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Filed	7/9/24
60th Day:	9/7/24
Extended to:	10/12/24
Staff:	W. Horn, W. Deppe-SF
Staff Report:	9/27/24
Hearing Date:	10/10/24

STAFF REPORT: REGULAR CALENDAR

Consistency Determination No.	**CD-0007-24**
Applicant:	Department of the Air Force – U.S. Space Force
Location:	Vandenberg Space Force Base (VSFB), Santa Barbara County
Project Description:	Increase Space Exploration Technologies' (SpaceX) Falcon 9 launch activities at Vandenberg Space Force Base (VSFB) from 36 to 50 per year.
Staff Recommendation:	Concurrence

SUMMARY OF STAFF RECOMMENDATION

On July 9, 2024, the Department of the Air Force (DAF), U.S. Space Force submitted a consistency determination for an increase in Space Exploration Technologies Corporation's (SpaceX) Falcon 9 rocket launch and landing activities to up to 50 per year from the space launch complex it leases from DAF on Vandenberg Space Force Base (VSFB). In addition, SpaceX would carry out up to 50 at-sea landings of its rocket first stage offshore of Baja California, Mexico, and would transport that first stage by ocean barge to the Port of Long Beach and then to Vandenberg Harbor where it would be offloaded onto a transport vehicle and returned to SpaceX's launch complex for refurbishment and reuse. DAF's consistency determination also proposes up to 12 rocket landings per year directly at the SpaceX complex on VSFB and up to 12 beach and campground closure events at Jalama Beach County Park (the same number previously considered and conditionally concurred with by the Commission in August

2024 through DAF's Consistency Determination No. CD-0003-24). Although more frequent - occurring roughly every five days for the remainder of 2024 – the proposed SpaceX launch and landing activities are generally the same as those recently conditionally concurred with by the Commission in August through DAF's consistency determination for up to 36 launches per year.

Objectively, the primary purpose of the proposed SpaceX launch activities is to further expand and support SpaceX's commercial satellite internet and telecommunications network, Starlink. Each rocket launch places approximately 21 Starlink satellites into Earth orbit. This network, or "satellite constellation," is now comprised of several thousand individual satellites that provide internet across the globe through a subscription service and are now equipped to support cellular phone service as well. With its Starlink satellite constellation, SpaceX owns significantly more satellites than the combined total owned by every country and other company in the world. Building and maintaining this system and leadership position is the primary purpose for launches and reason for their proposed increase, but SpaceX also periodically launches satellites and payloads under contract for a variety of federal government agencies and private companies as well.

Although the Commission and Commission staff have consistently rejected DAF's characterization of SpaceX launch activities – including those associated with the proposed increase - as a "federal agency activity" as defined in the Coastal Zone Management Act, DAF continues to maintain this stance in the current consistency determination, stating:

> The purpose of the Proposed Action is to provide greater mission capability to the Department of Defense (DOD), National Aeronautics and Space Administration (NASA) at the Western Range1, as well as other government and commercial entities by increasing Falcon flight opportunities. This increase in flight opportunities would improve U.S. space capabilities by providing additional launch to support future U.S. Government and commercial missions, which require or benefit from a Falcon 9 vehicle. The Federal Aviation Administration (FAA) forecasts that commercial launch operations will increase in the United States (U.S.) from an all-time high in 2022 of 87 launches, to up to 186 launches by 2026. The DOD, NASA, and other Federal agencies obtain access to space through the procurement of commercial launch services. As such, commercial launch capability is critical to the national defense, American's national space objectives, and the National Space Policy of the United States (May 2020) …
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> SpaceX is currently one of only two U.S. launch service providers certified to launch national security missions for the USSF's National Security Space Launch (NSSL) program, which procures launches for all the military services as well as the intelligence community…
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> Space launch for the USSF, other DOD organizations, and the intelligence community is reliant on commercial space launch service providers, as DOD does

> not operate its own space launch vehicles. SpaceX supports, and is under contract for, the full spectrum of U.S. Government space mission requirements.
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> …
>
> SpaceX has developed Starlink and Starshield, satellite constellations in low-Earth orbit that require numerous launches to develop and maintain the constellation. Starlink is a critical national capability that is directly utilized by DOD and the intelligence community, which contracts directly for satellite communications services important to the national defense and in support of U.S. interests abroad. Here, Starlink is a services provider for the DOD under numerous contracting vehicles…Starlink is under contract with the Federal Emergency Management Agency, the Department of State, Department of Veterans Affairs, Department of Transportation, U.S. Coast Guard (USCG), Customs and Border Patrol, U.S. Geological Survey, U.S. Forest Service, the National Oceanic and Atmospheric Administration (NOAA), and many other government organizations at the state and local level…
>
> Starlink and Starshield are critical national capabilities that are directly utilized by DOD and the Intelligence Community, who contract directly for satellite communications services important to the national defense, as well as in support of U.S. interests abroad, including in Ukraine... It is critical that CCC generally understand that the distinction between Starshield and Starlink does not exist for some U.S. Government users, and Starlink itself is the basis for exclusive and specialized U.S. Government services and capability.
>
> It is in the national interest to continuously enhance Starlink network capacity, particularly in furtherance of U.S. Government purposes and objectives. SpaceX's rapid launch capability and continuous deployment of Starlink satellites on orbit directly correspond to improved network performance that scales directly with network growth to meet escalating demand. Starlink launches are not incidental; each individual Starlink launch is part of a deliberate, planned effort to meet capacity needs to support specific requirements or demand, including the U.S. Government. The capability of new satellites allows SpaceX to add capacity more quickly and interconnect the Starlink constellation, to serve critical U.S. Government needs around the globe, and to launch critical communication services for aviation and maritime in the U.S. and the rest of the world's most remote locations.

To attempt to summarize and paraphrase DAF's position, because it is a customer of – and reliant on – SpaceX's launches and satellite network, SpaceX launches are a federal agency activity. However, this does not align with how federal agency activities are defined in the Coastal Zone Management Act's regulations or the manner in the Commission has historically implemented those regulations. While DAF's statements above provide no doubt as to the substantial value SpaceX provides to the U.S. government, the simple fact remains that it is a privately owned company rather than a public federal agency and should therefore be regulated accordingly. This appears to

be a perspective already held by the federal government outside of the context of the Commission's review process since SpaceX itself is required to lease its launch complex on VSFB from DAF and to apply for and hold various licenses, permits and authorizations from a variety of state, local and federal agencies, including the Federal Aviation Administration, in order to carry out launch activities; if the launch and landing activities at VSFB were a federal agency activity, then DAF, not SpaceX, would be responsible for applying for and obtaining all applicable licenses, permits and authorizations—but that's not the case. More consistent adherence to this approach therefore appears warranted, including recognition of SpaceX launches as private company activities through the Commission's review process.

While Commission staff continues to pursue these issues and seek to ensure that SpaceX's rocket launch and landing activities comply with both the Coastal Zone Management Act (CZMA) and Coastal Act – including through a recent series of direct discussions and letters with SpaceX – the fact remains that DAF has submitted this consistency determination in the meantime and if the review deadline under the CZMA lapses without a decision, the Commission will have been deemed to have concurred with it. The Commission's action on this consistency determination does not, however, preclude it from continuing to pursue application of its Coastal Act and CZMA authority in other ways as well.

It should be noted, however, that despite the ongoing disagreement between DAF and the Commission on this issue, substantial progress has been made in other aspects of the proposed project directly associated with coastal resource protection. Significantly, DAF has accepted all seven conditions of the Commission's August 8th conditional concurrence with DAF's consistency determination for 36 SpaceX launches per year and integrated implementation of the protective measures they require into the current consistency determination. DAF has committed to take steps to further investigate and minimize the spatial extent and magnitude of sonic booms resulting from launches. Over the past two weeks, it has also provided initial versions of the various plans required by those conditions: Enhanced Biological Monitoring, Coastal Access and Recreation Enhancement, Marine Debris Reduction, Commercial and Recreational Fishing Coordination, Lighting Management, Sonic Boom Assessment and Minimization. DAF has also agreed to accept and consider feedback provided by Commission staff on these plans and to refine and implement them.

Additionally, DAF has taken steps to convene a multi-agency working group comprised of Commission staff and key federal resource management agencies that will be focused specifically on enhancement and implementation of its biological monitoring programs as well as the analysis and discussion of monitoring results and identification of appropriate response measures. It has already demonstrated its commitment to information sharing and increased coordination by including Commission staff in discussions with the U.S. Fish and Wildlife Service. Further, it has brought onboard or committed to continuing to support biologists with expertise in a variety of coastal biological resources, including harbor seals, monarch butterflies, sea otters, western snowy plovers and California least terns. Finally, DAF was able to share details regarding a restoration opportunity at the Santa Ynez River Estuary with the potential to

offset adverse impacts to sensitive species and habitats that may result from launch and landing activities.

DAF leadership from its headquarters office in the Pentagon and VSFB have also been directly engaged in a constructive and collaborative manner that has advanced coastal resource protection beyond previous levels and commitments.

While room remains for additional progress to be made through the working group and through refinement and implementation of the plans that DAF recently prepared and shared with Commission staff, significant progress has been made in the short time following the Commission's August hearing and the current trajectory is a positive one.

In light of these positive developments and recognizing (1) DAF's inclusion into the current consistency determination of the protective measures established through the Commission's recent conditional concurrence; (2) affirmative commitment to implement those protective measures; (3) the relatively modest increase in launches proposed and anticipated short duration before the Commission will be able to again consider this activity (due to the expected submittal of another consistency determination for a further increase in launches to 100 per year as well as possible permitting action); and (4) absence of robust data demonstrating that substantially more or different adverse impacts to coastal resources would occur with the proposed launch increase despite implementation of the protective measures previously required by the Commission and accepted by DAF, the proposed project would be consistent with the enforceable policies of California Coastal Management Program. While several issues warrant closer consideration over the coming months and prior to a further increase in launch and landing activities beyond the 50 launches and landings proposed under this CD – including the effectiveness of the working group process once it is more fully implemented, DAF's ability to continue to meet the spirit and intent of the protective measures, and potential identification of new impacts – the required future monitoring of the potential unknown coastal effects from a much higher frequency of launches and landings and required adaptive management and mitigation of any future, currently unknown effects leads to the conclusion that the proposed project is consistent with the enforceable policies of California Coastal Management Program.

Therefore, Commission staff recommends that the Commission **concur** with DAF consistency determination No. CD-0007-24 and find that the proposed project is consistent with the enforceable policies of the California Coastal Management Program. The motion is on **page 7**.

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EXHIBITS

I. FEDERAL AGENCY'S CONSISTENCY DETERMINATION

Space Launch Delta 30 (SLD 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 enforceable policies of the California Coastal Management Program (CCMP).

II. MOTION AND RESOLUTION

Motion:

> I move that the Commission **concur** with Consistency Determination CD-0007-24 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 **YES** vote on the forgoing motion. Passage of this motion will result in a concurrence with 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 **concurs** with Consistency Determination CD-0007-24 on the grounds that the project is fully consistent, and thus consistent to the maximum extent practicable, with the enforceable policies of the CCMP.

III. APPLICABLE LEGAL AUTHORITIES

A. REVIEW PROCESS

It is the Commission's position that SpaceX's space launch activities are not a government program and are carried out solely by a private entity on a portion of Vandenberg Space Force Base (VSFB) leased to SpaceX by the Department of the Air Force (DAF). DAF nevertheless has determined that the proposed project is a "federal agency activity," as defined in the Coastal Zone Management Act's federal consistency regulations and has therefore prepared a consistency determination for the Commission's review. While preserving its position, the Commission is also moving forward with its review of DAF's consistency determination because failure to do so before October 12, 2024 – the review period deadline established by DAF - would result in a presumption of the Commission's concurrence with DAF's consistency determination.

However, Commission staff is also concurrently pursuing application of the Commission's authority to review the proposed activity under the section of the Coastal Zone Management Act that more readily applies to the project as well as under the California Coastal Act. To this end, Commission staff has initiated discussions with SpaceX directly and informed them of its position and the need for SpaceX to submit an

application for a coastal development permit seeking after-the-fact and continuing authorization for its ongoing rocket launch, landing and associated activities. This position was conveyed both through a meeting between Commission and SpaceX staff held on September 13, 2024, and through correspondence in response to a letter received from SpaceX on September 10, 2024 (both this letter and Commission staff's response are provided in **Exhibit 3**). Commission staff have also requested SpaceX's direct participation in the Commission's October 10, 2024, public meeting during which it will consider DAF's consistency determination for an increase in SpaceX launches to 50 per year. Commission staff have also informed DAF of its position and these discussions with SpaceX and requested its cooperation by encouraging SpaceX's participation in the Commission's hearing process. Commission staff is also separately pursuing application of other aspects of its Coastal Zone Management Act authority. Pending the results of these efforts, it is Commission staff's expectation that SpaceX will be required to seek the Commission's authorization through submittal of a consistency certification and/or coastal development permit application. The Coastal Zone Management Act and its regulations do not preclude a coastal management agency like the Commission from reviewing the same project through both a consistency determination and consistency certification if it requires a federal license or permit and would affect one or more coastal uses or resources.

Regarding what qualifies as a federal agency activity, the federal consistency regulations at 15 C.F.R. Section 930.31(a) state that:

> The term "Federal agency activity" means 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. "Federal agency activity" does not include the issuance of a federal license or permit to an applicant or person (see subparts D and E of this part) or the granting of federal assistance to an applicant agency (see subpart F of this part).

As discussed in the Commission's findings in support of its August 8, 2024, conditional concurrence with DAF's consistency determination for 36 SpaceX launches,

> Commission staff previously and consistently questioned this interpretation and the Commission's review of consistency determinations for projects submitted by DAF rather than coastal development permit applications or consistency certifications since those are the standard mechanisms by which the Commission reviews activities proposed by private entities within the coastal zone and/or affecting any coastal use or resource. In response, DAF has previously stated that "All activities taking place on federally owned (Department of Defense) land, including those that utilize private entities, are done so in a manner exercising our statutory responsibilities." Although the Commission has a long history of reviewing and

> authorizing development activities carried out by private entities on federally owned land, including VSFB, through the coastal development permit application or consistency certification processes, DAF maintains that the proposed project is different due to the unique partnership arrangement it has with commercial space launch companies like SpaceX. In short, because the federal government no longer carries out space launch activities, DAF now relies on private companies such as SpaceX to send government payloads to space and to establish and maintain satellite infrastructure and networks that are available to support DAF needs and priorities. Accordingly, while the project would be operated by a private company to serve its business objectives and would only occasionally launch materials at the behest of DAF, it would also help meet the needs of the federal government. Based on this mixed purpose and at the request of DAF, Commission staff agreed to bring forward the proposed project for the Commission's consideration as a consistency determination from DAF. However, as stated above, this does not prevent the Commission from also exercising its statutory authority under the other provisions of the Coastal Zone Management Act and Coastal Act. Commission staff are continuing to explore those options and whether SpaceX is required to submit a CDP application and/or consistency certification in addition to the DAF consistency determination currently under review. In addition, future projects involving commercial space launch activities at VSFB will continue to be considered on a case-by-case basis and different review approaches will be used when appropriate.

Although the Commission and Commission staff have consistently rejected DAF's characterization of the project as a "federal agency activity," DAF continues to maintain its position in the current consistency determination, stating:

> The purpose of the Proposed Action is to provide greater mission capability to the Department of Defense (DOD), National Aeronautics and Space Administration (NASA) at the Western Range1, as well as other government and commercial entities by increasing Falcon flight opportunities. This increase in flight opportunities would improve U.S. space capabilities by providing additional launch to support future U.S. Government and commercial missions, which require or benefit from a Falcon 9 vehicle. The Federal Aviation Administration (FAA) forecasts that commercial launch operations will increase in the United States (U.S.) from an all-time high in 2022 of 87 launches, to up to 186 launches by 2026. The DOD, NASA, and other Federal agencies obtain access to space through the procurement of commercial launch services. As such, commercial launch capability is critical to the national defense, American's national space objectives, and the National Space Policy of the United States (May 2020). The DOD issued the Commercial Space Integration Strategy (DOD 2024), providing a vision for prioritizing and aligning efforts to integrate commercial solutions into the U.S.'s national security space architecture. This strategy notes that integration will help deny adversaries the benefits of attacks against national security space systems and contribute to a safe, secure, stable, and sustainable space domain.
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> In furtherance of the National Space Policy and U.S. Government space launch requirements, this Proposed Action is needed to enable SpaceX to meet the

increasing need to implement missions for the U.S. Government. SpaceX is currently one of only two U.S. launch service providers certified to launch national security missions for the USSF's National Security Space Launch (NSSL) program, which procures launches for all the military services as well as the intelligence community.

The USSF's mission to "secure our Nation's interests in, from, and to space" is enabled by Space Systems Command's largest organization, the Assured Access to Space Directorate. The Assured Access to Space Directorate procures launch services from the commercial space transportation industry at VSFB, one of only two Federal Ranges from which national security space launches can occur—and the only Federal Range on the West Coast. Space launch for the USSF, other DOD organizations, and the intelligence community is reliant on commercial space launch service providers, as DOD does not operate its own space launch vehicles. SpaceX supports, and is under contract for, the full spectrum of U.S. Government space mission requirements.

…

SpaceX has developed Starlink and Starshield, satellite constellations in low-Earth orbit that require numerous launches to develop and maintain the constellation. Starlink is a critical national capability that is directly utilized by DOD and the intelligence community, which contracts directly for satellite communications services important to the national defense and in support of U.S. interests abroad. Here, Starlink is a services provider for the DOD under numerous contracting vehicles, including the U.S. Space Force Commercial Satellite Communications Office, the U.S. Air Force's Global Lightning program3, the Department of the Navy4, and other programs designed to enhance U.S. national security capability on orbit and on the ground. Starlink services have also been directly procured by each of the U.S. military services, and by U.S. Special Operations Command. More broadly, Starlink is under contract with the Federal Emergency Management Agency, the Department of State, Department of Veterans Affairs, Department of Transportation, U.S. Coast Guard (USCG), Customs and Border Patrol, U.S. Geological Survey, U.S. Forest Service, the National Oceanic and Atmospheric Administration (NOAA), and many other government organizations at the state and local level. These agencies include emergency management personnel who are actively using Starlink to facilitate emergency response and recovery efforts. At any given point in time, Starlink can be activated and deployed globally to respond to various crises.

Starlink and Starshield are critical national capabilities that are directly utilized by DOD and the Intelligence Community, who contract directly for satellite communications services important to the national defense, as well as in support of U.S. interests abroad, including in Ukraine. Many of these capabilities are classified and cannot be discussed in the context of this CD. For many U.S. Government users, Starlink and Starshield are indistinguishable. The ability to consistently launch both Starshield and Starlink is critical to maintaining the highly reliable and

> stable services of both constellations for the U.S. Government and U.S interests to respond to urgent matters. Starshield contracts are so sensitive that the work under them is classified. It is critical that CCC generally understand that the distinction between Starshield and Starlink does not exist for some U.S. Government users, and Starlink itself is the basis for exclusive and specialized U.S. Government services and capability.
>
> It is in the national interest to continuously enhance Starlink network capacity, particularly in furtherance of U.S. Government purposes and objectives. SpaceX's rapid launch capability and continuous deployment of Starlink satellites on orbit directly correspond to improved network performance that scales directly with network growth to meet escalating demand. Starlink launches are not incidental; each individual Starlink launch is part of a deliberate, planned effort to meet capacity needs to support specific requirements or demand, including the U.S. Government. The capability of new satellites allows SpaceX to add capacity more quickly and interconnect the Starlink constellation, to serve critical U.S. Government needs around the globe, and to launch critical communication services for aviation and maritime in the U.S. and the rest of the world's most remote locations.

To summarize and paraphrase DAF's position, because it is a customer of – and reliant on - SpaceX's launches and satellite network, SpaceX launches are a federal agency activity. However, this does not align with how federal agency activities are defined in the Coastal Zone Management Act's regulations or the manner in the Commission has historically implemented those regulations. While the value SpaceX provides to the U.S. Government is no doubt substantial, the simple fact remains that it is a privately owned company rather than a public federal agency and should therefore be regulated accordingly. This appears to be a perspective already held by the federal government outside of the context of the Commission's review process since SpaceX itself is required to lease its launch complex on VSFB from DAF and to hold various licenses and authorizations from the Federal Aviation Administration to carry out launch activities. More consistent adherence to this approach therefore appears warranted, including recognition of SpaceX launches as private company activities through the Commission's review process.

B. CONSISTENT TO THE MAXIMUM EXTENT PRACTICABLE

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).

Similar to what occurred in December 2023 with DAF's Negative Determination No. ND-0009-23, the Commission also has the ability under the federal consistency regulations to re-open this consistency determination should the proposed federal activity have effects on any coastal use or resources substantially different from those originally described in DAF's consistency determination. Should this scenario occur, the Commission's finding that the project is "fully consistent" with the enforceable policies of the CCMP could be re-examined in light of new circumstances.

C. Federal Lands Excluded from the Coastal Zone

As discussed in the Commission's findings in support of its August 8, 2024, conditional concurrence with DAF's consistency determination for 36 SpaceX launches,

> 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 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, if the activities would adversely affect a coastal species such as western snowy plover while it is present on the federal property and put it at risk outside of that federal property within the coastal zone as well, it would be considered to have a "spill over" effect.

In addition to the Commission disagreeing with DAF that the proposed project is a federal agency activity subject solely to Commission review as a consistency determination and the Coastal Zone Management Act's limited definition of "coastal zone," the project is also unique in that it is not spatially limited in the way most projects are. While the SpaceX launch and landing complex is located on VSFB property leased to SpaceX by DAF, the rockets pass outside of the base and result in development and effects directly within the coastal zone off of VSFB as well. For example, sonic booms

generated by the proposed SpaceX rocket launches can subject an extensive area of central and southern California's mainland coast and offshore islands to blast waves (also known as overpressure because they generate temporary spikes over and beyond natural atmospheric pressure) and elevated sound levels. Marine mammals and other coastal wildlife species outside of VSFB experience these sound and pressure effects from sonic booms and respond with startle responses and other behavioral changes. In addition, the public safety zones implemented during rocket launches such as those proposed in the current project would extend outside of VSFB and would result in up to 12 closures and evacuations per year of public beaches and campgrounds, including those at Jalama Beach County Park. This is another direct effect of the SpaceX rocket launches that would occur outside of VSFB and within the coastal zone. These closures and evacuations would adversely affect public beach access and recreation within the coastal zone. Further, the proposed at-sea rocket landings involve the barge transport of the rocket first stage from waters offshore of Baja, California, to the Port of Long Beach and then through coastal waters back to Vandenberg Harbor. As such, the project includes elements that would occur both within and outside of federal property within the coastal zone. The Commission therefore has the authority to review the proposed SpaceX launch and landing activities because they would result in both "spillover" and direct effects and development activities within the coastal zone.

IV. FINDINGS AND DECLARATIONS

A. PROJECT DESCRIPTION

For a complete history of the subject project, please refer to the staff report that was published for the June 12, 2024, hearing as well as the staff report for the August 8, 2024, hearing (Appendix A); that complete history of the subject project in those staff reports is incorporated by reference herein as though fully described in this report. The proposed project is similar to that recently considered by the Commission on August 8th but would expand on it in several notable ways, including by (1) increasing the number of annual SpaceX Falcon 9 rocket launches from 36 to 50; (2) increasing the number of at-sea landings and associated barge transports of the rocket first stage from Baja, California to the Port of Long Beach and then to Vandenberg Harbor from an annual maximum of 36 to 50; (3) fully implementing the coastal resource protective measures described in Conditions 1 through 7 of the Commission's August 8th conditional concurrence, including enhanced biological monitoring efforts, sonic boom minimization measures, coastal access and recreation enhancements, marine debris offsets, lighting management and fisheries coordination; and (4) increasing the number of pre-launch weather balloon deployments (as a result of the increase in launches, not due to an increase in deployments per launch).

The project does not propose to increase the number of closure and evacuation events for Jalama Beach and County Park from the current limit of 12 per year and also does not propose more than the current maximum of 12 landing events at Space Launch Complex (SLC) 4.

Launches

The proposed project would include launching the SpaceX Falcon 9 rocket from SLC-4E on VSFB up to 50 times per year. Although the request in this consistency determination is to increase the number of launches to 50 times per year, because DAF has communicated its plans to prepare and submit a new consistency determination in late 2024/early 2025 for a further increase in SpaceX launches to 100 per year, as a practical matter, the active duration of the current consistency determination would be effectively limited to just the remainder of this year, 2024. In other words, this consistency determination is intended to allow SpaceX to continue launching at its current cadence of approximately once every five days for the remainder of 2024 (achieving up to 50 launches by year end) but before it would come close to reaching 50 launches in 2025, DAF expects the Commission to review and consider a further doubling of the total number of authorized launches (from 50 to 100 per year). Though not explicitly proposed in its consistency determination as a limited duration activity, DAF nevertheless anticipates that this consistency determination for 50 launches per year will be soon replaced by another for 100 launches per year.

The project would include launch trajectories along a range of azimuths between 140 to 325 degrees. The launches would generally follow southerly trajectories between 140 and 210 degrees (i.e., southeast to southwest) intended to deliver payloads to a specific polar and geostationary orbit. Depending on the trajectory and atmospheric conditions, the launches may result in sonic booms affecting the counties of Santa Barbara, Ventura and Los Angeles. **Exhibit 4** provides a general estimate of the affected area based on predictive models used by DAF and FAA. **Exhibit 4a**[1] provides a figure depicting the sonic boom footprint (with psf levels predicted by model outputs over the 125 runs discussed above) for the areas along coastal Santa Barbara, Ventura and Los Angeles Counties, but only shows modeling results over the mainland areas of Santa Barbara, Ventura and Los Angeles Counties. **Exhibit 4b** shows the same set of model outputs, broken into several overpressure ranges, and includes model outputs over the Pacific Ocean and the northern Channel Islands. Additionally, **Exhibit 4c** shows the outputs of 8 individual model runs[2]. These models for sonic booms from launches are discussed in more detail in the August 8, 2024, staff report (Appendix A); that detailed discussion of the models for sonic booms from launches is incorporated by reference herein as though fully described in this report.

After launching rockets, SpaceX would land the first stage either directly adjacent to their launch site at VSFB or on a droneship stationed offshore of Baja California in the

[1] DAF explained: "Each data point is the estimated peak (aka maximum) overpressure level that PCBoom predicted would be received at that location from a single model run output (i.e., one possible scenario). […] Figure 6 is showing the overlay of 125 model run outputs (each output is a conical shaped carpet of points) that were produced using 4 example Falcon 9 easterly trajectories. Each of the four trajectories was modeled (i.e. "run") between 29 and 34 times, each run with a different randomly selected meteorological profile that captured potential weather conditions throughout the year…"

[2] Figures 1 through 8 depict examples of outputs for four Falcon 9 trajectories across a range of launch azimuths from 140 to 189, each under two example meteorological profiles to illustrate the potential variation due to weather conditions.

international waters of the Pacific Ocean. 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 30 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 and landing complex on VSFB 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 and landing complex is shown in **Exhibits 1** and **2**.

Other Project Components: Deluge Water and Vegetation Management, Payload Fairing Recovery Operations, Weather Balloons, Landing, Booster Roll-On Roll-Off, Ground Operations, Support, and Transport

These components of the project description remain unchanged from the staff report for the August 8, 2024, hearing. To achieve efficiency in drafting this staff report, the complete description of these project components in Appendix A are incorporated by reference herein as though fully described in this report. However, except for vegetation management, the amount associated with each component would increase consistent with the proposed increase in launch frequency. Specifically, the maximum number of at-sea barge landings would increase from 36 to 50 per year, but with no more than a total of 12 first stage landings occurring at VSFB on SLC-4W per year. The number of weather balloons released per launch would remain the same, but the increase in launch frequency would result in a greater total number of weather balloons being released. Also, payload fairing recovery operations, booster roll-on roll-off operations, ground operations, support, and transport would also increase consistent with the increase in launch frequency.

Engine Noise and Sonic Booms

As described by DAF in its CD submittal, there are four components of the Falcon 9 launches that would generate significant, potentially disruptive sound and noise:

> 1) continuous engine noise created by the launch vehicle during static fire tests (lasting several seconds); 2) continuous engine noise created during ascent (lasting several minutes); 3) impulsive sonic boom created by the launch of the rocket as well as returning first stage (both lasting less than one second); and 4) continuous engine noise as the first stage lands (lasting approximately 60 seconds).

Engine Noise

During launch operations and static fire tests, the rocket engines would produce noise of up to 150 (decibels) dBA near SLC-4; maps showing the extent of modeled engine noise are included in **Exhibits 5a and 5b** (**Exhibit 5a** shows model results included in the CD for 50 launches per year for impacts areas for engine noise for launches,

landings, and static fire tests, and for sonic booms from landings; **Exhibit 5b** shows the model results for those included in the Draft Environmental Assessment for 50 launches per year). For reference, sounds of 85 dBA are known to cause hearing loss in humans and sounds of 150 dBA exceed those generated during a fireworks show at close range. The engine noise estimates provided here are for in-air sound, and it is worth noting that a significant amount of sound energy (loudness) is lost when transmitting across the air-water interface, such that underwater sound from engine noise is expected to be much lower during launches and landings.

Additional information on engine noise is provided below in Sections IV.C and IV.D, in the context of potential impacts to marine mammals and ESHA on-base.

Noise associated with launches, static fire tests and landings occurs at and near multiple launch facilities across VSFB and may incrementally contribute to cumulative impacts to sensitive species and ESHA. Prior to 2023, VSFB has supported an average of 6.2 launches per year with a maximum of 17 in 2022. During 2023 a total of 24 Falcon 9 missions were performed on VSFB. As of the date of this staff report Commission staff have counted a total of approximately 32 SpaceX launches in 2024, with the most recent launch on September 24, 2024. To achieve efficiency in drafting this staff report, the complete description of these cumulative VSFB launch activities and engine noise is in Appendix B of the August 8, 2024 staff report which is incorporated by reference herein as though fully described in this report.

Sonic Booms

Section IV.C of the August 8, 2024, staff report for Commission's conditional concurrence with CD-0003-24 ("August 8, 2024, staff report"; see Appendix A) includes a detailed discussion of sonic booms associated with the project (sonic booms occurring on base and off base), and that detailed information, which is incorporated by reference herein as though fully described in this report, remains relevant for the launches proposed for this consistency determination for 50 launches per year. New information has also recently been made available to Commission staff by DAF and through the federal regulatory documents that have been prepared, including the Draft Environmental Assessment and USFWS Biological Opinion for the 50 SpaceX launches per year project. This information demonstrates that sonic booms generated by launch and landing activities continue to be highly variable and difficult to accurately predict. For example, the initial results provided by DAF from the acoustic monitoring carried out by researchers from Brigham Young University and California State University, Bakersfield, (included as **Exhibit 6**) appear to show that several SpaceX launches carried out during the summer of 2024 did not generate recordings of sonic booms at monitoring stations in Ventura and southern Santa Barabara counties. Although only a small number of launches were assessed at roughly two dozen sites during a limited summer season and therefore may not be representative of other locations or times of the year, these results nevertheless demonstrate that it may be possible for launches to occur in a manner that results in sonic booms of more limited magnitude and spatial extent. While this appears to be a positive development, before such conclusions can be definitively drawn, additional field monitoring needs to occur across a representative area and range of atmospheric conditions and rocket trajectories. Through DAF's

description of its efforts to meet Condition 2 of the Commission's recent conditional concurrence with DAF's CD for 36 launches per year, DAF appears committed to carry out this additional work. Specifically, DAF has stated that it will continue the BYU/CSU Bakersfield Sonic Boom Assessment Plan (acoustic monitoring program) and will invite Commission staff's feedback on how to adapt it to more effectively cover areas of sensitive coastal resources such as Channel Islands National Park and National Marine Sanctuary. In addition, DAF has also committed to evaluate the results of the data collection effort and use them and feedback from the interagency working group in order to minimize sonic booms:

> DAF will evaluate inputs from the Working Group when considering launch times and trajectory to minimize the spatial extent and severity of sonic booms experienced in those off-base areas to the greatest extent practicable. The DAF will carry these inputs into its Current Launch Schedule Review Board process when considering decisions on adjustments to launch times and trajectories.

This significant progress around sonic booms from launches is slightly offset, however, with new information from the Draft Environmental Assessment and most recent USFWS Biological Opinion that shows that while the proposed number of landing events for the first stage on VSFB would not increase from the 12 previously concurred with by the Commission, the sonic booms from these landing activities may be more powerful than previously considered. Figures illustrating the sonic boom footprints and peak overpressure levels modeled for sonic booms associated with the first stage landing of Falcon 9 rockets at SLC-4 in various new submittals (i.e. DAF's consistency determination for 50 launches, the 2024 USFWS Biological Opinion, and the Environmental Assessment for 50 launches per year), deviate from the figures provided in support of DAF's consistency determination for 36 launches per year and analyzed in the staff report for the August 8, 2024, hearing (**Appendix A**). Specifically, the maximum peak overpressure contour depicted for sonic booms for landings in Figure 2b of the Environmental Assessment for 36 launches (included in Exhibit 5 of the August 8, 2024, staff report – Appendix A) is shown as 4 psf (pounds per square foot), while it is shown as nearly twice that level - 7.5 psf - in Figure 3.2-4 of the Draft Environmental Assessment for 50 launches per year (included in **Exhibit 5b** of this staff report).

DAF stated in correspondence to Commission staff on September 17, 2024, that the reason for the variability in depicted sonic boom strength is as follows:

> The sonic boom footprint varies for each trajectory and the conditions assumed in that specific model run. The figure [in the CD for 50 launches per year] is not meant to be all inclusive but is simply an example of a single model run.

As described in detail in the staff report for the August 8, 2024, hearing, sonic boom impact areas depend significantly on trajectory and atmospheric conditions for a given launch or landing. The expanded modeled sonic boom footprint with higher peak overpressures (in comparison to the footprint analyzed for the USFWS 2023 Biological Opinion and the consistency determination for 36 launches per year) has resulted in an expanded potential impact area associated with on-base landings. These expanded

potential impact areas are discussed in the findings below for consistency with the CCMP policies for coastal waters and marine resources and for environmentally sensitive habitat areas (ESHAs). The implications of the expanded sonic boom impact areas from landings are also addressed in the USFWS 2024 Biological Opinion, as discussed in the Other Agency Approvals section below.

Progress on Satisfying Requirements of the Conditions from Consistency Determination No. CD-0003-24

Following the Commission's conditional concurrence with consistency determination CD-0003-24 for up to 36 SpaceX launches per year, DAF confirmed in a letter dated September 13, 2024, that it accepted all seven of the Commission's conditions and outlined its approach to meeting their requirements and intent. Commission staff provided feedback in response to this letter and DAF replied via letter on September 17, 2024, to expand on and clarify the scope of its commitments and efforts to satisfy the Commission's conditional concurrence. These letters are provided in **Exhibit 7**. DAF also provided, on September 13th,16th and 25th, plans required through Conditions 4 through 7. These plans are provided in **Exhibit 8** and discussed further below. Commission staff has had these documents for a very limited amount of time and additional review still needs to be completed on them. DAF is supportive of that review process and has committed to accepting and considering feedback from Commission staff on further refinements and improvements that may be warranted.

Although Conditions 1 through 7 apply to DAF's consistency determination to increase SpaceX launches from six to 36 per year, further development and implementation of the protective measures and plans needed to satisfy those conditions is also essential to ensuring that the additional increase in launches proposed in the current consistency determination would be consistent with the CCMP. As such, DAF has committed (in its September 17, 2024, letter) to implementing the protective measures and plans of Conditions 1 through 7 as part of the expanded launch project and has integrated them into the project description of the current consistency determination as elements of the project. As further described below, DAF has also committed to convening an interagency working group comprised of staff from the Commission, DAF, National Marine Fisheries Service, U.S. Fish and Wildlife Service and the Federal Aviation Administration. This working group will increase coordination among the agencies and their individual requirements and allow for discussion and further development of biological monitoring programs and analysis of results.

<u>Condition 1 – Enhanced Biological Monitoring Program</u>

Although DAF expressed reservations about implementation of Condition 1 prior to the Commission's August 8th meeting and conditional concurrence, it subsequently increased its efforts to work collaboratively with Commission staff and to accept and adhere to the condition's requirement to enhance its biological monitoring program. These efforts resulted in letters from DAF to the Commission's Executive Director (included as **Exhibit 7**) dated September 13 and September 17, 2024, in which it

confirmed acceptance of Condition 1 and outlined its approach to meeting the condition's requirements. This approach relies in part on implementation of enhanced monitoring program requirements that are also established through the most recent U.S. Fish and Wildlife Service Biological Opinion (from August 2024 and focused on up to 50 SpaceX launches in calendar year 2024), such as the establishment and evaluation of reference sites that can be used as a basis of comparison for on-base monitoring results, and the statistical analysis of monitoring results to help determine if adverse impacts to wildlife and habitat have occurred. DAF has also committed to restarting marine mammal monitoring efforts established through the National Marine Fisheries Service's 2019 Letter of Authorization but later discontinued as well as to monitoring of the on-base monarch butterfly, pallid bat and western red bat populations in a manner sufficient to assess potential changes in habitat use patterns and population levels.

Although the short interval between the Commission's review of DAF's consistency determination for 36 launches and this new one for 50 launches means that a number of its recently submitted documents for Condition 1 (such as some of the plans included in **Exhibit 8**) lack substance and specificity and many details have yet to be developed and provided regarding the manner in which DAF's commitments will be implemented and upheld, DAF has established a process that would allow for these issues to be resolved. This process includes continuing to accept and consider feedback from Commission staff on DAF's various plans and efforts and, most meaningfully, convening an interagency working group that includes staff from the Commission, U.S. Fish and Wildlife Service and National Marine Fisheries Service.

A mechanism to foster greater coordination between these resource management agencies regarding SpaceX launch and landing activities has long been a goal of Commission staff and this working group has the potential to help ensure compliance with Condition 1 and to enhance and improve coastal resource protection by optimizing monitoring efforts, analysis of results and identification of adaptive management measures to be implemented. The schedule, format, and initial focus of the working group is expected to be established by its membership soon, but DAF already demonstrated its commitment to increased coordination and transparency by facilitating Commission staff's participation in a meeting between USFWS and VSFB staff and biological consultants to discuss implementation of the requirements of the August 2024 Biological Opinion. While it is too early to know how effective the working group will be, these recent developments have all been in a positive direction and provide reason for optimism.

<u>Conditions 2 and 3 – Sonic Boom Minimization and Monitoring</u>

These conditions from the Commission's August 8th conditional concurrence are both focused on sonic boom effects outside of VSFB and are interrelated. Condition 2 calls for DAF to take steps to minimize the spatial extent and magnitude of sonic booms from SpaceX launches and Condition 3 calls for the development and implementation of a biological monitoring program to evaluate sonic boom effects on coastal biological resources if those minimization measures would not result in avoidance of sonic boom effects. Given the extensive size of the potential effects area from sonic booms

(hundreds of square miles of the coastal and marine environment), establishing and carrying out the kind of monitoring program described in Condition 3 would present a significant logistical and technical challenge. In addition, while such a program could be developed and used to ensure coastal resource protection over the long term, adverse impacts could accrue for a period of time before they are adequately recorded, recognized and responded to.

As such, Commission staff have encouraged DAF to instead focus on avoidance and minimization of sonic booms – and thereby their effects – through adherence to Condition 2. This guidance is reflected in DAF's recent response and commitments on these two conditions, particularly as reflected in its September 13th and 17th letters to the Commission's Executive Director outlining how it intends to meet the conditions. While DAF has consistently expressed to Commission staff the importance of it maintaining maximum operational flexibility and latitude for launch activities and the concerns it has with presuming effects are occurring before robust documentation is provided, its September 17th letter appears to offer a compromise approach that still meets the intent of Condition 2. This approach was developed following a productive series of information exchanges and open discussions between Commission staff and senior leadership at VSFB and DAF, facilitated by Dr. Ravi Chaudhary, Assistant Secretary of the Air Force for Energy, Installations, and Environment, and Colonel Mark Shoemaker, Commander, Space Launch Delta 30 and Western Launch and Test Range, VSFB. Specifically, DAF will be implementing a two-prong strategy in which it (1) has identified steps it will be taking to minimize sonic booms and (2) further commits to continuing its data-driven approach by proceeding with its ongoing field-based acoustic monitoring program in southern Santa Barbara, Ventura and north-western Los Angeles counties.

In terms of minimization efforts, DAF states in its letter:

> DAF will evaluate inputs from the Working Group when considering launch times and trajectory to minimize the spatial extent and severity of sonic booms experienced in those off-base areas to the greatest extent practicable. The DAF will carry these inputs into its Current Launch Schedule Review Board process when considering decisions on adjustments to launch times and trajectories.

This is expected to be an evolving process that will improve over time as additional information and understanding is developed as to what the dominant contributors are for sonic boom spatial extent and magnitude (trajectory, atmospheric conditions, seasonal patterns, etc.) and how those can be adjusted in a manner that allows launches to continue but with a reduced likelihood of effects.

In terms of the acoustic data field collection effort, DAF is partnering with researchers from Brigham Young University and CSU Bakersfield to continue the monitoring efforts initiated earlier this year and to accept and consider feedback from Commission staff about possible ways of augmenting or enhancing those effort and their ability to inform analysis of effects to coastal resources. DAF has already shared preliminary results from work carried out over the past couple months and engaged Commission staff in a

dialogue about possible conclusions that can be drawn from these findings and how they affect previous assumptions about launch generated sonic booms. These preliminary findings are provided in **Exhibit 6** and appear to demonstrate that certain launches result in less than anticipated sonic boom extent and magnitude. Although the data remains limited at this point and needs to be further verified across a wider range of conditions and locations, it nevertheless appears to be a positive development that may signal minimization of sonic boom extent and magnitude is achievable.

Conditions 4 Through 7

Conditions Four, Five and Seven require submittal of Lighting Management Plan, a Coastal Access and Recreation Enhancement Plan, and Commercial and Recreational Fishing Coordination Plan. Condition Six does not require the submittal of a plan, rather, the condition requires DAF to ensure that annual payments by SpaceX are made for each pound of unrecoverable marine debris generated as a result of space launch and landing activities. Condition Six also requires DAF to provide an update on efforts to reduce the amount of marine debris released as part of launch activities. DAF submitted these plans and documents to Commission staff on September 13th, 16th and 25th and they are provided in **Exhibit 8**. DAF has also included these plans and their implementation in its current consistency determination for 50 SpaceX launches per year.

For the Lighting Management Plan, DAF provided a general outline and update that the plan continues to be developed and would begin implementation by as soon as January of 2025. For the Coastal Access and Recreation Enhancement Plan, DAF shared information on how it would implement the three items specifically outlined in Condition 5, the coastal environmental education program for Lompoc Unified School District, the digital sign regarding camping availability at the intersection of Highway 1 and Jalama Rd., and the satellite internet service at Jalama Beach County Park. DAF also provided subsequent clarification through an email dated September 17. 2024, that the environmental education program would continue for the “life of the consistency determination” and internet service would be renewed after two years. The consistency determination does not include an identified termination date. DAF also updated Commission staff that the evacuation shuttle it had previously proposed to facilitate safety closures of Jalama beach and campground is no longer being considered due to concerns raised by Santa Barbara County regarding logistics. DAF also provided a copy of the Commercial and Recreational Fishing Coordination Plan. Commission staff is currently completing its review and will follow up, as necessary. Finally, DAF provided a written update regarding its efforts to minimize marine debris. These efforts include a reduction in per-launch weather balloon use of 10 to 20 weather balloons, the use of new equipment that would result in a significant reduction in plastic material, and investigation of ground-based alternatives to weather balloons.

B. Other Agency Approvals

United States Fish and Wildlife Service

DAF has previously 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 rocket launch activities at VSFB. The March 21, 2023 Biological Opinion issued by the USFWS evaluating SpaceX's 36 launch per year cadence 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 project was 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. However, at the time the 2023 Biological Opinion was developed, the USFWS had not been provided with information on sonic booms occurring outside of VSFB and the Northern Channel Islands, and thus the 2023 Biological Opinion did not analyze how sonic booms extending into Santa Barbara, Ventura, and Western Los Angeles Counties might affect federally listed species.

USFWS has subsequently issued a new Biological Opinion, dated August 28, 2024 (the 2024 USFWS Biological Opinion), to include up to 16 additional launches between October 1 and December 31, 2024. The USFWS 2024 Biological Opinion states that, cumulatively, SpaceX would not exceed 50 launches on VSFB in 2024. This new USFWS 2024 Biological Opinion does include analysis for the geographical extent of off-base sonic booms from launches over the mainland areas of Santa Barbara, Ventura, and Western Los Angeles Counties (for the term through the end of 2024). It also includes analysis for species in the impact area of the expanded sonic boom footprint associated with on-base landings with higher peak overpressures (in comparison to the USFWS 2023 Biological Opinion) as mentioned in the project description above.

The new USFWS 2024 Biological Opinion found that an additional 16 launches through the end of 2024 "may affect but is not likely to adversely affect" marbled murrelet (*Brachyramphus marmoratus*), southern sea otter (*Enhydra lutris nereis*), California condor (*Gymnogyps californianus*), unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*) and tidewater goby (*Eucyclogobius newberryi*). In addition, USFWS analyzed the expanded impact areas and DAF's requested informal conference on the proposed Western spadefoot (*Spea hammondii*, which is under review for potential listing under the Endangered Species Act). With the additional analysis, the USFWS 2024 Biological Opinion found that the proposed project also "may affect but is not likely to adversely affect" California gnatcatcher (*Polioptila californica californica*), California tiger salamander (*Ambystoma californiense*), arroyo toad (*Anaxyrus californicus*), light-footed Ridgway's rail (*Rallus obsoletus levipes*), and Western spadefoot (*Spea hammondii*).

The USFWS also found that the proposed project is likely to adversely affect but would not likely jeopardize the continued existence of California red-legged frog (*Rana draytonii*) and western snowy plover (*Charadrius aves)*. The USFWS also provided a conference opinion for the southwestern pond turtle (*Actinemys pallida*), which is

currently proposed as threatened and under federal review for listing under the Endangered Species Act. In addition, the USFWS 2024 Biological Opinion found that the proposed project is likely to adversely affect but would not likely jeopardize the continued existence of southwestern pond turtle. The USFWS 2024 Biological Opinion does not address potential impacts to California least tern (*Sterna antillarum browni*) (which the USFWS 2023 Biological Opinion did) because the period it covers (from October through the end of 2024) is outside of the species breeding season and it is not present within the action area at that time. While that period is also outside of the known breeding season for western snowy plover, VSFB is an important overwintering location for the species and as such western snowy plover is considered in the USFWS 2024 Biological Opinion.

The USFWS made the respective determinations for the species mentioned above due to the protection and mitigation measures that DAF has agreed to implement. These protection and mitigation measures are provided in the USFWS 2024 Biological Opinion (**Exhibit 9**), and are discussed further in Section IV.D. Several of these enhanced measures are intended to comport with the enhanced on-base biological monitoring and analysis measures in Condition One from the Commission's conditional concurrence with CD-0003-24.

Although the 2024 Biological Opinion applies only until December 31, 2024, USFWS staff have confirmed that it can be extended to ensure that protective measures included in the opinion can continue into 2025 and beyond. However, since western snowy plovers would not be breeding during the period covered in the 2024 Biological Opinion and California least terns would not be within the impact area at all during the period in the 2024 Biological Opinion, in order to process an extension, the opinion would need to be amended to include an analysis of breeding western snowy plover and California least terns.

National Marine Fisheries Service

DAF has also previously consulted with the National Marine Fisheries Service (NMFS) regarding rocket and missile launches and aircraft operations at VSFB 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 VSFB. 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 for marine species listed under the Endangered Species Act. NMFS provided a Section 7 concurrence letter on January 20, 2023. On April 10, 2024, DAF received a new LOA superseding the previous LOA. The new LOA is set to expire on April 9, 2029. Since then, DAF has officially incorporated the new LOA into the DAF's consistency determination as of the expiration of the previous LOA and issuance of the new LOA and the Draft Environmental Assessment for the 50 SpaceX launches per year project states:

> DAF provided an assessment to NMFS in August 2024 determining the Proposed Action falls within the take numbers covered under the current LOA

and are adequate to cover shifting impacts from portions of the Northern Channel Islands (NCI) to two mainland haulouts.

A copy of the new LOA is included in **Exhibit 10**. Like for the USFWS biological opinion, DAF's LOA application to NMFS did not include information on sonic booms occurring outside of VSFB and the Northern Channel Islands. As such, the NMFS 2024 rulemaking and 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 amended to reflect changes in launch operations – including increases in cadence or revisions to safety protocols following a launch mishap. 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. As of September 2024, a Draft Final Environmental Assessment (EA) is being developed by FAA and DAF for an increase in SpaceX launches from VSFB from 36 to 50 per year.[3] As such, it is Commission staff's understanding that SpaceX's FAA license would need to be amended.

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 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 (SBAPCD) has jurisdiction over stationary emission sources, including federal activities, in its air basin and California coastal waters; VSFB is within its jurisdictional air basin and marine vessels associated with the project will transit through state waters within SBCAPCD jurisdiction. The SBCAPCD has locally adopted air emission thresholds that are used to evaluate the significance of air quality and GHG impacts from a project's construction and operations 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 tugboat and barge operations, fuel transfer on space launch complexes, and also include air emissions from ancillary sources such as diesel generators, special equipment, and solvents to clean equipment. The SBCAPCD does not have jurisdiction

[3]https://www.vandenberg.spaceforce.mil/About-Us/Environmental/EAS/

over emissions from rocket liftoff, as liftoff is considered a mobile emissions source subject to either California Air Resources Board or U.S. EPA emission standards. To ensure that the proposed project will be consistent with the requirements imposed by the SBCAPCD, DAF has committed to ensuring that SpaceX will receive and comply with all of the relevant permits from the SBCAPCD prior to construction and operation of the proposed project.

South Coast Air Quality Management District.

The South Coast Air Quality Management District (SCAQMD) has jurisdiction over stationary emission sources within the South Coast air basin (western portions of Riverside and San Bernardino Counties, the southern two-thirds of Los Angeles County, and all of Orange County), including federal activities, and California coastal waters; and marine vessels associated with the project will transit through state waters in SCAQMD jurisdiction. The SCAQMD has locally adopted air emissions thresholds that are used to evaluate the significance of air quality and GHG impacts from a project's construction and operations and applicable regulatory requirements under the District's rules and regulations.

The project would not require any permits from SCAQMD. However, project operations would take place within the jurisdiction of the SCAQMD and would exceed general conformity requirements for NO_x. In order to accommodate projects subject to general conformity requirements, general conformity budgets for criteria pollutants are established within each air quality management district (AQMD). As described in the draft final EA, the SCAQMD currently has a general conformity budget of 299 tons for NO_x and the project is not anticipated to exceed the budget. DAF anticipates receiving a letter from SCAQMD granting use of budgeted NO_x shortly. SCAQMD, SpaceX and DAF have been coordinating and developed a methodology to track annual project emissions and return any unused credits.

Tribal Outreach and Consultation

As described in the Draft Final EA, according to DAF there is no National Historic Preservation Act (NHPA) Section 106 trigger for the project. Therefore, DAF did not consult with any federally recognized tribes for the project, including the Santa Ynez Band of Chumash Indians. The draft final EA will be provided to Santa Ynez Band of Chumash Indians for review.

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. 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, September 25, 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.

C. Coastal Waters and 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.

The proposed project has the potential to adversely impact marine resources, including the biological productivity of marine waters and marine areas and species of special biological significance such as marine protected areas, national marine sanctuaries, and marine mammal breeding and haul-out sites, due to marine debris and noise from rocket engines and sonic booms. The proposed project also has the potential to negatively affect water quality in Spring Canyon and the Pacific Ocean due to 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. Finally, the proposed project also has the potential to adversely affect marine resources due to artificial night lighting from rocket engines and illumination of the SpaceX launch complex.

Section 30230 of the Coastal Act requires areas and species of special biological significance to be provided with special protection. Section 30231 of the Coastal Act requires development to maintain the biological productivity and quality of coastal waters and wetlands by various means including preventing depletion of ground water supplies.

Regional Context

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. The proposed Chumash National Marine Sanctuary would also fully extend across the waters offshore of VSFB. Section IV.C of the August 8, 2024, staff report in Appendix A includes a complete summary of the species, habitats and notable regions within this section of the California coast; that summary is incorporated by reference herein as though fully described in this report.

Engine Noise and Sonic Booms

The proposed project has the potential to adversely affect marine biological resources through exposure of marine species and habitats to engine noise and sonic booms generated during rocket launches and landings. Marine mammals are sensitive to sound and are often considered to be indicator species to understand noise impacts on the marine environment. Marine mammals that may be present in the nearshore environment, particularly those that spend time above the water line, include southern sea otters, sea lions, and seals. Section IV.C of the August 8, 2024, staff report (Appendix A) includes a summary of the available scientific information addressing the effects of aircraft noise and sonic booms on wildlife; that summary is incorporated by reference herein as though fully described in this report.

Although this discussion in the August 8, 2024, staff report provides a useful point of reference, it should be noted that the historic launch frequencies at VSFB were significantly lower than those currently being carried out by SpaceX and considered in DAF's consistency determination. As such, past observations are useful for demonstrating the types of effects on marine species generated by periodic individual launches and noise exposure events – e.g., alert behavior, flushing into the water, decreases in hearing sensitivity – but cannot provide an accurate indication of long term or cumulative effects from a steady cadence of 50 launches, 30 engine tests and 12 landing events at VSFB each year currently proposed by DAF. More recent monitoring carried out on VSFB, in particular that summarized in the annual reports from 2022 and 2023 when the number of SpaceX launches began to increase sharply, provides another useful reference as to the types of effects that can be expected within marine mammal habitat areas of special significance such as haul outs. Similar to historical reports, those from recent years demonstrate that flushing of animals into the water is a common occurrence immediately following exposure to launch noise, in particular for those haul out sites located within the areas exposed to the highest levels of noise from engines and/or sonic booms. Although animals have been shown to return to the haul out site and resume previous behavior within a short time, flushing into the water is disruptive to individual animals and the colony, energetically expensive, and carries a risk of injury, particularly to young and smaller animals that may be trampled. Young animals may also become separated from their mothers and suffer stress and injury as a result. The severity of these effects is heavily influenced by the frequency of

disturbance. The more frequent the disturbance, the more substantial the effect or risk. Although very few studies have been carried out on the long-term effects to marine mammals and habitat areas of exposure to sonic booms, engine noise or other elevated, short duration sounds, research into other sources of disturbance demonstrates that a threshold exists beyond which the animals and/or colony will abandon the area.

Engine Noise and On-Base Sonic Booms

Engine noise generated by launches and landings at SLC-4 is described in the project description provided in Section IV.A, above. 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 (**Exhibits 5a** and **5b**). This sound level would be generated during engine testing, rocket liftoff and boost-back landings. 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 17 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. Rocket landing would also create sonic booms in the range of one to five psf on VSFB in areas where there are several marine mammal haulouts. The area of VSFB shown to experience a sonic boom of 7.5 psf per Figure 3.2-4 of the Draft Environmental Assessment (**Exhibit 5b**) is located in the more immediate area of the landing pad and is not located in areas known to be inhabited by marine mammals.

Off-Base Sonic Booms

As described in Section IV.A, above, vehicle launches would also create sonic booms in the range of up to 5.7 psf at the northern Channel Islands, and in the range of up to approximately 2 psf along the off-base mainland areas of Santa Barbara, Ventura, and Los Angeles Counties (**Exhibits 4a and 4b**). There are dozens of known marine mammal haulout sites located on the Channel Islands and in the mainland areas that experience sonic booms from launches, that may be adversely impacted by the sudden loud noises and overpressures associated with these sonic booms.

Cumulative Noise Impacts

To help evaluate potential adverse impacts to marine mammal hearing from elevated sound, Southall et al. (2019)[4], 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,

[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.

DAF has conducted monitoring of pinniped (seal and sea lion) responses to launch activities and previously found that historical launch activities have not had any observable long-term consequences for the pinniped populations on VSFB or their use of habitat at and around VSFB. Specifically, the Draft Environmental Assessment (EA) prepared for the project and released on September 16, 2024, found:

> The DAF 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 in collaboration with NMFS, there are generally no substantial behavioral disruptions or anything more than temporary affects to the number of pinnipeds hauled out on VSFB. Again, reactions between species are also different, for example, Pacific harbor seals (PHS) and California sea lion tend to be more sensitive to disturbance than northern elephant seals. Normal behavior and numbers of hauled out pinnipeds typically return to normal within 2 to 4 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.

Similarly, DAF has also monitored southern sea otters during launches to document their reaction to sound. As discussed in more detail in the August 8, 2024, staff report for Commission's conditional concurrence with CD-0003-24, southern sea otters (*Enhydra lutris*) occupy the nearshore ocean along the VSFB coastline and are often found within the kelp beds located at the southern end of VSFB and DAF has monitored southern sea otters during launches to document their reaction to sound. It has been DAF's position that no mortality or injury effects have been previously documented from launch-related noise, but launch-related noise may result in short-term behavioral changes, such as increased diving.[5] According to DAF there has been no indication that behavioral responses have translated into longer-term changes in habitat use or population levels. However, as noted above, past monitoring carried out during periods with relatively low launch cadences may not provide a useful or accurate indication of the long term or cumulative effects resulting from the higher frequencies of launches, engine tests and landing events proposed under the subject CD, highlighting the need for a robust, on-going monitoring program.

Monitoring and Reporting for Noise Impacts (Overall)

DAF's previous consultation with NMFS under the Marine Mammal Protection Act resulted in the issuance of a Letter of Authorization (LOA) on April 10, 2019 (**Exhibit 11**). As part of this 2019 NMFS LOA, DAF committed to monitoring pinnipeds located on

[5] 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 less sound is transmitted across the air-water interface, DAF has concluded that in-air sound would not physically damage or deafen pinnipeds and otters that are below the water surface. However, recent studies indicate that although less sound is transmitted across the air-water interface, sonic booms have been detected underwater to a depth of 50 meters. The strength of the underwater signal from sonic booms is dependent on the depth of the receiver and frequency of the sonic boom (Sohn, Vernon, Hildebrand, and Webb. 2000). .

VSFB and the northern Channel Islands during all launches, including those proposed by SpaceX. The 2019 NMFS LOA required DAF to avoid launches that were predicted to produce a sonic boom over the northern Channel Islands during the harbor seal pupping season from March through June, whenever possible. The 2019 LOA also required DAF to conduct launch-specific pinniped monitoring at southern VSFB haul out locations, as well as additional acoustic and biological monitoring at the Northern Channel Islands based on modeled sonic boom thresholds.

NMFS issued a new LOA on April 10, 2024 (**Exhibit 10**), which DAF subsequently incorporated into its consistency determination for 36 launches (CD-0003-24). However, the new 2024 NMFS LOA contains new requirements for mitigation, monitoring, and reporting that differ significantly, and in key instances weaken, the requirements included in the 2019 NMFS LOA. In particular, the 2024 LOA eliminates the requirement to conduct on-base marine mammal and acoustic monitoring during Falcon 9 launches at SLC-4 (such monitoring is now required only for specific instances of launches of new, larger, or louder rockets, or those launched from new facilities). The 2024 NMFS LOA also weakened the 2019 LOA requirements related to launch scheduling (i.e. avoidance of pupping season) and monitoring for the Northern Channel Islands (NCI).

While on the whole the 2024 NMFS LOA significantly weakened the launch restrictions and marine mammal monitoring requirements contained in the prior LOA, it does include more specific requirements to conduct semi-monthly surveys (two surveys per month) to monitor the abundance, distribution, and status of pinnipeds at VSFB, with data collection for species, number, general behavior, presence and number of pups, age class, gender, and any reactions to natural or human-caused disturbances, as well as environmental conditions, including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction. These monitoring requirements are expected to yield useful data about marine mammal population trends over time, but would not provide insight into launch-specific responses, behavior changes or impacts.

As discussed previously in the project description (Section IV.A), DAF, in letters dated September 13 and September 17, 2024, (included as **Exhibit 7**) has committed to implementing the enhanced monitoring called for in Condition 1 of the Commission's August 8, 2024, concurrence with the 36 launch per year project (CD-0003-24), and has included this commitment it is current consistency determination for the 50 launch per year project. Most critically, DAF committed to restoring the monitoring of pinnipeds at on-base haulouts during launches (with associated acoustic monitoring), consistent with the 2019 NMFS LOA, while also incorporating the revised monitoring required by the new 2024 NMFS LOA (which was incorporated into the subject CD). The resulting monitoring program, combining both launch-specific, on-base monitoring consistent with the 2019 NMFS LOA, and the semi-monthly surveys required by the 2024 NMFS LOA, will allow for ongoing assessment of both event-scale responses and impacts and broader population trends as the launch cadence increases.

Another issue with the monitoring program as previously implemented by DAF was a focus on counts of the otter population before and after launch events. This monitoring

approach and data went back as far as 1998 and indicated that the launching of rockets did not substantially affect the number of otters. However, the number of launches during the majority of this monitoring period were generally fewer than 10 launches per year. Since the proposed project requests a five-fold increase in launch frequency compared to the historic launch levels it is vital for the monitoring program to more closely scrutinize how more launches may be affecting otters. In order to better discern if otters are adversely affected by the more frequent launch intensity, DAF will implement both camera and in person biological monitoring during launch events to record behavioral responses. DAF will then provide a summary of the observed behavior and also share the data with resource agencies.

DAF has also committed to making improvements to its statistical analysis of monitoring results, to better determine if adverse impacts to wildlife and habitat have occurred. Specifically, DAF will conduct multivariate statistical analyses of the changes in population trends and other indicators of species status, using variables such as: (a) relevant historical population data, (b) the frequencies and seasonal timing of launches and on-base boost-back landings over different time scales, (c) geospatial variability; (d) off-base reference site data; (e) climatic and oceanographic factors; (f) acoustic monitoring data; (h) and other variables including (as relevant to the respective species) fledging rates, breeding rates, beach width, behavior during launches, and forage base or food web trends.

An additional concern, discussed in prior staff reports, is that equipment failures have, at times, reduced the effectiveness of DAF's monitoring efforts. For example, for two launches during the 2023 reporting period (June 22nd and July 7th), pre-launch modeling predicted that sonic booms could impact the northern Channel Islands, but equipment failure prevented any on-the-ground recording of the actual sonic boom intensities during these events. Equipment failure also occurred during monitoring of southern sea otters on two occasions (April 2nd and 14th), preventing any observation of sea otter behavioral responses to the launches. In response to the Commission's concerns, as part of the current CD DAF has committed to implement measures for equipment redundancy and data-handling improvements to help ensure further loss of monitoring data is avoided.

Importantly, DAF has also committed to establishing a resource agency working group to increase coordination among the agencies and their individual requirements, and to provide a forum for reviewing the on-base monitoring efforts and results, and providing recommendations for improvements, additional protective measures, and/or mitigation. This working group has the potential to help ensure the successful implementation of the measures included in Condition 1 and committed to by DAF under the subject CD, and to enhance and improve coastal resource protection by optimizing monitoring efforts, data analysis and identification of adaptive management measures to be implemented. DAF has also committed to submit annual reports on the findings of its enhanced biological monitoring program to the Executive Director by July 1st of each year, as well as a comprehensive 3-year report and presentation to relevant resource agency staff to discuss the monitoring results and conclusions. The annual reports

would have initial conclusions, including those from the analyses detailed below for part (b) of the condition regarding potential effects to any monitored species and if adverse impacts to on-base species populations are identified from these conclusions.

If significant disruption or degradation of habitat values are identified from those conclusions in terms of either (i) a statistically significant change, or (ii) a change greater than the baseline annual variation over the course of two consecutive years, in monitored indicators of species population or reproductive success, and cannot confidently be attributed to other natural- or human-caused catastrophic factors not related to the launch and landing activities, DAF would be required to prepare and provide for the Commission's federal consistency review a proposal for avoidance, minimization and mitigation measures to address the impacts. The proposal shall include some combination of operational changes (e.g., reduced launch/landing cadence, modified launch timing or trajectory), minimization (noise reduction measures) and meaningful mitigation (e.g., habitat enhancements). Given the uncertainty about how marine mammals will react and whether adverse impacts to these species will result from the proposed significant increased frequency of launch events, the enhanced monitoring, reporting and coordination commitments from DAF will help to ensure the project is consistent with Sections 30230 and 30231 of the CCMP.

Analysis for On-Base Noise Impacts

Commission staff have previously reviewed DAF's marine mammal monitoring program (including the annual reports provided to NMFS for the years 2018-2023) and have identified concerns about the efficacy of the monitoring and the conclusions being drawn from it. Specific concerns with the pinniped monitoring program, as it has been conducted and reported in recent years, are that (1) there are limitations in the extent to which observations through monitoring (during and on either side of launches) can be affirmatively tied to noise impacts from an individual launch, (2) while there is abundant historical data for pinniped populations on VSFB, a rigorous statistical analysis of the changes in population trends using this data to analyze potential impacts from changes in launch activities has not been conducted nor has this on-site data been compared to historical data of pinniped populations nearby but outside the influence of launches and sonic booms, and (3) there are uncertainties about how more frequent noise events from the proposed increase in launch cadence might have unprecedented impacts on pinniped populations on-base. Section IV.C of the August 8, 2024, staff report provides more information on these three points.

Given the concerns and uncertainty with the monitoring of marine mammals and the on-base habitats on which they depend, it is critical that marine mammal monitoring effectively record and analyze potential adverse impacts to marine mammals via an enhanced biological monitoring program, including the use of statistical analyses. It may be necessary to collect multiple years of monitoring data at a given launch cadence in order to adequately assess the effects of launch noise and sonic booms over time, while accounting for natural variability. 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, DAF should continue monitoring for noise impacts to marine mammals, with improvements, as discussed above. However, additional

analyses should be conducted by DAF and provided as part of annual reporting to corroborate DAF's conclusions that launch activities have not adversely affected marine mammals or their sensitive haul out areas on VSFB, the northern Channel Islands, or the off-base areas of Santa Barbara, Ventura, and Los Angeles, Counties.

To provide assurance that such adverse effects would be avoided, and that the previously proposed project of 36 SpaceX launches per year activities would be carried out consistent with Section 30230, the Commission included Condition 1 in its concurrence with CD-0003-24. As discussed in detail in the August 8, 2024, staff report for the 36 launch per year CD, Condition 1 called for an enhanced on-base biological monitoring program focused on evaluating the biological effects of engine noise and sonic booms from launches and boost-back landings. In response, as a part of its current consistency determination, DAF has committed to conduct multivariate statistical analyses of the changes in population trends using: (a) relevant historical population data; (b) frequency of launches and on-base boost-back landings over different time scales; (c) seasonality of launches and sensitive times of year for respective species; (d) geospatial variability; (e) off-base reference site data; (f) climatic and oceanographic patterns (e.g. El Niño, Pacific Decadal Oscillation, storms, ocean temperature); (g) acoustic monitoring data; (h) and patterns of other variables including (as relevant to the respective species), but not limited to, pupping rates, beach width, behavior during launches, and forage base or food web trends. Relevant population trends for these analyses include population sizes and locations. These analyses would also require identification of data and ongoing monitoring and, if necessary, establishment, of off-base reference site populations of marine mammals. Additionally, DAF's reporting commitments would include any initial conclusions from these statistical analyses and avoidance, minimization and mitigation measures, if significant disruption or degradation of habitat values are identified.

Also, as described in Section IV.A, DAF has agreed to convene an interagency working group comprised of staff from the Commission, DAF, NMFS, USFWS and the FAA. This working group will increase coordination among the agencies and their individual requirements, and, crucially, provide a forum for reviewing the on-base monitoring efforts and results, and providing recommendations for improvements, additional protective measures, and/or mitigation. This working group has the potential to help ensure the successful implementation of the measures included in Condition 1, and to enhance and improve coastal resource protection by optimizing monitoring efforts, data analysis and identification of adaptive management measures to be implemented.

While monitoring and data analysis conducted by DAF to date have not definitively demonstrated adverse impacts during similar launches over the past roughly 20 years of monitoring marine mammal populations along the shoreline of VSFB, it is important that historical data be analyzed more thoroughly along with ongoing monitoring. However, it is also true that until very recently, the total number of launches occurring at VSFB was low, and that a lack of observed impacts under a low launch cadence may not be predictive of the effects of the current/proposed higher launch cadence, especially over time. Thus, the continued, improved monitoring and additional statistical analyses committed to by DAF in the preparation of an enhanced biological monitoring

program will be critical in determining if the more frequent noise effects of the proposed increase in launch cadence from SLC-4 would avoid adverse impacts to pinnipeds using haulouts on VSFB. If impacts are identified, mitigation would be required to be implemented.

Therefore, the Commission finds that, with the commitments from DAF, the on-base impacts of engine noise and sonic booms from the proposed project would not adversely affect the biological productivity of coastal waters or adversely affect marine mammal species of special biological significance.

Minimization of and Monitoring for Off-Base Sonic Booms Impacts from Launches

There are dozens of known pinniped haulout sites located across Channel Islands National Park and the mainland coastal areas that area exposed to sonic booms from launches. Rookeries and haulout sites are commonly in isolated locations relatively free from land predators and frequent harassment by humans, and are essential areas for pinnipeds for reproduction and rest.[6] Haulouts are therefore considered by the Commission to be areas of special biological significance under Section 30230 of the CCMP because they are essential to the biological productivity of pinnipeds. These areas may be adversely affected by sudden noises and overpressures associated with sonic booms. Given the presence of these sensitive species and the uncertainties in the extent and severity of regional effects of off-base sonic booms from launches (see Section IV.A, above), as well as uncertainty associated with how marine mammals experience sonic booms and the degree to which they may be affected over time under an increased launch frequency, the proposed project raises concerns that sound and pressure waves generated by sonic booms could adversely affect pinniped habitat on the Channel Islands and mainland coast. This would be inconsistent with the requirements of Section 30230 of the CCMP that areas and species of special biological significance be provided with special protection and marine resources be protected and enhanced.

In its previous review of the consistency determination for the 36 launch per year project (CD-0003-24), the Commission addressed the potential for impacts to off-site marine resources and areas of special biological significance by including Conditions 2 and 3 (see August 8, 2024 staff report, Appendix A). Condition 2 called for DAF to develop a sonic boom minimization plan containing measures for avoiding or minimizing the potential for adverse effects to sensitive marine species and habitats, such as through altering launch trajectories or planning launches based on favorable atmospheric conditions (i.e., conditions that would minimize the magnitude and areal extent of sonic boom effects). If such minimization efforts would not avoid significant sonic boom effects on the Northern Channel Islands and mainland coast, Condition 3 called for the implementation of an acoustic and biological monitoring program to assess whether impacts to sensitive marine habitats and species were occurring.

Following discussions with Commission staff about the need for these conditions, DAF submitted to the Executive Direct two letters (dated September 13 and 17, 2024 –

[6] https://montereybay.noaa.gov/sitechar/mamm2.html

Exhibit 7), outlining its approach for meeting the intent of these conditions, while still maintaining maximum operational flexibility and without presuming that effects are occurring before collecting robust data. As part of the current consistency determination, DAF proposes to (1) continue its on-going, field-based acoustic monitoring program along the mainland coast of southeastern Santa Barbara, Ventura and northwestern Los Angeles counties, with a revised focus on areas of special biological significance (e.g., marine mammal haulouts), and (2) implement a data-driven decision-making approach for minimizing off-base sonic booms and their potential adverse effects.

In its September 17, 2024 letter, DAF stated it would use the collected sonic boom data "to assess potential adverse impacts and determine adaptive management measures necessary to address such adverse impacts to sensitive coastal resources", and committed to establishing an interagency working group, including staff from the Commission, DAF, USFWS, NMFS, and the FAA, to provide review of and recommendations for improving and adapting its off-base sonic boom monitoring program and sonic boom minimization efforts. As stated in the letter,

> DAF will evaluate inputs from the Working Group when considering launch times and trajectory to minimize the spatial extent and severity of sonic booms experienced in those off-base areas to the greatest extent practicable. The DAF will carry these inputs into its Current Launch Schedule Review Board process when considering decisions on adjustments to launch times and trajectories.

The interagency working group is expected to allow for an iterative process of review that will improve sonic boom minimization strategies over time as additional data inform a better understanding of the dominant contributors to sonic boom spatial extent and magnitude (i.e., trajectory, atmospheric conditions, seasonal patterns, etc.) and how launch parameters can be adjusted in a manner that allows launches to continue but with a reduced likelihood of effects. At the very least, the interagency working group process, combined with the on-going acoustic monitoring, would allow the Commission to assess over time the accuracy of DAF's conclusion that no effects to marine resources would occur as a result of launch-related, off-base sonic booms, and would provide information that could be used to re-open the Commission's review if this conclusion is shown to be inaccurate.

Based on these considerations and commitments, the Commission finds that the proposed project would protect off-base marine resources, species and areas of special biological significance, consistent with Sections 30230 and 30231 of the CCMP.

Conclusion for Impacts from Engine Noise and Sonic Booms

From the information provided by DAF on the potential effects of engine noise on nearshore marine mammals, there is an absence of data or analyses definitively demonstrating a positive or negative finding of adverse impacts on marine resources and areas of special biological significance during similar launches over the past roughly 20 years of monitoring marine mammal populations along the shoreline of

VSFB. However, given the potential for impacts as a result of the proposed increase in launch cadence from SLC-4, DAF has committed to continuing monitoring of marine mammals in the areas affected by engine noise and sonic booms generated from launches and landings. DAF has also committed to implement improvements to the monitoring program as part of the proposed project, with additional statistical analyses to be conducted moving forward, as well as convene an interagency working group that will enable Commission staff and staff of other resource agencies to work with DAF to address any unexpected impacts on marine mammals. Therefore, based on the existing data showing no adverse impacts from a much lower historical launch frequency at VSFB and commitments from DAF to gather new data to determine potential effects of the proposed launch and landing cadence on marine resources, the Commission finds that engine noise and sonic booms from the proposed project (including up to 50 SpaceX launches per year) would not adversely affect the biological productivity of coastal waters or adversely affect marine mammal species of special biological significance.

Launch Operations At SLC-4

Launching operations at SLC-4, as described in the project description above, include deluge water, steam, and flames, and associated vegetation management. These project aspects have the potential to impact water quality, water supply, and wetlands, and are discussed in more detail below.

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 make use of existing launch and landing facilities, and no new construction is proposed. However, the proposed rocket launches, and daily operations have the potential to result in release of sediment and various contaminants which could eventually migrate to the aforementioned water systems. Since the request in this consistency determination is to increase the annual number of launches from 36 to 50, and no other changes to the launch operations are proposed, this portion of the project is unchanged from the August 8, 2024, staff report. Section IV.C of the August 8, 2024, staff report (Appendix A) includes an analysis of how the project is consistent with the water quality provisions of the CCMP; that analysis is incorporated by reference herein as though fully described in this report.

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 50 launches per year, the annual amount of deluge water needed for SpaceX operations would be up to 6 million gallons. This volume of water usage would be less than the amount analyzed in the August 8, 2024, staff report and therefore would be consistent with the water supply provisions of the CCMP under the same analysis in Section IV.C of the August 8, 2024, staff report (Appendix A); that analysis is incorporated by reference herein as though fully described in this report to establish that the current proposal is also consistent with the water supply provisions of the CCMP because DAF is proposing less water than previously analyzed in the August 8, 2024, staff report.

Wetlands

A water deluge of the launch area during Falcon 9 launches is carried out 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 during each launch event. As discussed above, any water discharged into Spring Canon 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 12**. 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.

DAF developed and implemented an approximately two-acre wetland habitat enhancement project in 2017 pursuant to Regional Water Quality Control Board (RWQCB) and USFWS approved plans 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.

As discussed in more detail in Section IV.C of the August 8, 2024, staff report, DAF and Commission staff are continuing to evaluate the situation and working to determine if and how much wetland habitat is within the vegetation management area. These efforts include the collection and evaluation of information from 2017 and now about the plant species present and their relative percent coverage. Given the mixed presence of both upland plants and wetland plants within the vegetation management area, including areas fully dominated by upland plants, if wetland habitat is indeed present, it would be likely be substantially less than one acre, meaning that the ongoing DAF wetland enhancement project would be providing wetland mitigation at a ratio of greater than 2:1 already.

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 and atmospheric monitoring equipment called radiosondes (**Exhibit 13**), 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. Section IV.C of the August 8, 2024, staff report (Appendix A) contains the complete information on the types of marine debris associated with SpaceX launches; that information is incorporated by reference herein as though fully described in this report.

As described in Section IV.A, above, in letters to Commission staff dated September 13 and September 17, 2024 (included as **Exhibit 7**), DAF confirmed its acceptance of

Condition 6 from CD-0003-24 regarding marine debris. DAF committed to implementing the marine debris reduction and minimization measures outlined in the condition as a part of the current CD for 50 launches per year. To address potential adverse impacts from marine debris resulting from the weather balloons and fairing descent systems, however, DAF would ensure that SpaceX provides contributions to the California Lost Fishing Gear Recovery Project, with the intention of offsetting the release of unrecoverable debris into state and federal waters.

U.C. Davis's California Lost Fishing Gear Recovery Project has removed lost or discarded commercial fishing gear from California waters since 2005. Its work now focuses on fishing 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 is 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.

To address the increased costs of fishing gear recovery efforts due to inflation, DAF has committed to ensure that SpaceX would adjust its payment amounts annually for inflation. Further, DAF's commitment would also help address the inclusion of lithium ion batteries and electronic materials, consisting of circuit boards with heavy metals like lead or mercury in the radiosonde, by increasing the amount of the annual marine debris offset payment from $10 per pound to $20 per pound to be provided to the Lost Fishing Gear Recovery Project, and by establishing a collaborative effort by DAF and the Executive Director to identify a public or non-profit organization focused on removal of hazardous waste from the marine environment or battery/electronic waste recycling and reduction efforts that can also receive funding. Once that organization is identified, future marine debris offset payments will be divided equally between it and the U.C. Davis Program.

In addition, on September 25, 2024, DAF provided to Commission staff an update report (**Exhibit 8**) describing its recent efforts to evaluate and implement measures to reduce the amount of marine debris released as part of launch activities. DAF states that since December 2023 it has used improved technology and revised protocols to reduce the required number of balloons released per launch from 10 to 20, down to five. DAF is continuing to review and update protocols to see if there are any specific weather conditions or other opportunities that would allow DAF to waive or reduce the requirement for weather balloons. DAF recently deployed a new radiosonde unit for use with weather balloons. Compared to the previous model, the new radiosonde is half the weight, one third the size, and uses one third of the battery power. Lastly, DAF has been actively exploring alternatives to using weather balloons including tropospheric doppler radar profilers, high-altitude lidar for atmospheric sensing (HALAS), and

unmanned aircraft. None of these technologies are currently being deployed, but they are in various stages of exploration and testing.

DAF has stated that if technological and/or operational advancements in the future allow for further reductions of the use of weather balloons or marine debris associated with launches, DAF will consider further marine debris reduction efforts. DAF has also committed to provide an annual report to the Executive Director by January 1st of each year that includes the amounts and types of marine debris released as part of each SpaceX launch and provides details about the amounts of plastics and other materials within the released debris.

Artificial Night Lighting

In its consistency determination, DAF also 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 stage one offloading 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. 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 landscapes[7]. 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.

To ensure consistency with Sections 30230 and 30231 of the CCMP, DAF has committed to preparing a lighting management plan for submittal to USFWS, and to providing the Commission with a copy of the approved management plan. Implementation of the lighting management plan was initially required pursuant to Condition 4 of CD-0003-24. DAF confirmed its acceptance of that condition for that project and also committed to implement the lighting management plan as part of the current CD for 50 launches per year. The light management plan for the SpaceX launch complex would include Best Management Practices (BMPs) such as shielding, modifying the direction of lights to avoid sensitive receptors, and outlining parameters when lighting at night would be necessary.

Conclusion

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

VSFB is located immediately adjacent to the Pacific Ocean and the VSFB 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.

As described above, and in the August 8, 2024, staff report (Appendix A), although the Commission finds that the proposed project has the potential to adversely impact coastal waters and marine resources, with the avoidance, minimization and protective measures and other commitments made by DAF to: (1) restore the monitoring of pinnipeds at on-base haulouts during launches (with associated acoustic monitoring), consistent with the 2019 NMFS LOA, while also incorporating the revised monitoring required by the new 2024 NMFS LOA; (2) make improvements to its statistical analysis of monitoring results, to better determine if adverse impacts to wildlife and habitat have occurred; (3) implement measures for equipment redundancy and data-handling improvements to help avoid further loss of monitoring data; (4) establish a resource agency working group to increase coordination among the agencies and their individual requirements, (5) continue to enhance its off-base acoustic monitoring program to better understand the magnitude and spatial extent of launch-related sonic booms; (6) consider the collected monitoring data and input from Commission staff and the working group members in developing a framework for avoiding and minimizing sonic boom effects; (7) implement marine debris reduction and minimization measures and, via SpaceX, contribute to the California Lost Fishing Gear Recovery Project; and (8) develop and implement a plan to for minimizing artificial night lighting during launches; the project would be carried out in a manner which would provide special protection to areas and species of special biological significance and maintain the biological productivity and the quality of coastal waters.

The Commission therefore finds the proposed project consistent with the marine biological resource policies of the CCMP (Coastal Act Sections 30230 and 30231).

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.

DAF states in its consistency determination that the proposed project is consistent with Section 30240, citing the fact that launch operations would take place within an existing launch facility at SLC-4 and would not require any construction within ESHA. However, 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 located both within and outside VSFB (see **Exhibit 5** and Figures 1A-1F and Figures 2A-2G of the USFWS 2024 Biological Opinion in **Exhibit 9**). Section IV.C of the August 8, 2024, staff report (**Appendix A**) contains a more detailed discussion of sonic booms; that detailed discussion is incorporated by reference herein as though fully described in this report. The project description above also contains updates to modeled sonic boom footprints for landings.

In evaluating the potential effects of the proposed launch activities on an ESHA and its constituent species, it is crucial to recognize that a "habitat" consists not just of its solid, liquid and biological components (e.g. soil and substrate, hydrological and chemical processes, plants and animals) but also the surrounding atmosphere and aural environment. Noise and extreme changes in air pressure, such as associated with launch activities and sonic booms, represent disturbances to the habitat itself, with potentially significant effects on organisms. Similarly, perturbations to the light environment can have impacts on both plant and animal species. The project has the potential to adversely affect ESHA on-base due to engine noise during launches, as well as from sonic booms during on-base landings. Similarly, noise and blast waves from launch-related sonic booms could result in impacts to off-base ESHA over a broad area spanning the Santa Barbara, Ventura and Los Angeles County coasts and the Channel Island coasts, and to numerous parks and coastal recreation areas such as Jalama Beach County Park, Channel Islands National Park, and numerous state beaches. The project also has the potential to adversely affect ESHA on-base through impacts from artificial lighting at night.

The August 8, 2024, staff report (**Appendix A**) also includes a brief review of the scientific literature that has been published on wildlife responses to elevated and sudden noise and sonic booms; that review of scientific literature is incorporated by reference herein as though fully described in this report. In summary, repeated behavioral disturbances from noise or overpressure events are disruptive to individual animals and to populations, can induce stress responses and physiological changes, increase energy expenditures, and carry a risk of injury, particularly to eggs or young.

The severity of such effects is likely to be influenced by the pattern and frequency of disturbance, as well as the timing in relation to an organism's life cycle (e.g. breeding or nesting periods). Generally, the more frequent and aperiodic the disturbance, the more substantial the risk of adverse effects. Although few studies have been carried out on the long-term effects to seabirds and other sensitive wildlife (e.g. amphibians, bats, insects) of exposure to sonic booms, engine noise or other elevated, short duration sounds, research into other sources of disturbance demonstrates that a threshold exists beyond which the animals and/or colony/aggregation will abandon the affected area.

Types of Environmentally Sensitive Habitat Areas

Section IV.D of the August 8, 2024, staff report (**Appendix A**) includes detailed information about ESHA supporting rare and sensitive species, including western snowy plover, California least tern, California red-legged frog, pallid bat, western red bat, and monarch butterfly, that are located within the potential affected areas for the 36 launch per year project; that detailed information is incorporated by reference herein as though fully described in this report. As these areas substantially overlap the potentially affected areas for the currently proposed, 50 launch per year project, this information remains relevant for the Commission's review of the subject CD, and is incorporated by reference into these findings. However, the August 8, 2024, report did not evaluate more recently available information about potential impacts to ESHA supporting the southwestern pond turtle, a rare and sensitive species proposed for listing as threatened and under federal review under the Endangered Species Act.

Southwestern Pond Turtle Habitat

The 2024 USFWS Biological Opinion includes a new conference opinion for the southwestern pond turtle (*Actinemys pallida*), a species which was not addressed in the USFWS 2023 Biological Opinion, and found that the proposed project is likely to adversely affect but would not likely jeopardize the continued existence of this species. The southwestern pond turtle (SWPT) has a global rarity ranking of G2G3[8] and listed as a California Species of Special Concern. The USFWS 2024 Biological Opinion states:

> Southwestern pond turtles are semi-aquatic, having both terrestrial and aquatic life history phases. Eggs are laid in upland terrestrial habitat, and hatchlings, juveniles, and adults use both terrestrial and aquatic habitat. Terrestrial environments are required for nesting, overwintering, and aestivation (warm season dormancy), basking, and movement/dispersal. Aquatic environments are required for breeding, feeding, overwintering and sheltering, basking, and movement/dispersal.

Similar to California red-legged frog, SWPT are sensitive to disturbance and their habitat can 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

[8] G2 ranked species are considered 'imperiled' and at high risk of extinction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

2024 USFWS Biological Opinion. SWPT is a coastal species found in wetland and riparian habitats both within VSFB and in adjacent areas of the coastal zone, including coastal Santa Barbara, Ventura, and Los Angeles Counties. Over time, the populations on VSFB add to the genetic diversity and population of SWPT outside of the base via dispersal. 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.

Although SWPT are not known to be present in Spring Canyon directly adjacent to the SLC-4 SpaceX launch and landing complex, according to the 2024 USFWS Biological Opinion, DAF has documented SWPT on North VSFB (along San Antonio Creek, the Santa Ynez River, Shuman Creek, Lake Canyon, MOD Lake, and Punchbowl Pond) and on south VSFB (along Honda Creek and Jalama Creek). Honda Creek is located approximately 2 miles to the south of SLC-4. Jalama Creek is located just outside of VSFB but within the area of impact for engine noise from launches and sonic booms from landings. While Bear Creek (approximately 0.75 miles south of SLC-4) has not been surveyed for SWPT, it is known to support California red-legged frog, and therefore may reasonably be expected to support southwestern pond turtle breeding. In addition, the VSFB Integrated Natural Resources Management Plan notes that SWPT are found in riparian habitat such as arroyo willow shrubland and box elder forest and woodland alliances as well as Barka Slough and permanent ponds on the base.

All the rivers and creeks and associated riparian habitat on VSFB are considered ESHA by the Commission due to their rarity and sensitivity to disturbance, and because many support rare species such as SWPT. As discussed further below, the proposed SpaceX launch activities, including engine noise and sonic booms generated during launches and reentries, have the potential to adversely affect SWPT and the riparian and upland habitats on which the species relies.

Park and Recreation Areas

In addition to ESHA, there are numerous significant park and recreation areas and resources distributed throughout the area that would experience sonic booms from launches or landings throughout Santa Barbara, Ventura, and Los Angeles Counties. These include Channel Islands National Park, the Santa Monica Mountains Recreation Area, approximately ten State Beaches and eight State Parks (with a total of nine State Parks-run campgrounds), four State Historic Parks, Jalama Beach County Park and campground, and several other County and City beaches, parks, and camping areas.

Engine Noise and On-Base Sonic Booms

The proposed project has the potential to cause adverse impacts to ESHA and its dependent wildlife occurring on VSFB through exposure to elevated sound levels and pressure waves during static fire tests, launches and landings. Potentially affected resources include wildlife inhabiting rivers, creeks, and the associated riparian habitat (in Jalama Creek, Bear Creek, Honda Creek, and the Santa Ynez River) and western snowy plover and California least tern breeding and nesting habitat in nearby coastal beaches and dunes. Launch and landing noise would be expected to last for several minutes, and static fire noise would be expected to last for several seconds. Maps of

expected sound levels (from launch, landing and engine testing activities) in relation to nearby wildlife occurrences, including of California red-legged frog, southwestern pond turtle, pallid bat, western red bat, western snowy plover, and California least tern, are shown in **Exhibits 5a** and **5b**, and in Figures 1A-1F of the USFWS 2024 Biological Opinion (**Exhibit 9**); for California least tern, see Figure 1c in Exhibit 5 of the August 8, 2024, staff report. Engine noise and on-base sonic booms are described above in the project description provided in Section IV.A, and potential impacts to marine mammals are described in Section IV.C.

The currently proposed SpaceX launch activities include up to 14 additional rocket launches through the remainder of 2024 (as well as up to 2 static fire tests and 2 on base landings between October 1 and the end of 2024, according to the USFWS 2024 Biological Opinion), and a continuation of this higher launch cadence (up to 30 static fire tests, 50 launches and 12 landings annually) at least into early 2025. During these events, the maximum decibel (dB) levels in the riparian area of Honda Creek, where bats and southwestern pond turtles are present, would be expected to reach approximately 125 dB, based on modeling carried out by DAF. The areas of Bear Creek and Honda Creek that contain California red-legged frogs would receive sound levels of up to 130 dB and 125 dB, respectively. The western snowy plover nesting habitat would receive sound levels between 100 and 130 dB. The California least tern nesting site at Purisima Point would receive sound levels of up to approximately 108 psf.

Each landing of the first stage back at VSFB would also generate a sonic boom lasting a fraction of a second and would create an overpressure blast wave between 0.5 to 7.5 pounds per square foot (psf) across the majority of VSFB. Maps of the sonic boom overpressures expected from modeling are included in **Exhibits 5a** and **5b** and in Figures 2A-2G of the USFWS 2024 Biological Opinion in **Exhibit 9**; for California least tern, see Figure 2e in Exhibit 5 of the August 8, 2024, staff report. As discussed above in the project description, there has been significant variability depicted in the figures which present the sonic boom footprints and peak overpressure levels modeled for sonic booms associated with the first stage landing of Falcon 9 rockets at SLC-4 in various new submittals. CRLF and southwestern pond turtle habitat would experience a sonic boom overpressure estimated up to 5 psf within Honda and Bear Creek, up to 4 psf within the Santa Ynez River, and up to 2 psf within Jalama Creek. For western snowy plovers the level of overpressure is dependent upon which stretch of Surf Beach they are occupying at the time of the landing event, but overpressures could reach up to 5 psf. California least tern nesting and foraging sites are estimated to experience overpressures up to 2 psf. The extent to which these sound and pressure levels could significantly degrade wildlife habitat would be dependent on each species' individual sensitivity and respective phenology (life cycle stage) and the time between successive noise events. DAF has not identified any scheduling limitations that would ensure a certain duration of quiet between launches, landings or engine tests, but the current time needed by SpaceX to prepare a rocket for launch would mean at least several days would elapse between launches.

The sporadic, short-duration and high intensity noise and overpressure events generated by the launches and landings represent a significant disruption of the aural and barometric environment of these habitat areas. The potential for these habitat disruptions to cause adverse effects on sensitive wildlife species, including western snowy plover, California least tern, California red-legged frog, pallid bat, western red bat, and monarch butterfly, along with the need for continued, effective monitoring, is discussed in detail in Section IV.D of the August 8, 2024, staff report (**Appendix A**) for the Commission's conditional concurrence with CD-0003-24; that detailed discussion is incorporated by reference herein as though fully described in this report. To provide assurance that such adverse effects would be avoided, and that the proposed project of 36 launches per year would be carried out consistent with Section 30240, the Commission included Condition 1, requiring an enhanced on-base biological monitoring program focused on evaluating the biological effects of engine noise and sonic booms from launches and boost-back landings.

As described in Section IV.A, above, in letters to Commission staff dated September 13 and September 17, 2024 (included as **Exhibit 7**), DAF confirmed its acceptance of Condition 1 and committed to implementing the enhanced monitoring measures outlined in the condition as a part of the current CD for 50 launches per year. In particular, DAF has committed to adhering to the requirements of the 2024 USFWS Biological Opinion (which substantially overlap with provisions of Condition 1), including the establishment and evaluation of off-base reference site populations of western snowy plover, California least tern, and California red-legged frog, that can be used as a basis of comparison for on-base monitoring results.

The USFWS 2024 Biological Opinion also included new terms and conditions to implement its reasonable and prudent measures (for minimizing the impacts of the incidental take of southwestern pond turtle, California red-legged frog, and western snowy plover), which enhanced some of the monitoring, analysis, and reporting, requirements from the 2023 Biological Opinion. These include updates and specificity regarding species surveys and monitoring, monitoring for experienced noise and sonic boom levels on-base and off-base, vibration monitoring, monitoring to determine potential auditory harm to western snowy plover, multivariate statistical analyses of potential changes in populations tends, long-term monitoring plan and mitigation plan updates, and reporting requirements.

DAF has also committed to making improvements to its statistical analysis of monitoring results, to better determine if adverse impacts to wildlife and habitat have occurred. Specifically, DAF will conduct multivariate statistical analyses of the changes in population trends and other indicators of species status, using variables such as: (a) relevant historical population data, (b) the frequencies and seasonal timing of launches and on-base boost-back landings over different time scales, (c) geospatial variability; (d) off-base reference site data; (e) climatic and oceanographic factors; (f) acoustic monitoring data; (h) and other variables including (as relevant to the respective species) fledging rates, breeding rates, beach width, behavior during launches, and forage base or food web trends. Relevant population and status indicators to be analyzed include, but are not limited to, population sizes and locations, and for western snowy plovers and

least terns, rates of breeding success (including number of hatched chicks and fledglings), nest/colony abandonment, injury, or mortality to eggs or chicks. Analysis of potential impacts from individual launches would also include use of the results of the landscape-level camera monitoring for western snowy plover and California least tern required by the 2023 and 2024 USFWS Biological Opinions.

DAF has committed to continuing its monitoring programs for on-base monarch butterfly, pallid bat and western red bat populations in a manner sufficient to assess potential changes in habitat use patterns and population levels, and has provided reports summarizing its monitoring protocols for Commission staff review.

As described in Section IV.A, DAF has agreed to convene an interagency working group comprised of staff from the Commission, DAF, NMFS, USFWS and the FAA. This working group will increase coordination among the agencies and their individual requirements, and, crucially, provide a forum for reviewing the on-base monitoring efforts and results, and providing recommendations for improvements, additional protective measures, and/or mitigation. This working group has the potential to help ensure the successful implementation of the measures included in Condition 1, and to enhance and improve coastal resource protection by optimizing monitoring efforts, data analysis and identification of adaptive management measures to be implemented.

Based on DAF's commitment to implementing the enhanced monitoring measures contained Condition 1, along with the framework for on-going coordination and adaptive management established through the proposed working group, the Commission finds that the proposed project would protect on-base ESHA and associated species against significant disruption and degradation of habitat values, and would be compatible with the continuance of those habitat areas.

Southwestern Pond Turtle and Noise

The USFWS 2024 Biological Opinion analyzes potential impacts to southwestern pond turtle (SWPT) habitat from various impacts associated with the proposed project, including firebreak maintenance activities, lighting, flame duct use and associated vegetation maintenance, water extraction, engine noise and sonic boom overpressures from launches and on-base landings. The USFWS 2024 Biological Opinion requires DAF to implement long-term monitoring of annual population and distribution trends associated with SWPT populations within Jalama Creek, Honda Creek, Bear Creek, and the Santa Ynez River, and to develop a monitoring plan that adequately addresses potential short- and long-term project effects that may result from sensory pollutants.

This plan would include establishing baseline data and defining threshold criteria for mitigation. If SWPT mitigation threshold criteria are met, the DAF would implement mitigation actions, including: (a) creating new SWPT at a 2:1 ratio at the San Antonio Creek Oxbow Restoration Area, an established wetland mitigation site on VSFB; (b) conducting additional restoration in the "expansion area" adjacent to the existing restoration area (where restoration has already been conducted in support of other projects), including creating deep water aquatic habitat, suitable for SWPT, with

adjacent riparian woodland that simulates naturally occurring high-flow channels; (c) and ensuring that actions taken within this area will include certain site preparation methods. In addition to this monitoring and mitigation, USFWS is requiring DAF to conduct vegetation removal clearance surveys and monitoring. Some of these requirements are associated with the monitoring and mitigation measures USFWS is requiring for potential impacts to California red legged frog, as well. The UFSFWS 2024 Biological Opinion states:

> Based on the available information and minimization measures, including potential mitigation ensuring no net loss, we expect adverse effects to the recovery of southwestern pond turtles would be low. Although adverse effects are likely to occur as a result of the proposed action, we do not anticipate they will diminish the VSFB population's contribution to the recovery of the southwestern pond turtles at this time.

With the requirements contained in the 2024 USFWS Biological Opinion, which have been incorporated into DAF's current consistency determination for 50 launches per year, and in combination with DAF's proposed interagency working group process to improve monitoring efforts and address unexpected impacts to SWPT habitat, the Commission finds that the proposed project, would not significantly degrade SWPT habitat in Jalama Creek, Honda Creek, Bear Creek, and the Santa Ynez River.

Off-Base Sonic Booms

Section IV.D of the August 8, 2024, staff report (**Appendix A**) for Commission's conditional concurrence with CD-0003-24, describes in great detail the off-base sonic booms, and the sudden noises and overpressures associated with them, have the potential to adversely affect a significant distribution of ESHA and park and recreational land across the northern Channel Islands and along the mainland coast that is exposed to sonic booms from launches; that detailed description is incorporated by reference herein as though fully described in this report. DAF's modeling suggests rocket launches could create sonic booms of up to four psf across Channel Islands National Park and of up to approximately 2 psf along the off-base, mainland coastal areas of Santa Barbara, Ventura, and Los Angeles Counties (**Exhibit 4a and 4b**).

As with on-base launch noise events and sonic booms, the sporadic, short-duration sonic booms occurring along certain launch trajectories represent a disruption to the aural and barometric (air pressure) conditions within a wide range of rare and/or sensitive habitat areas in the region, and have the potential to adversely affect both habitat values and the species that depend on them. The extent to which sonic booms could significantly degrade wildlife habitat would be dependent on each species' individual sensitivity and the frequency and magnitude of the sonic booms.

Given the widespread presence of sensitive species and ESHA in off-base coastal areas and the uncertainties in the extent and severity of regional effects of sonic booms from launches, the proposed project raises concerns that sound and pressure waves generated by sonic booms (especially from strong ones) could result in the degradation and significant disruption of ESHA over a broad area. To provide assurance that such

adverse effects would be avoided, and that the proposed SpaceX launch activities would be carried out consistent with Section 30240 of the CCMP, the Commission's August 8, 2024, conditional concurrence with DAF's CD for the 36 launch per year project included requirements for off-base sonic boom minimization measures (Condition 2) and, if sonic booms effects on the Northern Channel Islands and mainland coast would not be avoided through the minimization measures, implementation of an acoustic and biological monitoring program to assess directly whether adverse impacts to ESHA and sensitive species are occurring (Condition 3).

In on-going discussions with DAF staff (see Section IV.A), Commission staff has emphasized the need to focus on the sonic boom minimization measures envisioned in Condition 2, in part due to the significant logistical and technical challenges that would be involved in establishing an effective, timely biological monitoring program over the large geographic areas affected by launch-related sonic booms. In short, the avoidance and minimization of strong sonic booms in ESHA and other areas of biological significance is the most certain and effective means of avoiding adverse effects to these resources.

In its letters of September 13 and 17, 2024, DAF outlined its strategy for meeting the intent of these conditions as a part of its current consistency determination for 50 launches per year, while still maintaining maximum operational flexibility and without presuming that effects are occurring before collecting robust data. In summary, DAF proposes to (1) continue its on-going, field-based acoustic monitoring program along the mainland coast of southeastern Santa Barbara, Ventura and northwestern Los Angeles counties, and (2) implement a data-driven decision-making approach for minimizing off-base sonic booms and their potential adverse effects.

Specifically, DAF proposes to develop a Sonic Boom Assessment Plan based on "data collected during different launch times, times of year, and launch azimuths" in order to better characterize the factors influencing the intensities and spatial extents of launch-generated sonic booms, and to continue collecting launch-specific sonic boom and noise data, over at least the next year. DAF is partnering with academic researchers from Brigham Young University and CSU Bakersfield to continue the acoustic monitoring effects begun earlier this year. In its September 17, 2024, letter, DAF further committed to adjusting the on-going acoustic monitoring to better assess sonic boom intensities and noise levels in areas of special biological significance, including ESHA, updating the Plan as new data become available, and considering feedback from Commission staff about possible ways of enhancing the monitoring efforts to better inform analysis of coastal resource effects. The resource agency working group, including Commission staff, will also be afforded the opportunity to review and provide feedback on the Sonic Boom Assessment Plan. Preliminary monitoring findings, provided in **Exhibit 6**, indicate that certain launches result in lesser sonic boom extents and magnitudes than predicted by modeling. While additional data are needed to assess sonic boom magnitudes and footprints over a wider range of conditions and

locations (including representative ESHA), the preliminary results suggest some potential for developing sonic boom minimization strategies (e.g., by targeting launches during certain atmospheric conditions or along certain trajectories) that would avoid significant disruption of ESHA, sensitive species, and recreation areas.

With regard to sonic boom minimization, in its September 17, 2024 letter DAF committed to using the collected sonic boom data "to assess potential adverse impacts and determine adaptive management measures necessary to address such adverse impacts to sensitive coastal resources." Further,

> DAF will evaluate inputs from the Working Group when considering launch times and trajectory to minimize the spatial extent and severity of sonic booms experienced in those off-base areas to the greatest extent practicable. The DAF will carry these inputs into its Current Launch Schedule Review Board process when considering decisions on adjustments to launch times and trajectories.

The interagency working group committed to by DAF is expected to allow for an iterative process of review that will improve sonic boom minimization strategies over time as additional data inform a better understanding of the dominant contributors to sonic boom spatial extent and magnitude (i.e., trajectory, atmospheric conditions, seasonal patterns, etc.) and how launch parameters can be adjusted in a manner that allows launches to continue but with a reduced likelihood of effects. At the very least, the interagency working group process, combined with the on-going acoustic monitoring, would allow the Commission to assess over time the accuracy of DAF's conclusion that no effects to ESHA (and parks and recreation areas) would occur as a result of launch-related, off-base sonic booms, and would provide information that could be used to re-open the Commission's review if this conclusion is shown to be inaccurate.

Based on these considerations, the Commission finds that the proposed project would protect off-base ESHA and parks and recreation areas against significant disruption and degradation of habitat values, and would be compatible with the continuance of those habitat areas.

Artificial Night Lighting

As discussed in more detail in the August 8, 2024, staff report (**Appendix A**) for the Commission's conditional concurrence with CD-0003-24, artificial night lighting associated with the proposed project has the potential to adversely affect ESHA and associated species occurring at VSFB; that detailed discussion is incorporated by reference herein as though fully described in this report.

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. USFWS recently started investigating the increase in artificial night lighting from launch activities at VSFB, including the SpaceX launches proposed in the subject CD, and has been coordinating with DAF. DAF is working with USFWS on measures to minimize the potential adverse

impacts from artificial night lighting, including development of a lighting management plan. The USFWS 2024 BO also included new terms and conditions intended to enhance the impact minimization measures to be included in the lighting management plan.

DAF has clarified in correspondence dated June 28, 2024, that the type of artificial night lighting required at SLC-4E is operational and safety lighting to support launch operations, and that at SLC-4W there is safety lighting around the support building. The lighting is used when necessitated by operational safety, with a duration that varies with the type of operation. DAF states that a total elimination of exterior lighting at SLC-4 is not possible due to safety, security, and mission critical operational requirements. They also communicated that the intensity of artificial night lighting and best management practices to reduce lighting would be addressed in a Lighting Management Plan being prepared for SLC-4.

While DAF also acknowledged that artificial night lighting can lead to skyglow (a phenomenon well-documented in urban environments), light trespass, and glare, DAF communicated its position to Commission staff that light emissions during a rocket launch are temporary, that the beaches and general landscape at VSFB are generally dark compared to other beaches and landscapes in central and southern California, and (citing the UCLA study referenced above) that no adverse effects to species in the coastal zone are expected due to artificial night lighting. Nonetheless, given the paucity of data on the effects of artificial night lighting associated with rocket launches at VSFB on sensitive species and ESHA, as part of the current CD DAF has committed to developing a Lighting Management Plan, consistent with Condition 4 of the Commission's conditional concurrence with CD-0003-24 (see Appendix A). The plan would include best management practices to minimize the effects of night lighting, including light shielding, luminare color and temperature considerations, avoidance of lights facing the beach where practicable, metrics for when lights are needed for operations, and monitoring of lighting on Surf Beach (where there is an annual western snowy plover population) using sky-quality camera(s) to assess any observable changes in lighting during night launches. Additionally, DAF has committed to keep Commission staff informed on the progress of its ongoing investigation with the USFWS, and, as a part of the proposed interagency working group, to work with Commission staff to address any unexpected impacts to sensitive species from artificial night lighting.

Conclusion

As described above, and in the August 8, 2024, staff report (**Appendix A**), the Commission finds that the proposed project has the potential to adversely impact ESHA both on-base and off-base. However, with the commitments made by DAF to: (1) implement an enhanced on-base biological monitoring program, consistent with the 2024 USFWS Biological Opinion and Condition 1 of the Commission's prior conditional concurrence with CD-0003-24; (2) continue and enhance its off-base acoustic monitoring program to better understand the magnitude and spatial extent of launch-generated sonic booms; (3) develop and implement a plan for minimizing artificial night

lighting during project activities; (4) establish an interagency working group to review and provide suggestions for improvement of the biological and acoustic monitoring programs and sonic boom minimization efforts; and (5) consider the collected monitoring data and input from Commission staff and the working group members in developing a framework for avoiding and minimizing sonic boom effects; the project would be carried out in a manner that would protect ESHA and recreation areas from significant disruption or degradation of habitat values, and be compatible with the continuance of those habitat and recreation areas.

The Commission therefore finds the proposed project consistent with the ESHA policies of the CCMP (Sections 30240 of the Coastal Act).

E. 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.

As of the date of this staff report, there have been a total of 32 SpaceX Falcon 9 rocket launches from the SLC-4E complex in 2024. The subject CD proposes 14 additional

launches through the end of the year, and to continue launches at a pace equivalent to of 50 launches per year into at least early 2025. 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 could be, and has historically been necessary to protect the public from potential hazards. As described in detail in the August 8, 2024, staff report (**Appendix A**), past closures and evacuations have had adverse impacts on public coastal access and recreation in northern Santa Barbara County, and at Jalama Beach and the Jalama Beach County Park campground (referred, collectively, as "Jalama"), a regionally-important coastal access point, inconsistent with Chapter 3 policies of the Coastal Act; that detailed description of these past public access and recreation issues is incorporated by reference herein as though fully described in this report.

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." In its concurrence with the DAF's 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. As recently as the April 10, 2023, negative determination for SpaceX's 36 launch per year program (ND-0009-23), DAF proposed an annual limit of 12 beach closures:

> 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.

However, as the number of launches from VSFB steadily increased in 2022 and 2023 primarily due to SpaceX activities, so did the number of beach closures. Available data indicate that in 2022 a total of 13 SpaceX launches occurred, leading to 18 evacuation notifications to reservation holders and eight evacuation and closure events at Jalama; this number of launches and related beach closures in 2022 exceeded the limits evaluated in the negative determination applicable at the time (ND-0027-15). In 2023, 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, exceeding both DAF's committed level of up to 12 closures per year under ND-0009-23 and the historic upper limit of 14 closures per year considered by the Commission in CD-049-98.

Through discussions with Santa Barbara County Parks and Recreation staff, Commission staff also came to understand that launch-related adverse impacts to public access and recreation at Jalama were not limited to the direct effect of closures and evacuations, but also encompassed frequent cancellations (up to 25%) of camping reservations in response to advanced e-mail notifications (provided by the County) of a planned launch, the chilling effect on visitation of similar notices provided through the County's reservation website, and frequent road closures used to prevent day-users from entering the park during evacuations or to suppress visitation below the 400-person level that would trigger an evacuation and closure event during a launch. Additionally, due to the remote location of Jalama and long driving times for accessing the park, and the long durations (four to eight hours) of launch-related closures, campers and day-users evacuated during launches would lose significant recreational time, and in many cases would abandon their plans. Moreover, the available data indicated that, for a variety of reasons, a single scheduled launch could require multiple evacuations and closures of Jalama.

On December 15, 2023, based on the scope and magnitude of the direct and indirect adverse impacts SpaceX launches were having on coastal access and recreation, the Commission approved a resolution "re-opening" the Executive Director's prior concurrence with the 2023 negative declaration (ND-0009-23) by concluding that the DAF's ND was no longer applicable to the project as described and conducted. In response, on March 7, 2024, DAF submitted a consistency determination (CD-0003-24) reevaluating the effects on coastal access and recreation of SpaceX's 36 launch per year cadence and proposing several remedial actions. This CD was evaluated in the August 8, 2024, staff report (**Appendix A**), and ultimately conditionally concurred with by the Commission on August 8, 2024.

As a part of the March 2024 consistency determination, DAF reevaluated its historical, safety-based restrictions during launches at two of the affected beach areas, Ocean Beach County Park and Surf Beach, and determined that evacuations of these locations could be limited to those launches where the first stage of the Falcon 9 launch vehicle would be boosting back to land at SLC-4W, which was expected to occur 12 times per year. In combination with other, existing nighttime access restrictions at these beaches, DAF anticipated that evacuations would occur up to 14 times per year, for four to eight hours each, during select launch attempts.

Most significantly, as part of the revised 36 launch per year project, DAF committed to implementing a revised launch schedule that would largely avoid launching during the day, instead launching during the night, to avoid evacuations of Jalama to the extent practicable.[9] By shifting the launch schedule to avoid daytime hours, when the number of users of Jalama Beach is greatest, DAF indicated that it would be possible to minimize the number of people within the launch hazard area ("Impact Limit Line") and thus reduce the calculated risk factor that determines the need for evacuations. If scheduling is unable to completely avoid evacuations, DAF committed to ensuring that the total number of evacuations of Jalama within a given year would not exceed 12, consistent with previous Commission approvals for launch programs at VSFB. Additionally, to help offset the adverse impacts to access and recreation at Jalama that have occurred in recent years as a result of the SpaceX launches, DAF committed to four additional measures, to be carried out in coordination with SpaceX:

- Provide high-speed internet terminals at Jalama Beach County Park in order to improve internet coverage there;
- 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;
- Operate a shuttle program that, in the event that an evacuation of Jalama is necessary, would 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;
- In coordination with the Lompoc Unified School District (LUSD), fund transportation for all 3rd graders in LUSD to visit Surf Beach/Ocean Park on an annual basis.

As discussed in the August 8, 2024, staff report for CD-0003-24, implementation of these measures is expected to provide meaningful benefits for coastal public access and recreation. More reliable internet would increase the efficiency of County Parks and Recreation in managing its operations and reservation system, reduce congestion and traffic at the beach park entrance, and allow County emergency responders to communicate more effectively. The variable messaging sign at the intersection of Highway One would provide real-time campsite availability information for members of the public before they commit to the 45-minute drive to the beach park, reducing uncertainty and encouraging greater public use of Jalama. The proposed evacuation shuttle service was thought to have the potential to alleviate several issues that currently inconvenience campers when they are forced to abandon their campsites on short notice during launches; for example, the shuttle could help avoid the need to break down camping equipment and would also allow campers to return to the park as soon as possible once the evacuation order is lifted. Finally, the proposed field trip program would provide a new opportunity for coastal and marine resource education that does not currently exist for early primary (grades K – 3) students in the LUSD. The March 2024 CD stated that the proposed program would involve nine schools and more

[9] However, as discussed in Section IV.D (above), a shift toward nighttime launches could result in new effects on sensitive species and habitats from night-lighting.

than 700 third graders, and provide “structured activities … focused on environmental stewardship and understanding our coastal resources, particularly the western Snowy Plover.”

Condition 5 of the Commission’s August 2024 conditional concurrence memorialized DAF’s proposed mitigation measures and its further commitment to submit an update on the Public Access and Recreation Enhancement efforts it is pursuing:

5. **Coastal Access and Recreation Enhancement.** Within 30 days of the Commission’s consideration of Consistency Determination No. CD-0003-24, DAF will provide, for Executive Director review and comments, an update on the Coastal Access and Recreation Enhancement efforts it is pursuing. The update will include (1) specific details and schedules for implementation of the commitments DAF has made for the evacuation shuttle, satellite internet and Highway 1 digital signage projects for Jalama Beach County Park and the Lompoc Unified School District third grade beach field trip program; (2) details of measures that SpaceX and DAF will take to ensure that the proposed launch activities will not exceed DAF’s commitment to cause more than 12 annual closures of Jalama Beach; and (3) a minimum notice period, coordinated with the Santa Barbara County Parks and Recreation Department, for any planned evacuations for Jalama Beach. DAF will consider comments provided by the Executive Director in response to the update and strive to address them when possible.

DAF submitted a Coastal Access and Recreation Enhancement Plan for the Executive Director’s review on September 13, 2024 (**Exhibit 8**), providing progress updates on each of the elements contained in Condition 5. The plan indicates that, in cooperation with DAF and Santa Barbara County, SpaceX has provided increased Starlink internet coverage at Jalama through the addition of a second high power satellite dish, that the system is fully operational as of July 30, 2024, and that the initial Starlink subscription would be renewed after two years. DAF and SpaceX are working with Santa Barbara County Parks & Recreation to develop the project scope and timeline for installation of a new variable message, digital welcome sign at the intersection of Jalama Road and Highway 1; DAF has committed to providing additional updates as this project progresses.

Additionally, the submitted plan indicates that DAF has coordinated with the LUSD to develop a third-grade field trip and natural resources education program that would provide for nine field trips per year (approximately 100 students per trip) to Surf Beach/Ocean Park, to be implemented over the next two school years. Subsequent email correspondence from DAF to Commission staff, dated September 17, 2024, amended the duration of the field trip program to “continue through the life of this CD.” As no end date for the 50 launch per year project is identified in the CD, the Commission assumes that these efforts would continue in perpetuity.

DAF reports that Santa Barbara County Parks & Recreation has declined SpaceX’s offer to develop complimentary shuttle service to assist overnight campers in the event

that launch-related evacuations are necessary, citing concerns that the shuttle service would simply complicate existing evacuation procedures. DAF indicates that this commitment still holds, and that SpaceX would provide the evacuation shuttle service if in the future the County determines it would help reduce access or reservation concerns.

Finally, the Plan reaffirms DAF's commitment to limiting Jalama Beach evacuations, related to all activities occurring on VSFB, to 12 per year. DAF has committed to providing at least seven days' notice of any launch requiring a closure at Jalama and to limit the duration of evacuations to the minimum necessary to assure public safety -- typically up to six hours, but not to exceed 48 hours.

In a letter to Commission staff dated September 17, 2024, DAF committed to implementing the protective measures agreed to for the 36 launch CD (CD-0003-24) in its implementation of the subject CD, including the limitation on evacuations of Jalama to 12 per year and the additional public access and recreation enhancements described above.

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 previously proposed by DAF, and incorporated into the subject CD, 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.

F. 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.

As described in detail in the August 8, 2024, staff report for CD-0003-24, SpaceX launch and landing activities have the potential to affect commercial and recreational fishing activities off the coast of VSFB. As of the date of this staff report, there have been a total of 32 SpaceX rocket launches in 2024. The subject CD proposes 14

additional launches through the end of the year, and to continue launches at a pace of 50 launches per year into at least early 2025. In the absence of impact avoidance and minimization measures, the proposed increase in launch activity would increase the risk of adverse effects to commercial and recreational fishing.

The potential for conflict between the proposed project and fishing activity arises from the possibility of safety-related restrictions or closures of fishing grounds during rocket launches and reentries. SpaceX launches from VSFB can occur along a broad range of azimuths between 140 and 325 degrees, and for any given mission, the associated maritime hazard area can encompass extensive commercial and recreational fishing grounds[10] (**Exhibit 14**). 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 the locations of potential hazards as well as dates and times of the hazardous conditions. Previous comments received by the Commission from local fishermen and processors raised concerns that launches from VSFB could require the closure of fishing grounds without compensation to mitigate to impacts to fishing, and stressed the need for increased communication between launch providers and the commercial fishing industry.

Even with the timely issuance of NOTMARs, there is still potential that the proposed increase in launch cadence could adversely impact the fishing industry. An increased number of launches will necessarily increase the frequency with which maritime hazard areas are defined and NOTMARs issued, and would increase the potential for preclusion of fishing (or the perception of preclusion) from certain areas, or during key seasons, times of day or peak fishing periods. An additional concern is that a single launch can be scheduled and scrubbed multiple times before successfully launching, requiring (per federal requirements) the issuance of a new NOTMAR each time a launch is rescheduled. Multiple NOTMARs issued for a single launch could create confusion, increase the difficulty of planning fishing operations, and preclude fishermen from fishing. DAF has not committed at this time to ensuring that SpaceX will time its launches to avoid the potential for restrictions or closures of the most important fishing areas or peak fishing times or periods.

In its prior consistency determination (CD-0003-24), DAF stated that it has worked closely with NASA, FAA and SpaceX to reduce the potential for impacts to large vessels during launches, that all launches would be scheduled in advance to minimize the interruption of airspace and waterways, and that once a NOTMAR is issued, there is no requirement for vessels to alter their routes or change their navigation speeds. 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. As proof of the

[10] DAF indicates that the maritime hazard area encompasses a band of up to 21 miles wide along the launch trajectory.

effectiveness of its efforts, DAF has stated that no SpaceX launches have needed to be scrubbed or moved due to vessels in the hazard area since 2022.

As a part of the March 2024 CD for the 36 launch per year cadence (CD-0003-24), DAF committed to, in coordination with SpaceX, establishing a communication protocol and regular dialogue with the commercial and recreational fishing industry in this area of the coast, including with 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. This advance notice is intended to allow fishermen to better understand the conditions and adjust their operations to help ensure fishermen meet their landing goals while also abiding by the NOTMAR. If these measures do not fully satisfy fishermen, DAF would 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. These commitments were memorialized in Condition 7 of the Commission's concurrence:

7. **Commercial and Recreational Fishing Coordination Plan.** Within 30 days of the Commission's consideration of Consistency Determination No. CD-0003-24, DAF will submit a Commercial and Recreational Fishing Coordination Plan to the Executive Director for review and comments. The Plan will include the development and implementation of a communication protocol, including regular dialogue, developed in coordination with the commercial and recreational fishing industry most likely to be affected by launch and landing activities at Vandenberg Space Force Base as well as an email to local fishermen's associations that include the date and time of the surveillance area, and the vessel hazard area that is also available in the Notice to Mariners, and for how long these will be in effect. DAF shall consider comments provided by the Executive Director and strive to address them, when possible.

On September 13, 2024, DAF submitted its Commercial and Recreational Fishing Coordination Plan for the Executive Director's review (**Exhibit 8**). The plan incorporated the key elements outlined in Condition 7, including:

- a communications protocol including a "danger zone hotline", a sign-up system for launch notifications to mariners via email and text messages, and a real-time control center (on marine channels 6 and 16);
- a launch notification distribution list including all Harbor Masters of fishing harbors in the vicinity of VSFB;
- procedures for issuing public notices and NOTMARs;
- a commitment to hold annual town hall meetings in Santa Barbara and San Luis Obispo to provide a platform for direct communication with fishermen;
- a commitment to measure the effectiveness of communications efforts by collecting feedback from fishermen and Harbor Masters.

In addition to collecting and considering feedback from the commercial and recreational fishing community, DAF has committed to consider, and address where possible, comments from Commission staff for improving its launch notification and communications efforts. In a letter to Commission staff dated September 17, 2024, DAF committed to implementing the protective measures agreed to for the 36 launch CD (CD-0003-24) in its implementation of the subject CD, including the measures outlined in the Commercial and Recreational Fishing Coordination Plan. With this plan in place, bolstered by DAF's stated commitment to receiving feedback and working to resolve conflicts as they arise, the proposed launch increases would protect commercial and recreational fishing activities. As such, the Commission finds the proposed project consistent with the commercial and recreational fishing provisions of the Coastal Act, including Section 30234.5.

G. 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 and landing activities (including fairing recovery and roll-on roll-off) and static fire tests.

Criteria Pollutants

As discussed in the Commission's findings in support of its August 8, 2024, conditional concurrence with DAF's consistency determination for 36 SpaceX launches,

> …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 (CO_2) 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 minimize the amount of soot released. Also, a small amount of nitrogen monoxide (NO) is formed. Since the project does not include any construction, any emissions would be from launches, 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. 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). Thus, the action's calculated emissions are compared against established de minimis emission levels based on the nonattainment status for each applicable criteria pollutant in the area of concern to determine the relevant compliance requirements.

As described in the September 2024 draft EA for the project to increase annual SpaceX launches to 50:

> "Operational emissions for the project will occur within three counties: Santa Barbara, Ventura, and Los Angeles. Santa Barbara, Ventura, and Los Angeles. Santa Barbara County falls within the SBCAPCD's jurisdiction and has no nonattainment/maintenance areas. Ventura County falls within the VCAPCD's jurisdiction and has only one nonattainment area. Los Angeles County falls within the SCAQMD's jurisdiction; however, Los Angeles County has multiple nonattainment and maintenance areas for the same criteria pollutant with differing severity classifications and boundaries. It was determined that the portion of Los Angeles County where the action will occur encompasses five nonattainment areas and two maintenance areas".

Tables 2, 3 and 4 (below) provide the expected annual emissions of air pollutions per year in Santa Barbara County, Ventura County, and Los Angeles County in comparison to the PSD thresholds specific to each area.

As illustrated in Table 2, the proposed project is below the PSD threshold for all criteria pollutants in Santa Barbara County and therefore, no significant impacts on air quality as a result of criteria pollutant emissions from the project would occur in Santa Barbara County. Similarly, as illustrated in Table 3, the proposed project is below the PSD threshold for all criteria pollutants in Ventura County.

Table 2: Estimated Annual Air Pollutant Emissions from Launches, Static Fire Tests and Project Operations in Santa Barbara County

	Estimated Emissions (Tons)						
	CO	NO_x	VOC*	SO_x	$PM_{2.5}$	PM_{10}	Pb
	69.06	48.23	4.24	1.43	1.90	1.99	0.01
Threshold	250	250	250	250	250	250	25
Below Threshold for all years?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3: Estimated Annual Air Pollutant Emissions from Launches, Static Fire Tests and Project Operations in Ventura County

	Estimated Emissions (Tons)						
	CO	NO_x	VOC*	SO_x	$PM_{2.5}$	PM_{10}	Pb
	36.55	24.30	1.92	0.5	0.51	0.51	0.00
Threshold	250	50	50	250	250	250	25
Below Threshold for all years?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 4: Estimated Annual Air Pollutant Emissions from Launches, Static Fire Tests and Project Operations in Los Angeles County

	Estimated Emissions (Tons)						
	CO	NO_x	VOC*	SO_x	$PM_{2.5}$	PM_{10}	Pb
	45.31	31.26	2.34	0.63	0.69	0.69	0.01
Threshold	100	10	10	250	70	100	25
Below Threshold for all years?	Yes	**No**	Yes	Yes	Yes	Yes	Yes

Los Angeles County (LA County) is located within the jurisdiction of the South Coast Air Quality Management District (SCAQMD). LA County is designated as an area of serious

nonattainment for Ozone and Particulate Matter 2.5 ($PM_{2.5}$), and a maintenance area for Carbon Monoxide (CO). As shown in Table 4, the project would exceed the general conformity de minimis threshold for Nitrogen Oxides (NO_x). NO_x is considered a primary precursor to Ozone because Ozone is created when NO_x reacts with Volatile Organic Compounds (VOCs) in the presence of sunlight[11].

In order to accommodate projects subject to general conformity requirements, general conformity budgets for NOx and VOC emissions are established within each air quality management district (AQMD), which for LA County is the SCAQMD. As described in the September 2024 draft EA for the 50 launch project, the SCAQMD currently has a general conformity budget of 299 tons for NO_x and the project is not anticipated to exceed the budget. DAF anticipates receiving a letter from SCAQMD granting use of budgeted NO_x shortly. SCAQMD, SpaceX and DAF have been coordinating and developed a methodology to track annual project emissions and return any unused credits.

Greenhouse Gases

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 CO_2-equivalents ($MTCO_2e$) per year from all combined stationary fuel combustion sources (e.g., boilers and stationary engines). Since the project would emit a net increase of 18,300 $MTCO_2e$ per year[12] from the prior project and a total of 46,356 $MTCO_2e$, it would appear to exceed this 25,000 $MTCO_2e$ threshold. However, 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.

Permits

Coastal Act Section 30253(c) requires that the proposed project be consistent with the requirements imposed by an air pollution control district or the State Air Resources

[11] https://www3.epa.gov/ttncatc1/cica/files/fnoxdoc.pdf

[12] Per the August 8, 2024, Commission staff report, the gross GHG emissions for 36 launches was 23,565 MTCO2e. As described in the September 2024 Draft Environmental Assessment for the increase to 50 launches, the baseline emissions of GHGs for 36 launches is 28,055 MTCO2e. With the proposed increase the new baseline emissions of GHGs will be 46,356 MTCO2e (equal to the previous baseline of 28,055 plus the new net of 18,300).

Board as to each particular development. The project will require an Authority to Construct and Permit to Operate permits from the Santa Barbara County Air Pollution Control District (SBCAPCD). The SBCAPCD has jurisdiction over stationary emission sources, including federal activities, in its air basin and California state waters; VSFB is within its jurisdictional air basin and marine vessels associated with the project will transit through SBCAPCD coastal waters. The SBCAPCD has locally adopted air emission thresholds that are used to evaluate the significance of impacts from construction and operation of a project 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 tugboat and barge operations, 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 SBCAPCD does not have jurisdiction over emissions from rocket liftoff, as liftoff is considered a mobile emissions source. To ensure that the proposed project will be consistent with the requirements imposed by the SBCAPCD, DAF has committed to ensuring that SpaceX will receive and comply with all of the relevant permits from the SBCAPCD prior to construction and operation of the proposed project. With the commitment to ensure that SpaceX will receive and comply with all applicable permits from the SBCAPCD prior to construction and operation of the project, DAF would be consistent with the requirements imposed by an air pollution control district and thus the project would be consistent with CCMP Section 30253(c).

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

H. 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. The project Draft Final Environmental Assessment (EA)[13] for the project states that "there is not National Historic Preservation Act (NHPA) Section 106 trigger for this project, and therefore, the federally recognized Santa Ynez Band of Chumash Indians was not consulted under Section 106." However, the Draft EA was submitted to the Santa Ynez Band of Chumash Indians for review in keeping with Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments", which directs federal agencies to coordinate and consult with Native

[13] Department of the Air Force, Draft Final Environmental Assessment, Falcon 9 Cadence Increase at Vandenberg Space Force Base, September 2024.

American tribal governments whose interests may be affected by activities on federally administered lands.

As part of its review process for the proposed increase in SpaceX launches, Commission staff reached out to 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.

Commission staff received a request for consultation from the Coastal Band of the Chumash Nation and Commission staff carried out this consultation with the Coastal Band of the Chumash Nation on Wednesday, September 25, 2024. During the consultation the Tribe expressed 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. This concern was previously expressed to Commission staff during consultation as part of its review of the CD for 36 launches.

As discussed in greater detail in the August 8, 2024, staff report for CD-0003-24 (**Appendix A**), the DAF's March 2023 "Identification of Historic Properties and Finding of No Effect" document, included as Appendix C to the May 2023 Supplemental EA prepared by DAF for 36 launches per year, reviewed previous studies that specifically analyzed the potential effects to archaeological resources from rocket engine noise and sonic boom vibrations, and concluded that there is no potential for rocket launches and boost back to adversely impact archaeological resources; that detailed discussion of DAF's March 2023 "Identification of Historic Properties and Finding of No Effect" document in the August 8, 2024, staff report is incorporated by reference herein as though fully described in this report. Due to the sensitive nature of the archaeological resources analyzed in those studies, the reports of those studies are not public information and were referenced and discussed in the 2023 Supplemental EA and the "Identification of Historic Properties and Finding of No Effect" rather than included or directly attached.

Although that document concluded there was no potential for adverse impacts to archaeological resources, the Coastal Band of the Chumash Nation requested copies of the reports. Commission staff relayed the request from the Coastal Band of the Chumash Nation to DAF. DAF responded that the Coastal Band of Chumash Nation can view the reports once it has an agreement with the Central Coast Information Center. Commission staff relayed this information from DAF back to the Coastal Band of Chumash Nation.

Based on these considerations, the Commission finds the proposed project consistent with the cultural and archaeological resources policy of the CCMP (Section 30244 of the Coastal Act).

APPENDIX A – SUBSTANTIVE FILE DOCUMENTS

1. CC-0003-24 (United States Space Force, increase Space Exploration Technologies' (SpaceX) Falcon 9 launch and landing activities at Vandenberg Space Force Base (VSFB) from six to 36 per year as well as the addition of offshore landing locations in the Pacific Ocean Vandenberg Space Force Base). Hyperlinks to: Report, Exhibits, Correspondence, Addendum, Addendum 2.
2. 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.
3. Monterey Bay National Marine Sanctuary. (2024). NBNMS Site Characterization. Marine Mammals. II. Pinnipeds (seals and sea lions) https://montereybay.noaa.gov/sitechar/mamm2.html
4. J. Engel & N. Sadrpour memo: Pepperdine University, CLP; Component 5 August 23, 2013
5. Department of the Air Force, Draft Final Environmental Assessment, Falcon 9 Cadence Increase at Vandenberg Space Force Base, September 2024.
6. Sohn. Vernon, Hildebrand, Webb. (2000). Field Measurements of Sonic Boom Penetration into the Ocean. Journal of the Acoustical Society of America. 107. 3073-3083.