data supporting and corroborating DAF's conclusions that launch activities have not adversely affected marine mammals or their sensitive haul out areas on VSFB and the northern Channel Islands, the Commission does not have sufficient information to determine if the proposed project would be consistent with the marine biological resource policies of the CCMP, specifically Sections 30230 and 30231. As of the date of this staff report, DAF has not provided the information and Commission staff has not been able to evaluate the extent of project related impacts or the likelihood and magnitude of benefits that would be provided through implementation of adequate monitoring.

Marine Debris

Several elements of the proposed project could result in the release of marine debris. These include the release and eventual abandonment into the ocean of weather balloons, parafoils from payload fairings, and potential mishaps during a launch that lead to some or all of the rocket falling into the ocean, and the intentional abandonment into the ocean of the rocket first stage and fairings. It should be noted, however, that SpaceX has not had any mishaps during any of its Falcon 9 launches from VSFB since it began launch operations at the base.

Prior to launches, SpaceX would release approximately six to ten weather balloons to monitor upper atmosphere wind conditions. Attached to the latex weather balloon would be a plastic-encased electronic device to measure atmospheric data and transmit it by radio to a ground receiver. The device is roughly the size of a shoe box and is powered by a 9-volt battery. Upon reaching an altitude of 12-19 miles above sea-level and providing the necessary data, the balloon would pop due to the reduction in atmospheric pressure. The likelihood of recovering the weather balloons and instrumentation is small due to the extreme height at which the balloon destruction would be triggered, the

trajectory of its descent and the potential for it to sink or become lost in the ocean. Due to these factors, the balloon and associated materials would be expected to deposit in the ocean and become marine debris.

The Falcon 9 system includes a fairing to protect payloads until they can be delivered to their designated orbit. The fairings consist of two halves which separate to release the payload into space. After separating the fairing halves would fall back to earth and each half contains a parachute system to slow the descent of the fairing and enable a soft splashdown so that the two halves can be recovered. The splashdown site is expected to be outside of California's state waters and United States territorial waters. The parachute system consists of a drogue parachute and a parafoil which are approximately 110 sq. fr. and 3,000 sq. ft. in size, respectively.

Additionally, launches could contribute to marine debris if a mishap occurs, the rocket fails to launch successfully, and it instead lands in ocean waters. Finally, SpaceX could decide to release its first stage into the ocean rather than landing it. These marine debris inputs could, depending on where they land, negatively affect areas of special biological significance, such as Channel Islands National Park, Channel Islands National Marine Sanctuary, and state-designated marine protected areas. As discussed in DAF's CD, SpaceX's objective is to land and recover the first stage boosters for reuse. However, some missions may require orbits and fuel usage that make recovery and reuse impossible, in which case the first stage booster is intentionally disposed of. The first stage is expected to break up upon atmospheric reentry, and upon making impact with the ocean surface the booster is expected to sink. SpaceX has not conducted an expendable booster mission from SLC-4E since 2018.

SpaceX would attempt to recover both halves of the fairing after each launch using a salvage ship stationed in the area of the anticipated splashdown site. For safety reasons the salvage ship could not be within 12 nautical miles of the splashdown site. Parachutes, parafoils, and their assemblies attached to the fairings to control their descent and aid in recovery are made of Kevlar and nylon and would quickly sink once they become waterlogged after splashdown. SpaceX would attempt to recover all parafoils, but ocean conditions or weather conditions could prevent salvage operations from recovering the foil.

To address these potential adverse impacts from marine debris, DAF has committed to ensuring that SpaceX provide contributions to the California Lost Fishing Gear Recovery Project, with the intention of offsetting the release of unrecoverable debris in state and federal waters.

U.C. Davis' California Lost Fishing Gear Recovery Project has removed lost or discarded commercial fishing gear from California waters since 2005. Its work now focuses on gear removal from the waters of Southern California, ensuring that gear recovery is occurring close to the areas that would be affected by the proposed project. Lost fishing gear such as nets, traps and lines are hazardous to wildlife, including seabirds, fish, turtles, sea otters, whales and other marine animals. It is anticipated that

the entanglement hazards posed to wildlife by the weather balloons are similar to those posed by lost fishing gear. Lost fishing gear, specifically traps, typically have a buoy attached to several dozen feet of nylon line; similarly, the weather balloon, which is relatively buoyant, is attached with lightweight lines to heavier scientific instruments. Thus, lost gear recovery would provide a reasonable means of offsetting the entanglement impacts associated with weather balloons. However, as discussed below, it is not clear that the recovery of lost fishing gear would provide meaningful offsets for other marine debris types generated by launch activities, in particular the electronic and battery components of the radiosondes attached to the weather balloons.

On an annual basis, the amount of material potentially released into the ocean would be recorded and, for every one pound of such material, SpaceX would make a compensatory donation of \$10.00 to the California Lost Fishing Gear Recovery Project. The administrators of that program have confirmed this contribution would be sufficient to recover approximately one pound of lost fishing gear. This commitment was used by other launch programs on VSFB for their marine debris impacts, including the Phantom programs considered by the Commission in CD-0010-22.

Lack of Information

DAF recently provided Commission staff with SpaceX's mitigation plan for marine debris developed in consultation with NMFS and also information on the most recent donation of \$7,774 in January 2024 to the California Lost Fishing Gear Recovery Project. DAF states that U.C. Davis advised DAF to use a 1000 pounds per day as an estimate of a standard recovery day and the cost of that effort should be calculated at \$6,000 per day. It appears that the factors advised by U.C. Davis are derived from the mitigation plan for marine debris.

The mitigation plan for marine debris developed in consultation with NMFS is dated March 14, 2016. The plan states that the mitigation is intended to provide in-kind, off-site compensatory mitigation to offset the adverse impacts to Essential Fish Habitat (EFH) for various federally managed fish species. According to the plan, this mitigation is necessary as a result of the cumulative addition of marine debris to the seafloor after a number of unsuccessful landing attempts. The plan incorporates the United States Army Corps of Engineers (Corps) mitigation ratio checklist as an option to determine an appropriate ratio of mitigation in relation to the amount of marine debris from the project. The plan notes that using the Corps mitigation ratio checklist is not conventional since the checklist is designed more toward assessing freshwater impacts and not necessarily an impact from the discharge of marine debris in offshore waters. As described in that plan, SpaceX proposes to mitigate 0.3 pounds of debris for every pound of debris not recovered by a failed first stage landing.

DAF's reliance on the mitigation plan for marine debris raises significant questions. First, the plan was developed in 2016 and does not appear to include any factors to adjust for inflation. As such, the mitigation monies being proposed are likely significantly less than would be required in today's dollars. Second, the plan was specifically written to address marine debris from a potential failed landing of the first stage of the Falcon 9

and how such a failure could impact EFH. The mitigation proposal included in the subject CD is intended to mitigate for marine debris from all aspects of a SpaceX Falcon 9 launch (balloons, radiosonde including the 9-volt battery, fairings, and possible failure of the first stage). Marine debris from all of these components have the potential to impact EFH as well as other aquatic habitats and species. Third, the plan admits that the Corp mitigation ratio checklist is not a conventional proxy for marine debris since the Corps program is designed for freshwater environments. Fourth, DAF stated that SpaceX supplied \$7,774 in January 2024, but provided no discussion on how that total was calculated. Fifth, DAF has never provided Commission staff with a quantification of the total amount of marine debris resulting from of SpaceX launches under the 36 launch cadence program and the total amount of funds supplied to the California Lost Fishing Gear Recovery Project. Therefore, Commission staff have no way to analyze the effectiveness of the mitigation.

A final issue with the proposed mitigation plan is the issue of how well the plan addresses specific issues of marine debris associated with the subject CD. Namely, the release of approximately six to ten weather balloons per launch, and whether it accounts for any balloons released before a launch was rescheduled for a later date. Each weather balloon is fitted with a radiosonde powered by a 9-volt battery. The CD submitted by DAF does not include any information on what specific instrumentation and electronics are in the radiosonde nor does it include any information on the 9-volt battery. Instrumentation and electronics can include various forms of hazardous waste consisting of circuit boards with heavy metals like lead or mercury. Also, there are various chemistries of 9-volt batteries consisting of metals such as lithium, nickel and zinc. After the weather balloon reaches a certain altitude and bursts, this material potentially falls into the ocean. DAF has stated that it is unable to recover the radiosonde and expects the units to sink, but where the units land after the balloon bursts, where they ultimately settle on the ocean floor, and what impact the units have on ocean species, water quality and environments is unknown. Although the California Lost Gear Recovery Project may be appropriate mitigation for debris such as balloon, parachutes and fairings, there is not enough information for Commission staff to analyze whether payment into the fund is appropriate mitigation for the types of electronic hazardous waste generated from the radiosonde.

Questions raised by the information provided on marine debris are summarized below:

- Have the mitigation payments from the 2016 report been adjusted for inflation?
- How well does the mitigation plan, which was originally drafted to address possible failed landings of the first stage, address other types of debris from the project?
- How was the total SpaceX payment to the U.C. Davis Lost Fishing Gear Recovery Project of \$7,774 calculated and what poundage of marine debris is that sum intended to account for?
- How much marine debris has been released as a result of SpaceX launches at VSFB pursuant to the subject CD?

- How well does the mitigation plan account for the electronic hazardous waste released as a result of the project?

All of this uncertainty could mean that marine debris is not being clearly accounted for or mitigated, resulting in significant adverse impacts to the marine environment. In order for the Commission to thoroughly analyze the proposed project's potential adverse impacts from marine debris and ensure they are mitigated sufficient to ensure consistency with the marine biological resource and water quality protection policies of the CCMP, the information identified above is necessary. As of the date of this staff report, DAF has not provided the information and Commission staff has not been able to evaluate the extent of project related impacts that would be identified through implementation of mitigation measures.

Conclusion

VSBFB is located immediately adjacent to the Pacific Ocean and the VSBFB SMR, while the Santa Barbara Channel and multiple other marine biodiversity hotspots are located further south within the range of the possible trajectories for the Falcon 9 launches. Falcon 9 launches have the potential to adversely impact sensitive species within the marine environment in several ways including loud noises and sonic booms, as well as by the generation of various forms of marine debris.

Coastal Act Section 30230 requires new development to protect, and where feasible enhance, the marine environment. Coastal Act Section 30231 requires the biological productivity and quality of coastal waters appropriate to maintain optimum populations of marine organisms to be maintained and, where feasible, restored. Here, the Commission is unable to analyze the proposed project's consistency with these requirements because the lack of information provided by DAF on sonic booms and marine debris prevents a full accounting of the project's potential adverse impacts. In addition, the lack of detailed monitoring does not allow the Commission to ensure that any potential effects are being adequately observed and analyzed. The mitigation plan for marine debris is over eight years old and it is not clear if the program included in that plan is appropriate for the types of marine debris being generated for this project, whether the mitigation payments have been appropriately adjusted for inflation, and how they payments are being calculated. As such, the lack of information provided to Commission staff about the project impedes its ability to evaluate the project's consistency with Sections 30230 and 30231. Unless DAF provides the information requested by Commission staff, this impediment would remain.

Without this information previously identified in Section III.B above, specifically Items One (Sonic Booms), Two (Marine Mammal Monitoring), and Three (Marine Debris), the Commission is unable to determine whether the proposed project is consistent with the marine resource policies of the CCMP and Coastal Act Sections 30230 and 30231. The Commission therefore objects to DAF's consistency determination, based on the lack of adequate information to determine the project's consistency with the marine resource policies of the CCMP.

D. ENVIRONMENTALLY SENSITIVE HABITAT AREAS

Section 30240 of the Coastal Act states:

(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.

(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

Section 30107.5 of the Coastal Act Defines Environmentally Sensitive areas as:

“Environmentally sensitive area” means any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.

Environmentally Sensitive Habitat Areas, or ESHA, are areas where plant communities or wildlife habitats are rare or especially valuable and easily disturbed or degraded by human activities. There are several types of ESHA adjacent to the project site. Section 30240(b) requires development adjacent to ESHA be sited and designed to prevent impacts that would significantly degrade ESHA habitat and be compatible with continued use of ESHA habitat. In addition, aspects of the project, including the sounds generated during launch and landing activities and pressure waves from sonic booms, extend dozens of miles outward from the launch site and rockets and directly into ESHA. For a more detailed discussion of sonic booms refer to Section IV.C above.

DAF states in its consistency determination that the proposed project is consistent with Section 30240. Since the launch operations would take place within an existing launch facility at SLC-4 the project would not require any construction within ESHA. DAF has also proposed monitoring and reporting to help determine if unexpected adverse impacts occur to sensitive habitat areas outside of the launch complex.

Types of Environmentally Sensitive Habitat Areas

Pallid Bat and Western Red Bat

The pallid bat (*Antrozous pallidus*) and western red bat (*Lasiurus frantzii*) are known to be present within VSFB in proximity to the area affected by launch noise and lighting. The most consistent observations have been within the riparian habitat of Honda Creek roughly two miles south of the SpaceX launch complex. These bat species have state rarity rankings of S3 and have been designated by the California Department of Fish

and Wildlife (CDFW) as Species of Special Concern⁴⁴. Bats play a special role in the ecosystem due to their high metabolic needs and extensive feeding on insects.

CDFW identified pallid bats as Species of Special Concern because they have experienced a marked population decline in recent years in California. Pallid bats are not tolerant of suburban or urban development and habitat conversion has led to their decline (CDFW 1998). CDFW identified western red bats as Species of Special Concern because they face increased predation from species associated with human development (jays and opossums), and their primary habitat in riparian corridors is under consistent threat of conversion to other land uses, specifically agriculture (CDFW 1998). CDFW's findings show that the habitat of both bat species is easily disturbed or degraded by development, leading to population declines. Within California, both pallid bats and western red bats are vulnerable and at moderate risk for extinction due to a restricted range, relatively few populations or recent and widespread declines. Populations of these species (and bat populations in general) are also at risk for significant declines in California due to the recent emergence of white-nose syndrome, a disease caused by a fungal infection that frequently results in high mortality rates and the catastrophic loss of entire bat colonies (CDFW 2023). The special role of these bat species in the ecosystem and their vulnerability to population declines supports identification of their roosting habitat as ESHA.

These bat species occur both on VSFB and outside of VSFB in the coastal zone of northern Santa Barbara County. Adverse impacts to the populations on VSFB would have spillover effects to outside areas, including within the coastal zone, by reducing overall carrying capacity, resiliency, and genetic diversity of pallid bats and western red bats in Santa Barbara County.

Western Snowy Plover Nesting Habitat

Surveys carried out by Point Blue Conservation Science, an independent avian research organization, for DAF and provided to Commission staff as part of previous consistency determinations have documented western snowy plover (*Charadrius nivosus nivosus*) ('snowy plover') nesting habitat on the beach approximately 2 miles northwest of the SpaceX launch and landing site within VSFB (USFWS 2023). The rarity and vulnerability of snowy plover is well established, with the species being listed as threatened under the federal Endangered Species Act since 1993 and with global and state rarity rankings of G3T3 and S3 respectively⁴⁵. They are also listed as California Species of Special Concern. The west coast-wide recovery objective for snowy plover is 3,000 birds, and the current population estimate falls over 20% below that at 2,371

⁴⁴ S3 ranked species are those considered 'vulnerable' and at moderate risk of extinction or elimination due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.

⁴⁵ G3 and S3 ranked species are those considered 'vulnerable' and at moderate risk of extinction or elimination due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors. And taxa which are subspecies receive a taxon rank (**T-rank**) in addition to the G-rank. Whereas the G-rank reflects the condition of the entire species, the T-rank reflects the global status of just the subspecies.

birds. The USFWS notes that threats to snowy plover and their habitat include “habitat loss and degradation attributed to human disturbance, urban development, introduced beachgrass, and expanding predator populations,” indicating that snowy plover nesting habitat is easily degraded by human activities and developments (USFWS 2023). The USFWS additionally identified that active efforts to improve habitat at breeding beaches have improved snowy plover population numbers (USFWS 2023). Therefore, snowy plover habitat has been identified as ESHA by the Commission.

Snowy plovers are present throughout the coastal zone in California, both north and south of VSFB. In the winter, snowy plovers migrate to non-nesting beaches to forage (USFWS 2023). The populations of snowy plover nesting and reproducing on VSFB therefore disperse to other beaches outside the base in the winter and may use beaches in the coastal zone for nesting the following year. Thus, nesting habitat on VSFB contributes to snowy plover population growth within the coastal zone. Impacts to snowy plover nesting habitat on VSFB would affect snowy plovers in the coastal zone due to species movement during the winter season and reduced population viability.

Preventing the degradation of this nesting habitat is important for the continued population growth and recovery of snowy plover. VSFB contributes to the largest sub-population of snowy plovers from San Luis Obispo County through Ventura County. The population target established by the USFWS for snowy plover in San Luis Obispo, Santa Barbara, and Ventura Counties is 1,200 breeding adults. In 2022, the USFWS found that the population remains well below this target at 804 breeding adults (USFWS 2023). This comparatively large population is critical to maintain and grow for long-term success of the species along the west coast.

California Least Tern Nesting Habitat

The California least tern (*Sternula antillarum browni*) has been listed under the federal and California Endangered Species Acts since 1972 with global and state rarity rankings of G4T2T3Q and S2, respectively⁴⁶. They are also listed as California Fully Protected species. California least tern is a migratory bird species that prefers to nest in small, scattered clusters on natural or artificial open areas near estuaries, bays, or harbors where small fish are abundant. At VSFB, California least tern nest in colonies in several locations along the coastal strand of the north VSFB coastline (USFWS, 2023). The primary colony at VSFB for California least tern is at Purisima Point which is located approximately 8 miles north of the launch facility at SLC-4. California least tern forage in the lagoon at the mouth of the Santa Ynez River and other near-shore locations at VSFB (USFWS, 2023).

VSFB supports a relatively small percentage of the total number of California’s total California least tern breeding population. However, the population at VSFB is significant because it is one of only three breeding colonies between Monterey and Point

⁴⁶ A Q-rank indicates questionable taxonomy; that the distinctiveness of this entity as a taxon at the current level is questionable. Resolution of this uncertainty may result in change from a species to a subspecies or hybrid. The “Q” modifier is only used at the global level, not the state level.

Conception. Also, the breeding colony at VSFB tends to be reproductively successful (USFWS, 2023).

Similar to western snowy plover, since VSFB is a significant location for hosting breeding colonies of California least tern, California least tern nesting habitat is considered ESHA by the Commission. Additionally, since the populations of California least tern disperse to other areas of the coast during the winter, nesting habitat on VSFB contributes to California least tern population recovery within the coastal zone, and impacts to California least tern nesting habitat on VSFB would affect California least tern in the coastal zone due to species movement and reduced population viability. As such, preventing degradation of this nesting habitat is important for the continued population growth and recovery of the California least tern.

California red-legged frog

Although California red-legged frog (*Rana draytonii*) (CRLF) are not present in Spring Canyon directly adjacent to the SLC-4 SpaceX launch and landing complex, DAF have documented CRLF within Bear Creek and Honda Creek, located 0.75 miles and 2 miles to the south of SLC-4, respectively. The Commission's staff ecologist has identified these locations as ESHA because they provide breeding habitat, forage and refuge for CRLF.

The rarity of California red-legged frogs is widely recognized and has resulted in its designation as a federally threatened species with global and state rarity rankings of G2G3 S2S3 and listing as a California Species of Special Concern⁴⁷. CRLF are sensitive to disturbance and their habitat could be easily disturbed or degraded from development including direct habitat loss due to stream alteration, loss of aquatic habitat, and indirect effects of expanding urbanization affecting their dispersal and migration into new habitats, as noted in the USFWS Biological Opinion. CRLF is a coastal species found outside of VSFB in the coastal zone in streams along the coast and transverse ranges of California, including coastal Santa Barbara County. The populations on VSFB add to the genetic diversity and population of CRLF outside of the base, particularly because this species of frogs are known to make long-distance overland migrations (up to 1.75 miles in wet environments) to suitable breeding habitat elsewhere. The USFWS notes that coastal CRLF populations in Santa Barbara County and to the north show genetic connectivity, indicating that there is migration and gene flow between CRLF populations on VSFB and those in the coastal zone outside of the federal property (USFWS 2023). The loss of CRLF populations on VSFB would reduce genetic diversity and gene flow between frog populations, which could affect the overall population of CRLF in the coastal zone outside of the base. For rare species, maintaining genetic diversity is particularly critical in the face of climate change due to the variety of environmental stressors it can bring and the need for adaptation and new traits that will enable survival.

⁴⁷G2 and S2 ranked species are considered 'imperiled' and at high risk of extinction or elimination due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.

According to the “Activities Pursuant to Biological Opinion 2017-F-0480: 2023 Activities Report” no launches occurred during the CRLF breeding season (late November to late April) during the reporting period under the new BO requirements. Under the prior BO requirements, the only launch when bioacoustic monitoring was conducted during the CRLF breeding season was during the SWOT December 16, 2022 mission. The monitoring resulted in a finding of more breeding calls per hour on average at the Fitness Center Drainage after the launch (31.4) compared to before the launch (7.8) however the report concluded that noise from the launch did not negatively affect CRLF breeding behavior. No rationale for this conclusion was provided in the 2023 Activities Report, however. It therefore appears that there has not been enough CRLF bioacoustic monitoring to determine that this species is not adversely impacted by launches or sonic booms, especially since modeling of sonic booms/boost backs includes sound levels reaching 3 and 4 psf in areas of known CRLF habitat.

Monarch Butterfly

Monarch butterflies (*Danaus plexippus*) are large and conspicuous, with bright orange wings surrounded by a black border and covered with black veins. Individual monarchs in temperate climates, such as western North America, undergo long-distance migration, and live for an extended period of time. In the fall, monarchs begin migrating to their respective overwintering sites. This migration can take monarchs over distances of 1,800 miles and last for over two months⁴⁸. Monarch populations have declined over the past twenty years due to several interrelated factors including habitat degradation and loss in breeding and overwintering sites, disease, pesticide exposure, and climate change. Recently, the western migratory population (including California) has experienced dramatic swings, including a low of less than 2,000 individuals in 2020-21, highlighting the vulnerability of the species to perturbations like habitat loss⁴⁹. Monarch butterflies are currently identified as a candidate species for federal listing, and the USFWS found in 2020 that listing was warranted, but precluded by other higher priority listing actions.

There are multiple eucalyptus groves within VSFB that are known monarch overwintering sites. One of these areas, consisting of two distinct eucalyptus stands that support monarch overwintering aggregations, is located immediately south of SLC-4, within Spring Canyon (**Exhibit 2**). The highest number of monarchs in the westward and eastward stands over the past decade was 6,015 and 11,082 in 2011 and 2013 respectively. Those numbers declined to zero over several years since then but have been slowly increasing in the westward and eastwards stands with 16,616, 10,768, and 2,235 and 30, 186, and 265 in the years spanning 2021 to 2023, respectively.

Similar to western snowy plover and California least tern, since VSFB is a location for hosting overwintering colonies of monarch butterflies, and overwintering habitat is critical for the persistence of the species, monarch butterfly habitat is considered ESHA by the Commission. Additionally, since the populations of monarch butterfly disperse to other areas of the coast, overwintering habitat on VSFB contributes to monarch butterfly

⁴⁸ <https://ecos.fws.gov/ecp/species/9743>

⁴⁹ <https://wildlife.ca.gov/Conservation/Invertebrates/Monarch-Butterfly>

populations within the coastal zone and impacts to monarch butterfly habitat on VSFB would affect monarch butterflies in the coastal zone due to species movement and reduced population viability. As such, preventing degradation of overwintering habitat adjacent to the SpaceX launch and landing site is important for the continued population growth and recovery of the monarch butterfly.

Monitoring

To confirm that elevated sound levels and sonic booms from the proposed increased launch frequency will not be incompatible with the continued use of bat habitat, DAF would augment the acoustic monitoring it committed to carry out as part of Consistency Determination No. CD-0010-22 (the Phantom Space Corporation launch complex and program recently reviewed by the Commission) by expanding it to include the noise footprint of the proposed SpaceX launches and sonic booms. This would allow a determination of the extent to which bat species are present in Honda Canyon by recording and assessing their call rates before and after rocket launches.

DAF committed to augmenting the existing western snowy plover monitoring program on VSFB, which records habitat use, nesting efforts, nest fates, fledgling survival, and population size through each breeding season, with geospatial analysis of snowy plover nesting and the noise environment. Sound meters are to be deployed immediately inland of south Surf Beach and at a control site to characterize the noise environment during the breeding season within the noise footprint of SpaceX launches. Geospatial analysis is then performed annually as SpaceX's launch frequency increases to assess whether patterns of snowy plover nesting activity, nest fates, or fledgling success are negatively impacted by noise and sonic booms from SpaceX operations.

DAF has previously conducted long-term monitoring on VSFB to assess California least tern and their response to launch activities, including noise and sonic booms. DAF has stated that its monitoring of California least tern to date has found that launch activities have not decreased California least tern populations and have only produced temporary observable changes in behavior. DAF has committed to California least tern monitoring and mitigation as part of its Biological Opinion with the USFWS.

For California red-legged frogs, DAF has conducted long-term monitoring on VSFB to assess the frogs and their response to launch activities, including noise and sonic booms. DAF has consistently stated that past launch activities have not decreased CRLF populations or led to the abandonment of habitat areas and have only produced temporary observable changes in behavior. DAF committed to placing passive bioacoustic recorders in Honda Creek and conducting CRLF surveys there as well. This monitoring program will be carried out as part of the SpaceX launch program and is designed to track habitat occupancy, breeding behaviors (calling), and breeding success (egg mass and tadpole density).

The DAF consistency determination does not include any information about monitoring of the two monarch aggregations sites located in the eucalyptus tree stands in Spring Canyon immediately adjacent to SLC-4. This is concerning because following ignition

of SpaceX Falcon 9 rockets, a deluge of water is flooded onto the launch pad to absorb or deflect the high levels of acoustic energy that are released as the rocket lifts off and to avoid damage to the vehicle and payload (**Exhibit 9**). The exhaust cloud is comprised of combusted fuel and water that largely consists of steam. The steam cloud generally billows out directly south of the launch pad but may move in different directions under various atmospheric conditions. For example, offshore winds could push the steam cloud toward the monarch aggregations resulting in adverse impacts such as physical damage to either stand trees or the monarchs themselves as well as initiation of flight responses causing the butterflies to use up necessary energy stores. Another source of disturbance is the sonic booms or boost backs when the rocket's first stage returns to SLC-4. Noise modeling provided to Commission staff by DAF and included as **Exhibit 6** indicates that the two monarch aggregations would be within the level 5 psf zone which is the highest noise level zone. How the monarchs would react to this level of noise is not known and therefore should be monitored. Any monarch monitoring plan developed should include two or more monarch aggregation reference sites outside the influence of the launches and sonic booms that would be surveyed at similar times to the impact site for comparison.

Lack of Information

A significant concern with the proposed project and the associated monitoring for these sensitive species is the significant and rapid increase in cadence to 36 launches per year, compared to the number of historic launches at VSFB. There simply has not been sufficient monitoring at the current cadence or a lesser one above the historic average to adequately assess how these species may, or may not, be reacting to launches. This issue is reflected in the findings of the 2023 monitoring report for western snowy plover and California least tern. 2023 monitoring suggests that there could possibly be a correlation between launching the Falcon 9 rockets and reactions from these two species, including startling, flushing, damage to eggs, and abandonment of nests. Under a higher launch cadence, more frequent behavioral responses of this sort could conceivably lead to lower nesting success and, over time, population level impacts. Sustained monitoring at the current launch cadences is needed to determine if impacts are occurring. This is consistent with the USFWS findings in the Biological Opinion that without long term population level effects analysis on the novel effects of increased launch cadence, it is difficult to accurately anticipate the magnitude of the response from these species.

The monitoring also lacks any kind of rigorous statistical analysis of the changes in populations trends using the historic data that DAF has been collecting for decades. Annual monitoring reports should incorporate comprehensive statistical analysis by looking at physical (oceanographic conditions, climate, storms, beach width, etc.), biological (population size, population location, behavior, etc.), temporal (frequency and time between launch events for species to recover, seasonal timing of launches and sensitive times of the year such as nesting), and anthropogenic factors (launches), to more accurately evaluate the likely causes of population trends. DAF has been monitoring these species for significant amounts of time, but as of the date of this staff

report they have not provided any of these historic monitoring reports to Commission staff for review or evaluation.

Another issue is the design of the monitoring programs and how data are being used to draw conclusions. For example, the monitoring programs for western snowy plover and California least tern do not include any control observations. As such, it is not possible to understand how an observed behavior recorded during a launch may differ from more normal behavior outside of launches. Also, the western snowy plover report compares the number of nests and their fates for beaches in south VSFB versus beaches in north VSFB. The report states that this comparison is provided because the beaches in north VSFB are a non-impact area. However, a significant portion of the north VSFB beach area, as identified in Figure 1.1 of the monitoring report, is within the same level 2 psf sonic boom footprint as the south VSFB beaches. Therefore, it is unclear why the report considers north VSFB as a non-impact area and how it can function as a comparison to south VSFB beaches during launches.

Monarch butterflies are known to overwinter in two eucalyptus stands in the eucalyptus grove ESHA located approximately 300 feet south of SLC-4W (**Exhibit 2**). This area could experience engine noises in excess of 130 dB during launch and landing, and also experience sonic booms with a peak overpressure of at least 4 psf. DAF has not provided any information to Commission staff about whether monarch butterflies are sensitive to noise and pressure. The project does not propose any plan for monitoring monarch butterflies. In addition, the proximity of this grove to the launch and landing complex and the susceptibility of eucalyptus to fire raises concerns about its long-term viability and exposure to fire risk as the number of launch and landing events and proportional risk of accidents increases.

Questions raised by the lack of information on the proposed monitoring are summarized below:

- How does the monitoring of the proposed increase of launch cadence compare to the historic monitoring of sensitive species at VSFB?
- Why doesn't the monitoring incorporate statistical analysis of population trends to infer whether the increase in launch cadence is potentially affecting sensitive species?
- How effective is the sensitive species monitoring if doesn't include appropriate controls/reference populations outside the influence of launches and sonic booms? For instance, during the only launch when bioacoustic monitoring was conducted during the California red-legged frog breeding season, there were significantly more breeding calls per hour on average at the Fitness Center Drainage after the launch (31.4) compared to before the launch (7.8). What is the rationale for the conclusion that noise from the launch did not negatively affect breeding behavior based on calls per hour?
- Is the monarch butterfly grove adjacent to the SpaceX launch and landing site sensitive to the types of sounds and peak overpressures associated with the Falcon 9 launching and landing activity?

- Has any monitoring of monarch butterfly over-wintering sites on VSFB occurred? How was this monitoring carried out and what does it show?

All of this uncertainty could mean that monitoring of these sensitive species is not effectively recording and analyzing potential adverse impacts. In order for the Commission to thoroughly analyze potential adverse impacts from the proposed project to ESHA and determine its consistency with the CCMP, the information identified above is necessary. As of the date of this staff report, DAF has not provided the information and Commission staff has not been able to evaluate the extent of project related impacts that would be identified through implementation of adequate monitoring.

Mitigation

Species specific mitigation is proposed for those species that may be adversely affected by the increased Falcon 9 launch cadence. For western snowy plover and California least tern, mitigation proposed by DAF would involve increasing predator control efforts in the non-breeding season. Currently, the DAF funds three full-time staff to perform predator control efforts on VSFB during the breeding season. The DAF would add one full-time staff to continue these activities through the non-breeding season. These activities would include trapping, shooting, and tracking known predators of snowy plover with particular focus on raven and crow removal at and adjacent to VSFB beaches. The DAF would report predator removal efforts and success within an annual report.

For bat species, DAF would provide additional bat habitat in the form of bat boxes, by retrofitting existing structures to make them suitable for bats, or by improving bat riparian habitat. For California red-legged frogs, DAF proposes to create new CRLF breeding habitat at a 2:1 ratio (breeding habitat enhanced: breeding habitat affected) at the San Antonio Creek Oxbow Restoration Area, an established wetland mitigation site that is located outside of areas impacted by launch noise over 110 dB on VSFB.

No mitigation is proposed for adverse impacts to monarch butterfly.

Lack of Information

Although it is foreseeable that implementing predator controls may benefit western snowy plover and California least tern to some degree, it isn't clear from the mitigation plan how predator controls relate directly to the types of responses being exhibited by western snowy plover and California least tern during an increased number of launches. For example, it is possible that if the birds are consistently flushing in response to launches they could be depleting their energy reserves. Birds that engage in repeated short flights were found to expend significantly more energy than under "non-flying" controls which equated to a flight expenditure multiple times their basal metabolic rate⁵⁰. The project doesn't clearly explain or demonstrate how predator controls would mitigate for depleted energy reserves.

⁵⁰ <https://pubmed.ncbi.nlm.nih.gov/10769218/>

As described in the 2023 annual monitoring report, in addition to responses from western snowy plover and California least tern, the monitoring recorded responses from predators. Specifically, predators were observed moving away from launch noise. The report concluded it is possible that consistent launches may be impacting predators in the vicinity. If the launches are in fact causing predators to move out of the area, then it would mean there are fewer predators in the area of western snowy plover and California least tern nesting areas. The mitigation program from DAF for western snowy plover and California least tern specifically proposes predator control efforts during the breeding season. If predators are already reacting to the launches and moving out of the area, then the proposed mitigation may be ineffective or provide limited value.

Questions raised by the lack of information on mitigation for these species is described below:

- How is predator control intended to mitigate for adverse impacts to western snowy plover and California least tern?
- If predators are already being driven out of the project area by launches, is alternative mitigation available to quantifiably offset adverse impacts to western snowy plover and California least tern? How would this be achieved?
- Where and how would additional bat habitat be created?
- Are there any mitigation measures available for monarch butterflies?

All of this uncertainty could mean that mitigation may not be able to effectively offset the project's potential adverse impacts to sensitive species and habitat areas. In order for the Commission to thoroughly analyze the efficacy of the mitigation and determine if the proposed project is consistent with the sensitive species and habitat protection policies of the CCMP (Section 30240 of the Coastal Act), the information identified above is necessary. As of the date of this staff report, DAF has not provided the information and Commission staff has not been able to evaluate the extent of project related impacts or the likelihood and magnitude of benefits that would be provided through implementation of adequate mitigation.

Artificial Night Lighting

In its CD submittal, DAF provided information about operations in the VSFB harbor and use of lighting at night. After salvage and landing operations are complete, any first stages, fairings and other materials would be transported via barge to the VSFB harbor. Once at the harbor, the equipment and materials would be loaded onto trucks for transport back to processing facilities at VSFB. Several marine species including pinnipeds and the federally threatened southern sea otters are known to frequent the area in and around the VSFB harbor. Any landing operations at the harbor occurring at night would require the use of artificial lighting to help facilitate project operations. The effects of artificial night light on marine species have been documented in recent years and include effects on physiology, navigation, reproductive behavior, predation success, and community structure. In order to minimize adverse effects to marine species from artificial night lighting the project incorporates several measures, including entering the

harbor at night when pinnipeds are not present and limiting and restricting nighttime activities and the use of artificial night lighting.

At present, there is little available information about the intensity of artificial night lighting at the SpaceX launch facility or its potential for adverse effects to nearby ESHA or sensitive species. Light is used by plants and animals to infer a wide range of information from their environment. One of the most important roles of light for both plants and animals is regulation of their biological clocks or circadian rhythms on a daily, weekly, seasonal, and annual basis, and thus light is a key influence on fundamental behaviors such as sleeping, foraging, hunting, eating, moving, and resting. Introducing artificial night light to an area will change the ambient setting and may adversely impact animals. Likely effects of artificial night lighting on mammals include avoidance, disorientation, disruption of foraging patterns, increased predation risk, disruption of biological clocks, increased mortality on roads, and disruption of dispersal movements through artificially lighted landscapes⁵¹.

A primary concern with both the regular illumination at the launch facility and the more episodic illumination from the rockets during night launches and landings is their location near the coast and the potential for night-migrating birds to become confused and attracted to the lights during inclement/foggy weather. Most migratory movement occurs early in the evening so any impacts to migrating birds due to artificial night lighting are likely to occur during the first two to three hours after sunset. Birds that migrate at night rely on the moon and stars for navigation. During clear weather the birds appear to be able to distinguish artificial night lighting from light emanating from planets and stars. However, during inclement weather, birds can become confused and drawn to artificial night lights. This phenomenon has been observed on numerous occasions at lighted buildings, oil platforms, and athletic fields. Once drawn into an artificial light source, a number of negative outcomes including mortality can occur; birds may crash into something, circle the light source and become exhausted, or become confused and drawn off course.

In addition to the potential disruption of migratory patterns, the University of California Los Angeles (UCLA) published a study in 2021 examining how exposure to artificial light at night (ALAN) could affect the distributions of avian species, in particular western snowy plovers⁵². The study included western snowy plover roosting sites from northern Ventura County line down to the southern Orange County line. The study used species distribution models with exposure to ALAN based on a ground-verified model of night sky illuminance. The study determined that significant declines were found in the likelihood of western snowy plover roosting locations where ALAN exposure exceeded illuminance levels equivalent to approximately one half a full moon. The study concluded that these disruptions in behaviors were likely the result of increased risk of predation and that control of nighttime illumination be used to mitigate disturbances to western snowy plover.

⁵¹ J. Engel & N. Sadrpour memo: Pepperdine University, CLP; Component 5 August 23, 2013

⁵² <https://meridian.allenpress.com/jcr/article-abstract/38/2/302/474456/Determining-the-Effects-of-Artificial-Light-at>

Bats are nocturnal animals adapted to life in the dark and therefore artificial night lighting of bat roosts and foraging pathways can be extremely disturbing. Artificial night lighting can cause many problems for bats including delaying or preventing emergence from roosts, abandonment of roosts, and avoidance of important foraging areas. Insect eating bats, such as pallid and western red bats, and other carnivorous bats, are highly adapted to finding prey in the dark, while avoiding predators. These species are particularly vulnerable to the effects of light pollution.

Artificial night lighting also has the potential to negatively impact California red-legged frogs and their use of habitat areas. Although no CRLFs were located near the proposed project site, light from launch vehicles would extend beyond the project site and into other areas of VSFB. In studies on wood frogs, experimental exposure to artificial light at night was found to make them more vulnerable to other stressors such as parasites and pollution (DAF 2023). Another study focused on common toads found that artificial night lighting reduced activity in male toads by half during the breeding season and changed their energy metabolism, which has the potential to adversely affect reproduction and overall fitness (DAF 2023). The effects of artificial night lighting on frogs are inconsistent and vary by species and life stage; however available research indicates a potential risk to CRLF breeding habitat from the proposed project.

Lack of Information

The increased frequency of launches represents a novel disturbance to the habitats and species of VSFB and there currently is not sufficient data to understand how species within the area could be reacting to artificial night lighting. Basic information about the type, location, direction and duration of artificial night lighting at the SpaceX launch complex is necessary in order for this issue to be evaluated. In addition, information about artificial night lighting footprints from rocket engines is also needed to facilitate an assessment of that aspect of the project and the locations, species and habitats it may be affecting. Finally, more population level monitoring and statistical analysis is necessary to better understand the potential for adverse effects from artificial night lighting from the proposed launch activities. USFWS recently started investigating the increase in artificial night lighting from launch activities at VSFB, including the SpaceX launches proposed in the CD, and has been coordinating with DAF. DAF is working with USFWS on measures to minimize the potential adverse impacts from night lighting including development of a light management plan. However, as of the date of this staff report no information about artificial night lighting and nearby ESHA and sensitive species has been provided to Commission staff nor has the plan been provided to Commission staff.

Questions raised by the information provided on lighting are summarized below:

- What type and intensity of artificial night lighting is used at SLC-4E and SLC-4W?
- At what times is lighting used and for how long?
- What potential impacts could artificial night lighting have on the surrounding environment (light trespass or spill, sky glow, and glare)?

- Has the base monitored/recorded the specific lighting levels on Surf Beach during night launches to account for anticipated increased illuminance within the adjacent areas expected from rocket flare?
- How could these impacts be adversely impacting sensitive species?
- What Best Management Practices (BMPs) could be applied to minimize the effect of artificial night lighting at SLC-4E and SLC-4W infrastructure as well as Falcon 9 flare?

Without answers to these questions, it is not possible to effectively analyze the potential adverse impacts to sensitive species and habitats around the project site as a result of artificial night lighting. In order for the Commission to be able to evaluate the project's consistency with the sensitive species and habitat protection policies of the CCMP (specifically, Section 30240), the information identified above is necessary. As of the date of this staff report, DAF has not provided the information and Commission staff has not been able to evaluate the extent of project-related impacts from artificial night lighting.

Conclusion

The project launch and landing facility is located adjacent to monarch butterfly overwintering ESHA and launches and landings of the SpaceX Falcon 9 rocket would produce sounds and sonic booms that would be experienced by several sensitive species (western snowy plover, California least tern, pallid and western red bats, and California red-legged frog) that are known to inhabit areas within VSFB as well as the beaches located elsewhere on the Santa Barbara County and Ventura County coastlines. Additionally, launching operations at night have the potential to expose these same species, plus other species such as migrating birds, to artificial lighting at night.

Coastal Act Section 30240 subdivision (a) states that ESHA shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas. Coastal Act Section 30240 subdivision (b) states that development in areas adjacent to ESHA shall not degrade those areas or be incompatible with their continued presence. While the project does not propose any construction activities within ESHA, it does include a variety of elements such as artificial night lighting and pressure and sound waves that have the potential to directly disrupt and degrade nearby ESHA. However, the Commission is unable to fully analyze these potential adverse impacts on ESHA due to the lack of adequate and complete information provided by DAF in its consistency determination. Namely, the lack of robust and detailed monitoring results, questions on the efficacy of the proposed mitigation, lack of any information on the use of artificial lighting at night, and absence of evaluation of what effect that lighting could have on sensitive species and habitats. Unless DAF provides this information, the Commission will be unable to fully assess the proposed project's consistency with the sensitive species and habitat protection policies of the CCMP.

In conclusion, the Commission finds that DAF has not provided sufficient information on the proposed project and its potential adverse impacts to ESHA and without this

information previously identified in Section III.B above, specifically Items Four (Monitoring of ESHA), Five (Mitigation for Adverse Impacts to ESHA), and Six (Artificial Lighting at Night), the Commission is unable to determine whether the proposed project is consistent with the ESHA policy of the CCMP, Coastal Act Section 30240. The Commission therefore objects to DAF's consistency determination, based on the lack of adequate information to determine the project's consistency with the ESHA policy of the CCMP.

E. COMMERCIAL AND RECREATIONAL FISHING

Section 30234.5 of the Coastal Act states:

The economic, commercial, and recreational importance of fishing activities shall be recognized and protected.

The proposed project has the potential to affect commercial and recreational fishing activities off the coast of VSFB. Coastal Act Section 30234.5 requires that the commercial and recreational importance of fishing be recognized and protected.

A map depicting the range of SpaceX's launch angles with respect to areas of commercial fishing is provided in **(Exhibit 13)**. DAF describes SpaceX's launch azimuth and relation to fishing areas in the CD as follows:

Southern California's west coast is a leading recreational and commercial fishing area. SpaceX launches missions from VSFB with a launch azimuth between 140 and 325 degrees, supporting a wide range of U.S. Government missions. The maritime hazard area for any given mission would include up to approximately 54 California Commercial Fisheries Blocks as defined by the California Department of Fish and Wildlife. Southerly trajectories would cover more blocks than westerly trajectories, as the vehicle's trajectory is over state waters for longer. The maritime hazard area follows the path of the trajectory and is approximately 21 miles wide at its widest. These launch azimuths also include multiple State Marine Reserves, which prohibit or significantly limit fishing. These are generally clustered around VSFB and the Northern Channel Islands.

In the event that SpaceX launch and reentry operations pose an extreme risk to public safety over navigable waters, the United States Coast Guard (USCG) would have the authority to determine whether risk mitigating strategies would need to be implemented, including restricting vessel traffic. USCG would be responsible for issuing a Notice to Mariners (NOTMAR) that would provide vessel operators with a location of potential hazards as well as dates and times of the hazardous conditions. Launches would be scheduled in advance to minimize the interruption of airspace and waterways. Once a NOTMAR is issued, there is no requirement for vessels to alter their routes or change their navigation speeds and if vessels are within the potentially hazardous area despite the NOTMAR, a scheduled launch would be delayed or altered to avoid potential hazards to vessels.

In addition, DAF and SpaceX have committed to establishing a communication protocol and regular dialogue with the commercial and recreational fishing industry in this area of the coast including: the Port San Luis Commercial Fishermen's Association, other fishing associations, fish buyers and processors, harbor masters, and sport fishing companies. Prior to each scheduled launch, the chairperson of these entities would be sent an email which would include the date and time of the hazardous conditions as established in the NOTMAR, and how long the conditions would be in effect. If these measures do not fully satisfy fishermen, DAF has committed to engage in additional coordination prior to and on the day of scheduled launches. This additional coordination would include updated safety calculations and real-time radio communications.

Lack of Information

Concerns about the launching of space vehicles from VSFB, NOTMARs, and the need to recognize and protect the importance of fishing were previously expressed by local fishermen and processors at the Commission's December 2023 meeting for CD-0010-22 and also in comments submitted for the April 2024 meeting for this project. Those comments raised concerns that the project would require closure of fishing grounds without compensation to mitigate to impacts to fishing. The comments also stressed the need for increased communication between launch providers and the commercial fishing industry.

As described previously, between 2017 - 2021, VSFB supported an average of 4.4 rocket launches per year, with a maximum of 7 launches in both 2017 and 2018. Launch activities increased to 21 launches in 2022 and 36 launches in 2023. As of the date of this staff report, thus far there have been a total of 18 SpaceX rocket launches in 2024. The subject CD requests a launch cadence of up to 36 SpaceX launches per year. Although DAF has stated that launches would be scheduled to avoid interruption of waterways and that once a NOTMAR is issued vessel operators would not be required to alter routes or change navigation speeds, there is still significant uncertainty regarding how the rapid increase in launch cadence could adversely impact the fishing industry. First, a single launch can be scheduled and scrubbed multiple times before successfully launching, but DAF has not provided any information on how NOTMARs would be issued for rescheduled launches. Multiple NOTMARs issued for a single launch could create confusion within the fishing industry and preclude fishermen from fishing. Second, fishermen using the areas within the fishing blocks that may be impacted by launches typically fish during certain times of the day or periods of the year. DAF has not committed to ensuring that SpaceX will time its launches to avoid impacting these peak fishing times or periods. Third, DAF has not provided any specific information on how the updated safety calculations would benefit coordination with fishermen and also has not described how the real-time radio communications would be implemented. Fourth, DAF has not provided any information on what additional measures would be implemented if adverse impacts to fishing continue to occur despite these commitments.

Questions raised by the information provided on commercial and recreational fishing are summarized below:

- How would rescheduling of launches affect NOTMARs and coordination with fishermen?
- Why can't DAF ensure SpaceX avoid timing its launches to avoid peak fishing times or peak fishing periods of the year?
- How would the updated safety calculations benefit coordination with fishermen?
- How would the real-time radio communications with fishermen be implemented?
- What additional measures would be implemented if adverse impacts to fishing occur?
- How many past scheduled SpaceX launches have been delayed or altered to avoid potential hazards to vessels?

All of this uncertainty could mean that the project is not effectively recording and analyzing potential adverse impacts to fishing. In order for the Commission to thoroughly analyze potential adverse impacts, Commission staff are requesting the information identified above. As of the date of this staff report, DAF has not provided the information and Commission staff has not been able to evaluate the extent of project related impacts or the likelihood and magnitude of benefits that would be provided through implementation of adequate mitigation measures.

Conclusion

Launches of the Falcon 9 rocket would follow a southern trajectory over areas used by commercial and recreational fishermen. Although DAF has stated that once a NOTMAR is issued, vessel operators would not be required to alter routes and DAF would coordinate with fishermen on launches, significant questions still remain about the potential effects the project could have on fishing.

Coastal Act Section 30234.5 requires that the commercial and recreational importance of fishing be recognized and protected. The Commission is unable to fully analyze the potential adverse impacts on fishing due to the lack of information and unless DAF provides the information requested by Commission staff, this uncertainty would remain.

In conclusion, the Commission finds that DAF has not provided sufficient information on the proposed project and its potential adverse impacts to fishing and without this information previously identified in Section III.B above, specifically Item Seven (Commercial and Recreational Fishing), the Commission is unable to determine whether the proposed project is consistent with the commercial and recreational fishing policy of the CCMP, Coastal Act Section 30234.5. The Commission therefore objects to DAF's consistency determination based on the lack of adequate information to determine the project's consistency with the fishing policy of the CCMP.

F. COASTAL WATERS

Section 30231 of the Coastal Act states (in relevant part):

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through...controlling runoff, preventing depletion of ground water supplies and substantial interference with surface waterflow, [and] maintaining natural vegetation buffer areas that protect riparian habitats.

The proposed project has the potential to negatively affect water quality in Spring Canyon and the Pacific Ocean due the use of deluge water during launch events and the ocean disposal of the rockets' fairing and weather balloons. The project will use existing infrastructure at Space Launch Complex 4 (SLC-4) so there is no potential for adverse impacts to water quality from construction activities. The proposed project has the potential to contribute to the depletion of groundwater supplies and interfere with surface water flow due to its water supply needs.

Water Quality

VSFB is divided into northern and southern halves by the Santa Ynez River. The two launch facilities (SLC-4E and SLC-4W) where SpaceX would be operating are located on South VSFB (Exhibit 1). Major drainages in the area of South VSFB include Bear Creek, Cañada Honda Creek, and Jalama Creek. There are also several unnamed minor drainages with intermittent ephemeral streams. All of these creeks and streams flow west and ultimately release into the Pacific Ocean. The two most proximal water bodies to SLC-4E and SLC-4W are Spring Canyon and the Pacific Ocean (Exhibit 2). Spring Canyon, which contains a seasonal, ephemeral stream, is located immediately adjacent to the southern perimeter of SLC-4E and SLC-4W, while the Pacific Ocean is approximately 0.5 miles to the west. The project would utilize existing launch and landing facilities and no new construction of any kind is proposed. However, launching of vehicles and daily operations have the potential to result in release of sediment and various contaminants which could eventually migrate to the aforementioned water systems.

The DAF's water quality analysis in its CD submittal focused on potential water quality effects from launch operations. The DAF concluded that:

Launch activities at SLC-4 would create exhaust clouds; however, Falcon does not use solid fuels. Wastewater discharges that may occur during project activities, including accumulated stormwater and non-stormwater discharges, would continue to be managed in accordance with the Regional Water Quality Control Board (RWQCB) letter for Enrollment in the General Waiver of Waste Discharge Requirements for SLC-4E Process Water Discharges. After a launch, approximately 9,000 gallons of deluge water per Falcon 9 launch would remain in the existing retention basin after evaporation. Samples of the deluge water would be collected and analyzed. If the water is clean enough to go to grade, it would

be discharged from the retention basin via the spray field. Currently, the water can be discharged to grade via the spray field approximately 90-95% of the time. It would then percolate into the groundwater system and flow down gradient into Spring Canyon. Therefore, impacts to surface water from launch operations under the Proposed Action would not be significant.

Commercial space companies are independently responsible for compliance with provisions of the Clean Water Act and its requirements for development of site-specific Spill Prevention, Contingency, and Countermeasures (SPCC) plan under 40 C.F.R. 112. Inspection and enforcement of each SPCC and any permitted tanks are delegated to the Santa Barbara County Certified Unified Programs Agency. The SPCC requirements for commercial space companies do not fall under the jurisdiction of SLD 30. SpaceX maintains and operates under an SPCC with Santa Barbara County CUPA. Under 40 C.F.R. 112, the SPCC includes elements that the Commission considers critical for these plans, including: an oil spill risk and worst-case scenario spill assessment, response capability analysis of the equipment, personnel, and strategies (both on-site and under contract) capable of responding to a worst-case spill, including alternative response technologies, oil spill preparedness training and drills, and evidence of financial responsibility demonstrating capability to pay for costs and damages from a worst-case spill. SpaceX's secondary containment is sized to capture all materials contained within any tanks present and the SPCC includes the necessary specifications on the spill response supplies needed at the site during operations.

The propellant for the Falcon 9 rocket would not include any solid fuels and would instead use liquid fuels consisting of rocket grade kerosene (RP-1) and liquid oxygen. Combustion of solid fuels release greater amounts of reactive chemicals and other pollutants compared to liquid fuels. Also, the Falcon 9 rocket would use oxidizer-rich staged combustion engines that produce a diminutive amount of soot. After ignition a deluge of water would be flooded onto the launch pad. The purpose of this deluge of water is to absorb or deflect the high levels of acoustic energy that are released as the rocket lifts off and avoid damage to the vehicle and payload. The exhaust cloud comprised of combusted fuel and water from the deluge would largely consist of steam with insignificant amounts of hazardous materials due to the oxidizer-rich staged combustion engines. Any deluge water that is not converted into steam would remain in the retention basin and would only be discharged after it meets the required certifications. As such, the launching of the Falcon 9 rocket would not result in adverse impacts to surface water quality.

Water Supply

Water use for SpaceX launches would include water for personnel and operational activities as well as deluge water for the launches, as discussed above. At the full proposed cadence of up to 36 launches per year, the annual amount of deluge water needed for SpaceX operations would be up to 7.2 million gallons. However, DAF reports

that SpaceX has, over time, greatly reduced the amount of water needed for launch activities:

Since the original project's implementation, SpaceX has reduced the amount of water needed in the flame duct per launch from 200,000 gallons to 70,000 gallons. In November 2022, SpaceX also replaced the former deluge water system with a closed loop system for cooling water that eliminates the need to utilize launch pad water for cooling.

By incorporating this closed loop system, the total annual requirement of water for the deluge system is reduced by 65 percent to 2.52 million gallons. In addition, up to 2.1 million gallons annually would be required to support the personnel and operational activities at the launch complex. The total maximum water supply need for the SpaceX launches is up to 4.28 million gallons annually, which is roughly the equivalent water use of twenty-three American households annually.

Section 30231 of the Coastal Act states that proposed projects should prevent depletion of groundwater supplies and prevent substantial interference with surface water flow. The water supply for VSFB includes four wells in the San Antonio Creek Valley Groundwater Basin. According to the 2022 Annual Report for the San Antonio Basin Groundwater Sustainability Agency (SAGSA), VSFB used up to 2,600 acre-feet of water in 2022. The majority of water users of the groundwater basin are agricultural. SAGSA found that the cumulative levels of groundwater storage in the San Antonio Creek Valley Groundwater Basin have decreased by 147,700 acre-feet between 2015 and 2022. Overall, San Antonio Basin Groundwater Sustainability Agency states:

Current basin conditions, comparison of current and historical groundwater elevation contour maps, and the basin historical water budget presented in the [Groundwater Sustainability Plan], indicate groundwater pumping in excess of the sustainable yield has created challenging conditions for sustainable management.

However, DAF has indicated in its consistency determination that the proposed project would not increase DAF pumping or water use from the San Antonio Creek Valley Groundwater Basin and is within the normal fluctuation of water demand at VSFB. This is due to the low water needs of the project, estimated to be approximately 0.7% of total base-wide water use. In its consistency determination, DAF states:

The Proposed Action's water usage would therefore be negligible and not result in any measurable impacts to flow rates, hydration periods, or water levels in San Antonio Creek and not contribute in any measurable way to the collective effects of water extraction requirements for all VSFB operations.

In essence, DAF has concluded that the impacts to surface water in San Antonio Creek as a result of SpaceX launches would not be significant.

Wetlands

A water deluge of the launch area is required during Falcon 9 launches to reduce the potential for damage from vibration during liftoff. SLC-4E currently has a civil water diversion structure to help capture and divert any water from this deluge that could potentially flow overland and into Spring Canyon. However, even with this diversion structure, approximately 25,000 gallons of steam could reach Spring Canyon for each launch event. As discussed above, any water discharged into Spring Canyon would meet the water quality thresholds identified by the California State Water Resource Control Board (SWRCB) in the statewide low threat discharge to surface waters permit.

The hydrology of Spring Canyon is described by DAF as follows:

Spring Canyon Creek originates approximately 1.4 miles inland and flows toward the Pacific Ocean. Lower Spring Canyon is an ephemeral creek that occasionally has intermittent standing water upstream from Surf Road. Surface flow percolates into the groundwater to pass beneath road embankments and eventually enters the Pacific Ocean (USAF, 1987)...the physical connectivity in Spring Canyon is blocked at Coast Road.

Vegetation types within Spring Canyon consist of: Central Coast Arroyo Willow Riparian Forest and Scrub; non-native trees such as Tasmanian bluegum eucalyptus (*Eucalyptus globulus*) which is a documented monarch butterfly roost; maritime chaparral with chamise (*Adenostoma fasciculatum*), La Purisima manzanita (*Arctostaphylos purissima*), and Santa Barbara mountain lilac (*Ceanothus impressus*); central coastal scrub; and invasive non-native plant cover.

Bird species within Spring Canyon consist of common species such as finch (*Carpodacus mexicanus*) and Brewer's blackbird (*Euphagus cyanocephalus*). No special status bird or reptile species have been documented in Spring Canyon. Spring Canyon may contain upland habitat for amphibians. However, due to the ephemeral nature of the drainage and lack of standing water during most years, Spring Canyon is considered only marginal habitat for the California red-legged frog.

In order to avoid and minimize adverse impacts to nesting migratory birds within Spring Canyon from hot steam produced as a result of the deluge curtain, SpaceX would remove all vegetation within a 3.3-acre area consisting of arroyo willow riparian habitat **Exhibit 10**. Since Spring Canyon is a relatively short, 1.4-mile, ephemeral creek with intermittent flows and standing water, and the area of the vegetation removal is outside of the creek corridor and would consist of arroyo willow riparian habitat that does not host any sensitive or listed species, the area of the vegetation removal does not meet the definition of ESHA pursuant to 30107.5. However, arroyo willow riparian vegetation is wetland vegetation - one of the parameters indicative of wetland habitats - and as such, the area of arroyo willow riparian vegetation constitutes coastal wetlands.

Removal of the vegetation would be performed by mowers and hand equipment prior to nesting bird season, and attempts would be made to reduce impacts to the drainage as

much as possible. Additional vegetation removal (e.g., mowing) of the impact area would be performed outside of nesting bird season (15 February to 15 August) annually as needed to maintain low stature vegetation. Vegetation removal would result in an estimated 1.121 acres of permanent impacts to arroyo willow habitat. The vegetation clearance within this area would not maintain optimum populations of wetland species consistent with 30231.

Lack of Information

During the course of Commission staff's review of this CD, DAF staff noted that vegetation clearance in this area has occurred at least as far back as 2010 and that it was their understanding that this activity was considered by the Commission in negative determination (ND) No. ND-055-10. However, in the concurrence letter associated with that ND the vegetation clearance activities were described as extending approximately 30 feet beyond the perimeter of the facility. At present, and as described in the subject CD, however, vegetation clearance extends approximately 300 - 450 feet beyond the perimeter of the facility and into wetland habitat.

Several other agencies also appear not to have been initially aware of this expanded vegetation clearance activity, and in December 2017, the Regional Water Quality Control Board (RWQCB) provided after-the-fact authorization for it.. Additionally, DAF chose to prepare and implement a wetland habitat restoration and monitoring effort. This wetland habitat enhancement has been occurring at a nearby location within Spring Canyon on VSFB at a ratio of 2:1 (2.6 acres restored:1.1 acres impacted).

However, the Commission has historically required mitigation for adverse impacts to wetlands at ratios greater than 2:1, particularly in cases where mitigation consists of the enhancement of existing habitats rather than the creation of new wetlands. In the present case, the current wetland enhancement at a 2:1 ratio, pursuant to the RWQCB and USFWS approved plan, appears insufficient to compensate for the loss of wetland habitat associated with the vegetation removal. Commission staff raised the issue of the increased vegetation management with DAF staff.

In response, DAF provided additional information questioning the area's identification as a wetland (essentially stating that while the area supports arroyo willow vegetation, this wetland vegetation is mixed with upland vegetation and may not be present in sufficient quantity/percent coverage to qualify as a wetland under the Commission's regulations, title 14 CCR section 13577(b)(1), which requires a showing that an area consists of "predominantly hydrophytic cover). DAF also clarified that despite its position that the area does not appear to be a wetland, DAF nevertheless developed and implemented an approximately two-acre wetland habitat enhancement project in 2017 within the Spring Canyon watershed to offset the mowing of approximately an acre of vegetation at a ratio of 2:1 (area of habitat enhanced: area of vegetation management). Although the habitat enhancement effort was focused on an area of wetland, the corresponding area of vegetation management included a mix of arroyo willow (a wetland plant species) and upland plant species. A formal wetland delineation was not carried out to determine if the percent coverage of arroyo willow was sufficient for some or all of the

area to be identified as a wetland under the Commission's regulations. As such, it's unclear if and how much wetland habitat under the Commission's regulations may have been present in the area of vegetation management.

Prior to its implementation, the DAF wetland enhancement project was considered and approved by staff of the Central Coast Regional Water Quality Control Board and U.S. Fish and Wildlife Service as adequate to address the removal of arroyo willow and upland vegetation within the area exposed to steam during launch activities. However, because no wetland delineation was carried out at the area prior to the vegetation removal activities that began roughly seven years ago, and DAF is contesting that the area currently supports wetland habitat, sufficient evidence is not currently available to indicate that the measures previously taken to offset the vegetation removal through over two acres of wetland habitat enhancement efforts provide sufficient mitigation for the adverse impacts to coastal wetlands.

Questions raised by the information provided on wetlands are summarized below:

- Is a formal wetland delineation available from before vegetation management occurred in the Spring Canyon area? What species and habitats are currently present within this area?
- What information was used to determine that restoration of 2.6 acres was sufficient to compensate for the loss of wetland habitat associated with the vegetation removal in Spring Canyon?

Without this information it is possible that the actual extent of adverse impacts to wetlands will remain unknown and the necessary mitigation for these adverse impacts may go unrealized.

Conclusion

With the testing of and appropriate discharge of deluge water and the lack of adverse impacts to available water supply the Commission finds those portions of the proposed project consistent with the water quality provisions of the Coastal Act under Section 30231.

However, the Commission is unable to fully analyze the potential adverse impacts to wetlands due to the lack of information and unless DAF provides the information requested by Commission staff, this impediment would remain. As such, the Commission finds that DAF has not provided sufficient information on the proposed project and its potential adverse impacts to wetlands and without this information previously identified in Section III.B above, specifically Item Eight (Wetlands), the Commission is unable to determine whether the proposed project is consistent with the wetlands policy of the CCMP, Coastal Act Section 30231. The Commission therefore objects to DAF's consistency determination based on the lack of adequate information to determine the project's consistency with the wetlands policy of the CCMP.

G. PUBLIC ACCESS AND RECREATION

Coastal Act Section 30210 of the Coastal Act states:

In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.

Section 30213 of the Coastal Act states (in relevant part):

Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided. Developments providing public recreational opportunities are preferred...

Section 30220 of the Coastal Act states (in relevant part):

Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.

Section 30221 of the Coastal Act states:

Oceanfront land suitable for recreational use shall be protected for recreational use and development unless present and foreseeable future demand for public or commercial recreational activities that could be accommodated on the property is already adequately provided for in the area.

Section 30223 of the Coastal Act states:

Upland areas necessary to support coastal recreational uses shall be reserved for such uses, where feasible.

The proposed project involves a six-fold increase (from six per year to 36 per year) in launches of the SpaceX Falcon 9 rocket from the existing space launch complex SLC-4E on the southern portion of Vandenberg DAF Base (VSFB), as well as up to 12 first stage landings at the existing SLC-4W launch complex. Depending on the trajectory of these rockets, prevailing atmospheric conditions, potential debris corridors from rocket explosion or catastrophic failure, and modeled public safety risks, closure and evacuation of public areas under the rocket trajectories has been historically necessary to protect the public from these potential rocket hazards. These closures and evacuations have had adverse impacts on public coastal access and recreation at Jalama Beach and the Jalama Beach County Park campground (referred, collectively, as "Jalama"), inconsistent with Chapter 3 policies of the Coastal Act.

Jalama Beach is an important public recreational resource because of its upland and water oriented recreational values and scenic resources. It is popular for surfing and wind surfing and used by people from all over the state. The Commission's California Coastal Resource Guide also describes this area as a popular fishing spot: "An offshore reef protects the nearshore waters from turbulent wave action, creating a popular sport fishing... spot." In addition, Jalama Beach County Park provides some of the only overnight beach camping sites within northern Santa Barbara County and is heavily used throughout the year. The sandy beach and estuary along Jalama Creek provide ample opportunity for the public to bird watch, walk, and passively enjoy coastal resources. The scenic resources of Jalama Beach provide a unique place to enjoy coastal recreational resources as well due to its remote location and the absence of visible development such as homes, buildings and lights in surrounding areas.

In the past, the Commission has had significant concerns about public beach closures in this area. The Commission has generally agreed that beach closures are necessary part of the space launching activities at VSFB and the Commission has generally supported these space launching activities. However, in evaluating these activities, the Commission required some mitigation for the beach closures. This mitigation included a limitation on the number of launches annually and other measures designed to reduce the significance of the impact.

The Commission has historically considered and analyzed the number of temporary closures to beaches in northern Santa Barbara County associated with launch activities and determined that with implementation of measures to minimize and offset adverse effects to the public, a total of 14 closures per year is consistent with the public access and recreation policies of the CCMP.

In its most recent negative determination (No. ND-0009-23), DAF analyzed the potential effects of the proposed increase in SpaceX launch and landing activity on coastal access and recreation uses and resources:

Since 1979, an evacuation and closure agreement has been in place between the Department of the Air Force (DAF) and Santa Barbara County (County). For the safety of park visitors, the County Parks Department and the County Sheriff currently close the parks upon request from the DAF. This agreement includes closing Jalama Beach County Park, Ocean Beach County Park, Surf Beach, and Point Sal Road, in the event of launch activities that have been determined by SLD 30 Range Safety to have certain human health and safety risks. These closures are communicated at least 72 hours prior to closure and can be closed for a maximum of 48 hours per the agreement. Point Sal Road is not anticipated to be closed due to SpaceX launches.

Under the Proposed Action, public access to the coastline via Jalama Beach County Park, Ocean Beach County Park, and Surf Beach may be temporarily restricted during launch and landing operations. The length and frequency of temporary closures are mission dependent and determined by SLD 30 Range

Safety; however, typical closures for launches from SLC-4E last between 4 to 8 hours. Launches from SLC-4E due to the Proposed Action would not cause an exceedance of 12 closures of Jalama Beach County Park per year. In the past, SLD 30 has restricted access to Ocean Beach County Park and Surf Beach for all launches from SLC-4E. Based on updated modeling and safety considerations, SLD 30 Range Safety and the Security Forces Squadron have determined closures are only required if the first stage of the Falcon 9 launch vehicle will boost back to land at SLC-4W. Thus, closures due to the Proposed Action would be infrequent (up to 12 times per year) and would not substantially diminish the protected activities, features, or attributes of Jalama Beach, Surf Beach, or Ocean Beach County Parks.

If it is later determined there are public safety issues or other human health and safety concerns, additional closures may be authorized. The DAF would notify the California Coastal Commission and determine the best path forward to offset impacts if more than 12 closures will occur in a calendar year during open public access hours .

Access to the coastline from Surf Beach is available year-round. During the western snowy plover season, beach access is available from 0800-1800 and restricted during evening hours from 1800-0800. Access to the coastline from Ocean Beach County Park is available via a trail established by SLD 30 connecting this area to the coastal access available at nearby Surf Beach.

Ocean Beach County Park is open from 8:00 AM to dusk year-round. A portion of launches would occur at night when these locations are closed. Accordingly, the Proposed Action would only restrict public access to the coastline during daytime launches with boost back to SLC-4W.

Activity Conducted and Having Effects Substantially Different than Described

In its December 15, 2023, findings, the Commission discussed how the SpaceX space launch activity was affecting public coastal access and recreation different than as described in the ND. The Commission found that:

Based on this description and analysis, effects to coastal access and recreation from SpaceX's increase in launch and landing activities (from 6 to 36 launches and 6 to 12 landings) were expected to be limited to no more than 12 temporary closures of Jalama per year during launches. Closures were expected to last four to eight hours.

Shortly after the Executive Director's concurrence with DAF's negative determination (No. ND-0009-23), however, Commission staff were informed through discussions with Santa Barbara County Parks and Recreation Department staff responsible for the management of Jalama Beach County Park that the number of closures at Jalama due to SpaceX launches within the first seven months of the year had already exceeded the maximum annual number committed

to by DAF. While there may be some discrepancy based on data collection methods, it is Commission staff's understanding that Jalama had been closed and evacuated 15 times by July 7, 2023, three more than the "no more than 12" stated by DAF in its negative determination.

In addition, over a dozen more launches and potential closures of Jalama were scheduled to occur before the end of that year.⁵³ Additionally, as noted above, launch frequency and beach closure information from 2022 indicates that the number of SpaceX launches and related beach closures also exceeded the numbers evaluated in the prior ND concurrence (ND-0027-15).

The Commission went on to find that:

These exceedances appear to be due, in part, to SpaceX directly communicating with Santa Barbara County regarding scheduled launches and closures in a manner that DAF was unaware of and that did not take into consideration DAF's commitment and, in part, due to the fact that the process for evacuations and closures of Jalama in anticipation of a scheduled launch was not as simple and linear as one closure per launch. Rather, a single scheduled launch could require multiple evacuations and closures of Jalama. Several variables, such as weather, could result in a launch being scheduled, cancelled, and rescheduled any number of times before successful completion. As such, Jalama could be closed multiples times because of a single launch.

Through discussions with Santa Barbara County Parks and Recreation Department staff, Commission staff also came to understand that adverse impacts to public access and recreation at Jalama as a result of launches were not limited to only closures and evacuations of the beach and park – as described and analyzed in DAF's negative determination - but rather that they occurred in four primary ways.

The first is through an advanced email notification to camping reservation holders that they may be required to temporarily evacuate Jalama during their stay due to safety concerns over potential hazards from a scheduled launch. Jalama includes a total of 110 individual camp sites ranging from basic campsites for tent campers, group sites for large parties of tent campers, sites with water and electricity hookups for recreational vehicles (RVs), and cabins equipped with additional amenities. Based on information provided to Commission staff by Santa Barbara County, these evacuation notifications often result in cancellations by approximately 25% of reservation holders, due to concerns about needing to pack up and evacuate approximately 30-40 minutes away to Highway 1 several hours in advance of a scheduled launch – some of which occur late at night or during early morning hours. At maximum capacity, Jalama can accommodate approximately

⁵³ Following Commission staff's identification of this issue with DAF, a refined protocol was established that only required the closure and evacuation of Jalama during launches if generally 400 or more members of the public were present at the beach and campground. In addition, SpaceX shifted launch trajectories and/or launch timing to overnight hours when numbers are lowest at Jalama

900 campers per night so any particular launch could result in significant disruption and loss of coastal recreation and low-cost overnight accommodation resources. Each evacuation notification and resulting reservation cancellation can also result in lost revenue for Santa Barbara County, which owns and operates the campground

The second way that public access and recreation was adversely affected was through similar notices that are provided through the County's reservations website to those attempting to book a campsite during the time of a scheduled launch. These notifications also resulted in cancellations and limit bookings, both of which reduce public coastal access and recreation.

In addition to overnight camping, Jalama offers day use parking and facilities for members of the public. Popular activities for day use visitors include exploring Jalama's beaches, picnicking, fishing, and surfing. The third way that public access was adversely impacted is through closure of the road to Jalama to prevent day-use patrons from entering the park during evacuations or to limit the number of people at Jalama in order to remain below the 400-person level that would trigger an evacuation and closure event. Jalama includes dozens of parking spaces for day-use patrons and, as one of the few publicly available beaches in northern Santa Barbara County, is a popular and well used area. Thus, in addition to the displacement of campers, a particular launch and closure of Jalama Road also has the potential to eliminate public access and recreation opportunities for day-use patrons.

The fourth and most severe type of adverse impact to public access and recreation was through evacuation sweeps of the park to remove all campers and day-use patrons currently within Jalama prior to a scheduled launch. Any campers and day-use patrons were asked to leave Jalama and not return until the launch has completed. Jalama is located in a remote part of the County, with the nearest town being Lompoc located 20 miles to the north. Jalama is accessed by a narrow, two-lane road. Vacating the park and traveling to Lompoc to wait for launch completion takes significant time, approximately 45 minutes each way. Considering the time needed to drive out of Jalama to Lompoc, the time for a launch to initiate and complete, and the time needed to drive back to Jalama from Lompoc, campers and day-use patrons who had been evacuated from Jalama could be displaced for much of the day, between four and eight hours.

As noted by DAF in its 2023 negative determination (ND-0009-23), in 2022, a total of 13 SpaceX launches occurred. Although there may be discrepancies based on data collection methods, it is Commission staff's understanding based on information provided by County staff, that these triggered 18 evacuation notification emails to reservation holders as well as eight evacuation and closure events at Jalama.

The Commission’s findings on how the activity was being conducted and was having effects substantially different than described concluded by stating:

Because DAF’s negative determination stated that no more than 12 closures would occur⁵⁴ and did not describe or evaluate the full range of adverse impacts to coastal access and recreation resulting from SpaceX’s expanded launch program, a program that, at the time of the negative determination’s submittal, had already expanded well beyond the level previously considered and concurred with by the Executive Director, the Commission found in December of 2023 that the SpaceX program was being conducted and was having coastal effects substantially different than originally described by DAF in its negative determination. This finding led to the consistency determination currently being considered.

In 2023, it is Commission staff’s understanding that a total of 28 SpaceX launches occurred. Between January and July 2023, these launches required 16 evacuations and closures of Jalama Beach and Jalama Road, 21 evacuation notification emails to reservation holders and an unknown number of reservations that were not made due to concerns about potential evacuations. Between August 2023 and March 2024, 30 launches were carried out but no evacuations of Jalama Beach or closures of Jalama Road were required or carried out. This is because the launches were scheduled during nighttime hours when the occupancy of Jalama has been below the evacuation threshold. Further, no evacuation emails have been sent and only seven contingency emails⁵⁵ have been sent. Santa Barbara County has indicated that less than one percent of reservations have been cancelled or changed due to the contingency emails during this time. Thus far this year, through the end of May 2024, a total of 18 SpaceX launches have occurred. Although any increase in SpaceX launches beyond the 36 per year currently proposed by DAF and evaluated in this report would trigger additional federal consistency review by the Commission, an additional 40 SpaceX launches are tentatively scheduled through the end of 2024. These could result in additional camper notifications, closures of Jalama Road, and evacuation sweeps.

Effects on Coastal Resources and Consistency with the CCMP

Due to the limited availability of coastal access and recreation opportunities in northern Santa Barbara County – which only includes three publicly accessible beaches in the approximately 63 miles between Gaviota State Beach and Pt. Sal – and their high levels of use and regional importance, the Commission has long been concerned about any potential adverse effects to public access at these beaches.

In prior reviews of coastal and recreational access impacts from space launch activities at VSFB, adverse impacts to public coastal access and recreation have been described in terms of “beach closures.” As noted above, in its concurrence with the DAF’s

⁵⁴ The commitment that no more than 12 closures would occur was also included in the subject CD.

⁵⁵ These emails consist of notifications sent by Santa Barbara County staff to Jalama campground reservation holders once the County receives contingency evacuation notices from DAF about an upcoming scheduled SpaceX launch and potential evacuation. Emails are sent several days in advance of the anticipated launch date.

Consistency Determination No. CD-049-98, the Commission found that with the addition of minimization measures (such as avoiding high use holidays and summer months), an average of eight and maximum of 14 launches per year and associated temporary beach closures would be consistent with the coastal access and recreation policies of the CCMP.

Although this numeric limit was established in 1998 and prior to the authorization of a wide range of new space launch programs with significantly higher stated levels of launch activity, the DAF adhered to it consistently through 2021. However, the number of launches from VSFB has steadily increased over the past two years and exceeded the limit of 14 closures per year maximum considered by the Commission in CD-049-98. In addition, as described above, Commission staff have learned that adverse impacts to public coastal access and recreation in northern Santa Barbara County associated with the SpaceX expanded rocket launch and landing activities, particularly at Jalama, take a variety of forms and cannot simply be categorized as “beach closures.”

Accordingly, the scope and magnitude of adverse impacts to the coastal access and recreation resources of northern Santa Barbara County that have occurred as part of SpaceX’s expanded launch and landing program significantly exceed those previously considered and concurred with by the Commission and Executive Director in their review of prior space programs at VSFB. These adverse impacts are not consistent with the relevant coastal access and recreation protection and maximization policies of the California Coastal Management Program, including Sections 30210, 30213, 30220, 30221 and 30223.

On December 15, 2023, the Commission approved a resolution making these findings, and “re-opened” the Executive Director’s prior concurrence by concluding that the original negative declaration made by DAF for the subject SpaceX launch activity was no longer applicable to the project as described and conducted. Approval of that resolution made the Executive Director’s prior concurrence with the ND no longer applicable and authorized the Executive Director to prepare and send a letter to DAF requesting remedial actions to resolve this situation and help ensure that launch activities by SpaceX are carried out consistent with the enforceable policies of the CCMP. The Executive Director’s letter was officially transmitted to the DAF on February 22, 2024, and DAF confirmed receipt of the letter that same day.

Consistency Determination and Remedial Actions

On March 7, 2024, DAF submitted the subject CD in response to the Executive Director’s letter. The project, as described in the CD, would be identical to the project concurred with by the Executive Director in ND-0009-23.

In addition, the CD submitted by DAF also addresses coastal access and recreation effects with respect to how SpaceX launch activities are conducted.

Ocean Beach County Park and Surf Beach

Access to Surf Beach is available throughout the year except during western snowy plover nesting season when beach access is available from 8:00 a.m. to 6:00 p.m. and restricted from 6:00 p.m. until 8:00 a.m. These restrictions to access at Surf Beach were previously concurred with by the Commission in CD-0004-18 as part of a Beach Management Plan to help protect and enhance coastal access and recreation while simultaneously promoting the survival and recovery of the western snowy plover. Access at Ocean Beach County Park is available from 8:00 a.m. to dusk year-round and at Ocean Beach County Park there is a trail created by DAF that leads directly to the coast at Surf Beach.

Historically, DAF has additionally restricted access to Ocean Beach County Park and Surf Beach during all launches from SLC-4E based on modeling and safety considerations as determined by the Range Safety and the Security Forces Squadron. In response to the Executive Director's letter, DAF engaged in discussions with the Range Safety and the Security Forces Squadron to discuss the modeling and whether adjustments were feasible in order to minimize restriction in access and recreation at these locations. After updating the modeling and revisiting the safety considerations DAF, in coordination with the Range Safety and the Security Forces Squadron, determined that evacuations of Ocean Beach County park and Surf Beach would only be required in the event that the first stage of the Falcon 9 launch vehicle would be boosting back to land at SLC-4W. Launches with the first stage boosting back to land at SLC-4W would be expected to occur 12 times per year.

Since nighttime access at Surf Beach is already restricted during western snowy plover nesting season and nighttime access at Ocean Beach County Park is restricted year-round, any SpaceX launches scheduled during the night that would boost back to land at SLC-4W would not adversely impact access and recreation at these locations. This means that only daytime launches with boost back to land at SLC-4W would affect access and recreation at Ocean Beach County Park. At Surf Beach, boost back would only affect access and recreation during daytime launches or during nighttime launches scheduled outside of the snowy plover nesting season. DAF anticipates that in response to SpaceX launches, these two locations would only be evacuated up to 14 times per year for approximately four to eight hours each time during select launch attempts.

Jalama

At Jalama, the determination whether to evacuate the campground and adjacent beaches is dependent on a risk analysis completed by DAF for each individual launch. The DAF describes the process for calculating this risk analysis in the CD submittal as follows:

The launch risk factors are estimated based on the probability of vehicle failure, population size in the high-risk area, day of launch weather, trajectory, and other factors. SLD 30 Range Safety considers the number of people within the Impact Limit Line and thirty days prior to launch, conducts prelaunch debris risk assessments that determine high risk areas that contribute to the allowable risk

criteria. If the risk of a Conditional Expected Casualty (CEC; a factor that estimates the risk of a multiple casualty event and assumes 100% vehicle failure) is greater than 0.01, Individual Risk is greater than 1/1,000,000, or the Expected Casualty risk is greater than 1/10,000, SLD 30 issues an evacuation requirement letter 25 days prior to launch. Generally, for launches from south VAFB, the population size in the Impact Limit Line determines the need for evacuation of Jalama Beach County Park and a CEC greater than 0.01 is typically triggered when the population exceeds 500. Therefore, the number of users, including day users, campers, and staff, at Jalama Beach County Park may or may not exceed a level that triggers evacuation.

The project concurred with under ND-0009-23 included a process whereby if evacuation would be required for a particular launch, DAF would notify the County and the County subsequently would notify reservation holders via email as described earlier. A copy of the County's email notification system is included as **Exhibit 11**. As described by DAF in the CD submittal, pursuant to discussions with the County, the email notification typically resulted in three to four reservations being cancelled for each launch. This number of reservation cancellations could include up to a maximum of 32 individuals no longer camping at Jalama.

In response to discussions with Commission staff, DAF reviewed the risk analysis to consider alternatives that could minimize adverse impacts to access and recreation. One option included changing the trajectory of the launch to a "dog leg" trajectory so that the Impact Limit Line would shift away from Jalama such that the risk to persons from vehicle failure would be effectively zero. This would eliminate the need to evacuate Jalama completely. However, the maneuvering required for this trajectory would result in a significant performance reduction for the launch vehicles which would then reduce the total payload mass that could be placed into orbit. This would then require more launches to place the same amount of mass in orbit compared to the current trajectory. Also, if the mass of the payload is sufficiently great then this maneuver would preclude certain missions from launching.

Since one component of the risk factor analysis is the number of people within the Impact Limit Line, DAF proposed changing the launch schedule to avoid launching during the day and instead launching during the night. During the day, members of the public at Jalama include campers with reservations as well as day use visitors who are exploring Jalama's beaches, picnicking, fishing, and surfing. At night, visitors at Jalama are limited to campers with reservations. Thus, by shifting the launch schedule to avoid daytime hours and take place primarily at night the number of people within the park would be less and therefore fall below the risk factor. DAF has committed to primarily launch during the night to avoid any evacuations of Jalama to the extent practicable. If scheduling is unable to completely avoid evacuations, DAF has committed to ensure that the total number of evacuations of Jalama within a given year would not exceed 14, consistent with previous Commission approvals for launch programs at VAFB. However, as discussed in Section IV.E (above), a shift toward nighttime launches could result in new effects on sensitive species and habitats.

Finally, in order to help offset the adverse impacts to access and recreation at Jalama that have been occurring as a result of the SpaceX launches and public coastal access and recreation restrictions that exceeded the scope of ND-0009-23, DAF is proposing four additional measures:

- DAF in coordination with SpaceX would provide high-speed internet terminals at Jalama Beach County Park in order to improve internet coverage there;
- DAF in coordination with SpaceX would fund a variable messaging sign for use by Santa Barbara County Parks and Recreation to replace the existing sign at the intersection of Highway One and Jalama Road;
- In the event that an evacuation of Jalama is necessary, DAF in coordination with SpaceX would operate a shuttle program to evacuate campers from the park to a safe location so that their camps can remain intact. After the launch is complete the shuttles would bring campers back into the park;
- DAF, in coordination with SpaceX and the Lompoc Unified School District (LUSD) and SpaceX, will fund transportation for all 3rd graders in LUSD to visit Surf Beach/Ocean Park on an annual basis.

Currently, cell phone service in the area of Jalama is limited. More reliable internet would increase the efficiency of County Parks and Recreation operations at Jalama and allow the County to more efficiently manage its reservation system. Greater efficiency would help avoid congestions for members of the public looking to reserve a camping site at Jalama, thus helping to increase its usage. Also, this greater efficiency would allow County staff to more quickly process transactions for visitors passing through the entrance kiosk, therefore helping to reduce congestion at the entrance and getting more people into Jalama more quickly. Finally, more reliable internet would allow County emergency responders to communicate more effectively. Depending on the amount of bandwidth required by the County any remaining data could also provide the public with some reliable connectivity.

Jalama offers 110 campsites, including 12 walk-in, first-come first-served sites. The drive from Highway One to Jalama can take upwards of 45 minutes and cellphone connectivity in this area can be intermittent. For any members of the public in the area who may be considering a stay at Jalama but do not know the current availability of the campsites, the only option currently available is to drive into the site and inquire. The proposed variable messaging sign at the intersection of Highway One would allow County staff to post vacancy status and campsite availability information to members of the public so they can check the status of available campsites at Jalama before committing to driving 45 minutes to the park from Highway 1. Additionally, making this information more readily available would encourage greater use of Jalama by the public and thus encourage access and recreation.

Regarding the evacuation shuttles, under the current system once an evacuation order is issued campers within Jalama are instructed to prepare to leave the campground and asked to secure their valuables. Depending on the type of camping equipment being used an evacuation order could require campers to break down equipment to ensure it

is secure. For larger recreational vehicles (RV) an evacuation order could mean securing the vehicle and driving the entire vehicle out of the campsite along Jalama Road. This system for evacuation could create frustrations for campers, particularly if the evacuation order is issued during the night or at some other inopportune time. Additionally, once an evacuation order is issued campers are instructed to leave the campground and not return until the launch is complete. However, it may be difficult for campers to monitor the status of the launch and therefore know when it is safe to return to the park which could result in campers waiting an unnecessarily long time. The proposed shuttle service would help to alleviate these issues since it would avoid the need to break down camping equipment and would also allow campers to return to the park as soon as possible.

Finally, although there are some programs within the LUSD focused on marine resource education for children in grades four through seven, including the aquarium at Cabrillo High School, there is currently no program for children younger than fourth grade. In response, DAF has proposed a new program for third graders described in the CD as follows:

SLD 30, in coordination with LUSD and SpaceX, will fund transportation for all 3rd graders in LUSD to visit Surf Beach/Ocean Park on an annual basis. SLD 30 will coordinate with LUSD and set up a field trip date for all 9 schools each school year. SLD 30 will coordinate with the individual teachers and provide structured activities during the beach visit that are generally focused on environmental stewardship and understanding our coastal resources, particularly the Western Snowy Plover. This program will ensure that an average of 700+ third graders, 25+ teachers, and 100+ chaperones (typically student family members) would visit Surf Beach/Ocean Park annually. This will likely have secondary effect of families visiting the beach more often after the facilitated introduction provided through this program.

Coastal Act Section 30213 requires that lower cost visitor and recreational facilities be protected. As described previously, SpaceX launching activities were adversely affecting access and recreation at Jalama due to excessive evacuations and closures. The modified launch program proposed by DAF would result in most launches occurring at night, lowering the safety risk factors and thereby reducing the number of necessary evacuations to levels that the Commission has historically concurred with. Additionally, Coastal Act Sections 30210, 30220, 30221 and 30223 require maximum access and recreational opportunities within coastal areas. The offsets proposed by DAF as part of the subject CD will increase access and recreation at Jalama while the LUSD program will promote coastal access and recreation within the greater area of Northern Santa Barbara County.

Conclusion

Therefore, the Commission finds that, with the DAF's commitments and mitigation measures, the proposed activities would be conducted in a manner that would protect, encourage, and provide coastal access and recreation consistent with Sections 30210, 30213, 30220, 30221, and 30223 of the Coastal Act.

H. AIR QUALITY

Coastal Act Section 30253 states (in relevant part):

New development shall do all of the following:

[...]

(c) Be consistent with requirements imposed by an air pollution control district or the State Air Resources Board as to each particular development.

[...]

The proposed project has the potential to produce air pollution emissions through launch activities (including fairing recovery and roll-on roll-off) and static fire tests.

In the CD the DAF states that the exhaust from Falcon 9 launches is fuel-rich and contains high concentrations of carbon monoxide (CO), and that subsequent entrainment of ambient air results in complete conversion of CO into carbon dioxide (CO₂) and oxidation of the soot from the exhaust. The Falcon 9 rocket would use liquid fuels consisting of rocket grade kerosene (RP-1) and liquid Oxygen and the rocket would use oxidizer-rich staged combustion engines that produce a diminutive amount of soot. Also, a small amount of nitrogen monoxide (NO) is formed. Since the project does not include any construction, any emissions would be from launches, including landings and recovery of the fairing and first stage (if necessary), and from ground operations, support and transport of the launch vehicle components.

The federal Clean Air Act (CAA) requires states to develop plans, known as State Implementation Plans (SIPs), stating how they will attain or maintain National Ambient Air Quality Standards (NAAQS). A SIP is developed in order to improve or maintain air quality in designated nonattainment and maintenance areas. Through this plan, states propose their strategy for reducing criteria air pollutant emissions.⁵⁶ General Conformity is a key component of the CAA strategy intended to ensure federal actions conform with SIPs in achieving and maintaining the NAAQS. Section 176 of the federal CAA Amendments of 1990, contains requirements that apply specifically to federal agency actions, including actions receiving federal funding. This section of the CAA requires federal agencies to ensure that their actions are consistent with the CAA. General conformity applicability pertaining to the Proposed Action is codified in 40 CFR §93.153(b).

A federal action is exempt from general conformity analysis requirements if the total emissions resulting from the action are equal to or less than the de minimis thresholds specified in 40 CFR § 93.153(b)(1)⁵⁷. Thus, the action's calculated emissions are compared against established de minimis emission levels based on the nonattainment

⁵⁶ <https://www.epa.gov/general-conformity/frequent-questions-about-general-conformity#4>, accessed August 12, 2021.

⁵⁷ <https://www.epa.gov/general-conformity/de-minimis-tables>, accessed August 12, 2021.

status for each applicable criteria pollutant in the area of concern to determine the relevant compliance requirements.

Table 1 provides the expected annual emissions of air pollutions per year in comparison to the PSD thresholds.

Table 1: Estimated Annual Air Pollutant Emissions from Launches, Static Fire Tests and Project Operations

	Estimated Emissions (Tons)						
	CO	NO _x	VOC*	SO _x	PM _{2.5}	PM ₁₀	Pb
	8.3	16.4	9.4	0.2	0.4	0.1	0.0
Prevention of Significant Threshold	250	250	250	250	250	250	25
Below Threshold for all years?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

As illustrated in Table 1 the proposed project is below the PSD threshold for all criteria pollutants and therefore, no significant impacts on air quality as a result of criteria pollutant emissions from the project would occur.

The United States Environmental Protection Agency (USEPA) is the agency responsible for writing and implementing federal regulation for the protection of the environment, including implementation of measures to address climate change and the USEPA pursues a number of efforts, including regulatory initiatives such as the GHG Reporting Program.

The Greenhouse Gas (GHG) Reporting Program, codified in 40 CFR, Part 98, requires mandatory reporting of GHG emissions for certain industrial operations, most of which are large emitters of GHGs (e.g., electricity generation facilities, oil refineries, and manufacturing operations). Mandatory reporting is also required for facilities capable of emitting more than 25,000 metric tons of CO₂-equivalents (MTCO_{2e}) per year from all combined stationary fuel combustion sources (e.g., boilers and stationary engines). Since the project would emit 23,565 MTCO_{2e} per year, the project is below the significance threshold for mandatory reporting of GHG emissions.

Overall, the proposed project is not expected to exceed the annual CO_{2e} threshold or the annual threshold for criteria pollutants under the National Environmental Policy Act.

Coastal Act Section 30253(c) requires that the proposed project be consistent with the requirements imposed by the Santa Barbara County Air Pollution Control District (APCD). The APCD has jurisdiction over stationary emission sources, including federal activities, in its air basin; VSFB is within its jurisdictional air basin. The SBCAPCD has locally adopted air emission thresholds that are used to evaluate a project's impacts and applicable regulatory requirements under the District's rules and regulations. In the

context of launch projects and operations, stationary source emissions include roll-on roll-off, fuel transfer on space launch complexes and also includes air emissions from ancillary sources such as diesel generators, special equipment, and solvents to clean equipment. The APCD does not have jurisdiction over emissions from rocket liftoff, as liftoff is considered a mobile emissions source. The SBCAPCD issued Authorities to Construct (ATC) 15999 and 16000 for the projects' proposed increases in launch-related operations on June 6, 2023. The issuance of these required SBCAPCD permits ensures the project is designed, constructed, and operated to meet local, state, and federal air quality requirements.

As such, the project is consistent with the requirements imposed by an air pollution control district and thus the project would be consistent with Section 30253(c).

I. CULTURAL RESOURCES

Section 30244 of the Coastal Act states:

Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

As discussed in the CD prepared for the project, the project would use an existing launch facility (SLC-4) and no construction or ground disturbance would be required as part of the project. Pursuant to the National Historic Preservation Act and Section 106, DAF carried out government-to-government consultation with the Santa Ynez Band of Chumash Indians tribal chairman, but did not receive an official response from the Santa Ynez Band of Chumash Indians within the 30-day review period of CFR 800.3(c)4.

As part of its review process for the March 2024 meeting, Commission staff reached out to the Santa Ynez Band of Chumash Indians and several other Tribes with potential cultural connection to the project area, as indicated by the list provided to Commission staff by the Native American Heritage Commission. Consultation invitations were mailed to the Barbareño/Ventureño Band of Mission Indians, the Chumash Council of Bakersfield, the Coastal Band of the Chumash Nation, the Northern Chumash Tribal Council, the San Luis Obispo County Chumash Council, and the Santa Ynez Band of Chumash Indians. The Santa Ynez Band of Chumash Indians did not request additional coordination or consultation with Commission staff beyond what had already been carried out by DAF.

Commission staff, however, did receive a request for consultation from the Coastal Band of the Chumash Nation. Commission staff scheduled a consultation with the Coastal Band of the Chumash Nation on Wednesday, March 27, 2024. During the consultation the Coastal Band of the Chumash Nation shared concerns that the force of overpressures from sonic booms could adversely impact sensitive cultural resources or exfoliate new, undiscovered cultural resources that were previously buried. The Tribe

also expressed concerns about possible anchoring for the offshore droneships and whether anchoring could adversely impact submerged cultural resources.

Regarding overpressures and sensitive cultural resources, the EA prepared for the project discussed previous research which determined that noise levels of 120 dB and sonic booms exceeding 2.0 psf were the threshold at which archaeological resources could potentially be affected by noise. The project would not result in overpressures greater than 5.0 psf. However, a portion of the base would be subject to overpressures between 2.0 and 5.0 psf.

DAF archaeologists reviewed available literature and did a search of the California Historical Resources Information System (CHRIS) to determine which types of resources would be located within the area of potential affect (APE). DAF archaeologists also reviewed previous studies that specifically analyzed the potential effects to archaeological resources from rocket engine noise and sonic boom vibrations. Those studies included placement of a model slope sand cone and midden chunk located approximately 3,000 feet southwest of SLC-4W to determine if noise vibration resulting from SpaceX launches and boost back landings resulted in changes to the materials. No visual impacts were observed in either the midden chunk or sand cone, with the exception of a few fine grains of sand shifting down the cone which was determined to likely be from wind. DAF has also monitored a sheer cliff-face midden deposit in the southern portion of VSFB and a rock art site for adverse impacts from noise vibrations and found that no visible effect from noise vibrations has been observed at the sites. The DAF concluded that there is no potential for rocket launches and boost back to adversely impact archaeological resources.

The droneships that would be used for landing of the first stage of the Falcon 9 would be located offshore in deep international waters. Due to the depth of water it is unlikely that the droneships would be able to anchor. Additionally, since the droneships would be located 500 to 1,100 miles off the coast of Baja California it is not likely that sensitive cultural resources of California Native American Tribes would be adversely impacted by droneship operations in this area.

After the project was continued and rescheduled for the June 12, 2024 Commission meeting, Commission staff completed outreach to a refined list of the Tribes in May of 2024, including the Barbareño/Ventureño Band of Mission Indians, the Coastal Band of the Chumash Nation, the Northern Chumash Tribal Council, and the Santa Ynez Band of Chumash Indians. As of the date of this staff report Commission staff have not received any requests for additional consultation from the Tribes.

As such, the Commission therefore finds that the proposed project consistent with Section 30244 of the Coastal Act.

APPENDIX A – SUBSTANTIVE FILE DOCUMENTS

1. Air Force Consistency Determination, SpaceX Operations at Space Launch Complex 4, Vandenberg Space Force Base, March, 2024.
2. Air Force Final Supplemental Environmental Assessment Falcon 9 Cadence Increase at Vandenberg Space Force Base, California and Offshore Landing Locations, May 18, 2024.
3. Air Force Consistency Determinations for launches from Vandenberg AFB: CD-0010-22 (Construct SLC-5 and Carry out 48 Rocket Launches and 48 Static Fire Engine Tests Per Year), CD-059-03 (Ground Based Missile Defense), CD-006-99 (Theater Ballistic Missile (TBM) Targets Program), CD-064-91 (Modification to Delta II launch vehicle and complex), CD-028-90 (Conversion of SLC-6 for Titan IV/Centaur launch vehicles), CD-003-88 (Space launch vehicle modification), and CD-018-82 and CD-021-82 (Space Shuttle (SLC-6) improvements).
4. Southall, Brandon & Finneran, James & Reichmuth, Colleen & Nachtigall, Paul & Ketten, Darlene & Bowles, Ann & Ellison, William & Nowacek, Douglas & Tyack, Peter. (2019). Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. *Aquatic Mammals*. 45. 125-232. 10.1578/AM.45.2.2019.125.

APPENDIX B – COMPLETE PROJECT HISTORY

In 1998, the Commission concurred with a consistency determination (No. CD-049-98) (hereinafter, “CD”) by the DAF for development and operation of the Evolved Expendable Launch Vehicle Program (EELVP), a space launch program involving four types of rockets developed by the Boeing Company and the Lockheed Martin Corporation. The program involved the substantial modification of two existing space launch complexes (SLC-3W and SLC-6) and replaced four older launch systems (Atlas II, Delta II, Titan II and Titan IVB). The goal of the EELVP was to provide a lower cost system with the capability to launch Department of Defense, National Aeronautics and Space Administration (NASA) and commercial payloads to space orbit through the year 2020.

As had been the case during its prior federal consistency reviews for space programs at VSFB, the Commission’s primary concern in considering the program was the potential for adverse impacts to public coastal access and recreation resources associated with temporary public safety closures during space launches. Specifically, the Commission focused on the three publicly accessible beaches in northern Santa Barbara County nearest to the city of Lompoc: Surf Beach, Ocean Park Beach and Jalama Beach. In concurring with the CD for the program, the Commission found that because it would replace other existing space launch programs and therefore not increase the overall frequency of launches from the base and existing number of associated temporary beach closures (established as an annual average of eight and maximum of 14), and included implementation of a variety of measures to minimize coastal access and recreation impacts, the CD was consistent with the public coastal access and recreation policies of the CCMP. Those measures included DAF’s proposal to “minimize [its] impact by limiting the number of launches per year and considering access impacts in its scheduling decisions (i.e., attempt to avoid launches during holiday weekends and minimize the number of launches during summer months).” Additionally, DAF committed to “monitor beach closures and provide an annual report to the Commission. The monitoring was to provide data on the number of launches that included beach closures, the location of the closure, and the duration of each closure.”⁵⁸

In November 2010, the Executive Director concurred with a negative determination (ND) by DAF (No. ND-055-10) for modification of space launch complex SLC-4E to support the Space Exploration Technologies Corporation’s (SpaceX) Falcon 9 and Falcon 9 Heavy launch vehicle programs at VSFB and the use of SLC-4E for a maximum of five launches annually of each rocket type. The Executive Director determined that those programs would not generate new or additional adverse impacts on coastal resources not previously examined by the Commission in its concurrence with CD-049-98 for the EELVP, a program that had been phased out, and other prior CDs for programs involving larger rockets, many of which had also been ended.

⁵⁸ Despite this commitment, recent record searches carried out by staff from both VSFB and the Commission have not indicated that any such reports were prepared or submitted.

In August 2015, the Executive Director concurred with another ND by DAF (No. ND-0027-15) for revision of the SpaceX program to include up to six SpaceX Falcon 9 launches per year from SLC-4E and associated first-stage landings at space launch complex SLC-4W or on an offshore barge specifically designed as a first-stage landing platform and located at least 31 miles offshore of VSFB. The Executive Director's concurrence acknowledged that Surf Beach and Ocean Park may be closed to public access to ensure public safety starting approximately three hours prior to a launch and ending up to two hours after. No closure or other effects to Jalama Beach were noted.

Negative Determination No. ND-0009-23

On May 5, 2023, the Executive Director concurred with a negative determination by the U.S. DAF (No. ND-0009-23), for a further increase to the SpaceX space program from six to 36 annual launches of its Falcon 9 rocket from the existing SLC-4E launch complex as well as up to 12 landings per year of the rocket's first stage at the existing SLC-4W launch complex and associated activities such as payload processing and the designation of a new offshore landing location. The proposed launches would serve the primary purpose of placing into Earth orbit thousands of small satellites for SpaceX's "Starlink" commercial satellite internet business.

Although the proposed expanded program initially called for continuance of the temporary public access closures to Surf Beach and Ocean Park in advance of each launch event, over the course of Commission staff's review, DAF's Space Launch Delta 30 Range Safety and the Security Forces Squadron re-evaluated its public safety protocols for VSFB and was able to eliminate the need for all launch related public access and recreation restrictions to Surf Beach and Ocean Park, a significant reduction in potential adverse impacts to coastal access and recreation, particularly for residents of the nearby City of Lompoc.

However, the proposed program also included up to 12 landings per year of the SpaceX rocket's first stage. These landings were anticipated to result in short term (between four and eight hours) public safety closures of Surf Beach and Ocean Park. In addition, closures of Jalama Beach were anticipated for certain launch trajectories. To help ensure the proposed expanded program and increased number of Falcon 9 launches continued to meet the negative determination standard and did not result in additional effects to public coastal access and recreation beyond those previously concurred with by the Commission in CD-049-98, DAF stated in its ND that "Launches from SLC-4E due to the Proposed Action would not cause an exceedance of 12 closures of Jalama Beach County Park per year."

This is below the number of annual beach closures that, in combination with implementation of several minimization measures, the Commission found to be consistent with the CCMP's coastal access and recreation policies in its concurrence with CD-049-98. DAF further committed in its ND to (1) track closures of Jalama Beach, Surf Beach and Ocean Beach County Park (Ocean Park) during their normal operating hours and to provide calendar year totals to the Commission by March 1 of the following year; (2) notify the Commission if more than 12 closures will be required in one calendar

year during open hours at Jalama Beach, Surf Beach or Ocean Park and complete either a ND or CD at that time; and (3) follow up with the Commission after five years with a summation of biological monitoring results, launch totals, and the amount of unrecovered marine debris and documentation of funds contributed to lost fishing gear recovery efforts as compensatory mitigation. In her May 5, 2023, concurrence with DAF's ND, the Executive Director found the following:

With [the] reduction in proposed safety closures of Ocean Beach County Park and Surf Beach to only boost-back landing activities (rather than during launches and landings, as is the current practice) as well as the commitment to not exceed 12 closures per year of any northern Santa Barbara County beaches (Jalama Beach, Ocean Beach County Park, and Surf Beach), the Commission staff agrees that the proposed project will not generate new or additional adverse impacts on coastal access and recreation not previously examined and found to be consistent by the Commission and Executive Director in CD-049-98 and subsequent negative determinations for launch activities on VSFB.

However, SpaceX did not adhere to these limits in the implementation of its expanded launch program and carried out that program in a manner that differed significantly from what DAF described in its ND. Between January and July 2023, SpaceX launches required 16 evacuations and closures of Jalama Beach and Jalama Road, 21 evacuation notification emails to reservation holders, and an unknown number of reservations that were not made due to concerns about potential evacuations. In addition, information regarding SpaceX launches from VSFB over the past two years (2022 and 2023) indicated that it had expanded its launch operations well in advance of the Executive Director's May 2023 concurrence with ND-0009-23, including by carrying out in 2022 more than double the six Falcon 9 launches per year as described and concurred with by the Executive Director in ND-0027-15.

“Re-opening” of Executive Director’s Concurrence with the ND

As a result of this enhanced understanding of SpaceX's recent launch activities, the Commission found on December 15, 2023, that the launches were being conducted and were having effects on coastal uses and resources substantially different than originally described by DAF in its negative determination. In addition, because these effects exceed those which the Commission had previously determined to be consistent with the public coastal access and recreation policies of the CCMP, the Commission also found that the substantially different effects from the SpaceX launch activity were not consistent to the maximum extent practicable with the enforceable policies of the CCMP.

On December 15, 2023, the Commission also approved a resolution making the above findings and “re-opened” the Executive Director's prior concurrence by concluding that the original negative determination made by DAF for the subject SpaceX launch activity was no longer applicable to the project as described and conducted. Approval of that resolution reversed the Executive Director's May 5, 2023, concurrence and authorized the Executive Director to prepare and send a letter to DAF requesting remedial actions

to resolve this situation and ensure launch activities by SpaceX are carried out consistent with the enforceable policies of the CCMP.

The Executive Director transmitted that letter to DAF requesting remedial actions on February 22, 2024 (**Exhibit 12**), and DAF confirmed receipt of the letter that same day. After reviewing the letter, DAF prepared and submitted the subject CD on March 7, 2024, to resolve the situation.

April 2024 Commission Meeting

After receiving the CD from DAF on March 7, 2024, Commission staff reviewed the information in the CD submittal, prepared a staff report, and added the project to the Commission's April 2024 meeting agenda as Item W13a. The Commission staff report for that hearing recommended that the Commission conditionally concur with the CD. However, subsequent to posting that staff report for public review, members of the public raised concerns regarding sonic booms generated during launches and their effects on coastal areas in Santa Barbara and Ventura Counties. This aspect of SpaceX launch operations was not previously acknowledged or evaluated thoroughly by DAF or included in its consistency determination or the NEPA Supplemental Environmental Assessment prepared to support it. During the April Commission meeting, additional questions and concerns were also raised by the public and the Commission about the scope of effects on coastal resources from SpaceX launches and landings and the appropriateness of reviewing them as "federal agency activities," as proposed by DAF. In order to provide more time for these issues to be evaluated further, the Commission voted unanimously to continue its consideration of the project to a future meeting and DAF provided an extension of the consistency determination review period.

Following the April 2024 meeting, DAF provided a briefing on operation of Vandenberg Space Force Base to the Commission on May 10, 2024, and submitted additional information on SpaceX activities to Commission staff on May 14th and 17th.