UNITED STATES SPACE FORCE
DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI)
AND FINDING OF NO PRACTICABLE ALTERNATIVE (FONPA)

Vaya Dauntless and Phantom Daytona/Laguna Launch Programs at Space Launch Complex-13, Cape Canaveral Space Force Station, Florida

Pursuant to provisions of the National Environmental Policy Act (NEPA), Title 42 United States Code (USC) Section 4321 et seq., the Department of Defense (DOD) NEPA Implementing Procedures, dated 30 June 2025, and the Department of the Air Force (DAF) Initial Policy for Implementation of NEPA Guidance Memo, dated 7 July 2025, the DAF prepared the attached Environment Assessment (EA) to address the potential environmental impacts on the human environment, including the natural environment, associated with proposed Vaya Space (Vaya) Dauntless and Phantom Space Corporation (Phantom) Daytona and Laguna launch programs at Space Launch Complex (SLC) 13 at Cape Canaveral Space Force Station (CCSFS). The Unique Identification number for this NEPA action is EAXX-007-57-USF-1749463003.

This DRAFT Finding of No Significant Impact (FONSI) hereby incorporates by reference and attaches hereto the *Draft Environmental Assessment (EA), Vaya Dauntless and Phantom Daytona/Laguna Launch Programs at Space Launch Complex-13 at Cape Canaveral Space Force Station, Florida*. The EA considered all potential environmental impacts of the Proposed Action Alternative and the No Action Alternative, and identified management protective measures to avoid, prevent, or minimize environmental impacts.

PURPOSE AND NEED OF THE PROPOSED ACTION

The purpose of the Proposed Action is to increase the space launch mission capability of the United States (U.S.) DOD, National Aeronautics and Space Administration, and other federal and commercial customers, and to enhance the resilience and capacity of the nation's space launch infrastructure, while promoting a robust and competitive national space industry. As directed by U.S. policy (10 USC Section 2273, "Policy regarding assured access to space: national security payloads"); the U.S. seeks to provide greater launch and landing capabilities and infrastructure to support national security objectives, including deploying satellites and other space assets that enable intelligence, reconnaissance, and global security operations. The U.S. aims to promote a hybrid space architecture that diversifies access to space, reduces dependency on singular systems, and ensures rapid reconstitution capabilities.

The Proposed Action is needed to meet current and near-term U.S. Government space launch requirements from the Eastern Range, specifically to fulfill (in part) 10 USC Section 2276(a), "Commercial space launch cooperation", authorizing the Secretary of Defense to:

(1) Maximize the use of the capacity of the space transportation infrastructure of the DOD by the private sector in the U.S.;
(2) Maximize the effectiveness and efficiency of the space transportation infrastructure of the DOD;

(3) Reduce the cost of services provided by the DOD related to space transportation infrastructure and launch support facilities and space recovery support facilities;
(4) Encourage commercial space activities by enabling investment by covered entities in the space transportation infrastructure of the DOD; and
(5) Foster cooperation between the DOD and covered entities.

The government's interest in commercial space, as identified in the National Space Policy, includes greater mission capability for space exploration, and advancing reliable and affordable access to space which in turn advances the scientific and national security benefits of the U.S. space program as a whole.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Proposed Action Alternative

The Proposed Action Alternative is for the DAF to authorize Vaya and Phantom to modify SLC-13 at CCSFS into a shared launch complex for the Dauntless, Daytona, and Laguna launch programs to support U.S. Government and commercial launch service needs. At full cadence, Vaya and Phantom would launch a combined total of 52 Dauntless, Daytona, and/or Laguna vehicles per year from SLC-13. Vaya and Phantom would utilize existing infrastructure at SLC-13 to the maximum extent in order to minimize construction and demolition activities. Two landing zones at SLC-13, currently used to support SpaceX Falcon booster landings, would be modified into SLC-13A and SLC-13B. Two new hangars would be installed on the west side of SLC-13, one to support Vaya operations and one to support Phantom operations.

No Action Alternative

Under the No Action Alternative, the DAF would not authorize Vaya or Phantom launch operations at, or modifications to, SLC-13. Under the No Action Alternative, there would be no new effects on the environmental impact categories analyzed in the EA. The No Action Alternative is the environmentally preferable alternative.

Alternatives Eliminated from Further Consideration

As per the DOD NEPA Implementing Procedures dated 30 June 2025, and the DAF Initial Policy for Implementation of NEPA Guidance Memo dated 7 July 2025, the DAF objectively evaluated reasonable alternatives to the Proposed Action, including alternatives that the DAF eliminated from detailed study. In 2022, Space Launch Delta 45 (SLD 45) developed the Launch Pad Allocation Strategy (LPAS) to account for the following priorities: maximizing opportunities for the number of commercial launch service providers (CLSPs) that can be hosted at CCSFS; maximizing the launch capacity of the Eastern Range; and minimizing the impacts that CLSPs create for other CLSPs during adjacent operations. The following factors were considered during the planning process for LPAS for SLC-13: explosives safety quantity-distance arc impact to adjacent operations and ground transportation; frequency of launch; financial and technical maturity; environmental impacts; and benefit to government and/or commercial industry.

As part of the alternative development process, Vaya and Phantom considered and evaluated SLC-14, SLC-15, SLC-19, SLC-20, SLC-46, SLC-50, SLC-48, and alternative undeveloped sites at CCSFS. As described in Section 2.3 of the EA, these alternatives did not meet the operational or

technical requirements of the Proposed Action and were determined not to meet the definition of a "reasonable" alternative in accordance with the DOD NEPA Implementing Procedures dated 30 June 2025, and the DAF Initial Policy for Implementation of NEPA Guidance Memo dated 7 July 2025. Therefore, the DAF only carried forward the Proposed Action Alternative and No Action Alternative for further evaluation.

ENVIRONMENTAL CONSEQUENCES

The attached EA analyzed the potential environmental consequences of activities associated with the Proposed Action Alternative and the No Action Alternative. Environmental analyses focused on the following resources: air quality, noise, biological resources, water resources, cultural resources, coastal resources, Department of Transportation Act Section 4(f) properties, socioeconomics, transportation and infrastructure, human health and safety, hazardous materials and waste management, geology and soils, solid waste management, and utilities. The DAF determined that neither the Proposed Action Alternative nor the No Action Alternative would result in individual or reasonably foreseeable significant impacts to any resources.

The No Action Alternative, which includes all projects currently authorized for implementation with signed NEPA decision documents, would result in impacts less than the Proposed Action Alternative; however, it would not meet the Action's purpose and need. The Proposed Action Alternative would incorporate environmental protection measures that would be implemented to avoid and/or minimize the potential adverse impacts.

MITIGATIONS

SLD 45 shall take steps as appropriate to the action and shall monitor these as necessary to ensure that Vaya and Phantom implement avoidance, minimization, and/or mitigation measures as set forth in the Final EA under the various impact categories.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and analyses contained in the attached EA, conducted per the NEPA, 42 U.S. Code 4321 et seq., the DOD NEPA Implementing Procedures dated 30 June 2025, and the DAF Initial Policy for Implementation of NEPA Guidance Memo dated 7 July 2025, I conclude that implementing the Proposed Action Alternative and the associated mitigation measures will not have a significant effect on the quality of the human environment. Therefore, further analysis with an Environmental Impact Statement for this Action is not required and this FONSI is appropriate. I decided this after considering all submitted information, including reviewing public and agency comments, and considering a range of reasonable alternatives.

FINDING OF NO PRACTICABLE ALTERNATIVE

Pursuant to Executive Order (EO) 11988, Floodplains Management, and EO 11990, Protection of Wetlands (24 May 1977), and considering all supporting information, I find there is no practicable

alternative to the Proposed Action, which will impact floodplains. As noted in the attached EA, the proposed construction and demolition would be located within the floodplain as the majority of SLC-13 is located in the 100-year floodplain. The location of existing facilities and utilities, limited developable area outside the floodplain, and the requirement to avoid listed species habitat to the greatest extent possible precludes placing these improvements outside the floodplain. This finding fulfills the requirements of the referenced EOs.

_____ _____

MARCIA L. QUIGLEY, Col, USAF
Director, Space Force Mission Sustainment
(Engineering, Logistics, & Force Protection)

Attachment: Draft Environmental Assessment Vaya Dauntless and Phantom Daytona/Laguna Launch Programs at Space Launch Complex-13 at Cape Canaveral Space Force Station, Florida

Draft Environmental Assessment

for

Vaya Dauntless and Phantom Daytona/Laguna Launch Programs at Space Launch Complex-13, Cape Canaveral Space Force Station, Florida

23 February 2026

Unique Identification Number: EAXX-007-57-USF-1749463003

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PRIVACY ADVISORY

The Draft Environmental Assessment (EA) is provided for public comment in accordance with the National Environmental Policy Act (NEPA), as amended by Public Law 118-5, the Fiscal Responsibility Act of 2023 (42 United States Code Section 4321 et seq.), and with the Department of Defense (DOD) NEPA Implementing Procedures.

The NEPA provides an opportunity for public input on Department of the Air Force (DAF) decision-making, allows the public to offer input on alternative ways for the DAF to accomplish what it is proposing, and solicits comments on the DAF's analysis of environmental effects.

Public input allows the DAF to make better, informed decisions. Letters or other written or verbal comments provided may be published in the EA. Providing personal information is voluntary. Private addresses will be compiled to develop a stakeholders inventory. However, only the names of the individuals making comments and specific comments will be disclosed. Personal information, home addresses, phone numbers, and email addresses will not be published in the EA.

Compliance with Section 508 of the Rehabilitation Act

The digital version of this EA is compliant with Section 508 of the Rehabilitation Act of 1973 because assistive technology (e.g., "screen readers") can be used to help the disabled to understand these electronic media. Due to the nature of graphics, figures, tables, and images occurring in the document, accessibility may be limited to a descriptive title for each item.

COVER SHEET

Responsible Lead Agency: Department of the Air Force

Cooperating Agencies: Federal Aviation Administration, National Aeronautics and Space Administration, United States Coast Guard

Title: Vaya Dauntless and Phantom Daytona/Laguna Launch Programs at Space Launch Complex-13, Cape Canaveral Space Force Station, Florida

Inquiries: Information regarding the Environmental Assessment (EA) is available on the website at https://www.patrick.spaceforce.mil/Resources/Environmental-Information/. For information regarding the EA please contact Ms. Taylor Janise, 45 CES/CEIE, 1224 Jupiter Street, Mail Stop 9125, Patrick Space Force Base, Florida 32925 or via email at 45ces.ceie.envconservworkflow@spaceforce.mil

Designation: Draft EA

Abstract: The Department of the Air Force (DAF) has prepared this Draft EA in accordance with the National Environmental Policy Act (NEPA), as amended by the Fiscal Responsibility Act of 2023 (Public Law 118-5; FRA); the Department of Defense's NEPA Implementing Procedures; the DAF Policy for Implementation of NEPA (7 July 2025); Executive Order 14154 (*Unleashing American Energy*), and Federal Aviation Administration (FAA) Order 1050.1G (*FAA NEPA Implementing Procedures*). Under the Proposed Action, the DAF would authorize Vaya and Phantom to modify SLC-13 at Cape Canaveral Space Force Station into an Vaya and Phantom Launch Complex for the Dauntless, Daytona, and Laguna launch programs to support United States Government and commercial launch service needs. At full cadence, Vaya and Phantom would launch a combined total of up to 52 Dauntless, Daytona, and/or Laguna vehicles per year from Space Launch Complex-13.

This Draft EA evaluates the potential environmental impacts associated with the Proposed Action and the No Action Alternative to the following resource areas: air quality, noise, biological resources, water resources, cultural resources, coastal resources, Department of Transportation Act Section 4(f) resources, socioeconomics, transportation, human health and safety, hazardous materials and waste management, geology and soils, solid waste management, and utilities.

Public Review: A 30-day public review period of the Draft EA will take place starting 25 February 2026 and ending 27 March 2026.

EA Identification Number: EAXX-007-57-USF-1749463003

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ACRONYMS AND ABBREVIATIONS

ACF	actual cubic feet	CRA	Cultural Resource Assessment
ACM	asbestos-containing material	CSOSA	Commercial Space Operations Support Agreement
AFMAN	Air Force Manual		
AGL	above ground level	CWA	Clean Water Act
APE	area of potential effect	CZMA	Coastal Zone Management Act
BA	Biological Assessment	DAF	Department of the Air Force
BMPs	Best Management Practices	dB	unweighted decibel(s)
CCAFS	Cape Canaveral Air Force Station	dBA	A-weighted decibel(s)
CCSFS	Cape Canaveral Space Force Station	dBC	C-weighted decibel(s)
		DNL	day-night average sound level
C&D	construction and demolition	DPS	Distinct Population Segment
CANA	Canaveral National Seashore	DOD	Department of Defense
CDNL	C-weighted day-night average noise level	E	Endangered
		EA	Environmental Assessment
CFR	Code of Federal Regulations	EF	emission factor
CLSP	commercial launch service provider	EO	Executive Order
		ESA	Endangered Species Act
CO	carbon monoxide	EFH	Essential Fish Habitat
CO_2	carbon dioxide		

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EPM	environmental protection measure
ERP	Environmental Resource Permit
ESQD	explosives safety quantity-distance
F	Final
FAA	Federal Aviation Administration
FDEP	Florida Department of Environmental Protection
FONSI	Finding of No Significant Impact
g	gram(s)
GN2	gaseous nitrogen
HAPs	hazardous air pollutants
HIF	horizontal integration facility
IAW	in accordance with
IPaC	Information for Planning and Consultation
INRMP	Integrated Natural Resources Management Plan
ISWMP	Integrated Solid Waste Management Plan
kg	kilogram(s)
kN	kilonewton(s)
KSC	Kennedy Space Center
LAA	Limited Access Area
L_{Amax}	A-weighted maximum sound level
lbm	pounds-mass
LBP	lead based paint
LED	light-emitting diode
LEO	low-earth orbit
LID	Low Impact Development
L_{max}	maximum sound pressure level
LNG	liquid natural gas
LOI	Letter of Intent
LPAS	Launch Pad Allocation Strategy
LPS	lightning protection system
LZ	landing zone
mgd	million gallons per day
MINWR	Merritt Island National Wildlife Refuge
MMPA	Marine Mammal Protection Act
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NAS	National Airspace System
NASA	National Aeronautics and Space Administration
NEEP	Experimental Population, Non-Essential
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOTAM	Notice to Airmen
NOTMAR	Notice to Mariners
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
O_3	ozone
OSHA	Occupational Safety and Health Administration
P	Proposed
Pb	lead
PCBs	polychlorinated biphenyls
PE	Proposed Endangered
Phantom	Phantom Space Corporation
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	particulate matter less than or equal to 10 microns in diameter
PBFs	physical and biological features
psf	pounds per square foot
PT	Proposed Threatened
RCRA	Resource Conservation and Recovery Act
RNA	Regulated Navigation Area
ROI	region of influence
RP-1	rocket propellant
RWWTP	Regional Wastewater Treatment Plant
SCTPO	Space Coast Transportation Planning Organization
SHA	temporary hazard within a defined area
SJRWMD	St. Johns River Water Management District
SLC	Space Launch Complex
SLD 45	Space Launch Delta 45
SEL	sound exposure level

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SHPO	State Historic Preservation Office	U.S.	United States
SO_X	sulfur oxides	USACE	U.S. Army Corps of Engineers
SpaceX	Space Exploration Technologies	USC	U.S. Code
SPCC	Spill Prevention, Control, and Countermeasures	USCG	U.S. Coast Guard
		USEPA	U.S. Environmental Protection Agency
SSC	Space Systems Command		
SSCM	Space Systems Command Manual	USSF	U.S. Space Force
SWI	Space Wing Instruction	Vac	vacuum
SWPPP	stormwater pollution prevention plan	Vaya	Vaya Space
		VOC	volatile organic compound
T	Threatened	VPLC	Vaya and Phantom Launch Complex
TCP	traditional cultural place		
tpy	tons per year	VTEL	Vaya Transporter Erector Launcher
UFC	Unified Facilities Criteria		

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1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 Introduction and Background

The Department of the Air Force (DAF) is evaluating the potential environmental effects associated with the Proposed Action and alternatives described in an appendix to the Final EA, namely (1) DAF's authorization of the redevelopment of Space Launch Complex (SLC)-13, an existing SLC on Cape Canaveral Space Force Station (CCSFS; Figure 1.1-1 in Appendix A), into a Vaya and Phantom Launch Complex (VPLC) to support the Vaya Space (Vaya) Dauntless and Phantom Space Corporation (Phantom) Daytona and Laguna launch programs; and (2) the Federal Aviation Administration's (FAA's) issuance of a vehicle operator license along with potential renewals and modifications to licenses to Vaya for Dauntless operations at CCSFS and Phantom for Daytona and Laguna operations at CCSFS and approval of related airspace closures.

The DAF is the lead agency for the Proposed Action and is responsible for the scope and content of this Environmental Assessment (EA). DAF's federal action includes the potential execution of a real property agreement between the United States Space Force (USSF) and Vaya and Phantom at CCSFS. In addition to a real property agreement, Space Launch Delta 45 (SLD 45) would need to approve the program on the Eastern Range, including modifications to the program. These modifications encompass changes to planning, construction, operations, and vehicle configurations as outlined in the program's jointly tailored Space Systems Command Manual (SSCM) 91-710, relevant Statement of Support, and Commercial Space Operations Support Agreement (CSOSA) and CSOSA Annex between the User and Eastern Range. The FAA, National Aeronautics and Space Administration (NASA), and United States Coast Guard (USCG) are cooperating agencies.

The FAA is a cooperating agency because it licenses commercial space launch operations in the U.S. and approves related airspace closures. The Commercial Space Launch Act of 1984, as amended and codified at 51 U.S.C. 50901–50923, authorizes the Secretary of Transportation to oversee, license, and regulate commercial launch and reentry activities, and the operation of launch and reentry sites within the United States or as carried out by U.S. citizens. Section 50905 directs the Secretary to exercise this responsibility consistent with public health and safety, safety of property, and the national security and foreign policy interests of the United States. In addition, Section 50903 requires the Secretary to encourage, facilitate, and promote commercial space launches and reentries by the private sector. As codified at 49 Code of Federal Regulations (CFR) Section 1.83(b), the Secretary has delegated authority to carry out these functions to the FAA Administrator. The FAA is also responsible for creating airspace closure areas in accordance with (IAW) FAA Order 7400.2M, *Procedures for Handling Airspace Matters*, to ensure public safety.

NASA is a cooperating agency because of the special expertise they provide with respect to environmental issues and space launch operations. NASA may rely on the analysis contained in

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this EA to support their environmental review process as a potential future customer of Phantom or Vaya.

The USCG is a cooperating agency because of its role in maritime safety and regulatory authority over waters subject to jurisdiction of the U.S., pursuant to the Ports and Waterways Safety Act, 46 USC Section 700. The USCG also has regulatory authority of U.S. and foreign flagged vessels as outlined in Title 46 of the CFR and has a requirement to review and advise SLD 45 on all launch and reentry site evaluation risk assessments with a focus on vessel navigation safety.

This EA assesses the potential environmental, social, economic, historic, and cultural impacts of the Proposed Action and alternatives and was prepared IAW the National Environmental Policy Act (NEPA) of 1969 as amended (42 United States [U.S.] Code [USC] Section 4321 *et seq*.), the Department of Defense (DOD) NEPA Implementing Procedures dated 30 June 2025, the DAF Initial Policy for Implementation of NEPA Guidance Memo dated 7 July 2025, FAA Order 1050.1G, *FAA National Environmental Policy Act Implementing Procedures*, and the USCG Environmental Planning Policy, Commandant Instruction (COMDTINST) 5090.1 (series) and the USCG Environmental Planning Implementing Procedures.

Implementation of the Proposed Action would support the DAF's statutory obligation to ensure capabilities to launch and insert necessary national security payloads into space (10 USC Section 2273). This would be accomplished through Vaya and Phantom launch operations at CCSFS which would support the DAF, DOD, and other National Security Space Launch requirements and objectives. The DAF authorization of Vaya and Phantom to redevelop SLC-13 to support the Dauntless, Daytona, and Laguna launch programs would help to expand launch capabilities available to the DAF, DOD, and NASA, as well as commercial entities.

The FAA's federal action is to issue vehicle operator licenses to Vaya and Phantom for Dauntless, Daytona, and Laguna launch operations at CCSFS, along with potential renewals and modifications, within the scope of operations analyzed in this EA. In addition, the FAA is also responsible for creating airspace closure areas consistent with the statutory mandate in 49 USC Section 40103 to ensure the safe and efficient use of the National Airspace System (NAS). The FAA carries out this mandate IAW FAA Order 7400.2R, *Procedures for Handling Airspace Matters*, to ensure public safety. If, after reviewing this EA, the FAA determines the Proposed Action would not result in significant impacts on the human environment, the FAA would adopt this EA and issue its own Finding of No Significant Impact (FONSI) to support issuing licenses to Vaya and Phantom and approving related airspace closures. The FAA will draw its own conclusions from the analysis presented in this EA and assume responsibility for its environmental decisions and any related mitigation measures. For the FAA to fully adopt this analysis to support its determination without supplementation, the EA must meet the requirements of FAA Order 1050.1G, which contains the FAA's policies and procedures for compliance with NEPA. Successfully completing the environmental review process does not guarantee that the FAA would issue licenses to Vaya or Phantom or approve related airspace closures.

1.2 Purpose of Action

The purpose of the Proposed Action is to increase the space launch mission capability of the U.S. DOD (Eastern Range[1]), NASA, and other federal and commercial customers, and to enhance the resilience and capacity of the nation's space launch infrastructure, while promoting a robust and competitive national space industry. The U.S. aims to promote a hybrid space architecture that diversifies access to space, reduces dependency on singular systems, and ensures rapid reconstitution capabilities.

1.3 Need for Action

The Proposed Action is needed to meet current and near-term U.S. Government space launch requirements from the Eastern Range, specifically to fulfill (in part) 10 USC Section 2276(a), "Commercial space launch cooperation", authorizing the Secretary of Defense to:

- Maximize the use of the capacity of the space transportation infrastructure of the DOD by the private sector in the U.S.;
- Maximize the effectiveness and efficiency of the space transportation infrastructure of the DOD;
- Reduce the cost of services provided by the DOD related to space transportation infrastructure and launch support facilities and space recovery support facilities;
- Encourage commercial space activities by enabling investment by covered entities in the space transportation infrastructure of the DOD; and
- Foster cooperation between DOD and covered entities[2].

As directed by U.S. policy (10 USC Section 2273, "Policy regarding assured access to space: national security payloads"); the U.S. seeks to provide greater launch and landing capabilities and infrastructure to support national security objectives, including deploying satellites and other space assets that enable intelligence, reconnaissance, and global security operations. The government's interest in commercial space, as identified in the National Space Policy, includes greater mission capability for space exploration, and advancing reliable and affordable access to space which in turn advances the scientific and national security benefits of the U.S. space program as a whole.

1.4 Interagency/Intergovernmental Coordination and Consultations

1.4.1 Government to Government Consultation

Executive Order (EO) 13175, "Consultation and Coordination with Indian Tribal Governments," directs federal agencies to coordinate and consult with Native American tribal governments with interests that might be directly and substantially affected by activities on federally administered

[1] The Eastern Range is the DOD space launch range that supports launches centered at CCSFS and Kennedy Space Center.

[2] "Covered entity" means a non-Federal entity that is organized under the laws of the U.S. or of any jurisdiction within the U.S. and is engaged in commercial space activities.

lands. IAW Section 106 of the National Historic Preservation Act (NHPA), EO 13175, DOD Instruction 4710.02, "DOD Interactions with Federally Recognized Tribes," and the DAF Instruction 90-2002, "Department of the Air Force Interactions with Federally Recognized Tribes," the USSF sent the Cultural Resources Assessment (CRA) with letters to the Seminole Tribe of Florida, Seminole Nation of Oklahoma, and the Miccosukee Tribe of Indians of Florida on 10 November 2025 requesting initiation of government to government consultation (Appendix B). The DAF received concurrence from the Seminole Tribe of Florida on 17 December 2025 (Appendix B).

1.4.2 Interagency Coordination

During the development of this EA, DAF coordinated with various local, state, and federal agencies regarding the Proposed Action and would continue to coordinate with these agencies as required.

IAW the Coastal Zone Management Act and the Florida Clean Marina Program, DAF will submit the Consistency Determination (CD) as part of the EA/FONSI via the State Clearinghouse. The state has 60 days to review that CD along with the Draft EA.

IAW Section 106 of the NHPA, DAF initiated consultation with the Florida Division of Historical Resources on 10 November 2025 (Appendix B).

IAW Section 7 of the Endangered Species Act (ESA), the DAF submitted a revised Biological Assessment (BA) to initiate Section 7 consultation with the United States Fish and Wildlife Service (USFWS) on 6 January 2026 (Appendix C). The DAF also submitted a consultation memo for Section 7(d) consultation with the National Marine Fisheries Service (NMFS) on 8 January 2026 to address the potential effects of the Proposed Action on ESA-listed species and designated critical habitat in the marine environment (Appendix D).

1.5 Public Participation

The DAF initiated a public review and comment period for the Draft EA by publishing a Notice of Availability (NOA) in *Florida Today* and *Hometown News Brevard* on 25 February 2026 and 27 February 2026, respectively. The Draft EA and NOA were also published on the Patrick Space Force Base Website (https://www.patrick.spaceforce.mil/Resources/Environmental-Information/). In addition, the DAF distributed the Draft EA to the Florida State Clearinghouse on 25 February 2026. The public review and comment period will end on 27 March 2026. Following the closure of the public comment period, the DAF will revise the Draft EA, as appropriate, in response to comments received, and a Final EA will be prepared. The Final EA will reflect the DAF's consideration of comments and will provide responses to substantive comments in an appendix to the Final EA.

2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Proposed Action Alternative

The Proposed Action is for the DAF to authorize Vaya and Phantom to modify SLC-13 at CCSFS for the Dauntless, Daytona, and Laguna launch programs to support U.S. Government and commercial launch service needs. At full cadence, Vaya and Phantom would launch a combined total of up to 52 Dauntless, Daytona, and/or Laguna vehicles per year from SLC-13. The location of SLC-13 on CCSFS can be seen in Figure 1.1-1 in Appendix A.

The FAA's federal action is to license Vaya and Phantom commercial launches at CCSFS, as described above. The FAA's federal action also includes the issuance of temporary airspace closures.

2.1.1 Space Launch Complex 13 Modifications

Vaya and Phantom would utilize existing infrastructure at SLC-13 to the maximum extent practicable in order to minimize construction and demolition (C&D) activities. Landing Zone (LZ)-1 and LZ-2, currently used to support Space Exploration Technologies (SpaceX) Falcon booster landings, would be modified into SLC-13A and SLC-13B (Figure 2.1-1 in Appendix A), respectively. Each pad would be equipped with three 150-foot tall lightning protection masts (a passive lightning protection system, ensuring that launch vehicles are protected from lightning strikes, which would be attracted to the system and transferred safely to the ground) and tie-downs that can hold down a mobile temporary launch pedestal. No additional reinforcement of the pads would be required to implement the Proposed Action. A circumferential French drain system would be installed within the perimeter of each pad to capture deluge water used during launch. An evaporation basin would be added north of SLC-13B, where deluge water would be transferred after testing the water for any launch-related contamination (Figure 2.1-1 in Appendix A). A flare stack would be added to prevent the release of combustible vapor clouds into the environment. Two new hangars would be constructed on the west side of SLC-13, one to support Vaya operations and one to support Phantom operations (Figure 2.1-1 in Appendix A). While the footprints of each hangar are located on existing impervious surfaces, each hangar would require foundation construction work.

Vaya's hangar, approximately 122 feet by 88 feet, would only be used for inert system software/hardware checkouts on Dauntless, including command click tests, fit checks, hardware swaps, etc., and to roll the vehicle out of weather hazards. Vaya may store payloads in the hangar for short periods, while attached to Dauntless, in the event of extreme weather; however, the payloads would be contained, conditioned, and if necessary, barricaded from the rest of the building for storage. The facility would also house Vaya's communications and information technology infrastructure and include workforce support facilities, a break room, and restrooms. A conceptual layout of the Vaya hangar is shown in Figure 2.1-2 in Appendix A.

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Phantom's hangar, approximately 122 feet by 99 feet, would be used as a horizontal integration facility (HIF), where inert launch vehicles and payloads would be processed. Hazardous payload checkout and fueling operations would be conducted at an offsite location. Encapsulated payloads would be transported from the offsite facility to the HIF at SLC-13 where they would be rotated to the horizontal position and mated to the launch vehicle. The HIF would provide pre-positioning of Phantom's launch vehicles and encapsulated payloads, storage of ground support equipment (GSE), spare parts, and tools for SLC-13 operations, and provide an area for engineers and technicians to conduct vehicle checkout and integration tasks and maintenance of GSE. This approach minimizes preparation time and post-launch time at the pad, enabling higher cadence operations at SLC-13. The facility would also house Phantom's communications and IT infrastructure equipment and include workforce support facilities, a break room, and restrooms. A conceptual layout of the Phantom hangar/HIF is shown in Figure 2.1-3 in Appendix A.

The existing access roads into the complex and from the hangar area to each pad would be improved. No new firebreaks would be installed. Vegetation within SLC-13 would be maintained at low stature to minimize risk of fires. The access road to SLC-13 would be widened at the intersection of ICBM Road and at the east end of the access road to enable access to Phantom's hangar by adding approximately 6,500 square feet of pavement as shown in Figure 2.1-1 in Appendix A. To the extent possible, construction and modifications would be performed on previously developed land to minimize the addition of new impervious surfaces.

Existing pipelines and utilities, which currently terminate within the fenceline, include water, electricity, and gaseous nitrogen (GN2) and have sufficient capacity to support the Proposed Action. Trenching inside the fenceline would be required for utility distribution throughout the site. New communication lines would be installed from an existing terminal at a communications shed north of SLC-13B (Figure 2.1-1 in Appendix A) to the hangars. Wastewater lines would be connected to CCSFS infrastructure at ICBM Road through installation of a new line under the access road to SLC-13. New commodity storage would be installed at SLC-13 (Figure 2.1-1 in Appendix A). New shared storage would include up to approximately 30,000 gallons of liquid oxygen (LOX), 1,350 gallons of liquid nitrogen (LN2), 300 actual cubic feet (ACF) of GN2, and up to 33,760 gallons of water for deluge operations. For Phantom's operations, there would also be 6,000 gallons of rocket propellant (RP-1), 4,000 gallons of liquefied natural gas (LNG), and 300 ACF of gaseous helium, and GN2. Storage requirements for Phantom include a portable explosive storage locker located in the hangar to accommodate overnight storage of self-destruct ordnance. Secondary containment would be installed around all commodity storage containers. Vaya would not use explosives for flight termination of stage/fairing separation.

Exterior lighting poles would be installed around new structures (e.g., hangars and commodity storage areas) and around the pad where the mobile launch towers would sit, as well as any areas as required for safety. The designs would follow requirements under 45 Space Wing Instruction (SWI) 32-7001, *Exterior Lighting Management*, which requires the use of full cut off, well shielded, low wattage, limited wavelength amber light-emitting diode (LED) lights.

2.1.2 Pre-Launch Operations

Vaya and Phantom would configure the two launch pads so they could be used for either Vaya or Phantom launch structures and sharing common oxidizer, nitrogen, water, power, and communications utilities.

The GSE for both Vaya and Phantom would largely be mobile, and both companies would employ similar rapid roll-on roll-off launch concepts, with vehicle and payload integration primarily occurring offsite (Phantom would perform stage integration at their HIF at SLC-13). Vaya Space would assemble Dauntless offsite at their production facility, located in Cocoa, Florida, where their inert Hybrid Fuel Grains would be mounted to the stages and integrated together on the strongback frame, also known as the Vaya Transporter Erector Launcher (VTEL). Dauntless would be shipped lying flat on the VTEL frame via large industrial transports by road. The VTEL would be shipped to a third-party payload processing facility where the cleaned payload would be encapsulated and mated to the top of Dauntless. Then the vehicle would be shipped to SLC-13 where it would lock into temporary hardware pre-assembled on the launch pad. The VTEL would plug into fluid and electrical GSE before lifting Dauntless into its vertical launch position. Prior to beginning fill for launch operations, the system would be inspected and a wet dress rehearsal would be performed, including tanking and de-tanking prior to launch or test fire. The VTEL also includes a dual slide flame diverter.

Conversely, Phantom would perform all pre-launch operations on-site. The booster and payload would be integrated horizontally and mated to a strongback in the hangar for transport to the launch pad. The launch vehicle would be rotated to vertical at the pad and configured for launch. Phantom would utilize a removable, above-ground flame deflector with integrated deluge system which would be affixed to the launch pedestal.

2.1.3 Launch Vehicles

2.1.3.1 Vaya Dauntless

Vaya's launch program would include the Dauntless launch vehicle, which has two variations: Block 1 and Block 2. Both variations are expendable and classified as small, light-lift, high-capacity vehicles. Dauntless hybrid engines are fueled by solid high-density polyethylene (HDPE) and LOX. Stage 1 residual LOX is predicted to be approximately 500 kilograms (kg), and there would be a *de minimis* amount of residual fuel remaining upon reentry. Dauntless Block 1 is shown in Figure 2.1-4 in Appendix A and Figure 2.1-5 in Appendix F presents side by side comparisons of each variant's characteristics.

2.1.3.2 Phantom Daytona and Laguna

Phantom's launch program would include two vehicles, the Daytona with two variations (Block 1 and Block 2) and the Laguna, which are expendable, small-lift vehicles (Figure 2.1-5 in Appendix A). Both vehicles are expendable and use LOX and RP-1 and/or LNG. Table 2.1-1 in Appendix F

presents side by side comparisons of Daytona and Laguna characteristics. Phantom expects later phases of its launch program to have a fully reusable rocket; however, any reuse and recovery actions would be covered under future NEPA analysis.

2.1.3.3 Payloads

Payloads and their associated materials/fuels/volumes are mission-dependent but would be similar to current U.S. Government and commercial payloads as described in the 2011 EA for Launch of NASA Routine Payloads (NASA 2011), for which the DAF and the FAA were cooperating agencies. If the payload activities are outside the completed analyses under existing NEPA documentation for payloads, they would be evaluated to determine if additional environmental documentation is needed.

2.1.4 Launch, Test Fire Operations, and Reentry

2.1.4.1 Launches and Test Fires

The GSE would include LOX and water fluid pumps, VTEL hydraulics to lift and lower the vehicle, potentially diesel generators, and potentially a small forklift and flatbed trucks. Both Phantom and Vaya would utilize approximately 15,000 gallons of deluge per launch (1.5 million gallons total annually at full cadence). Water from the deluge system would evaporate into steam and residual runoff would be captured by circumferential French drains built into the pad, described in Section 2.1.1, to prevent it from penetrating into the ground. SLC-13 is equipped with two existing water tanks that sum to a capacity of approximately 33,000 gallons. Vaya expects to only use up to 21,000 gallons of water for static long duration test fire events. Phantom would use up to 15,000 gallons of water during each pre-launch static fire test.

At full cadence, Vaya would launch 26 Dauntless vehicles per year, and Phantom would launch a combined total of 26 Daytona and/or Laguna vehicles per year from SLC-13. Launches would occur at any time of year, day or night, but would occur at an approximate equal distribution between night and day. Vaya and Phantom would use launch azimuths ranging from 35 to 120 degrees (Figure 2.1-6 in Appendix A). Vaya would conduct a series of developmental static fires before the first launch of Dauntless Block 1, totaling approximately 600 seconds of burn time in 2027 prior to first flight. Development of the Dauntless Block 2 would require an additional approximately 600 seconds of static fire testing in 2030. Phantom would conduct one static fire test prior to each launch, lasting for approximately 10 seconds.

After each launch, standard GN2 purging and securing operations would be conducted for applicable ground support systems and from launch vehicle if a launch is scrubbed. Vaya and Phantom would pack up components that may remain at or leave the site and perform safety inspections to secure the site at the end of each launch or test fire operation.

2.1.4.2 Splashdown

Vaya expects the Dauntless first stage to splashdown in the Atlantic Ocean between 220 and 550 nautical miles from SLC-13 within the proposed splashdown zone depicted in Figure 2.1-6 in Appendix A. The first stage would break apart upon impact with the ocean. First stage remnants are not buoyant and would sink to the bottom of the ocean. The first stage would be completely inert upon impact in the ocean. Traces of plastic (HDPE) would be the only potential residual fuel and no explosive danger exists. All LOX would have been used or vented during first stage descent. Vaya has no plans to do a controlled booster landing at this time. The second stage and payload fairings are expected to break apart and burn up entirely upon re-entry.

Phantom would expend first stages offshore in the Atlantic Ocean within the same proposed splashdown zone as for Vaya (Figure 2.1-6 in Appendix A). Under normal operations, Daytona and Laguna first stages would break up upon atmospheric re-entry and there would be no residual propellant or explosion upon impact with the Atlantic Ocean. First stage remnants are not buoyant and would sink to the bottom of the ocean. If an anomalous situation when an intentionally expended booster does not break up upon atmospheric reentry and impacts the ocean's surface intact, a residual amount of propellant would remain in the first stage upon impact (less than 1 percent). In this situation, the vehicle would possibly experience an explosive event due to mixing remaining propellants. This represents an off-nominal, low probability, and worst-case scenario and is not assessed for these reasons. Daytona and Laguna second stages are expected to break apart and burn up entirely during re-entry.

At maximum cadence, a combined total of up to 52 first stages would be expended each year.

2.1.4.3 Launch Safety

On launch days, there is a possibility of temporary restricted public access due to visitor volume on sections of Merritt Island National Wildlife Refuge (MINWR) and Canaveral National Seashore (CANA). These temporary closures of MINWR and CANA are typically related to crowd control, access for emergency services, and the volume of visitor traffic in an area. In addition, debris and/or propellant dispersion analyses could lead to a recommendation by SLD 45 Range Safety to close parts of MINWR and CANA to ensure public safety. Day-of-launch winds, anticipated crowds, and time of day are among the many factors that contribute to this recommendation. Each trajectory would be provided to SLD 45 in a Flight Safety Data Package, that identifies, quantifies, assesses, and addresses operational risks. Any potential closures due to visitor volume would be coordinated between SLD 45 security, MINWR, NASA/Kennedy Space Center (KSC), and CANA by monitoring to ensure parking lot thresholds are not exceeded, and that roadways allow for emergency egress for any form of emergency associated with large crowds.

Airspace Coordination/Closures

All launch operations would comply with the necessary notification requirements, including issuance of Notices to Airmen (NOTAMs), as defined in agreements required for a vehicle

operator license issued by the FAA. A NOTAM provides notice of unanticipated or temporary changes to components of, or hazards in, the NAS (FAA Order JO 7930.2U, *Notices to Airmen*). The FAA issues a NOTAM at least 48 hours prior to a launch or reentry activity in the airspace to notify pilots and other interested parties of temporary conditions. NOTAMs are similarly used by foreign Air Navigation Service Providers to provide notice of temporary airspace closures in their airspace. Advance notice via NOTAMs and the identification of Aircraft Hazard Areas[3] (AHAs) assist pilots in scheduling around any temporary disruption of flight activities in the area of operation.

The location and size of airspace closures for commercial space operations also vary with each mission type and are influenced by multiple factors, including prior flight history. The size of airspace closures can grow or shrink as reliability is either decreased or increased with results and analysis from each launch. The FAA received notional launch trajectories and developed a notional airspace closure analysis with AHAs based on similar launch vehicles. AHAs define the temporarily closed airspace that would be established and published through a NOTAM prior to the launch/reentry.

Launches would impact air routes extending eastward from the launch site over portions of the Atlantic Ocean. AHAs may necessitate the closure of across the coastal corridor into the Atlantic Ocean and New York Center Oceanic Airspace, requiring substantial aircraft rerouting to avoid the AHAs. The southernmost launch trajectories could impact the airspace of the Bahamas. The Bahamas would be expected to close its airspace up to 6,000 feet (1,829 meters), and the FAA would close the airspace above that level. See Figure 2.1-6 in Appendix A for a depiction of the range of notional launch trajectories and the area within which there could be associated AHAs for each respective trajectory.

Maritime Coordination

All launch and reentry operations would comply with necessary notification requirements, including issuance of Notices to Mariners (NOTMARs), as defined in agreements required for a vehicle operator license issued by the FAA. A NOTMAR provides a notification regarding a temporary hazard within a defined area (an SHA) to ensure public safety during proposed operations. A NOTMAR itself does not alter or restrict vessel movement; rather the NOTMAR disseminates relative information regarding maritime activity and temporary hazards within a defined area to ensure public awareness and safety during the proposed operations.

To comply with FAA's licensing requirements, Phantom and Vaya would need to develop a Letter of Intent (LOI) with the USCG to establish procedures for the issuance of a NOTMAR prior to a launch or reentry, as well as other measures necessary to protect public health and safety, promoting safe operations over navigable waters. The LOI would describe the required

[3] Hazard areas are any region of land, sea, or air that must be surveyed, publicized, controlled, or evacuated to control the risk to the public. It includes regions of land, sea, and air potentially exposed to hazardous debris generated during normal flight events and all reasonably foreseeable failure modes.

responsibilities and procedures for Phantom, Vaya, and the USCG during the event, which may include launch or reentry operation resulting in the issuance of a NOTMAR.

The USCG publishes NOTMARs through multiple media platforms, to include Local NOTMAR, Broadcast NOTMAR, and Navigational Telex, as needed, to inform the maritime community of temporary changes in condition, Limited Access Areas (LAAs), Regulated Navigation Areas (RNAs), and hazards on navigable waterways. Notices in international areas are published by the National Geospatial Intelligence Agency. Advance notice via a NOTMAR and the identification of SHAs would assist mariners in voyage planning and scheduling around any temporary operation.

2.1.5 Estimated Equipment & Personnel

Construction would begin in early 2026 and occur in two phases. Phase I is estimated to begin in February 2026 and finish in February 2027. Phase II is estimated to start in September 2026 and be completed in March 2027. The anticipated equipment needed for C&D activities is included in Table 2.1-3 and Table 2.1-4 in Appendix F.

Vaya and Phantom anticipate supporting launch operations with 25 personnel each. Vaya personnel would be stationed primarily in off-base facilities, while Phantom personnel would occupy their integration hangar at SLC-13 when not required to evacuate for hazardous operations. For Phantom launch operations, up to four tanker truck deliveries of LOX, one tanker truck delivery of RP-1, and one tanker truck delivery of LNG would be required per launch. Vaya would transport 10,500 kg of HDPE solid fuel grains with Dauntless on the VTEL and require two tanker trucks of LOX for each launch. A 120 kilowatt (Kw) stationary generator would be used at SLC-13 for critical systems backup.

2.2 No Action Alternative

Under the No Action Alternative, the DAF would not authorize Vaya or Phantom launch operations at, or implement modifications to, SLC-13. The FAA would not issue vehicle operator licenses for Vaya or Phantom operations at SLC-13. SLD 45 does not intend on renewing SpaceX's site license at LZ-1/2 after expiration in 2026. SLD 45 has implemented a policy that phases out dedicated LZs to maximize opportunities for the number of commercial launch service providers, maximize the launch capacity of the Eastern Range, and minimize impacts that commercial launch service providers create for other users or government programs during operations (USSF 2023a). SLD 45 policy now requires commercial launch service providers to conduct landing operations at their existing launch sites (DAF 2023). Under the No Action Alternative, other operations at SLC-13 would cease when SpaceX's lease ends and there would be no new effects on the environmental impact categories analyzed in this EA. The No Action Alternative provides the basis for comparing the environmental consequences of the Proposed Action.

2.3 Alternatives Eliminated

As per the DOD NEPA Implementing Procedures dated 30 June 2025, and the DAF Initial Policy for Implementation of NEPA Guidance Memo dated 7 July 2025, the DAF objectively evaluated reasonable alternatives to the Proposed Action, including alternatives that the DAF eliminated from detailed study. In 2022, SLD 45 developed the Launch Pad Allocation Strategy (LPAS) (USSF 2022a) to account for the following priorities:

- Maximizing opportunities for the number of commercial launch service providers (CLSPs) that can be hosted at CCSFS.
- Maximizing the launch capacity of the Eastern Range.
- Minimizing the impacts that CLSPs create for other CLSPs during adjacent operations.

The following factors were considered during the planning process for LPAS for SLC-13, SLC-14, and SLC-15:

- Explosives safety quantity-distance (ESQD) arc impact to adjacent operations and ground transportation
- Frequency of launch
- Financial and technical maturity
- Environmental impacts
- Benefit to government and/or commercial industry

The LPAS ensures the equitable allocation of excess launch property, while protecting and preserving National Security Space Launch and Major Range and Test Facility Base missions and addressing environmental concerns. The strategy supports the commercial space launch industry as directed by 51 USC, *National and Commercial Space Programs*. Based on the previous criteria and delegated authority from Assistant Secretary of the Air Force for Energy, Installations, and Environment, the SLD 45 Commander allocated SLC-13 to Vaya and Phantom as an VPLC. The allocation of SLC-13 to Vaya and Phantom was an initial determination arrived at by weighing the previous factors and subject to the completion of, and compliance with, the Air Force Environmental Impact Analysis Process IAW the DOD NEPA Implementing Procedures dated 30 June 2025, and the DAF Initial Policy for Implementation of NEPA Guidance Memo dated 7 July 2025.

As part of the alternative development process, the DAF considered and evaluated various launch sites IAW the DOD NEPA Implementing Procedures dated 30 June 2025, and the DAF Initial Policy for Implementation of NEPA Guidance Memo dated 7 July 2025. Potential reasonable alternatives were evaluated using the following selection standards:

- Uses a SLC on the Eastern Range with Range Safety support capabilities.
- Maximizes the use of existing suitable launch infrastructure by reactivating a SLC.

- Accommodates Vaya and Phantom's launch vehicles and necessary infrastructure, taking into consideration enacting the VPLC concept and future plans for construction of a LZ which would be incorporated into Phantom's full future program.
- Minimizes conflicts with operational restrictions related to noise, lines of sight, air installation compatible use zones, exclusionary safety zones (that is, blast danger areas, flight hazard areas, flight caution areas, and special clear areas), airfield operation clear zone, accident potential zone, ESQD arcs, and antiterrorism/force protection standards.
- Maximizes physical distances between launch service providers to minimize ESQD conflicts and impacts to launch operations.
- Minimizes impacts to undisturbed land and mitigation areas.
- Able to support launches in 2026.
- Minimize costs or financial burden.

The following potential alternatives were assessed but they did not meet the operational or technical requirements of the Proposed Action. Therefore, the following alternatives were determined not to meet the definition of a "reasonable" alternative IAW the DOD NEPA Implementing Procedures dated 30 June 2025, and the DAF Initial Policy for Implementation of NEPA Guidance Memo dated 7 July 2025:

SLC-14: SLC-14 is currently licensed to another CLSP. Therefore, this alternative cannot accommodate Vaya and Phantom's launch programs and was eliminated from further analysis.

SLC-15: Phantom expects later phases of its launch program to have a fully reusable rocket that lands back at where it was launched from to align with the SLD 45 policy that requires rocket landings to occur in the same location as the launch. Because of safety constraints, LZs are required to be offset by certain distances and avoid flyovers of the launch pad to the maximum extent possible. As such, LZs are required to be located east of the proposed launch pad. While SLC-15 has enough total acreage, the amount of land available east of the launch pad is not enough to accommodate Phantom's full future program with an LZ. As a result, SLC-15 was eliminated from further analysis.

SLC-19: This SLC was eliminated because the undeveloped areas around SLC-19 are mitigation areas that have been, or are planned to be, restored to offset impacts to threatened and endangered species. As a result, SLC-19 has only approximately 24 acres of available land for development and approximately 51 acres would be necessary to construct the proposed VPLC and future LZ to support Vaya and Phantom operations. Therefore, this site was eliminated from further analysis.

SLC-20: The USSF has a real property license with Space Florida. SLC-20 is currently sub-licensed to another CLSP. Therefore, this alternative cannot accommodate Vaya and Phantom's launch programs and was eliminated from further analysis.

SLC-46: This SLC is a multi-user site, which launch service providers can use for their launches. Space Florida operates SLC-46 and does not allow permanent modifications to the pad infrastructure. Therefore, this alternative cannot accommodate Vaya and Phantom's launch programs or required infrastructure and was eliminated from further analysis.

SLC-50: SLC-50 is a greenfield site with no existing infrastructure that was identified in the *Range of the Future Cape Canaveral Space Force Station 21 District Plans* (USSF 2022b). This alternative is not an existing SLC, does not minimize costs, time requirements to develop, or financial burden, and does not minimize impacts to undisturbed land. Therefore, this alternative was eliminated from further analysis.

SLC-48: SLC-48 is an existing launch site at KSC, immediately north of CCSFS, and has a launch pad, paved roads, a fuel storage area, and a catch basin. This site was developed as a "clean pad" multi-user site for small-class vehicles that would allow each customer to bring their required resources for each launch to the site and then remove the resources after their vehicle launched, leaving an empty pad for the next user. While this is conceptually similar, it would not allow for concurrent multi-pad activities, as proposed under the VPLC concept, nor a future LZ, without further development. This alternative does not minimize costs or financial burden, and does not minimize impacts to undisturbed land. Therefore, SLC-48 was eliminated from further analysis.

Alternative Undeveloped Sites at CCSFS: Constructing a new SLC elsewhere at CCSFS on undeveloped land would result in substantially greater environmental impacts and eliminate the efficiencies gained by refurbishing an existing launch site, which reduces the need for new construction. For these reasons, constructing a new launch complex on previously undeveloped land at CCSFS was eliminated from further consideration.

2.4 Permits, Licenses, and Other Authorizations

Table 2.4-1 in Appendix F provides a summary of the permits, licenses, and regulatory requirements that are required for implementing aspects of the Proposed Action.

2.5 Comparison of Environmental Consequences and Mitigations by Alternative

Table 2.5-1 in Appendix F provides a summary of the environmental consequences of the Proposed Action and No Action Alternative. The summary is based on the findings of the detailed analysis of each of the resource areas as discussed in Section 3 of this EA. Additionally, the Mitigations and Monitoring subsections in Chapter 3 list environmental protection measures (EPMs) that include measures to avoid and minimize environmental impacts.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

3.1.1 Resources Not Carried Forward for Detailed Analysis

The resources listed in Table 3.1-1 in Appendix F were considered but not analyzed in this EA because the resource would not be affected.

3.1.2 Reasonably Foreseeable Future Actions

The effects of the Proposed Action, in combination with other reasonably foreseeable future projects (Federal or non-Federal), are evaluated to determine potential effects. The depth of this analysis is commensurate with the potential for significant impacts. Any future federal agency actions modifying the launch program would be subject to environmental review.

The region of influence (ROI) for the analysis of reasonably foreseeable future actions of each resource are the same areas as defined for each resource's direct and indirect impact analysis, as described below. Past, present, and reasonably foreseeable actions within the ROI include current and future rocket launches, rocket engine testing, development in the local area related to activities at CCSFS, and any other development that may occur as a result of economic growth in the area. The projects identified in the following sections include those that had or have the potential to affect the environmental impact categories analyzed in this EA.

Table 3.1-2 in Appendix F lists past actions recently completed on CCSFS with approved NEPA documentation. The temporal boundary for past actions is five years for most resource areas. Table 3.1-3 in Appendix F provides a list of past and current vehicle launches at CCSFS and KSC. The reasonably foreseeable planned future and potential launch actions at CCSFS and KSC are listed in Table 3.1-4 in Appendix F.

This environmental analysis and pad allocation does not guarantee launch rates. SLD 45, Phantom, and Vaya are aware there may be other effects on non-environmental resources on CCSFS, such as logistical and operational constraints, that occur directly or indirectly as a result of the heightened launch activity at CCSFS. SLD 45 would manage those effects to ensure compliance with all relevant statutes, regulations, and other requirements. Safety procedures requiring installation maintenance, along with other requirements, may impose restrictions on site access because of concurrent operations by other launch service providers and other installation functions, potentially leading to construction delays or necessitating operational deconfliction along ICBM Road.

The following documents were reviewed for present or reasonably foreseeable future actions within the ROI that could result in cumulative resource impacts when combined with the Proposed Action. A summary of the findings from the document reviews follows in Table 3.1-5 in Appendix F.

- *2045 Long Range Transportation Plan and Amendments for Space Coast Transportation Planning Organization* (Space Coast Transportation Planning Organization [SCTPO] 2023a)
- *Brevard County Operating and Capital Budget 2024-2025* (Brevard County 2024)
- *Canaveral Port Authority 30-Year Strategic Vision Plan 2017-2047* (Canaveral Port Authority 2018)
- *Cape Canaveral Spaceport Complex Master Plan* (Space Florida 2017)
- *Center Master Plan Final Programmatic Environmental Impact Statement, Kennedy Space Center, Florida* (NASA 2016)
- *City of Cocoa Beach Adopted Annual Budget Fiscal Year 2025: Capital Improvement Program* (City of Cocoa Beach 2024)
- *EA for Eastern Range Planning and Infrastructure Development, Cape Canaveral Space Force Station, Florida* (USSF 2024a)
- *Draft Supplemental EA for the Roberts Road SpaceX Operations Area Expansion and Supporting Infrastructure on Kennedy Space Center* (NASA 2023a).
- Kennedy Space Center Master Plan (NASA 2025)
- *EA for Blue Origin Orbital Launch Site at Cape Canaveral Air Force Station, Florida* (USAF 2016)
- *Final EA for the United Launch Alliance Vulcan Centaur Program Operations and Launch on Cape Canaveral Air Force Station* (USAF 2019a)
- *Final EA for SpaceX Falcon Launches at Kennedy Space Center and Cape Canaveral Air Force Station* (FAA 2020)
- *Final EA for the Reconstitution and Enhancement of Space Launch Complex 20 Multi-User Launch Operations at Cape Canaveral Air Force Station, Florida* (Space Florida 2020)
- *EA for Space Florida Launch Site Operator License at Launch Complex-46 (*FAA 2008)
- *EA for Exploration Park North at the John F. Kennedy Space Center, Kennedy Space Center, Florida* (NASA 2021)
- *EA for the Relativity Terran 1 Program Launch Complex 16, Cape Canaveral Space Force Station, FL* (USSF 2020)
- *Record of Decision Launch Operator Licenses, Evolved Expendable Launch Vehicle (EELV) Program Atlas V and Delta IV* (FAA 2011)
- *Annual Compendium of Commercial Space Transportation: 2018* (FAA 2018)
- *Range of the Future: Cape Canaveral Space Force Station District Plans* (USSF 2022b)
- *Resilient Cape Canaveral* (City of Cape Canaveral 2019)
- *Space Coast Transportation Planning Organization FY24–FY28 Transportation Improvement Program* (SCTPO 2023a)
- *Supplemental EA for the Relativity Terran R Launch Program* (USSF 2024b)
- *Integrated Natural Resources Management Plan: Cape Canaveral Air Force Station, Patrick Air Force Base, Malabar Transmitter Annex, Jonathan Dickinson Missile Tracking Annex*. 45th Space Wing (USSF 2024c)

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- *U.S. Air Force Integrated Cultural Resource Management Plan*, 45th Space Wing (USSF 2023b)
- *EA for Eastern Range Planning and Infrastructure Development, Cape Canaveral Space Force Station, FL* (USSF 2024d)
- *EA for the Replacement of the Administrative Building Complex and Construction of the Next Big Thing Experience at KSC, FL* (NASA 2024)
- *EA for Retail Warehouse at John F. Kennedy Space Center, Kennedy Space Center, Florida* (NASA 2023b)
- *Florida Spaceport System Maritime Intermodal Transportation Study Feasibility Phase, Port*
- *Canaveral, Florida* (Space Florida 2024)
- *Final EA SpaceX Falcon 9 Operations at Space Launch Complex 40, Cape Canaveral Space Force Station, Florida* (FAA 2024)
- *Final EIS SpaceX Starship-Super Heavy Operations at Cape Canaveral Space Force Station* (USAF 2025)
- *Final EIS SpaceX Starship-Super Heavy Operations at Launch Complex 39A at the Kennedy Space Center, Merritt Island, Florida* (FAA 2026)

For the scenarios under consideration to have a significant impact on a resource area, the impacts of all identified past, present, and reasonably foreseeable actions, including the Proposed Action, must be significant. Only publicly available documents pertaining to the federal agencies, transportation agencies, and county and city governments were reviewed and included here. Based on the review of reasonably foreseeable actions, launch cadence from the Eastern Range will increase over the next five years and there will be significant noise impacts to the local community associated with the SpaceX Starship-Super Heavy Launch Program at CCSFS and KSC. Given the size and scale of the Proposed Action compared to the reasonably foreseeable actions, the Proposed Action is not expected to cumulatively add to the anticipated impacts. It is anticipated that the reasonably foreseeable actions would proceed, and these impacts would occur, regardless of whether the Proposed Action is implemented Under the No Action Alternative, the Proposed Action would not occur and no further analyses is necessary.

The FAA no longer conducts cumulative impacts analysis. In 2023, the U.S. Congress passed the Fiscal Responsibility Act, which directed agencies to consider "the reasonably foreseeable environmental effects of proposed agency actions" (42 USC 4332(2)(c)). The Council on Environmental Quality has since revoked its regulations (40 CFR parts 1500-1508) implementing NEPA, 42 USC 4321 et seq., as amended, in response to EO 14154, "Unleashing American Energy." In addition, the Supreme Court issued the Seven County Infrastructure Coalition v. Eagle County, 605 U.S. 168 (2025) ruling on 29 May 2025. As a result of these actions, it is no longer a legal requirement or the policy of the FAA to conduct cumulative impact analyses. In addition, the Seven Counties ruling reinforced the limited scope of NEPA reviews, holding that NEPA does not

require an agency to consider environmental effects of other activities and projects "separate in time or place" from the proposed action.

3.2 Aviation Emissions and Air Quality

3.2.1 Affected Environment

3.2.1.1 Regulatory Setting

Air quality in a given location is defined by the concentration of various pollutants in the atmosphere. Many factors influence the air quality of a region, including the type and amounts of pollutants emitted into the atmosphere, the size and topography of the affected air basin, and the prevailing meteorological conditions. Most air pollutants originate from human-made sources, including mobile sources (e.g., cars, trucks, aircraft) and stationary sources (e.g., factories, refineries, power plants), as well as indoor sources (e.g., cleaning solvents and some building materials). Air pollutants are also released from natural sources such as volcanic eruptions and wildfires.

The U.S. Environmental Protection Agency (USEPA) established the National Ambient Air Quality Standards (NAAQS) to regulate the following criteria pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_x), sulfur dioxide (SO_x), particulate matter less than or equal to 10 microns in diameter (PM_{10}), particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). Under the Clean Air Act, USEPA establishes air quality regulations and the NAAQS and delegates the enforcement of these standards to the states.

O_3 and some NO_2 and particulates are formed through atmospheric chemical reactions from other pollutant emissions (called precursors) that are influenced by weather, ultraviolet light, and other atmospheric processes. O_3 is formed in the atmosphere by photochemical reactions of previously emitted NO_x and photochemically reactive volatile organic compounds (VOCs).

In addition to criteria pollutants, USEPA also regulates hazardous air pollutants (HAPs). HAPs are emitted from a range of industrial facilities and vehicles. HAPs are air pollutants known or suspected to cause cancer or other serious health effects, or adverse environmental and ecological effects. NAAQS are not established for these pollutants; however, the EPA has developed rules and control standards that limit emissions of HAPs from specific stationary (National Emissions Standards for HAPs) and mobile sources (Mobile Source Air Toxics). These emissions control standards are intended to achieve the maximum degree of reduction in emissions of the HAPs, taking into consideration the cost of emissions control, non-air-quality health and environmental impacts, and energy requirements. These emissions are typically one or more orders of magnitude smaller than concurrent emissions of criteria air pollutants.

Federal agencies address emissions of greenhouse gases by reporting and meeting reductions mandated in Federal laws, EOs, and agency policies.

3.2.1.2 Region of Influence

The ROI for air quality includes Brevard County and the adjacent coastline of the Atlantic Ocean and nearshore waters, as impacts of emissions below the mixing layer (nominally 3,000 feet above ground level [AGL]) associated with construction and launch operations would be localized. The wind-driven transport of project emissions beyond this area would result in dispersion to low ambient pollutant concentrations.

3.2.1.3 Climate of the Region of Influence

The climate of the ROI is classified as subtropical, which is characterized by hot and humid summers with substantial amounts of rainfall and thunderstorms and mild, relatively dry winters. Occasional hurricanes do affect the area with potentially damaging storm surges and winds. Hurricane season extends from June through November.

3.2.1.4 Existing Conditions – Aviation Emissions and Air Quality

Brevard County currently is in attainment for all NAAQS (USEPA 2025). Compliance with the NAAQS in the region is due to a lack of substantial emission sources, abundant sunshine, sea breezes, and frequent rain showers that promote atmospheric mixing and limit the buildup of air pollutants in a given location. In February 2024, USEPA lowered the $PM_{2.5}$ annual NAAQS from 12 to nine micrograms per cubic meter, and they estimate that the levels for Brevard County are below this new standard (USEPA 2025). Therefore, the project air quality analysis treats $PM_{2.5}$ as an attainment pollutant within the project ROI.

3.2.2 Environmental Consequences

3.2.2.1 Proposed Action

Construction Activities

Construction under the Proposed Action would result in the temporary addition of pollutants to the local airshed in Brevard County caused by on-site sources (i.e., off-road construction equipment, soil disturbance) and off-site sources (i.e., haul trucks and worker vehicle trips). Construction emissions can vary substantially from day to day, depending on the level of activity; the specific type of operation; and, for dust, the prevailing weather conditions. Therefore, such emission levels can only be approximately estimated with a corresponding uncertainty in precise ambient air quality impacts. Criteria air pollutant emissions associated with temporary construction activities were quantified using the DAF Air Conformity Applicability Model (ACAM). Detailed assumptions and the results of the ACAM analysis are included in Appendix G. Construction schedule assumptions, including phase type, duration, and sequencing, were based on information provided by the project applicant and are intended to represent a reasonable scenario based on the best information available. Implementation of the Proposed Action would generate air pollutant emissions from entrained dust, off-road equipment, vehicle emissions, architectural coatings, and asphalt pavement application.

Construction activities would implement best management practices (BMPs) to minimize fugitive dust emissions. Example BMPs include staging construction to minimize exposed areas, watering soil for dust suppression, covering or watering exposed dirt or storage piles, covering truck loads that transport materials that would generate dust, and rinsing truck undercarriages before leaving the construction site. As shown in Table 3.2-1 in Appendix F, net annual emissions from construction activities in Brevard County would not exceed the DAF insignificance thresholds[4]. Although Section 2.1.5 states construction will take place over two years the DAF has conservatively estimated that all construction related emissions will occur within one year, however, emissions are still below *de minimis* levels.

Launch Activities

At full cadence, Vaya would launch 26 Dauntless vehicles per year and Phantom would launch a combined total of 26 Daytona and/or Laguna vehicles per year from SLC-13. Launches would occur at any time of year, day or night, but would occur at an approximate equal distribution between night and day. Emissions calculations are based on time spent below the mixing layer (3,000 feet AGL). Dauntless would require approximately 14 seconds to reach 3,000 feet AGL in altitude during launch, while the Daytona and Laguna would require 29 seconds and 24 seconds, respectively, to reach 3,000 feet AGL.

Vaya would conduct a series of developmental static fires before the first launch of Dauntless Block 1, totaling approximately 600 seconds of engine burn time in 2027 prior to first flight. Development of Dauntless Block 2 would require an additional approximately 600 seconds of static fire testing in 2030. Phantom would conduct one static fire test prior to each launch. As shown in Table 3.2-2 in Appendix F, net annual emissions from launch activities in Brevard County would not exceed the DAF insignificance thresholds.

Available emissions factors (specific to each criteria pollutant) were used to estimate the emissions generated under the mixing layer (3,000 feet AGL). For the Phantom Daytona and Laguna launch vehicles, the emission factor (EF) for NO_x factor was 3.93 grams (g)/kg of propellant combusted (FAA 2020). Per emission modeling, no other criteria pollutants had emissions rates. For Dauntless, the emissions rates were derived from the mass-fractions from scaled engine testing performed by Vaya. The derived EFs were CO: 7.0692 g/kg and CO_2: 19.8638 g/kg. These factors were then multiplied by launch specific parameters (number of engines used, fuel flow) and the number of launches and static fires per year. This calculation provides estimates of annual emissions in grams, which can then be converted into tons for reporting.

Airspace closures associated with commercial space operations would result in additional aircraft emissions mainly from aircraft being re-routed and expending more fuel. Minimal, if any,

[4] The DAF follows the CAA, which sets NAAQS for six principal (or "criteria") pollutants. The insignificance criteria used by the DAF vary depending on whether an action takes place in an area that is in attainment or near nonattainment for air quality standards. As Brevard County is in attainment for all criteria pollutants, the threshold is typically 250 tons per year of any regulated pollutant, which is the Prevention of Significant Deterioration major source threshold.

additional emissions would be generated from aircraft departure delays. Based on Vaya and Phantom's proposal, airspace-related impacts could occur up to a maximum of 52 times per year. Any delays in aircraft departures from affected airports would be short-term. Thus, any increases in air emissions from grounded aircraft are expected to be minimal and would occur in attainment areas. Therefore, these emissions increases are not expected to result in an exceedance of a National Ambient Air Quality Standard for any criteria pollutant. Emissions from aircraft being re-routed would occur above 3,000 feet (the mixing layer) and thus would not affect ambient air quality. Therefore, airspace closures associated with commercial space operations are not expected to result in significant air quality impacts.

3.2.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. Therefore, there would be no new impacts on air quality.

3.2.2.3 Mitigation and Monitoring

As the Proposed Action would not cause an exceedance of NAAQS and with implementation of BMPs for dust, no additional mitigation or monitoring actions are proposed for air quality.

3.3 Noise and Noise-Compatible Land Use

3.3.1 Affected Environment

3.3.1.1 Regulatory Setting

A description of noise/sound, applicable regulations, ambient sound guidance documents, Federal Interagency Committee on Urban Noise (1980) criteria, and USEPA noise standards are contained in Appendix H. Sound is a physical phenomenon consisting of pressure fluctuations that travel through a medium, such as air, and are sensed by the human ear. Noise is considered unwanted sound that can disturb routine activities (e.g., sleep, conversation, student learning) and can cause annoyance.

Noise-compatible land use means the use of the land is normally consistent with the outdoor noise environment at the location. DOT regulations at 14 CFR 150.7 establish that noise-sensitive land uses, such as residential areas, are generally not compatible with noise levels greater than a day-night average sound level (DNL) of 65 A-weighted decibels (dBA). For impulsive noises (e.g., banging sounds such as sonic booms), a C-weighted DNL (CDNL) of 60 decibels (dBC) is the threshold level above which not all land uses are considered compatible (FAA 2020; Galloway 1981). Land use noise compatibility analysis considers the effects of noise on special management areas, such as national parks, national wildlife refuges, and other sensitive noise receptors, where a quiet setting is a generally recognized purpose and attribute.

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3.3.1.2 Region of Influence

The ROI is defined by the area potentially affected by rocket engine noise and sonic booms. The size of the ROI varies based on the type of noise and the effect/metric examined:

- Propulsion Noise: DNL 65 dBA for human annoyance; A-weighted maximum sound level (L_{Amax}) 115 dBA for hearing impairment; maximum sound level (L_{max}) 111 unweighted decibels (dB) and 120 dB for vibration on structures
- Sonic Booms: CDNL 60 dBC for human annoyance; L_{pk} 140 dB / 4 pounds per square foot (psf) for hearing impairment; 2 psf for vibration on structures

A DNL exceeding 65 dBA is generally considered unacceptable for a residential neighborhood and is used to define the area of potentially significant noise impacts on communities. Rocket engine noise is predictable and sustained based on knowledge of launch times and trajectory whereas sonic booms are acute, non-sustained, and highly dependent on trajectory, speed of launch vehicle, altitude, as well as atmospheric conditions. A sonic boom is an impulsive noise similar to thunder caused when an aircraft or rocket vehicle exceeds the speed of sound. Sonic booms with overpressures of about 1.0 psf are audible and can startle people, but generally do not cause adverse effects such as damage to structures (Plotkin et al. 1997; Benson 2013; National Oceanic and Atmospheric Administration [NOAA] 2024); Haber and Nakaki 1989).

3.3.1.3 Noise Metrics

3.3.1.3.1 Day-Night Average Sound Level

The A-weighted DNL metric is the energy-averaged sound level measured over a 24-hour period, with a 10 dBA penalty assigned to noise events occurring between 10 p.m. and 7 a.m. (acoustic night). The DNL is the standard noise metric used by the U.S. Department of Housing and Urban Development, FAA, USEPA, and the DOD (used surrounding air installations). Most people are exposed to sound levels of 50–55 dBA DNL or higher on a daily basis. Noise-sensitive land uses, such as housing, schools, and medical facilities, are considered compatible in areas where the DNL is less than 65 dBA. Therefore, the 65 dBA DNL noise contour is typically used to determine compatibility of military operations with local land use. Under FAA Order 1050.1G Exhibit A-1, significant noise impacts would occur if the Proposed Action would increase noise by DNL 1.5 dBA or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dBA noise contour, or that would be exposed at or above the DNL 65 dB level due to a DNL 1.5 dBA or greater increase in noise exposure, when compared to the No Action Alternative for the same timeframe.

The CDNL metric is a version of the DNL metric described above calculated based on dBC levels. Because C-weighted sound levels are different from A-weighted sound levels and are associated with different effects, CDNL cannot be added to A-weighted DNL to yield meaningful results and must be discussed separately. Under FAA Order 1050.1G Exhibit A-1, significant noise impacts

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would occur if the Proposed Action would result in noise exposure from impulsive noise sources (e.g., sonic booms) that meet or exceed 60 CDNL – equivalent to DNL 65 dBA.

3.3.1.3.2 Sound Exposure Level

The sound exposure level (SEL) represents both the magnitude of a sound and its duration by stating total noise energy of a noise event as if the event occurred within a single second.

3.3.1.3.3 Maximum Sound Level

The L_{max} is a single-event metric that is the highest sound level measured during a noise event. Often, this parameter would be described along with information about the weightings used (for example, L_{Amax} indicates the maximum level measured with A-weighting). The L_{Amax} is often used in determining the potential for speech interference or hearing impairment under Occupational Safety and Health Administration (OSHA). L_{max} is one metric used in assessing potential effects of sound on structures.

3.3.1.3.4 Pounds Per Square Foot

A sonic boom is a pressure wave created when an object moves through air faster than the speed of sound. The magnitude of the pressure change (i.e., the overpressure) is affected by several factors including the size, weight, shape, and speed of the object, as well as atmospheric conditions. The psf metric is useful for describing listener experiences and assessing potential for hearing impairment and structural damage.

3.3.1.4 Noise Sensitive Areas

Noise sensitive areas are those areas where noise interferes with normal activities. These include off-base residential, educational, health, and religious sites, parks, recreational areas, wildlife refuges, and cultural sites. Users of designated recreational areas are considered sensitive receptors. CCSFS SLC-13 is several miles from the closest communities. The City of Cape Canaveral is over six miles to the south, while other urban areas are located farther away on the western shore of the Indian River or on Merritt Island. The closest residences are in a low-density housing area approximately six miles southwest of SLC-13.

3.3.1.5 Baseline Noise Conditions

Rocket noise is a notable, occasional part of the acoustic environment in the ROI. Noise levels in the ROI when rocket operations are not underway vary by location depending primarily on the intensity and types of nearby human activities. Rural or remote areas typically have DNL less than 49 dBA while urbanized commercial or industrial areas may have DNL as high as 59 dBA. During the daytime, rural or remote areas within the ROI could experience equivalent sound levels below 48 dBA, while noise levels at night are likely less than 42 dBA. In urbanized commercial or industrial areas, daytime equivalent levels are typically 60 dBA and nighttime levels are typically 54 dBA (ANSI/ASA, 2013). DNL levels modeled for multiple launch operations at CCSFS and KSC (including launches, landings, and static fire engine tests), which were presented in the SpaceX

Starship Superheavy 39-A Environmental Impact Statement, showed that the 65 dBA DNL contour was within the CCSFS and KSC boundaries (FAA 2026).

3.3.2 Environmental Consequences

Potential noise effects could occur from the proposed construction or the increased number of static fire tests and launches at SLC-13. Significant noise effects would occur if the Proposed Action would increase noise by 1.5 dBA DNL or more for a noise-sensitive area that is exposed to noise at or above the 65 dBA DNL (or 60 dBC CDNL), or that would be exposed at or above the 65 dBA DNL due to a 1.5 dBA DNL or greater increase, when compared to the No Action Alternative for the same timeframe. Noise effects would also be considered significant if supplemental metrics indicate a dramatic increase in activity interference, an exceedance of hearing conservation criteria, or a substantial risk of widespread structural damage.

FAA Order 1050.1G Appendix C also states that while the basic elements of the FAA noise assessment for NEPA including the standard DNL 65 dB significance threshold applies, it also states that supplemental noise metrics can be used on a case-by-case basis to characterize specific noise impacts. Noise levels exceeding background levels are more likely to be noticed. Noise levels exceeding the 90 dBA L_{Amax} or 100 dB SEL have a high likelihood of interfering with activities. Rocket launches during the late night have some potential to awaken people who are sleeping.

3.3.2.1 Proposed Action

This section describes noise levels associated with proposed noise-generating activities (i.e., construction, static fire tests, and launches). Static fire, launch engine noise, landing engine noise and impacts on human sensitive receptors are presented in units of L_{Amax}. Sonic booms are presented in terms of psf.

3.3.2.1.1 Construction

Noise generated by heavy equipment during construction would be temporary and localized to the vicinity of the construction site. Workers would wear hearing protection, as required, IAW applicable regulations. Because there are no noise-sensitive locations in the immediate vicinity of proposed construction activities, noise effects associated with construction activities would be minimal and are not discussed further in this section.

3.3.2.1.2 Static Fire Tests

Vaya would conduct a series of developmental static fires before the first launch of Dauntless Block 1, totaling approximately 600 seconds of burn time in 2027 prior to first flight. Development of the Dauntless Block 2 would require an additional approximately 600 seconds of static fire testing in 2030. Phantom would conduct one static fire test prior to each Daytona or Laguna launch, each with a single engine burn for 20 seconds (up to 26 static fire tests per year for up to 520 seconds annually).

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RUMBLE, a publicly available software tool developed by Blue Ridge Research and Consulting, LLC, was used to model rocket engine noise from both static fire tests and launches. The received noise was estimated by combining the source components and propagation effects. Model inputs included both details regarding the airframe (height, diameter, mass, number of stages) as well as details regarding each engine used by that airframe (engine weight, propellant type, thrust, nozzle exit diameter, nozzle exit velocity, number of nozzles, and the number of engines employed). RUMBLE uses this in conjunction with the trajectory of the airframe (which includes coordinates, speed, heading, pitch, time varying thrust, weight, and length) to calculate noise metrics relevant to environmental noise analysis. For static fire calculations, no trajectory file is used, rather details regarding the static fire are utilized (location, nozzle exit height, nozzle exit direction, and duration).

The 90 dBA through 120 dBA L_{Amax} and SEL contours from static fires at SLC-13 are shown in Figure 3.3-1 through Figure 3.3-4 in Appendix A. These contours represent the maximum levels estimated for each static fire event at SLC-13. The higher contours (100 – 130 dBA L_{Amax}) are located within about one mile of SLC-13. RUMBLE modeling indicates that L_{Amax} above 90 dBA and SELs above 100 dBA from all static fire activities would be contained within the boundaries of CCSFS and have negligible impacts to sensitive receptors.

3.3.2.1.3 Launches

The 90 dBA through 130 dBA L_{Amax} and SEL contours from launch events at SLC-13 are shown in Figure 3.3-5 through Figure 3.3-8 in Appendix A. Similar to static fire tests, both L_{Amax} above 90 dBA and SELs above 100 dBA would not extend off of CCSFS and would have a negligible impact on the surrounding off-base community. If a launch occurs during the day, when background levels are in the 50 to 60 dBA L_{Amax} range, residents to the west and south are more likely to notice launch noise levels above 70 dBA L_{Amax}. If the same launch occurs during the night, when background levels are lower than during the day (e.g., below 40 to 50 dBA L_{Amax} range), residents over a broader area to the north, west, and south are more likely to notice launch noise levels that exceed 60 dBA L_{Amax}. Though potentially audible, given the distance to sensitive receptors from SLC-13, the infrequency of launch events, and the relatively low L_{Amax}, it is unlikely that DNLs in adjacent communities would be impacted at measurable levels (see Section 3.3.2.1.5).

Airspace closures associated with the Proposed Action could result in temporarily grounded aircraft at affected airports and re-routing of en-route flights on established alternate flight paths. Aircraft could be temporarily grounded if airspace above or around the airport is closed. Ground delays are also used under some circumstances to avoid airborne reroutes. If aircraft were grounded, noise levels at the airport could temporarily increase if the planes sit idle; some aircraft would likely shut down engines altogether until the closure has lifted. Also, depending on the altitude at which aircraft approach an airport, there could be temporary increases in noise levels in communities around the airports. Aircraft would travel on existing routes and flight paths that are used on a daily basis to account for weather and other temporary restrictions. Re-routing associated with launch-related closures represents a small fraction of the total amount

of rerouting that occurs from all other reasons in any given year. Any incremental increases in noise levels at individual airports would only last the duration of the airspace closure on a periodic basis and are not expected to meaningfully change existing day night average sound levels at the affected airports and surrounding areas. Therefore, airspace closures due the Proposed Action are not expected to result in significant noise impacts.

3.3.2.1.4 Sonic Booms

PCBoom was used to model the overpressures and impact locations of potential sonic booms that could be generated by Vaya and Phantom vehicles launching from SLC-13 for typical trajectories. PCBoom considers the size and shape of the vehicle and the trajectory in relationship to the thrust, drag, and weight of the vehicle, which vary during the flight of the vehicle, to estimate the initial signature of the overpressure. While overpressures and impact locations may vary as a result of varying atmospheric conditions and unique trajectories, all sonic booms are predicted to occur east of the launch facility, entirely over the Atlantic Ocean (Figure 3.3-9 through Figure 3.3-11 in Appendix A) and would not impact land.

3.3.2.1.5 Day-Night Average Sound Levels

A DNL exceeding 65 dBA is generally considered unacceptable for a residential neighborhood and is used to define the area of potentially significant noise impacts on communities. DNL was estimated for projected launch and static fire test operations at SLC-13. These estimates were made for each operation type (i.e., Phantom and Vaya launches and static fire). When DNL was assessed for the proposed maximum cadence which includes all combinations of these operation types assuming an almost equal distribution between night and day activities (i.e., assumption of 50-50 split between day and night), noise exposure was still estimated to be less than DNL 65 dBA in populated areas west of the CCSFS property line. The resulting DNL estimates for the combined Vaya and Phantom annual operations are shown in Figure 3.3-12 in Appendix A. The DNL 65 dBA contour is located entirely within the CCSFS property and does not include residential land use. Therefore, the Proposed Action would not result in significant impacts related to noise and noise-compatible land use.

3.3.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. The No Action Alternative would not contribute to new noise impacts.

3.3.2.3 Mitigation and Monitoring

No mitigation or monitoring to reduce the impacts of noise would be required.

3.4 Terrestrial Biological Resources

3.4.1 Affected Environment

Terrestrial biological resources information was derived from the SLD 45 Integrated Natural Resources Management Plan (INRMP) (USSF 2024c) and the BA for Vaya Dauntless and Phantom Daytona/Laguna Launch Programs at SLC-13, CCSFS, Florida (USSF 2025).

3.4.1.1 Regulatory Setting

Biological resources include native or invasive plants and animals, sensitive and protected floral and faunal species, and the habitats, such as wetlands, forests, and grasslands, in which they exist. Habitat can be defined as the resources and conditions in an area that support a defined suite of organisms. The following is a description of the primary federal statutes that form the regulatory framework for the evaluation of biological resources.

Endangered Species Act (ESA). The ESA of 1973 (16 USC Section 1531 et seq.) established protection over and conservation of threatened and endangered species and the critical habitat upon which they depend. Sensitive and protected biological resources include plant and animal species listed as threatened, endangered, or special status by the USFWS and the NMFS. Under the ESA (16 USC Section 1536), an "endangered species" is defined as any species in danger of extinction throughout all, or a large portion, of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. The USFWS maintains a list of species considered to be candidates for possible listing under the ESA. The ESA also allows the designation of geographic areas as critical habitat for threatened or endangered species. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and may warrant protection under the ESA.

Section 4(a)(3)(B)(i) of the ESA was amended by the National Defense Authorization Act of 2004 to preclude the Secretaries of Interior (USFWS) and Commerce (NMFS) from designating critical habitat on any lands or other geographical areas owned or controlled by the DOD, or designated for its use, that are subject to an approved DOD INRMP developed under the Sikes Act Improvement Act of 1997 (16 USC Section 670a), provided that the appropriate Secretaries certify in writing that the INRMP benefits the federally listed species.

Migratory Bird Treaty Act (MBTA). The MBTA of 1918 makes it unlawful for anyone to take migratory birds or their parts, nests, or eggs unless permitted to do so by regulations. Per the MBTA, "take" is defined as "pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR 10.12). Migratory birds include nearly all avian species in the U.S., with the exception of some upland game birds and nonnative species. The list of bird species protected by the MBTA is included in 50 CFR 10.13.

EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, requires all federal agencies undertaking activities that may negatively impact migratory birds to follow a prescribed set of actions to further implement the MBTA. EO 13186 directs federal agencies to develop a Memorandum of Understanding with the USFWS that promotes the conservation of migratory birds.

Bald and Golden Eagle Protection Act. The Bald and Golden Eagle Protection Act of 1940 (16 USC Sections 668-668c) provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle [or any golden eagle], alive or dead, or any part, nest, or egg thereof." "Take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb," and "disturb" is defined as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, injury to an eagle, a decrease in productivity by substantially interfering with the eagle's normal breeding, feeding or sheltering behavior, or nest abandonment by substantially interfering with the eagle's normal breeding, feeding or sheltering behavior." The Bald and Golden Eagle Protection Act also prohibits activities around an active or inactive nest site that could result in an adverse impact on the eagle.

3.4.1.2 Region of Influence

The ROI consists of locations where terrestrial habitats and species could be affected by habitat removal and alteration, wildlife disturbance and collisions with vehicles or equipment during construction and operations, noise (specifically but not limited to sonic booms), vibration, heat and exhaust plumes, and items striking the ground or water surface (e.g., capsules, boosters, fairings, or debris). These locations generally include terrestrial, wetland, and nearshore habitats on and near CCSFS affected by launches, launch noise, SLC-13 construction, and general launch facility operations.

3.4.1.3 Methodology

Potential impacts on vegetation would be limited to SLC-13 and areas proximate to SLC-13 that could be exposed to heat plumes during launches. Therefore, vegetation resources are only assessed for SLC-13. Wildlife and special status animal species could be affected by launch operations including increased noise from Phantom and Vaya launches; therefore, wildlife and special status animal species within the 100 dB L_{max} noise contour are considered.

3.4.1.4 Existing Conditions - Vegetation Resources

Figure 3.4-1 in Appendix A displays the vegetation communities at and proximate to SLC-13. Most of SLC-13 is classified as urban and contains no defined vegetation community type. Vegetation community types adjacent to SLC-13 that could be exposed to increased heat during launch activities include Brazilian Peppertree Ruderal Wet Scrub Association, Rose Natal Grass – Ragweed Ruderal Herbaceous Alliance, and Live Oak – Cabbage Palmetto – Redbay / Twinberry

Forest Association. Vegetation community types adjacent to the SLC-13 access road include Saw Palmetto – Sea Grape – Tough Bully – Twinberry – Guianese Colicwood Scrub Association and Wax Myrtle – Eastern Baccharis – Dogfennel Mixed Ruderal Shrubland Alliance (DAF 2019).

3.4.1.5 Existing Conditions - Wildlife Resources

Habitats proximate to SLC-13 are primarily native uplands (i.e., oak and rosemary scrub, palmetto scrub, hardwood hammocks, coastal strand, and dune), wetlands (i.e., freshwater marsh, brackish marsh, cabbage palm hammock, and wetland scrub-shrub), and disturbed areas along roadways and other SLCs. Invasive plant species such as rose natal grass (*Melinis repens*) and Brazilian pepper (S*chinus terebinthifolia*) may also be present. To the east of SLC-13 are coastal dune and beach habitats associated with the Atlantic Ocean shoreline. As CCSFS is situated on a barrier island, intertidal wetlands are located adjacent to CCSFS. Banana River and Indian River (approximately 3 and 10 miles west of SLC-13, respectively) include both freshwater and brackish water habitats consistent with estuarine environments. These habitats on and near CCSFS support a diverse wildlife use, including mammalian, avian, reptilian, and amphibian species. Specifically, more than 25 mammalian species, more than 50 amphibian and reptile species, and more than 200 bird species are known to occur on or in the vicinity of CCSFS (USSF 2024c). CCSFS is adjacent to the Indian River Lagoon (which includes the Banana River) which is considered one of the most biologically diverse estuaries in North America (Florida State Parks 2024). The St. Johns River Basin ecosystem, one of the largest freshwater marsh systems in Florida, is approximately 16 miles west of CCSFS, CANA, and MINWR, and support more than 1,500 plant and animal species (USFWS 2024). Much of the land in these areas proximate to CCSFS is undeveloped and in a natural or semi-natural state. Many wildlife species are year-round residents.

3.4.1.6 Existing Conditions - Special Status Species

Under the ESA, in general, the USFWS is responsible for listed terrestrial species and NMFS is responsible for listed marine species. The USFWS and NMFS share jurisdiction over sea turtles because they have life stages that occur on land and in the sea. USFWS has jurisdiction over manatees.

The USFWS's Information for Planning and Consultation (IPaC) system was queried in May 2025, for species lists for the SLC-13 Project Area (see Figure 2.1-1 in Appendix A) and estimated noise impact areas (Figure 3.4-2 in Appendix A), which includes the modeled 100 dBA SEL launch noise contours. Results of the IPaC queries are provided in Table 3.4-1 in Appendix F. Detailed descriptions of listed species and proposed and final designated critical habitats can be found in the BA in Appendix C.

3.4.2 Environmental Consequences

The effects on biological resources are considered significant if one or more of the following criteria are met with the implementation of the Proposed Action:

- Jeopardize the continued existence of a federally listed or proposed endangered or threatened species or its habitat, or would result in the destruction or adverse modification of critical habitat.
- Substantial loss of populations or habitat of a federal species of concern or otherwise regionally rare or sensitive species that could jeopardize the continued existence of that species in the project region.
- Substantial loss or long-term disruption of a major wildlife movement corridor.
- Substantial loss of native plant or animal species or community diversity.

3.4.2.1 Proposed Action

The Proposed Action would have negligible impacts on vegetation and negligible short-term and minor long-term impacts on wildlife at CCSFS.

Habitat Loss. Habitat Loss can occur from vegetation clearing and other construction site preparation activities that remove vegetation, disturb soils temporarily, or permanently reduce the amount of habitat available to be used by a species. At SLC-13, approximately 6,500 square feet of new vegetation disturbance would occur. An additional 25,308 square feet of undeveloped, but previously disturbed areas, near the launch pads at SLC-13 would be permanently developed. However, all the habitat that would be disturbed during construction activities is composed of turf grasses located immediately adjacent to the existing SLC-13 access road and previously disturbed areas within the SLC-13 launch site. Therefore, the impacts on native vegetation at CCSFS would be negligible.

Habitat Degradation. Heat plumes from launch activities can cause habitat degradation. Launches by Phantom and Vaya from the two launch pads proposed at SLC-13 would result in heat plumes. Heat from these launches could damage nearby vegetation during launch events, and damage to vegetation would remain following launches. However, SLC-13 has been utilized for launches and landings in the past, including recently for SpaceX booster landings; therefore, the vegetation surrounding SLC-13 has already been damaged by launch and landing heat plumes. Further, the deluge system deployed during launch events would reduce the likelihood of fire, absorb most of the heat, and protect nearby undisturbed vegetation from heat plume damage. Temperature measurements taken by SpaceX during past launch events at SLC-40 found the highest reading was approximately 127 degrees Fahrenheit at the fenceline surrounding the outer boundary of SLC-40, with temperature rapidly decreasing over the following seconds (Pownall, personal communication, as described in USSF 2024e). Given that the rocket engines of Phantom and Vaya would be smaller than those used during the SpaceX temperature measurements at SLC-40, temperatures at the perimeter of the developed portion of SLC-13 would reach a maximum no greater than 127 degrees Fahrenheit during launches, but likely less. Therefore, it is highly unlikely that heat from SLC-13 launch activities would cause habitat degradation beyond the SLC-13 boundaries, in nearby, relatively undisturbed habitats.

Wildlife Disturbance. Noise and visual disturbance created by people, vehicles, equipment, and machinery are forms of wildlife habitat modification that can temporarily or permanently damage hearing in animals or cause physiological stress, interfere with animal communication or disrupt essential animal behaviors (like feeding, nesting, or roosting), or reduce the functional quantity or quality of wildlife habitat. Effects may influence individual animals, populations of a particular species, or entire wildlife communities. Visual disturbance to wildlife at SLC-13 would remain unchanged, as SLC-13 has been used by SpaceX for booster landing activities, and the types of human movement and activities with the Proposed Action would remain relatively unchanged.

Noise from construction and launch operations would have the greatest impact on wildlife proximate to SLC-13. Construction-related noise impacts would be temporary, last approximately one year, and would cease when construction activities end. Launch related noise would occur approximately 52 times annually, with each anticipated launch event at SLC-13. The range of noise-wildlife impact studies in the published literature addresses a wide array of different species (e.g., birds, mammals, fish, entire wildlife communities), biological responses, acoustic metrics, environments, and other confounding variables (Ortega 2012; Shannon et al. 2016). Shannon et al. (2016) reported that a variety of studies on birds demonstrate responses to noise occurring at noise levels of at least 45 dBA (roughly the noise level of a quiet urban or rural setting). Terrestrial mammals responded to noise levels between 52 and 68 dBA (roughly equivalent to the noise level of commercial area or busy highway), and gleaning bats responded to noise levels exceeding 80 dBA (roughly the noise level of a noisy urban area) (Shannon et al. 2016). The comparative noise level descriptors are consistent with those described by FAA (2022). Shannon et al. (2016) suggest that the most consistent findings relating noise levels to wildlife responses occur in the context of studies that measure average, ambient, or continuous noise levels, which is indicative of a chronic noise environment. Ambient or continuous noise would not be the type of noise produced by launch-related activity at SLC-13. Instead, wildlife would be exposed to very high noise levels for brief periods of time during each launch, potentially exceeding 120 dB proximate to SLC-13, with noise levels returning to ambient levels immediately following each launch. Although wildlife at CCSFS are likely habituated to launch noise as launch activity is frequent, and noise levels likely exceed 100 dB across CCSFS with each launch, additional launches from SLC-13 would further stress wildlife, cause some wildlife species to flee the area during launch, reduce breeding and foraging proximate to SLC-13 during and immediately following each launch, and likely discourage use of suitable habitat for wildlife immediately adjacent to SLC-13. These would be long-term minor impacts on wildlife and wildlife habitat proximate to SLC-13.

Threatened and Endangered Species. USSF is currently conducting formal ESA Section 7 consultation with the USFWS regarding the Proposed Action. Potential effects on ESA-listed, proposed, and candidate terrestrial species were evaluated in the associated BA in Appendix C (USSF 2025). Conclusions are summarized in Table 3.4-2 in Appendix F. The USSF would

implement all applicable minimization, monitoring, avoidance measures, and mitigations in the resultant BO.

3.4.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. Therefore, there would be no new impacts on terrestrial biological resources.

3.4.2.3 Mitigation and Monitoring

SpaceX committed to the restoration and management of approximately 99 acres of potential Florida scrub-jay and eastern indigo snake habitat at CCSFS to mitigate for the loss of unoccupied scrub-jay habitat from the development of LZ-1 at SLC-13. Restoration was completed by SLD 45 in Land Management Unit 33 of CCSFS. A combination of mechanical treatment and prescribed burning was used to restore the habitat. Per the 2015 Biological Assessment, SpaceX was required to maintain and manage the mitigation area in Land Management Unit 33 as part of their real property agreement for SLC-13 (45th Space Wing 2015). Phantom and Vaya would take over the responsibility of maintenance and monitoring requirements of this mitigation site.

All conservation measures and Section 7 consultation terms and conditions would be followed to minimize impacts on federally listed species. The Proposed Action has the potential to impact the southeastern beach mouse habitat at CCSFS as a result of impacts on 0.73 acre of maintained turf grasses for access road improvements and the construction of a flare stack, LNG storage, deluge basin, guard shack, and transformer pad on undeveloped areas within the SLC-13 Project Area boundary. This could result in a take of this species due to their use of this area. However, based on past studies completed for CCSFS, southeastern beach mice are benefiting from the same habitat restoration activities being conducted at CCSFS for Florida scrub-jays, and the population is expanding into inland locations (USSF 2024c). Therefore, no additional compensation for the Proposed Action impacts of 0.73 acres of southeastern beach mouse habitat would occur (Appendix C). The USSF submitted a revised BA to the USFWS on 6 January 2026 (Appendix C) to support Section 7 consultation with the USFWS and would implement all applicable minimization, monitoring, avoidance measures, and mitigations in the resultant BO.

3.5 Marine Biological Resources

3.5.1 Affected Environment

3.5.1.1 Regulatory Setting

Marine biological resources include sensitive and protected species and habitat in which they exist. Habitat can be defined as the resources and conditions in an area that support a defined suite of organisms. The following is a description of the primary federal statutes that form the regulatory framework for the evaluation of marine biological resources.

ESA. As discussed in Section 3.4.1.1, the ESA established protection and allows for recovery of threatened and endangered species and their habitats. Section 7 of the ESA specifies that any agency that proposes a federal action that could affect a listed species or result in the destruction or adverse modification of its habitat must participate in an interagency cooperation and consultation process with the USFWS and/or NMFS.

Marine Mammal Protection Act (MMPA). The MMPA (16 USC Sections 18.1361-18.1407) protects marine mammals, including whales, dolphins, porpoises, manatees, and other marine species. Under the MMPA, it is unlawful to pursue, hunt, take, capture, wound, or kill a marine mammal by any means, unless otherwise authorized. USFWS and NMFS share responsibility for implementing MMPA.

Marine Wildlife and Essential Fish Habitat (EFH). The Magnuson-Stevens Fishery Conservation and Management Act (50 CFR 600.305(b)(2)) requires interagency coordination if a federal agency may adversely affect EFH. The Act defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

3.5.1.2 Region of Influence

The ROI for marine biological resources consists of the locations where marine habitats and species could be affected by disturbance from noise (specifically but not limited to rocket engine noise and sonic booms) or potential collision with items striking the water surface (e.g., capsules, boosters, fairings, or debris). These locations generally include nearshore habitats on and near CCSFS affected by launches, launch noise, SLC-13 construction, and general launch facility operations and the proposed splashdown zone (Figure 2.1-6 in Appendix A).

3.5.1.3 Existing Conditions - Marine Species and Critical Habitat

There is no marine turtle habitat within the SLC-13 construction area (Figure 2.1-1 in Appendix A). The green sea turtle (*Chelonia mydas*), Kemp's ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), and loggerhead sea turtle (*Caretta caretta*) nest on beaches at CCSFS and occur in nearshore waters to the east of SLC-13 within the noise area. The hawksbill sea turtle (*Eretmochelys imbricata*) does not nest at CCSFS but occurs in nearshore waters within the noise area along the coastline of CCSFS. Detailed descriptions of these species, status, habitat, and occurrence within the project area are included in the BA (Appendix C). The CCSFS was exempted from critical habitat designation for nesting habitat for loggerhead sea turtle because of its INRMP, which specifies the implementation of beneficial sea turtle management actions at CCSFS (USSF 2024c). Nesting habitat for loggerhead sea turtle has been designated approximately 5.7 miles north of the Project Area and outside CCSFS boundaries. Similarly, nesting habitat for the green sea turtle has been proposed as critical habitat approximately 5.7 miles north of the Project Area. The USSF determined that these designated and proposed critical habitats would not be affected by the action and are not considered further in this EA (see Appendix C).

The proposed splashdown area within the Atlantic Ocean overlaps designated critical habitat for the Northwest Atlantic Ocean Distinct Population Segment (DPS) of the loggerhead sea turtle (i.e., *Sargassum* habitat, see Figure 3.5-1 in Appendix A). The physical and biological features (PBFs) of loggerhead *Sargassum* habitat are accumulations of floating material, especially *Sargassum*, that support the development and foraging habitat for young loggerhead sea turtles. The primary constituent elements that support this habitat are the following: (i) convergence zones, surface-water downwelling areas, the margins of major boundary currents, and other locations where there are concentrated components of the *Sargassum* community in water temperatures suitable for the optimal growth of *Sargassum* and inhabitance of loggerheads; (ii) *Sargassum* in concentrations that support adequate prey abundance and cover; (iii) available prey and other material associated with *Sargassum* habitat including, but not limited to, plants and cyanobacteria and animals native to the *Sargassum* community such as hydroids and copepods; and (iv) sufficient water depth and proximity to available currents to ensure offshore transport (out of the surf zone), and foraging and cover requirements by *Sargassum* for post-hatchling loggerheads, i.e., >10 meters in depth.

The SLC-13 construction area contains no habitat for the West Indian manatee, but the species may occur in the nearshore waters of the Atlantic Ocean approximately 750 feet east of the construction area within the noise area or within brackish waters along the Banana River. A detailed description of West Indian manatee status, habitat, and occurrence within the project area is included in the BA (Appendix C). The nearest area of designated critical habitat for the West Indian manatee is the coast of the Atlantic Ocean immediately east of SLC-13. On 24 September 2024, the USFWS published a proposed rule to revise the existing designated critical habitat for two subspecies of the West Indian manatee. The proposed rule would remove previously designated areas along the Atlantic Coast and the east turning basin of Port Canaveral. Based on the proposed revisions, the nearest area of critical habitat would be located approximately 2.1 miles from SLC-13. The USSF determined that designated critical habitat for the West Indian manatee would not be affected by the Proposed Action and it is not considered further in this EA (see Appendix C).

The following ESA-listed cetacean species occur in the proposed splashdown area of the Atlantic Ocean: the blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), sei whale (*Balaenoptera borealis*), North Atlantic right whale (*Eubalaena glacialis*), and sperm whale (*Physeter macrocephalus*), as summarized in Table 3.5-1 in Appendix F. Critical habitat for the North Atlantic right whale has been designated along the Atlantic Coast, which includes the proposed splashdown area in the Atlantic Ocean.

ESA-listed fish species potentially occurring within the proposed splashdown area of the Atlantic Ocean include Atlantic sturgeon (*Acipenser oxyrinchus*; DPS and South Atlantic DPS), giant manta rays (*Manta birostris*), oceanic whitetip shark (*Carcharhinus longimanus*), scalloped hammerhead shark (*Sphyrna lewini*, Central and Southwest Atlantic DPS), shortnose sturgeon (*Acipenser*

brevirostrum), and smalltooth sawfish (*Pristis pectinata*), as summarized in Table 3.5-1 in Appendix F.

3.5.2 Environmental Consequences

The effects on biological resources are considered significant if one or more of the following criteria are met with the implementation of the Proposed Action:

- Jeopardize the continued existence of a federally listed or proposed endangered or threatened species or its habitat, or would result in the destruction or adverse modification of critical habitat.
- Substantial loss of populations or habitat of a federal species of concern or otherwise regionally rare or sensitive species that could jeopardize the continued existence of that species in the project region.
- Substantial loss or long-term disruption of a major wildlife movement corridor. Substantial loss of animal species or community diversity.

3.5.2.1 Proposed Action

The USSF prepared a BA to support Section 7 consultation with the USFWS for the potential effects of the Proposed Action on federally-listed nesting sea turtles and the West Indian manatee (USSF 2025; Appendix C). The effects determinations are summarized in Table 3.5-2 in Appendix F. The USSF submitted a revised BA to the USFWS on 6 January 2026 (Appendix C) to support Section 7 consultation with the USFWS and would implement all applicable minimization, monitoring, avoidance measures, and mitigations in the resultant BO.

The DAF and FAA prepared a consultation memo for Section 7 consultation with NMFS to address the potential effects of the Proposed Action on ESA-listed species and designated critical habitat in the marine environment. The density of species is low in the open ocean and adverse effects to species under NMFS jurisdiction would be unlikely. Additionally, the DAF determined that the scale of operations is not large enough to affect boundary current or areas of convergence that promote aggregations of *Sargassum* and that any potential impacts to the PBFs for loggerhead critical habitat are expected to be very small and temporary, and therefore insignificant (Appendix D). Therefore, the DAF concluded that the proposed activities may affect, but are not likely to adversely affect any of the designated critical habitats in the action area (Appendix D). The DAF submitted a Section 7(d) memo to initiate informal consultation with NMFS on 8 January 2026 (Appendix D). Appropriate EPMs specified in the resultant NMFS Letter of Concurrence would be implemented to avoid or minimize potential effects on ESA-listed species and designated critical habitat in the Atlantic Ocean (Appendix D).

With the implementation of applicable minimization, monitoring, and avoidance measures, the potential effects of the Proposed Action on marine protected species would be mitigated and mitigations would be approved by the USFWS and NMFS. Therefore, the Proposed Action would not result in significant impacts on marine biological resources.

3.5.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. Therefore, there would be no new impacts on marine biological resources.

3.5.2.3 Mitigation and Monitoring

The DAF submitted a revised BA to the USFWS on 6 January 2026 to support Section 7 consultation (Appendix C) and Section 7(d) memo to initiate informal consultation with NMFS on 8 January 2026 (Appendix D) and would implement all applicable minimization, monitoring, avoidance measures, and mitigations in the resultant BO and Letter of Concurrence.

3.6 Water Resources

3.6.1 Affected Environment

Water resources include surface waters, groundwater, and floodplains. Surface waters include all lakes, ponds, rivers, streams, impoundments, and wetlands within a defined area or watershed. Wetlands are transitional areas between terrestrial and aquatic systems with land covered by shallow surface water. Groundwater resources include water contained in soils, permeable and porous rock, or unconsolidated substrate. Floodplains are areas that are flooded periodically by the lateral overflow of surface water bodies.

3.6.1.1 Regulatory Setting

Surface waters, as defined in 33 CFR 328.3, are regulated under Sections 401 and 404 of the Clean Water Act (CWA; 33 United States Code [USC] Section 1251 et seq.) and Section 10 of the Rivers and Harbors Act. The CWA regulates discharges of pollutants in surface waters of the U.S. Section 404 of the CWA establishes a program to regulate the discharge of dredged and fill material into waters of the U.S., including wetlands. The U.S. Army Corps of Engineers (USACE) defines wetlands as “those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions” (Environmental Laboratory 1987). Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR 328). Federal protection of wetlands is also promulgated under EO 11990, *Protection of Wetlands,* the purpose of which is to reduce adverse impacts associated with the destruction or modification of wetlands. This EO directs federal agencies to provide leadership in minimizing the destruction, loss, or degradation of wetlands.

The CWA provides the authority to establish water quality standards, control discharges into surface and subsurface waters (including groundwater), develop waste treatment management plans and practices, and issue permits for discharges. A National Pollutant Discharge Elimination System (NPDES) permit under Section 402 of the CWA is required for discharges into surface waters. The USEPA oversees the issuance of NPDES permits at federal facilities, as well as water

quality regulations (Section 401 of the CWA) for both surface and groundwater within states. The Florida Environmental Resource Permit (ERP) Program regulates activities involving the alteration of surface water flows. This includes new activities in uplands that generate stormwater runoff from upland construction, as well as dredging and filling in wetlands and other surface waters.

Under Section 438 of the Energy Independence and Security Act of 2007, federal agencies are required to reduce stormwater runoff from development and redevelopment projects implemented by the federal government in order to protect water resources. Federal agencies can comply by implementing a variety of stormwater management practices, such as green infrastructure or low-impact development practices. Examples of these stormwater management practices include reducing impervious surfaces by using increased vegetation cover on surface, implementing porous pavements, integrating cisterns, and building green roofs (USEPA 2024).

Groundwater is water that occurs in the saturated zone beneath the earth's surface and includes underground streams and aquifers. It is an essential resource that functions to recharge surface water and can be used for drinking, irrigation, and industrial processes. Groundwater typically can be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations. The susceptibility of aquifers to groundwater contamination relates to geology, depth to groundwater, infiltration rates, and solubility of contaminants. Groundwater resources are regulated on the federal level by the USEPA under the Safe Drinking Water Act, 42 USC Section 300f et seq. The USEPA's Sole Source Aquifer Program, authorized by the Safe Drinking Water Act, further protects aquifers that are designated as critical to water supply and makes any proposed federal or federal financially assisted project that has the potential to contaminate the aquifer subject to USEPA review.

Floodplains are areas of low-level ground along rivers, stream channels, or coastal waters that provide a broad area to inundate and temporarily store floodwaters. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body. Floodplains are subject to periodic or infrequent inundation due to rain or melting snow. Risk of flooding typically hinges on local topography, the frequency of precipitation events, and the size of the watershed above the floodplain. Flood potential is evaluated and mapped by the Federal Emergency Management Agency, which defines the 100-year (regulatory) floodplain. The 100-year floodplain is the area that has a 1 percent chance of inundation by a flood event in a given year. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety.

EO 11988, *Floodplain Management*, provides guidelines that agencies should carry out as part of their decision making on projects that have potential impacts to or within the floodplain. This EO requires federal agencies to avoid, to the extent possible, the long- and short-term adverse

impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

3.6.1.2 Region of Influence

The ROI for water resources includes CCSFS and the adjacent waterways, which includes the Atlantic Ocean to the east and the Banana River to the west.

3.6.1.3 Existing Condition - Surface Water

CCSFS is within the Indian River Lagoon watershed (Hydrologic Unit Code [HUC] 3080202 and the Banana River subwatershed (HUC 030802020201). CCSFS is located on a barrier island between the Atlantic Ocean to the east and the Banana River Lagoon to the west (USSF 2024c). There are no surface waters present within SLC-13, and the nearest surface water body to SLC-13 is the Atlantic Ocean to the east.

Section 303(d) of the CWA authorizes states, territories, and authorized Tribes in listing impaired waters and developing total maximum daily loads for impaired waters. A total maximum daily load sets the maximum amount of a pollutant allowed in an impaired waterbody, providing a tool for restoring water quality. The Indian River Lagoon north of the Melbourne Causeway is listed as impaired. Fecal coliform is the parameter assessed using the Impaired Surface Water Rule for the Indian River Lagoon. In 2023, the State of Florida, established the Indian River Lagoon Protection Program within the Florida Department of Environmental Protection (FDEP) to reduce harmful nutrients entering the Indian River Lagoon through 21 priority water quality projects. The Indian River Lagoon Protection Program provides action plans for basins within the Indian River Lagoon, including the Banana River Lagoon Basin.

The Banana River Lagoon Basin Management Action Plan (Banana River Lagoon Stakeholders and FDEP 2013) provides a long-term plan to restore seagrass habitats in the Indian River Lagoon Basin by reducing the total nitrogen and total phosphorus loadings in the watershed. CCSFS was a stakeholder involved in the development and implementation of the Basin Management Action Plan.

Ground-disturbing construction activities that exceed one acre must be permitted under the NPDES Construction General Permit. This requires the development of a stormwater pollution prevention plan (SWPPP) and the implementation of BMPs to provide pollution prevention IAW permit requirements.

3.6.1.4 Existing Conditions - Ground Water

Two continuous aquifer systems, the surficial aquifer and the Floridan aquifer, are present in Brevard County. The surficial aquifer system is contained in undifferentiated Late Miocene, Pliocene, and Recent Pleistocene deposits. These deposits are composed primarily of medium to coarse quartz sands, with coquina and shell occurring more frequently at depth (Brown et al. 1962). The surficial aquifer is hydrologically separated from the underlying Floridan aquifer by

sediments of the Hawthorn Group of Miocene Age. The low permeability clays, silts, and marls of the Hawthorn Group are considered the aquitard between the non-artesian surficial and the artesian Floridan aquifer system. The Floridan aquifer system consists of a series of highly permeable limestone formations including the Ocala Group and the Avon Park Limestone, both of Eocene age. Water enters the surficial aquifer through direct infiltration from the percolation of rainwater. Groundwater deeper than the surficial aquifer is affected more by regional boundaries such as the Atlantic Ocean and the Banana River. Rates of groundwater movement are generally substantially less than one foot per day (USSF 2024c).

The surficial aquifer is typically classified by the FDEP as a Class G-II aquifer (less than 10,000 milligrams per liter total dissolved solids). A Class G-II aquifer is defined as able to supply water treatable for human consumption; however, the surficial aquifer does not, nor is planned to, supply potable water at CCSFS (USSF 2024c).

3.6.1.5 Existing Conditions - Waters of the United States

Jurisdictional wetlands have been identified by USACE on CCSFS for canals that directly connect with the Banana River up to the west side of Phillips Parkway; however, this identification is not an official jurisdictional determination by USACE and FDEP. There are wetland habitats that occur on the installation including mangrove wetlands, salt marsh, and freshwater wetlands, as well as manmade wetland habitats created by impoundments and borrow pits. Mangrove wetlands are located on the fringes of the Banana River and adjacent impoundments. Salt marshes occur throughout CCSFS amidst the intertidal shorelines. Freshwater wetlands are located throughout CCSFS in low-lying areas associated with topographic undulations and depressions generally caused by relict interdunal swales (USSF 2024c). No wetland habitats or potentially jurisdictional waters of the U.S. are present on SLC-13, although jurisdictional forested freshwater wetlands and inland oligohaline to freshwater marshes (palustrine wetlands) are adjacent to the SLC-13 developed areas (Figure 3.6-1 in Appendix A).

3.6.1.6 Existing Conditions - Floodplains

Floodplains extend beyond the coastal dune and wetlands and into portions of the CCSFS upland plant communities. On CCSFS, the 100-year floodplain extends to seven feet above mean sea level on the ocean side and four feet above mean sea level on the Banana River side. The 500-year floodplain elevations are 10 feet above mean sea level on the ocean side of CCSFS and six feet above mean sea level along the Banana River (USSF 2024c). SLC-13 and all areas on CCSFS surrounding SLC-13 are located within the 100-year floodplain.

3.6.2 Environmental Consequences

Evaluation criteria for potential impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. Adverse impacts on water resources would occur if the Proposed Action were to do any of the following:

- Reduce water availability or supply to existing users.

- Cause overdrafts of groundwater basins.
- Exceed safe annual yield of water supply sources.
- Affect water quality adversely.
- Endanger public health by creating or worsening health hazard conditions.
- Violate established laws or regulations adopted to protect water resources.

Potential impacts related to flood hazards can be significant if such actions are proposed in areas with high probabilities of flooding; however, all impacts can be mitigated through the use of design features to minimize the effects of flooding.

3.6.2.1 Proposed Action

The Proposed Action would have negligible short-term and long-term impacts on water resources. Construction activities could cause increase sediment erosion and soil disturbance at SLC-13. The use of construction equipment could result in the release of contaminants from accidental leaks, drips, or spills of petroleum products that could reach surface water or groundwater. However, only a small area of new ground disturbance associated with the entrance road realignment would occur, and BMPs associated with the proposed construction project's SWPPP would be implemented. The combination of a small area of new ground-disturbing activities and the implementation of BMPs would ensure that there would be no substantial sediment transport into surface waters from stormwater during construction activities. All construction equipment would be monitored for drips, leaks, and spills, and drip pans would be placed beneath parked and unused construction equipment to capture petroleum products. The negligible increase in impervious surfaces associated with the new hangars and road realignment would not affect surface water flows, groundwater recharge, or exacerbate flooding on CCSFS.

Launch operations could produce minor amounts of pollutants from vehicles and equipment used to transport launch vehicles and service and support launch operations. However, effects on water resources from vehicle and equipment pollutants would be negligible as BMPs would be implemented IAW the CCSFS Spill Prevention Control and Countermeasure Plan. Launch operations would also involve rocket exhaust and production of deluge water. Rocket exhaust would contain little to no residual rocket propellant, and combustion products from rocket launches would not impact surface water or groundwater. The main combustion product is CO, see Table 3.2-2 in Appendix F. To prevent runoff into surrounding habitats, construction work would follow BMPs and permit requirements. Deluge water used during launch activities would be entirely captured in a French drain system surrounding both launch pads, and would drain to an evaporation pond, where deluge water would evaporate and remain separated from surface water and groundwater resources. Therefore, deluge water collection, containment, and evaporation would remain entirely separated from all other surface water resources and would not require a FDEP Industrial Wastewater Permit, as the deluge water would not be discharged and would not impact water resources. Additionally, where practicable, Low Impact Development (LID) standards would be followed to implement sustainable stormwater

management practices. The Unified Facilities Criteria (UFC) 3-210-10 outlines the requirements for LID as part of the DOD's compliance with stormwater management regulations under Section 438 of the Energy Independence and Security Act of 2007. This UFC serves as a framework for planning, design, and construction practices that aim to minimize the environmental impact of development projects.

There would be no impacts on wetlands or waters of the U.S. as neither is present within the SLC-13 construction area. There would be new construction within the 100-year floodplain of CCSFS at SLC-13. Potential effects on the floodplain from the construction of new hangars and impervious surface areas include loss of natural habitat functions, increased surface water runoff, reduced surface water infiltration, increased sediment erosion, and increased surface water temperatures. However, the overall area of new impervious surfaces is relatively small (approximately 0.7 acre) in comparison to the large undeveloped areas of CCSFS surrounding SLC-13, and the construction and use of new hangars and the SLC-13 access road improvement would not alter the 100-year floodplain. In addition, new construction that could be impacted/damaged by flooding (e.g. hangars) should be elevated so that the finish floor elevation is above the 100-year floodplain level. The DAF published an Early Public Notice that the Proposed Action would occur in a floodplain in *Florida Today* on 29 and 30 June 2025 and the *Hometown News* on 27 June 2025 (Appendix E). FDEP, Florida Fish and Wildlife Conservation, and SJRWMD responded on 25 August 2025, indicating that they had no comments or recommendations (Appendix E). No additional public comments related to the Early Public Notice were received.

3.6.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. Therefore, there would be no new impacts on water resources under the No Action Alternative.

3.6.2.3 Mitigation and Monitoring

No mitigation or monitoring would be required to reduce the level of impacts on water resources. BMPs associated with design requirements and the project's SWPPP would be adequate to minimize the potential impacts on surface water, groundwater, and floodplains.

3.7 Cultural Resources

3.7.1 Affected Environment

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture or community for scientific, traditional, religious, or other purposes. These resources are protected and identified under several federal laws and EOs. Cultural resources include the following subcategories:

- Archaeological (i.e., prehistoric or historic sites where human activity has left physical evidence of that activity, but no structures remain standing)

- Architectural (i.e., buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance)
- Traditional cultural places (TCPs) (resources of traditional, religious, or cultural significance to Native American tribes)

Significant cultural resources are those that have been listed on the National Register of Historic Places (NRHP) or determined to be eligible for listing. To be eligible for the NRHP, properties must be 50 years old and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They must possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance and meet at least one of four criteria:

- Associated with events that have made a significant contribution to the broad patterns of our history (Criterion A)
- Associated with the lives of persons significant in our past (Criterion B)
- Embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C)
- Have yielded or be likely to yield information important in prehistory or history (Criterion D)

Properties that are less than 50 years old can be considered eligible for the NRHP under Criterion Consideration G if they possess exceptional historical importance. Those properties must also retain historic integrity and meet at least one of the four NRHP criteria (A, B, C, or D). The term "historic property" refers to National Historic Landmarks (NHL) and to NRHP-listed and NRHP-eligible cultural resources.

3.7.1.1 Regulatory Setting

Federal laws protecting cultural resources include the Archaeological and Historic Preservation Act of 1960 as amended, the American Indian Religious Freedom Act of 1978, the Archaeological Resources Protection Act of 1979, the Native American Graves Protection and Repatriation Act of 1990, and the NHPA, as amended through 2016, and associated regulations (36 CFR 800). The NHPA requires federal agencies to consider effects of federal undertakings on historic properties prior to making a decision or taking an action and to integrate historic preservation values into their decision-making process. Federal agencies fulfill this requirement by completing the Section 106 consultation process, as set forth in 36 CFR 800. Compliance with Section 106 requires consultation with the State Historic Preservation Office (SHPO) and other parties, including federally recognized Indian tribes with a vested interest in the undertaking. Section 106 of the NHPA requires all federal agencies to seek to avoid, minimize, or mitigate adverse effects on these properties (36 CFR 800.1[a]).

3.7.1.2 Region of Influence

For cultural resource analysis, the Area of Potential Effect (APE) is used as the ROI. APE is defined as the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16[d]), and thereby diminish their historic integrity.

Direct effects include alteration or damage during construction activities. Indirect effects include the introduction of visual, audible, or atmospheric elements that are out of character with a property or that alter its historic setting. Direct and indirect effects are considered adverse if a project would cause a change in the quality of a property that qualifies it for inclusion in the NRHP.

Three separate APEs have been defined for the proposed action at SLC-13 (Figure 3.7-1 and Figure 3.7-2 in Appendix A). The Launch Noise/Vibration APE includes (L_{max} 111 dB and 120 dB) consists of the area for potential risk of structural damage based on Guest and Slone's (1972) study that indicates that approximately one damage claim will result per 100 households exposed at 120 dB and one damage claim per 1,000 households exposed at 111 dB. This area includes the area of indirect effects on land. The Physical Impact APE (30.4 acres) includes the area that would be directly affected by earthwork and construction activities. The Sonic Boom APE includes the area that would be affected by a sonic boom. This area is offshore in the Atlantic Ocean. All ground disturbance would occur on land; no impacts to submerged areas are expected.

3.7.1.3 Existing Conditions

A review of National Park Service (NPS) files and geospatial database, Florida SHPO files and Integrated Cultural Resources Management Plan determined that 11 NRHP-Listed properties are within the Engine Noise APE (Figure 3.7-3 in Appendix A; Table 3.7-1 in Appendix F). Most of these historic properties are located well outside the Physical Impact APE and are associated with historic rocket launch complexes and the Space Program. Only one historic property, the Cape Canaveral Air Force Stations (CCAFS), extends into the Physical Impact APE. This district is also designated as a NHL (4/16/1984).

The CCAFS district is a discontinuous district that is considered nationally significant under Criteria A and C for engineering and space exploration efforts at Cape Canaveral between 1949 and 1983. Specifically, the CCFAS played a pivotal role in the research, development, and testing of the nation's missile and space programs (NPS 1983). The district includes several historic SLCs, including SLC-5/6, SLC-13, SLC-14, SLC-19, SLC-34, and the Original Mission Control Center.

SLC-13 is currently part of the CCAFS NHL district. However, SLC-13 no longer retains integrity due to past undertakings and SHPO-approved infrastructure improvements. A CRA (Appendix B) was completed for SLC-13 that describes SLC-13's history and the past actions and consultations that have occurred that led to SLC-13's loss of integrity. SLC-13 no longer retains integrity, and

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through consultation, may be considered a non-contributing element of the NHL district. SLC-13 may be delisted from the NHL at a future date.

In addition to preparing a CRA for the Proposed Action (Appendix B), the Physical Impact APE has been subject to extensive and complete archaeological investigations and no sites were identified. Investigators determined it to have a low potential for cultural deposits (Penders 2014). Based on preliminary information, no additional cultural resource studies are needed. A full Cultural Resource Assessment Survey of SLC-13 was completed in 2014 and received SHPO concurrence (Bendus 2014; Blaylock 2014; Penders 2014).

3.7.2 Environmental Consequences

This section documents potential effects on cultural resources within the APE (36 CFR 800.16(i) and 40 CFR 1508.1(g)). The Proposed Action is analyzed to consider whether the effects are adverse and/or significant (36 CFR 800.5(a), 40 CFR 1501.3(b), and Air Force Manual [AFMAN] 32-7003, para. 2.4.5.4).

An adverse effect or significant impact to cultural resources and historic properties may occur if the Proposed Action:

- Alters, damages, or destroys the integrity of an NRHP-listed or eligible resource so that the significance is no longer conveyed by the resource.
- Alters the characteristics of the surrounding environment that contribute to a resource's significance.
- Results in neglecting the resource to the extent that it deteriorates or is destroyed.

Thresholds for determining impact significance are based on applicable compliance standards, federal- or state-recommended guidance, and professional standards.

3.7.2.1 Proposed Action

The Proposed Action includes construction of new facilities, improvements to existing infrastructure, and noise and vibration from proposed launch activities. Physical effects would be limited to SLC-13. Ground disturbance for the proposed action would be limited to the extent of SLC-13 and access roads in areas where previous soil-disturbing activities occurred for the original construction and use of the LZ infrastructure. These areas have also been previously covered by Section 106 studies and similar actions have received SHPO concurrence. The Proposed Action would have no physical or indirect impact on the existing LZ where the first boosters landed back on land. The Proposed Action is consistent with past use of the area.

Any visual effects would be limited and low profile, and planned use is consistent with historic and ongoing activities. The Proposed Action would not introduce incompatible visual changes.

Noise and vibrations from launch operations are anticipated in the Engine Noise APE. Most of these properties in this area (see Figure 3.7-3 in Appendix A) were designed to experience noise

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and vibrations from rocket launches. The Proposed Action would not adversely affect any of the historic properties since it is consistent with historic and ongoing use of the area.

The USSF sent the CRA with letters to the Seminole Tribe of Florida, Seminole Nation of Oklahoma, and the Miccosukee Tribe of Indians of Florida on 10 November 2025 requesting initiation of government to government consultation (Appendix B). The DAF received concurrence from the Seminole Tribe of Florida on 17 December 2025 (Appendix B). IAW Section 106 of the NHPA, DAF initiated consultation with the Florida Division of Historical Resources on 10 November 2025 (Appendix B).

3.7.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. Therefore, there would be no new impacts on cultural resources.

3.7.2.3 Mitigation and Monitoring

As of the preparation of this draft EA, no cultural resources mitigation is currently required. This is subject to SHPO consultation and review of the upcoming Cultural Resources Analysis report.

In the unlikely event that previously unidentified archaeological resources or human remains are encountered during construction activities, USSF SLD 45 would follow the Discoveries of Archaeological Resources and Native American Graves Protection and Repatriation Act Cultural Items Standard Operating Procedure in the Integrated Cultural Resources Management Plan (USSF 2023b:20-21).

3.8 Coastal Resources

3.8.1 Affected Environment

The coastal zone refers to coastal waters and the adjacent shorelines, including islands, transition and intertidal areas, salt marshes, wetlands, and beaches, extending to the outer limit of state title and ownership under the Submerged Lands Act (i.e., to three nautical miles).

3.8.1.1 Regulatory Setting

NOAA oversees the Coastal Zone Management Program for the federal government. Authorized by the Coastal Zone Management Act (CZMA) of 1972 (16 USC Section 1451 et seq., as amended), coastal areas in the U.S. receive special land use protections through the federal Coastal Zone Management Program, which addresses the coastal issues of the U.S. through a voluntary partnership among the federal government and the coastal and Great Lakes states and territories. The program's purpose is to protect, restore, and responsibly develop the nation's diverse coastal communities and resources. Section 307 of the CZMA provides states with the authority to offer input in federal agency decision making for activities potentially affecting coastal uses or resources. This federal consistency provision provides authority to the states that

would not otherwise be authorized through other federal programs. Section 307 of the CZMA requires that federal actions that have reasonably foreseeable impacts on any coastal use or natural resources of the coastal zone be consistent with the enforceable policies of a state's approved coastal management program. Federal agency activities must be consistent with the state's coastal management program to the maximum extent practicable.

The Florida Coastal Management Program (Florida Statutes, Chapter 380, Part II, Coastal Planning and Management) was approved by NOAA in 1981. The program consists of nine state agencies and five regional water management districts that implement 24 statutes protecting and enhancing Florida's natural, cultural, and economic coastal resources. The FDEP directs the implementation of the Florida Coastal Management Program. The Florida State Clearinghouse coordinates federal consistency reviews, except for projects requiring permits under Section 404 of the CWA, Section 10 of the Rivers and Harbors Act, and offshore activities. All of Florida's 35 Florida coastal counties and the adjoining territorial seas are in the designated coastal zone.

3.8.1.2 Region of Influence

The ROI for coastal resources is SLC-13 and nearshore resources that may be affected by increased noise from launch activities.

3.8.1.3 Existing Conditions

The existing conditions for coastal resources are described in Section 3.8.1.1 of this EA that are pertinent to the Florida Coastal Management Program.

3.8.2 Environmental Consequences

An action could be considered significant if it was inconsistent with a relevant state coastal zone management plan, impact a coastal barrier resources system unit, impact a coral reef ecosystem, or restrict access to publicly available coastal resources.

3.8.2.1 Proposed Action

CCSFS is statutorily excluded from Florida's coastal zone. However, construction, operations, and launch activities for the Phantom and Vaya launch vehicles at SLC-13 would have direct and/or indirect effects on Florida coastal uses and resources. These include effects on air quality, noise, water quality, and biological resources as documented in applicable sections in this EA.

CCSFS has siting and facility design standards for construction that require new facilities to be set back at least 150 feet from the coast (USSF 2024f). The SLC-13 launch pad is positioned approximately 750 feet west of the Atlantic Coast. Construction activities related to the Proposed Action would not impact marine ecosystems, would be limited to SLC-13, and would have very minimal disturbance to undeveloped areas. DAF has prepared a CZMA consistency determination, and the Proposed Action is consistent with CZMA and Florida Coastal Management Program requirements (Appendix I). CZMA consistency determination

correspondence is included in Appendix I. The Proposed Action would not have significant impacts on coastal resources.

3.8.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. As such, there would be no new impacts on coastal resources.

3.8.2.3 Mitigation and Monitoring

No mitigation or monitoring would be required to reduce the level of impacts on coastal resources.

3.9 Department of Transportation Section 4(f)

3.9.1 Affected Environment

The FAA, as an agency within the U.S. Department of Transportation, must consider potential impacts on Section 4(f) resources. The FAA is a cooperating agency on this EA, and must consider Section 4(f) resources and ensure that Section 4(f) compliance is met.

3.9.1.1 Regulatory Setting

Section 4(f) of the U.S. Department of Transportation Act of 1966 (49 USC Section 303) provides that the Secretary of Transportation may approve a program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance, or land of a historic site of national, state, or local significance, only if there is no feasible and prudent alternative to using that land and the program or project includes all possible planning to minimize harm resulting from the use. The term “use” as it relates to Section 4(f) denotes an adverse impact on, or occupancy of, a Section 4(f) property (Federal Highway Administration 2025). The three conditions under which use occurs are 1) permanent incorporation, 2) temporary occupancy, and 3) constructive use. Permanent incorporation is when a Section 4(f) property is acquired for a transportation project. Temporary occupancy is when there is a temporary use of a Section 4(f) property that is adverse in terms of Section 4(f)’s preservation purpose. Constructive use is when there is no physical incorporation of the property but the impacts on a Section 4(f) property (e.g., noise) are so severe that the activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired (FAA Order 1050.1G, Exhibit A-1). Impacts on Section 4(f) properties can include constructive use or physical use, such as an actual physical taking of Section 4(f) property through the purchase of land or permanent easement, physical occupation of a portion or all the property, or alteration of structures or facilities on the property.

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3.9.1.2 Region of Influence

The ROI for evaluating impacts on 4(f) properties is the 65 dBA DNL contour (see Figure 3.3-12 in Appendix A). The 65 dBA DNL contour is the area that the FAA considers as having the potential for community annoyance due to changes in the noise environment. SLC-13 is the only 4(f) property within the ROI.

3.9.2 Environmental Consequences

Impacts could be considered significant if an action involves more than a minimal physical use of a Section 4(f) property or constitutes a constructive use based on an FAA determination that would substantially impair the Section 4(f) property (FAA Order 1050.1G, Exhibit A-1). Substantial impairment would occur if the significance and enjoyment of a Section 4(f) property is substantially reduced or lost.

3.9.2.1 Proposed Action

Permanent Incorporation. The Proposed Action would construct new launch support facilities at SLC-13, which is a Section 4(f) historic property (refer to Section 3.7, Cultural Resources). However, features that would be modified are greatly deteriorated and do not represent the functions of the original SLC-13 historic uses. The Proposed Action would result in the continued use of SLC-13 as related to its historic use as a launch complex, and the historic integrity of setting, location, association, and feeling of SLC-13 would be retained. The new design for the Phantom and Vaya launch programs would use similar materials and layout in keeping with, but not duplicating, the historic appearance of the original SLC-13.

Noise greater than 130 dBA and vibrations from launch activities could affect nearby buildings and structures. However, the only historic buildings and structures within the 130 dBA DNL contour are ICBM Road and SLC-13. ICBM Road would not be affected by noise and vibration.

For historic properties, a *de minimis* impact under Section 4(f) is one that results in a Section 106 determination of "no adverse effect" (23 CFR 774.17) (refer to Section 3.7, Cultural Resources, for more detailed discussion of impacts on cultural resources). The continued use of SLC-13, which is a continuation of its historic use, retaining its integrity of setting, location, association, and feeling, would result in no adverse effect on historic properties under Section 106 of the NHPA. CCSFS will request the Florida SHPO's concurrence with this finding of no adverse effect and will notify the SHPO that the FAA intends to make a *de minimis* impact determination based on the FAA's concurrence with the finding of "no adverse effect." A *de minimis* impact would be less than significant.

Temporary Use. The Proposed Action would not have a temporary use of any Section 4(f) properties.

Constructive Use. Launch trajectories from SLC-13 for Phantom and Vaya would be oriented to the east over the Atlantic Ocean. The 65 dBA DNL contour used to identify potential noise impacts

from launches does not extend to any of the identified parks around CCSFS. On launch days, sections of MINWR and CANA may be restricted for crowd control and access for emergency services. There is minimal potential for annoyance from launch activities to affect the recreational experience around CCSFS. Temporary restrictions to MINWR and CANA are in keeping with regular launch activities from CCSFS and KSC and would not substantially affect these resources. Such closures would not be expected to cause more than a minimal disturbance to the use of resources at MINWR and CANA, and areas outside the safety exclusion zones would be available for nature study, bird watching, and other recreational activities. All closures would last approximately 3 to 6 hours per launch for a maximum of 52 launches per year combined across Vaya and Phantom vehicles. There would be no impact from sonic booms during launches, as these would occur entirely over the Atlantic Ocean. Therefore, the Proposed Action would not result in the constructive use of any Section 4(f) properties.

3.9.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. Therefore, there would be no new permanent incorporation, temporary use, or constructive use of Section 4(f) properties.

3.9.2.3 Mitigation and Monitoring

No mitigation or monitoring would be required to reduce potential impacts on Section 4(f) properties from the Proposed Action.

3.10 Socioeconomics

3.10.1 Affected Environment

3.10.1.1 Regulatory Setting

Socioeconomics is the relationship between economics and social elements, such as population levels and economic activity. There are several factors that can be used as indicators of economic conditions for a geographic area, such as demographics, median household income, unemployment rates, percentage of families living below the poverty level, employment, and housing data. Data on employment identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region. Economic data are typically presented at county, state, and U.S. levels to characterize baseline socioeconomic conditions in the context of regional, state, and national trends. The relevant factors related to the Proposed Action include income and employment.

3.10.1.2 Region of Influence

The ROI includes Brevard County, Florida where socioeconomic conditions could be affected by changes in employment, population, housing, and economic activity associated with construction

and launch operations at SLC-13, and offshore areas where maritime safety closures could temporarily impact fisheries and marine commercial and recreational shipping.

3.10.1.3 Existing Conditions

The unemployment rate for Brevard County was 3.5 percent in 2024 (U.S. Bureau of Labor Statistics 2025a). This was nearly equal to the 2024 unemployment rate for Florida of 3.4 percent and lower than the unemployment rate for the U.S. of 4.0 percent (U.S. Bureau of Labor Statistics 2025b). The median household income in 2023 for Brevard County was $75,817, which was higher than that for Florida ($71,711), but lower than the median household income for the U.S. ($78,538). The rate of persons in poverty in 2023 (the most recent year available for poverty data) in Brevard County was 10.3 percent, which is less than the rate of persons in poverty in Florida (12.3 percent) and in the United States (11.2 percent) (U.S. Census Bureau 2025). Brevard County's Gross Domestic Product (i.e., a measure of the market value of goods and services produced) was $39.6 billion in 2023 (Federal Reserve Bank of St. Louis 2025).

SLD 45 supports an estimated workforce of 3,807 military personnel, 2,418 civilian personnel, and 2,553 contractors, with an overall economic impact of $1.28 billion annually (SLD 45 2022).

Port Canaveral is estimated to have a $6.1 billion economic impact to the region and State of Florida. Port Canaveral supports the growing space industry associated with CCSFS and KSC, providing for booster recoveries, port facilities for launch service providers, and landing vessels (Port Canaveral 2025).

In 2023, 96.2 million pounds of fish with a wholesale value of $286.5 million were caught in Florida. Fisheries supported 3,552 jobs and generated more than $10.6 million in business tax revenues and generated more than $435 million in total economic output. The 10 most valuable species landed on Florida's Atlantic Coast in 2023 were white shrimp ($9.0 million), marine shrimp ($6.6 million), blue crab ($6.2 million), king mackerel ($5.9 million), spiny lobster ($3.9 million), Spanish mackerel ($2.7 million), swordfish ($2.3 million), golden tilefish ($1.6 million), stone crab ($1.1 million), and Vermilion snapper ($1.1 million) (Florida Department of Agriculture and Consumer Services 2024).

3.10.2 Environmental Consequences

Consequences to socioeconomic resources were assessed in terms of the potential impacts on the local economy from the Proposed Action. The level of impacts associated with construction expenditure is assessed in terms of direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing, employment, community resources). The magnitude of potential impacts can vary greatly, depending on the location of an action. For example, implementation of an action that creates 10 employment positions might be unnoticed in an urban area, but it might have significant impacts in a rural region. In addition, if potential socioeconomic changes resulting from other factors were to result in substantial shifts in

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population trends or in adverse effects on regional spending and earning patterns, they may be considered adverse.

3.10.2.1 Proposed Action

SLC-13 construction activities would occur for approximately one year, and during that time there would be increased expenditures on materials and equipment in the region supporting the construction activities, as well as increased employment for personnel supporting all aspects of the SLC-13 construction. An estimated 25-30 personnel would temporarily support construction at SLC-13. Although the construction activities would increase regional expenditures, the increase would be a negligible contribution to the economy of Brevard County. The long-term employment of 50 new personnel to support launch activities, and the long-term regional expenditures needed to sustain Phantom and Vaya launches at SLC-13, would provide a greater contribution to the Brevard County economy, although given the size of the regional economy those long-term benefits would be minor. The Proposed Action would contribute to the broader positive regional economic positioning of Brevard County as a competitive launch hub.

The USCG has statutory authority to safeguard the Marine Transportation System (MTS) and is responsible for doing so to facilitate commerce for all stakeholders. Because of the potential risks to navigation, public safety, or the marine environment space launch and reentry activities present, the USCG has a responsibility to understand, engage, and support these activities in a manner that promotes their safe execution and simultaneously enables other waterways uses. The USCG manages risk to the marine transportation system using Captain of the Port (COTP) authority and regulatory tools such as safety and security zones.

Port Canaveral Port Authority coordinates with the USCG and SLD 45 to deconflict maritime safety closures as a result of launches with port activities (Canaveral Port Authority 2024). Growth in the space industry associated with CCSFS and KSC have had a beneficial economic impact on Port Canaveral. The continued deconfliction of maritime activities including commercial shipping and cruise terminal activities, would ensure that there would be no adverse impacts on anticipated economic growth of Port Canaveral from additional launch activities.

There would be a minor, long-term adverse impact on recreational and commercial fisheries from increased launch activities from SLC-13. Maritime access restrictions during launch activities would pose an inconvenience to recreational and commercial fishing operations. However, advance notice of temporary maritime closures for safety and/or security would be provided via NOTMARs and would assist all mariners, including recreational and commercial fisherman, to plan their operations accordingly.

As the commercial space industry has expanded, the fishing industry has expressed concerns that increasing launches could adversely impact commercial fishing, particularly for king and Spanish mackerel, and shrimp fleets, in the southern zone of the Atlantic Ocean (USSF 2024b). A portion of the Atlantic coast proximate to CCSFS would be temporarily restricted to vessel traffic during launch operations. However, the fishing activity that could be affected within the ROI from vessel

restrictions would be a small fraction of the amount of fishing within Florida's Atlantic Coast and would have a minimal effect on these fishing operations as all maritime restrictions would be temporary and spatially limited. Launch NOTMARs adjacent to CCSFS would have the potential to interfere with vessel routes near Port Canaveral, which could affect commercial fishing operations originating from the Cape Canaveral area. To minimize disruptions, advance notice via NOTMARs would assist local commercial fishing operations in anticipating and scheduling around any temporary disruption of maritime activities. Phantom and Vaya would minimize maritime interruptions by reducing the duration of closure times for launch operations and opening the closure areas as soon as a launch is scrubbed. Local commercial fishing operations would temporarily adjust their routes or find other suitable locations to fish to avoid revenue loss during these limited restricted activities. The approximately 80 charter boats docked at Port Canaveral would delay their trips or take alternate routes when temporary restrictions are activated; however, NOTMARs would allow charter captains to plan around restrictions through timing of launches or modification of routes to fishing areas. Therefore, there would be no substantial long-term impacts on fisheries from launch operations.

Estimating the economic impact that the Proposed Action may have on airspace and maritime activities is challenging and is unlikely to produce reasonable and defensible estimates. Any estimate of the economic impact on airspace and maritime users resulting from space launch or re-entry activity is sensitive to the timing of prelaunch notification as well as the timing and duration of the closure, which itself may be further impacted by any off-nominal launch-related events.

The economic impacts would vary significantly based on aircraft/vessel type, operational flexibility, alternative routing options, scheduling constraints, and any buffers within these operational scenarios.

Furthermore, as Phantom and Vaya operations become more reliable at CCSFS, the effect on airspace and maritime activities with each launch/reentry operation may decline due to the implementation of numerous protocols and procedures, compliance with necessary notification requirements (i.e., NOTAMS and NOTMARS), and airspace coordination activities between Phantom, Vaya, the DAF, the FAA, and USCG. Economic theory also recognizes that self-interested entities whose decisions are primarily driven by gain, logical analysis and preferences may adjust their behavior to recurring, predictable constraints. As such, airlines and other users of the airspace may incorporate known operational constraints from repeated launch and reentry operations as they become more reliable and predictable into their routing, scheduling, and pricing decisions.

Given these factors and the high sensitivity of impacts to unpredictable operational variables, the lack of stable causal relationships, and the potential adaptation of affected users over time, any present attempt to estimate the long-term economic impact of airspace and maritime closures

for the proposed action may be overstated and unreliable, and as such, too speculative, to reasonably inform the decision-maker's choice among potential alternatives.

Therefore, the Proposed Action would have negligible short-term beneficial impacts and long-term negative impacts would not be significant.

3.10.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. Therefore, there would be no new impacts on socioeconomics from the No Action Alternative.

3.10.2.3 Mitigation and Monitoring

All impacts from the Proposed Action would be beneficial. No mitigation or monitoring would be required.

3.11 Transportation and Infrastructure

3.11.1 Affected Environment

Transportation is defined as the system of roadways, highways, and transit services that are in the vicinity of the installation and could be reasonably expected to be potentially affected by the Proposed Action. Infrastructure consists of the systems and structures that enable a population in a specified area to function. Infrastructure is wholly human made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as developed.

3.11.1.1 Regulatory Setting

Vehicular and equipment transportation and associated infrastructure such as controlled access gates at CCSFS are owned and managed by the USSF. The USCG minimizes disruptions to maritime commerce by assessing and mitigating risks to safe navigation. In the event a disruption to the waterway occurs, the USCG works closely with federal, state, and local partners including key maritime industries to reopen and restore affected portions of the MTS such as after extreme weather events, marine accidents, or terrorist incidents. The USCG works in concert with other Federal agencies, state and local governments, marine industries, maritime associations, and the international community to optimize balanced use and champion development of the Nation's marine transportation system.

3.11.1.2 Region of Influence

The ROI is CCSFS, regional roadways that would be utilized for equipment transportation to and from SLC-13, and portions of the Atlantic Ocean where maritime closures would be required during launch activities.

3.11.1.3 Existing Conditions

CCSFS is located on a barrier island, separated from most of Merritt Island and KSC by the Banana River. CCSFS can be accessed from U.S. Highway 1 and Interstate 95, which are major north-south transportation corridors, via State Route 528 and State Route 404/NASA Parkway, which provide east-west access from U.S. Highway 1 and Interstate 95 to access control gates on CCSFS (Figure 3.11-1 in Appendix A). Gate 1/Southern Gate is accessed from State Route 401 and State Route 528, just northeast of Port Canaveral. The West Entry Gate provides access into CCSFS from the west via State Route 405/NASA Parkway (Figure 3.11-1 in Appendix A), near the KSC Visitor Complex on Merritt Island. There are also two gates located on KSC that provide access onto Cape Road and a connector road that enters CCSFS from the north; however, these would not be used by Phantom or Vaya for transport of launch vehicles or for construction access at SLC-13.

The SCTPO collects annual traffic counts to support transportation monitoring and planning efforts in Brevard County. The CCSFS is located within the Merritt Island Planning Area for traffic management. The 2023 Traffic Volume Summary Memorandum (SCTPO 2024) evaluates the most constrained roadways by planning area. Of the roadways proposed for use by Phantom and Vaya for rocket launch transportation activities, State Route 520, between the Humphrey Bridge and North Tropical Trail, is the only constrained segment (SCTPO 2024). However, even though this segment is listed as constrained, it had a vehicle to capacity ratio of 0.78, which is less than the 0.85 vehicle to capacity ratio that is considered congested by the Space Coast Transportation Planning Organization. The only roadway segment in the Merritt Island planning area considered to be congested was South Courtenay Parkway (State Route 3), from Cone Road to Fortenberry Road, with a vehicle to capacity ratio of 0.89 (SCTPO 2024).

Port Canaveral, located immediately south of CCSFS, is one of the busiest cruise terminals in the U.S., with over 7.5 million cruise passengers in Fiscal Year 2024, as well as 6.5 million short tons of cargo shipped in Fiscal Year 2024 (Port Canaveral 2025).

3.11.2 Environmental Consequences

The effects on transportation and traffic would be considered significant if the Proposed Action resulted in (1) a substantial increase in on- or off-base traffic or (2) substantial congestion on or around CCSFS access control gates.

3.11.2.1 Proposed Action

Surface Transportation

The Proposed Action would have minor short-term and long-term impacts on transportation and infrastructure. There would be increased vehicle traffic at the CCSFS access control gates during construction activities. This would include personally operated vehicles used by construction workers, and trucks hauling materials and equipment. The adverse impact on vehicle traffic at the CCSFS gates would be limited to the period of construction and would cease at the end of construction activities, which are anticipated to require approximately one year to complete.

During operations, Phantom would transport launch vehicles from an offsite payload processing facility, such as Astrotech in Titusville, or Impulso Space in Melbourne, to the Gate 1/Southern Gate via State Route 528, then on CCSFS following Phillips Parkway, to Central Control Road, to ICBM Road, to SLC-13 (see Figure 3.11-1 in Appendix A). Vaya would likely transport launch vehicles from the Vaya Space Production Facility located on Grissom Parkway in Cocoa, and travel to U.S. Highway 1, north to the NASA Causeway (see Figure 3.11-1 in Appendix A), making a stop at a third-party payload processing facility, where the fairing would be integrated to the Dauntless rocket, and then to CCSFS and SLC-13 following Central Control Road to ICBM Road (see Figure 3.11-1 in Appendix A). Alternatively, Vaya could take State Route 528 East to the CCSFS Gate 1/Southern Gate, then follow Phillips Parkway to Central Control Road, to ICBM Road to SLC-13 (see Figure 3.11-1 in Appendix A).

Airspace

The FAA conducted an NAS assessment of the notional range of launch AHAs (see Figure 2.1-6) based on 2025 commercial aircraft data; the launch AHAs could affect a minimum of 10 commercial aircraft per hour, during the lowest period of midnight hours, or up to a maximum of 220 commercial aircraft per hour, during peak daily travel periods. This EA assumes that half of the launches (26 launches of 52 total) would occur during the day (7:00 a.m. to 10:00 p.m.) and half would be at night (10:00 p.m. to 7:00 a.m.). Table 3.11-1 in Appendix F shows the approximate number of commercial aircraft impacted per hour and per year for total Proposed Action operations. Domestic flights that normally take coastal routes are expected to be rerouted via inland routes, which would cause an increase in congestion and flight travel time.

Integrating Phantom and Vaya launch operations from SLC-13 into the NAS may require the FAA to conduct ground stops commensurate with the timing of the AHA, miles in trail (distance between aircraft) for spacing and volume control as well as rerouting of aircraft around the AHA. Due to the length of the AHAs, certain flights, especially international, may elect to delay the departure time due to the inability to accept a reroute caused by fuel constraints or the flight time of the reroute. While the notional AHA does not physically overlay Florida airports, it may indirectly impact arrivals and departures that conflict with the hazard area. These conflicts could necessitate ground stops, miles-in-trail restrictions, or significant reroutes.

According to the NAS assessment, the average expected flight delay for launches would last approximately 40 minutes and could last up to 4 hours. General aviation operations would be similarly impacted by the launch AHAs; however, general aviation operations typically have more flexibility for flight planning than commercial flights, due to the nature of connecting commercial flights. The southernmost launch AHAs could also affect airways within the flight regions of the Bahamas.

Maritime

The USCG has broad authority to establish LAAs, which may include Safety and/or Security Zones, and RNAs on navigable waters subject to U.S. authority and schedule in advance to minimize

interruption to the maritime community. Launches (up to 52 per year) would be of short duration, and scheduled in advance to minimize interruption to ship traffic.

All landing operations would comply with necessary notification requirements, including issuance of NOTMARs by the USCG, as defined in agreements required for a vehicle operator license issued by the FAA. The USCG maintains authority to establish and enforce LAAs and RNAs as needed to support public health and safety during these events. A NOTMAR provides a notification regarding a temporary hazard and any additional safety measures within a defined area (an SHA) to ensure public safety during proposed operations.

A number of spotter aircraft, including drones, and surveillance vessels (or boats) are used during launch activities to ensure that designated hazard areas are clear of nonparticipating crafts. Combinations of radar, visual spotter aircraft, surface surveillance, and law enforcement vessels may be deployed prior to launch. Most fixed-wing aircraft operate at altitudes of 15,000 feet (4,572 meters) but may drop to 1,500 feet (457 meters) to obtain a call sign visually from a nonparticipating vessel.

3.11.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. Therefore, there would be no new impacts to local highways and no new maritime safety closures during additional launches from CCSFS associated with the Phantom or Vaya programs.

3.11.2.3 Mitigation and Monitoring

No mitigation or monitoring to reduce the impacts on transportation would be required.

3.12 Human Health and Safety

3.12.1 Affected Environment

The safety categories analyzed include construction and operations safety, range safety, and security requirements.

3.12.1.1 Regulatory Setting

At CCSFS, range safety organizations assess, authorize, oversee, and if needed, implement safety stoppages on all construction, pre-launch and launch activities. These actions are performed IAW SSCM guidelines (Space Systems Command [SSC] 2022). The purpose of range safety is to ensure an acceptable safety standard for the public and installation resources and to facilitate the full compliance of all construction, pre-launch and launch operations with legal regulations.

3.12.1.2 Construction Safety

Construction site safety regulations are designed to safeguard employees and curtail the risk of harm, illness, fatality, and property destruction. All contractors performing construction and demolition activities at CCSFS must adhere to OSHA regulations at 29 CFR 1926. These standards

mandate that work procedures be performed without increasing safety risks to the workers or the public.

3.12.1.3 Range Safety

Range safety at CCSFS adheres to USAF requirements and public laws that consider various domains, including the general public and publicly accessible areas near the launch complexes, personnel within the launch area, and adjacent launch complexes. The SSCM establishes the mission safety program requirements at USSF ranges, which includes safety requirements for launch vehicles, payloads, ground support equipment, systems, and materials used within the ranges (SSC 2022). IAW 14 CFR 450 *Launch and Reentry License Requirements*, the FAA would issue a safety approval to Phantom and Vaya if it is determined that the launch can be conducted without jeopardizing public health and safety and safety of property.

3.12.1.4 Security Requirements

CCSFS access is controlled through manned guard stations and fencing, necessitating access badges for entry by employees and visitors. CCSFS upholds USSF security standards, which encompass the mitigation of terrorist threats.

3.12.1.5 Region of Influence

The ROI for direct impacts from construction and facility safety associated with the Proposed Action is limited to the SLC-13 launch complex and surrounding support facilities and areas within CCSFS (see Figure 2.1-1 in Appendix A). Personnel at SLC-13 may be exposed to hazardous conditions, hazardous materials, and hazardous waste.

The ROI for direct impacts related to marine and airspace safety, including impacts from launches and recoveries, associated with the Proposed Action includes the oceanic area extending approximately 550 miles from the SLC-13 launch complex shown in Figure 2.1-6 in Appendix A.

3.12.2 Environmental Consequences

This section evaluates potential impacts resulting from the Proposed Action. The anticipated direct and indirect impacts, considering both short- and long-term project effects, were assessed for each resource. An adverse impact to health and safety would result in an increased risk of bodily injury, illness, and death or property damage from the Proposed Action. An impact to health and safety would be considered significant if the Proposed Action:

- Substantially increases the safety risk to installation personnel, contractors, or the general public.
- Hinders the ability to respond to an emergency.
- Introduces new health or safety risks that installation personnel are not prepared to manage or respond to.

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3.12.2.1 Proposed Action

3.12.2.1.1 Construction and Operational Safety

The Proposed Action involves inherent site safety risks resulting from loud noise, the operation of heavy machinery, debris, electricity, and potential contact with hazardous materials used or encountered during work. These risks necessitate the implementation of preventive measures for the well-being of workers. SLD 45 Range Safety Program oversees safety requirements, including compliance with all applicable regulations on CCSFS. These regulations set procedures for assessments, authorizations, and operational safety during launch activities. Operational safety includes safe distance area(s) to address the risks associated with a potential hazard contingency. The safe distance area(s) identify potential affects to associated support facilities, non-related facilities and roadways; all of the terrestrial components of these safety distances are located on CCSFS and would not extend into local communities. Typically, these safe distances (or hazard closure areas) include road closures at multiple points, evacuation of all personnel, and ceasing all operations within the closure areas on CCSFS. The closures would remain in place until the all-clear is determined by the provider in conjunction with SLD 45.

Construction activities conducted on CCSFS would be performed IAW CCSFS safety regulations, DAF Technical Orders, and OSHA-prescribed standards. Specifically, the Proposed Action would adhere to OSHA regulations 29 CFR 1926, *Safety and Health Regulations for Construction,* and 29 CFR 1910, *Occupational Safety and Health Standards,* and DAFI safety standards.

Fire protection systems would comply with National Fire Protection Association requirements as applied by the CCSFS Authority Having Jurisdiction, Unified Facilities Criteria and DOD Engineering Technical Letter guidance and direction. The CCSFS Fire Department would monitor fire protection alarms.

Each launch mount/pad would include a lightning protection system (LPS) to protect from lightning. The LPS system would be taller than the rocket and comply with 14 CFR 77, *Safe Efficient Use and Preservation of the Navigable Airspace*.

While complying with industrial and ground safety procedures detailed above and in Section 3.12.1 and EPMs described in Section 3.12.2.4, there would be no significant impacts on Human Health and Safety from the construction activities at SLC-13 under the Proposed Action.

3.12.2.1.2 Marine and Airspace Safety

All launches must comply with established government safety requirements and cannot jeopardize public safety or property (FAA 2006; SSC 2022). The public is defined as an individual outside the hazard areas around a launch site. The probability of a launch mishap affecting a member of public or their property is extremely unlikely, due to safety protocols in place and because the launch azimuth projects from the shore to the ocean. Given the established USCG procedures for maritime safety around launches, the potential safety risk to the maritime community is also extremely unlikely. All launch and reentry operations would comply with the

necessary notification requirements, including issuance of NOTMARs and NOTAMs. IAW 14 CFR 450, Phantom and Vaya would be required to enter into a Letter of Intent with appropriate USCG Districts for USCG to issue local NOTMARs for maritime hazard areas. Phantom and Vaya would be responsible for coordination with the National Geospatial Intelligence Agency for the issuance of international NOTMARs.

SLD 45 would perform a risk analysis for each mission and generate required hazard areas (domestic and/or international). An approved surveillance plan by applicable government agencies is executed for launch compliance. Sea surveillance efforts may include the use of land-based, aerial, and/or seaborne assets to detect targets of interest within a hazard contour. For far downrange tracking of hazard areas, automatic identification system-based surveying could be conducted. Targets of interest within applicable contours are reported to the Space Force Risk Assessment Center for risk analysis input in compliance with risk thresholds IAW 14 CFR 450 and SSCM 91-710. SLD 45 and/or launch service provider would coordinate with the USCG to implement a safety zone, security zone, and/or regulated navigation area to decrease the risk to the maritime community and reduce risk to public safety and the Maritime Transportation System.

The SLD 45 Flight Analysis notifies applicable agencies of areas that are hazardous to aircraft (that is, impact debris corridors) for all normally jettisoned and impacting stages prior to launch. The 1st Range Operations Squadron notifies the FAA so that the appropriate altitude reservation or NOTAM can be disseminated. Restricted and warning areas would be active and controlled according to SSCM 91-710, Range Safety Requirements.

In summary, closure areas during launch are specific to each launch and would be coordinated with SLD 45 and the FAA based on the Flight Safety Analysis results, resulting in no significant health and safety impact to onsite personnel or the general public.

3.12.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. Therefore, there would be no new impacts to human health and safety.

3.12.2.3 Mitigation and Monitoring

Implementing the EPMs outlined below would avoid or minimize potential adverse effects to human health and safety during the Proposed Action. Qualified Phantom and Vaya personnel or contractor staff would oversee fulfilling EPMs.

- Comply with OSHA, Air Force Occupational Safety and Health, Florida OSHA regulations, and other recognized standards and applicable DAF regulations or instructions.
- Provide for the health and safety of workers and all subcontractors who may be exposed to operations or services. Submit a health and safety plan to CCSFS and appoint a formally

trained individual to act as safety officer who would be the point of contact for all issues involving job site safety.

- Site-wide anomaly avoidance would be implemented since it is possible Unexploded Ordnances may be encountered outside of Military Munitions Response Program boundaries.
- Comply with all provisions and procedures prescribed for the control and safety of personnel and visitors to the job site.

3.13 Hazardous Materials and Waste Management

3.13.1 Affected Environment

3.13.1.1 Regulatory Setting

Hazardous waste is any solid, liquid, or contained gas waste that is dangerous or potentially harmful to human health or the environment. Hazardous wastes are classified under the Resource Conservation and Recovery Act (RCRA) in 40 CFR 261, Identification and Listing of Hazardous Waste as either characteristic wastes or listed wastes. Characteristic hazardous wastes exhibit one or more of the following traits: ignitability, reactivity, corrosivity, or toxicity. Listed hazardous wastes are wastes specifically listed as being hazardous and are from either specific sources, non-specific sources, or discarded chemical products.

A toxic substance is a substance that when ingested or absorbed is harmful or fatal to living organisms. Toxicity is an attribute of some hazardous waste. Through the Toxic Substances Control Act, EPA regulates toxic substances such as asbestos, Lead based paint (LBP), polychlorinated biphenyls (PCBs), and radon.

Pesticides are substances that control pests; certain pesticides are toxic to humans. Pesticides include herbicides, insecticides, rodenticides, fungicides, and other categories, with herbicides being the most common type of pesticide used. The Federal Insecticide, Fungicide, and Rodenticide Act, as amended, is implemented in the military by DOD Directive 4150.07, DOD Pest Management Program. This directive applies to all military pest control activities, including contracted operations, and is implemented by the DAF in AFMAN 32-1053, Integrated Pest Management Program.

The Superfund Amendments and Reauthorization Act of 1986, Title III: Emergency Planning and Community Right-to-Know Act establishes standards for community right-to-know programs and requires the reporting of releases of certain toxic chemicals. Local planning committees, comprising government, news media, industry, environmental organizations, and medical representatives, receive right-to-know information from facilities. Facilities with Standard Industrial Classification codes between 20 and 39 that manufacture, process, or otherwise use listed toxic chemicals, must report a release of these toxic chemicals to the environment, in greater than reportable quantities, on a Form R.

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Hazardous materials include Extremely Hazardous Substances listed in Appendix A of 40 CFR 355, Emergency Planning and Notification; those listed as hazardous if released, under the Comprehensive Environmental Response, Compensation, and Liability Act, in 40 CFR 302.4, Designation of Hazardous Substances; and by definition of hazardous chemicals by OSHA in 29 CFR 1910.1200, Hazard Communication. Hazardous materials are defined in AFMAN 32-7002, Environmental Compliance and Pollution Prevention, to include all items covered under the Emergency Planning and Community Right-to Know Act or other applicable federal, state, local or Final Governing Standards tracking or reporting requirements; all items covered by OSHA under 29 CFR 1910.1200, Hazardous Communication or 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories; and Class I or Class II Ozone Depleting Substances.

3.13.1.2 Region of Influence

The ROI for direct impacts from hazardous materials and waste management associated with the Proposed Action is limited to the SLC-13 launch complex and surrounding support facilities and areas within CCSFS where construction and operations activities would occur and hazardous materials are used and/or hazardous waste is generated.

3.13.1.3 Existing Conditions

SLC-13 was active between 1958 until 1978 and was utilized to support a series of launch programs. Asbestos products were widely used in the construction of facilities from 1940 through 1977 (USAF 2020). LBP was widely used commercially until the federal government banned consumer uses of LBP in 1978 (EPA 2023c). Asbestos-containing material (ACM) and LBP have been documented in the existing structures at SLC-13. Additionally, hazardous materials were known to be used at the complex, including various propellants, fuels, solvents, and coatings on structures on the launch pad that contained PCBs. The operations conducted at SLC-13 were known to generate hazardous waste because of launch program activities (USEPA n.d.). In February of 2015 SLC-13 was leased by SpaceX to be used as a landing platform for the Falcon 9 first-stage.

CCSFS has developed environmental management plans to establish procedures to mitigate adverse effects to the environment from hazardous materials, however, any waste generated under the proposed action would be managed by Vaya/Phantom. The CCSFS Hazardous Waste Management Plan provides guidance on the proper handling and disposal of hazardous waste, including spill contingency and response requirements, on CCSFS property. Procedures and responsibilities for responding to a hazardous waste spill or other incident are also addressed in the Hazardous Waste Management Plan (USAF 2024). The CCSFS Spill Prevention, Control, and Countermeasures (SPCC) Plan establishes procedures on the proper management and storage of petroleum products (USAF 2023b). The SPCC Plan includes immediate response actions to take in the event of a release of petroleum products to the environment (USAF 2018). The CCSFS SWPPP establishes procedures and BMPs for outdoor material storage areas and maintenance

activities to prevent pollution to stormwater (USAF 2019b). The CCSFS Integrated Solid Waste Management Plan provides guidance on the proper handling and disposal of non-hazardous solid waste and source reduction procedures (USAF 2024). The CCSFS Asbestos Management Plan lists applicable regulations and policies for the management, notification, demolition, and disposal of ACM (USAF 2020).

SLC-13 has not been identified as a site of concern under the Installation Restoration Program (IRP). The hazardous waste potentially generated as a result of previous mission activities at SLC-13 includes deluge waters, waste fuels, and waste solvents. A complete list of all the hazardous materials and hazardous waste stored and generated at the complex is not available. SLC-13 is a Solid Waste Management Unit (C038) under the installations Resource Conservation and Recovery Act permit with the State of Florida. It is managed by the DAF IRP. Preliminary assessment/site investigation was completed in the early 1990's, and corrective measures were implemented in the early 2000's to address soil hotspots (above industrial cleanup levels) and vegetable oil injections to address groundwater contamination. A Supplemental Site Investigation is planned at the site in 2025 to close some data gaps and then the site will more likely be under Long Term Management for soil and groundwater for the next 30-40 years.

3.13.2 Environmental Consequences

Releases of hazardous materials or waste to the environment can result in human health and ecological risks from exposure. The risks associated with releases depends on the quantity released and the characteristics of the material or waste released. These risks can be mitigated through proper management and storage techniques. The potential impacts associated with hazardous materials and waste from the reactivation of SLC-13 depend on the characteristics and quantities of the hazardous materials and waste used, stored and generated at SLC-13. The Proposed Action could result in a significant impact if it:

- Violated applicable federal, state, tribal, or local laws or regulations regarding hazardous materials.
- Produced an appreciably larger quantity or new type of hazardous waste.
- Generated an appreciably larger quantity or new type of solid waste or used a different method of collection or disposal and/or would exceed local capacity.
- Adversely affected human health and the environment.

3.13.2.1 Proposed Action

The renovation of SLC-13 would involve the use of hazardous materials and produce potentially hazardous wastes. The management of hazardous materials and hazardous waste is the responsibility of each launch operator or entity. Large quantities of hazardous materials would be used during operations to support SLC-13 activities, including petroleum-based products, paints, solvents, and fuels. These materials would be handled, stored, and disposed of IAW Safety Data Sheet recommendations, applicable federal and state regulations, and CCSFS environmental

management plans. Hazardous materials such as propellants, chemicals, and other hazardous material payload components would be transported IAW Department of Transportation regulations governing interstate and intrastate shipment of hazardous materials, as applicable. These materials are routinely used at CCSFS and proposed operations do not deviate from current CCSFS operations or introduce new or different hazardous materials or operations. Both Phantom and Vaya would obtain a USEPA RCRA site identification number for their respective operations.

Demolition of existing infrastructure and construction of new facilities would generate construction debris. Prior to demolition and renovation of the existing infrastructure, ACM and LBP surveys would be required. Based on the results of the ACM survey, demolition activities would be coordinated with the SLD 45 Hazardous Materials and Toxics Program Manager. The notification, storage, and disposal of ACM and LBP would be IAW all applicable federal and local regulations. Documentation for the transportation and disposal of ACM and LBP would be required to be maintained IAW federal regulations. Additionally, if any previously undocumented contamination is discovered during construction activities, work would cease and CCSFS environmental staff would be notified immediately.

Hazardous waste generated during construction activities may include empty hazardous substance or petroleum containers, spent solvents, paints, sealants, adhesives, waste oil, spill cleanup materials, lead acid batteries, and various universal wastes. Handling, storing, and disposing of hazardous materials and hazardous waste during construction activities, including taking measures to prevent releases, would be required IAW all applicable federal and state regulations and CCSFS environmental management plans. Mission activities on SLC-13 would be required to be conducted IAW all applicable CCSFS environmental management plans and procedures.

If required, Vaya will apply for an EPA Identification number in order to generate, transport, and/or dispose of regulated hazardous waste. Waste will be managed under Vaya's EPA Identification number and within applicable regulations.

If required, Phantom will apply for an EPA Identification number in order to generate, transport, and/or dispose of regulated hazardous waste. Waste will be managed under Phantom's EPA Identification number and within applicable regulations.

Pollution prevention practices reduce, eliminate, or prevent pollution at its source before it is created. This practice can be accomplished through a variety of methods and would be implemented to reduce the quantity of hazardous materials and hazardous waste stored and generated at the complex. Source reduction minimizes the quantity of hazardous materials and hazardous waste used, stored, and generated at the complex, and would also be employed.

Additional BMPs include storing materials and hazardous waste within secondary containment and storing adequate spill response supplies near storage areas. Routine inspections of material and waste storage areas would result in the early detection of spills and releases to the

environment. Demolition- and construction-derived waste would be recycled to the maximum extent possible to reduce waste sent to landfills.

There would be no significant impacts from the Proposed Action associated with hazardous materials and hazardous waste management.

3.13.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. Therefore, there would be no new impacts on hazardous materials or waste management.

3.13.2.3 Mitigation and Monitoring

Implementing the EPMs outlined below would avoid or minimize potential adverse effects to hazardous materials and waste management during the Proposed Action. Qualified Phantom and Vaya personnel or contractor staff would oversee fulfilling EPMs.

- Proper disposal of hazardous waste would be accomplished through identification, characterization, sampling (if necessary), and analysis of wastes generated.
- All hazardous materials would be properly identified and used IAW manufacturers' specifications to avoid accidental exposure to or release of hazardous materials required to operate and maintain equipment.
- All equipment would be properly maintained and free of leaks during operation and maintenance activities. All necessary equipment maintenance and repairs would be performed in pre-designated controlled, paved areas to minimize risks from accidental spillage or release.
- Phantom and Vaya would ensure employees and contractor staff are trained in proper prevention and cleanup procedures.
- Phantom and Vaya would store liquids, petroleum products, and hazardous materials in approved containers and drums and would ensure that any open containers are covered prior to rain events.
- Per 40 CFR 112, Spill Prevention, Control, and Countermeasure Plan, Phantom and Vaya would place chemicals, drums, or bagged materials on a pallet and, when necessary, secondary containment.
- All aboveground oil or fuel tanks and containers 55 gallons or greater shall be reported to the SLD 45 Tanks Program Manager. All tanks and containers must be doubled-walled or constructed with secondary containment at minimum of 110 percent of the total capacity.

3.14 Geology and Soils

3.14.1 Affected Environment

The Cape Canaveral Peninsula is part of the barrier island complex along the Atlantic coast. The peninsula is Holocene-aged and contains coastal sand deposits forming a series of beach-ridges

separated by erosional surfaces, primarily shaped by waves and wind. Cape Canaveral is considered a cuspate foreland, which is a land formation characterized by a triangular extension from the coastline (USAF 2023a).

The sediments that comprise Cape Canaveral consist of quartz sand and carbonate sand- to pebble-size shell fragments. The geology underlying CCSFS is comprised of four stratigraphic units including surficial sands, Caloosahatchee Marl, Hawthorn Formation, and limestone formations of the Floridian aquifer.

Topography at CCSFS is relatively flat with elevations that range from sea level to 15 feet above mean sea level. The higher naturally occurring elevations occur along the east portion of CCSFS, with a gentle slope to lower elevations toward the marshlands along the Banana River Lagoon (USAF 2005).

The Natural Resources Conservation Service identifies three different soil types within SLC-13, including the Canaveral-Anclote complex, Canaveral-Urban land complex, and Urban land (U.S. Department of Agriculture 2025). The Canaveral series consists of very deep, somewhat poorly to moderately well-drained soils, on side slopes of dune-like ridges with water table depths of 10 to 40 inches. Anclote soils are very poorly drained, with a depth-to-water table of about six inches. The Urban land series occurs in flatwoods, rises, knolls, ridges, and hills on marine terraces. Canaveral-Urban complex is found primarily around structures and impenetrable surfaces within the SLC-13. These soils are moderately well-drained with a depth to surface water of 30 to 60 inches (U.S. Department of Agriculture 2025). There are no farms or agriculturally important soils or facilities at CCSFS.

3.14.1.1 Regulatory Setting

Earth resources include the soil, underlying geology, and potential for geologic hazards and erosion within SLC-13. The following federal regulations and policies are relevant to the analysis of geological resources: Farmland Protection Policy Act (7 USC Section 4201); Earthquake Hazards Reduction Act of 1977 (42 USC Section 7701 et seq.); and the UFC (e.g., UFC 3-220-01, *Geotechnical Engineering*, UFC 3-310-04, *Seismic Design of Buildings*, and UFC 3-220-10N, *Soil Mechanics*).

3.14.1.2 Region of Influence

The ROI for direct impacts to geology and soils associated with the Proposed Action is limited to the SLC-13 launch complex and surrounding support facilities and areas within CCSFS where construction and operations activities would occur.

3.14.2 Environmental Consequences

Impacts to geology and soils would be significant if the Proposed Action:

- Increased the likelihood of, or resulted in exposure to, foundation instability, land subsidence, or other severe geologic hazards.

- Resulted in the loss of soil used for agriculture or habitat, loss of aesthetic value from a unique landform, or loss of mineral resources.
- Caused severe erosion or sedimentation from site preparation, construction/demolition, or operational activities.

3.14.2.1 Proposed Action

Most construction activities associated with the Proposed Action would occur within the original footprint of the existing SLC-13. The construction would disturb approximately 0.7 acres of previously undisturbed soils. Increased erosion and sedimentation may be caused by these site preparation and construction activities; however, these would be avoided or minimized by incorporating proper construction techniques, erosion-control measures, and structural engineering designs into project development. An NPDES permit would be obtained and a SWPPP would be developed prior to construction that would provide detailed erosion prevention and control measures to be implemented during site preparation and construction activities. Soil disturbance would not result in foundational instability and no unique geologic features of exceptional interest, mineral resources or farmland are present. Therefore, impacts to geology and soils would be less than significant.

3.14.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. Therefore, there would be no new impacts on geology and soils.

3.14.2.3 Mitigation and Monitoring

In the absence of significant effects, no mitigation or monitoring measures have been identified for this resource.

3.15 Solid Waste Management

3.15.1 Affected Environment

3.15.1.1 Regulatory Setting

Solid waste is defined by the implementing regulations of RCRA generally as any discarded material that meets specific regulatory requirements and can include such items as refuse and scrap metal, spent materials, chemical byproducts, and sludge from industrial and municipal wastewater and water treatment plants. Solid waste management on CCSFS is directed by DODI 4715.23, Integrated Recycling and Solid Waste Management, and implemented in SLD 45's Integrated Solid Waste Management Plan (ISWMP; USSF 2021). AFMAN 32-7002, Environmental Compliance and Pollution Prevention, details requirements and programs that installations must comply with to successfully divert as much solid waste as economically feasible. The DOD Strategic Sustainability and Performance Plan listed a solid waste diversion goal of 50 percent and a C&D debris diversion rate of 60 percent. The DAF is committed to achieving these goals.

3.15.1.2 Region of Influence

The ROI for direct impacts to solid waste management associated with the Proposed Action is limited to the SLC-13 launch complex and surrounding support facilities and areas within CCSFS where construction and operations activities would occur. Solid waste is generally defined as any discarded material that is not characterized by other specific regulatory requirements detailed in the RCRA (40 CFR 261.2). Solid waste is subject to corrective action under RCRA (42 USC Section 6901 et seq.). The regulatory environment for solid waste management reflects comprehensive federal, state, and local approaches to minimize waste generation and increase reuse and recycling.

3.15.1.3 Existing Conditions

Solid waste can include items such as refuse and scrap metal, spent materials, and nonhazardous chemical byproducts (40 CFR 261.2). A private refuse contractor transports nonhazardous solid waste from CCSFS to the permitted Brevard County landfill for disposal (USSF 2021). The Brevard County Central Disposal Facility receives 3,500 tons or more of waste per day (Brevard County 2024). Several Brevard County landfill expansions are underway, and the projected life span of the Central Disposal Facility is up to 40 years (Smith, pers. comm. 2024). Items recycled at CCSFS include paper, cardboard, plastics, wood, metals, and used oil (USSF 2021).

3.15.2 Environmental Consequences

Solid waste impacts are evaluated using federal, state, and local laws and regulations; permit conditions; and contract specifications. Significant impacts would occur from noncompliance with applicable regulatory requirements, an increase in the amount of waste disposal that would exceed available waste management capacities, or adverse effects to human health and the environment. The FAA has not established a significance threshold for solid waste and pollution prevention.

3.15.2.1 Proposed Action

Solid waste generated during demolition would primarily include concrete, asphalt, and metal, much of which is recyclable. Construction wastes would include packing materials (cardboard and plastic), scrap materials (rebar, wood, pipes, wiring), and miscellaneous waste generated by onsite construction workers. Contractors would be responsible for the disposal or recycling of all waste generated during the scope of the construction. During launch operations and facilities maintenance, solid waste (e.g., cardboard packaging, wood, rags, plastic and aluminum bottles and cans) would be disposed of on a routine basis. Solid waste would be collected and transported to the local permitted landfills with capacity for waste disposal, diversion, and recycling. The solid waste generated would be an increase from existing conditions but would not exceed the capacity of the expanded Brevard County landfill, which has a projected lifespan of up to 40 years. Solid waste would be minimized by strict compliance with CCSFS's ISWMP. All materials that are disposed of off-base would be reported to the Solid Waste Manager.

Solid waste would be managed appropriately and would not exceed current landfill capacities. The proposed action would include minimal demolition work, therefore no significant amounts of solid waste are anticipated to be generated and disposed of at the Brevard County landfill.

Daily operations would generate office, food, and packaging waste. EPA estimates that a person generates 4.9 pounds of solid waste per day (USEPA 2023). Vaya and Phantom anticipate supporting launch operations with 25 personnel each. Vaya personnel would be stationed primarily in off-base facilities, while Phantom personnel would occupy their integration hangar at SLC-13. With the addition of 25 onsite personnel, approximately 122.5 pounds of municipal solid waste could be generated each day during operations (approximately 22.4 tons annually). This amount is approximately 0.0000175% of the daily amount of waste currently received at the Brevard County Central Disposal Facility. The Brevard County landfills would have the capacity to accommodate solid waste generated during operations.

During C&D at SLC-13, sewage would be collected in temporary on-site portable toilets subject to spill-prevention EPMs and serviced by a commercial contractor. Before implementing the Proposed Action, the contractor would prepare a hazardous material Spill Prevention and Response Plan.

Compliance with all applicable federal, state, local laws, and regulations, applicable SLD 45 plans and policies, and EPMs (Section 3.15.2.4), would govern all aspects of the Proposed Action, and would avoid or minimize potential impacts related to solid waste or pollution prevention. Therefore, the Proposed Action would not have a significant impact on solid waste management.

3.15.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. Therefore, there would be no new impacts on solid waste management.

3.15.2.3 Mitigation and Monitoring

Implementing the EPMs outlined below would avoid or minimize potential adverse effects to solid waste during the Proposed Action. Qualified Vaya and Phantom personnel or contractor staff would oversee fulfilling EPMs. Solid waste would be minimized by strict compliance with SLD 45's ISWMP.

- All materials that are disposed of off Base would be reported to the SLD 45 Solid Waste Manager.

3.16 Utilities

3.16.1 Affected Environment

Originally constructed in the 1950s, SLC-13 was deactivated in 1978. Because of the age of the existing infrastructure at SLC-13 and the lack of ongoing maintenance, the condition of onsite

utilities is unknown. For the purposes of this EA, it is assumed that all onsite utilities would need to be provided as part of the Proposed Action.

3.16.1.1 Potable and Nonpotable Water

The City of Cocoa's municipal water distribution system provides potable water to CCSFS via a connection at the South Gate. The City's water supply comes from groundwater wells in east Orange County and the Taylor Creek Reservoir in Orange and Osceola Counties. The water is treated by the City at the Claude H. Dyal Water Treatment Plant. The City of Cocoa has a water franchise agreement with CCSFS for the provision of water and wastewater services.

The CCSFS potable water system operates under FDEP Potable Water System Number 3054140. Based on the City's water supply plans, the City's largest wholesale water customer is the U.S. Government for a combined annual average daily flow of five million gallons per day (mgd) at three installations: KSC, CCSFS, and Patrick Space Force Base. The historical flows peak to 4.2 mgd, with the average being 3.7 mgd. Based on the City's Comprehensive Plan, the City has sufficient water production and storage capacity to accommodate future average daily and typical peak day demands generated by customers in its water service area (Space Florida 2017).

Water is used at CCSFS for potable and non-potable uses. Non-potable uses include fire protection, launch activities, and limited irrigation. Various storage systems and secondary pump systems on CCSFS supply water needs (USAF 2017). SLC-14 is serviced by an 8-inch fire main and a 4-inch potable main along ICBM Road.

3.16.1.2 Wastewater

Domestic wastewater is treated at the Regional Wastewater Treatment Plant (RWWTP) on CCSFS (FDEP permit number: FL0102920). The RWWTP is used by most facilities at CCSFS, though several areas, including legacy SLCs along ICBM Road, treat wastewater using septic tanks and drain field systems. Deluge discharge water is either sent to the RWWTP or is discharged to the ground IAW permitted water quality parameters (USSF 2022b). There are currently no sanitary sewer services available at SLC-13.

3.16.1.3 Electrical Power

Florida Power and Light Company provides high-voltage (115-kilovolt) electrical power to several substations at CCSFS. Electrical transmission lines enter CCSFS at the southwest boundary coming across the BRL into the south substation and the Titan substation. The feeds can provide 59 megavolt-amperes to CCSFS, which exceeds current requirements (USSF 2022b). CCSFS maintains the local electrical distribution system, which provides 13.2 kilovolts to the launch complexes from load brake switches through a duct-bank system of conduit and manholes. On individual launch facilities, the medium-voltage power is stepped down through other load brake switches to the various low-voltage distribution transformers, which supply the required power for the existing facilities (USAF 2017). Electrical service is currently available at SLC-13.

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3.16.1.4 Regulatory Setting

NEPA requires all federal agencies to assess potential impacts of proposed activities related to utility infrastructure, including electricity, water, wastewater, natural gas, and telecommunications. Utility usage at CCSFS is largely regulated by local entities and all actions at CCSFS must ensure adequate capacity exists in water, wastewater, and electrical power facilities.

3.16.1.5 Region of Influence

The ROI for direct impacts to utilities associated with the Proposed Action is the SLC-13 launch complex and surrounding CCSFS support facilities and areas within CCSFS where construction and launch activities would occur.

3.16.2 Environmental Consequences

Impacts to utilities would be significant if the Proposed Action:

- Resulted in a substantial disruption to utilities, requiring extensive mitigation to offset adverse impacts, and the success of mitigation could not be guaranteed.
- Resulted in an exceedance of the existing capacity of the utilities or infrastructure, requiring extensive mitigation to offset adverse impacts, and the success of mitigation could not be guaranteed.

3.16.2.1 Proposed Action

Water. The Proposed Action would connect to the existing fire main along ICBM Road. A deluge system would utilize approximately 15,000 to 21,000 gallons of water for deluge during launches. This water would be sourced from the CCSFS fire water line, using the existing connection at SLC-13.

At peak cadence, there would be 52 launches per year, requiring approximately 15,000 to 21,000 gallons of water per launch for deluge. Compared to the historic average consumption of 3.7 mgd for CCSFS, KSC, and Patrick Space Force Base combined, the water needs for deluge and fire suppression at SLC-13 would not result in significant impact to water utilities.

An existing connection to potable water main along ICBM Road provides potable water to SLC-13. The potable water demand needed to support 50 launch-related personnel would not result in a significant impact to water utilities at CCSFS.

Wastewater. Industrial wastewater has the potential to be produced by deluge activities associated with the Proposed Action. An onsite deluge water containment and disposal system would be designed to capture the deluge water for testing until water quality criteria outlined in the required FDEP Industrial Wastewater Permit for onsite disposal of launch-related wastewater were met. Deluge water used during launch activities would be entirely captured in a French drain system surrounding both launch pads, and would drain to an evaporation pond, where deluge water would evaporate.

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Electrical Power. The Proposed Action includes improvements to an existing connection to the CCSFS electrical system. The estimated annual average power usage for the Proposed Action would be 1.72 megawatt-hours. The electrical demand as a result of the Proposed Action would result in a negligible increase in energy use at CCSFS and would not result in significant impact to electrical power supply.

3.16.2.2 No Action Alternative

Under the No Action Alternative, there would be no construction at SLC-13 and no launches or static fire tests from SLC-13 in support of the Phantom and Vaya launch programs. Therefore, there would be no new impacts on utilities.

3.16.2.3 Mitigation and Monitoring

In the absence of significant effects, no mitigation or monitoring measures have been identified for this resource.

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APPENDIX A - FIGURES



Figure 1.1-1. Project location map

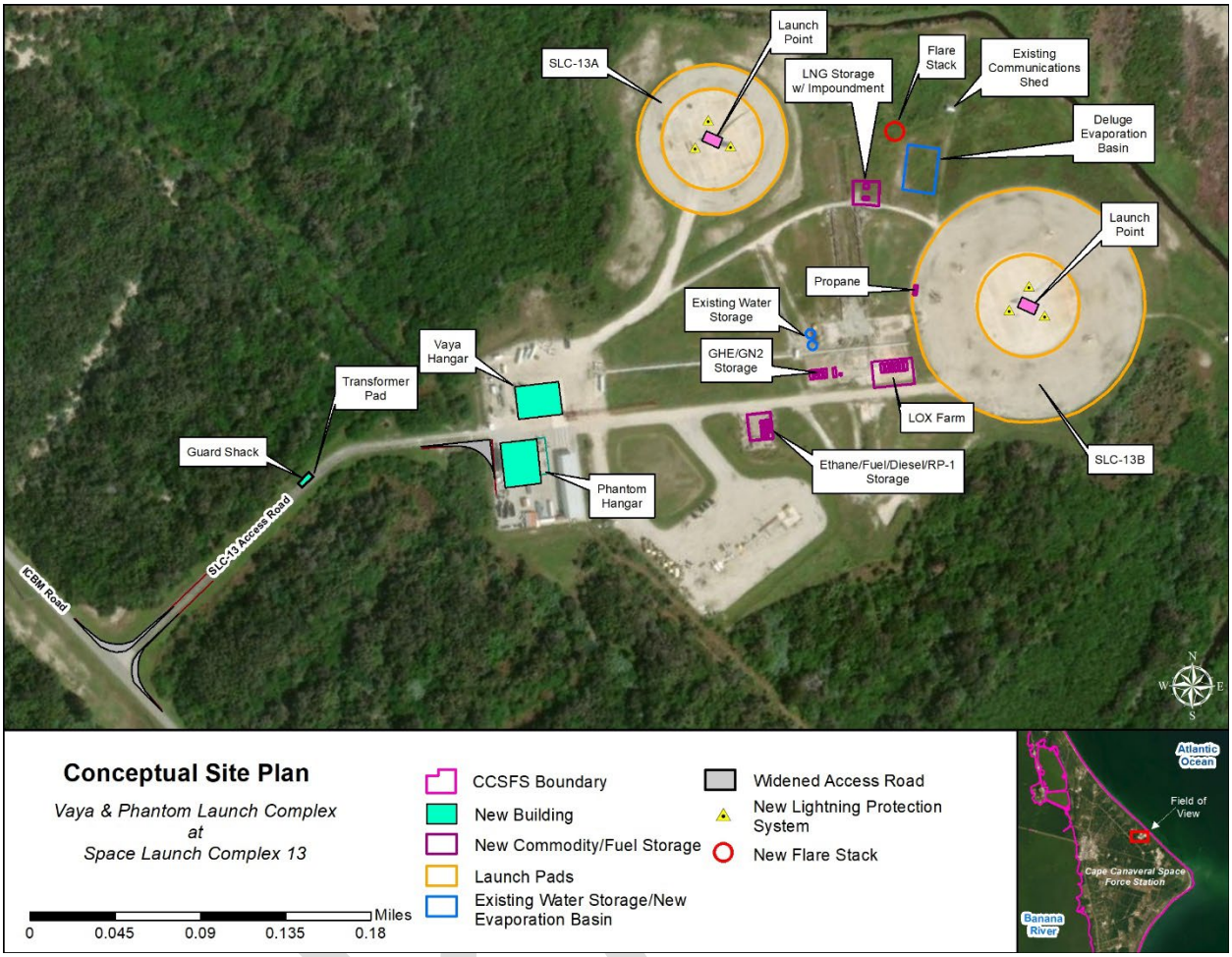


Figure 2.1-1. SLC-13 conceptual site plan

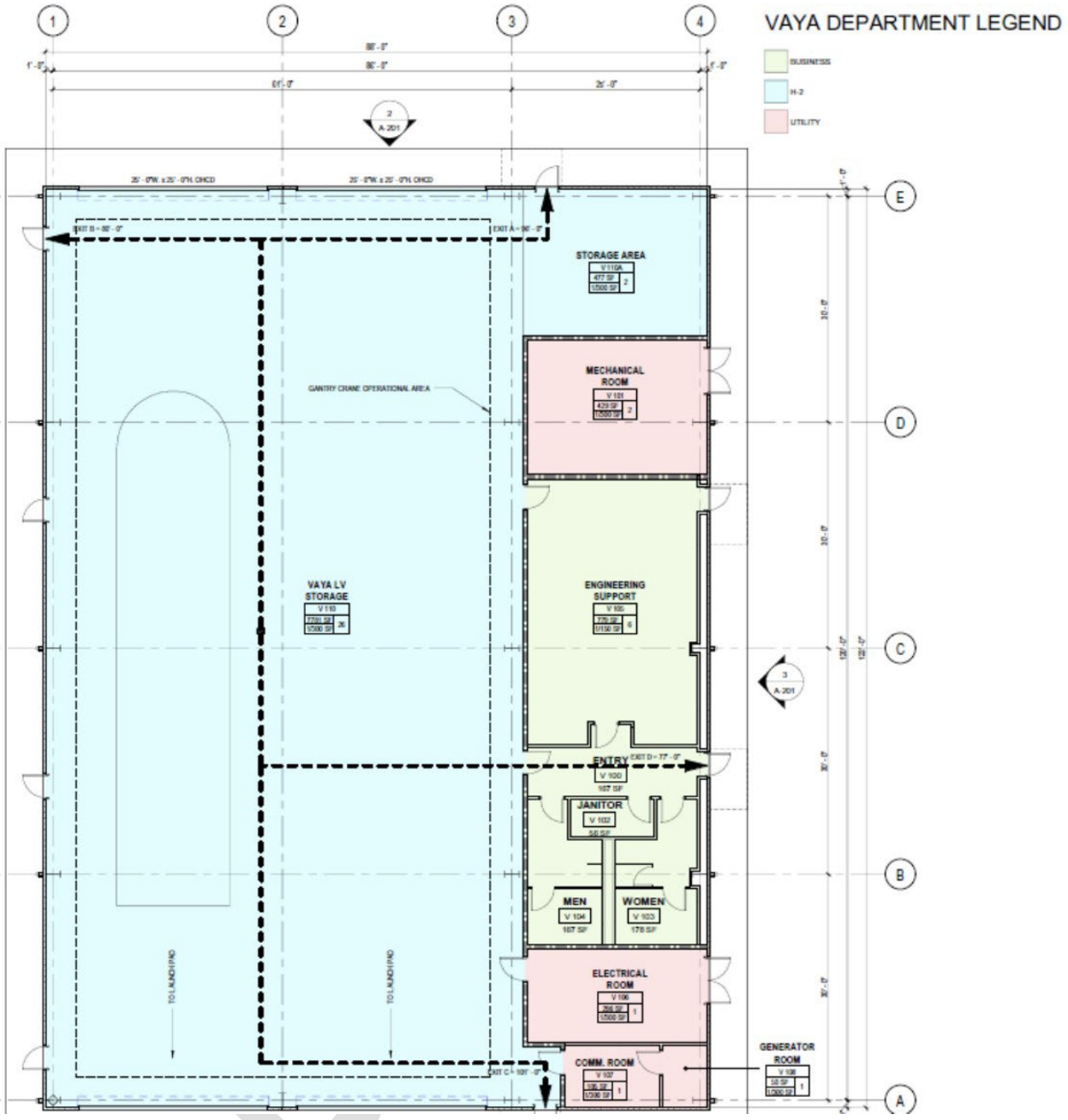


Figure 2.1-2. Conceptual layout of Vaya hangar

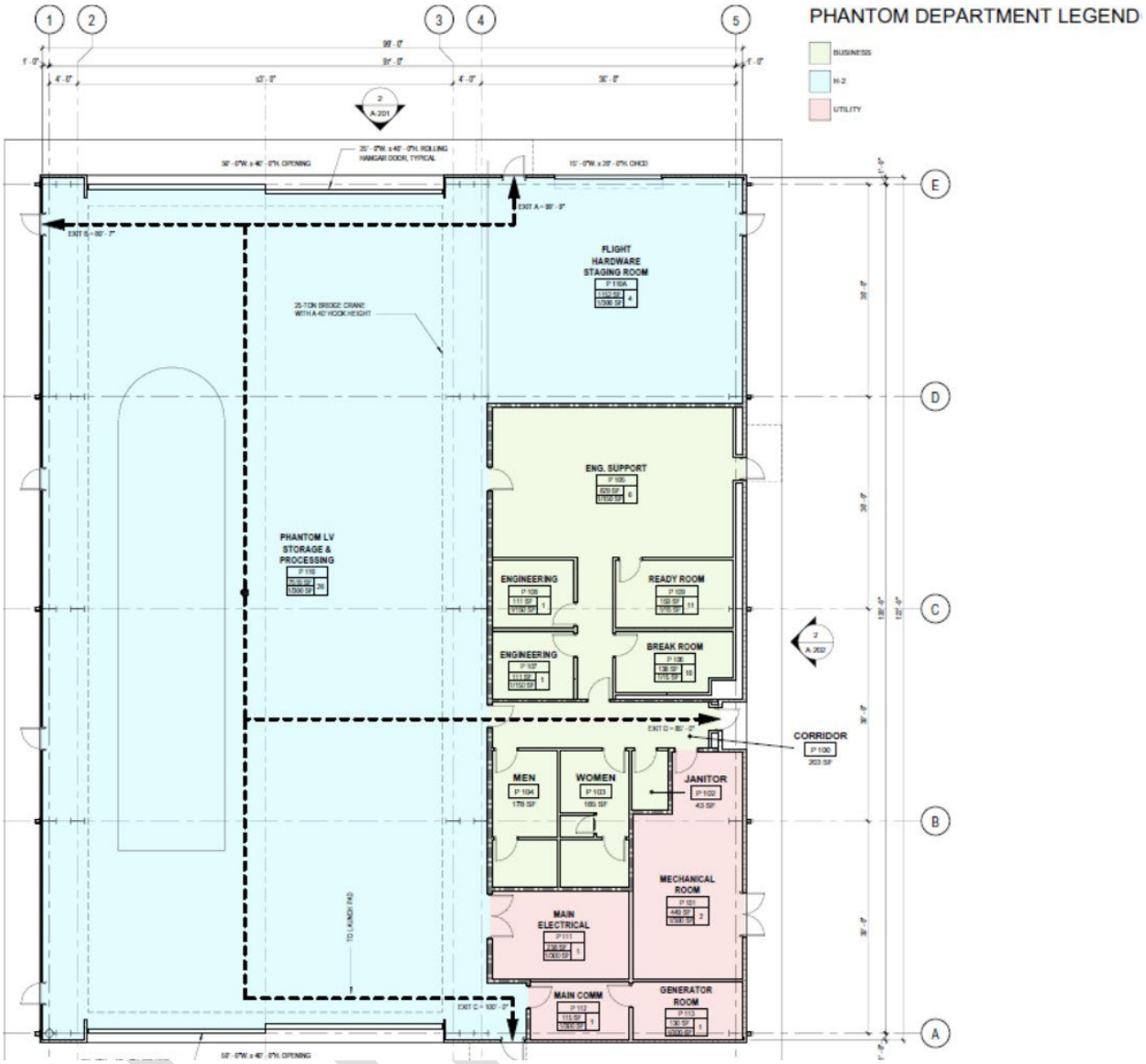


Figure 2.1-3. Conceptual layout of Phantom hangar/HIF

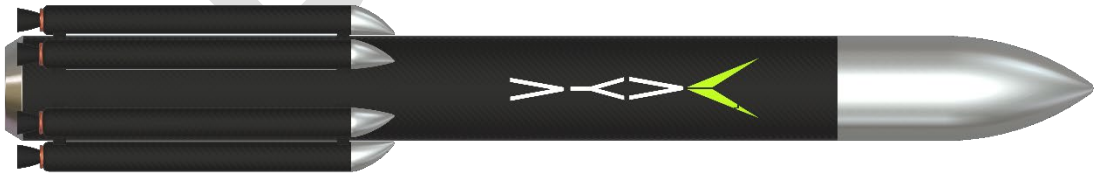


Figure 2.1-4. Vaya Dauntless Block 1 Launch Vehicle



Figure 2.1-5. Phantom Daytona (top) and Laguna (bottom) Launch Vehicles (note: images not shown to scale)

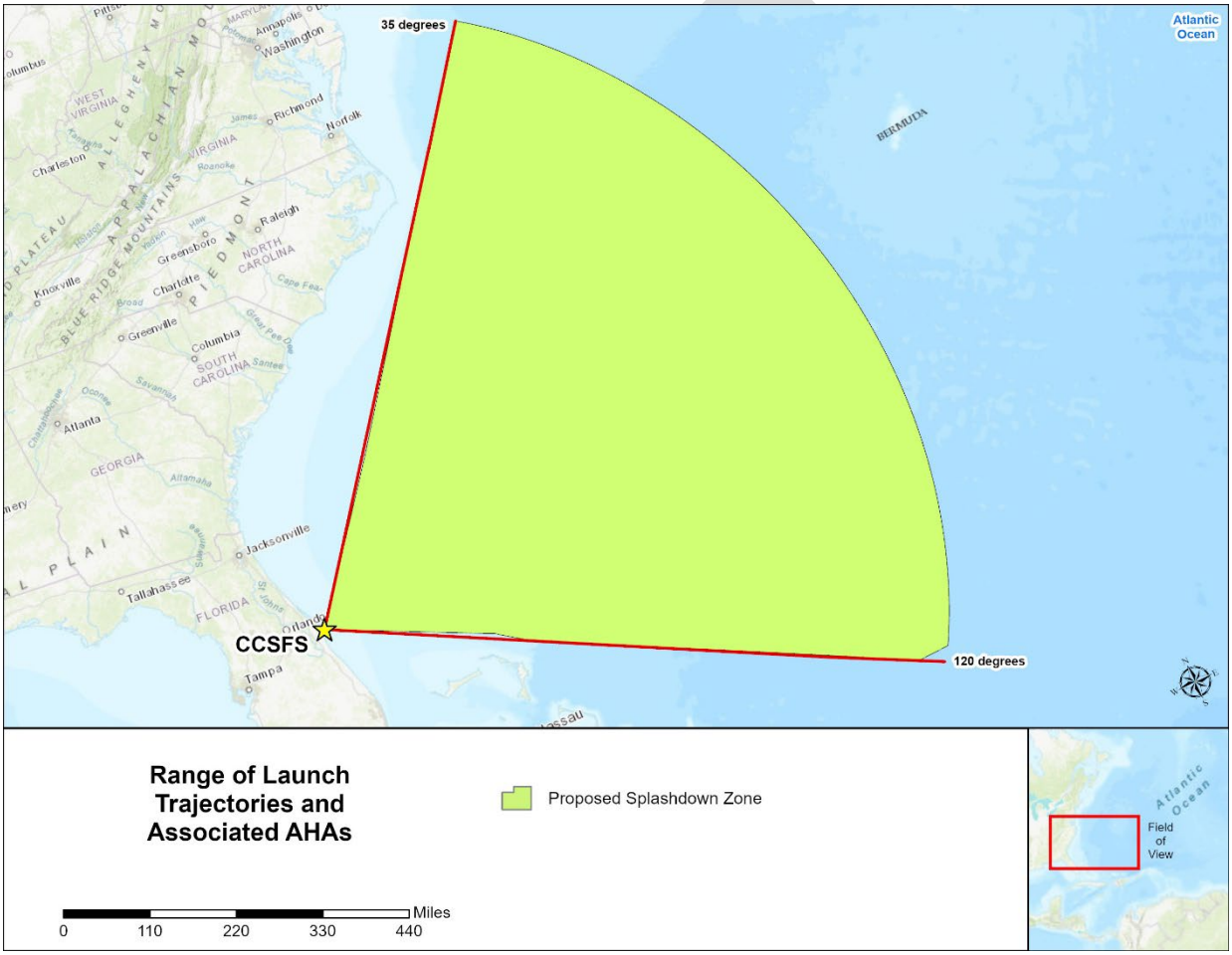


Figure 2.1-6. Proposed Vaya and Phantom Splashdown Zone

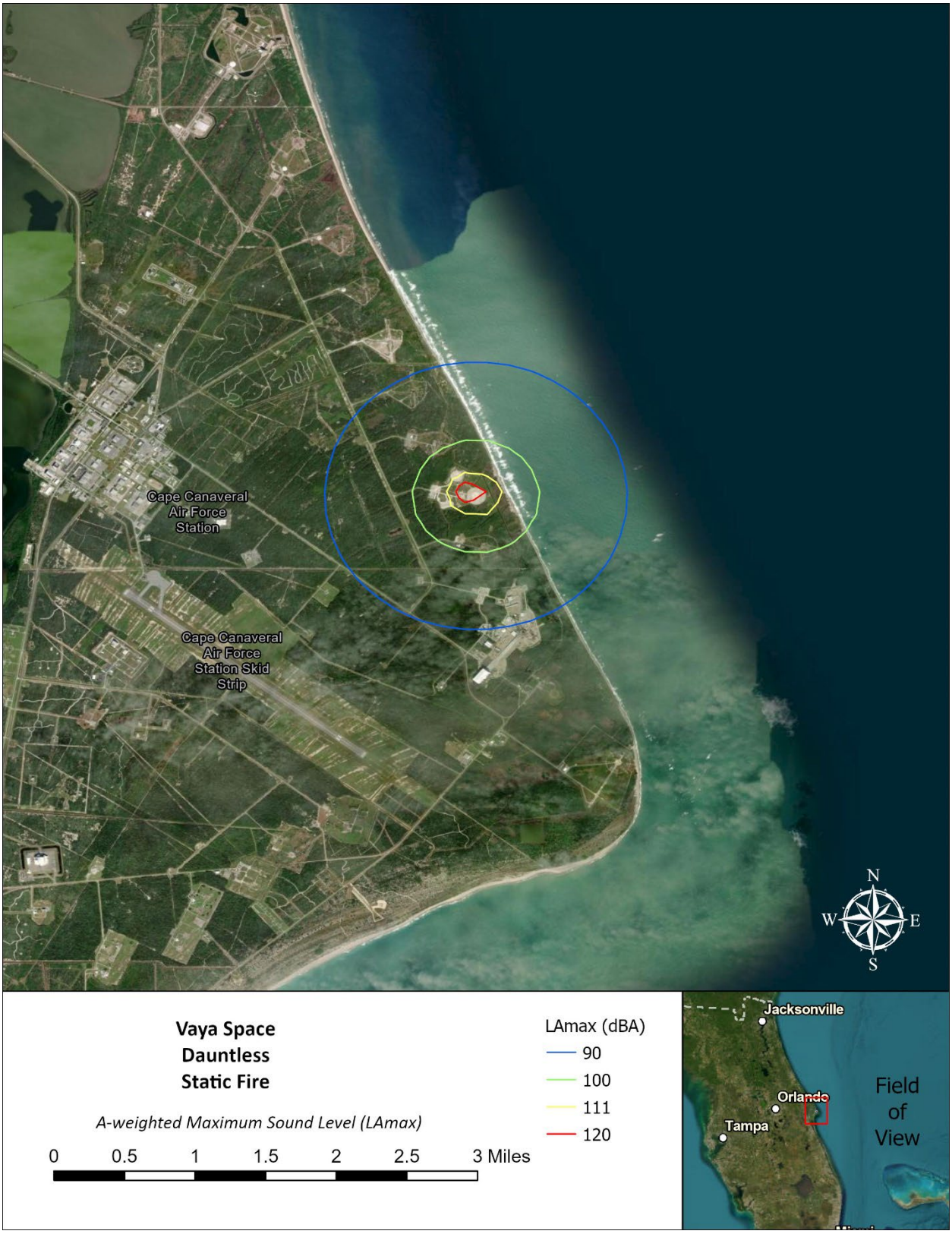


Figure 3.3-1. Vaya Space Dauntless Static Fire A-weighted Maximum Sound Levels



Figure 3.3-2. Vaya Space Dauntless Static Fire A-weighted Sound Exposure Levels

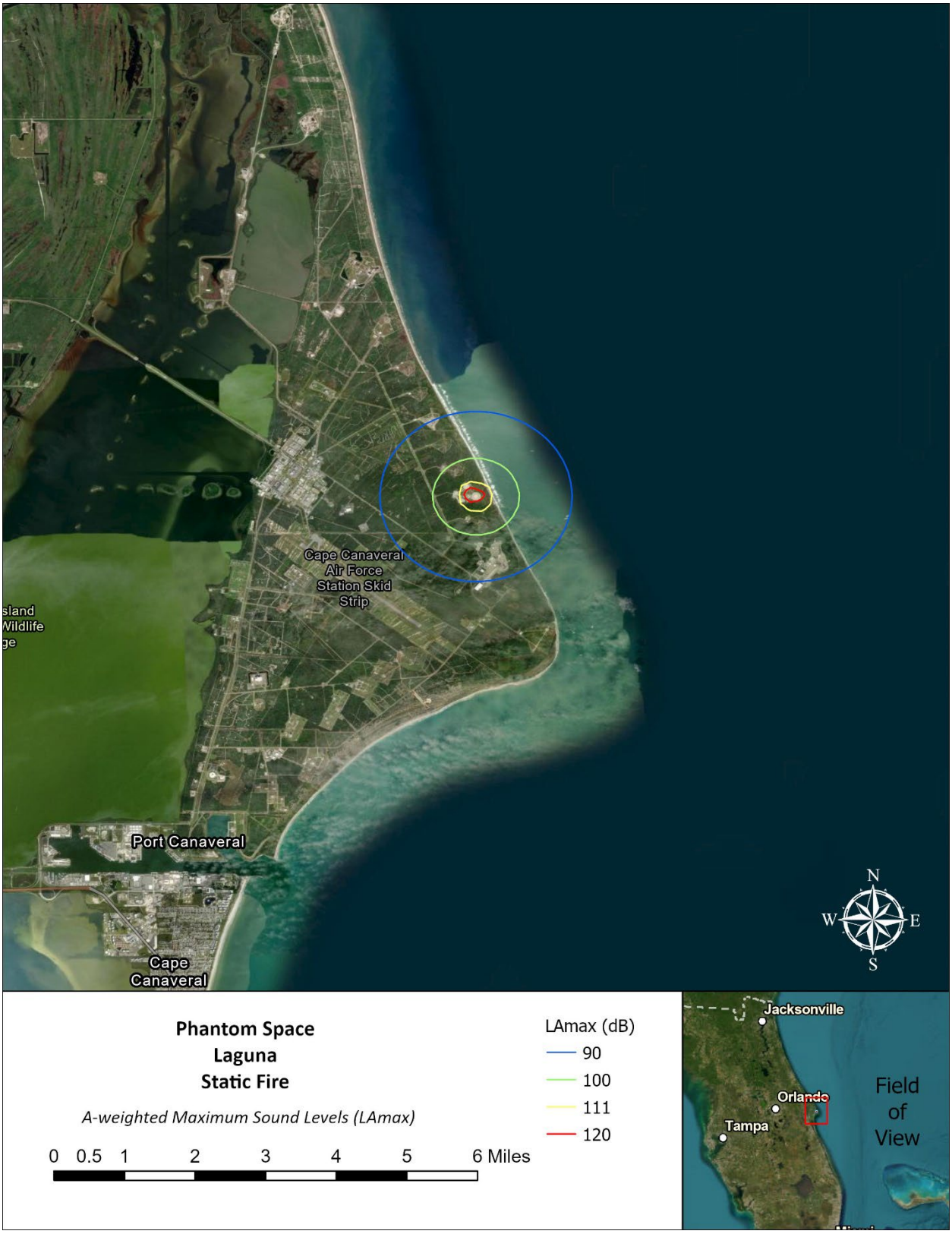


Figure 3.3-3. Phantom Space Laguna Static Fire A-weighted Maximum Sound Levels



Figure 3.3-4. Phantom Space Laguna Static Fire A-weighted Sound Exposure Levels



Figure 3.3-5. Vaya Space Dauntless Launch A-weighted Maximum Sound Levels



Figure 3.3-6. Vaya Space Dauntless Launch A-weighted Sound Exposure Levels



Figure 3.3-7. Phantom Space Laguna Launch A-weighted Maximum Sound Levels

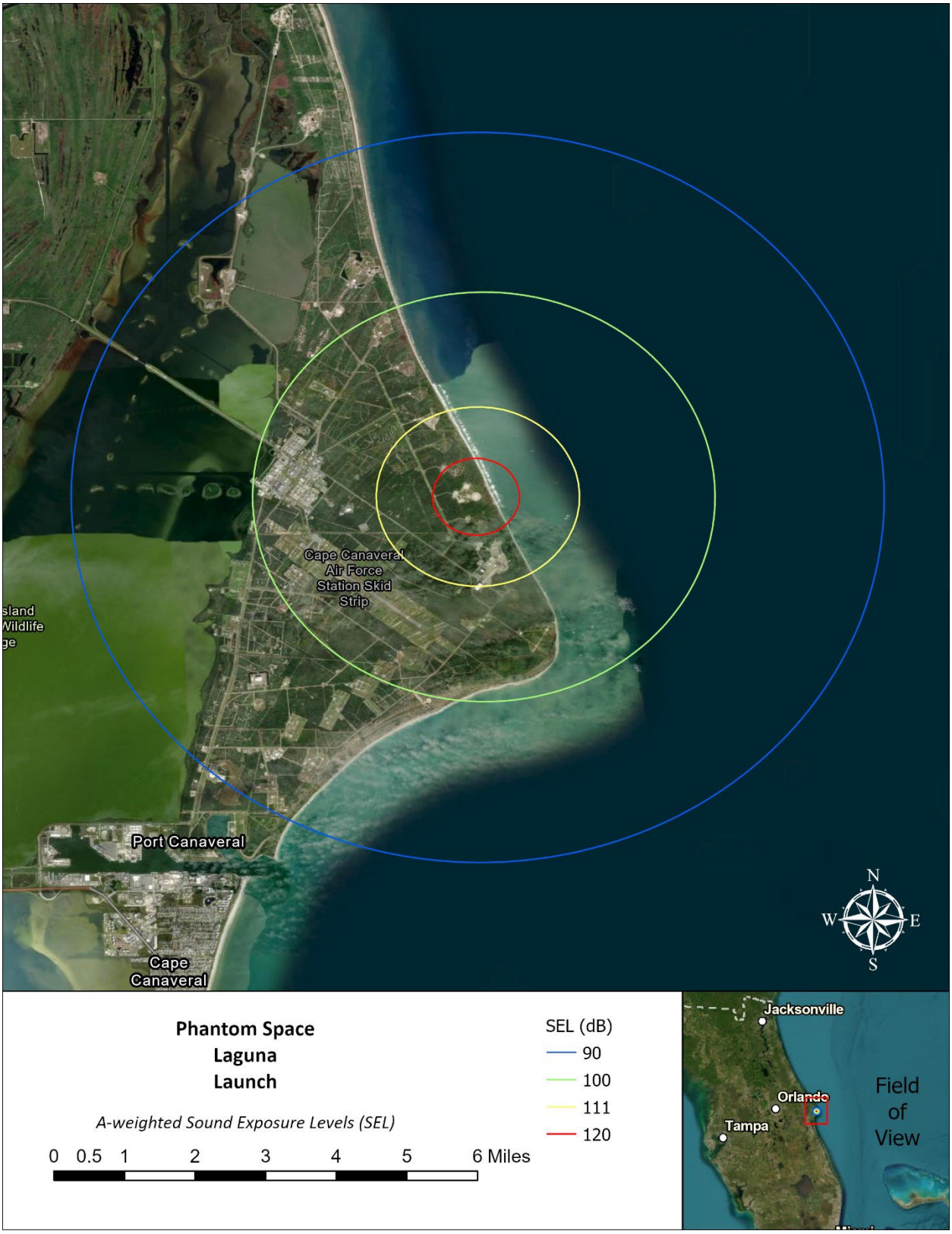


Figure 3.3-8. Phantom Space Laguna Launch A-weighted Sound Exposure Levels



Figure 3.3-9. Vaya Space Dauntless Sonic Boom Model Results

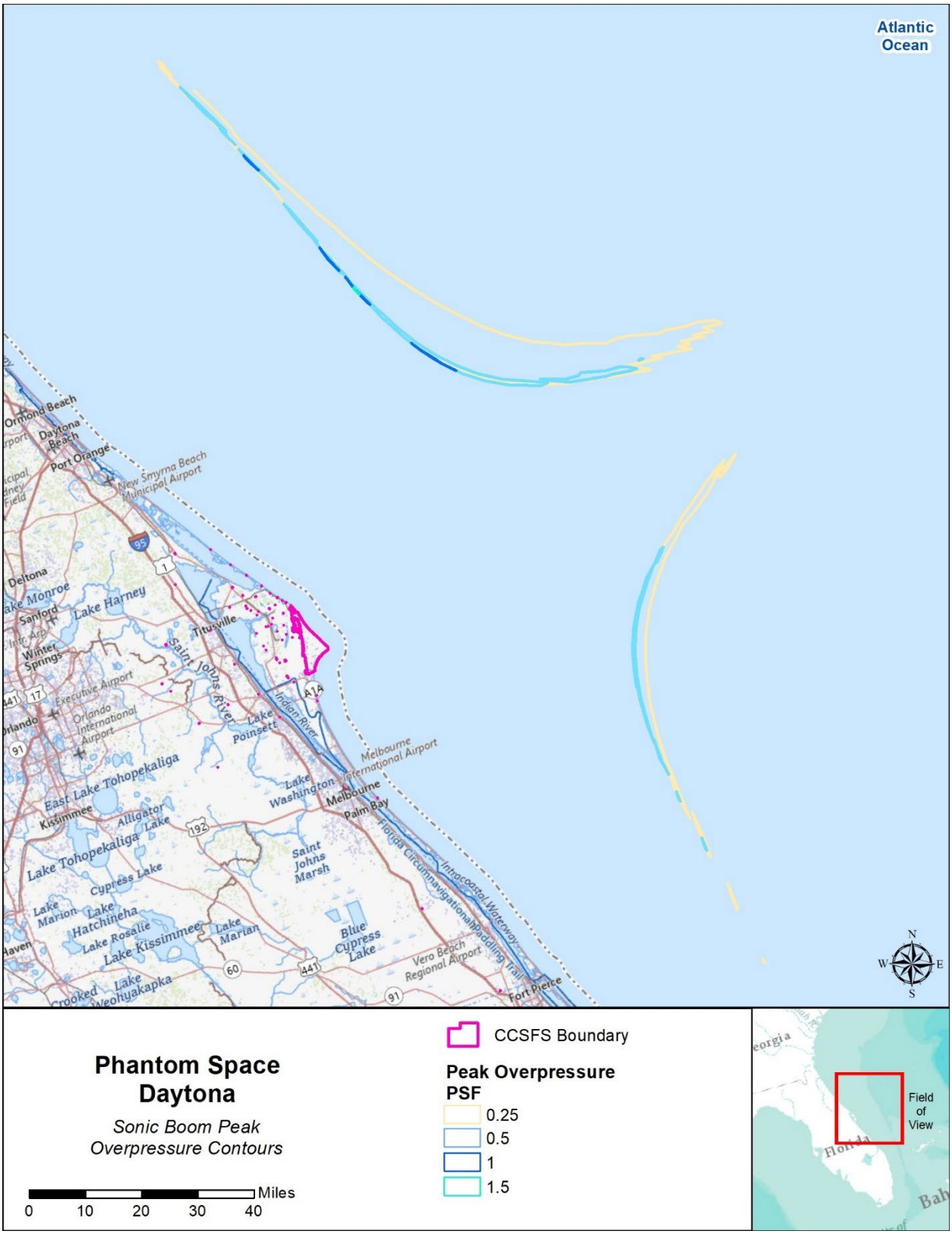


Figure 3.3-10. Phantom Space Daytona Sonic Boom Model Results for 120-degree (lower right) and 35-degree (upper) Launch Azimuths

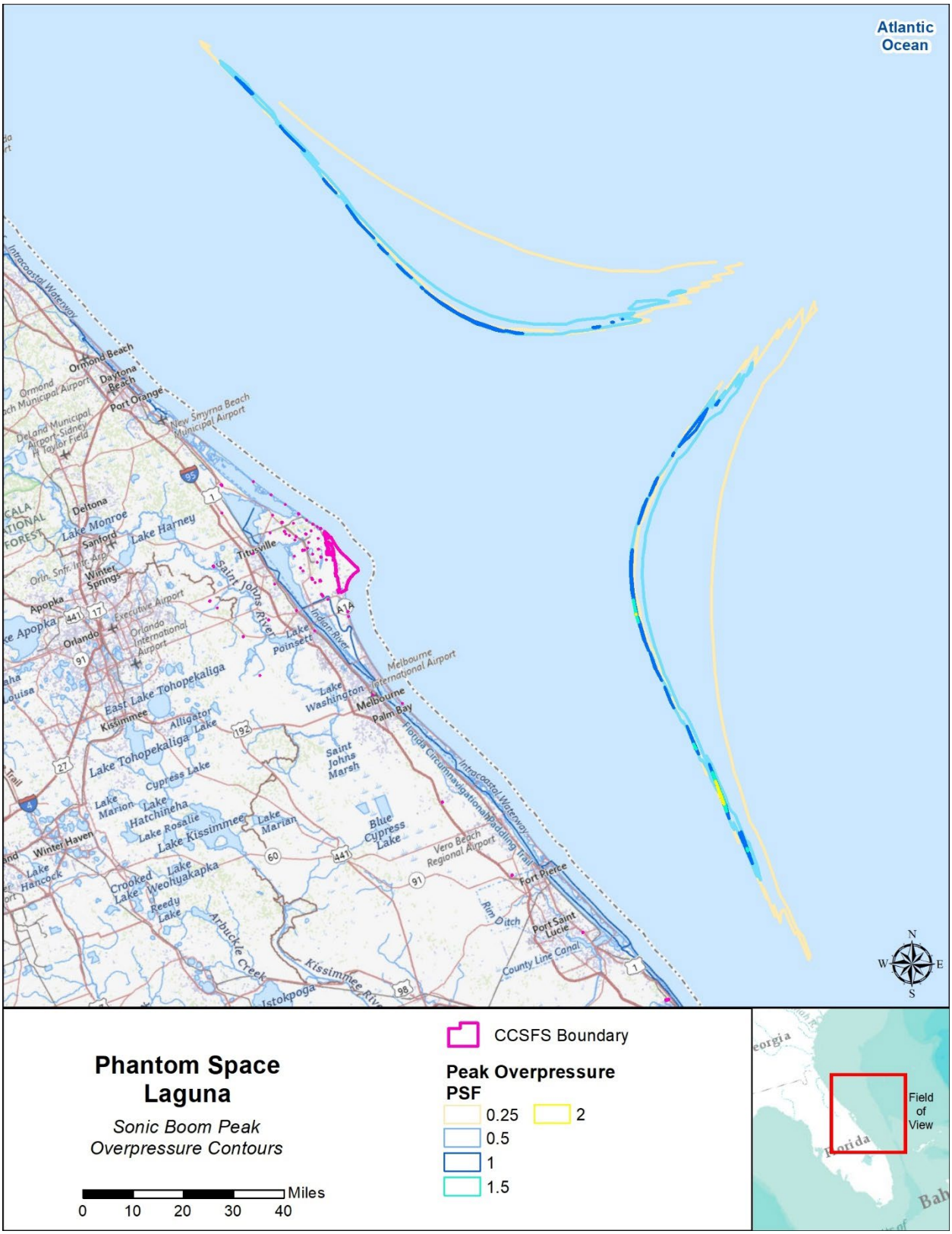


Figure 3.3-11. Phantom Space Laguna Sonic Boom Model Results for 120-degree (lower right) and 35-degree (upper) Launch Azimuths

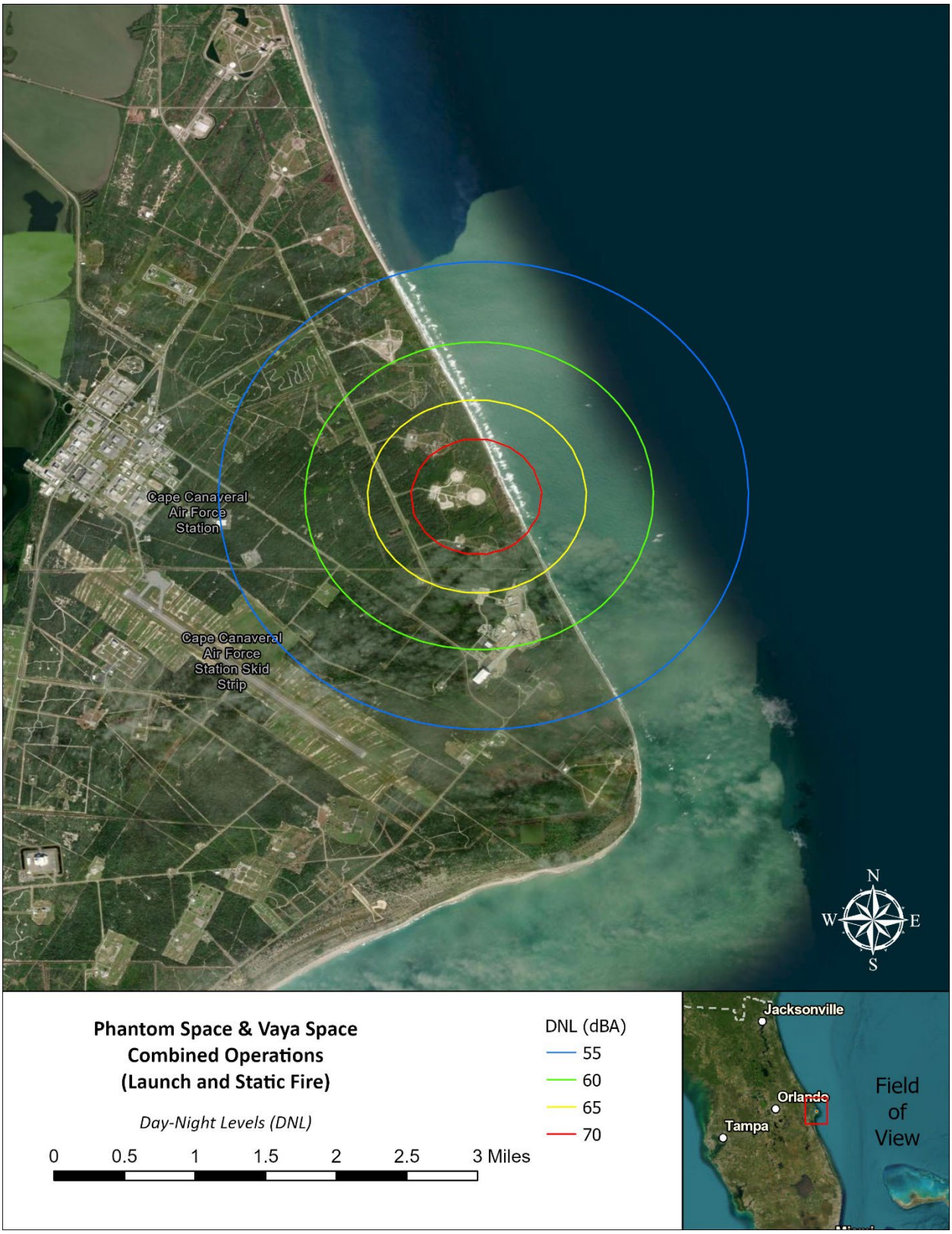


Figure 3.3-12. Vaya Space and Phantom Space DNL Contours for Combined Operations

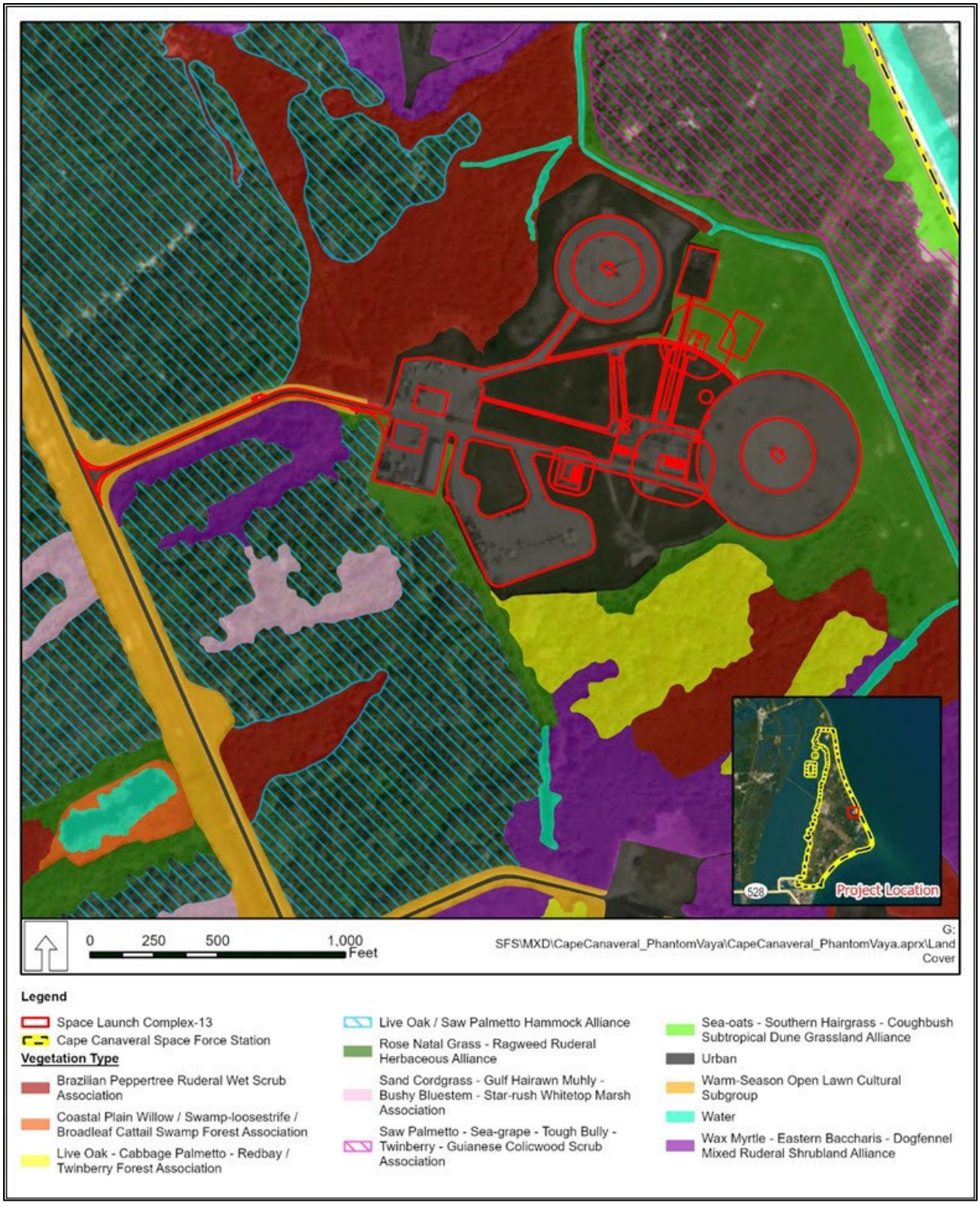


Figure 3.4-1. Vegetation Community Types at Space Launch Complex-13

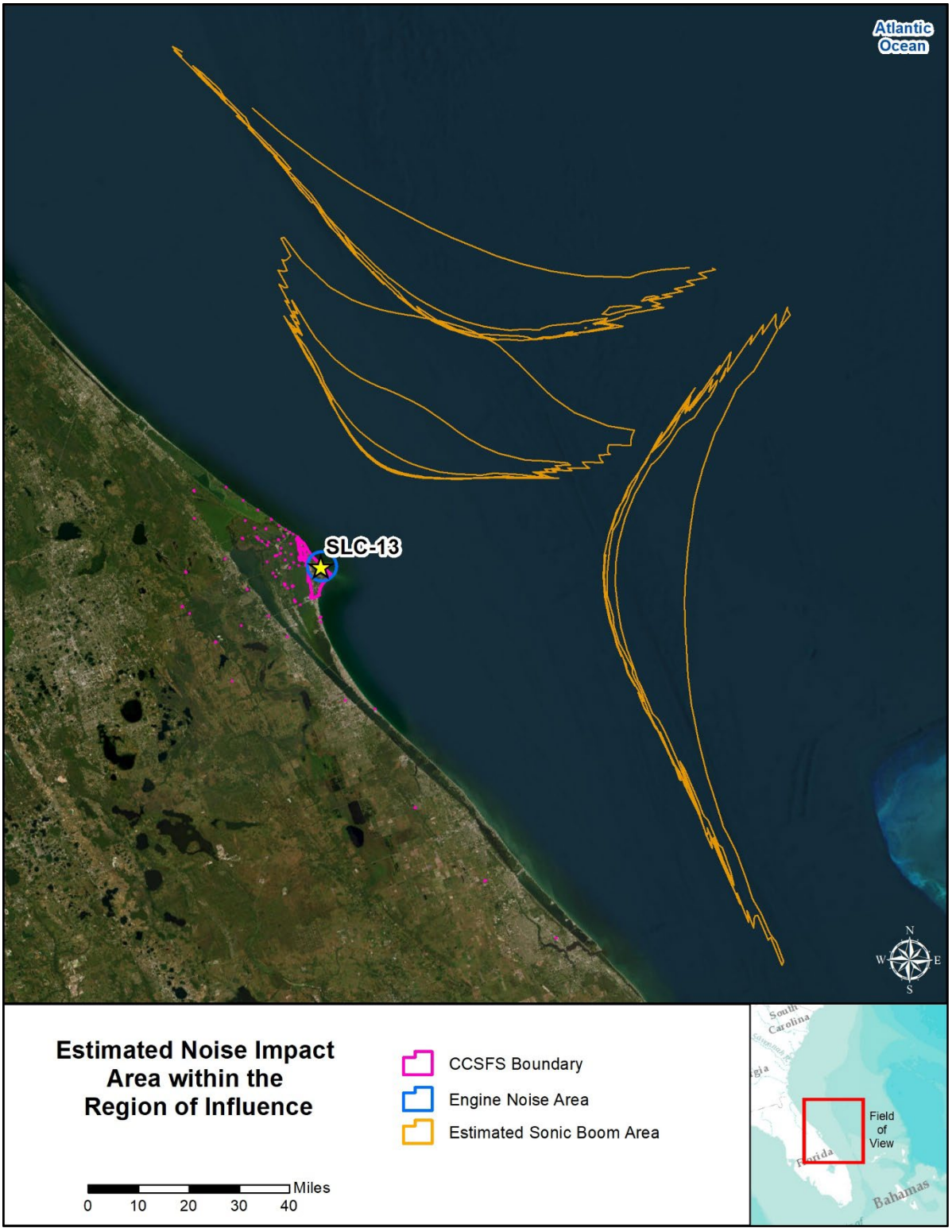


Figure 3.4-2. Action Areas for Threatened and Endangered Species Analyses

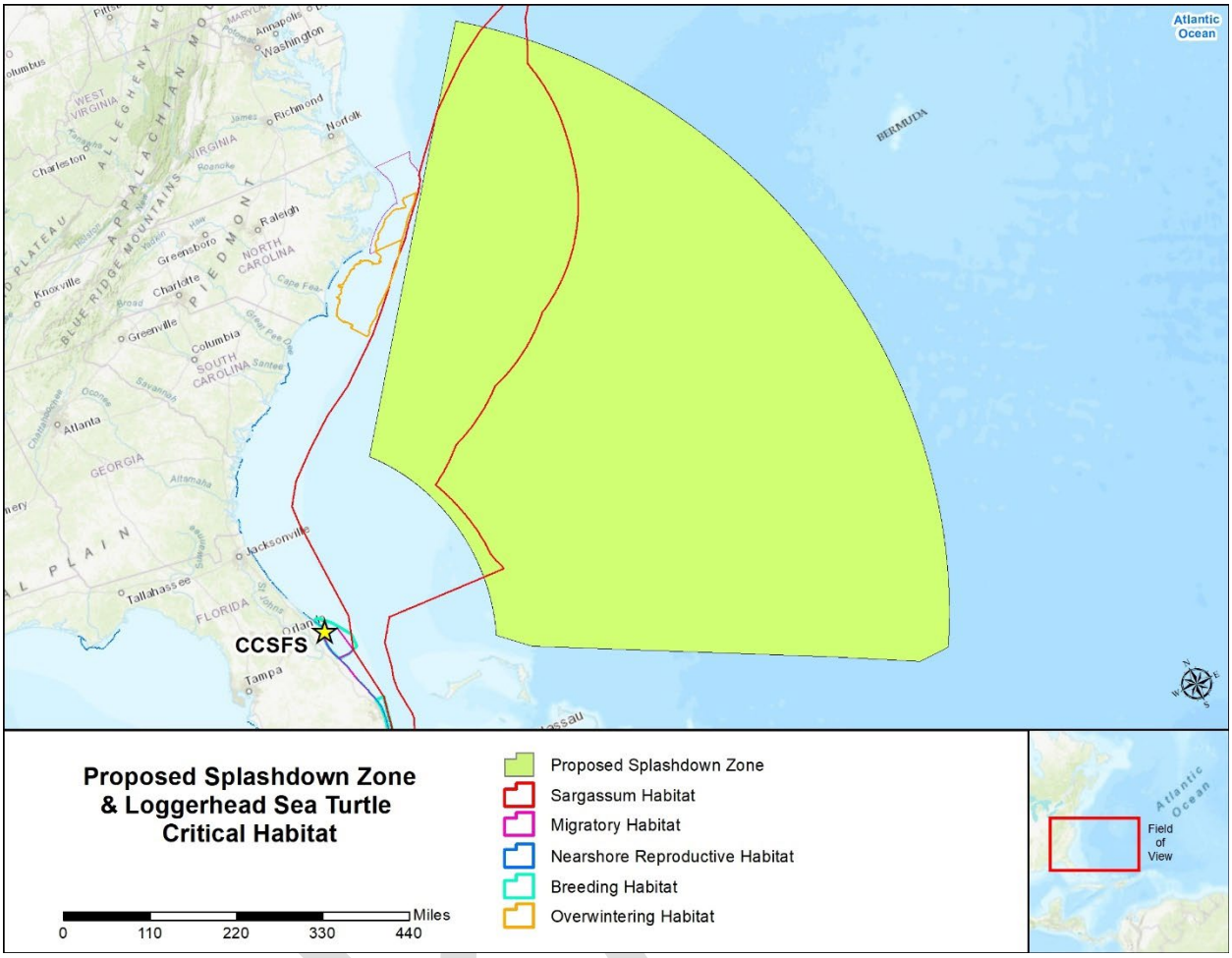


Figure 3.5-1. Proposed Splashdown Zone and Loggerhead Sea Turtle Critical Habitat

DRAFT

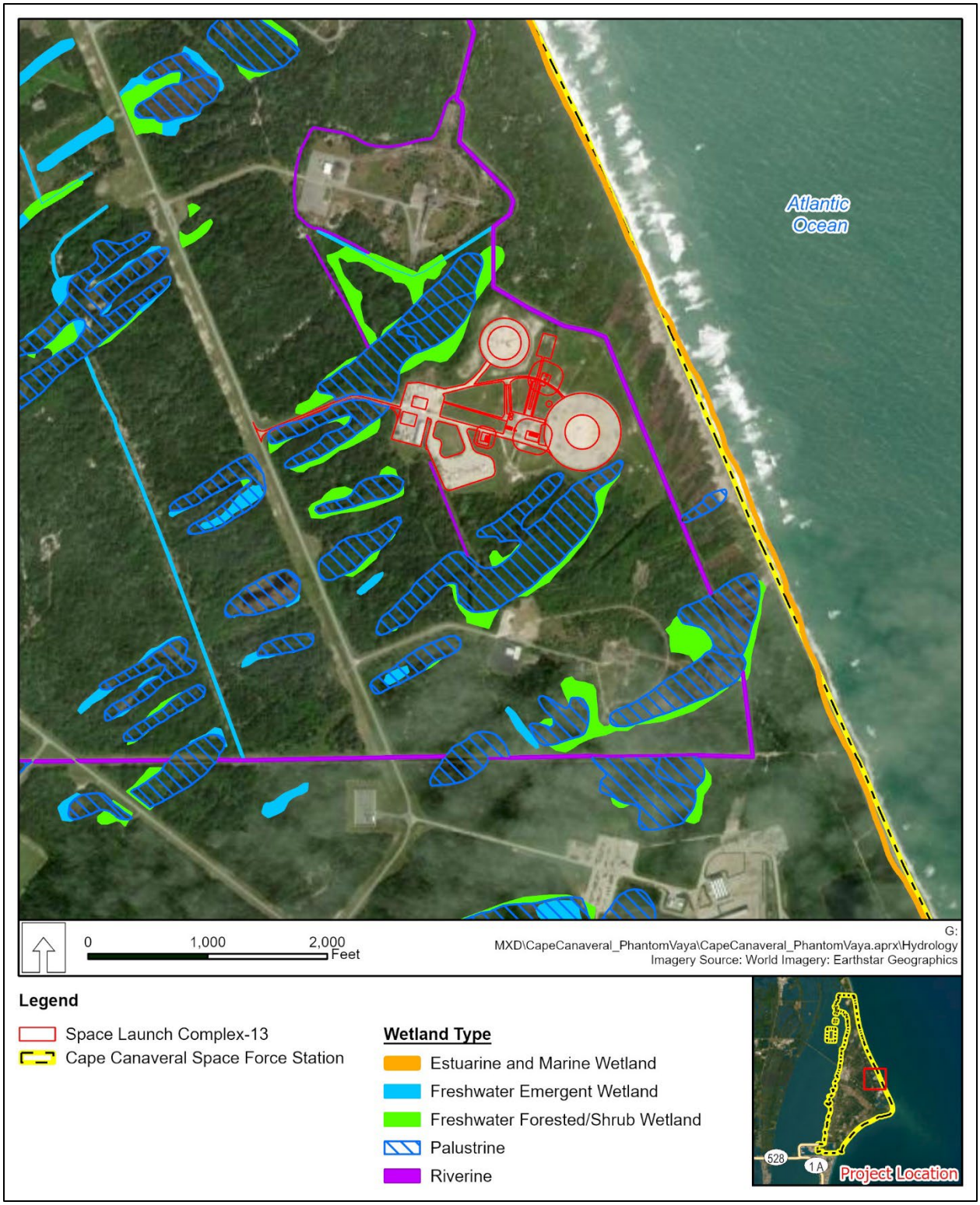


Figure 3.6-1. Wetlands Mapped on Cape Canaveral Space Force Station Proximate to Space Launch Complex-13

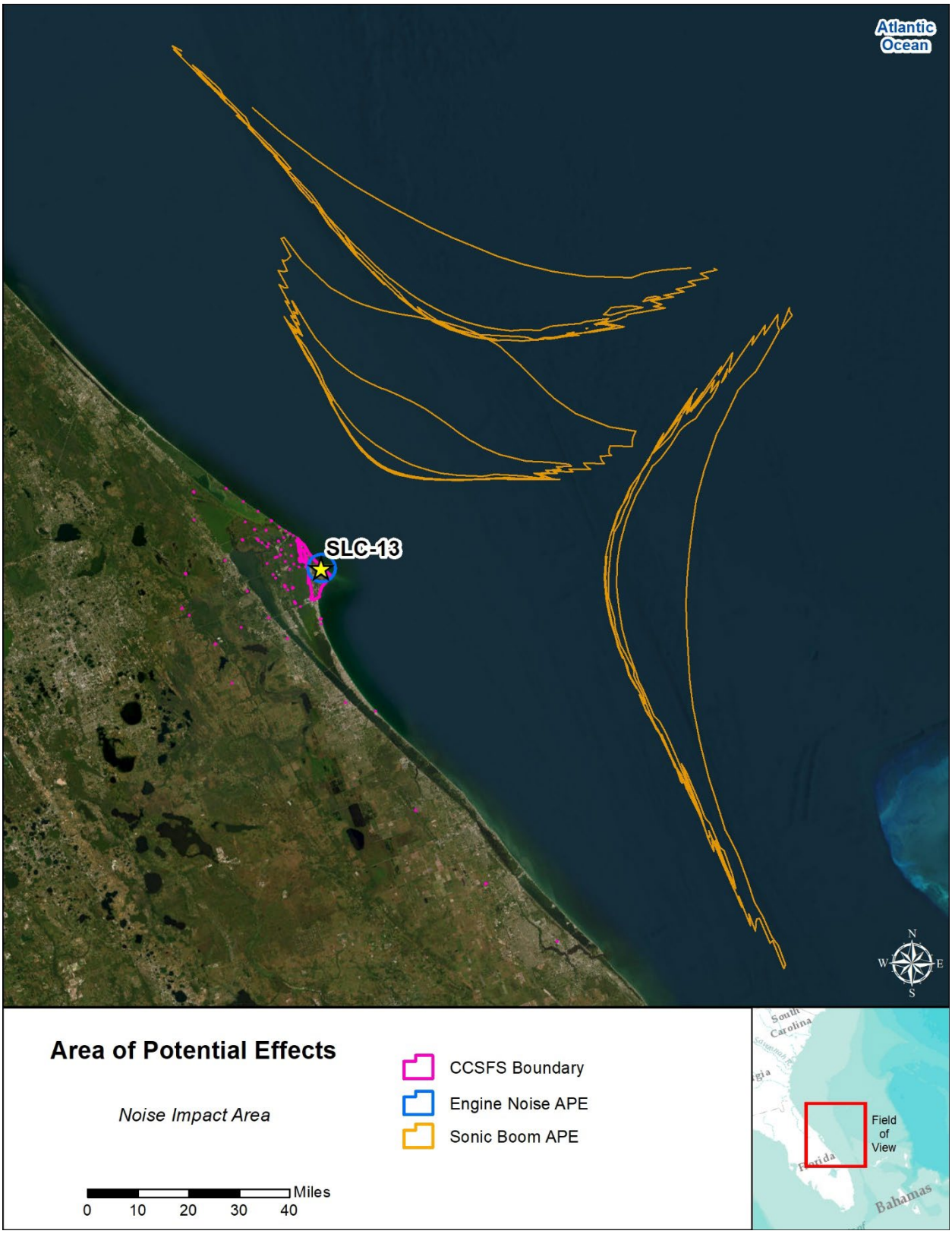


Figure 3.7-1. The Engine Noise APE and the Sonic Boom APE shown in relation to the CCSFS

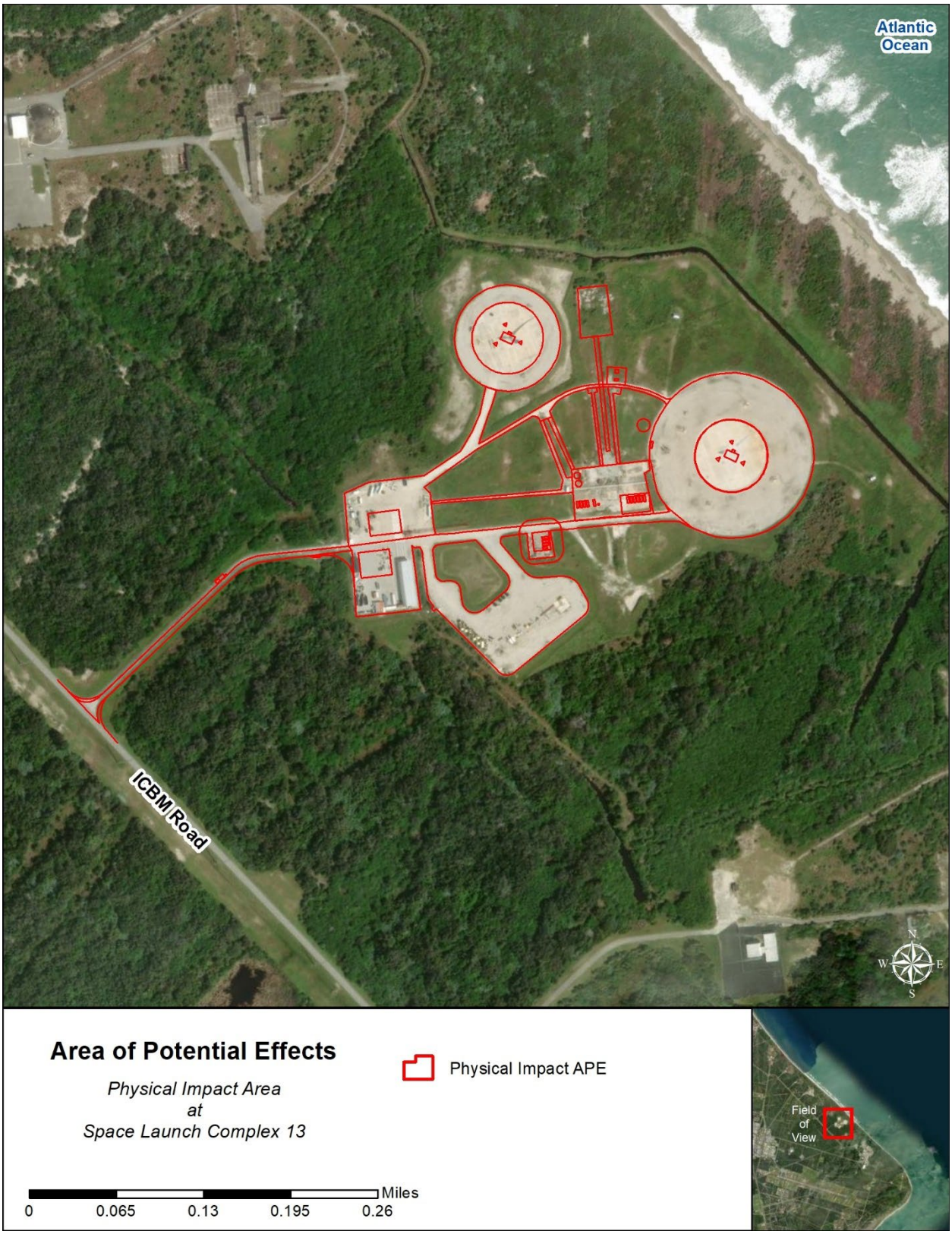


Figure 3.7-2. The Physical Impact APE at SLC-13

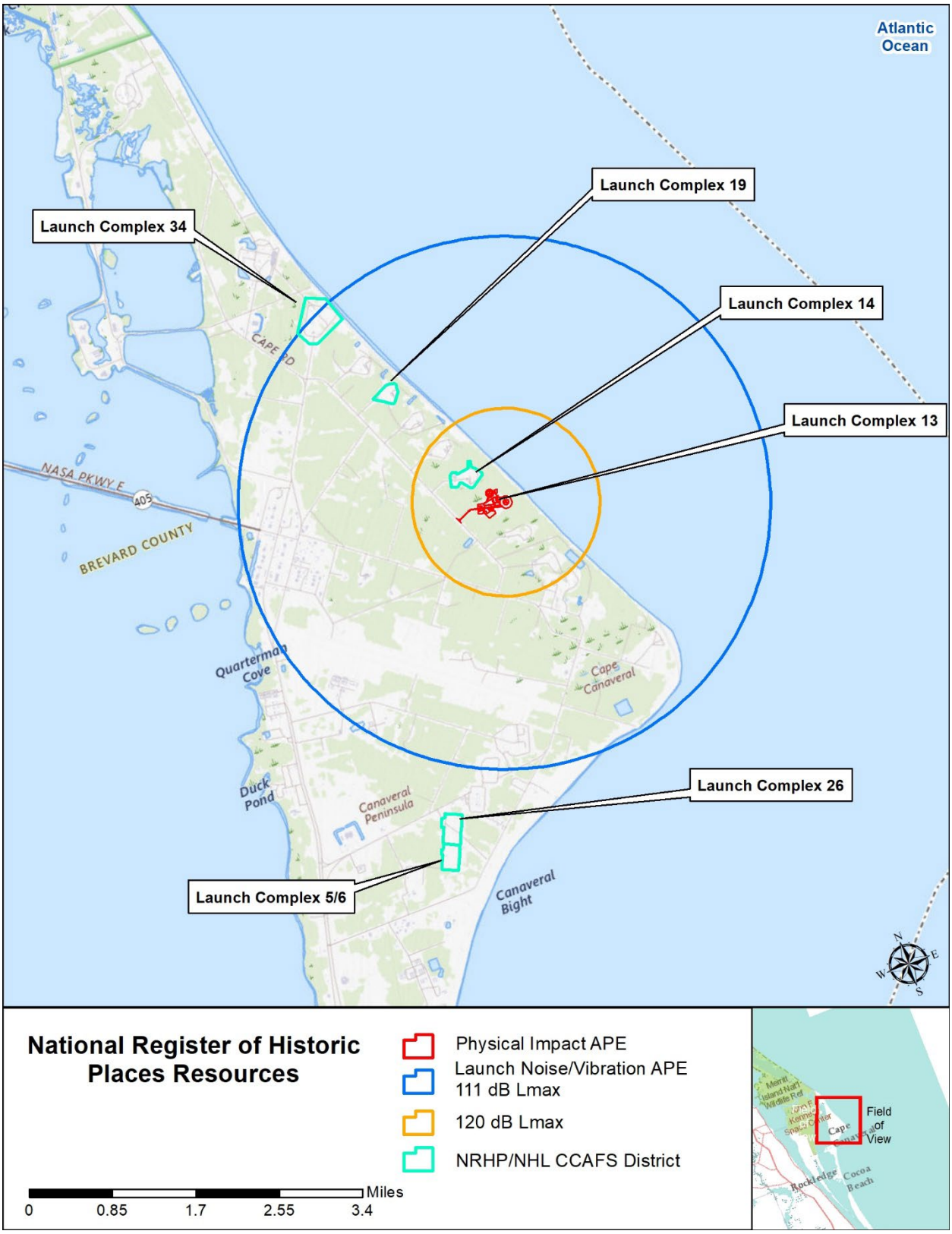


Figure 3.7-3. NRHP-Listed properties within the Launch Noise/Vibration APE

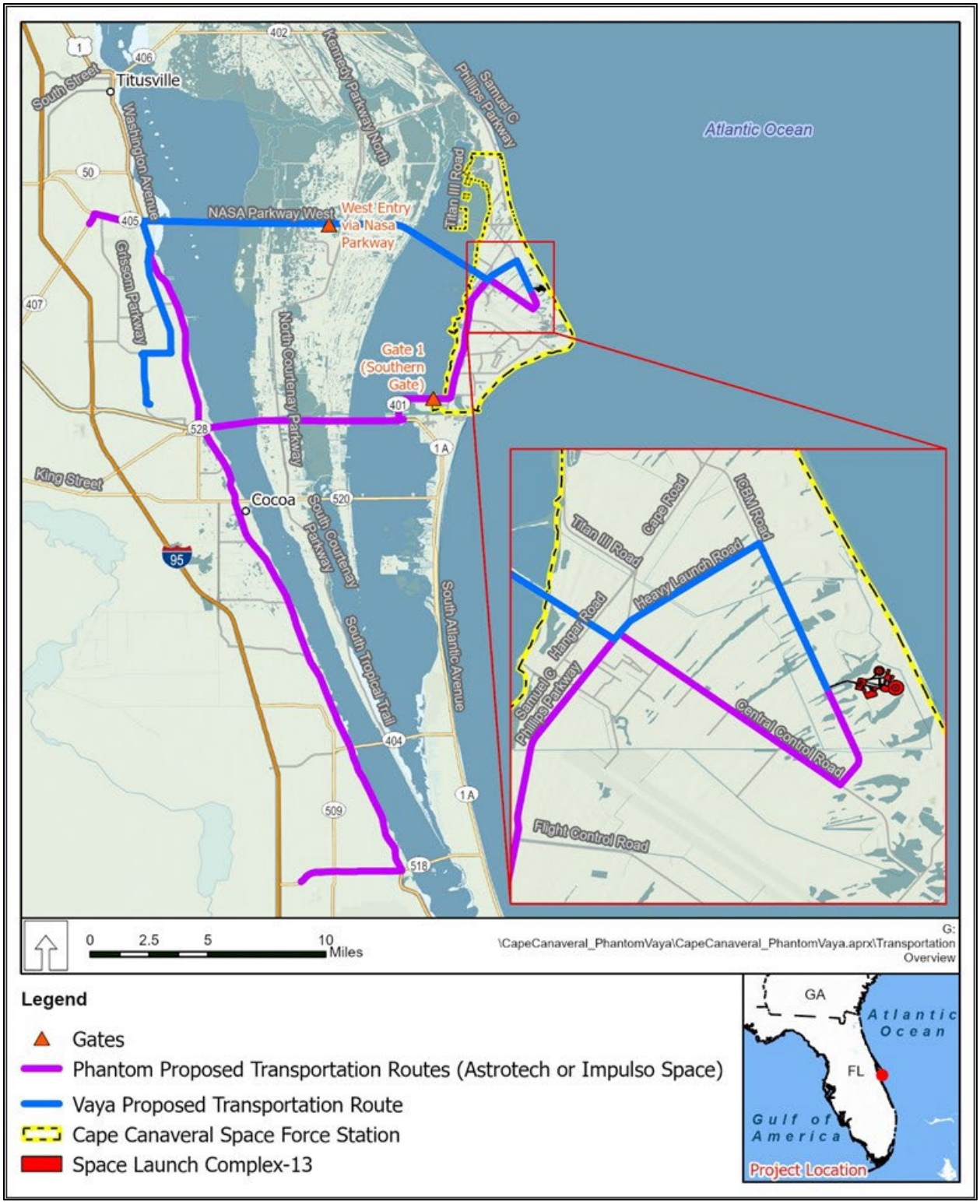


Figure 3.11-1. Regional Transportation Map

APPENDIX B – STATE HISTORIC PRESERVATION OFFICE AND NATIVE AMERICAN TRIBAL CONSULTATIONS

DRAFT

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 45

5 November 2025

MEMORANDUM FOR STATE HISTORIC PRESERVATION OFFICER
ATTENTION: MS. ALISSA SLADE LOTANE
FLORIDA STATE HISTORIC PRESERVATION OFFICE
R.A. GRAY BUILDING, 4TH FLOOR
500 SOUTH BRONOUGH STREET
TALLAHASSEE, FLORIDA 32399

FROM: 45 CES/CEIE
1224 Jupiter Street, MS-9125
Patrick Space Force Base FL 32925-3242

SUBJECT: Cultural Resource Assessment of the Proposed Modification to Space Launch Complex 13 (SLC-13) at the Cape Canaveral Space Force Station (CCSFS), Brevard County, Florida.

1. In December 2024, Brockington and Associates, Inc. (Brockington) contracted with ManTech SRS Technologies, Inc. (ManTech) to conduct a cultural resources assessment for Phantom Space and Vaya Space, ahead of a proposed Phantom Space and Vaya Space project at the CCSFS in Brevard County, Florida. The project is funded by Phantom Space and Vaya Space, with agency oversight from the US Space Force (USSF) and the Federal Aviation Administration (FAA).

2. The proposed project includes construction and use of new facilities, improvements to existing infrastructure, and noise and vibration from proposed launch activities at the former Cold War-era LC-13, now Space Launch Complex 13 (SLC-13). New facilities would include two space launch/test pads (13A and 13B), one hangar, and one horizontal integration facility (HIF). In addition, infrastructure improvements would include modifications to associated fluid and lighting systems, storage areas, utilities, access roadways, and perimeter fencing. Earthwork, in the form of cutting and filling operations, will be required.

3. Based on the results of this cultural resources assessment, Brockington recommends that construction within the Physical Impact APE will not physically or visually affect any historic properties. There will be project-associated noise and vibration within the Launch Noise/Vibration APE. However, there will be no adverse effect to any of the historic properties within the Launch Noise/Vibration APE since it is consistent with historic and ongoing use of the area. The Sonic Boom APE is overwater where no cultural resources are present.

4. The Physical Impact Area has been covered by a Phase I CRAS (Penders 2014). While it is statistically unlikely, it is possible that individual artifacts or small (>25-m interval), disturbed archaeological sites remain at the property. Even at locations that have been previously surveyed

and cleared, there is still a minor potential for the discovery of unidentified archaeological components, features, or human remains that may require additional investigation and assessment. In the unlikely event that previously unidentified archaeological resources or human remains are encountered during construction activities, USSF SLD 45 should follow the Discoveries of Archaeological Resources and Native American Graves and Repatriation Act (NAGPRA) Cultural Items Standard Operating Procedure (SOP) in the current ICRMP (USSF 2023:20-21).

5. The results of the archaeological investigation are contained in the enclosed report entitled *Cultural Resource Assessment of the Proposed Modification to Space Launch Complex 13 at the Cape Canaveral Space Force Station, Brevard County, Florid*a.

6. The SLD 45 Cultural Resources Manager has reviewed the report and concurs with the findings. We formally request you consultation.

7. This consultation is being submitted in accordance with Section 106 of the National Historic Preservation Act and 36 CFR 800

8. Point of contact for this matter is Tom Penders at 321-853-0886, or e-mail, Thomas.Penders@spaceforce.mil

MICHAEL A. BLAYLOCK, NH-3, DAF
Chief Environmental Conservation

Attachment:
1. Archaeology report, September 2025

John LaBonte <john.labonte@mantech.com>

FW: Reuse of SLC-13, CCSFS

1 message

NICELY, MEGAN E CIV USSF SSC 45 CES/CEIE-C <megan.nicely.1@spaceforce.mil> Tue, Nov 18, 2025 at 2:03 PM

To: "noah.cruz@mantech.com" <noah.cruz@mantech.com>
Cc: "LaBonte, John P" <john.labonte@mantech.com>, "JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C" <taylor.janise.1@spaceforce.mil>

FYSA.

From: PENDERS, THOMAS E CIV USSF SSC 45 CES/CEIE <thomas.penders@spaceforce.mil>
Sent: Monday, November 10, 2025 9:38 AM
To: CompliancePermits <compliancepermits@dos.fl.gov>; CompliancePermits <compliancepermits@dos.myflorida.com>
Cc: BLAYLOCK, MICHAEL A CIV USSF HQSF 45 CES/CEIE <michael.blaylock.4@spaceforce.mil>; NICELY, MEGAN E CIV USSF SSC 45 CES/CEIE-C <megan.nicely.1@spaceforce.mil>; STUCZYNSKI, JESSICA L CIV USSF SSC 45 CES/CEIE <jessica.stuczynski@spaceforce.mil>; JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C <taylor.janise.1@spaceforce.mil>
Subject: Reuse of SLC-13, CCSFS

Good Morning,

The Space Launch Delta 45 of the United States Space Force formally requests your review and comments on the proposed undertaking at Space Launch Complex 13. We have attached the CRAS report for your review. Thank you.

v/r

Tom Penders

2 attachments

SLC_13 Reuse Report _SHPO signed.pdf
282K

Cape Canaveral Space Force LC-13 CRA REV 9-17-25.pdf
18086K

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 45

3 November 2025

MEMORANDUM FOR TRIBAL HISTORIC PRESERVATION OFFICER
SEMINOLE TRIBE OF FLORIDA
ATTENTION: MS. TINA OSCEOLA
30290 JOSIE BILLIE HIGHWAY, PMB 1004
CLEWISTON, FL 33440

FROM: 45 CES/CEIE
1224 Jupiter Street, MS-9125
Patrick Space Force Base FL 32925-3242

SUBJECT: Cultural Resource Assessment of the Proposed Modification to Space Launch Complex 13 (SLC-13) at the Cape Canaveral Space Force Station (CCSFS), Brevard County, Florida.

1. In December 2024, Brockington and Associates, Inc. (Brockington) contracted with ManTech SRS Technologies, Inc. (ManTech) to conduct a cultural resources assessment for Phantom Space and Vaya Space, ahead of a proposed Phantom Space and Vaya Space project at the CCSFS in Brevard County, Florida. The project is funded by Phantom Space and Vaya Space, with agency oversight from the US Space Force (USSF) and the Federal Aviation Administration (FAA).

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5. The results of the archaeological investigation are contained in the enclosed report entitled *Cultural Resource Assessment of the Proposed Modification to Space Launch Complex 13 at the Cape Canaveral Space Force Station, Brevard County, Florid*a.

6. The SLD 45 Cultural Resources Manager has reviewed the report and concurs with the findings. We formally request you consultation.

7. This consultation is being submitted in accordance with Section 106 of the National Historic Preservation Act and 36 CFR 800

8. Point of contact for this matter is Tom Penders at 321-853-0886, or e-mail, Thomas.Penders@spaceforce.mil

MICHAEL A. BLAYLOCK, NH-3, DAF
Chief Environmental Conservation

Attachment:
1. Archaeology report, September 2025

John LaBonte <john.labonte@mantech.com>

FW: Reuse of SLC-13, CCSFS

1 message

NICELY, MEGAN E CIV USSF SSC 45 CES/CEIE-C <megan.nicely.1@spaceforce.mil> Tue, Nov 18, 2025 at 2:05 PM

To: "noah.cruz@mantech.com" <noah.cruz@mantech.com>
Cc: "LaBonte, John P" <john.labonte@mantech.com>, "JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C" <taylor.janise.1@spaceforce.mil>

FYSA.

From: PENDERS, THOMAS E CIV USSF SSC 45 CES/CEIE <thomas.penders@spaceforce.mil>
Sent: Monday, November 10, 2025 9:45 AM
To: THPO Compliance <thpocompliance@semtribe.com>; Tina Osceola <tinaosceola@semtribe.com>
Cc: Victoria Menchaca <victoriamenchaca@semtribe.com>; Danielle Simon <daniellesimon@semtribe.com>; BLAYLOCK, MICHAEL A CIV USSF HQSF 45 CES/CEIE <michael.blaylock.4@spaceforce.mil>; NICELY, MEGAN E CIV USSF SSC 45 CES/CEIE-C <megan.nicely.1@spaceforce.mil>; JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C <taylor.janise.1@spaceforce.mil>; STUCZYNSKI, JESSICA L CIV USSF SSC 45 CES/CEIE <jessica.stuczynski@spaceforce.mil>
Subject: Reuse of SLC-13, CCSFS

Good Morning,

The Space Launch Delta 45 of the United States Space Force formally requests your review and comments on the proposed undertaking at Space Launch Complex 13. We have attached the CRAS report for your review. Thank you.

v/r

Tom Penders

2 attachments

SLC_13 Reuse Report _STOF Letter 2 .pdf
190K

Cape Canaveral Space Force LC-13 CRA REV 9-17-25.pdf
18086K

Outlook

FW: Resending Launch Complex 13 reuse consultation

From BLAYLOCK, MICHAEL A CIV USSF HQSF 45 CES/CEIE <michael.blaylock.4@spaceforce.mil>
Date Wed 12/17/2025 4:09 PM
To PENDERS, THOMAS E CIV USSF SSC 45 CES/CEIE <thomas.penders@spaceforce.mil>
Cc NICELY, MEGAN E CIV USSF SSC 45 CES/CEIE-C <megan.nicely.1@spaceforce.mil>; JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C <taylor.janise.1@spaceforce.mil>; STUCZYNSKI, JESSICA L CIV USSF SSC 45 CES/CEIE <jessica.stuczynski@spaceforce.mil>

1 attachment (243 KB)
SLC_13 Reuse Report _STOF signed.pdf;

Hi Tom,
Have you heard anything from the SHPO?

v/r
Mike
Michael Blaylock
Chief, Environmental Conservation
45 CES/CEIE-C
Space Launch Delta 45
WP 321-853-0964, CP 321-292-1503

From: Victoria Menchaca <VictoriaMenchaca@semtribe.com>
Sent: Wednesday, December 17, 2025 3:27 PM
To: PENDERS, THOMAS E CIV USSF SSC 45 CES/CEIE <thomas.penders@spaceforce.mil>
Cc: THPO Compliance <THPOCompliance@semtribe.com>; Danielle Simon <daniellesimon@semtribe.com>; BLAYLOCK, MICHAEL A CIV USSF HQSF 45 CES/CEIE <michael.blaylock.4@spaceforce.mil>
Subject: [Non-DoD Source] RE: Resending Launch Complex 13 reuse consultation

SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE

SEMINOLE TRIBE OF FLORIDA

TRIBAL HISTORIC
PRESERVATION OFFICE

THPO PHONE: (863) 983-6549

THPO TRIBAL CONSULTATION EMAIL:
THPOCOMPLIANCE@SEMTRIBE.COM

THPO WEBSITE: WWW.STOFTHPO.COM

TRIBAL OFFICERS

MARCELLUS W. OSCEOLA JR.
CHAIRMAN

HOLLY TIGER
VICE CHAIRWOMAN

NAOMI R. WILSON
SECRETARY

PETER A. HAHN
TREASURER

December 17, 2025

Thomas E. Penders, MS, RPA
U.S. Space Force
Space Launch Delta 45 CES/CEIE-C
1224 Jupiter Street
Patrick SFB FL 32925-3343
Phone: 321-853-0886
Phone: 321-307-0075
Email: thomas.penders@spaceforce.mil

Subject: Modification to Space Launch Complex 13 (SLC-13) for the Vaya Dauntless and Phantom Daytona/Laguna Launch Programs, Cape Canaveral Space Force Station (CCSFS), Brevard County, Florida
THPO Compliance Tracking Number: 0034723

In order to expedite the THPO review process:

1. Please correspond via email and provide documents as attachments,
2. Please send all emails to THPOCompliance@semtribe.com,
3. Please reference the THPO Compliance Tracking Number if one has been assigned.

Dear Tom Penders:

Thank you for contacting the Seminole Tribe of Florida Tribal Historic Preservation Office (STOF THPO) Compliance Section regarding the Modification to Space Launch Complex 13 (SLC-13) for the Vaya Dauntless and Phantom Daytona/Laguna Launch Programs, Cape Canaveral Space Force Station (CCSFS), Brevard County, Florida.

The proposed undertaking does fall within the STOF Area of Interest. We have reviewed the documents that you have provided and completed our assessment pursuant to Section 106 of the National Historic Preservation Act (16 USC 470) as amended and its implementing regulations (36 CFR 800). We have no objections or other comments at this time. Please notify our office if any archaeological, historical, and/or burial resources are inadvertently discovered during project implementation and feel free to contact us with any questions or concerns.

Sincerely,
Victoria L. Menchaca, M.A.,RPA
Compliance Analyst II
Seminole Tribe of Florida
Tribal Historic Preservation Office
Phone: 863-458-8195
Email: victoriamenchaca@semtribe.com

From: PENDERS, THOMAS E CIV USSF SSC 45 CES/CEIE <thomas.penders@spaceforce.mil>
Sent: Wednesday, December 10, 2025 10:40 AM
To: Victoria Menchaca <VictoriaMenchaca@semtribe.com>
Cc: Danielle Simon <daniellesimon@semtribe.com>
Subject: RE: Resending Launch Complex 13 reuse consultation

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

SLC 13 letter.

Did you ever receive the SLC 51 and the Hotel Site report consult last month?

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 45

5 November 2025

MEMORANDUM FOR THE TRIBAL HISTORIC PRESERVATION OFFICER
MICCOSUKEE TRIBE OF INDIANS OF FLORIDA
ATTENTION: DR. JASON DANIEL
TAMIAMI STATION
PO BOX 440021
MIAMI, FL 33114

FROM: 45 CES/CEIE
1224 Jupiter Street, MS-9125
Patrick Space Force Base FL 32925-3242

SUBJECT: Cultural Resource Assessment of the Proposed Modification to Space Launch Complex 13 (SLC-13) at the Cape Canaveral Space Force Station (CCSFS), Brevard County, Florida.

1. In December 2024, Brockington and Associates, Inc. (Brockington) contracted with ManTech SRS Technologies, Inc. (ManTech) to conduct a cultural resources assessment for Phantom Space and Vaya Space, ahead of a proposed Phantom Space and Vaya Space project at the CCSFS in Brevard County, Florida. The project is funded by Phantom Space and Vaya Space, with agency oversight from the US Space Force (USSF) and the Federal Aviation Administration (FAA).

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MICHAEL A. BLAYLOCK, NH-3, DAF
Chief Environmental Conservation

Attachment:
Archaeology report, September 2025

John LaBonte <john.labonte@mantech.com>

FW: Reuse of Space Launch Complex 13 CRAS Report

1 message

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To: "noah.cruz@mantech.com" <noah.cruz@mantech.com>
Cc: "LaBonte, John P" <john.labonte@mantech.com>, "JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C" <taylor.janise.1@spaceforce.mil>

FYSA.

From: PENDERS, THOMAS E CIV USSF SSC 45 CES/CEIE <thomas.penders@spaceforce.mil>
Sent: Monday, November 10, 2025 9:35 AM
To: thpo_fed@miccosukeetribe.com
Cc: BLAYLOCK, MICHAEL A CIV USSF HQSF 45 CES/CEIE <michael.blaylock.4@spaceforce.mil>; NICELY, MEGAN E CIV USSF SSC 45 CES/CEIE-C <megan.nicely.1@spaceforce.mil>; JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C <taylor.janise.1@spaceforce.mil>; STUCZYNSKI, JESSICA L CIV USSF SSC 45 CES/CEIE <jessica.stuczynski@spaceforce.mil>
Subject: Reuse of Space Launch Complex 13 CRAS Report

Good Morning,

The Space Launch Delta 45 of the United States Space Force formally requests your review and comments on the proposed undertaking at Space Launch Complex 13. We have attached the CRAS report for your review. Thank you.

v/r

Tom Penders

2 attachments

SLC_13 Reuse Report _Micco signed.pdf
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Cape Canaveral Space Force LC-13 CRA REV 9-17-25.pdf
18086K

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 45

5 November 2025

MEMORANDUM FOR TRIBAL HISTORIC PRESERVATION OFFICER
SEMINOLE TRIBE OF FLORIDA
ATTENTION: MS. TINA OSCEOLA
30290 JOSIE BILLIE HIGHWAY, PMB 1004
CLEWISTON, FL 33440

FROM: 45 CES/CEIE
1224 Jupiter Street, MS-9125
Patrick Space Force Base FL 32925-3242

SUBJECT: Cultural Resource Assessment of the Proposed Modification to Space Launch Complex 13 (SLC-13) at the Cape Canaveral Space Force Station (CCSFS), Brevard County, Florida.

1. In December 2024, Brockington and Associates, Inc. (Brockington) contracted with ManTech SRS Technologies, Inc. (ManTech) to conduct a cultural resources assessment for Phantom Space and Vaya Space, ahead of a proposed Phantom Space and Vaya Space project at the CCSFS in Brevard County, Florida. The project is funded by Phantom Space and Vaya Space, with agency oversight from the US Space Force (USSF) and the Federal Aviation Administration (FAA).

2. The proposed project includes construction and use of new facilities, improvements to existing infrastructure, and noise and vibration from proposed launch activities at the former Cold War-era LC-13, now Space Launch Complex 13 (SLC-13). New facilities would include two space launch/test pads (13A and 13B), one hangar, and one horizontal integration facility (HIF). In addition, infrastructure improvements would include modifications to associated fluid and lighting systems, storage areas, utilities, access roadways, and perimeter fencing. Earthwork, in the form of cutting and filling operations, will be required.

3. Based on the results of this cultural resources assessment, Brockington recommends that construction within the Physical Impact APE will not physically or visually affect any historic properties. There will be project-associated noise and vibration within the Launch Noise/Vibration APE. However, there will be no adverse effect to any of the historic properties within the Launch Noise/Vibration APE since it is consistent with historic and ongoing use of the area. The Sonic Boom APE is overwater where no cultural resources are present.

4. The Physical Impact Area has been covered by a Phase I CRAS (Penders 2014). While it is statistically unlikely, it is possible that individual artifacts or small (>25-m interval), disturbed archaeological sites remain at the property. Even at locations that have been previously surveyed and cleared, there is still a minor potential for the discovery of unidentified archaeological components, features, or human remains that may require additional investigation and assessment. In the unlikely event that previously unidentified archaeological resources or human remains are encountered during construction activities, USSF SLD 45 should follow the Discoveries of Archaeological Resources and Native American Graves and Repatriation Act (NAGPRA) Cultural Items Standard Operating Procedure (SOP) in the current ICRMP (USSF 2023:20-21).

5. The results of the archaeological investigation are contained in the enclosed report entitled *Cultural Resource Assessment of the Proposed Modification to Space Launch Complex 13 at the Cape Canaveral Space Force Station, Brevard County, Florid*a.

6. The SLD 45 Cultural Resources Manager has reviewed the report and concurs with the findings. We formally request you consultation.

7. This consultation is being submitted in accordance with Section 106 of the National Historic Preservation Act and 36 CFR 800

8. Point of contact for this matter is Tom Penders at 321-853-0886, or e-mail, Thomas.Penders@spaceforce.mil

MICHAEL A. BLAYLOCK, NH-3, DAF
Chief Environmental Conservation

Attachment:
Archaeology report, September 2025

John LaBonte <john.labonte@mantech.com>

FW: SLC-13, CCSFS Reuse

1 message

NICELY, MEGAN E CIV USSF SSC 45 CES/CEIE-C <megan.nicely.1@spaceforce.mil> Tue, Nov 18, 2025 at 2:04 PM

To: "noah.cruz@mantech.com" <noah.cruz@mantech.com>
Cc: "LaBonte, John P" <john.labonte@mantech.com>, "JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C" <taylor.janise.1@spaceforce.mil>

FYSA.

From: PENDERS, THOMAS E CIV USSF SSC 45 CES/CEIE <thomas.penders@spaceforce.mil>
Sent: Monday, November 10, 2025 9:44 AM
To: Jeffery Harjo <harjo.je@sno-nsn.gov>
Cc: BLAYLOCK, MICHAEL A CIV USSF HQSF 45 CES/CEIE <michael.blaylock.4@spaceforce.mil>; NICELY, MEGAN E CIV USSF SSC 45 CES/CEIE-C <megan.nicely.1@spaceforce.mil>; JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C <taylor.janise.1@spaceforce.mil>; STUCZYNSKI, JESSICA L CIV USSF SSC 45 CES/CEIE <jessica.stuczynski@spaceforce.mil>
Subject: SLC-13, CCSFS Reuse

Good Morning,

The Space Launch Delta 45 of the United States Space Force formally requests your review and comments on the proposed undertaking at Space Launch Complex 13. We have attached the CRAS report for your review. Thank you.

v/r

Tom Penders

2 attachments

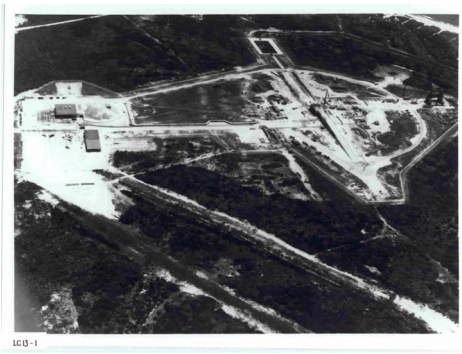
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Cultural Resource Assessment of the Proposed Modification to Space Launch Complex 13 at the Cape Canaveral Space Force Station

Brevard County, Florida







September 2025

Brockington®
CULTURAL RESOURCES CONSULTING

Cultural Resource Assessment of the Proposed Modification to Space Launch Complex 13 at the Cape Canaveral Space Force Station

Brevard County, Florida

Revised Draft Report

September 2025

Submitted to:
ManTech SRS Technologies, Inc.
300 North G Street
Lompoc, CA 93436

Prepared by:



Stacey Whitacre Pruitt, RPA
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and

James Page
Graphics Specialist

Brockington and Associates, Inc.
Atlanta • Charleston • Savannah

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1.0 Introduction

Information contained in this report relating to the nature and location of archaeological sites is considered private and confidential and not for public disclosure in accordance with Section 304 of the National Historic Preservation Act ([NHPA] 54 U.S.C. § 307103); 36 CFR Part 800.6 (a)(5) of the Advisory Council on Historic Preservation's (ACHP) rules implementing Sections 106 and 110 of the Act; Section 9(a) of the Archaeological Resource Protection Act ([ARPA] 54 U.S.C. § 100707).

In December 2024, Brockington and Associates, Inc. (Brockington) contracted with ManTech SRS Technologies, Inc. (ManTech) to conduct a cultural resources assessment for Phantom Space and Vaya Space, ahead of a proposed Phantom Space and Vaya Space project at the Cape Canaveral Space Force Station in Brevard County, Florida. The project is funded by Phantom Space and Vaya Space, with agency oversight from the US Space Force (USSF) and the Federal Aviation Administration (FAA).

The proposed project includes construction and use of new facilities, improvements to existing infrastructure, and noise and vibration from proposed launch activities at the former Cold War-era Launch Complex 13, now Space Launch Complex 13 (SLC-13). New facilities would include two space launch/test pads (13A and 13B), one hangar, and one Horizontal Integration Facility (HIF). Infrastructure improvements would include modifications to associated fluid and lighting systems, storage areas, utilities, access roadways, and perimeter fencing. Earthwork, in the form of cutting and filling operations, will be required. Detailed project plans are provided in Appendix A.

The USSF has defined three separate areas of potential effects (APEs) (Figures 1.1-1.3). This Cultural Resource Assessment will be the first submittal of the APEs to the SHPO. Project APEs include:

- The Physical Impact APE (30.4 acres) includes the area that will be directly affected by earthwork and construction activities. The Physical Impact APE is situated on the east side of Cape Canaveral, west of the Atlantic Ocean, directly east of the Intercontinental Ballistic Missile (ICBM) Road connecting the historic and current launch complexes, and within the central eastern portion of Section 17, Township 23, Range 38.
- Launch Noise/Vibration APE (Lmax 111 decibels [dB] and 120 dB) consists of the area for potential risk of structural damage based on Guest and Slone's (1972) study that indicates that approximately one damage claim will result per 100 households exposed at 120 dB and one damage claim per 1,000 households exposed at 111 dB. This area includes the area of indirect effects on land.
- The Sonic Boom APE includes the area that will be affected by a sonic boom. This area is offshore in the Atlantic Ocean.

All ground disturbance would occur on land; no impacts to submerged areas are expected.

Brockington conducted background research and developed a site potential model for the Physical Impact APE based on topography, soil conditions, and land use since the mid-twentieth century. Due to past and current disturbance, the Physical Impact APE was considered a low probability zone (LPZ). As a result of this disturbance and a previous State Historic Preservation Office (SHPO)-approved Phase I Cultural Resource Assessment Survey (CRAS) of SLC-13 (Penders 2014a), no excavations were undertaken as part of this investigation.

In May and June 2025, Brockington personnel completed a Phase I CRAS for the project, including archaeological and architectural/historic resources assessments. The goal of this survey was to identify and evaluate any historic properties that may be affected by the proposed property development so that potential effects could be evaluated. This investigation consisted of three primary tasks: archival research, resource assessment, and report production.

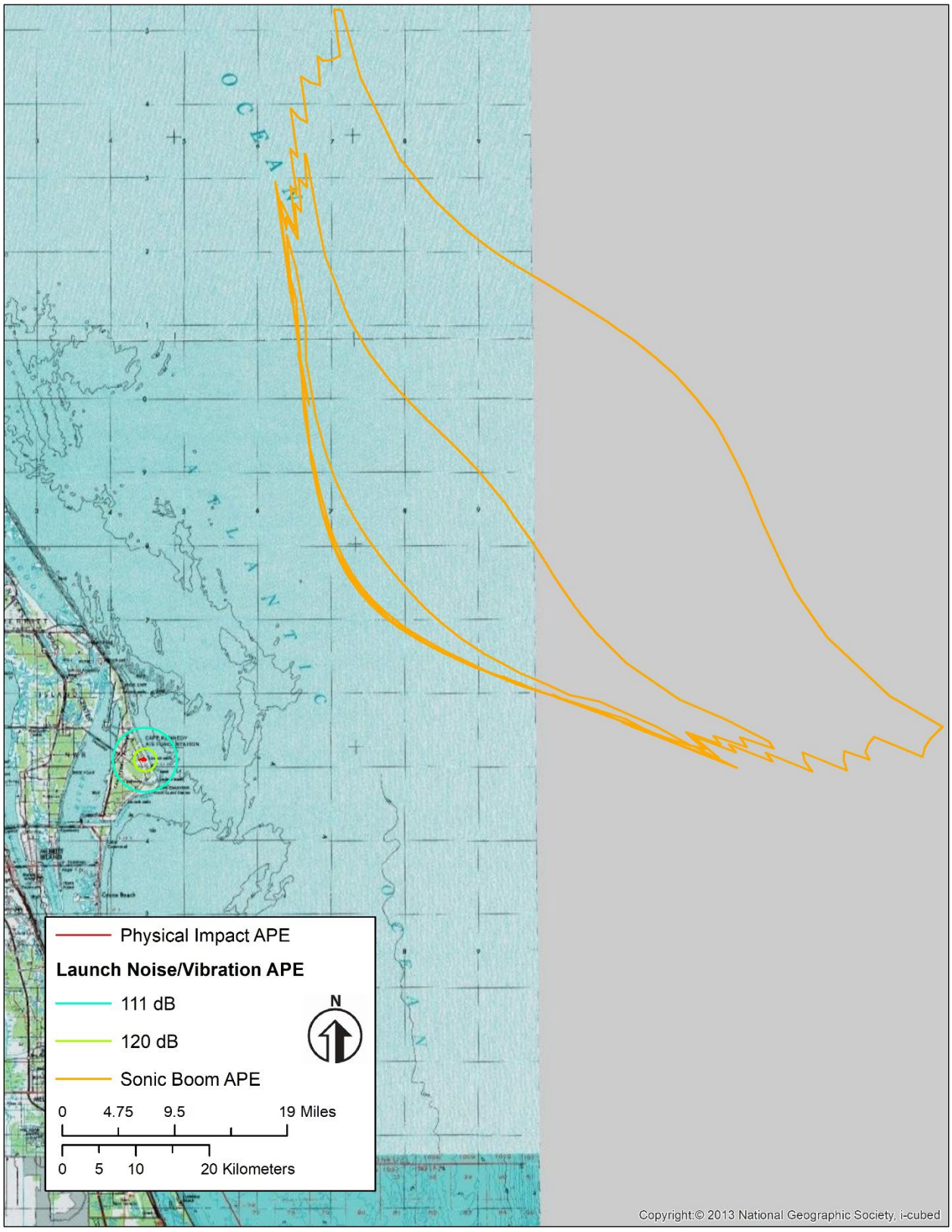


Figure 1.1 The Physical Impact APE, the Launch Noise/Vibration APE, and the Sonic Boom APE shown on the *Cape Canaveral, Florida* United States Geological Survey (USGS) topographic quadrangle (2013).

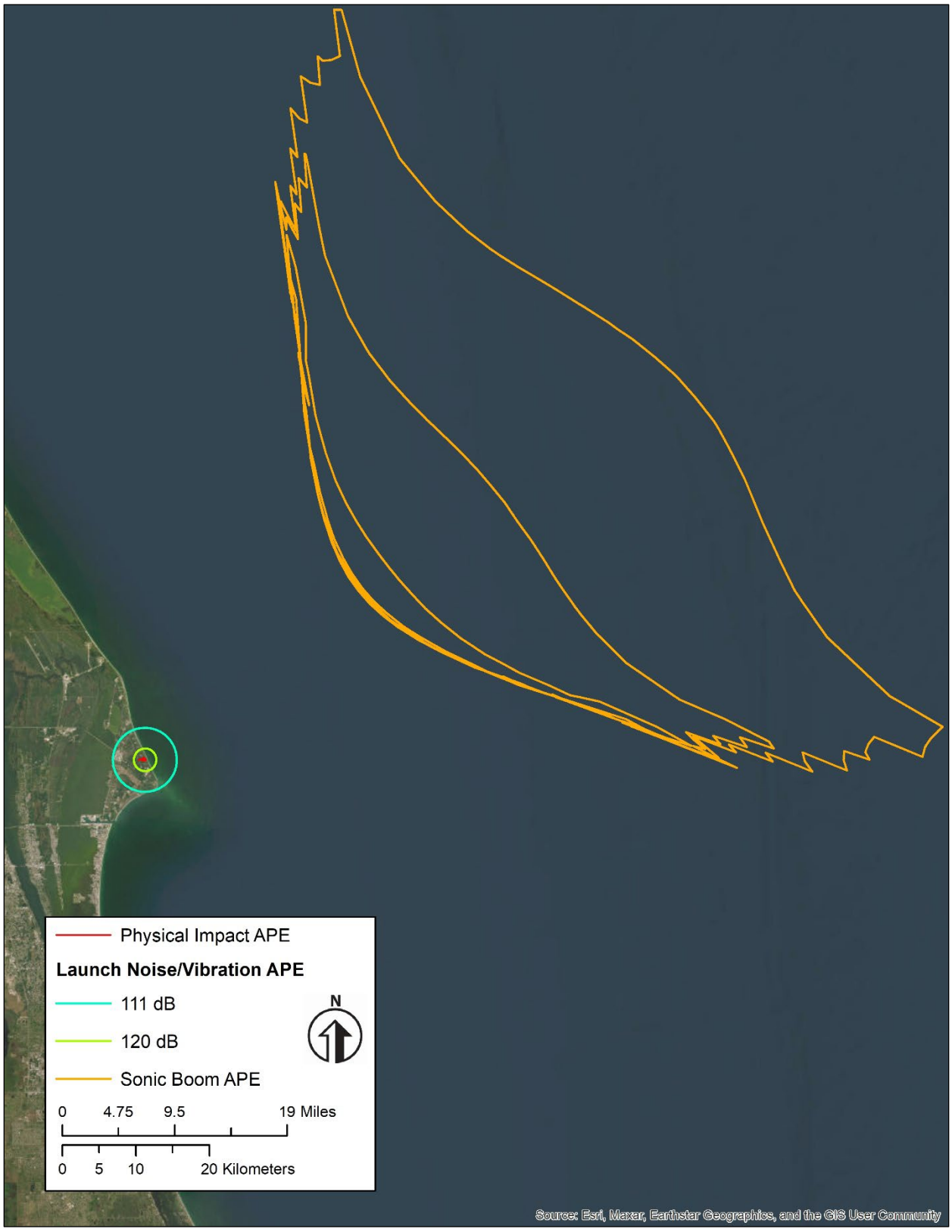


Figure 1.2 The Physical Impact APE, the Launch Noise/Vibration APE, and the Sonic Boom APE shown on modern aerial imagery.

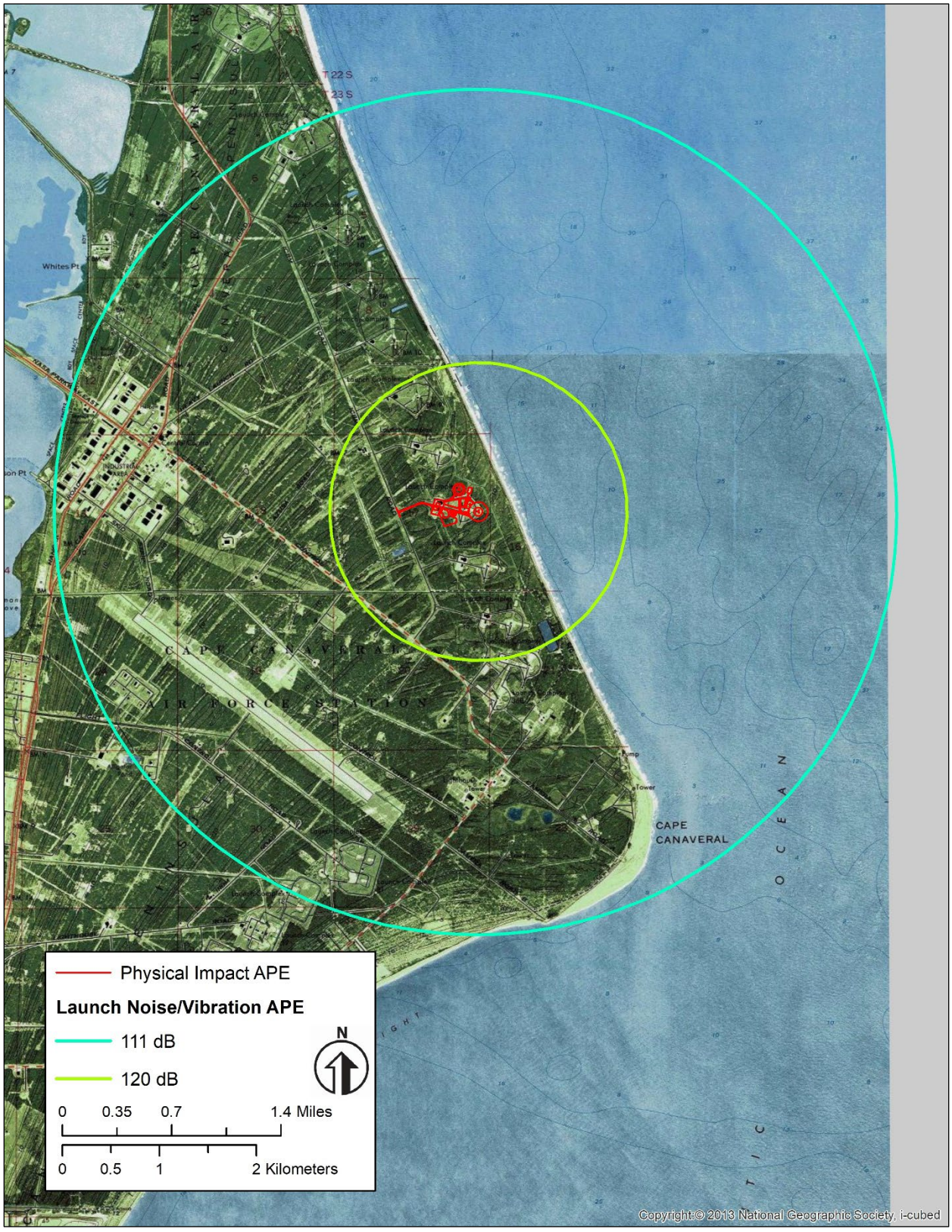


Figure 1.3 The Physical Impact APE and the Launch Noise/Vibration APE shown on the *Cape Canaveral, Florida* USGS topographic quadrangle (USGS 1976).

Brockington's assessment was conducted in compliance with both federal and state guidelines including Section 106 of the NHPA of 1966 (54 USC 30010, as amended through 2016), the ACHP's implementing regulations (36 CFR Part 800), Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (1983), Chapter 267 Florida Statutes (FS), Rule 1A-46 Florida Administrative Code (FAC), and cultural resources survey and reporting guidelines set forth by the Florida Division of Historical Resources (FDHR) (FDHR 2002a, 2002b). Key project personnel meet or exceed the qualifications described in the Secretary of the Interior's "Professional Qualifications Standards" (48 FR 44738-9) (Appendix B). The results of this cultural resources assessment will be included in an Environmental Assessment (EA) developed in compliance with the National Environmental Protection Act (NEPA).

This report is organized into seven chapters, references cited, and three appendices. Following this Introduction, an outline of methodology is provided in Chapter 2. Chapter 3 gives a brief description of the environmental setting, and Chapter 4 provides a focused cultural context of the project area. Chapter 5 contains a summary of previous cultural resource work in the area. Chapter 6 presents the results of our cultural resource assessment. Project summary information is presented in Chapter 7, followed by a References Cited section. Appendix A contains detailed project plans. Appendix B presents resumes for key project personnel. FDHR/SHPO correspondence is provided in Appendix C.

1.1 Acknowledgements

Brockington would like to thank John LaBonte and Noah Cruz (among others) at ManTech for their assistance with project planning and coordination. Additionally, we would like to thank Taylor Janise and Megan Nicely at USSF for their help understanding past NRHP determinations and overall project review. Stacey Whitacre Pruitt served as Brockington's Principal Investigator, Archaeologist, and co-author of this report along with Patricia Stallings (Architectural Historian) and James Page (GIS Specialist). Meagan Brady and Whitney Gray edited and produced the report.

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2.0 Methods of Assessment

The goal of this assessment was to identify and evaluate historic properties that may be affected by the proposed modification to SLC-13. Brockington conducted archival background research within a 1.0-mile radius (Research Buffer) to identify any previously recorded resources. This buffer was expanded to include NRHP- and National Historic Landmark (NHL)-listed properties within the entire Launch Noise/Vibration APE to account for indirect effects. A cultural resource assessment was conducted for the entirety of SLC-13 and all adjacent historic properties. The NRHP eligibility of all identified cultural resources was thoroughly documented.

2.1 Archival Research

Archival research was conducted in May and June of 2025. The project area was evaluated for its potential to contain historic properties (precontact or historic cultural resources listed in or eligible for the NRHP) by defining environmental and cultural contexts. Brockington personnel analyzed environmental variables known to be associated with precontact and historic settlement (i.e., soil drainage, proximity to water and/or wetland resources, relative elevation, and historic settlement patterns). Research was also conducted at the State Library and Archives of Florida to gather regional and local information (e.g., local histories, historic maps, etc.). This information was supplemented by searching online repositories such as the Library of Congress, the USGS, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service, Nationwide Environmental Title Research (NETR), and others. A brief description of the environmental setting and a focused cultural context for the project area are presented in Chapters 3 and 4.

Brockington also conducted research regarding previous cultural resources investigations and previously identified cultural resources (i.e., archaeological sites, buildings, structures, districts, objects, and sites of traditional/cultural importance) within one mile of the project area. Research was conducted through the National Park Service's National Register files and via FMSFweb, an online cultural resource database managed by the Florida Master Site File (FMSF). This research provides information regarding the proximity of significant resources to the project area. All known cultural resources within a 1.0-mile buffer of the project tract were also identified and documented to the extent that they may have bearing on resources within the subject tract.

2.2 Archaeological Potential Assessment

Brockington archaeologists assessed the Physical Impact Area in terms of its potential to contain intact, significant archaeological sites (sites with artifacts or deposits that can generate important information about the past and be eligible for the NRHP) based on topography, soil conditions, and land use since the mid-twentieth century.

The project area is located on dune coastal landforms adjacent to the Atlantic Ocean and wetland ponds, so it is likely that both precontact camp/resource extraction sites and historic domestic sites are in the vicinity. While no historic buildings were shown within the Physical Impact APE on the reviewed historic maps, it is possible that historic buildings were erected and occupied in the area. However, due to the largescale earthwork and disturbance associated with the historic construction and ongoing use of SLC-13, it is unlikely that undocumented, intact, NRHP-eligible archaeological resources are located within the Physical Impact APE. Therefore, it is designated as an LPZ.

A full Phase I CRAS of SLC-13, including systematic subsurface testing, was completed in 2014 and received SHPO concurrence (Bendus 2014; Blaylock 2014; Penders 2014a). Therefore, no additional subsurface testing is needed for this project.

2.3 NRHP Eligibility

Cultural resources (i.e., districts, buildings, structures, sites, and objects) are generally evaluated based on the criteria for eligibility to the NRHP as specified in Department of Interior Regulations 36 CFR Part 60: *National Register of Historic Places*. According to 36 CFR Part 60.4 (Criteria for Evaluation), cultural resources (referred to as properties in the regulations) can be defined as significant (i.e., eligible for the NRHP) if they "possess integrity of location, design, setting, materials, workmanship, feeling, and association." In addition, to be considered eligible for the NRHP, a property must be shown to be significant under one or more of four basic criteria for evaluation, presented below.

Criterion A. Are associated with events that have made a significant contribution to the broad pattern of history; or

Criterion B. Are associated with the lives of persons significant in the past; or

Criterion C. Embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or

Criterion D. Have yielded, or may be likely to yield, information important in prehistory or history.

The initial qualification used for identifying potentially significant resources is the 50-year minimum age necessary for inclusion in the NRHP (36 CFR Part 60.4; Savage and Pope 1997:5). Technical information and guidelines for evaluating NRHP eligibility are provided by the National Park Service in several published bulletins (e.g., Savage and Pope 1997; Sherfy and Luce 1998; Townsend et al. 1993).

The process for evaluating cultural resources for NRHP eligibility includes categorizing the resource as a site, a district, a building, a structure, or an object; determining the appropriate context (precontact or historic) for the resource; determining whether the resource is significant under the NRHP Criteria for Evaluation; and determining whether the resource retains integrity (Savage and Pope 1997:3).

After a cultural resource has been assigned to a category (site, district, building, structure, or object), the context represented by the resource must be identified. According to the National Park Service, "the significance of a historic [resource] can be judged and explained only when it is evaluated within its historic context" (Savage and Pope 1997:7). Evaluating a resource within its historical context involves several steps. These include identifying the themes, geographical limits, and chronological period that the resource represents; determining how these themes are significant in the history of the area, state, or nation; determining whether the particular resource type is important in illustrating these themes through historic associations, architectural or engineering values, or informational potential; and determining the features that the resource must have in order to reflect these themes (Savage and Pope 1997:7-8).

Archaeological sites are generally evaluated relative to Criterion D; however, some sites, particularly those representing historic period occupation or use, can be considered eligible if they can be shown to be "associated with events that have made a significant contribution to the broad patterns of [American] history" (Criterion A), or are found to be "associated with the lives of persons significant in [America's] past" (Criterion B), or "embody the distinctive characteristics of a type, period, or method of construction" as in the case of Civil War earthworks (Criterion C). According to the U.S. Department of the Interior's guidelines for applying the NRHP criteria, the key to applying Criterion D to archaeological sites is in determining the "information potential" of the resource

(Savage and Pope 1997:21). For an archaeological site to be considered eligible for the NRHP under Criterion D, that site:

1. must have, or have had, information to contribute to our understanding of human history or prehistory; and,
2. the information must be considered important.

The first of these requirements can be defined as research potential. The National Park Service provides clarification for this statement by adding that a site should be considered for the NRHP if that site "has been used as a source of data and contains more, as yet unretrieved data" (Savage and Pope 1997:21).

It is extremely difficult to develop a completely objective set of attributes that allows definition of NRHP eligible and ineligible archaeological sites. National Park Service interpretation of published guidelines indicates that sites should be evaluated based on their ability to contribute to our "theoretical and substantive knowledge" (Butler 1987:821-826). Regardless of exact terminology, there is consensus among cultural resource managers that each site type must be evaluated with full awareness of regional research needs and relative to similar sites in the region.

Cultural resources may also qualify for the NRHP under Criteria A, B, or C if they meet certain conditions known as Criteria Considerations A through G (*How to Appy the National Register Criteria for Evaluation* [Savage and Pope 1997]).

Criteria Consideration A applies to religious properties. Special situations that might allow the listing of religious resources include architectural or artistic merit and/or representation of an important historic or cultural force.

Criteria Consideration B applies to resources that are relocated, especially in a case where the resource was moved prior to its period of significance. Other situations may include being the sole surviving property directly associated with a historic event or person or if the resource retains enough of its features to portray its architectural values.

Criteria Consideration C applies to birthplaces and graves of distinguished historical figures. In order to be listed under this consideration, a birthplace or grave must be associated with a person of extraordinary importance, and no more appropriate place associated with their life can survive.

Criteria Consideration D applies to cemeteries. A cemetery may be eligible for the NRHP only when it possesses a factor that raises its importance above that of the average burial ground. For example, if it derives its significance from age, distinctive design or layout, association with historic events, potential to answer previously identified research questions, or from a number of graves of persons of transcendent importance.

Criteria Consideration E applies to reconstructed properties, including those that were reproduced in the exact form and detail of a former building, structure, or object. To be listed under this consideration, a property must be part of a larger group of mostly historic resources (district), it must stand on the original building's site, it must be an accurate copy, and it must be acknowledged as a reproduction.

Criteria Consideration F refers to commemorative properties, typically those created to honor historic events or significant persons. These resources are eligible only when age, artistic or architectural design, tradition, or symbolic value has given them their own historical significance.

Criteria Consideration G refers to resources that have gained their significance in the last 50 years because of exceptional importance. The National Park Service asserts that enough time must have passed before a resource can be evaluated with perspective and objectivity.

However, some events are so significant that they merit eligibility prior to reaching 50 years of age.

Cultural resources documented during Brockington's cultural resources assessment of the proposed modification of SLC-13 were documented and evaluated within local and regional historic contexts. Each resource's potential to provide data was evaluated explicitly as research potential beyond the present assessment project.

2.4 Cultural Resources Assessment

Brockington completed an assessment of NRHP- and NHL-listed and NRHP-eligible cultural resources that may be impacted by the proposed modification at SLC-13. These include the NHL-listed Cape Canaveral Air Force Station (CCAFS) district (including SLC-13 and SLC-14) and the ICBM Road. Brockington personnel assessed the integrity of each resource and evaluated potential project-related impacts or effects.

The assessment of effects was completed in accordance with 36 CFR 800.5(a)(1), which states that an adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics that qualify a historic property for inclusion in the NRHP in a manner that would diminish the integrity of location, design, setting, materials, workmanship, feeling, or association. The effects assessment also referenced the ACHP's (1991) guidance, *Balancing Historic Preservation Needs with the Operation of Highly Technical or Scientific Facilities*, as the NHL-listed CCAFS district and its components including SLC-13 and SLC-14 are highly technical and scientific facilities. The guidance specifically recognizes the challenge of agencies with missions involving active research and highly technical operations, such as the USSF with the historic space launch complexes at Cape Canaveral Space Force Station (CCSFS), given their continuous need to modify or replace historic facilities and how long-term operation of these facilities can result in "significant alterations" (ACHP 1991). It asserts that historic properties associated with highly scientific and technical operations require an "unusual degree of flexibility," noting that "a special effort should be made toward maintaining flexibility in the planning and execution of research work and meeting the time constraints of priority programs" (ACHP 1991). The ACHP's (1991) guidance notes explicitly that "modifications that result in a historic property's loss of integrity *can* have a beneficial effect, however, if those modifications result in the continued use of a facility or structure." It notes that "active facilities must constantly evolve if they are to continue to make scientific or engineering advancements. Under the right circumstances, this process can result in the historic property's preservation."

When accepting the CCAFS designation as an NHL, the Secretary of the Interior's Advisory Board, National Park Service, and the Department of the Air Force agreed that the designation should not interfere with the mission at the current CCSFS. This applies to operational matters, as well as the use of existing facilities and the design flexibility needed to add, expand, or adapt facilities. This agreement is explicitly memorialized in the NHL nomination, which states, "It was the consensus of the Board that the designation of these facilities should not interfere with the mission of the United States Air Force at Cape Canaveral Air Force Station" (National Park Service 1983).

A detailed discussion and management recommendations for each known historic property (the NHL-listed CCAFS district [including SLC-13 and SLC-14] and the ICBM Road) are presented in Chapter 6.

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3.0 Environmental Setting

The Physical Impact APE is situated on the east side of Cape Canaveral in the Eastern Florda Flatwoods region of the Southern Coastal Plain physiographic province. The property is located on modified dune-coastal landforms adjacent to low-lying wetland pond areas about 200 m west of the Atlantic Ocean. The topography is flat with an elevation of 5 to 10 ft above mean sea level (amsl).

The USDA (1974, 2025) has documented three soil types within the Physical Impact APE (Table 3.1; Figure 3.1). These include moderately well drained to somewhat poorly drained soils that were formed in sandy marine deposits. Urban land complex soils (20.6 acres; 68%) have been documented as disturbed by modern cutting or filling, including areas that have been covered by buildings or pavement.

The project area has seen extensive soil disturbance in the past, including the entirety of the Physical Impact APE (Figure 3.2). This area was considerably modified during the construction of historic Launch Complex 13 (now SLC-13) in the 1950s. Disturbances included heavy machinery use, large-scale grading, cut and fill activities, and launch complex construction and use. Since its construction, several alterations and renovations occurred at SLC-13. The surrounding area has also been disturbed by the historic construction and continued use of SLC-12 to the south, SLC-14 to the north, and ICBM Road to the west.

Given the project tract's location adjacent to the Atlantic Ocean and wetland ponds, the area was likely a draw for its natural resource potential in both the precontact and historic periods. The project area is flat with some areas that would be amenable for habitation, settlement, and/or agriculture. However, due to considerable launch complex disturbance, we believe the probability for intact archaeological resources to be low. It is unlikely that additional undocumented NRHP-eligible archaeological or historic resources are located within the Physical Impact APE.

Table 3.1 USDA soil associations within the Physical Impact APE (USDA 2025).

Symbol	Name	Drainage	Landform	Parent Material	Usage	Description	Acreage
9	Canaveral-Anclote complex, gently undulating	Somewhat poorly drained	Ridges and dunes on marine terraces	Sandy marine deposits	Not prime farmland	A (0-6in) sand; C (6-12in) sand; C (12-80in) coarse sand	9.8
69	Urban land, 0 to 2 percent slopes	Variable	Modified	Redeposited fill	Not prime farmland	Variable	20.6
						Total Acreage	**30.4**

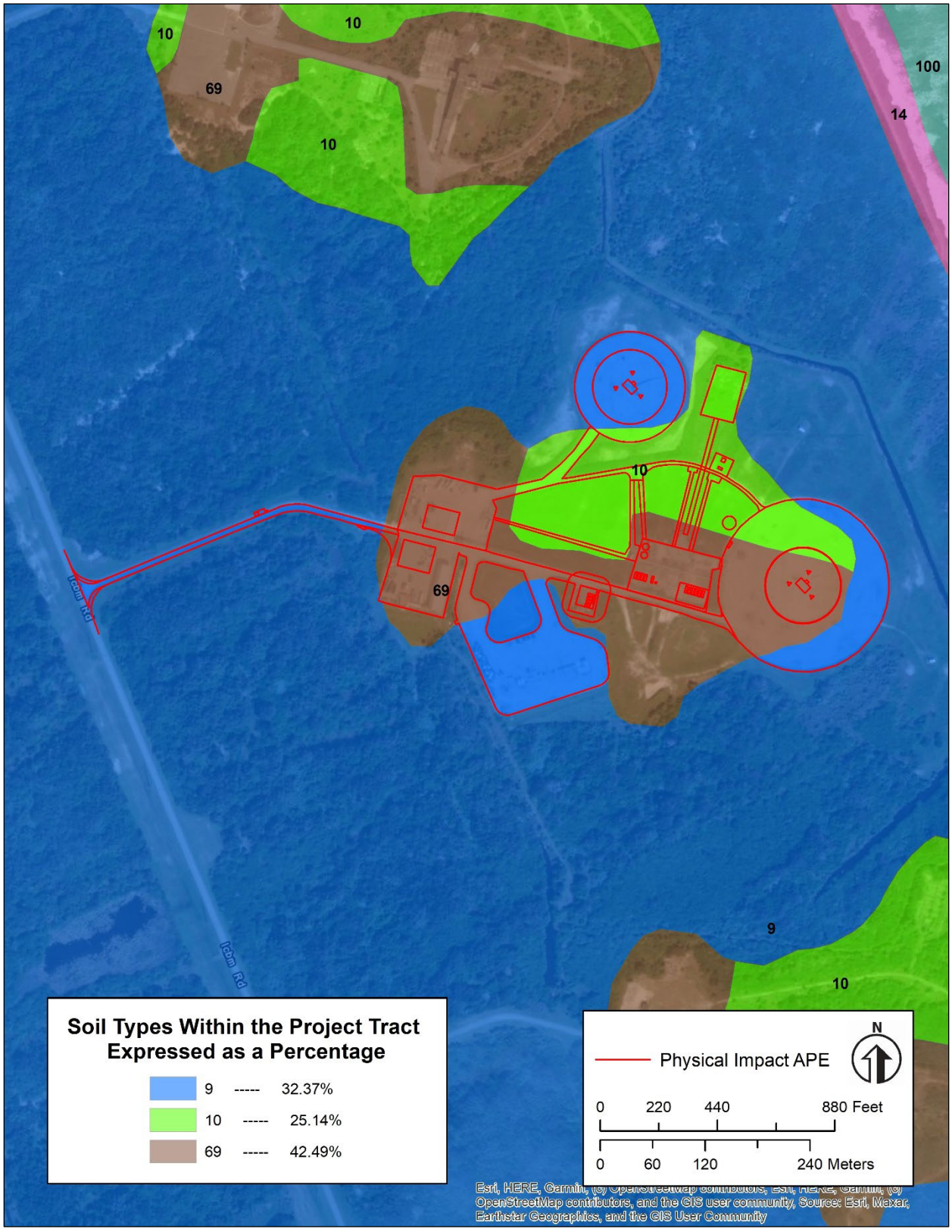


Figure 3.1 USDA soil associations within the Physical Impact APE, overlaid on modern aerial imagery (USDA 2025).

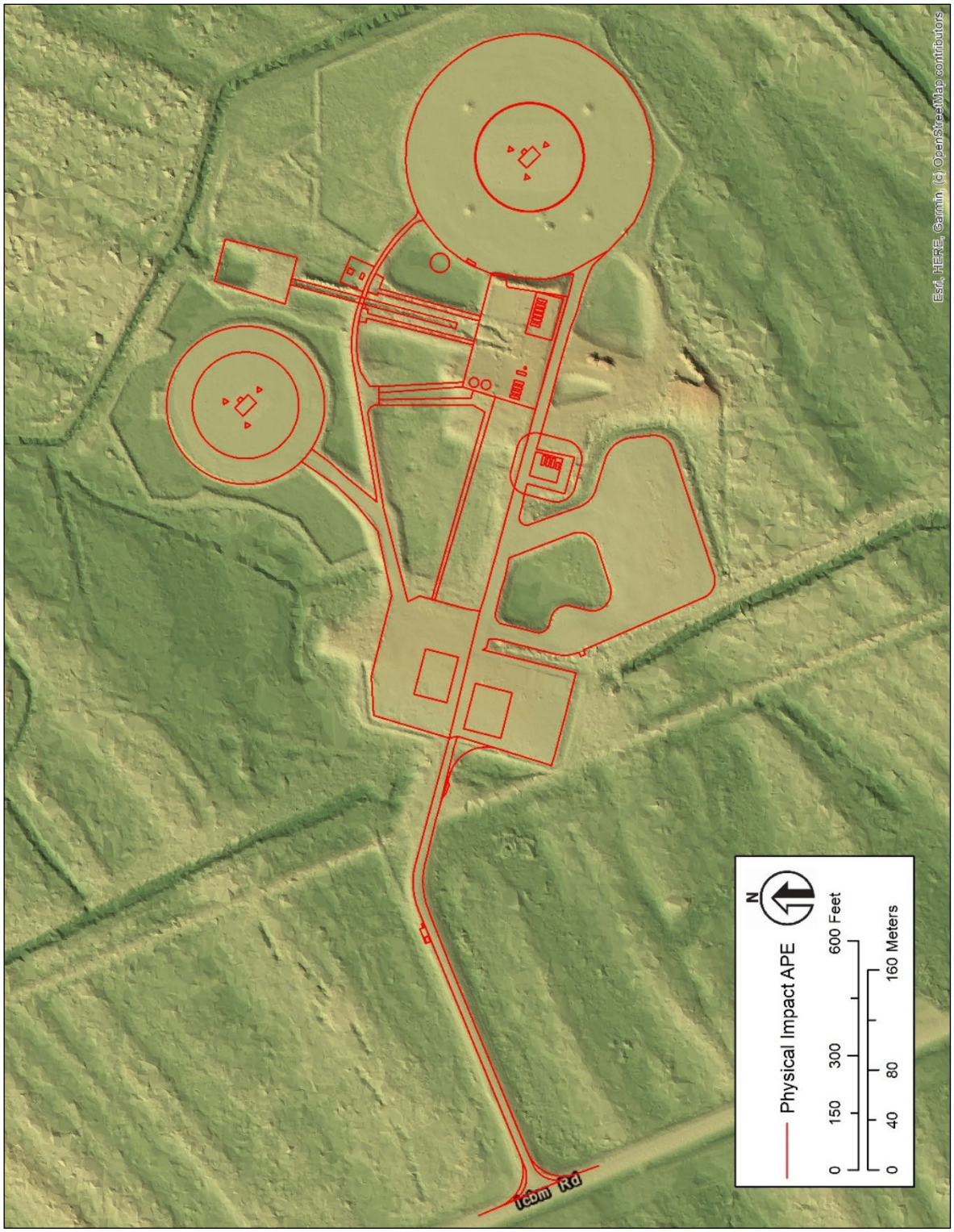


Figure 3.2 The Physical Impact APE, overlaid on LiDAR imagery.

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4.0 Focused Cultural Context

The archaeological and historic context of Cape Canaveral and the area including SLC-13 has been extensively documented in several previous investigations and reports (Barton and Levy 1984; Joseph et al. 1996; Levy et al. 1984; Penders 2014b; USSF 2023; Wobig et al. 2024). Detailed precontact and historic summaries are presented in Section 8.2 of the current ICRMP (USSF 2023). This chapter presents a focused summary context to define the area around SLC-13. For more detailed contexts, the reviewer is directed to previous cultural resource reports, notably the Phase I CRAS of the SLC-13 area, the results of which received SHPO concurrence (Penders 2014b).

4.1 Cape Canaveral and the Space Program

In the 1940s, the US government began acquiring land on Cape Canaveral to establish a mission test center for a long-range proving ground. By 1950, the first missile launch pads, support facilities, and roads were constructed at the CCAFS, now known as the CCSFS. The first missile was launched in July 1950. After 1953, the station supported the Intermediate Range Ballistic Missile (IRBM) and the ICBM. The facility was used to further Cold War missile testing and research. Following Russia's Sputnik I launch in 1957, attention turned toward space exploration, and National Aeronautics and Space Administration (NASA) also utilized parts of the CCAFS. Numerous launch complexes were constructed on the Cape (Figure 4.1). These facilitated early satellite launches and manned flights. In 1966, activities at the CCAFS peaked, and the following years saw a decline in operations. Launch complexes and support buildings were adapted to other uses or deactivated. Currently, the CCSFS is utilized for civilian contractor space launches. Operations are overseen by Space Launch Delta 45 at Patrick Space Force Base.

4.1.1 SLC-13 History

SLC-13 was originally constructed as a Cold War launch complex constructed between 1956 and 1958 by the US Army Corps of Engineers (USACE), and it was one of four identical launch complexes. It was originally built in support of the US Air Force's (USAF) Single Stage Atlas Weapons System. The Atlas was the US's first operational ICBM. The complex was used for testing Atlas missiles; in total, 30 Atlas research and development flights took place at SLC-13, the last occurring in February 1961 (USAF 1959) (Figure 4.2). In 1963, the launch complex was modified (construction of a mobile service tower [MST]) and used to support NASA's multistage Atlas-Agena vehicle for unmanned spacecraft. The first Atlas-Agena test flight took place in October 1963. Between 1966 and 1967, SLC-13 was also used to launch the Ranger, Mariner, and Lunar Orbiter missions. SLC-13 also supported Department of Defense (DOD) satellite launches. The last launch occurred in March 1968.

When it was originally constructed, SLC-13 contained 21 facilities within its boundaries (McCarthy et al. 1993; Turner et al. 1994) (Figures 4.3-4.4). The complex was deactivated and abandoned in place in 1978 and later served as a storage area. Most of the smaller facilities were removed after deactivation including above-ground storage tanks, cableways and cables, and pipelines. The complex was further demolished in the 1990s and 2000s during clean-up activities. The MST was removed in 2005, and the SLC 13 Blockhouse was demolished in 2012. All these undertakings had the requisite Section 106 studies completed and received SHPO concurrence (Gaske 2004, 2007, 2008; Sutherland 2008).

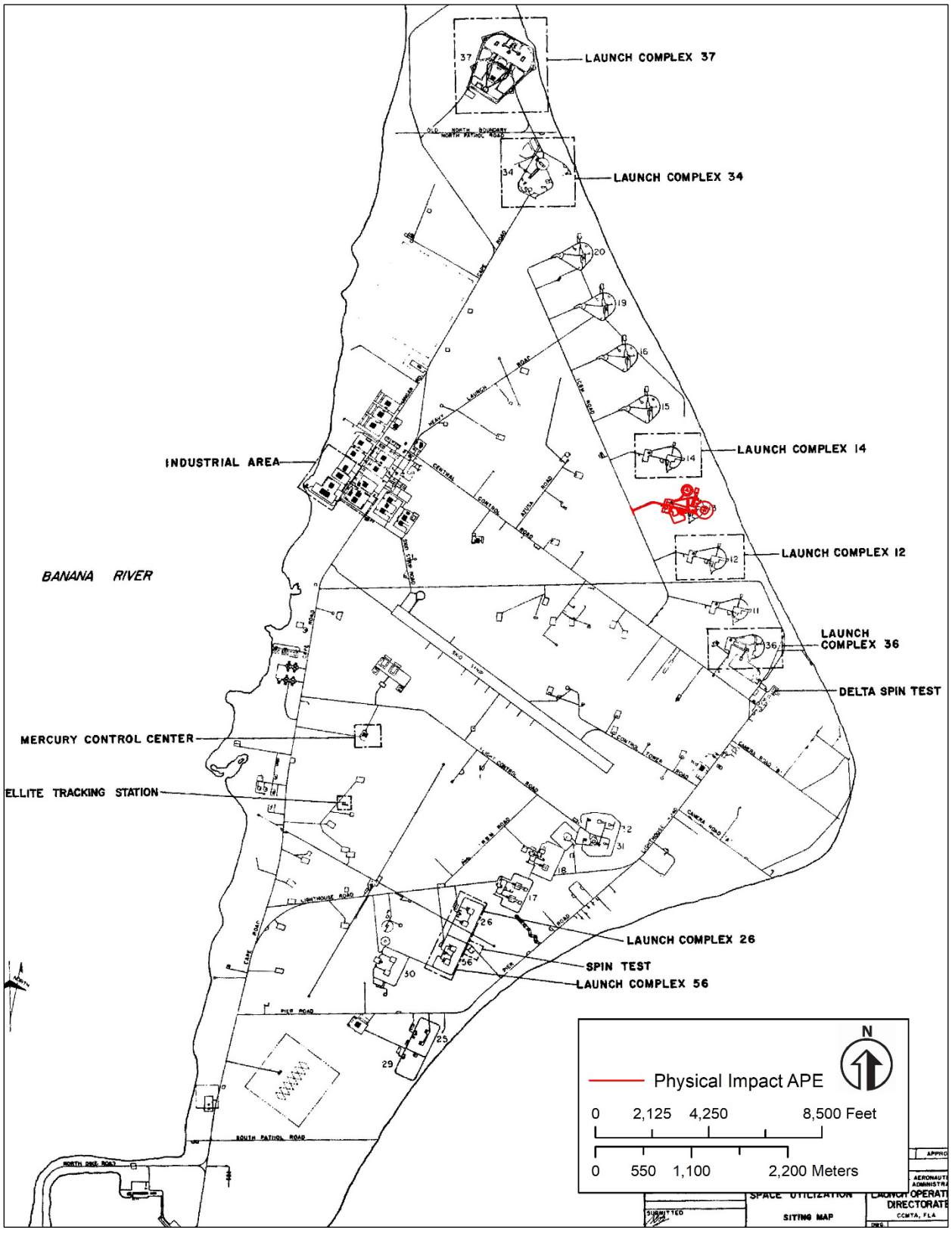


Figure 4.1 The Physical Impact APE shown on a map of the CCAFS, detailing NASA utilization in 1962 (NASA 1962).



Figure 4.2 Atlas missile on the pad at SLC-13 in 1959 (USAF 1959).

CAPE CANAVERAL AIR STATION,
LAUNCH COMPLEX 13
HAER No. FL-8-1 (page 11)

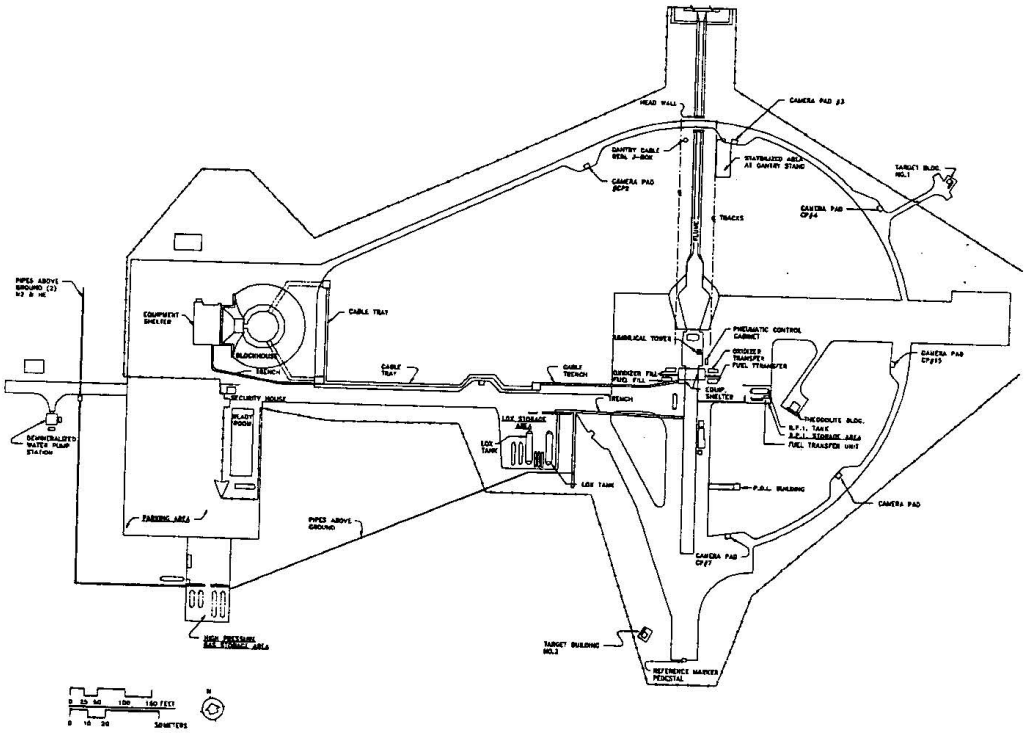


FIGURE 2: Launch Complex 13

Source: As-Built Engineering Drawing, Facilities Management Office, Johnson Controls, Cape Canaveral Air Station, FL (Redrawn in CAD by Ring-Ru Lyn, USACERL, 1993)

Figure 4.3 As-built engineering drawing of SLC-13 (copied from Turner et al. 1994:11).

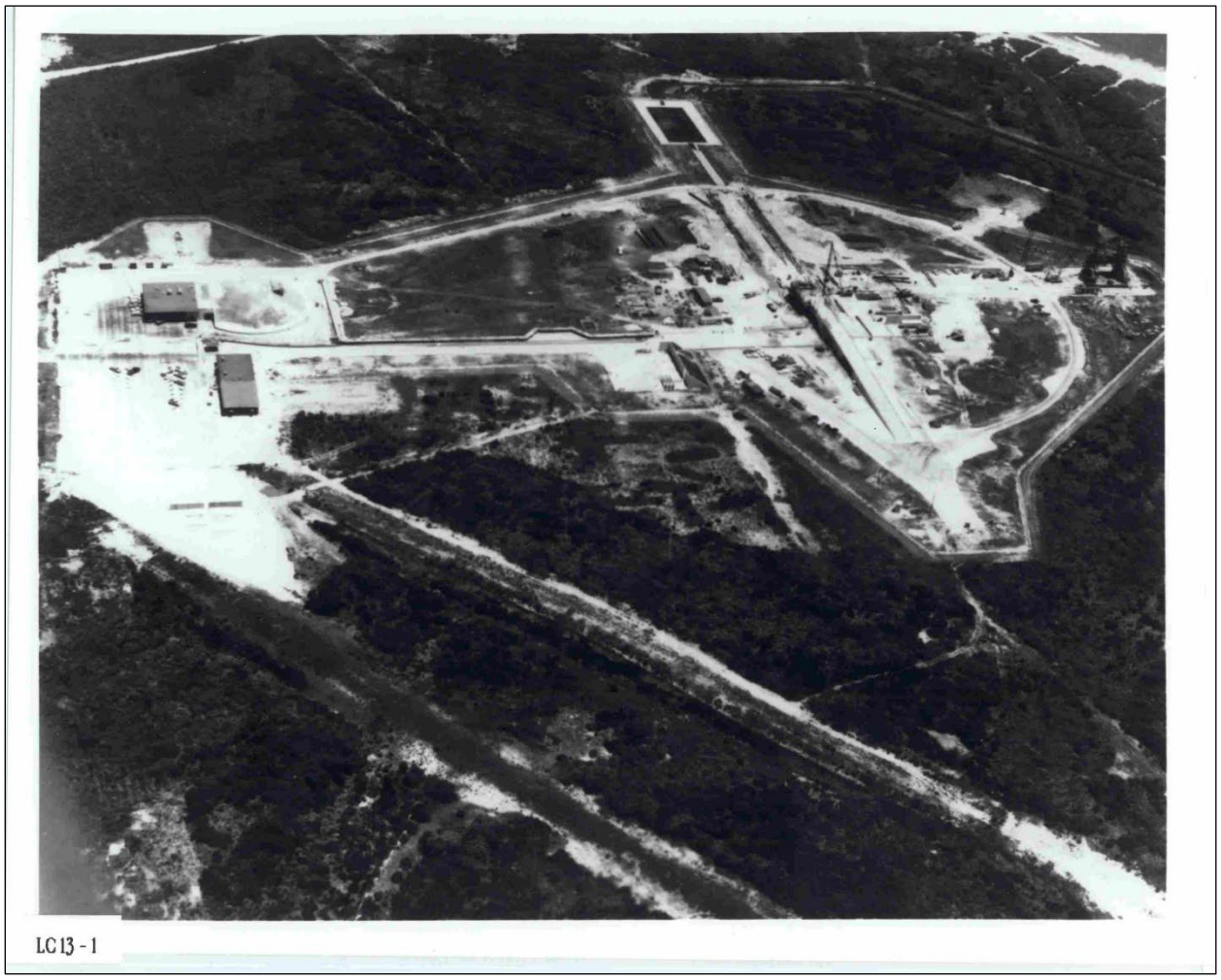


Figure 4.4 Aerial view of SLC-13, photograph taken July 23, 1962 (copied from McCarthy et al 1993:LC13-1).

The remaining structures at SLC-13 were cleared ahead of construction of SpaceX Falcon landing pads in 2015 (LZ 1 and 2). A full Phase I CRAS was conducted ahead of these actions, including the majority of the current Physical Impact APE, and received SHPO concurrence (Bendus 2014; Blaylock 2014; Penders 2014a). The 2017 USAF Supplemental Environmental Assessment analyzed the potential effects to historic properties for the Falcon 9 first stage boost-back and landing at LZ-1 and LZ-2 (USAF 2017). USAF's analysis concluded that Falcon booster landings would not affect historic properties.

In 2015, SLC-13 was reactivated for vertical orbital class rocket fly-back operations. The two landing zones (LZ-1 and LZ-2) were used by SpaceX for some of the first Falcon 9 and Falcon Heavy first stage boost-back and landings. On December 21, 2015, SpaceX successfully landed a Falcon 9 first stage booster back on land at LZ-1 during the ORBCOMM-2 mission (Foust 2016; Wall 2015). The December 21, 2015, landing at CCSFS was completed by the first Falcon 9 first stage booster with payload, but not the first landing of a version of the Falcon that SpaceX considered a success. Other test versions of the booster were landed on land outside the CCSFS and Falcon 9 first stage boosters were also landed on barges many times prior to the December 21, 2015, landing. LZ-2 was first used during the demo flight of Falcon Heavy on February 6, 2018, when the rocket's two side boosters landed simultaneously at LZ-1 and LZ-2 (Figure 4.5).



Figure 4.5 View of LZ-1 and LZ-2 at SLC-13 during the first Falcon Heavy landing in 2018 (Image courtesy of SpaceX).

4.2 Historic Map Review

Brockington personnel reviewed historic maps of the project area (see Figure 4.1; Figures 4.6-4.8). The Physical Impact APE is situated on the east side of Cape Canaveral, west of the Atlantic Ocean, and directly east of the ICBM Road connecting the historic and current launch complexes. The community of Canaveral Town was historically located approximately 0.8 mile southeast. The Physical Impact APE is within the central western portion of Section 17, Township 23, Range 38.

No communities, buildings, or roads are shown in the project vicinity on an 1885 map of Brevard County; the project area is shown north of Canaveral Beach and southeast of DeSoto Grove and Bitter Sweet (Le Baron 1855).

In 1925, one road extends northwest to southeast along the coast and one extends north northeast through the west side of Section 17 (Brown 1925) (see Figure 4.6). The W.A. Tucker home is shown west of the first road in Section 16. Two unlabeled buildings are shown west of a bend in the second road.

The 1951 *Cape Canaveral* quadrangle shows neither of these roads (USGS 1951) (see Figure 4.7). A straight north-south road extends through the western portion of the section. Likewise, the two unlabeled buildings and the Tucker home are not shown. Four new buildings (two houses and two outbuildings) are shown in Section 17, directly south of the Physical Impact Area. Much of the area is depicted as a wetland pond.

By 1970, the *Cape Canaveral* quadrangle shows a row of launch complexes along the east side of Cape Canaveral, including SLC-13 within the Physical Impact APE (USGS 1970) (see Figure 4.8). All earlier buildings in the vicinity were demolished and removed by this time.

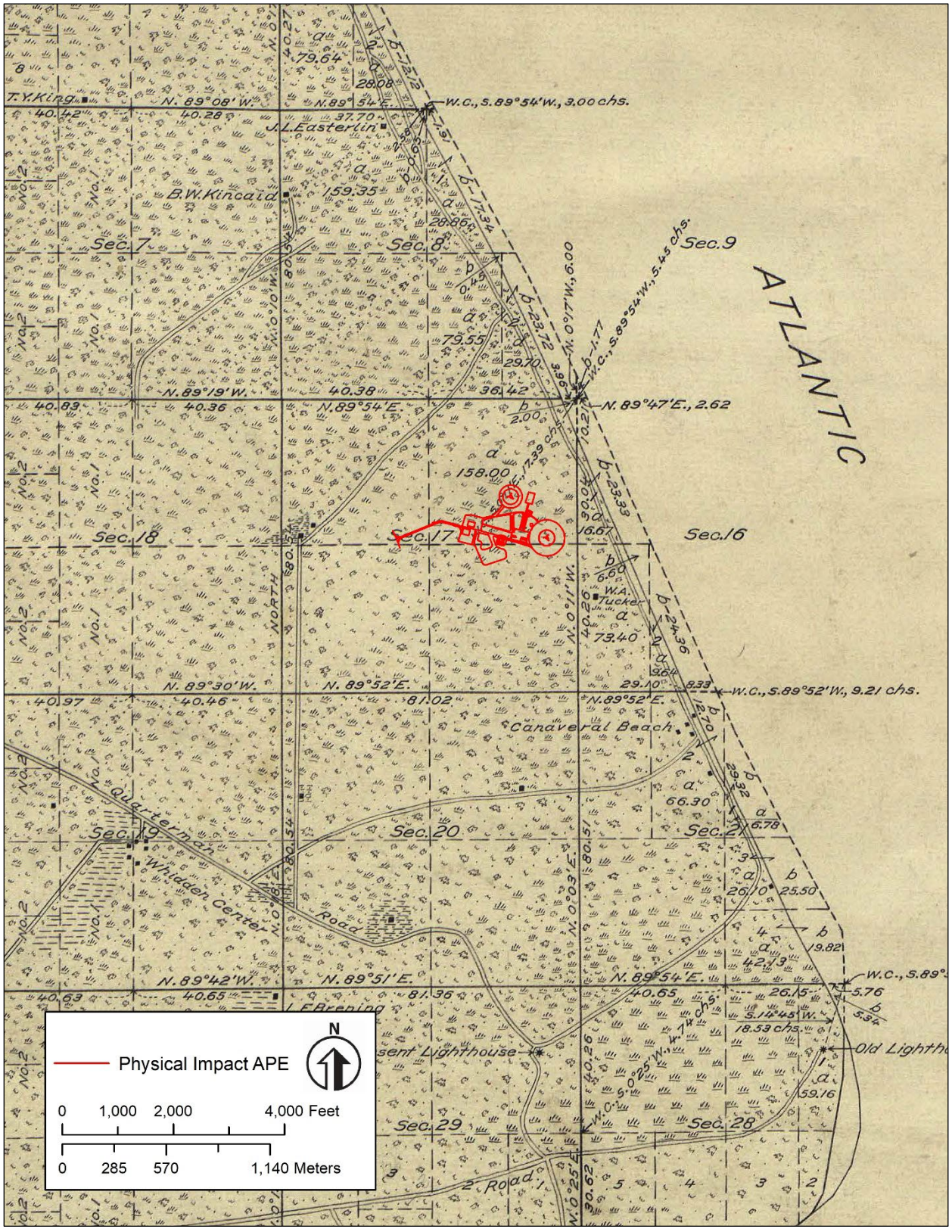


Figure 4.6 The Physical Impact APE shown on a 1925 plat map of Cape Canaveral (Brown 1925).

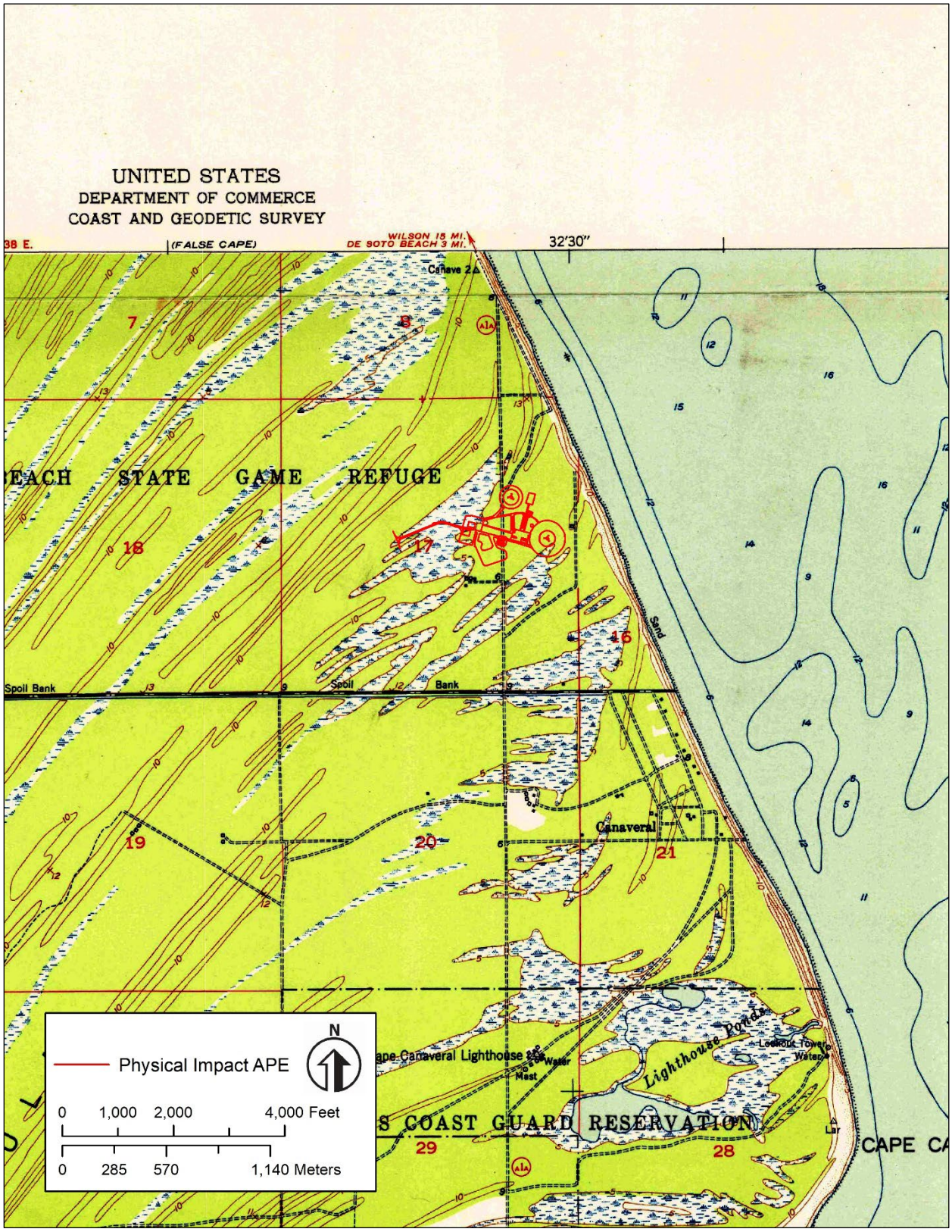


Figure 4.7 The Physical Impact APE shown on the 1951 *Cape Canaveral, Florida* USGS topographic quadrangle (USGS 1951).

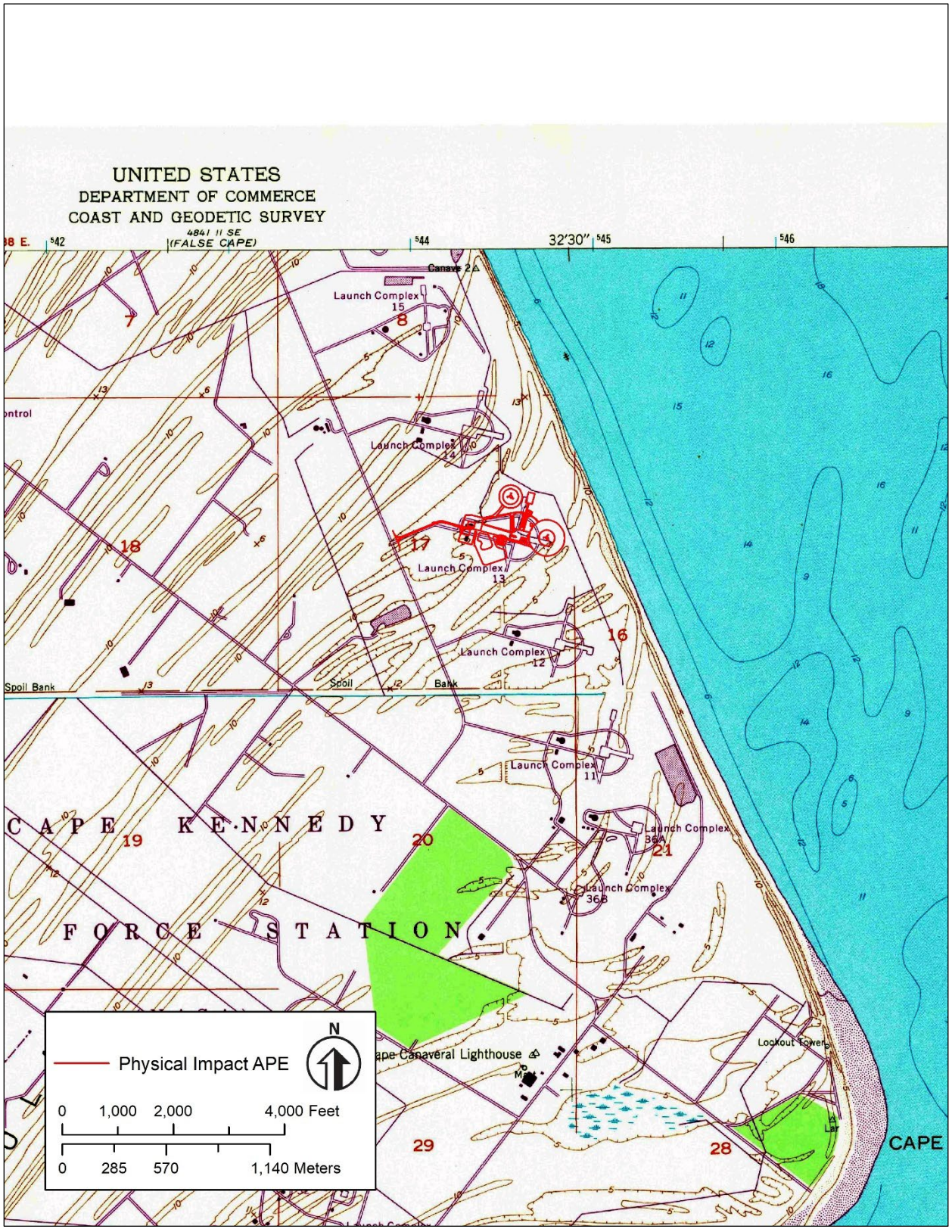


Figure 4.8 The Physical Impact APE shown on the 1970 *Cape Canaveral, Florida* USGS topographic quadrangle (USGS 1970).

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5.0 Archival Research

Brockington conducted research regarding any NRHP-listed properties, previous cultural resources investigations, and previously identified archaeological sites and historic resources (e.g., site forms, relevant reports, and map data) within one-mile of the Physical Impact APE. This buffer was expanded to include NRHP- and NHL-listed properties within the Launch Noise/Vibration APE to account for indirect effects.

5.1 NRHP and NHL Properties

Research identified one NRHP-listed property within 1.0 mile of the Physical Impact APE (Figure 5.1; Table 5.1). The CCAFS historic district was nominated in 1983 and listed on April 16, 1984. This district is also designated as an NHL (April 16, 1984). Several earlier draft versions of this nomination are in circulation but were ultimately rejected. This discontinuous district contains the only NRHP properties currently listed at the CCSFS.

The CCAFS district is a discontinuous district that is considered nationally significant under Criteria A and C for engineering and space exploration efforts at Cape Canaveral between 1949 and 1983. Specifically, the CCAFS played a pivotal role in the research, development, and testing of the nation's missile and space programs (National Park Service 1983). The district includes SLC-5/6, SLC-13, SLC-14, SLC-19, SLC-34, and the Original Mission Control Center (Figure 5.2).

Notably, SLC-13 is currently part of the CCAFS NHL district. The NRHP eligibility of SLC-13 was inconclusively documented for several years with multiple opposing recommendations (Barton and Levy 1984; McCarthy et al. 1993). Following Historic American Engineering Record (HAER) documentation in 1994 (Turner et al. 1994) and the removal of the MST, plans were made to delist SLC-13 from the NHL district (Gaske 2004; Penders 2014a). While this action never occurred, all components of SLC-13 have been thoroughly documented and determined not eligible for the NRHP. In 2008, the USSF Space Launch Delta (SLD) 45 cultural resource manager (CRM) documented SLC-13 and all associated facilities within the complex. As part of the documentation completed FMSF forms, as-built drawings, location maps, historic photographs, and current photographs were submitted to the SHPO (Penders 2007). SLC-13 was determined not eligible for the NRHP (USAF determination [Blaylock 2014; Sutherland 2008] and SHPO determination [Bendus 2014]) due to an absence of historical integrity.

All components of SLC-13 have been demolished or removed. The MST was removed in 2005, and the SLC-13 Blockhouse was demolished in 2012. In 2015, SLC-13 was reactivated for vertical orbital class rocket fly-back operations. All remaining standing structures and buildings were removed prior to this reactivation. All these undertakings had the requisite Section 106 studies completed and received SHPO concurrence (Bendus 2014; Blaylock 2014; Gaske 2004, 2007, 2008; Sutherland 2008). SLC-13 had 11 contributing resources, but none are extant. The SLC-13 foundation remnants were determined not eligible for listing in the NRHP by USSF SLD 45 with the SHPO's concurrence (Penders 2014a; USAF 2017; DHR Project File Number: 2014-4037), though the site remains honorarily listed as one of the six launch complexes in the CCAFS NHL district.

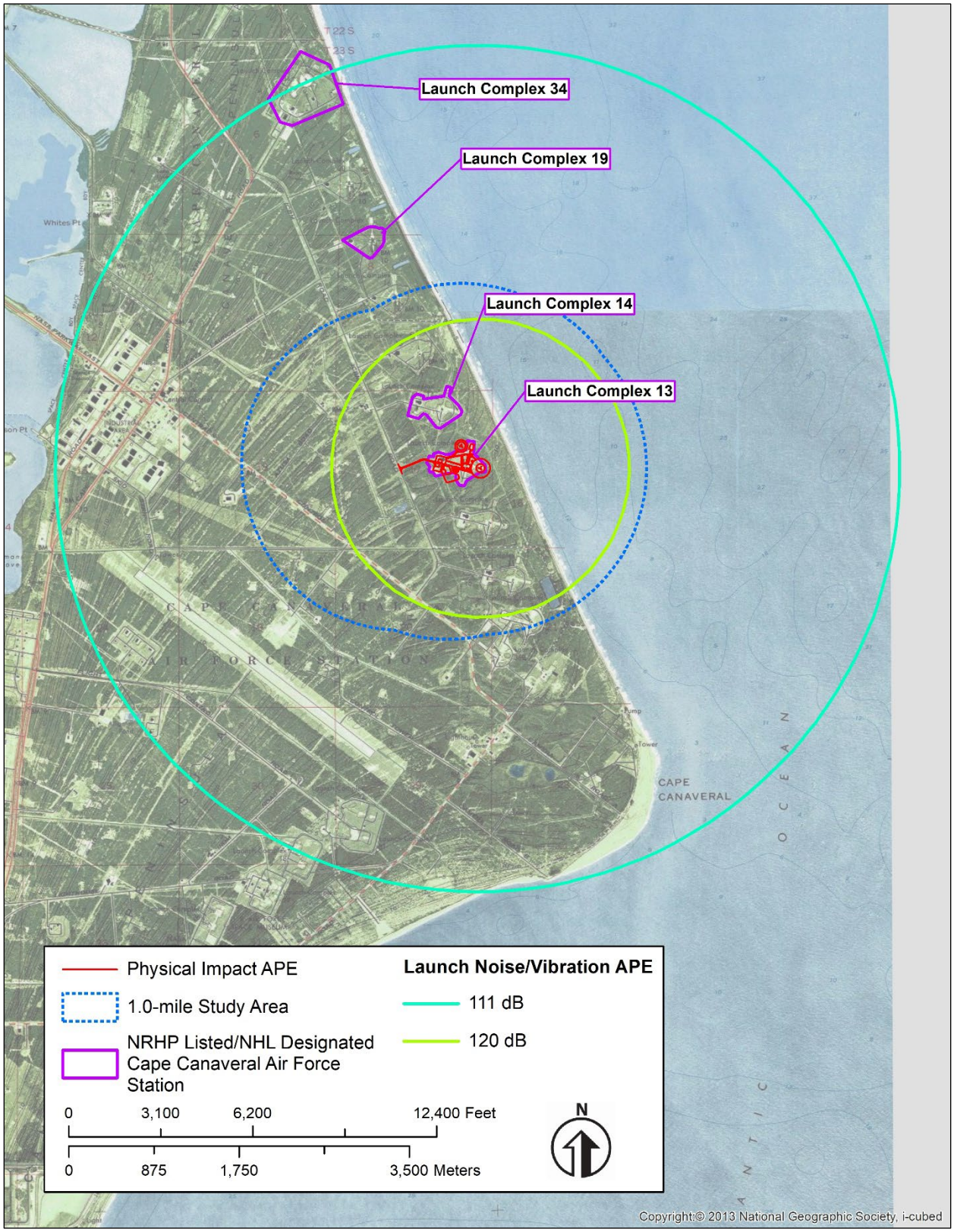


Figure 5.1 NRHP-listed and NHL-designated properties within 1.0 mile of the Physical Impact APE and Launch Noise/Vibration APE shown on the *Cape Canaveral, Florida* USGS topographic quadrangle (USGS 2025).

Table 5.1 NRHP-listed and NHL-designated properties within the Physical Impact APE and the Launch Noise/Vibration APE.

Property Name	NRHP No.	Type	Location	Description	Date	Significance
Cape Canaveral Air Force Station (8BR216)	84003872	District	Discontinuous district at the CCAFS	LC 5/6, LC 13, LC 14, LC 19, LC 26, LC 34, and Original Mission Control Center	1949-1983	Criteria A and C, National level (Engineering and Space Exploration); Designated NHL (4/16/1984)

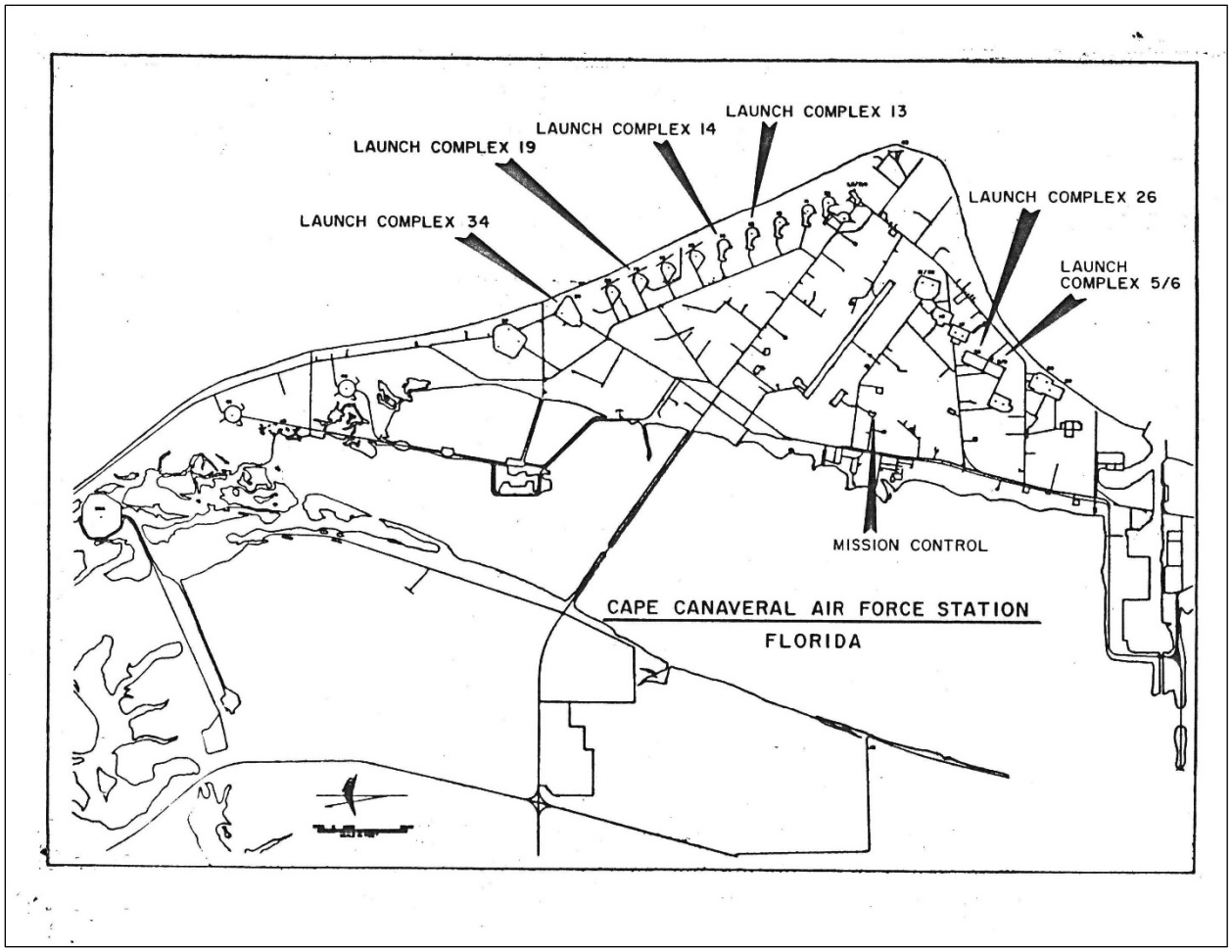


Figure 5.2 The CCAFS NHL district as detailed in the final NRHP/NHL nomination (copied from NPS 1983).

SLC-13 no longer retains integrity, and through consultation, may be considered a non-contributing element of the NHL district. The USSF SLD 45 is currently working with the National Park Service and SHPO to amend the CCAFS NHL nomination to update the contributing and non-contributing resources and to clarify the qualifying characteristics and the necessary aspects of integrity for the historic property. SLC-13 may be delisted from the NHL at a future date.

The adjacent SLC-14 is also part of the NHL district. This resource has been determined to be NRHP eligible and a contributing element of the NHL. It has also been determined to be individually eligible for the NRHP under Criteria A, B, C, and D with SHPO concurrence (Wobig et al. 2024). However, no construction will occur within SLC-14 as a result of the proposed action. The proposed

construction and operation at SLC-13 is consistent with the historical operation, and use of the historic district and would not result in an adverse visual effect.

5.2 Previous Cultural Resources Investigations

Brockington personnel reviewed previous archaeological and historic architectural investigations available on FMSFweb. In total, 31 previous cultural resources investigations have been conducted within one mile of the Physical Impact APE (Table 5.2). Of these, 11 have been conducted in the immediate vicinity (Banguilan et al. 2017; Barton and Levy 1984; Cantley et al. 1994; Joseph et al. 1996; Levy et al. 1984; McCarthy et al. 1993; Penders 2007, 2014a; Rogers et al. 2020; Turner et al. 1994; Wobig et al. 2024) (Figure 5.3).

These investigations identified 25 archaeological sites and 71 historic resources within one mile of the Physical Impact APE (Tables 5.3 and 5.4). Most of these are related to the missile launch and space program at CCAFS during the Cold War, including seven launch complexes (SLC-11, SLC-12, SLC-13, SLC-14, SLC-15, SLC-16, and SLC-36). Only two archaeological sites (8BR3176 and 8BR3178) and 13 historic resources have been documented within or directly adjacent to the Physical Impact APE (see Figure 5.3). Most of these were components of SLC-13 (Resources 8BR2135; 8BR2198-2208) in association with the Atlas ICBM missile program (1957-1966). Resource 4191 (ICBM Road) is an NRHP-eligible linear resource. Historically, this roadway connected all the launch complexes at the CCAFS.

In 1982, Resource Analysts, Inc. (RAI) conducted an archaeological survey of the CCAFS (Levy et al. 1984). This effort consisted of a literature review, historic map review, oral interviews with local residents who lived on Cape Canaveral prior to US government acquisition, and development of a site location predictive model based on a systematic survey of the CCAFS. Limited field survey was undertaken in portions of the CCAFS along the Banana River and other locations identified by local informants. The Banana River shoreline, Atlantic strand, and interior areas of the peninsula were recommended as sensitive historic areas. However, RAI did not investigate the interior areas, nor did they fully test identified sites. As a result of the survey, RAI revisited six previously recorded sites and identified 26 additional sites. None of these are located within or adjacent to the Physical Impact APE.

Also in 1982, RAI completed a reconnaissance level architectural and engineering survey of facilities at the CCAFS (Barton and Levy 1984). This survey resulted in the documentation of 1,325 facilities. Of these, 21 launch complexes (including SLC-13 and SLC-14), the Cape Canaveral lighthouse, Hangar S, and the original Mission Control building were recommended as potentially eligible for the NRHP. RAI recommended that the SLC-13 MST and all of SLC-14 were NRHP eligible (Barton and Levy 1984). This study was the basis for the USAF and National Park Service nomination of six launch complexes (SLC-5/6, SLC-13, SLC-14, SLC-19, SLC-26, and SLC-34) and Mission Control as an NHL district (CCAFS district [8BR216]) (National Park Service 1983). During the NPS nomination process, the entirety of SLC-13 was listed.

In 1993, New South Associates (New South) conducted a historic properties survey of the CCAFS (Cantley et al. 1994). New South compiled detailed environmental and cultural contexts for Cape Canaveral. The survey covered 1,430 acres at the CCAFS and documented 56 sites (26 precontact and 21 historic). Of these, 19 sites were recommended for additional testing or avoidance. None of these are located within or adjacent to the Physical Impact APE. New South archaeologists also noted that the Banana River salt marsh environments contained a dense area of precontact habitation. This area is located more than two miles west of the Physical Impact APE.

Table 5.2 Previous cultural resources investigations within one mile of the Physical Impact APE.

FMSF ID	Date	Description	Location	Agency/Client	Consultant	Reference
n/a	2007	Documentation of SLC-11, SLC-12, SLC-13, SLC-14, and SLC-15	Within Physical Impact APE	FDHR	USAF	Penders 2007
421	1977	Cultural resource assessment of chemical waste disposal facilities	Research Buffer	NASA	FDAH	Martinez 1977
1150	1982	Architectural and engineering survey of the Cape Canaveral Air Force Station (CCAFS)	Within Physical Impact APE	National Park Service (NPS)	Resource Analysts, Inc. (RAI)	Barton and Levy 1984
2410	1982	Archaeological survey of the CCAFS	Within Physical Impact APE	NPS	RAI	Levy et al. 1984
3820/ 14138	1993	Historic properties survey of the CCAFS	Within Physical Impact APE	USACE	New South Associates (New South)	Cantley et al. 1994
6517	1996	45th Space Wing cultural resources management plan	Within Physical Impact APE	USACE	New South	Joseph et al. 1996
8477	1999	Phase II testing of 16 sites at the CCAFS	Research Buffer	USAF	Archaeological Consultants, Inc. (ACI)	Deming and Horvath 1999
13171/ 16379	1993-1994	HAER of SLC-13, 26, and 36	Within Physical Impact APE	USAF	USACE	Turner et al. 1994
15082	2001	Documentation of missile systems on display at CCAFS	Research Buffer	USAF	USACE	McCarthy et al. 2001
16292	2008	Additional documentation of three sites at CCAFS	Research Buffer	USAF	USAF	Hawkins 2008
17581	1993	Determination of eligibility of launch complexes and related facilities at CCAFS	Within Physical Impact APE	USAF	USACE	McCarthy et al. 1993
17608	2003	HAER of SLC-3 and SLC-4	Research Buffer	USAF	ACI	Hinder 2003a
17646	2003	HAER of SLC-14	Research Buffer	USAF	ACI	Hinder 2003b
17661	2003	HAER of SLC-34	Research Buffer	USAF	ACI	Hinder 2003c
20064	2008	Condition reports for NASA-owned components of the CCAFS NHL district	Research Buffer	NPS	NASA	Naylor 2008
20929	2013	Phase I CRAS of Land Management Units 50 and 166	Research Buffer	FDHR	USAF	Penders 2014a

FMSF ID	Date	Description	Location	Agency/Client	Consultant	Reference
21090	2013	Paleo-environmental assessment of CCAFS	Research Buffer	USAF	Florida State University	Doran et al. 2014
21172	2014	Phase I CRAS of the proposed Falcon Vertical Landing Site	Within Physical Impact APE	FDHR	USAF	Penders 2014b
21951	2014	CRAS of SLC-16	Research Buffer	FDHR	USAF	Penders 2015
22502	2014	Underwater remote sensing	Research Buffer	FDHR	Global Marine Exploration (GME)	GME 2014
22503	2015	Underwater dig and identify investigation	Research Buffer	FDHR	GME	GME 2015a
22740	2013-2014	3D digital documentation of select launch complexes at CCAFS	Research Buffer	USAF	Applied Interdisciplinary Research in Spatial Technologies	Collins and Doering 2015
23093	2016	Updated HAER for SLC-14	Research Buffer	NPS	USACE	Hinder and Enscore 2016
23475	2016	HAER for SLC-1/2, 3/4, 9/10, 14, and 34	Research Buffer	USAF	USACE	Enscore and Stupich 2016
23553	2016	Phase I CRAS of Blue Origin lease area	Research Buffer	USAF	LG2 Environmental Solutions (LG2)	Healey et al. 2016
24166	2008-2015	CRAS for the Skid Strip Area Development at CCAFS	Research Buffer	FDHR	USAF	Penders 2017
24517	2017	Phase I CRAS of the Glenn Substation and transmission line corridor	Within Physical Impact APE	USAF and Florida Power and Light Company	LG2	Banguilan et al. 2017
27193	2014-2015	Underwater remote sensing	Research Buffer	FDHR	GME	GME 2015b
27194	2015	Underwater archaeological research design plan	Research Buffer		GME	Sinclair 2015
27738	2018-2019	Phase I archaeological survey of 2138.3 acres at CCFAS	Research Buffer	USAF	New South	Gregory et al. 2019
27962	2019	Phase I CRAS along ICBM Road	Within Physical Impact APE	USAF	University of South Florida	Rogers et al. 2020
29357	2024	Cultural resource report for reactivation of SLC-14	Within Physical Impact APE	USAF	Jacobs	Wobig et al. 2024

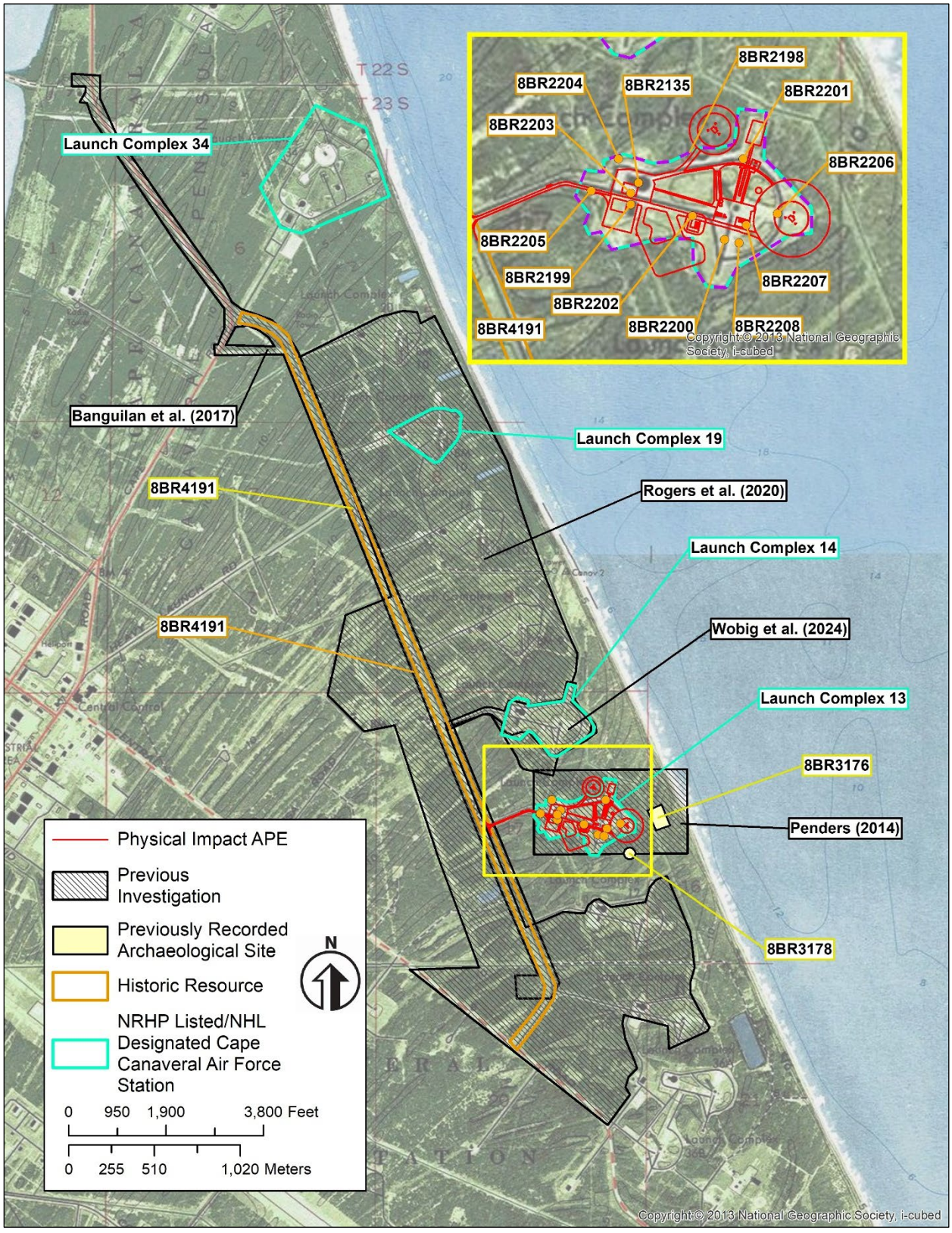


Figure 5.3 Previous cultural resources investigations and previously recorded archaeological sites and historic resources within or adjacent to the Physical Impact APE shown on the *Cape Canaveral, Florida* USGS orthophotomap topographic quadrangle (USGS 1976).

Table 5.3 Previously recorded archaeological sites within one mile of the Physical Impact APE.

Site No./ Name	Type	Description	Cultural Affiliation	Location	Reference(s)	NRHP Status
8BR238/ Canaveral Town / Canaveral Beach Park	District	Historic town remnants	Early Twentieth Century	Research Buffer	Cantley et al. 1994; Healey et al. 2016; Levy et al. 1983	Unassessed
8BR238A	Site	Historic structure foundation	Early Twentieth Century	Research Buffer	Cantley et al. 1994; Healey et al. 2016	Unassessed
8BR238B	Site	Historic structure foundation	Early Twentieth Century	Research Buffer	Cantley et al. 1994; Healey et al. 2016	Unassessed
8BR238C	Site	Historic artifact scatter	Early Twentieth Century	Research Buffer	Cantley et al. 1994; Healey et al. 2016	Unassessed
8BR238D	Site	Historic homestead	Early Twentieth Century	Research Buffer	Cantley et al. 1994; Healey et al. 2016	Unassessed
8BR1642	Site	Precontact artifact scatter and shell midden; Contact artifact scatter	Malabar I/II; Contact	Research Buffer	Cantley et al. 1994; Healey et al. 2016	Unassessed
8BR2256/ Azusa Antenna Field	Site	Cold War scatter and building remains (associated with missile tracking site)	Mid- to Late Twentieth Century	Research Buffer	Gregory et al. 2019; Rogers et al. 2020	Not Eligible
8BR2343/ Cape Point	Site	Precontact artifact scatter and redeposited midden	Malabar I	Research Buffer	Hawkins 2008	Not Eligible
8BR3176/ Angy's Scatter	Site	Historic homestead	Early to Mid-Twentieth Century	Adjacent to Physical Impact APE	Penders 2014b	Not Eligible
8BR3177/ Atlas Debris	Site	Cold War scatter (associated with Atlas missile explosion)	Twentieth Century	Research Buffer	Penders 2014b	Not Eligible
8BR3178/ Canaveral Rose's Garden	Site	Precontact artifact scatter and shell midden	Malabar I/II	Adjacent to Physical Impact APE	Penders 2014b	Not Eligible
8BR3370	Site	Precontact artifact scatter; Historic homestead	Transitional/Orange Period; Mid-Twentieth Century	Research Buffer	Healey et al. 2016	Not Eligible
8BR3371	Site	Historic artifact scatter	Early to Mid-Twentieth Century	Research Buffer	Healey et al. 2016	Not Eligible
8BR3372	Site	Cold War aircraft/rocket scatter (LC-11)	Mid- to Late Twentieth Century	Research Buffer	Healey et al. 2016	Not Eligible

Site No./ Name	Type	Description	Cultural Affiliation	Location	Reference(s)	NRHP Status
8BR3373/ Lansing Beach School	Site	Historic artifact scatter	Early Twentieth Century	Research Buffer	Healey et al. 2016	Not Eligible
8BR3375	Site	Cold War artifact scatter (associated with launch complex construction)	Mid- to Late Twentieth Century	Research Buffer	Healey et al. 2016	Not Eligible
8BR3376	Site	Precontact artifact scatter; Historic homestead	Malabar I; Mid-Twentieth Century	Research Buffer	Healey et al. 2016	Not Eligible
8BR3380	Site	Historic artifact scatter	Mid-Twentieth Century	Research Buffer	Healey et al. 2016	Not Eligible
8BR3381	Site	Historic artifact scatter	Mid-Twentieth Century	Research Buffer	Healey et al. 2016	Not Eligible
8BR3558/ ICBM Concrete Pad	Site	Historic building remains	Twentieth Century	Research Buffer	Banguilan et al. 2017	Not Eligible
8BR4007	Site	Historic artifact scatter	Mid-Twentieth Century	Research Buffer	Gregory et al. 2019	Not Eligible
8BR4188/ CCAFS LMU 53 Concrete Pads	Site	Historic building remains	Twentieth Century	Research Buffer	Rogers et al. 2020	Not Eligible
8BR4189/ CCAFS LMU 61 Concrete Remains	Site	Historic building remains	Twentieth Century	Research Buffer	Rogers et al. 2020	Not Eligible
8BR4190/ Camera Road E Artifact Scatter	Site	Precontact artifact scatter; Historic artifact scatter	Malabar I/II; Twentieth Century	Research Buffer	Rogers et al. 2020	Not Eligible
8BR4369	Shipwreck	Historic shipwreck	Unknown Colonial Period	Research Buffer	GME 2015b	Unassessed

Table 5.4 Previously recorded historic resources within one mile of the Physical Impact APE.

Resource No./Name	Type	Description	Construction Date	Location	Reference(s)	NRHP Status
8BR1934/ Launch Complex 36A Gantry	Structure	Cold War launch complex	1959-1961	Research Buffer	Turner et al. 1994	Eligible (Criteria A, B, and D)
8BR1961/ Launch Complex 36B Gantry	Structure	Cold War launch complex	1963	Research Buffer	Turner et al. 1994	Eligible (Criteria A, B, and D)
8BR2134/ Launch Complex 12 Blockhouse	Building	Concrete block and rebar circular 1-story dome roof blockhouse	1956-1957	Research Buffer	Barton and Levy 1984; McCarthy et al. 1993	Unassessed (Potentially Eligible under Criteria A, and C)
8BR2135/ Launch Complex 13 Blockhouse	Building	Concrete block and rebar circular 1-story dome roof blockhouse	1956-1958	Within the Physical Impact APE	Penders 2007, 2014a; McCarthy et al. 1993; Turner et al. 1994	Not Eligible (Demolished)
8BR2198/ Launch Complex 13	District	Cold War launch complex	1956-1958	Within the Physical Impact APE	Barton and Levy 1984; Penders 2007, 2014a; McCarthy et al. 1993; Turner et al. 1994; Wobig et al. 2024	NRHP listed as contributing to the CCAFS NHL district (8BR216); SHPO Previously Determined Not Eligible (Demolished)
8BR2199/ LC 13 Ready Bldg/ Contractors Support Building	Building	Wood frame rectangular 1-story building with corrugated asbestos cement siding	1956-1958	Within the Physical Impact APE	Penders 2007, 2014a; Turner et al. 1994	Not Eligible (Demolished)
8BR2200/ Launch Complex 13 Launch Stand and Ramp	Structure	Concrete block and rebar rectangular 1-story ramp and stand structure	1956-1958	Within the Physical Impact APE	Penders 2007, 2014a; Turner et al. 1994	Not Eligible (Demolished)
8BR2201/ Launch Complex 13 Flume and Skimming Basin	Structure	Concrete slab rectangular ditch and poured concrete collection pond	1956-1958	Within the Physical Impact APE	Penders 2007, 2014a; Turner et al. 1994	Not Eligible (Demolished)

Resource No./Name	Type	Description	Construction Date	Location	Reference(s)	NRHP Status
8BR2202/ LC 13 LOX/GN2 Storage Area	Structure	Concrete slab rectangular storage area with concrete blast wall with earthen berm	1956-1958	Within the Physical Impact APE	Penders 2007, 2014a; Turner et al. 1994	Not Eligible (Demolished)
8BR2203/ LC 13 Guard Shack	Structure	Wood frame rectangular 1-story structure with asbestos cement panel siding	1956-1958	Within the Physical Impact APE	Penders 2007, 2014a; Turner et al. 1994	Not Eligible (Demolished)
8BR2204/ LC 13 POL Building	Building	Concrete block square 1-story POL building	1960	Within the Physical Impact APE	Penders 2007, 2014a; Turner et al. 1994	Not Eligible (Demolished)
8BR2205/ LC 13 Water Demineralization Station	Building	Concrete block square 1-story water demineralization building	1957	Within the Physical Impact APE	Penders 2007, 2014a; Turner et al. 1994	Not Eligible (Demolished)
8BR2206/ Launch Complex 13 Gantry Rails and Parking Area	Structure	Poured concrete slab and rebar rectangular structure	1956-1958	Within the Physical Impact APE	Penders 2007, 2014a; Turner et al. 1994	Not Eligible (Demolished)
8BR2207/ Launch Complex 13 Propellant (RP-1) Facility	Structure	Poured concrete slab and rebar rectangular structure with concrete blast wall	1956-1958	Within the Physical Impact APE	Penders 2007, 2014a; Turner et al. 1994	Not Eligible (Demolished)
8BR2208/ LC 13 POL Building	Building	Concrete block square 1-story POL building	1956-1958	Within the Physical Impact APE	Penders 2007, 2014a; Turner et al. 1994	Not Eligible (Demolished)
8BR2209/ Launch Complex 14	District	Cold War launch complex	1957	Research Buffer	Barton and Levy 1984; Hinder 2003b; Hinder and Enscore 2016; McCarthy et al. 1993; Wobig et al. 2024	NRHP listed as contributing to the CCAFS NHL district (8BR216); Eligible (Criteria A, B, C, and D)
8BR2210/ Launch Complex	Structure	Rectangular concrete block 1-story 6-bay	1957	Research Buffer	Hinder 2003b; Hinder and	Eligible (Criteria A

Resource No./Name	Type	Description	Construction Date	Location	Reference(s)	NRHP Status
14 Launch Stand and Ramp		structure with concrete slab ramp			Enscore 2016; Wobig et al. 2024	and C) (Demolished)
8BR2211/ LC 14 Propellant Transfer Unit	Building	Square concrete block 1-story building with shed roof	1957	Research Buffer	Hinder 2003b; Hinder and Enscore 2016; Wobig et al. 2024	Eligible (Criteria A and C) (Pending Demolition)
8BR2212/ Launch Complex 14 Jet Propellant-4 Facility	Structure	Rectangular concrete slab with reinforced concrete blast wall	1956-1958	Research Buffer	Hinder 2003b; Hinder and Enscore 2016; Wobig et al. 2024	Eligible (Criteria A and C) (Pending Demolition)
8BR2213/ LC 14 POL	Building	Square concrete block 1-story building with flat roof	1957	Research Buffer	Hinder 2003b; Hinder and Enscore 2016; Wobig et al. 2024	Eligible (Criteria A and C)
8BR2214/ LC 14 Liquid Oxygen/Gaseous Nitrogen Storage Area	Structure	Rectangular concrete slab with blast wall and earthen berm	1957	Research Buffer	Hinder 2003b; Hinder and Enscore 2016; Wobig et al. 2024	Eligible (Criteria A and C)
8BR2215/ Launch Complex 14 Flume and Skimming Basin	Structure	Rectangular concrete slab ditch and collection pond	1957	Research Buffer	Hinder 2003b; Hinder and Enscore 2016; Wobig et al. 2024	Eligible (Criteria A and C)
8BR2216/ Launch Complex 14 Blockhouse	Building	Circular concrete block and slab blockhouse covered with earth	1957	Research Buffer	Hinder 2003b; Hinder and Enscore 2016; Wobig et al. 2024	Eligible (Criteria A, B, C, and D)
8BR2217/ LC 14 Ready Bldg/ Contractors Support Building	Building	Rectangular 1-story wood frame building with gable roof	1957	Research Buffer	Hinder 2003b; Hinder and Enscore 2016; Wobig et al. 2024	Eligible (Criteria A, B, C, and D) (Demolished)
8BR2218/ LC 14 Communications Cable Building	Building	Square 1-story concrete block building with built up roof	1957	Research Buffer	Hinder 2003b; Hinder and Enscore 2016;	Eligible (Criteria A, B, C, and D)

Resource No./Name	Type	Description	Construction Date	Location	Reference(s)	NRHP Status
					Wobig et al. 2024	(Pending Demolition)
8BR2219/ LC 14 Water Demineralization Station	Building	Square 1-story concrete block building with built up roof	1957	Research Buffer	Hinder 2003b; Hinder and Enscore 2016; Wobig et al. 2024	Eligible (Criteria A, B, C, and D) (Demolished)
8BR2220/ LC 14 Rails and Service Tower Parking	Structure	Square 1-story concrete slab reinforced with steel rebar service tower rail system	1957	Research Buffer	Hinder 2003b; Hinder and Enscore 2016; Wobig et al. 2024	Eligible (Criteria A, B, C, and D) (Pending Demolition)
8BR2221/ Mercury Memorial	Structure	Stainless steel astronomical symbol for the planet Mercury and bronze plaque	1964	Research Buffer	Hinder 2003b; Hinder and Enscore 2016; Wobig et al. 2024	Eligible (Criteria A, B, and C)
8BR2255/ LC 15 Ready Bldg/ Contractors Support Building	Building	Rectangular 1-story wood frame building with gable roof	1957	Research Buffer	McCarthy et al. 1993; Penders 2007	Not Eligible (Demolished)
8BR2275/ Launch Complex 15 Blockhouse	Building	Circular concrete block and concrete slab blockhouse covered with earth	1957	Research Buffer	McCarthy et al. 1993; Penders 2007	Eligible (Criteria A and C)
8BR2276/ Launch Complex 15 Theodolite Building	Building	Square 2-story concrete block building with built up roof	1957	Research Buffer	McCarthy et al. 1993; Penders 2007; Rogers et al. 2020	Not Eligible
8BR2277/ LC 15 Propellant Transfer Unit Building	Building	Rectangular 1-story concrete block building with shed roof	1957	Research Buffer	McCarthy et al. 1993; Penders 2007	Not Eligible (Demolished)
8BR2278/ Launch Complex 15 Cableway	Structure	Linear and rectangular 1-story concrete block and mortar structure covered with poured concrete and a flat roof	1957	Research Buffer	McCarthy et al. 1993; Penders 2007	Not Eligible (Demolished)

Resource No./Name	Type	Description	Construction Date	Location	Reference(s)	NRHP Status
8BR2301/ Launch Complex 11 Blockhouse	Building	Circular concrete block and concrete slab blockhouse covered with earth	1956-1957	Research Buffer	Barton and Levy 1984; McCarthy et al. 1993; Penders 2007	Unassessed (Potentially Eligible under Criteria A, and C)
8BR2302/ LC 11 Ready Bldg/ Contractors Support Building	Building	Rectangular 1-story wood frame building with gable roof	1956-1957	Research Buffer	Barton and Levy 1984; McCarthy et al. 1993; Penders 2007	Not Eligible
8BR2303/ LC 11 Water Demineralization Station	Building	Square 1-story concrete block building with built up roof	1956-1957	Research Buffer	Barton and Levy 1984; McCarthy et al. 1993; Penders 2007	Not Eligible
8BR2304/ LC 11 Liquid Oxygen/ Gaseous Nitrogen Storage Area	Structure	Rectangular concrete slab with concrete blast wall and earthen berm	1956-1957	Research Buffer	Barton and Levy 1984; McCarthy et al. 1993; Penders 2007	Not Eligible
8BR2305/ Launch Complex 11 Propellant (RP-1) Facility	Structure	Rectangular concrete slab with concrete blast wall	1956-1957	Research Buffer	Barton and Levy 1984; McCarthy et al. 1993; Penders 2007	Not Eligible
8BR2306/ Launch Complex 11 JP-4 Fuel Facility	Structure	Rectangular concrete slab with concrete blast wall	1956-1957	Research Buffer	Barton and Levy 1984; McCarthy et al. 1993; Penders 2007	Not Eligible
8BR2307/ Launch Complex 11 Spillway and Catchment Basin	Structure	Rectangular concrete slab ditch and collection pond	1956-1957	Research Buffer	Barton and Levy 1984; McCarthy et al. 1993; Penders 2007	Not Eligible
8BR2308/ Launch Complex 11	District	Cold War launch complex	1956-1957	Research Buffer	Barton and Levy 1984; McCarthy et al. 1993; Penders 2007	Not Eligible
8BR2309/ Launch Complex 15 Launch Stand and Ramp	Structure	Rectangular concrete block 2-story 6-bay structure with concrete slab ramp	1957	Research Buffer	McCarthy et al. 1993; Penders 2007	Not Eligible (Demolished)

Resource No./Name	Type	Description	Construction Date	Location	Reference(s)	NRHP Status
8BR2310/ Launch Complex 15 Fuel Holding Facility	Structure	Rectangular concrete slab with concrete blast wall	1957	Research Buffer	McCarthy et al. 1993; Penders 2007	Not Eligible (Demolished)
8BR2311/ LC 15 Oxidizer Holding Area	Structure	Rectangular concrete slab with concrete blast wall and earthen berm	1957	Research Buffer	McCarthy et al. 1993; Penders 2007	Not Eligible (Demolished)
8BR2312/ Launch Complex 15	District	Cold War launch complex	1957-1959	Research Buffer	Barton and Levy; McCarthy et al. 1993; Wobig et al. 2024	Not Eligible (Pending Demolition)
8BR2320/ Launch Complex 12	District	Cold War launch complex	1956-1957	Research Buffer	Barton and Levy; McCarthy et al. 1993; Penders 2007	Not Eligible
8BR2321/ Launch Complex 16	District	Cold War launch complex	1957-1959	Research Buffer	Barton and Levy 1984; McCarthy et al. 1993; Penders 2015	Not Eligible
8BR2322/ Launch Complex 16 Blockhouse	Building	Circular concrete block and concrete slab blockhouse covered with earth	1957-1959	Research Buffer	McCarthy et al. 1993; Penders 2015	Eligible (Criteria A and C)
8BR2323/ Launch Complex 16 Cableway	Structure	Linear and rectangular 1-story concrete block and mortar structure covered with poured concrete and a flat roof	1957-1959	Research Buffer	McCarthy et al. 1993; Penders 2015	Not Eligible
8BR2324/ LC 16 Ready Bldg/ Contractors Support Building	Building	Rectangular 1-story wood frame building with gable roof	1957-1959	Research Buffer	McCarthy et al. 1993; Penders 2015	Not Eligible
8BR2325/ Launch Complex 16 Launch Stand and Ramp	Structure	Rectangular 2-story concrete block ramp and stand structure with steel I-beams	1957-1959	Research Buffer	McCarthy et al. 1993; Penders 2015	Not Eligible

Resource No./Name	Type	Description	Construction Date	Location	Reference(s)	NRHP Status
8BR2326/ LC 16 Propellant Transfer Unit Building	Building	Rectangular 1-story concrete block building with shed roof	1957-1959	Research Buffer	McCarthy et al. 1993; Penders 2015	Not Eligible
8BR2327/ LC 12 Liquid Oxygen/ Gaseous Nitrogen Storage Area	Structure	Rectangular concrete slab with blast wall and earthen berm. Recent addition of sheet metal roof	1957	Research Buffer	McCarthy et al. 1993; Penders 2007	Not Eligible
8BR2328/ Launch Complex 12 Jet Propellant-4 Facility	Structure	Rectangular concrete slab with blast wall	1956-1958	Research Buffer	McCarthy et al. 1993; Penders 2007	Not Eligible
8BR2329/ Launch Complex 12 Gantry Rails and Parking Area	Structure	Rectangular concrete slab with rebar enforcement	1956-1957	Research Buffer	McCarthy et al. 1993; Penders 2007	Not Eligible
8BR2330/ Launch Complex 12 Flume and Skimming Basin	Structure	Rectangular concrete slab ditch and collection pond	1956-1957	Research Buffer	McCarthy et al. 1993; Penders 2007	Not Eligible
8BR2331/ LC 12 Communications Cable Building	Building	Square 1-story concrete block building with built up roof	1956-1957	Research Buffer	McCarthy et al. 1993; Penders 2007	Not Eligible
8BR2332/ Launch Complex 16 Flume and Skimming Basin	Structure	Rectangular concrete slab ditch and collection pond	1957-1659	Research Buffer	McCarthy et al. 1993; Penders 2015	Not Eligible
8BR2333/ Launch Complex 36 Blockhouse	Building	Circular concrete block and slab blockhouse covered with earth	1959-1961	Research Buffer	McCarthy et al. 1993; Turner et al. 1994	Eligible (Criteria A and C)
8BR2363/ Canaveral Beach Canal	Linear Resource	Historic canal	1926	Research Buffer	Penders 2014a	Not Eligible
8BR3190/ Pershing Missile Test Site	Structure	Rectangular launch pad	1974	Research Buffer	Penders 2015	Not Eligible
8BR3191/ Fac. 7-68230: Sentry Building	Structure	Rectangular building with wood and	Unknown	Research Buffer	Penders 2015	Not Eligible

Resource No./Name	Type	Description	Construction Date	Location	Reference(s)	NRHP Status
		aluminum siding and flat roof				
8BR3382	Structure	Historic camera target (LC-11)	1964	Research Buffer	Healey et al. 2016	Not Eligible
8BR3383	Structure	Historic camera target (LC-11)	1964	Research Buffer	Healey et al. 2016	Not Eligible
8BR3384 (NW Road)	Linear Resource	Historic road	1951	Research Buffer	Healey et al. 2016	Not Eligible
8BR3385/ Ocean Way/ Palmetto Drive	Linear Resource	Historic road	1943	Research Buffer	Healey et al. 2016	Not Eligible
8BR3386/ White Drive	Linear Resource	Historic road	1943	Research Buffer	Healey et al. 2016	Not Eligible
8BR3387/ Avenido Francesco	Linear Resource	Historic road	1951	Research Buffer	Healey et al. 2016	Not Eligible
8BR3555/ Glenn Substation Road	Linear Resource	Historic road	1951	Research Buffer	Banguilan et al. 2017	Not Eligible
8BR4187/ LC-14 Thrust Block and Valve Pit	Structure	Concrete pump structure on elevated platform	1956	Research Buffer	Rogers et al. 2020	Not Eligible
8BR4191/ ICBM Road	Linear Resource	Historic road	1956-1957	Within the Physical Impact APE	Rogers et al. 2020	Eligible (Criterion A)

In 1993, the historians from the USACE Construction Engineering Research Laboratories (CERL) documented the launch complexes and related facilities at CCAFS to determine eligibility (McCarthy et al. 1993). In addition to discussing the NRHP-listed (CCAFS NHL district) complexes (SLC-5/6, SLC-13, SLC-14, SLC-19, SLC-26, and SLC-34), they evaluated 16 of the facilities from the previous RAI study for possible NRHP eligibility. This study recommended six additional launch complexes (SLC-1/2, SLC-3/4, SLC-17, SLC-21/22, SLC-25, and SLC-31/32) for nomination to the NRHP. It was recommended that the remaining facilities (SLC-10, SLC-11, SLC-12, SLC-15, SLC-16, SLC-18, SLC-30, SLC-37, and Hangar S) be documented instead of being preserved. This study also recommended that SLC-13 no longer contained sufficient physical remains to meet NRHP requirements under Criterion C ("embodying distinctive characteristics of a type, period, or method of construction…") nor did it possess sufficient integrity for potential eligibility (McCarthy et al. 1993). Overall, they argued that preserving SLC-13 would be redundant and unnecessary, as the facilities were identical to those at SLC-11, SLC-12, and SLC-14. No assessment was made for SLC-14. USACE CERL's report was never submitted to SHPO for review, though it was submitted to the FMSF as documentation.

Between 1993 and 1994, the USACE CERL completed a HAER of SLC-13, SLC-26, and SLC-36 (Turner et al. 1994). Each report included a detailed historical overview, archival large-format photographs, as-built drawings of the facilities, and a statement of significance. The HAER documentation of SLC-13 was completed so that it could be delisted from the NRHP and CCAFS NHL district in order to demolish the MST (Penders 2014b:80). However, there is no record the HAERs were sent to SHPO for review, though they were submitted to the FMSF as documentation.

In 1996, New South compiled a cultural resources management plan for the 45th Space Wing which included USAF properties at CCAFS and Patrick Air Force Base (Joseph et al. 1996). This document has been the basis for subsequent ICRMPs. This plan also includes correspondence and other resource documentation related to SLC-13 and SLC-14 as an appendix.

In 2007, the 45th Space Wing Cultural Resources Manager, Thomas Penders, completed a documentation survey of several of the historic launch complexes, including SLC-12, SLC-13, and SLC-14 (Penders 2007). This project consisted of a historic facility assessment of each of the launch complexes. At this time, the USAF determined SLC-12 and SLC-13 were not eligible for the NRHP (Sutherland 2008). However, SHPO did not concur and determined that the resource remained eligible. SLC-14 was determined eligible, and the USAF planned to preserve it as the best example of the original four identical launch complexes. HAER documentation of SLC-14 was completed in 2003 and updated in 2016 (Hinder 2003b; Hinder and Enscore 2016; Enscore and Stupich 2016). SLC-14 has also been documented with high-definition laser scanning (3D digital documentation) (Collins and Doering 2015).

In 2014, the USAF conducted a Phase I CRAS of the proposed Falcon Vertical Landing Site at SLC-13 (Penders 2014b). This survey included intensive surface inspection (10-meter [m] intervals) and subsurface shovel testing according to a probability model. Survey shovel tests were excavated at 25-m intervals, and delineation shovel tests were excavated at 10-m intervals. All excavated soils were screened through 1/4-inch hardware mesh for the recovery of artifacts. Additional soil probing was utilized to help detect subsurface features. Penders recommended that SLC-13, associated with the Atlas missile program, was not eligible for the NRHP. Nearby sites 8BR3176 and 8BR3178 were recommended not eligible for the NRHP. During SHPO consultation, SLC-13 was determined not eligible for the NRHP due to absence of historical integrity (Bendus 2014; Blaylock 2014).

In 2017, LG2 Environmental Solutions (LG2) completed a Phase I CRAS of the Glen Substation and transmission line corridor for the USAF and the Florida Power and Light Company (Banguilan 2017). This survey covered 61.6 acres and included both systematic shovel testing (50 centimeter [cm] diameter shovel tests) and pedestrian survey where digging was not feasible. As a result, LG2 identified several historic roads and archaeological sites. None of these are located within or adjacent to the Physical Impact APE.

In 2019, the University of South Florida conducted a Phase I CRAS along ICBM Road (Rogers et al. 2020). Archaeological field methods included systematic surface inspection and 25-m-interval shovel testing based on a probability model. Architectural survey methods included a review of historic maps and aerial photographs and field documentation of the remains of historic structures and linear resources. The survey covered 1,045 acres within the CCSFS. Eleven cultural resources were documented, including 8BR4191 (ICBM Road), which was recommended eligible for the NRHP under Criterion A for its association with the four historic launch complexes and the early ICBM testing and Space Program.

In 2024, Jacobs completed a cultural resource report for the reactivation of SLC-14 (Wobig et al. 2024). This assessment was completed as a desktop analysis; no field investigations or subsurface testing were undertaken. Jacobs provided detailed documentation of SLC-14, as well as the adjacent SLC-13 and SLC-15 and the ICBM Road (8BR4191). They assessed each resource for overall integrity in relation to NRHP eligibility and provided an assessment of effects for the proposed reactivation of SLC-14. Jacobs recommended that SLC-13 was not eligible for the NRHP, though it was still listed as a component of the CCAFS NHL district. They also recommended SLC-14 was eligible as a component of the CCAFS NHL district as well as individually eligible for the NRHP. However, they argued that there would be no adverse effect to SLC-14 due to the fact that reactivation would restore the launch complex to its historic function and thereby preserve it for future launches and continue the USSF mission.

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6.0 Cultural Resources Assessment

Brockington completed an assessment of historic properties that may be impacted by the proposed modification at SLC-13. These include the NHL-listed CCAFS district (including SLC-13 and SLC-14) and the NRHP-eligible ICBM Road. Brockington personnel assessed the integrity of each resource and evaluated potential project-related impacts or effects. A detailed discussion and management recommendations for each resource are presented below.

6.1 The CCAFS NHL District

The CCAFS NHL district is a discontinuous 132.5-acre district that includes six launch complexes (SLC-5/6, SLC-13, SLC-14, SLC-19, SLC-26, and SLC-34), Hangar S, and the Mission Control Center (National Park Service 1983). The district was concurrently listed on the NRHP and designated as an NHL on April 16, 1984. The district extends across both USSF- and NASA-owned property. The USSF owns SLC-13, SLC-14, SLC-19, SLC-26, and SLC-34. NASA owns SLC-5/6, Hangar S, and Mission Control Center. The CCAFS NHL district is significant at the national level under NRHP Criterion A in the areas of communications, science, and space exploration and under Criterion C for its engineering, with a period of significance from 1949 to 1984 (the time of designation). The NHL nomination recognizes the need for CCSFS to continue its mission of space exploration and that the nomination should not encumber this (see Section 2.4). This is explicitly stated in the NHL nomination: "It was the consensus of the Board that the designation of these facilities should not interfere with the mission of the United States Air Force at Cape Canaveral Air Force Station" (National Park Service 1983).

Since the property was listed as an NHL in 1984, changes have occurred at CCAFS, including removing contributing resources, reactivating launch complexes, and constructing new facilities. SLC-13 (8BR2198) and associated resources are no longer extant, having been replaced by LZ-1 and LZ-2 in 2015. Despite some changes in use and physical condition, as a whole, the CCAFS NHL district (8BR216) retains sufficient integrity of association, feeling, setting, and location with some diminishment of design, materials, and workmanship.

In terms of the current project, only SLC-13 and SLC-14 are located within the Physical Impact APE and the 120 dB Launch Noise/Vibration APE (the area of indirect effect), respectively. SLC-13 and SLC-14 were both constructed between 1956 to 1958 for the Atlas program from the same set of site plans, along with two other originally identical launch complexes (SLC-11 and SLC-12) on Missile Row. SLC-19 and SLC-34 are located within the 111 dB Launch Noise/Vibration APE. Brockington recommends there will be no adverse effect to the CCAFS NHL district at SLC-19 or SLC-34 as these properties were designed to experience noise and vibrations from rocket launches.

6.1.1 SLC-13 as a Component of the CCAFS NHL District

SLC-13 is currently part of the CCFAS NHL district. SLC-13 originally had 11 contributing resources (see Table 2.4), but none are extant. The NRHP eligibility of SLC-13 was inconclusively documented for several years with multiple opposing recommendations (Barton and Levy 1984; McCarthy et al.1993). Following HAER documentation in 1994 (Turner et al. 1994) and the removal of the MST, plans were made to delist SLC-13 from the NHL district (Gaske 2004; Penders 2014a). While delisting never occurred, all components of SLC-13 have been thoroughly documented and determined not eligible for the NRHP and subsequently demolished. In 2007, the USSF SLD 45 cultural resource manager documented SLC-13 and all associated facilities within the complex. As part of the documentation, completed FMSF forms, as-built drawings, location maps, historic photographs, and current photographs were submitted to the SHPO (Penders 2007). USAF and SHPO determined that

SLC-13 was not eligible for the NRHP individually and was non-contributing to the NHL district due to absence of historical integrity (Bendus 2014; Blaylock 2014; Sutherland 2008).

All components of SLC-13 have been demolished or removed. The MST was removed in 2005, and the SLC-13 Blockhouse was demolished in 2012. In 2015, SLC-13 was reactivated for vertical orbital class rocket fly-back operations. All remaining standing structures and buildings were removed prior to this reactivation. All these undertakings had the requisite Section 106 studies completed and received SHPO concurrence that no historic properties would be affected, taking into consideration the previous HAER documentation as mitigation (Bendus 2014; Blaylock 2014; Gaske 2004, 2007, 2008; Sutherland 2008). None of the original 11 NHL contributing resources at SLC-13 remain. The SLC-13 foundation remnants were determined not eligible for listing in the NRHP by USSF SLD 45 with the SHPO's concurrence (Penders 2014a; USAF 2017; DHR Project File Number: 2014-4037), though the site remains honorarily listed as one of the six launch complexes in the CCAFS NHL district.

SLC-13 no longer retains integrity, and through consultation for the current project, would likely be verified as a non-contributing element of the NHL district. The USSF SLD 45 is currently working with the National Park Service and SHPO to amend the CCAFS NHL nomination to update the contributing and non-contributing resources and to clarify the qualifying characteristics and the necessary aspects of integrity for the historic property. SLC-13 may be delisted from the NHL entirely or formally excluded as a contributing element at a future date.

Physical effects related to the current project would be limited to SLC-13. Ground disturbance for the proposed action would be limited to the extent of SLC-13 and access roads in areas where previous soil-disturbing activities occurred for the original construction and use of the LC infrastructure. These areas have been previously covered by Section 106 studies for similar actions which received SHPO concurrence that no archaeological resources are present within the current Physical Impact APE.

Although all contributing resources of SLC-13 were removed under a past action, the launch complex is still listed as part of the CCAFS NHL. However, the physical changes needed to modify SLC-13 are necessary to fulfill the USSF mission and consistent with prior use. Following the ACHP's (1991) guidance, the proposed modifications would result in the continued use of the historic site as a launch complex and allow for scientific and engineering advancements that could not occur in SLC-13's current condition. Therefore, Brockington recommends there will be no adverse effect to CCAFS NHL district at SLC-13.

6.1.2 SLC-14 as a Component of the CCAFS NHL District

The adjacent SLC-14 is also part of the NHL district. SLC-14 was listed as a contributing resource to the CCAFS NHL district with seven contributing resources identified in the amended NHL nomination (referred to in the NHL nomination as the Blockhouse, Launch Stand, Ready Building, Propellent Transfer Building, Fuel Storage Area, Liquid Oxygen Storage Area, and Flume and Skimming Basin). SLC-14 has been determined to be NRHP eligible and a contributing element of the NHL under Criteria A and C for its association with space exploration, communications, science, and engineering. It has also been determined to be individually eligible for the NRHP for its association with the Gemini, Mercury, and Apollo astronauts (Criterion B) and its ability to provide information for future research (Criterion D), which is captured in the extensive documentation that has been done and made available for scholars and the public (Wobig et al. 2024).

SLC-14's NRHP and NHL qualifying characteristics include its location and setting within the historic CCAFS (now actively used as the CCSFS) and adjacent to other launch complexes; its basic design as a launch complex defined by a launch pad within a general circulatory layout, set back from ICBM Road and reached via a secondary access road; and its association with space exploration and the US Space Program. The CCAFS NHL nomination (National Park Service 1983) acknowledged the lack of material integrity in 1983. It noted that SLC-14 underwent extensive alterations during the

transition from Project Mercury to Atlas-Agena and that the service structure and launch stand were both demolished in 1976. The launch pad retained only concrete foundations in 1983. SLC-14 was abandoned in 1973 and has deteriorated since that time. As of 2024, most of the remaining components at SLC-14 have been demolished or modified ahead of its reactivation (Wobig et al. 2024). Only the SLC-14 Blockhouse, Thrust Block and Valve Pit, and Mercury Memorial remain in place with no physical changes. SHPO determined that this action was not an adverse effect as it restored SLC-14 to its original use.

For the current project, no construction will occur within SLC-14 as a result of the proposed action. Any visual effects would be limited and low profile, and planned use is consistent with historic and ongoing activities. The proposed action would not introduce incompatible visual changes; proposed modifications to SLC-13 would be similar in design, materials, scale, and function to the historic launch complex and thus would not introduce incompatible visual changes. Therefore, the qualifying characteristics of SLC-14 will not be altered by the proposed undertaking in a manner that would diminish its location, design, setting, feeling, association, or integrity. In fact, they would be strengthened by the continued use of SLC-13 as launch complex (its historic use). Brockington recommends there will be no adverse effect to the CCAFS NHL district at SLC-14.

6.2 ICBM Road (8BR4191)

In addition to the launch complexes, an NRHP-eligible segment of ICBM Road (8BR4191) intersects the western end of the Physical Impact APE, though it is outside the area where construction activities are planned. The ICBM Road was constructed between 1956-1957 for access use for the original four launch complexes. It provides access and runs parallel to the row of historic launch complexes. It was recorded as a historic resource (8BR4191) in 2019 by the University of South Florida and was determined eligible under Criterion A for its association with early ICBM testing and the Space Program in relation to the launch complexes (Rogers et al. 2020). The road has had ongoing repairs and maintenance to allow continuous use as an active roadway. Based on a 2024 assessment of the resource, the ICBM Road retains sufficient integrity of association, feeling, setting, location, design, and workmanship with some changes to materials from maintenance and repairs (Wobig et al. 2024).

For the current project, no modification will occur adjacent to the ICBM as a result of the proposed action. The roadway, as well as the existing access road directly east of the ICBM Road, would be used to transport construction materials. However, this would not cause an adverse effect. Any visual effects would be limited and low profile, and planned use is consistent with historic and ongoing activities. The proposed action would not introduce incompatible visual changes; proposed modifications to SLC-13 would be similar in design, materials, scale, and function to the historic launch complex and thus would not introduce incompatible visual changes. Therefore, Brockington recommends there will be no adverse effect to the ICBM Road.

7.0 Project Summary and Management Recommendations

In May and June 2025, Brockington completed a cultural resources assessment of a possible Phantom Space and Vaya Space project at SLC-13 at the CCAFS in Brevard County, Florida. This investigation was conducted for ManTech on behalf of Phantom Space and Vaya Space, with agency oversight from the USSF. The goal of this assessment was to identify and evaluate historic properties that may be affected by the proposed modification to SLC-13. Brockington's assessment was conducted in compliance with both federal and state guidelines including Section 106 of the NHPA and cultural resources investigation and reporting guidelines set forth by the FDHR.

Brockington conducted a literature review of all previous investigations and cultural resources within one mile of the Physical Impact APE. This buffer includes NRHP- and NHL-listed properties within the Launch Noise/Vibration APE to account for indirect effects. We also consulted with USSF and FDHR to document previous determinations of eligibility and identify any new, as-yet unrecorded resources. As a result, Brockington documented two historic properties that may be impacted by the current project: the NHL-listed CCAFS district (8BR216 [including SLC-13 and SLC-14]) and the ICBM Road (8BR4191). A cultural resource assessment was conducted for the entirety of SLC-13 and all adjacent historic properties, including SLC-14 and the ICBM Road. The NRHP eligibility of all identified cultural resources was thoroughly documented.

SLC-13 is a non-contributing element of the NHL district, and proposed construction is limited to the existing pad. Therefore, there will be no adverse effect to the NHL district at SLC-13. Any visual effects would be limited and low profile. Planned use is consistent with historic and ongoing activities. Therefore, there will be no adverse effect to the NHL district at the adjacent SLC-14.

The NRHP-eligible segment of ICBM Road (8BR4191) is outside the area where construction activities are planned. There will be no physical modification to the roadway. Any visual effects would be limited and low profile. Planned use is consistent with historic and ongoing activities. Therefore, there will be no adverse effect to 8BR4191.

Brockington recommends no additional cultural resources studies are needed. Based on the information gathered from previous cultural resources investigations and supplemental research, no further historic resources survey is recommended because the project construction area is limited to the existing launch complex at SLC-13, and all historic-era resources in the vicinity have been thoroughly documented and evaluated. No archaeological survey is recommended because the soils in the Physical Impact APE have a low potential for cultural deposits, and the area has previously been subject to extensive and complete investigation (Penders 2014b), which received SHPO concurrence (Bendus 2014). The proposed ground-disturbing activities will be limited to the extent of SLC-13 and access roads in areas where prior soil-disturbing activities occurred for the original construction of the launch complex infrastructure. Thus, no new ground disturbance is anticipated for the undertaking, and no fieldwork was completed for this review.

Based on the results of this cultural resources assessment, Brockington recommends that construction within the Physical Impact APE will not physically or visually affect any historic properties. There will be project-associated noise and vibration within the Launch Noise/Vibration APE. However, there will be no adverse effect to any of the historic properties within the Launch Noise/Vibration APE since it is consistent with historic and ongoing use of the area. The Sonic Boom APE is overwater where no cultural resources are present.

The Physical Impact Area has been covered by a Phase I CRAS (Penders 2014b). While it is statistically unlikely, it is possible that individual artifacts or small (>25-m interval), disturbed archaeological sites remain at the property. Even at locations that have been previously surveyed

and cleared, there is still a minor potential for the discovery of unidentified archaeological components, features, or human remains that may require additional investigation and assessment. In the unlikely event that previously unidentified archaeological resources or human remains are encountered during construction activities, USSF SLD 45 should follow the Discoveries of Archaeological Resources and Native American Graves and Repatriation Act (NAGPRA) Cultural Items Standard Operating Procedure (SOP) in the current ICRMP (USSF 2023:20-21).

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Appendix A
Detailed Project Plans

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Appendix B

Resumes for Key Project Personnel

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Appendix C
FDHR/SHPO Correspondence

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APPENDIX C – UNITED STATES FISH AND WILDLIFE SERVICE CONSULTATION

DRAFT

BIOLOGICAL ASSESSMENT VAYA DAUNTLESS AND PHANTOM DAYTONA/LAGUNA LAUNCH PROGRAMS AT SPACE LAUNCH COMPLEX-13, CAPE CANAVERAL SPACE FORCE STATION, FLORIDA



Prepared by:

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Space Launch Delta 45

with assistance from

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ManTech International Corporation

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Cover Photograph: Launch Complexes at Cape Canaveral Space Force Station, including Space Launch Complex 13. Courtesy of Vaya Space (https://www.vayaspace.com/launch)

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LIST OF ACRONYMS AND ABBREVIATIONS

BA	Biological Assessment
CANA	Canaveral National Seashore
CCSFS	Cape Canaveral Space Force Station
DAF	Department of the Air Force
dB	decibel
dBA	A-weighted decibel
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FLSJ	Florida scrub-jay
FNAI	Florida Natural Areas Inventory
FR	Federal Register
FWC	Florida Fish and Wildlife Conservation Commission
GN2	nitrogen gas
GSE	ground-support equipment
HIF	horizontal integration facility
IPaC	Information for Planning and Consultation
kg	kilograms
kN	kilownewtons
KSC	Kennedy Space Center
LAeq	A-weighted equivalent continuous sound level
Leq	equivalent continuous sound level
LAmax	A-weighted maximum noise level
Lmax	maximum noise level

LEO	low-earth orbit
LOA	letter of agreement
LZ	Landing Zone
m	meter
MINWR	Merritt Island National Wildlife Refuge
NOAA	National Oceanic and Atmospheric Administration
NOTAM	Notices to Airmen
NOTMAR	Notices to Mariners
psf	pounds per square foot
SEBM	southeastern beach mouse
SEL	sound exposure level
SLC	Space Launch Complex
SLD 45	Space Launch Delta 45
USFWS	US Fish and Wildlife Service
USSF	US Space Force
Vac	vacuum
VTEL	Vaya Transporter Erector Launcher

1.0 INTRODUCTION

The Cape Canaveral Space Force Station (CCSFS) is located in Merritt Island, Brevard County, Florida, and is administered by the Department of the Air Force (DAF) and the United States Space Force (USSF) (Figure 1-1). The DAF is evaluating the potential environmental effects associated with the (1) DAF's authorization of the redevelopment of Space Launch Complex (SLC)-13, an existing SLC on CCSFS (Figure 1-1) into a Vaya and Phantom Launch Complex to support the Vaya Space (Vaya) Dauntless and Phantom Space Corporation (Phantom) Daytona and Laguna launch programs; and (2) the Federal Aviation Administration's (FAA's) issuance of a vehicle operator license along with potential renewals and modifications to licenses to Vaya for Dauntless operations at CCSFS and Phantom for Daytona and Laguna operations at CCSFS and approval of related airspace closures. The Dauntless, Daytona, and Laguna launch programs would support US Government and commercial launch service needs.

This Biological Assessment (BA) of the proposed Vaya and Phantom launch program was prepared utilizing information from the BA for Falcon Operations at Space Launch Complex 40 (USSF 2024).

1.1 Federal Action

The DAF's federal action is to authorize the redevelopment of SLC-13. There would be no expansion of SLC-13 to support the launch program and Vaya and Phantom would utilize existing infrastructure at SLC-13 to the maximum extent practicable. The access road to SLC-13 would be widened to enable access to Phantom's hangar by adding approximately 6,500 square feet (0.15 acre) of pavement. The construction of a flare stack, LNG storage tank, deluge evaporation basin, guard shack, and transformer pad would occur on 0.58 acre of previously disturbed but undeveloped areas of SLC-13. All other construction would be performed on previously developed land and no other impervious surfaces would be installed. The FAA's federal action is to issue vehicle operator licenses to Vaya and Phantom for Dauntless, Daytona, and Laguna launch operations at CCSFS and approve related airspace closures for launch and landing operations.

1.2 Purpose and Need for the Biological Assessment

The Vaya and Phantom launch program is related to the DAF's and FAA's federal actions (i.e., the Project would not occur but the federal actions and the Project are reasonably certain to occur) and contributes to the effects of the action. The purpose of this BA is to evaluate the effects of the action (e.g., the effects of the Project) on species and critical habitats protected by the Endangered Species Act (ESA) and certain other species and habitats that are proposed or under review for ESA protection. The DAF, as the lead federal action agency, has made effect determinations for each species and critical habitat considered in this BA.

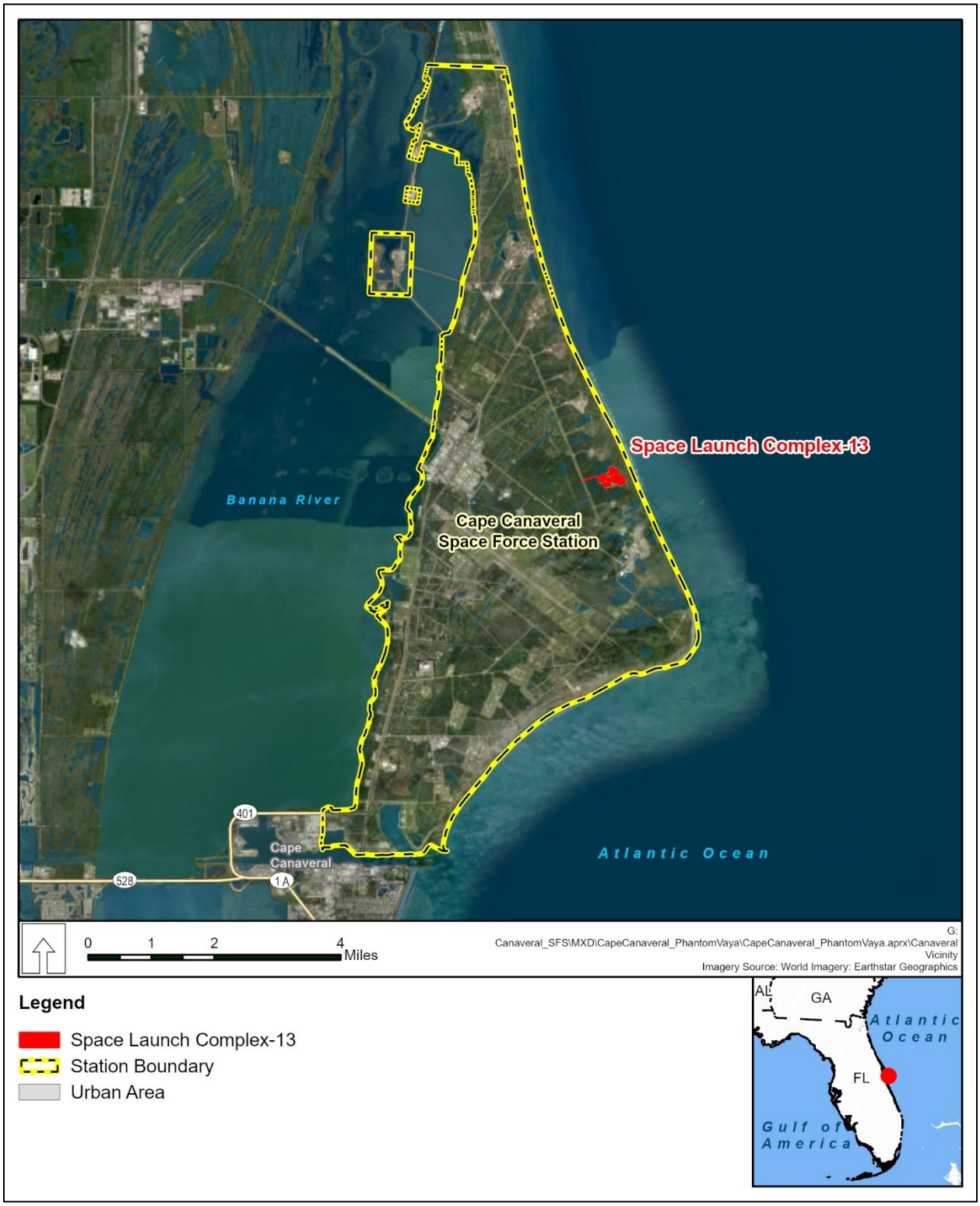


Figure 1-1. Project Location

Based on these determinations, the DAF submits this BA to the US Fish and Wildlife Service (USFWS) to initiate federal interagency consultation and conference in accordance with Section 7(a)(2) and Section 7(a)(4) of the ESA. The DAF seeks concurrence with an effect determination of “may affect, not likely to adversely affect” for the West Indian manatee (*Trichechus manatus*), tricolored bat (*Perimyotis subflavus*), Audubon’s crested caracara (*Polyborus* [*Caracara*] *plancus audubonii*), eastern black rail (*Laterallus jamaicensis* ssp. jamaicensis), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), Florida scrub-jay (*Aphelocoma coerulescens*; FLSJ), piping plover (*Charadrius melodus*), rufa red knot (*Calidris canutus rufa*), wood stork (*Mycteria americana*), black capped petrel (*Pterodroma hasitata*), eastern indigo snake (*Drymarchon couperi*), and monarch butterfly (*Danaus plexippus*). The DAF determined that the Project is “likely to adversely affect” and seeks to initiate formal consultation with USFWS on the southeastern beach mouse (*Peromyscus polionotus niveiventris*; SEBM), green sea turtle (*Chelonia mydas*), hawksbill sea turtle (*Eretmochelys imbricata*), Kemp’s Ridley sea turtle (*Eretmochelys imbricata*), leatherback sea turtle (*Dermochelys coriacea*), and loggerhead sea turtle (*Caretta caretta*).

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2.0 PROJECT DESCRIPTION AND ACTION AREA

2.1 Space Launch Complex 13

The Proposed Action is for the DAF to authorize Vaya and Phantom to modify SLC-13 at CCSFS (see Figure 1-1) into a Vaya and Phantom Launch Complex for the Dauntless, Daytona, and Laguna launch programs to support US Government and commercial launch service needs. At full cadence, Vaya and Phantom would launch a combined total 52 Dauntless, Daytona and/or Laguna vehicles per year from SLC-13. The FAA's federal action is to license Vaya and Phantom commercial launches at CCSFS, as described above. The FAA's federal action also includes the issuance of temporary airspace closures.

2.1.1 Location

The CCSFS is located on lands owned and managed by the Space Launch Delta 45 (SLD-45), a unit of the DAF, in Brevard County, Florida, near the cities of Cape Canaveral and Titusville (see Figure 1-1). SLC-13 is located on CCSFS (see Figure 1-1) and is an existing SLC originally developed for test launches of the SM-65 Atlas and for operational Atlas launches. More recently it was renovated by SpaceX as the SpaceX East Coast landing location of returning Falcon 9 and Falcon Heavy launch vehicle booster stages.

2.1.2 Components and Activities

Vaya and Phantom would utilize existing infrastructure at SLC-13 to the maximum extent to minimize construction and demolition activities. Landing Zone- (LZ-) 1 and LZ-2, which until recently supported SpaceX Falcon booster landings, would be modified into SLC-13A and SLC-13B (Figure 2-1), respectively. Each pad would be equipped with three 150-foot lightning protection masts (i.e., a passive lightning protection system, ensuring that launch vehicles are protected from lightning strikes which would be attracted to the system and transferred safely to the ground) and tie-downs that can hold down a mobile temporary launch pedestal. No additional reinforcement of the pads would be required to implement the Proposed Action. A circumferential French drain system would be installed within the perimeter of both launch pads to capture deluge water used during launch, which is estimated to be approximately 15,000 gallons per launch. The French drain system would prevent deluge water from penetrating the ground. After testing, the deluge water would be transferred to an evaporation basin north of SLC-13B (Figure 2-1). Two new hangars would be installed on the west side of SLC-13, one to support Vaya operations and one to support Phantom operations (Figure 2-1). While the footprints of each hangar would be located on existing impervious surfaces, each hangar would require foundation construction work.

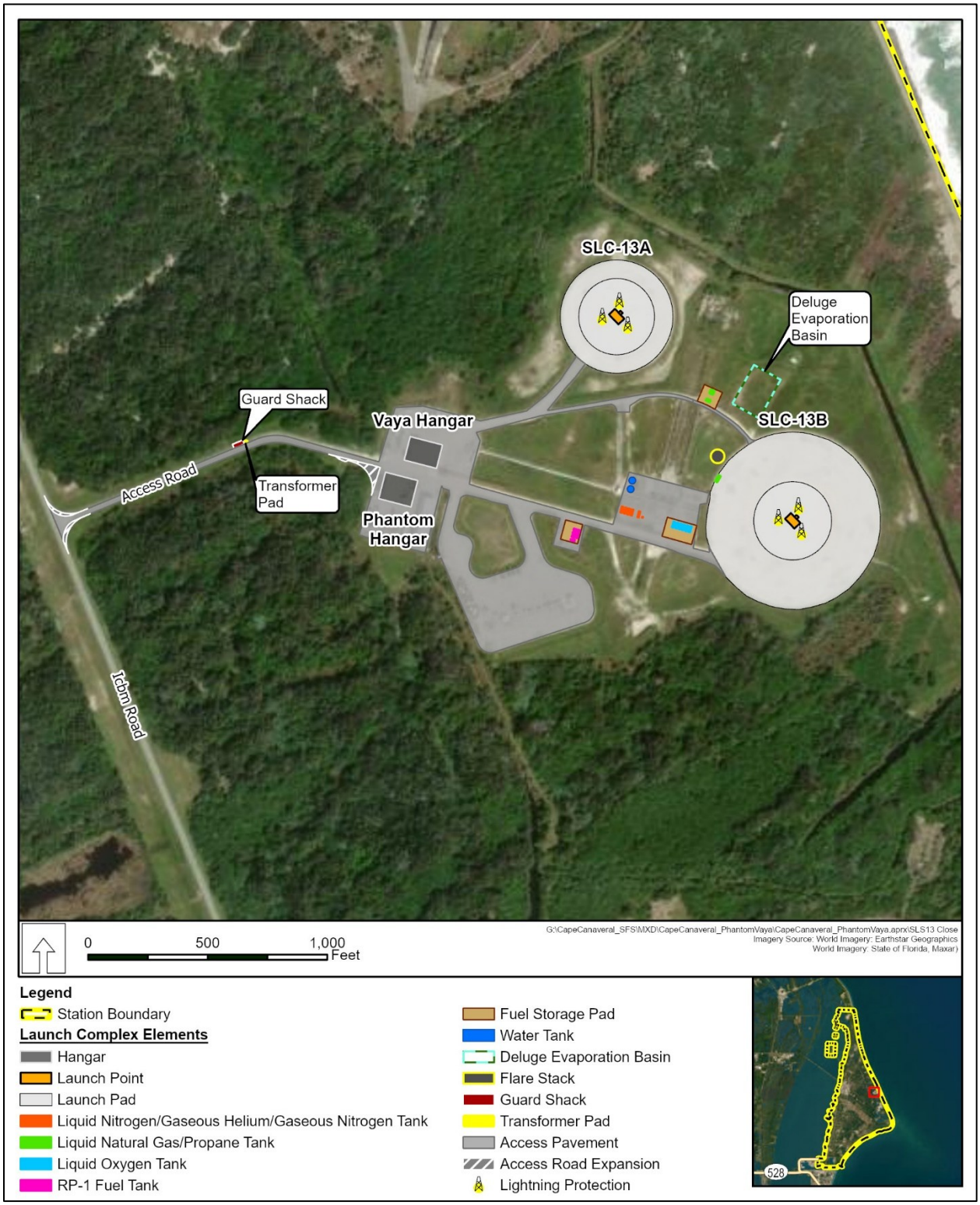


Figure 2-1. Proposed Space Launch Complex-13 Improvements

Vaya's hangar, approximately 122 feet by 88 feet, would only be used for inert system software/hardware checkouts on Dauntless, including command click tests, fit checks, hardware swaps, etc., and to roll the vehicle out of weather hazards. Vaya may store payloads in the hangar for short periods while attached to Dauntless in the event of extreme weather; however, the payloads would be contained, conditioned, and if necessary, barricaded from the rest of the building for storage. The facility would also house Vaya's communications and information technology infrastructure and include workforce support facilities, a break room, and restrooms.

Phantom's hangar, approximately 122 feet by 99 feet, would be used as a horizontal integration facility (HIF), where inert launch vehicles and payloads would be processed. Hazardous payload checkout and fueling operations would be conducted at an off-site location. Encapsulated payloads would be transported from the off-site facility to the HIF at SLC-13 where they would be rotated to the horizontal position and mated to the launch vehicle. The HIF would provide pre-positioning of Phantom's launch vehicles and encapsulated payloads, storage of ground support equipment (GSE), spare parts, and tools for SLC-13 operations, and provide an area for engineers and technicians to conduct vehicle checkout and integration tasks and maintenance of GSE. This approach minimizes preparation time and post-launch time at the pad, enabling higher cadence operations at SLC-13. The facility would also house Phantom's communications and information technology infrastructure equipment and include workforce support facilities, a break room, and restrooms.

The existing access roads into the complex and from the hangar area to each Pad would be improved. No new firebreaks would be installed. Vegetation within SLC-13 would be maintained at low stature to minimize risk of fires. The access road to SLC-13 would be widened at the intersection of ICBM Road and at the east end of the access road to enable access to Phantom's hangar by adding approximately 6,500 square feet of pavement (see Figure 2-1). All other construction would be performed on previously disturbed land, with approximately 25,308 square feet of disturbance to previously disturbed but undeveloped areas at SLC-13.

Existing pipelines and utilities, which currently terminate within the fenceline, include water, electricity, and gaseous nitrogen (GN2) and have sufficient capacity to support the Proposed Action. Trenching inside the SLC-13 fence line would be required for utility distribution throughout the site. New communication lines would be installed from an existing terminal at a communications shed north of SLC-13B to the hangars. Wastewater lines would be connected to CCSFS infrastructure at ICBM Road through installation of a new line under the access road to SLC-13. New commodity storage would be installed at SLC-13 (Figure 2-1). For shared storage, this would include up to approximately 30,000 gallons of liquid oxygen, 1,350 gallons of liquid nitrogen, 300 actual cubic feet of GN2, and up to 33,760 gallons of water for deluge operations. For Phantom's operations, there would also be 6,000 gallons of rocket propellant, 4,000 gallons of liquid nitrogen, and 300 actual cubic feet of gaseous helium, and gaseous nitrogen. Storage requirements for Phantom include a portable explosive storage locker located in the hangar to accommodate overnight storage of self-destruct ordnance. Secondary containment would be installed around all commodity storage containers. Vaya would not use explosives for flight termination of stage/fairing separation.

Exterior lighting poles would be installed around new structures (e.g., hangars and commodity storage areas) and around the pad where the mobile launch towers would sit, as well as any areas as required for safety. The designs would follow requirements under 45 Space Wing Instruction (SWI) 32-7001, *Exterior Lighting Management*, which requires the use of full cut-off, well-shielded, low-wattage, limited-wavelength, amber, light-emitting diode lights.

2.2 Increased Operations

2.2.1 Launch Activities

Vaya and Phantom plan to modify SLC-13 into a Vaya and Phantom Launch Complex. The goal would be for launch operations to be airport-like, by blending the benefits of a unique sole-use site with the flexibility of being rocket agnostic by maximizing the use of common infrastructure and standardization to minimize launch preparation time, avoid pad downtime, and allow for surge operations. This would be achieved by constructing two launch pads that can be configured for either Vaya or Phantom launch structures and can share common oxidizer, nitrogen, water, power, and communications utilities.

GSE for both Vaya and Phantom would largely be mobile and both companies would employ similar rapid roll-on/roll-off launch concepts, with vehicle and payload integration primarily occurring offsite (Phantom would perform stage integration at their new hangar at SLC-13). Vaya Space would assemble Dauntless offsite at their production facility, located in Cocoa, Florida, where their inert Hybrid Fuel Grains would be mounted and integrated together on the strongback frame, also known as the Vaya Transporter Erector Launcher (VTEL). Dauntless would be shipped lying flat on the VTEL Strongback frame via large industrial transports by road. The VTEL would be shipped to a third-party payload processing facility, such as All Points Logistics Space Prep Space Logistics Center located at the Kennedy Space Complex, where the cleaned payload would be encapsulated and mated to the top of Dauntless. The vehicle would then continue its way to the launch site, where it would lock into temporary hardware pre-assembled on the launch pad. The VTEL would plug into fluid and electrical GSE before lifting Dauntless into its vertical launch position. Prior to beginning fill for launch operations, the system would be inspected and a wet dress rehearsal performed, including tanking and de-tanking prior to launch or test fire. The VTEL would also include a dual-slide flame diverter.

Conversely, Phantom would perform all pre-launch operations on-site. The booster and payload would be integrated horizontally and mated to a strongback in the hangar for transport to the launch pad. The launch vehicle would be rotated to vertical at the pad and configured for launch. Phantom would utilize a removable, above-ground flame deflector with integrated deluge system which would be affixed to the launch pedestal.

2.2.2 Launch Vehicles

Vaya's launch program would include the Dauntless launch vehicle, which has two variations: Block 1 and Block 2 (Table 2-1). Both variations would be expendable and classified as small, light-lift, high-capacity two-stage vehicles. Dauntless hybrid engines are fueled by solid high-density polyethylene (HDPE) and liquid oxygen. Stage 1 residual liquid oxygen is predicted to

be approximately 500 kilograms (kg), and there would be a *de minimis* amount of residual fuel remaining upon reentry.

Table 2-1. Vaya Dauntless Vehicle Variant Characteristics

Characteristics	Variant	
	Block 1	**Block 2**
Number of Stages	2	2
Total Length (m)	22.3	25
Stage 1 diameter (m)	3.35	3.25
Stage 2 diameter (m)	2.05	2.1
Gross Lift-Off Weight (kg)	46,000	100,000
Engines		
First Stage	6x 143 kN	6x 200 kN
Second Stage	1x 185 kN Vac	1x 218 kN Vac
Payload to LEO (kg)	1,000+	2,000+

m - meters; **kg** - kilograms; **kN** - kilonewtons; **LEO** - low-earth orbit

Phantom's launch program would include two vehicles, the Daytona with two variations (Block 1 and Block 2) and the Laguna, which are expendable, small-lift two-stage vehicles (Table 2-2). Both vehicles would use liquid oxygen and rocket propellent and/or liquified natural gas.

Table 2-2. Phantom Daytona and Laguna Vehicle Variant Characteristics

Characteristics	Variant		
	Daytona 1	**Daytona 2**	**Laguna**
Number of Stages	2	2	2
Total Length (m)	18.7	19.5	21.2
Stage 1 diameter (m)	1.85	2	2
Stage 2 diameter (m)	1.5	1.5	2
Gross Lift-Off Weight (kg)	78,000	110,000	153,117
Engines			
First Stage	4x Vast/ Launcher E2	5x Vast/ Launcher E2	9x Vast/ Launcher E2
Second Stage	1x Ursa Major Hadley ITV	1x Ursa Major Hadley ITV	1x Vast/ Launcher E2
Payload Capacity (kg) (500km x 500km)	800	950	2,000

m - meters; **kg** - kilograms; **kN** - kilonewtons; **Vac** - vacuum

2.2.3 Launches and Test Fires

Vaya and Phantom launches would occur at any time of year, day or night, with an estimated 26 launches occurring during the day and 26 launches occurring at night. Vaya and Phantom would use launch azimuths ranging from a 35 to 120 degrees. Vaya Dauntless launch vehicles would use a solid rocket motor and as such, each static test fire would consume the entire rocket motor. Therefore, for the Vaya Dauntless solid rocket engines, test fires are better measured in seconds of burn time annually than by describing the total number of static test fires annually. Vaya would conduct a series of developmental static fires before the first launch of Dauntless Block 1, totaling approximately 600 seconds of burn time in 2027. No additional static fires would be required until development of the Block 2. Development of the Dauntless Block 2 would require an additional approximately 600 seconds of static fire testing in 2030.

Phantom would conduct one static fire test prior to each launch (i.e., 26 tests annually). After each launch, standard GN2 purging securing operations would be conducted for applicable ground support systems and from launch vehicle if a launch is scrubbed. Vaya and Phantom would pack up components that may remain at or leave the site and perform safety inspections to secure the site at the end of each launch or test fire operation.

2.2.4 Reentry

The Dauntless first stage would freefall back to earth and would be expected to splashdown in the Atlantic Ocean between 220 and 550 nautical miles from SLC-3 (Figure 2-2). The first stage would break apart upon impact with the ocean. There would be no residual propellant or explosion upon impact. First stage remnants are not buoyant and would sink to the bottom of the ocean. The first stage would be completely inert upon impact in the ocean. Any residual fuel would be traces of plastic and no explosive danger exists. All liquid oxygen would have been used or vented on its way down and certainly vented upon impact. Although Vaya would use parachutes, the initial mission(s) would likely go without any parachutes on board. Vaya has no plans to do a controlled booster landing at this time. Vaya is only expecting the payload fairing to be jettisoned, and no other auxiliary components. The second stage would be expected to break apart and burn up entirely upon reentry.

Phantom would expend first stages offshore in the Atlantic Ocean within the same proposed splashdown zone as for Vaya (see Figure 2-2). Daytona and Laguna first stages would break up upon atmospheric reentry and there would be no residual propellant or explosion upon impact with the Atlantic Ocean. First stage remnants would not be buoyant and would sink to the bottom of the ocean. If an anomalous situation when an intentionally expended booster does not break up upon atmospheric reentry and impacts the ocean’s surface intact, a residual amount of propellant would remain in the first stage upon impact (less than 1 percent). In this situation, the vehicle would possibly experience an explosive event due to mixing remaining propellants. This would represent an off-nominal, low probability, and worst-case scenario and is not assessed for these reasons.

At maximum cadence a combined total of up to 52 first stages would be expended each year.

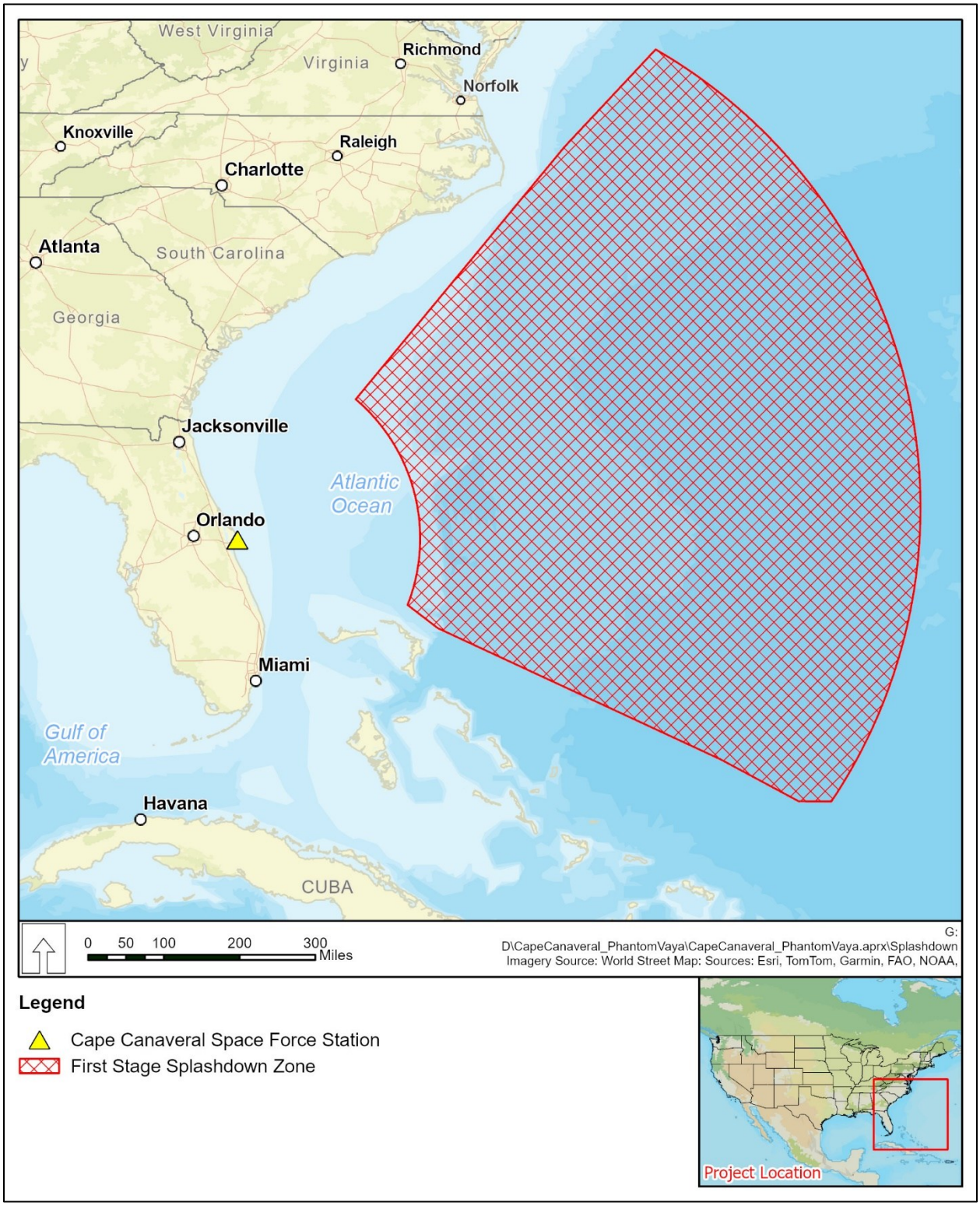


Figure 2-2. First Stage Splashdown Zone Location

2.2.5 Launch Safety

To protect the safety of other aircraft and nautical vessels, all launch operations would comply with the necessary notification requirements, including issuance of Notices to Airmen (NOTAMs) and local Notices to Mariners (NOTMARs), consistent with current procedures. A NOTAM provides notice of unanticipated or temporary changes to components of, or hazards in, the National Airspace System (FAA Order JO 7930.2S). A NOTMAR provides notice of temporary changes in conditions or hazards in navigable waterways. Eastern Range operations follow the procedures stated in a Letter of Agreement (LOA; dated 1 May 2020) between the SLD 45 and FAA. The LOA establishes responsibilities and describes procedures for SLD 45, Eastern Range operations, within airspace common to the Miami Center, Jacksonville Center, New York Center, San Juan Center Radar Approach Control, Central Florida Terminal Radar Approach Control, NASA Shuttle Landing facility, Fleet Area Control and Surveillance Facility Jacksonville, Air Traffic Control System Command Center, and Central Altitude Reservation Function areas of jurisdiction. The LOA defines responsibilities and procedures applicable to operations, which require the use of Restricted Areas, Warning Areas, Air Traffic Controlled Assigned Airspace, and/or altitude reservations within Eastern Range airspace.

The Proposed Action does not include altering the dimensions (shape and altitude) of any airspace. All launch and reentry operations would be infrequent and of short duration and comply with the necessary notification requirements, including issuing NOTAMs, as defined in agreements required for an FAA issued launch license. A NOTAM provides notice of unanticipated or temporary changes to components of, or hazards in, the National Airspace System (FAA Order JO 7930.2S, *Notices to Airmen*). The FAA issues a NOTAM at least 24 hours before a launch or reentry activity in the airspace to notify pilots and other interested parties of temporary conditions. Vaya and Phantom would provide the FAA with updates and schedule changes to their notional launch schedules to minimize interruption to air traffic.

On launch days, there is a possibility of temporary restricted public access due to visitor volume on sections of Merritt Island National Wildlife Refuge (MINWR) and Canaveral National Seashore (CANA). These temporary closures of MINWR and CANA are typically related to crowd control, access for emergency services, and the volume of visitor traffic in an area. In addition, debris and/or propellant dispersion analyses could lead to a recommendation by SLD 45 Range Safety to close parts of MINWR and CANA to ensure public safety. Day-of-launch winds, anticipated crowds, and time of day are among the many factors that contribute to this recommendation. Each trajectory would be provided to SLD 45 in a Flight Safety Data Package, that identifies, quantifies, assesses and address operational risks. Any potential closures due to visitor volume would be coordinated between SLD 45 security, KSC, MINWR, and CANA by monitoring to ensure parking lot thresholds are not exceeded, and that roadways allow for emergency egress for any form of emergency associated with large crowds.

2.2.6 Mitigation Management

SpaceX committed to the restoration and management of FLSJ habitat at CCSFS to mitigate for the loss of unoccupied FLSJ habitat from the development of Landing Zone 1 at SLC-13.

Restoration was completed by SLD 45 in Land Management Unit 33 of CCSFS. A combination of mechanical treatment and prescribed burning were used to restore the habitat. SpaceX was required to maintain and manage the Land Management Unit 33 mitigation area as part of their lease of SLC-13 for use as Landing Zone 1. Phantom and Vaya would take over the responsibility of maintenance and monitoring requirements of this mitigation site.

2.2.7 Conservation Measures

The following conservation measures will be implemented as part of the Proposed Action.

SEBM. No specific conservation measures are proposed for SEBM. However, based on past studies completed for CCSFS, SEBM are benefiting from habitat restoration activities being conducted for FLSJ, and the SEBM population is expanding into inland locations.

Tricolored Bat. The following conservation measures will be implemented for the tricolored bat:

- Tree clearing will be avoided between 15 May and 15 July to minimize impacts during bat maternity season.
- Tree clearing will be avoided when ambient daytime temperatures are 45 degrees Fahrenheit or below.

Audubon's Crested Caracara. SLD 45 would implement the following conservation measures for the Audubon's crested caracara:

- SLD 45 will monitor for Audubon's crested caracara before construction activities begin at SLC-13, where potential nesting habitat is present proximate to construction areas. If observed, SLD 45 will coordinate (and then follow up) with USFWS and Florida Fish and Wildlife Conservation Commission (FWC) with data and an explanation about how the conservation measures were implemented.
- SLD 45 will inspect all trees and cabbage palms for nests before construction. If a nest is documented, Phanton and Vaya will coordinate with SLD 45 to determine the appropriate course of action.

FLSJ. Surveys for FLSJs will be conducted in all suitable FLSJ habitat within 300 feet of proposed SLC-13 construction activities during the FLSJ nesting season (1 March to 30 June) to ensure that no FLSJs are nesting within 300 feet of proposed construction. Any FLSJ nests encountered would be flagged, and no clearing would be allowed within 300 feet until all birds have fledged.

Phantom and Vaya will comply with prescribed burn requirements as described in their lease agreements. Phantom and Vaya will protect flight hardware and payloads against smoke from wildfires and prescribed burning, and they will work closely with SLD 45 to ensure that their launch operations at SLC-13 do not impact the SLD 45 Prescribed Burn Program.

Eastern Indigo Snake. SLD 45 implements conservation measures for the gopher tortoise (*Gopherus polyphemus*) that would also minimize the potential for effects on the eastern indigo snake. To the extent possible, gopher tortoise burrows would not be disturbed, and a minimum

25-foot buffer around the surface opening of each gopher tortoise burrow will remain to connect the burrow to foraging areas. In accordance with FWC guidelines, no more than 90 days before and no fewer than 72 hours before any clearing or construction, a 100-percent pedestrian survey will be conducted to locate and flag and stake all burrows. Gopher tortoise burrows in areas to be cleared, in areas for new construction, or on the shoulder of roads to be rebuilt would be excavated. All captured tortoises would be relocated to a SLD 45-approved recipient site on CCSFS. Any eastern indigo snake present would be allowed to voluntarily leave the area before excavation continues. In addition, continued habitat enhancement/restoration by SLD 45 for the FLSJ and SEBM, including the 0.73 acre of proposed habitat restoration as compensation for the loss of SEBM habitat from the proposed improvements at SLC-13, will increase available habitat for the eastern indigo snake.

The SLD 45 Indigo Snake Protection/Education Plan will be presented to the Phantom and Vaya project managers, construction managers, and construction personnel. Educational signs will be displayed at the site to inform personnel of the indigo snake's appearance, its protected status, and who to contact if an indigo snake is spotted at SLC-13. If any eastern indigo snakes are encountered during vegetation removal or ground-disturbing activities, they will be allowed to safely move out of the project area. Any observations of live or dead eastern indigo snakes will be reported to SLD 45 immediately, who will then report it to USFWS, if appropriate.

Sea Turtles. To minimize potential impacts on sea turtles from new or temporary lighting at SLC-13, exterior lighting proposed for this project would be in accordance with the 45 SWI 32-7001, *Exterior Lighting Management*. Clearing maintained grassland vegetation at the SLC-13 for the access road improvements will not have an impact on nesting or hatchling sea turtles; therefore, no compensation is required for those activities. Phantom and Vaya will prepare a Light Management Plan for SLC-13 and distribute the Light Management Plan to SLD 45 and USFWS for review and approval. The Light Management Plan will be implemented year-round.

2.3 Action Area

The Action Area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 Code of Federal Regulations 402.02). In this BA, the Action Area represents the area wherein the Project would cause a noticeable change to the physical environment. The Action Area establishes the geographic scope of the BA for the purposes of identifying the species and critical habitats that may be exposed to the effects of the action, describing the environmental baseline for the species and critical habitats considered in the BA, and identifying future non-federal activities contributing to cumulative effects.

2.3.1 Physical Consequences of the Action

Changes to the physical environment caused by the Project include the direct modification of vegetation and soil within a portion of the Expansion Area, the potential for soil migration (via water or wind) outside of direct construction footprint, and an increase in the occurrence and, in

some cases, magnitude of noise and vibration, heat, light and anthropogenic activity in the vicinity of the expanded SLC-13 site.

Direct Modification of Vegetation and Soil. The Project would directly modify approximately 31,808 square feet of land by widening the access road to SLC-13, constructing a new flare stack, LNG storage area, a guard shack, transformer pad, and deluge evaporation basin. All other ground-disturbing activities would be limited to previously disturbed and developed areas within the SLC-13 site. Continued use of the existing SLC-13 launch and support facilities would not cause substantial direct physical changes to vegetation or soil.

Soil Migration. Best management practices include implementation of the Stormwater Pollution Prevention Plan requirements, which would prescribe the installation of silt fences and erosion barriers to contain soil within the disturbed areas of SLC-13, including the access road widening area. Soil is not expected to migrate beyond the construction limits within SLC-13. Additionally, soil would be compacted and graded during construction to help minimize dust or particulate movement via wind.

Light and Anthropogenic Activity. During daylight hours, construction activities within SLC-13 that involve large machinery such as a hydraulic truck crane would be visible at a distance. Dense vegetation located between SLC-13 and ICBM Road would obstruct visibility of all construction activities. Construction activities may continue into non-daylight hours and would require artificial lighting. The lighting required for construction would be limited to the immediate vicinity of active construction in SLC-13 and would be back-shielded to avoid stray light on the nearby beaches and dunes.

Heat Plume. The deluge system, which would utilize approximately 15,000 gallons of deluge per launch for both Phantom and Vaya at SLC-13, would absorb the vast majority of the heat produced by launches at SLC-13. The Vaya Dauntless heat plume would be controlled by a dual slide-style flame diverter, which would be placed on the flat concrete pad, creating two angles of flow for the heat plume (Figure 2-3). The Phantom Laguna and Daytona would also utilize a flame diverter on the flat concrete pad diverting the heat plume away from developed infrastructure of SLC-13 (Figure 2-4).

The distance for thermal effects from both proposed Vaya and Phantom launches without water deluge would be very similar; the primary differences between the Vaya and Phantom heat plumes from launches would be directional as a result of the different flame diverters.

The maximum estimated temperature at the perimeter of SLC-13 where relatively undisturbed vegetation occurs, would be 376 Kelvin, which is 217 degrees Fahrenheit, and then temperatures would rapidly drop to under 140 degrees Fahrenheit at a distance of approximately 785 feet from the center of the launch pads (Figures 2-5 and 2-6). Therefore, heat plumes generated by launches at SLC-13 would not scorch or damage nearby vegetation and would result in temperatures that are above normal summer ambient temperatures for approximately 200 feet beyond the boundary of SLC-13. However, the flame diverters would angle the heat plume upwards, dispersing the heat plume from launches mostly above shrub-

scrub vegetation along the perimeter of SLC-13, and well above the ground surface; the deluge system would further reduce temperatures of the heat plume during launches. Therefore, increased heat within vegetation proximate to SLC-13 and along the ground surface from launch operations would likely be less than that estimated by the plume modeling.

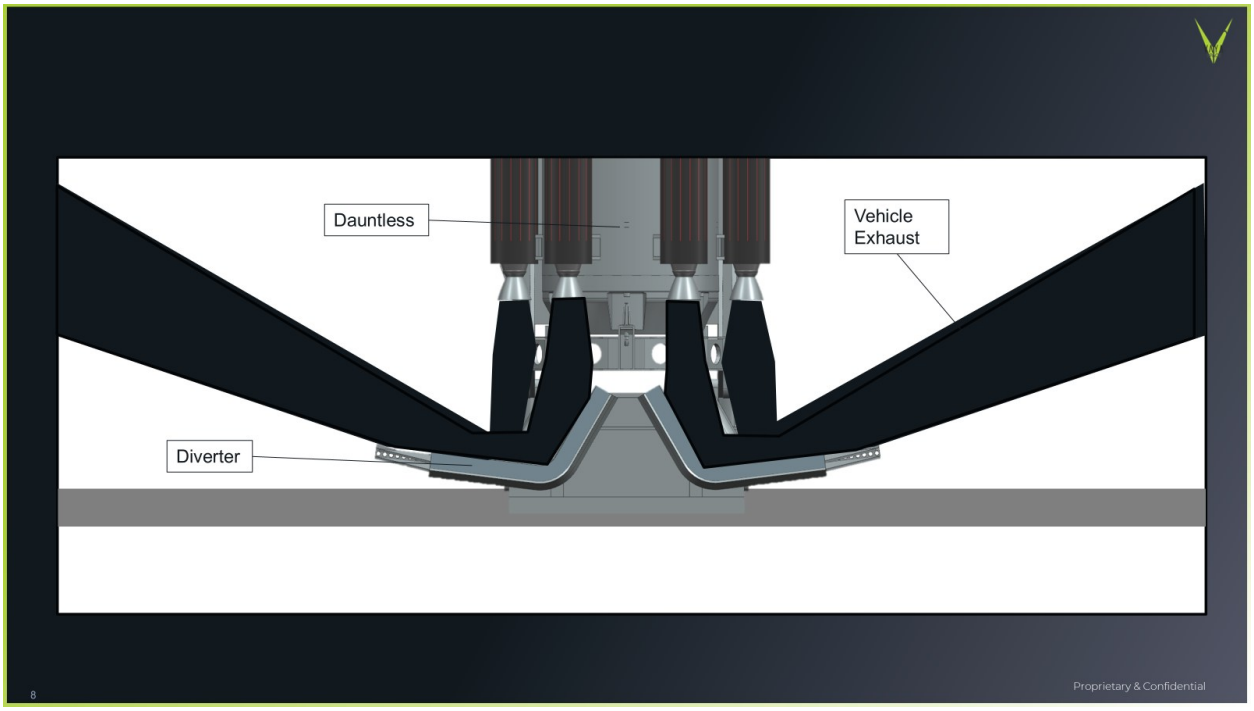


Figure 2-3. Proposed Flame Diverter for the Vaya Dauntless Rocket at Space Launch Complex-13.

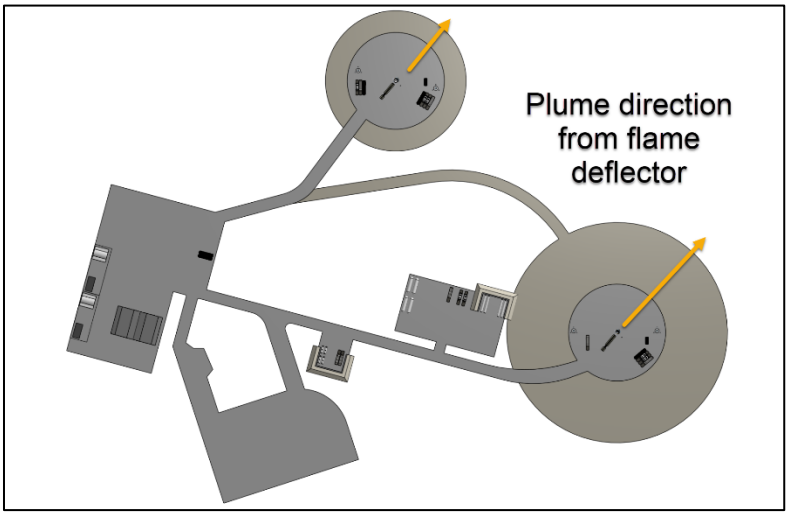


Figure 2-4. Proposed Phantom Heat Plume Direction from the Flame Diverter at Space Launch Complex-13.

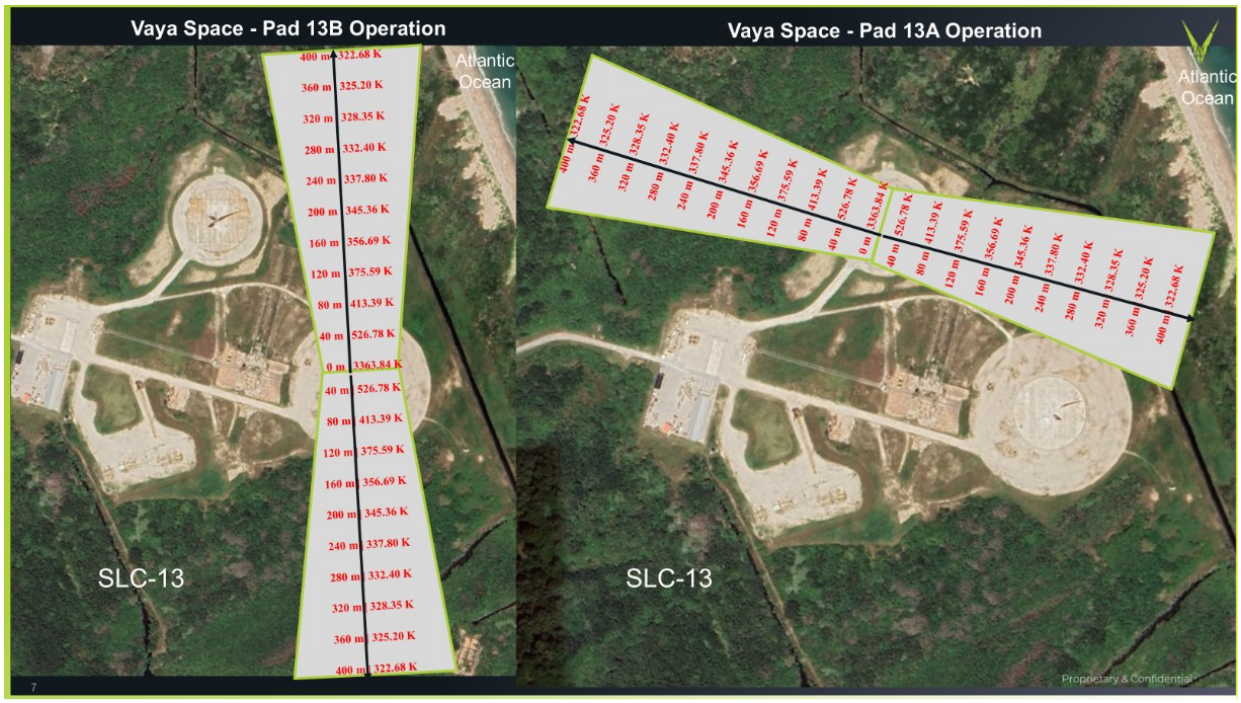


Figure 2-5. Estimated Heat Plume for the Vaya Dauntless Rocket at Space Launch Complex-13

Dist (m)	Temp (k)
0	3500
20	2600
40	1750
60	1100
80	900
100	830
120	609
140	580
160	450
180	408
200	350

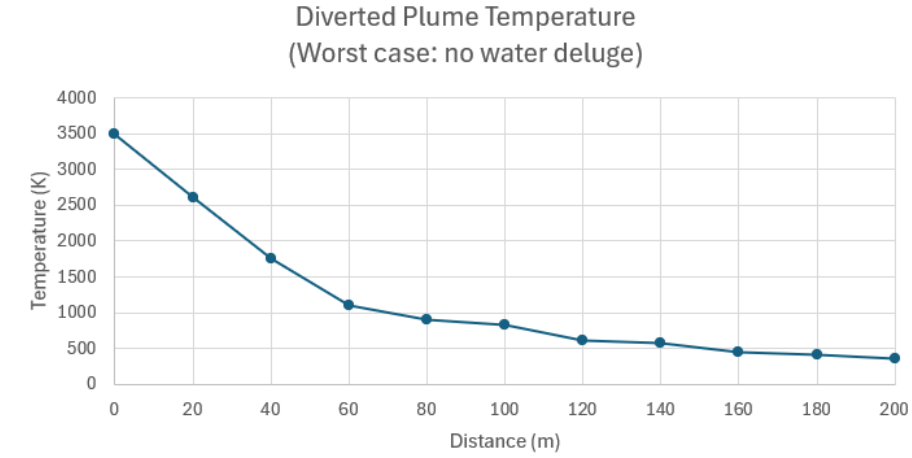


Figure 2-6. Estimated Heat Plume Distance for the Phantom Rockets at Space Launch Complex-13

Noise and Vibration. A-weighted sound levels between 60 to 90 A-weighted decibels (dBA) are considered “moderate” relative to commonly encountered sounds (Aerostar 2007). However, dBA is a sound level measurement that is weighted to better represent sound levels that are more sensitive to the human ear. Maximum single event sound levels (Lmax) as measured in

decibels (dB) from rocket launches at CCSFS and nearby KSC is a conservative metric to evaluate the response of wildlife to launch noise. There were 93 launches in 2024 and 72 launches in 2023 from CCSFS; each of these launches have single event noise that exceed 90 dB across CCSFS. Although wildlife may be less likely to habituate to these single event noise events relative to continuous noise, these launch events are already frequent enough at CCSFS that wildlife experience launch noise greater than 90 dB on average once every four days. Therefore, it is the extreme noise levels (i.e., 100 dBA and greater) that would be most likely to affect wildlife where very loud noise events such as launch noise occur so frequently, such as at CCSFS. The Phantom and Vaya proposed launches at SLC-13 would produce sound levels of 100 dBA Sound Exposure Level (SEL) across an area extending approximately 3 miles around SLC-13 from Vaya Dauntless launches (Figure 2-7) and approximately 5.5 miles for the Phantom Laguna launches (Figure 2-8). The Phantom Daytona is a smaller rocket (i.e., less thrust) than the Phantom Laguna and therefore the Phantom Laguna is used to define the action area for Phantom launches.

Sonic Boom Overpressure. Launches from SLC-13 would cause sonic booms and the launch trajectory along with local atmospheric conditions determine the likely locations where sonic booms could be heard and felt. Due to the proposed Phantom and Vaya launch trajectory from SLC-13, the sonic boom area would occur entirely over the Atlantic Ocean to the east of CCSFS. Modeled sonic boom overpressure levels would exceed 1 pound per square foot (psf), with the highest overpressures modeled as occurring approximately 25 miles east of CCSFS and decreasing across the Atlantic Ocean farther east from SLC-13 (Figure 2-9).

2.3.2 Extent of the Project Area

The Project Area for this BA includes all the SLC-13 proposed improvements (see Figure 2-1), including the access road widening, the guard shack, transformer pad, Vaya and Phantom hangars, the French drain system and deluge evaporation basin, storage tanks, launch pad improvements, and lightning protection system. There would be approximately 31,808 square feet of ground disturbance associated with the Proposed Project.

2.3.3 Extent of the Action Area

The Action Area for this BA includes the entirety of the launch noise contours modeled using the SEL metric at 100 dBA and higher (i.e., the launch operations noise contour for the Action Area as agreed upon by the DAF, USFWS, FAA, and National Aeronautics and Space Administration), which extends in an up to 5.5-mile radius from SLC-13 from the Phantom Laguna launches (Figure 2-10); this composes the Onshore Action Area. The Action Area also includes the sonic boom overpressure area over the Atlantic Ocean, approximately 25 miles east of CCSFS and SLC-13. This Action Area encompasses the portions of the Atlantic Ocean where modeled sonic boom overpressures meet or exceed 1 psf (Figure 2-10); this composes the Offshore Action Area.

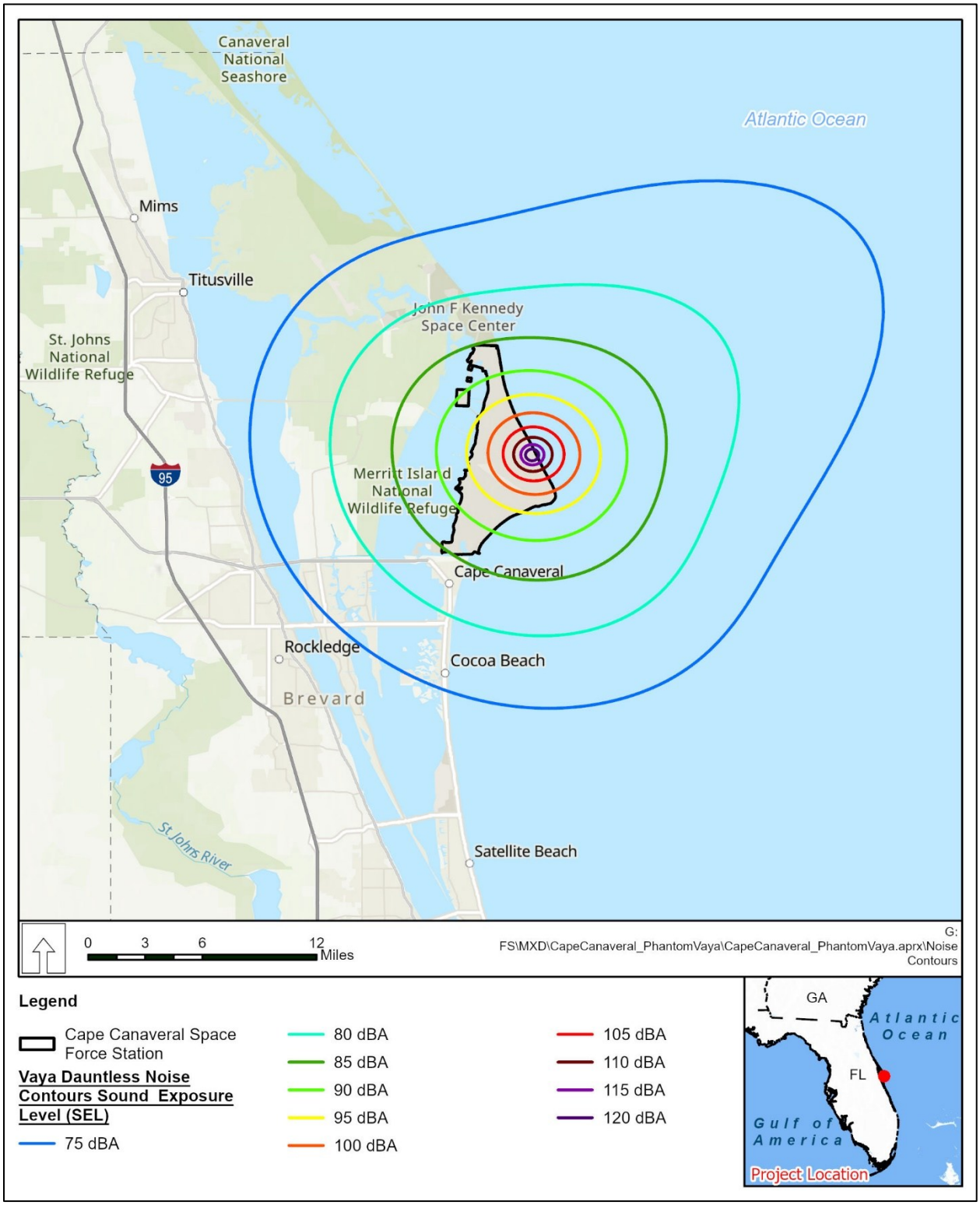


Figure 2-7. Vaya Dauntless Launch Noise Contours

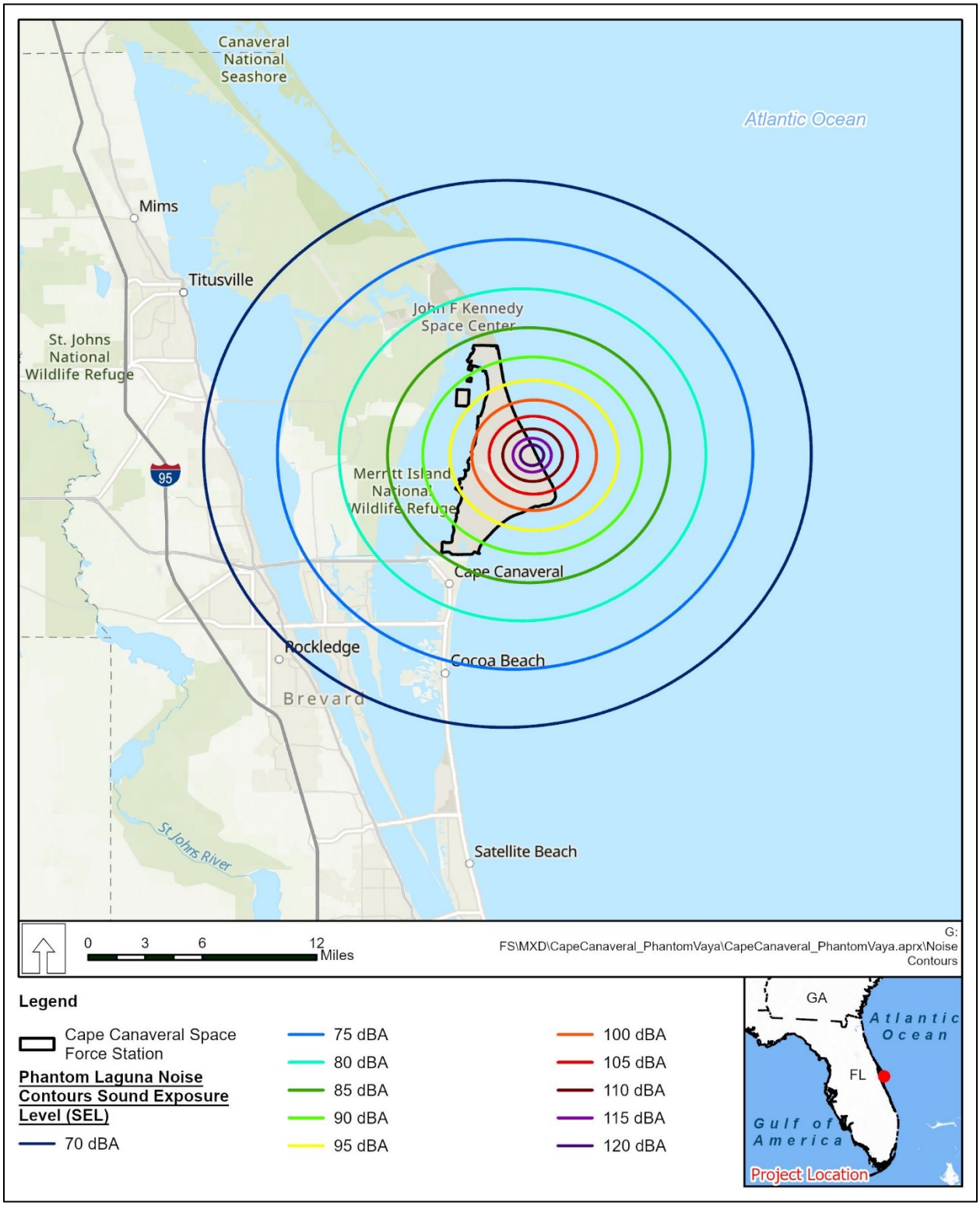


Figure 2-8. Phantom Laguna Launch Noise Contours

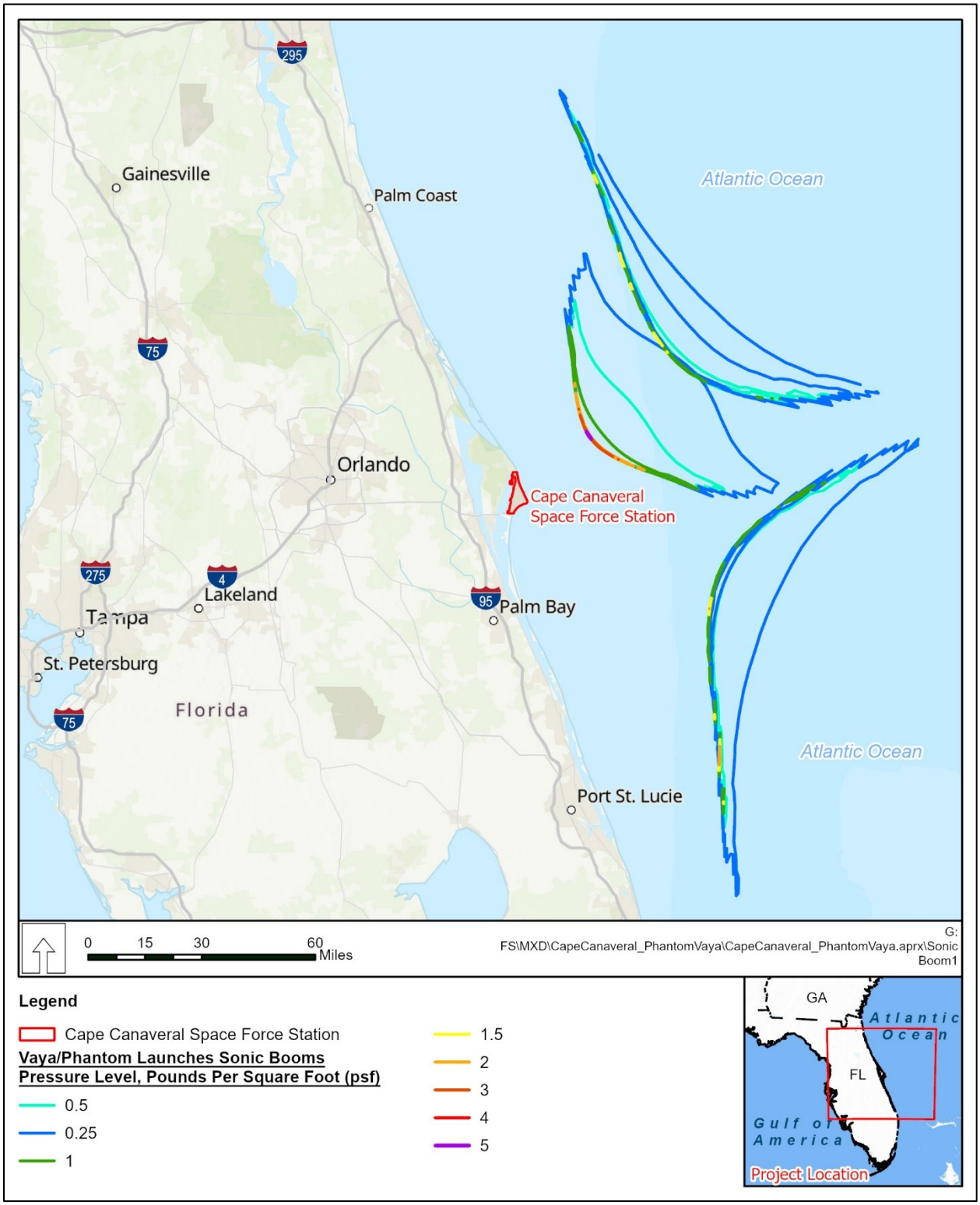


Figure 2-9. Sonic Boom Overpressure Zone

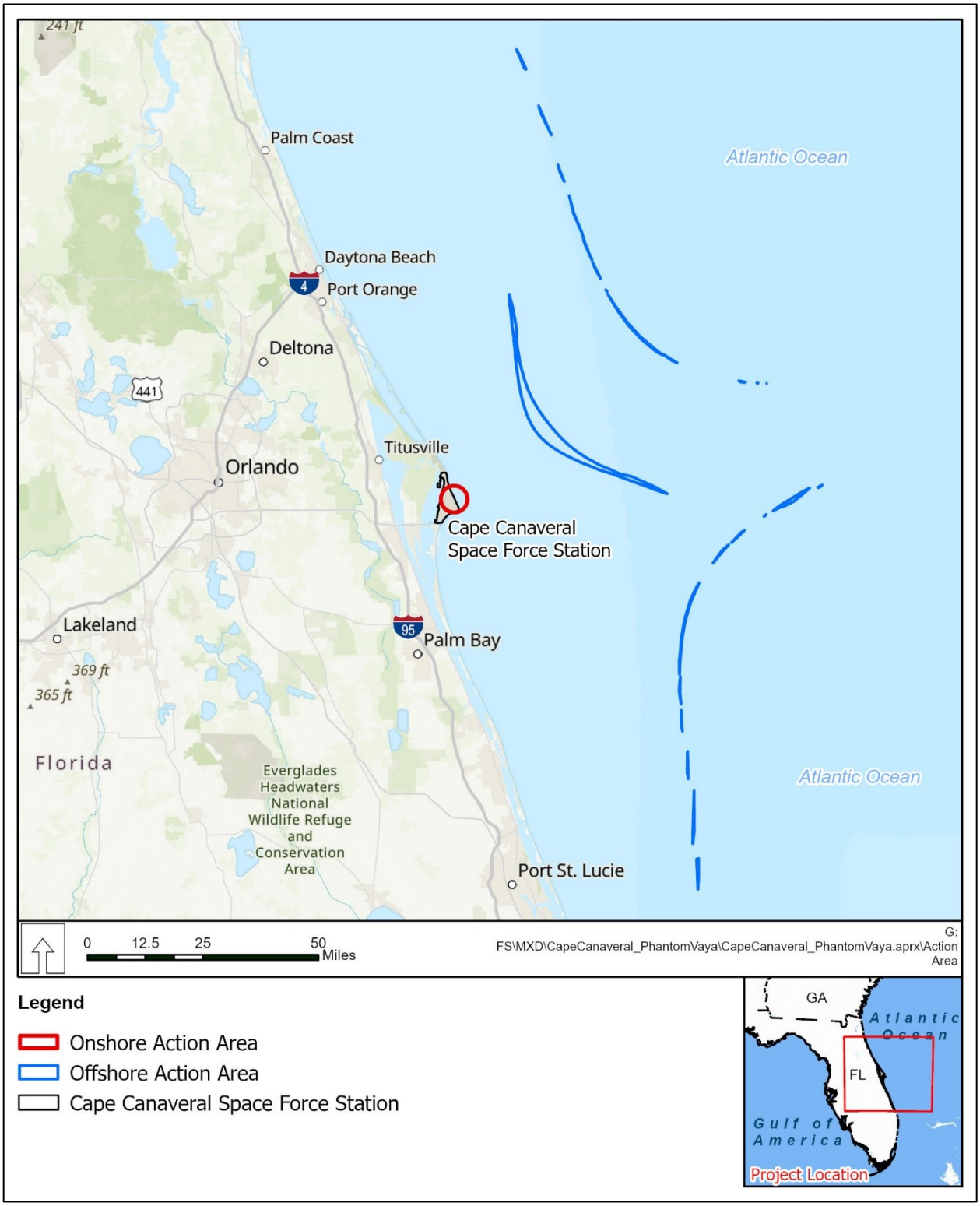


Figure 2-10. Onshore Action Area and Offshore Action Area

The FAA is conducting a separate update (i.e., reinitiation) to the programmatic consultation with National Marine Fisheries Service for effects of the action that may occur to species under National Marine Fisheries Service jurisdiction.

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3.0 SPECIES AND CRITICAL HABITATS CONSIDERED

3.1 Official Species List

The USFWS's Information for Planning and Consultation (IPaC) system was queried in May 2025, for species lists for the SLC-13 Project Area (Appendix A; see Figure 2-1), Onshore Action Area (Appendix B; see Figure 2-10), and Offshore Action (Appendix C; see Figure 2-10), which includes the modeled 100 dBA SEL launch noise contours and the 1.0 and greater psf sonic boom overpressure areas, respectively. Results of the IPaC queries are provided in Table 3-1.

Table 3-1 Information for Planning and Consultation Official Species List and Critical Habitat for the Project and Action Areas

Common Name (Scientific Name)	Federal Status	Noted in the Official Species List for the Project Area	Noted in the Official Species list for the Noise area 100 dBA	Noted in the Official Species List for the 1.0 psf Overpressure Zone
Mammals				
Southeastern Beach Mouse (*Peromyscus polionotus niveiventris*)	Threatened	X	X	-
West Indian Manatee (*Trichechus manatus*)	Threatened	X [1]	X	-
Tricolored Bat (*Perimyotis subflavus*)	Proposed Endangered	X	X	-
Northern Long-eared Bat (*Myotis septentrionalis*)	Endangered	-	-	-
Birds				
Crested Caracara (Audubon's) [Florida Distinct Population Segment] (*Polyborus plancus audubonii*)	Threatened	X	X	-
Eastern Black Rail (*Laterallus jamaicensis* ssp. *jamaicensis*)	Threatened	X	X	-
Everglade Snail Kite (*Rostrhamus sociabilis plumbeus*)	Endangered	X	X	-
Florida Scrub-Jay (*Aphelocoma coerulescens*)	Threatened	X	X	-
Piping Plover (*Charadrius melodus*)	Threatened	-	X	-

Rufa Red Knot (*Calidris canutus rufa*)	Threatened	X	X	-
Whooping Crane (*Grus americana*)	Experimental Population, Non-Essential	-		-
Wood Stork (*Mycteria americana*)	Threatened	-	X	-
Black-Capped Petrel (*Pterodroma hasitata*)	Endangered	-	-	X
Reptiles				
Atlantic Salt Marsh Snake (*Nerodia clarkii taeniata*)	Threatened	-	X	-
Eastern Indigo Snake (*Drymarchon couperi*)	Threatened	X	X	-
Green Sea Turtle (*Chelonia mydas*)	Threatened	X [1]	X	-
Hawksbill Sea Turtle (*Eretmochelys imbricata*)	Endangered	-	X	-
Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)	Endangered	-	X	-
Leatherback Sea Turtle (*Dermochelys coriacea*)	Endangered	-	X	-
Loggerhead Sea Turtle (*Caretta caretta*)	Threatened	-	X	-
Insects				

Monarch Butterfly (*Danaus plexippus*)	Proposed Threatened	X	X	-
Plants				
Carter's Mustard (Warea carteri)	Endangered	X	X	-
Lewton's Polygala (*Polygala lewtonii*)	Endangered	X	X	-
Critical Habitat				
West Indian Manatee	Final and Proposed	-	-	-
Rufa Red Knot	Proposed	-	X	-
Green Sea Turtle	Proposed	-	X	-
Loggerhead Sea Turtle	Final	-	X	-

[1] Although the Information for Planning and Consultation database indicates that these species could occur in the Project Area (SLC-13), there is no suitable habitat for these species and would not occur in the Project Area.

3.2 No Effect Determinations

The official species list includes certain species and critical habitat (Figure 3-1) that, in consideration of the best available science, either do not or are not expected to occur in the Project or Action Areas. Other species and designated critical habitat from the official species list would not be exposed to effects of the action due to the type of habitat that they occupy. These species and designated critical habitat would not be affected by the action and are not considered further in this BA (Table 3-2).

Table 3-2. No Effect Determinations for Certain Species and Critical Habitats on the Official Species List

Common Name (Scientific Name)	Rationale for No Effect Determination
Species	
Northern Long-eared Bat (*Myotis septentrionalis*)	USFWS listed the northern long-eared bat as endangered effective 31 March 2023 (88 FR 4908). This wide-ranging bat species, is found in 37 states and 8 provinces in North America, typically overwinters in caves or mines and spends the remainder of the year in forested habitats (USFWS 2022). Non-migratory bat species are not typically thought to travel over the open ocean; however, some bat species may utilize temporary roost sites on lighthouses and other structures offshore. Some Myotis species were documented in acoustic surveys 2.8 to 11.5 km off the coasts of New Jersey and the mid-Atlantic states (Dowling et al. 2017). According to the IPaC report (Appendix C), this species only needs to be considered if the project includes wind turbine operations. Because wind turbines are not proposed, the Project would have no effect on this species.
Whooping Crane (*Grus americana*)	USFWS listed the whooping crane as endangered on 11 March 1967 (48 FR 4001). The Aransas-Wood Buffalo population is the only wild and self-sustaining population of the species. These whooping cranes nest in Canada and winter along the central Texas coast. Individuals from the Aransas-Wood Buffalo population do not occur in Florida. On 26 June 2001, USFWS designated a nonessential experimental population of whooping cranes in the eastern US, with a geographic boundary that includes Florida (66 FR 33903). A nonessential experimental population is one that has been established within a species' historical range to aid in recovery of the species. The USFWS has determined that nonessential experimental populations are not necessary for the continued existence of a species. Individuals within these populations are treated as threatened under the ESA only when occurring on a NWR or on National Park land. MINWR is proximate to the Action Area; however, whooping cranes are not known to occur on the MINWR (USFWS 2024a). Whooping cranes from the eastern migratory population are observed infrequently in Florida, with two individuals having been documented in the state (outside the Action Area) in winter 2022-2023 (International Crane Foundation 2023). Because whooping cranes are not expected to occur in the Action Area, the Project would have no effect on this species.
Atlantic Salt Marsh Snake	The Atlantic salt marsh snake was listed as threatened by the USFWS on 2 June 1977 (42 FR 28165). Surveys for this species conducted between 2010 and 2012

(*Nerodia clarkii taeniata*)	discovered that the current distribution of the species appears limited to the coastal marshes of Volusia County, Florida (USFWS 2019b). Volusia County is not within the Action Area. Because this species is not believed to be present within the Action Area, the Project would have no effect on this species.
Carter's Mustard (*Warea carteri*)	Carter's mustard was listed as endangered by the USFWS on 21 January 1987 (52 FR 2227). This species occurs in both sandhill and scrubby flatwoods habitats, but populations are not densely or evenly distributed across the known range. The FNAI database contains historic occurrence records within Brevard County, Florida, from 1987. However, the FNAI and USFWS presently consider Carter's mustard extirpated from Brevard County (FNAI 2000; USFWS 2021b). Because the species is considered extirpated from the Action Area, the Project would have no effect on this species.
Lewton's Polygala (*Polygala lewtonii)*	Lewton's polygala was listed as endangered by the USFWS on 27 April 1993 (58 FR 25746). This species occurs primarily in sandhill habitats and may also be found in scrub areas that probably were former sandhill areas prior to logging and fire suppression activity (USFWS 2020a). There is one record for Lewton's polygala in Brevard County, Florida. However, the record was based on a misidentification (USFWS 2020a). Further, no plants of this taxon were observed during subsequent surveys on Merritt Island or mainland Brevard County (Schmalzer et al. 2003 as cited in USFWS 2020a). Because the species is unlikely to occur in the Action Area, the Project would have no effect on this plant.
Critical Habitat (Proposed and Final)	
Rufa Red Knot (*Calidris canutus rufa*) Proposed Critical Habitat	On 15 July 2021, USFWS published proposed non-breeding critical habitat for the rufa red knot that included a unit for FL-2 Ponce Inlet Complex in Volusia and Brevard Counties and FL-3 MINWR Impoundments in Brevard County (86 FR 37410). Therefore, proposed critical habitat occurs approximately 7.1 miles north of the Project Area (Figure 3-1). Several specific physical and biological features are described for this critical habitat (86 FR 37410). Neither the construction activity, which will occur 7.1 miles away, nor the increase in operations is expected to affect the physical or biological characteristics of the proposed critical habitat. Therefore, the Project would have no effect on the critical habitat.
Loggerhead Sea Turtle (*Caretta caretta*) and Green Sea Turtle (*Chelonia mydas*) Proposed or Final Critical Habitats	Loggerhead sea turtle (designated) and green sea turtle (proposed) critical habitats are located approximately 5.7 miles north of the Project Area and outside CCSFS boundaries (Figure 3-1). Portions of these critical habitats are proximate to multiple CCSFS SLCs and landing zones and are currently exposed to the operational activities that occur there. There has been a total of 1,265 launches at CCSFS, and it is the third most active launch site on Earth. Further, there has been an increasing number of launches from CCSFS and KSC, with 93 launches in 2024, 72 launches in 2023, and 57 launches in 2022. Similarly, the FWC Fish and Wildlife Research Institute reports that between 2019 and 2023, the number of loggerhead sea turtle nests and nesting attempts reported in Brevard County generally trended toward an increase, from 27,814 nests in 2019 to 33,343 nests in 2023 (representing an overall increase of 19.9 percent) (Falchi et al., 2016). These nest data are for Brevard County at large, and not specific to the proposed and designated critical habitats. However, these data suggest that Brevard County beaches remain suitable (including

	sufficiently dark) to support increasing loggerhead sea turtle nesting activity, despite the proximity of onshore habitat to anthropogenic activity (e.g., lighting). The incremental increase in activity associated with proposed Project activities at SLC-13 is not expected to affect the physical or biological characteristics of the designated critical habitat as the results (e.g., noise, light) of such activity 1) will represent a relatively minor addition to the level of activity to which the critical habitats are currently exposed, 2) will attenuate with distance from the Project Area, and 3) cannot be reliably parsed out from the other activities occurring as part of the baseline condition.
West Indian Manatee (*Trichechus manatus*) Critical Habitat	Designated West Indian manatee critical habitat is located proximate to the Project Area and within the Action Area. Designated West Indian manatee critical habitat is aquatic. The nearest area of designated critical habitat is the coast of the Atlantic Ocean adjacent to the Project Area (Figure 3-1). On 24 September 2024, the USFWS published a proposed rule to revise the existing designated critical habitat for two subspecies of the West Indian manatee based on physical or biological features essential to conservation of the species. The total area proposed for Florida subspecies of the West Indian manatee critical habitat is 1,904,191 acres. In the proposed rule, the USFWS identified physical or biological features as essential to species conservation including warm-water refuges with either reliable thermal quality throughout winter or established manatee use each year; foraging areas (i.e., areas that support submerged, emergent, or floating aquatic vegetation) within 18.6 miles of warm-water refuges; and foraging areas within 18.6 miles of other established winter manatee aggregations areas. The proposed revision of the spatial boundaries of designated critical habitat would remove previously designated areas along the Atlantic Coast and the east turning basin of Port Canaveral. The proposed rule would add new areas of designated critical habitat within the Canaveral barge canal at Port Canaveral and include the west and middle turning basins at the port. Based on the proposed revisions, the nearest area of critical habitat would be located approximately 2.1 miles from the Project Area and within the Onshore Action Area. Threats to manatee critical habitat identified in the proposed rule include the loss of warm water or aquatic vegetation, algal blooms, climate change, contaminants, and tropical storms and hurricanes. The Project does not include activities that would contribute to these proposed threats. Overpressures from sonic booms are not expected to travel through the water column and affect marine species. Acoustic energy from in-air noise does not effectively cross air-water interfaces; therefore, most of the noise is reflected off the water surface (Federal Aviation Administration 2020). In addition, underwater sound pressure levels from in-air noise are not expected to reach or exceed threshold levels for injury to any marine species (FAA 2020).

USFWS – US Fish and Wildlife Service; **km** – kilometer; **FR** – Federal Register; **IPaC** – Information for Planning and Consultation; **ESA** - Endangered Species Act; **MINWR** - Merritt Island National Wildlife Refuge; **FNAI** – Florida Natural Areas Inventory; **CCSFS** – Cape Canaveral Space Force Station; **SLC** – Space Launch Complex; **KSC** – Kennedy Space Center; **FWC** – Florida Fish and Wildlife Commission; **FAA** – Federal Aviation Administration

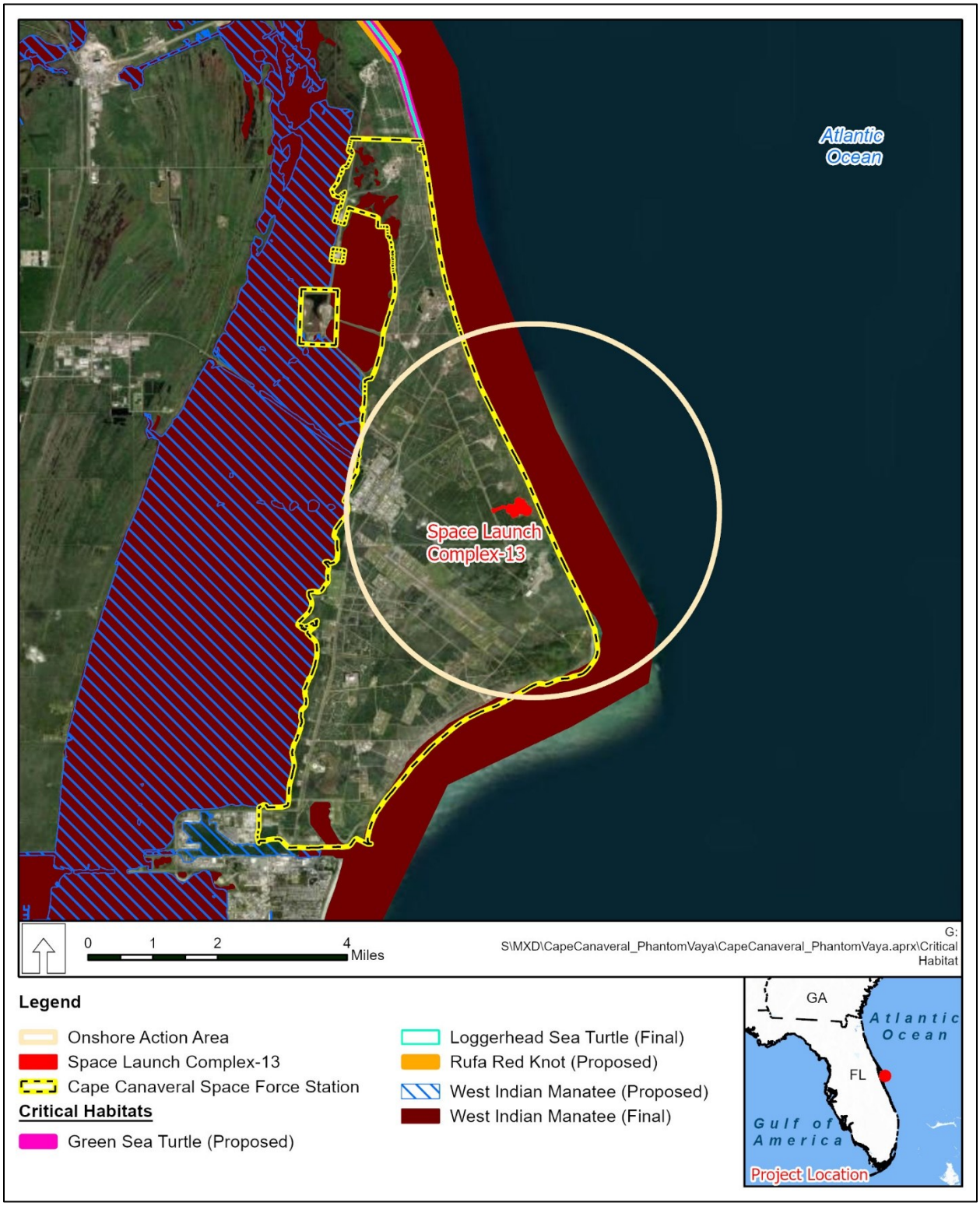


Figure 3-1. Designated Critical Habitat Proximate to the Project Area and within the Onshore Action Area

4.0 ENVIRONMENTAL AND OPERATIONAL CONTEXT

4.1 Landscape Resources

The Onshore Action Area includes 16,697 acres and is completely contained within the Southern Coastal Plain Ecoregion. This ecoregion consists of mostly flat plains and also contains barrier islands, coastal lagoons, marshes, and swampy lowlands along the Gulf and Atlantic coasts (U.S. Environmental Protection Agency 2013). Land cover is described following the Florida Land Use, Cover and Forms Classification System (FLCCS) (FDOT 1999). The FLCCS is a partnership venture between the FWC and Florida Natural Areas Inventory (FNAI), and represents ecologically based, statewide land cover mapping using existing sources and expert aerial photography review. The Onshore Action Area consists primarily of bays and estuarine, shrub and brushland, saltwater marshes, mixed wetland hardwoods, saltwater ponds, and freshwater marshes (Table 4-1). Large areas of open water, including the Atlantic Ocean, and Banana and Indian Rivers, are present (approximately 49 percent of the total area) in the Onshore Action Area.

Table 4-1. Florida Land Cover Classification for the Onshore Action Area and Project Area

FLCCS Site Code	FLCCS Site Name	Onshore Action Area (acres)	Onshore Action Area Percent of Total	Project Area (acres)
6000	Marine	8,152.39	48.83%	-
1150	Xeric Hammock	1,464.54	8.77%	1.50
1650	Maritime Hammock	1,399.96	8.38%	5.34
1210	Scrub	1,315.18	7.88%	-
1640	Coastal Strand	847.60	5.08%	2.35
1830	Rural Open	791.23	4.74%	7.75
1840	Transportation	641.45	3.84%	-
1822	High Intensity Urban	575.44	3.45%	0.05
7000	Exotic Plants	386.59	2.32%	-
1822	Institutional	263.94	1.58%	6.59
1821	Urban Open Land	172.06	1.03%	0.69
4200	Canal	151.10	0.90%	0.05
2120	Coastal Interdunal Swale	131.46	0.79%	0.32
1670	Sand Beach (Dry)	99.36	0.60%	-
2121	Basin Marsh	75.35	0.45%	-
5000	Estuarine	43.63	0.26%	-
5300	Cultural - Estuarine	41.86	0.25%	-
1500	Shrub and Brushland	38.02	0.23%	-
3200	Artificial Impoundment/Reservoir	29.23	0.18%	-
1600	Beach Dune	18.93	0.11%	-
1600	Shell Mound	13.52	0.08%	-
2120	Marshes	13.39	0.08%	-
5250	Mangrove Swamp	12.96	0.08%	-
2100	Floating/Emergent Aquatic Vegetation	8.90	0.05%	-
2110	Mixed Scrub-Shrub Wetland	8.06	0.05%	-

FLCCS Site Code	FLCCS Site Name	Onshore Action Area (acres)	Onshore Action Area Percent of Total	Project Area (acres)
1880	Bare Soil/Clear Cut	0.58	0.00%	-
1860	Utilities	0.14	0.00%	-
1821	Urban Open Forested	0.08	0.00%	-

4.2 Existing Development and Ongoing Activities

SLC-13, historically named Launch Complex-13, is a two-pad launch site for rockets located at the north end of CCSFS. Launch Complex-13 was used to launch Atlas and Atlas-Agena rockets between 1958 and 1978. Following the end of the Atlas launches at LC-13, it remained inactive until 2015. In 2015, SLC-13 was leased to SpaceX and renovated for use by SpaceX as Landing Zone 1 and Landing Zone 2. It has operated as the East Coast landing location for returning Falcon 9 and Falcon Heavy launch vehicle booster stages. SpaceX has decommissioned SLC-13's use as a launch vehicle booster stage landing site, and SLC-13 has been leased to Phantom and Vaya.

4.3 Cumulative Activities

"Cumulative effects" under the ESA are those effects of future state or private activities, not involving federal activities, which are reasonably certain to occur within the Action Area of the federal action subject to consultation (50 CFR 402.02). A substantial portion of the Onshore Action Area is owned and operated by federal agencies (e.g., CCSFS, KSC, MINWR, Canaveral National Seashore). Projects on federal land do not, by definition, contribute to cumulative effects under the ESA. A review of the non-federal lands within the Action Area was conducted to identify state or private activities that, when combined with the Project, may result in cumulative effects. An online search was conducted to identify state, local, and private projects planned to occur within non-federal lands of the Action Area. This information is compiled from a review of public meeting records for local governments mentioning approvals for specific projects involving new development projects, searches of local newspapers for activities related to development projects, and other publicly available databases and planning documents such as transportation project dashboards.

The following unrelated activities may contribute to cumulative effects in the Action Area:

Florida Department of Transportation. The Florida Department of Transportation (FDOT) website provides an interactive map with current and future projects by county. The map identifies multiple transportation improvement projects which consist of pavement rehabilitation and preventative maintenance activities. These types of projects are typically implemented within existing rights-of-way. Several road widening, repair, and enhancement projects are planned to occur within the next several years, and include the State Route 528 from east of State Route 3 to Port Canaveral Interchange project, the State Route A1A from south of International Drive to Long Point Road, US Highway 1 – State Route 404/Pineda Causeway to Park Avenue, and State Route 519 and Fiske Boulevard Corridor Planning Study (FDOT 2025).

City of Cape Canaveral. The Presidential Streets Master Plan identifies future street improvements, stormwater filtration systems, pedestrian and bicycle access, improved Americans with Disabilities Act accessibility, and traffic management features. This plan addresses the residential area south of Port Canaveral along the beach as part of several initiatives and projects over the next decade (City of Cape Canaveral 2022).

Canaveral Port Authority. Port Canaveral plans to expand its infrastructure to build a new cruise ship terminal. Additionally, parking expansion to accommodate 2,400 vehicles in the form of parking garages would be considered. The new terminal is estimated to open in 2026 (Jacksonville Business Journal 2023).

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5.0 EFFECTS OF THE ACTION

5.1 Analysis Framework

The Project involves two major types of activities for which consequences are reasonably certain to occur: 1) SLC-13 construction and maintenance and 2) launch operations and maintenance. Decommissioning of the Project is not expected for several decades, and the consequences of decommissioning are too tenuous at this time to be considered reasonably certain to occur, including whether Project facilities are decommissioned at all. Therefore, consequences to species and designated critical habitat are evaluated only for Project construction, operation, and maintenance activities.

Generally, Project activities and tasks may cause the following types of impacts:

Habitat loss. Vegetation clearing and other construction site preparation activities that remove habitat features (e.g., cover, forage, dens, roosts) temporarily or permanently reduce the amount of habitat available to be used by a species. Habitat loss changes the local distribution of a species (e.g., species are not expected to occur in places where habitat is not present). Habitat loss may also reduce the abundance of a species if individuals are killed or injured by the loss of habitat when essential life history behaviors (e.g., breeding, feeding, sheltering, movement) are significantly impaired. At SLC-13, approximately 31,808 square feet of vegetation and previously disturbed ground disturbance is proposed, and this could cause direct habitat loss.

Habitat degradation. Project activities may temporarily or permanently reduce the functional quality of habitat without completely removing the habitat. For example, soil disturbance near water resources can generate sediment that makes aquatic habitat less suitable for species that prefer clear water or channel beds. When severe, habitat degradation can cause functional habitat loss. Like habitat loss, habitat degradation may change the local distribution of a species or reduce the abundance of a species through significant impairment of an essential life behavior. Specific types of habitat degradation follow.

Heat plumes from launch activities can cause habitat degradation. Studies on the effects to local vegetation from 14 Delta, 20 Atlas, and 8 Titan launches at CCSFS detected temporary near-field damage from fire and heat (FAA 2020). Increased launches by Phantom and Vaya from the two launch pads at SLC-13 would increase the number of heat plumes annually. Heat from these launches could damage nearby vegetation during launch events and damage to vegetation would remain following launches. However, the deluge system deployed during launch events would reduce the likelihood of fire, absorb most of the heat, and protect nearby undisturbed vegetation from heat plume damage (FAA 2020). There would be no direct damage to vegetation (i.e., scorching or burning) from heat plumes. Vegetation in the first 370 feet beyond the boundary of SLC-13 within the heat plume would experience temperatures between 217 degrees and 140 degrees Fahrenheit. These temperatures would damage vegetation and cause some minor habitat degradation beyond the SLC-13 boundary in 1.7 acres of nearby, relatively undisturbed habitats.

Noise and visual disturbance. Noise and visual disturbance created by people, vehicles, equipment, and machinery are forms of wildlife habitat modification that can temporarily or permanently damage hearing in animals or cause physiological stress, interfere with animal communication or disrupt essential animal behaviors (like feeding, nesting, or roosting), or reduce the functional quantity or quality of wildlife habitat. Effects may influence individual animals, populations of a particular species, or entire wildlife communities. Researchers have noted that the effects of anthropogenic noise on wildlife is often conflated with other elements of the activity causing the noise, like visual disturbances or physical habitat modification, and do not often indicate a clear or discrete chain of causation between particular environmental consequences and observed changes (if any) in wildlife populations (Ortega 2012; Shannon et al. 2016).

The range of noise-wildlife impact studies in the published literature addresses a wide array of different species (e.g., birds, mammals, fish, entire wildlife communities), biological responses, acoustic metrics, environments, and other confounding variables (Ortega 2012; Shannon et al. 2016). Shannon et al. (2016) reports that a variety of studies on birds demonstrated responses to noise occurring at noise levels of at least 45 dBA (roughly the noise level of a quiet urban or rural setting), terrestrial mammals responded to noise levels between 52 and 68 dBA (roughly equivalent to the noise level of commercial area or busy highway), and gleaning bats responded to noise levels exceeding 80 dBA (roughly the noise level of a noisy urban area). The comparative noise level descriptors are consistent with the interpretation in FAA (2022). Shannon et al. (2016) suggests that the most consistent findings relating noise levels to wildlife responses (such as those contributing to the relatively low noise response thresholds described in the prior paragraph) occur in the context of studies measuring average, ambient, or continuous noise levels – indicating a chronic noise environment. Ambient or continuous noise would not be the type of noise produced by launch-related activity at SLC-13. The noise impact studies that identified wildlife responses at higher noise levels were more often associated with noise types and metrics that evaluated maximum noise produced during an event or represented the sound exposure level (a metric that represents the level and duration of a noise event in a single number; described by FAA [2022] as the equivalent of "squeezing all the noise energy from an event into one second”). Therefore, the acoustic metrics reported in noise impact studies (which are not consistent among studies as demonstrated in Figure 3 of Shannon et al. [2016]) are important to understanding how noise was quantified – different means of quantifying noise produce different noise level numbers that are not equivalent. The five studies evaluated by Shannon et al. (2016) that addressed sounds from activities most like those considered herein are classified as “military” and include noise-producing activities such as “gunfire, explosions, aircraft, naval sonar, and in some cases, entire military training operations.” Among these studies, each of which evaluated noise using different types of metrics, biological responses were detected at levels summarized in Table 5-1.

Table 5-1. Relevant Studies Evaluating Noise and Wildlife Biological Responses

Taxon	Type of Biological Response	Response-Inducing Sound Level and Metric	Sources
Birds	Increase in vigilance and alert behavior	63 dBA LAeq 89 dBA LAmax	Conomy, J.T., J.A. Dubovsky, J.A. Collazo, and W.J. Fleming. 1998. Do black ducks and wood ducks habituate to aircraft disturbance? The Journal of Wildlife Management. 62:1135–1142. Goudie, R. and I.L. Jones. 2004. Dose-response relationships of harlequin duck behaviour to noise from low-level military jet over-flights in central Labrador. Environmental Conservation. 31:289–298.
Mammals	Short-term increase in heart rates and shifts in resting and movement behaviors of ungulates	85 dB Leq (uncertain frequency weighting, if any) 98 dBA SEL 92 dB Lmax (uncertain frequency weighting, if any)	Krausman, P.R., L.K. Harris, C.L. Blasch, K.K. Koenen, and J. Francine. 2004. Effects of military operations on behavior and hearing of endangered Sonoran pronghorn. Wildlife Monographs. 157:1–41. Maier, J.A., S.M. Murphy, R.G. White, and M.D. Smith. 1998. Responses of caribou to overflights by low-altitude jet aircraft. The Journal of Wildlife Management. 62:752–766. Weisenberger, M.E., P.R. Krausman, M.C. Wallace, D.W. De Young, and O.E. Maughan. 1996. Effects of simulated jet aircraft noise on heart rate and behavior of desert ungulates. The Journal of Wildlife Management. 60:52–61.

dBA – A-weighted decibel; **LAeq** – A-weighted equivalent continuous sound level: **LAmax** – maximum A-weighted noise level; **dB** – decibel; **Leq** - equivalent continuous sound level; **SEL** – sound exposure level; **Lmax** – maximum noise level

For the studies reporting noise metrics similar to the type modeled for Phantom and Vaya launches (i.e., maximum A-weighted noise level [LAmax] or Lmax with uncertain frequency weighting), biological responses were detected at levels of 89 dBA and 92 dB. These studies support a wildlife noise impact threshold for this BA of a 100 dBA SEL as this would be the noise level that would likely elicit responses. However, whether this noise level has adverse consequences on specific listed wildlife species is not certain.

Published reviews of the body of work on the impacts of noise on wildlife are careful to note that "synthesising [sic] a coherent understanding of the biological consequences of noise from this

literature is challenging" (Shannon et al. 2016) and that "some species react more negatively to noise than others" (Ortega 2012). The collective findings of these studies demonstrate the likelihood of adverse effects from noise, which the authors note often occur in association with and are conflated by other forms of human disturbance. These studies also identify the means by which these noise impacts may manifest on an individual animal, a wildlife population, or a wildlife community. However, the variation in the context of these studies (e.g., different species or wildlife communities; different sources, frequencies, magnitudes, durations, and consistencies of noise; different environmental settings) makes the application of their generalized findings difficult to reliably apply to specific species and specific human activities. Shannon et al. (2016) offers that the combined body of work on noise impacts and wildlife has utility for predicting the outcomes of noise exposure and suggests that the studies identifying a significant response to noise at lower noise levels have the most utility for that purpose. But Shannon et al. (2016) does not apply or test the predictive power of their "cumulative weight-of-evidence curve."

Studies suggest that common animal responses to noise include the startle response and, ultimately, habituation (FAA 2020; Shannon et al. 2016; Schmalzer et al. 1998). It has been reported that the intensities and durations of the startle response decrease with the numbers and frequencies of exposures, suggesting no long-term adverse effects. Monitoring studies at CCSFS indicated that FLSJ continued to use the area within 1 kilometer of launch sites post-launch, and that the behavior of FLSJ was normal following launch events (Schmalzer et al. 1998). Additionally, Schmalzer et al. observed no animal mortality that could be attributed to launches (1998).

Construction noise. Potential noise-related impacts could occur from construction activities at SLC-13. Noise levels near facilities at CCSFS and KSC currently proximate those of an urban industrial area, reaching levels of 60 to 80 dBA (FAA 2020). Noise related to Project construction activities may result in a temporary increase in noise levels near SLC-13 but are expected to be comparable to noise levels historically and currently occurring at the CCSFS and associated with SLC-40 launches, especially in natural areas that contain relatively undisturbed habitat, which is at a distance from the SLC-13 construction activities as to have greatly attenuated construction noise.

Launch engine noise. Noise resulting from a launch is short-lived and diminishes quickly as the vehicle ascends. Static fire testing would occur prior to some launches and would be included within launch activities. Additionally, the vehicle's deluge system assists in reducing the noise and vibrations produced during a launch. Figure 2-2 illustrates the area exposed to maximum noise levels from launch activities at SLC-13. Static fire engine tests produce maximum noise level contours that are less extensive than a launch event. Static fires produce lower maximum noise levels than launches. The Project would result in an increase in frequency of noise occurrences at SLC-13 as well as an increase in the magnitude of this noise. In any case, the noise impact studies reviewed by Shannon et al. (2016) suggest that launches and static fires produce noise levels that are likely to affect wildlife within at least part of the Onshore Action Area.

Sonic booms. Sonic booms are generated by launch vehicles exceeding the speed of sound following each launch while accelerating to achieve speeds necessary to reach earth orbit. Modeled sonic boom overpressure levels of 1 pound per square foot (psf) or greater are generated during launches, which may be heard or felt up to approximately 15 miles away from the point following a launch when the speed of sound is achieved as the launch vehicles ascend. An overpressure of 1 psf is similar to a clap of thunder. Overpressure events ranging from 5 to 10 psf may be experienced over the Atlantic Ocean, and could startle wildlife on the ocean surface, but not physically injure wildlife or wildlife habitats. For example, NASA states that human exposure to sonic boom overpressure events generating between 20 and 144 psf has been experienced without injury (NASA 2003). A 1991 study funded by the DAF found that chicken eggs, when exposed to sonic booms of 17 to 19 psf for a duration of 9 days, did not develop cracks or deviations (Bowles et al. 1991). Numerous other studies also cite sonic booms of varying intensity as having no detrimental effect on wildlife (Maglieri et al. 2014). Therefore, direct physical injury or death of wildlife from sonic booms generating approximately 5 to 10 psf of overpressure are not anticipated. The effects on listed wildlife are likely related to behavioral responses such as startling or flushing, if a listed species was present at or near the surface of the ocean when the sonic boom occurred.

Visual. Potential visual disturbances related to the Project include the presence of people and equipment during construction; the intermittent presence of people, vehicles, and vehicle components during launch activities; the potential for increased instances of visibility of rockets in the sky; and increased instances of nighttime lighting due to nighttime launch events. All potential visual disturbances are consistent with current land use and activities at CCSFS.

As described above, researchers have noted that the effects of anthropogenic noise on wildlife is often conflated with other elements of the activity causing the noise, including visual disturbances. As such, it is difficult, if not often impossible, to indicate a clear or discrete chain of causation between particular environmental consequences and observed changes (if any) in wildlife populations (Ortega 2012; Shannon et al. 2016). As such, visual changes associated with Project activities for which there is also a potential noise impact (i.e., construction, launches, and landings) are considered together as potential impacts resulting from noise (i.e., impacts are assumed to be contributed to noise versus visual disturbance). Given the currently industrialized environment of CCSFS, and the year-round implementation of a Light Management Plan to minimize sky glow, impacts resulting from visual disturbances alone (e.g., the presence and movement of people at the site without the concurrent use of heavy equipment or machinery that might cause noise; the presence of new lightning protection towers) are expected to be minimal and/or intermittent. Therefore, the Project would result only in insignificant impacts resulting from visual disturbance.

Vehicular Traffic. An increase in vehicle traffic during daily operations from construction and operational personnel could increase the potential for vehicle collisions with wildlife, including ESA-listed species. Increased traffic and human presence could cause wildlife to avoid the area, but no new transportation routes are proposed. Traffic would continue to utilize CCSFS roadways such as ICBM Road, which is a two-lane road with generally low traffic volumes. The Project is not expected to result in a significant increase in traffic on CCSFS roads. Most of the

traffic from construction and operations would occur during daylight hours. Drivers would be expected to obey the posted speed limit and the potential for wildlife collision would be similar to other areas of CCSFS.

Collision. Activities associated with increased human presence, vehicles, equipment, and machinery can create opportunities to physically encounter individuals of a species. Collisions can occur under two types of circumstances: 1) when an individual of a species collides with facilities or 2) when vehicles, equipment, or machinery collide with an individual of a species. Collisions may kill or wound individuals of a species and reduce the abundance of local populations.

Three additional types of impacts were considered and determined unlikely to occur as a result of the Project.

Habitat fragmentation and edge effects. A form of habitat degradation, fragmentation can exacerbate the consequences of habitat removal by altering the configuration of remaining habitats (e.g., reducing a patch size below the threshold of suitability). Habitat fragmentation increases edge effects (e.g., exposing previously established forest interior habitat to light and temperature changes along a now-open edge) and may decrease the ability of a species to move across the landscape when the distance between habitat patches increases. Habitat fragmentation and edge effects may change the distribution of a species or reduce the abundance of a species through significant impairment of an essential life behavior. When dispersal behaviors are affected, the consequences of habitat fragmentation can influence species at a local or regional scale. The Project Area is currently comprised of a mosaic of land uses, including open, natural, and developed areas. Specifically, the 6,500-square-foot area to be cleared for the access road expansion is primarily vegetated by turf grasses and does not include any woody vegetation. Approximately 25,308 square feet of disturbance would occur to undeveloped areas within SLC-13 proximate to the existing pads. Therefore, there is no anticipated habitat fragmentation from the road-widening activity and SLC-13 development, and no increased edge effect.

Hazardous material exposure. Fuels or other hazardous materials (e.g., isopar, isopropyl alcohol) such as those used during Project activities have the potential to degrade habitat, particularly for species with relatively small home ranges, if an area is subject to unintentional exposure to such materials (e.g., leaks, spill events). Toxicity from hazardous materials may also directly impact individuals of a species that is susceptible to such exposure. Generally, where hazardous material exposure substantially degrades habitat or directly impacts individuals, the use of these materials may change the local distribution or reduce the local abundance of the species. Phantom and Vaya will implement best management practices to minimize the potential for spills and will implement a Spill Prevention, Control, and Countermeasure Plan throughout Project construction and operation. All CCSFS hazardous materials handling and hazardous waste disposal procedures will be followed during construction and during launch operations. All vehicles will be maintained in road-worthy conditions and will be used only on access routes. Therefore, the potential for any impacts to occur as a result of exposure to hazardous materials is considered unlikely.

Ecological community changes. Some projects may change the landscape in ways that may promote the introduction or abundance of some species (e.g., invasive/noxious species) and demote others, changing the dynamics of the predator, competitor, and prey relationships. Altering these relationships may influence individuals and populations of species in complex ways that may be adverse in some respects but beneficial in others. The Project is not expected to have ecological community change impacts because 1) the Project will result in minimal native vegetation removal, 2) the removal will occur within a landscape mosaic of open, natural, and developed areas; and 3) operations and maintenance will represent an increase in frequency of activities currently conducted at, and near, the Project Area.

5.2 Southeastern Beach Mouse

5.2.1 Biology and Habitat

The SEBM occupies primary and secondary habitats. Primary habitat is characterized by foredunes, transitional dunes, and coastal scrub dunes typically vegetated by sea oats and other salt-tolerant vine and grass species. Secondary habitats are interior scrub and other natural and human-altered landscapes landward of dunes that provide refugia habitat and may support species resource needs, movement corridors, and/or population extensions (Johnson and Barbour 1990). SEBM utilizes the scrub adjacent to these dunes for digging burrows, which are generally found on the sloping side of a dune at the base of vegetation and are used for refuge, nesting, and food storage (USFWS 2019b). Breeding by the SEBM generally peaks in the winter season, with gestation lasting 23 days, and litters typically consisting of three to four individuals. The weening period typically lasts 18 days, and SEBM reaches sexual maturity at 30 days old (FWC 2024a).

5.2.2 Environmental Baseline

The SEBM was listed as threatened on 12 May 1989 (54 Federal Register (FR) 20598). The SEBM is known to occur on CCSFS, where a metapopulation exists with at least four subpopulations identified (FAA 2020). This metapopulation of SEBM occurs in federally protected lands along the beaches of MINWR and the CCSFS (USFWS 2019c). At CCSFS, SEBM typically occurs from the coastal dunes inland to west of Samuel C. Phillips Parkway and occurs where sand is suitable for burrows, coastal scrub is present, and the water table is not near the surface (USFWS 2020b).

SEBM surveys have been conducted at CCSFS; there are recent (2020 – 2022) SEBM detections proximate to the Project Area (SLC-13) and throughout CCSFS within the Action Area. A survey for SEBM in a portion of the SLC-13 project area was conducted in 2014 in support of the proposed SpaceX Landing Complex, which ultimately developed portions of the current SLC-13. The survey was conducted from the top of the beach dune down the backside of the slope outward to the palmetto edge; surveys were not conducted across most of SLC-13. SEBM were captured during the survey (45th Space Wing 2015). Therefore, the SEBM has been detected at SLC-13 and immediately east of SLC-13 during small mammal trapping and camera bucket surveys.

As the SEBM has been detected on and proximate to SLC-13, all unpaved areas on and proximate to SLC-13 are considered suitable SEBM habitat (Figure 5-1). Approximately 0.73 acre (31,808 square feet) of suitable SEBM habitat at SLC-13 would be disturbed from project improvements (Figure 5-1).

5.2.3 Effects of the Action

Construction of the access road improvements would convert 0.15 acre (6,500 square feet) of maintained turf grasses to paved roadway and develop approximately 0.58 acre (25,308 square feet) of previously disturbed but undeveloped areas near the launch pads at SLC-13. These improvements would directly impact SEBM habitat at CCSFS (see Figure 2-1). This conversion would result in a direct loss of suitable SEBM habitat in the Project Area and could also result in a take of SEBM due to its known past detections at SLC-13.

The proposed increase in annual number of launches and addition of landings would increase the frequency of occurrence of noise, lighting, activity, and vibrations in the Project Area. Bednarz (2021) reviewed previously published studies of the impacts of traffic noise on rodents and found that responses by species were varied (ranging from adverse to beneficial), but many studies documented changes in vigilance and foraging behaviors at noise levels between 26 and 87 dB. The findings of adverse effects were biased towards rodent species that are social and rely on alarm calls for protection (e.g., prairie dogs). SEBM, in contrast, are not a social species.

Increased launch frequency might generate more intense or longer-term adverse impacts on SEMB, as compared to the findings of Oddy et al. (1999), or increased launch frequency may continue to have no measurable adverse effect on how SEBM use habitat adjacent to these types of activities. There have been no studies to measure impacts related to more frequent launch activity. It is estimated that approximately half of all launches would occur during daytime hours when the SEBM would normally be in burrow habitat, which would greatly reduce any impacts on SEBM from launch noise. Alternatively, there would be noise-related impacts on SEBM from night launches, as SEBMs would most likely be out of their burrow habitat and more greatly exposed to launch noise.

SEBM faces many threats, which include habitat loss due to development and hurricanes, and predation by native and nonnative species, such as domestic cats (FWC 2024a).

Increased temperatures are anticipated in portions of the coastal strand and coastal scrub habitat adjacent to SLC-13. Although temperatures as high as 217 degrees in vegetated areas proximate to SLC-13 have been estimated by heat plume modeling, the angle of the proposed heat diverters would direct the heat plume upward and above the ground surface. Temperatures at the ground surface and in burrows below the heat plume would be substantially less than air temperatures at the top of and above nearby vegetation. Therefore, it is unlikely that the heat plume generated by launches would affect the SEBM.

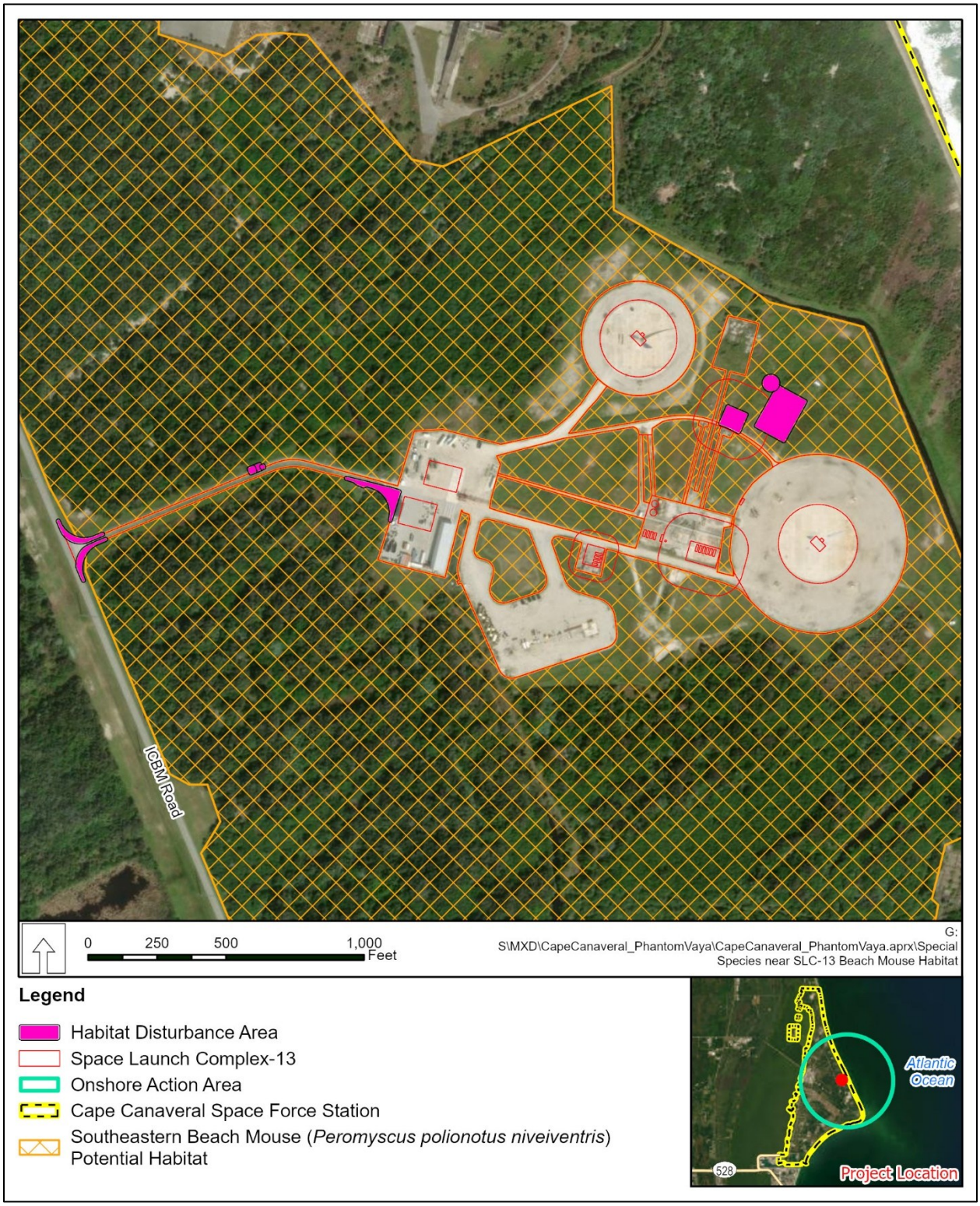


Figure 5-1. Southeastern Beach Mouse Habitat Disturbance in the Action Area

Construction activities would involve very limited use of lighting, and lighting would primarily be used during construction for activities that require work in reduced temperatures (e.g. concrete pours). Lighting would be required for nighttime launch operations and would have the potential to adversely affect the SEBM. Lighting at SLC-13 would likely cause SEBM to shift their foraging activities away from lighted areas, and increased lighting could cause increased predation of SEBM if they remained in lighted areas.

Increased vehicular travel at night to and from SLC-13 associated with construction activities, as well as vehicle travel associated with the up to 52 launches annually from SLC-13, would increase the risk of vehicle strikes to SEBM leading to unintended SEBM fatalities.

Given the direct loss of 0.73 acre of suitable SEBM habitat that has the potential to be occupied by SEBM, the Project may affect and is likely to adversely affect the SEBM.

5.2.4 Cumulative Effects

As identified in Section 5.2.2, main threats to SEBM include habitat loss due to development and hurricanes; and predation by native and nonnative species, such as domestic cats. The projects, if they occur in or adjacent to SEBM habitat, may create the same types of threats to the species and could result in adverse cumulative effects to the species when combined with the Project.

The Service is continually working with private and state entities to review proposed projects, offer technical assistance, and provide recommendations on avoidance and minimization measures to protect SEBM. With ongoing cooperative efforts to protect the species and its habitat (see Sections 2.2.6 and 2.2.7), the DAF does not believe that the potential cumulative effects are likely to jeopardize the continued existence of SEBM.

5.2.5 Population-Level Biological Consequences

Because this species is known to continue using secondary habitat on CCSFS that is proximate to areas where activity, including rocket launches at SLC-13, currently occur, the Project is expected to have a minimal overall impact on the population of SEBM in the vicinity of SLC-13.

5.2.6 Compensation and Conservation Measures

The Proposed Action has the potential to impact the SEBM population at CCSFS as a result of impacts on 0.73 acre of undeveloped/unpaved areas of SEBM habitat within the SLC-13 Project Area boundary (see Figure 5-1). This could result in a take of this species due to the loss of suitable habitat and its potential use of this area. However, based on past studies completed for CCSFS, SEBM are benefiting from habitat restoration activities being conducted for scrub-jays, and the SEBM population is expanding into inland locations.

5.3 Tricolored Bat

5.3.1 Biology and Habitat

The tricolored bat roosts singly or in small groups in caves, tree foliage and cavities, and occasionally buildings and other human-made structures (e.g., culverts, bridges) (FWC 2024b) (USFWS 2021b). In Florida, female tricolored bats give birth to two pups in May or June (FWC 2024b).

Tricolored bats prefer wooded riparian areas for foraging, often flying along streams or ponds. Tricolored bats may prefer landscapes with a mosaic of relatively open and closed canopy areas, with forest edges and tree lines used for foraging and closed canopy woodland used for travel (USFWS 2021c). Tricolored bats are known to use small forest patches and linear tree lines, with no known minimum patch size threshold (USFWS 2024b). During winter, tricolored bats hibernate in caves and mines; however, in the southern US where caves are sparse, the species often hibernates in road-associated culverts, and sometimes in tree cavities and abandoned water wells (USFWS 2021c).

The year-round active range for tricolored bats includes the entire state of Florida (USFWS 2024c). The range of the tricolored bat in the US is organized into three Representation Units: Northern, Eastern, and Southern (USFWS 2021c). Tricolored bats found within the Southern Representative Unit, which includes all of Florida, exhibit shorter hibernation lengths, increased winter activity, and utilization of culverts as hibernacula (USFWS 2021c).

5.3.2 Environmental Baseline

The tricolored bat was proposed endangered by USFWS on 14 September 2022 (87 FR 177). The species is known to occur in most areas of Florida, including Brevard County, and is considered uncommon because it is rarely encountered within the state (Evans et al. 2017). Main threats to the species include white nose syndrome, wind energy development-related mortality, and habitat loss (USFWS 2021c).

The Project Area contains almost no natural woody vegetation and woody vegetation that could provide roosting habitat for the tricolored bat is limited to natural vegetation along the periphery of SLC-13, including saw palmetto (*Serenoa repens*), sand live oak (*Quercus geminata*), and eastern baccharis (*Baccharis halimifolia*). Tricolored bats may roost in Spanish moss (*Tillandsia usneoides*) and the foliage of live or recently dead deciduous hardwood trees.

The tricolored bat prefers landscapes with tree corridors or other largely forested areas and is less abundant in developed, urban areas (USFWS 2021c) such as those present in and adjacent to the Project Area. The species may utilize culverts or tree cavities in the Action Area as winter hibernacula.

Tricolored bats have been detected on CCSFS during 2019 acoustic surveys (Figure 5-2; USFWS 2020b). No tricolored bat roosts have been visually identified on CCSFS and no deceased tricolored bats have been observed on CCSFS (USFWS 2020b).

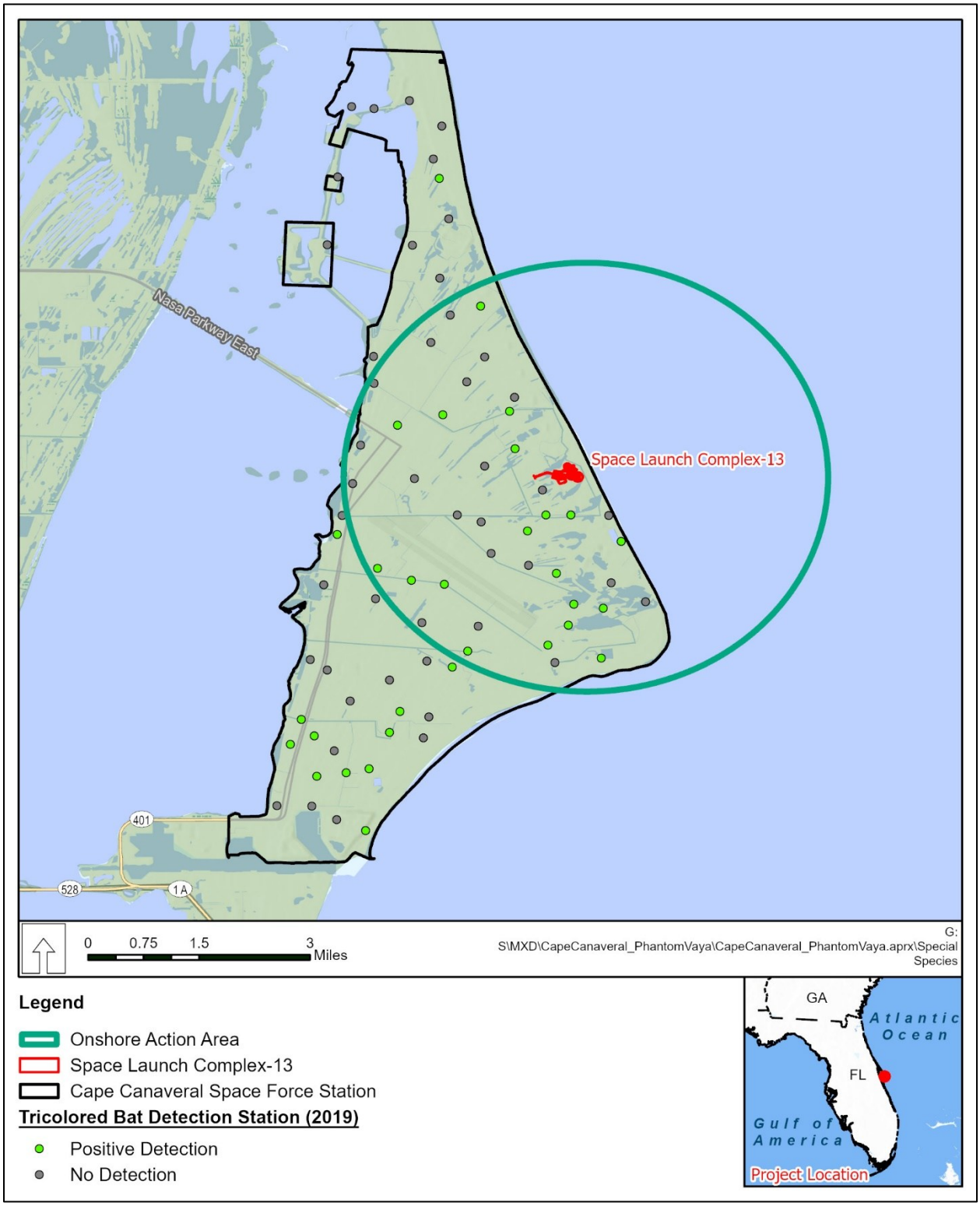


Figure 5-2. 2019 Tricolored Bat Acoustic Survey Detections on Cape Canaveral Space Force Station in the Action Area

5.3.3 Effects of the Action

There would be no direct impacts on suitable tricolored bat habitat in the Project Area. Construction activities at SLC-13 are mostly limited to previously developed and paved areas and also include 0.58 acre of previously disturbed but undeveloped areas and 0.15 acre of maintained turf grass that would be used to improve the SLC-13 access road.

The proposed increase in the annual number of launches would increase the frequency of occurrence of noise, activity, and vibrations in the Project Area to which tricolored bats inhabiting the Action Area are currently exposed. These occurrences would be intermittent and short-lived.

Studies of noise impacts on bats have detected changes in some species in how they use habitat adjacent to highways with traffic noise, suggesting that bats may not use noisy environments as often as quiet environments (Shannon et al. 2016; Bednarz 2021). Researchers have noted that the effects of anthropogenic noise on wildlife is often conflated with other elements of the activity causing the noise, like visual disturbances or physical habitat modification, and do not often indicate a clear or discrete chain of causation between particular environmental consequences and observed changes (if any) in wildlife populations (Ortega 2012; Shannon et al. 2016).

Roosting and foraging habitat for tricolored bats is not a limiting factor for the species across the landscape, particularly in the context of dramatically reduced bat abundance following the introduction of white-nose syndrome. Therefore, mobile individuals, if disturbed, are expected to move to adjacent or nearby suitable habitats. Nonvolant individuals may be exposed to the increase in short-lived, intermittent disturbances related to the proposed Action. However, there are no data available to indicate that this increase in exposure to such occurrences would result in an adverse effect to any bat.

Heat from launch activities would not affect roosting or foraging bats. There is no suitable forested habitat within the estimated heat plume for the launch activities. Additionally, the diverter for the heat plume would be angled to distribute the heat above vegetation adjacent to SLC-13. Foraging tricolored bats would avoid the noise and vibration from active night launch activities when bats are active, and would therefore also avoid the heat plume from launch activities.

Increased nighttime launches would require additional lighting. However, although tricolored bats forage at night, they move and forage via echolocation, and increased lighting would not negatively impact these foraging activities. Increased nighttime vehicular travel for construction and for nighttime launch operations would have no substantive effects on tricolored bat, as vehicle strikes on bats are extremely rare since bats are able to navigate via echolocation to avoid other moving objects.

As such, the Project may affect, but is not likely to adversely affect, the tricolored bat.

5.3.4 Cumulative Effects

The Project is not likely to adversely affect the tricolored bat. Therefore, cumulative effects are not considered.

5.3.5 Population-Level Biological Consequences

The Project is not likely to adversely affect the tricolored bat. Therefore, no population-level biological consequences will occur.

5.3.6 Conservation Measures

No compensation is proposed for the tricolored bat. The following conservation measures will be implemented:

- Tree clearing will be avoided between 15 May and 15 July to minimize impacts during bat maternity season.
- Tree clearing will be avoided when ambient daytime temperatures are 45 degrees Fahrenheit or below.

5.4 West Indian Manatee

5.4.1 Biology and Habitat

The West Indian manatee inhabits rivers, bays, canals, estuaries, and coastal areas where it moves between fresh, saline, and brackish waters. Florida's estuaries, freshwater lakes, springs, and rivers provide seagrass and freshwater aquatic vegetation, which are the species' primary food sources (FWC 2024c).

Manatees require warm water for survival and cannot survive prolonged exposure to very cold water (FWC 2024c).

5.4.2 Environmental Baseline

The USFWS lists the West Indian manatee as threatened (32 FR 4001). Main threats to the species are collisions with boats and loss of warm water habitat (FWC 2024c). The species does not occur in the Project Area but is known to occur in suitable habitat within the Onshore Action Area (see Figure 3-1). On 14 January 2025 (90 FR 3131), the USFWS proposed to list the two subspecies of the West Indian manatee, the Florida manatee (*Trichechus manatus latirostris*) and the Antillean manatee (*Trichechus manatus manatus*), as Threatened. These listings would replace the current threatened listing of the West Indian manatee.

5.4.3 Effects of the Action

The Project will generate vibration and noise associated with construction activities and launches/landings that may affect the West Indian manatee. Acoustic energy from in-air noise does not effectively cross the air-water interface and the majority of noise is reflected off the water surface. In addition, underwater sound pressure levels from in-air noise are not expected

to reach or exceed threshold levels for injury to any marine species. Noise impacts from operations are expected to be minimal, based on previous launch programs, and noise effects are expected to be insignificant (USFWS 2020b).

During operations, overpressures from sonic booms are not expected to travel through the water column and affect marine species underwater. Thus, the potential for overpressure resulting from sonic booms – and related sound and vibration – to impact manatees is insignificant. Further, the location where sonic booms would most likely occur based on boom modeling would be approximately 25 miles from the Florida coastline over the Atlantic Ocean, where the West Indian manatee would be unlikely to occur.

Further booster expenditures in the Atlantic Ocean would not directly affect the manatees, which primarily inhabit freshwater lagoons and rivers.

West Indian manatees that surface to breathe at the same time construction activity or launch activity occurs may be temporarily exposed to related noise, lighting, or vibration. This exposure would be intermittent, occasional, and short-lived. Therefore, related effects (e.g., startling resulting in returning underwater prematurely) are expected to be minimal and insignificant. Noise impacts on manatees would be discountable, because manatee ears remain below the water surface even when they surface to breathe. Therefore, it is highly unlikely that a startling response would occur to manatees during launch activities. Noise impacts on manatees from sonic booms are highly unlikely as sonic booms have been estimated to occur over the open Atlantic Ocean, beyond normal manatee habitat. The Project may affect but is not likely to adversely affect the West Indian manatee.

5.4.4 Cumulative Effects

The Project is not likely to adversely affect the West Indian manatee. Therefore, cumulative effects are not considered.

5.4.5 Population-Level Biological Consequences

The Project is not likely to adversely affect the West Indian manatee. Therefore, no population-level biological consequences will occur.

5.4.6 Conservation Measures

Due to discountable impacts on this species, no conservation or compensation measures are proposed.

5.5 Audubon's Crested Caracara

5.5.1 Biology and Habitat

Crested caracaras are found in wet prairies associated with cabbage palms (*Sabal palmetto*) and wooded areas associated with palmetto, cypress, scrub oaks, and pastures throughout south-central Florida. They prefer open areas with thin ground cover to allow them to get a

running start before flight (Cornell Lab of Ornithology 2024a). Caracaras typically build nests in cabbage palms, the tallest vegetation, or tree-like structures with a wide view in generally open prairie or pasture with low density scattered brush (Morrison and Dwyer 2023). The species' global distribution includes Texas, Arkansas, Mexico, Cuba, and Panama (FWC 2024d).

The crested caracara is a strikingly patterned, broad-winged opportunist that often feeds on carrion. Aggressive, it may chase vultures away from road kills. Widespread in the American tropics, it occurs in the US only near the Mexican border in the southwestern US and in Florida. Found primarily in open ground habitats including the wet prairies of Florida, nests are 8 to 50 feet above the ground in shrubs and trees. Clutch size is typically two to three eggs, rarely four. Diet consists carrion and small mammals with of smaller creatures alive or found dead (National Audubon Society 2024).

5.5.2 Environmental Baseline

Audubon's crested caracara is synonymous with the northern crested caracara (*Caracara cheriway*), as the scientific name changed in July 2023. Although *Polyborus plancus audubonii* is not currently recognized as a valid subspecies, the name Audubon's crested caracara is retained in the FR as that was the name at the time of the Florida's population's federal listing as threatened (52 FR 25229; 6 July 1987). Main threats to the species include habitat loss due to urban development and agriculture, vehicle strikes, and illegal take (FWC 2024d). Caracaras are present in Florida in relatively small, isolated populations and are year-round residents throughout their range, which includes areas of Brevard County within the Action Area. Their primary habitat in Florida consists of improved pasture, dry prairies interspersed with marshes, mixed upland hardwoods, shrub swamp, grasslands, and pinelands (USFWS 2009). In Florida, up to 80 percent of nesting pairs of crested caracaras are found on private cattle ranches, likely due to shorter grass that increases visibility, allowing less vulnerability to predators (Rose and Boughton 2019). Caracara have been observed on CCSFS, and sightings have been increasing in recent years; however, no nesting has been confirmed to date.

5.5.3 Effects of the Action

The Project Area does not contain any rural pastureland preferred by Audubon's crested caracara. However, marginal habitat is present for the crested caracara to forage and nest within the Action Area and noise disturbance from launch and sonic booms may startle or flush individuals. The proposed increase in annual number of launches at SLC-13 would create more frequent occurrences of related activity, noise, lighting, and vibrations; however, due to the lack of habitat present within the Project Area and the minimal impacts that the small, isolated populations may experience from launch noise and sonic booms, the Project may affect, but is not likely to adversely affect, the crested caracara.

5.5.4 Cumulative Effects

The Project is not likely to adversely affect the Audubon's crested caracara. Therefore, cumulative effects are not considered.

5.5.5 Population-Level Biological Consequences

The Project is not likely to adversely affect the Audubon's crested caracara. Therefore, no population-level biological consequences will occur.

5.5.6 Conservation Measures

SLD 45 would implement the following conservation measures for the Audubon's crested caracara:

- SLD 45 will monitor for Audubon's crested caracara before construction activities begin at SLC-13, where potential nesting habitat is present proximate to construction areas. If observed, SLD 45 will coordinate (and then follow up) with USFWS and FWC with data and an explanation about how the conservation measures were implemented.
- SLD 45 will inspect all trees and cabbage palms for nests before construction. If a nest is documented, Phantom and Vaya will coordinate with SLD 45 to determine the appropriate course of action.

5.6 Eastern Black Rail

5.6.1 Biology and Habitat

Eastern black rails live in marshes of all kinds, including riparian, coastal, saltmarshes, and impounded wetlands. Plant structure, vegetation height, and vegetation density (versus plant species composition) may most accurately predict habitat suitability, and potentially, species presence, as the species requires dense vegetative cover for movement below the canopy (USFWS 2024d).

Eastern black rails prefer habitat along the Atlantic Ocean and Gulf of America (formerly Gulf of Mexico) coastlines where they defend up to 10 acres of territory. The species flies very little during breeding and wintering periods. Flushed individuals typically move only a short distance and remain on the ground, using rodent and rabbit runways to travel through dense vegetation (USFWS 2019d).

Due to their relatively small size, habitat preferences, and secretive nature, little is known about the species' breeding behavior. However, the species is known to build nests on taller vegetation a few inches off the ground. Clutch size may be anywhere from 4 to 13 eggs, with females laying one to two clutches per year (Cornell Lab of Ornithology 2024b).

5.6.2 Environmental Baseline

The USFWS listed the eastern black rail as threatened on 9 November 2020 (85 FR 63764). Main stressors impacting the species include habitat degradation, loss, and fragmentation, ground and surface water withdrawals; incompatible land management techniques (e.g., poorly timed prescribed burns, intense grazing or haying); and natural events such as floods and hurricanes (USFWS 2019d).

Eastern black rail was detected on MINWR in 2022; therefore, this species may occur in the Action Area year-round (USFWS 2019d). Suitable eastern black rail habitat is not present within the Project Area; however, suitable habitat exists within the Onshore Action Area as intertidal marshes and emergent wetlands present west of SLC-13 and beneath the extended noise contours on and beyond CCSF.

5.6.3 Effects of the Action

The increased number of annual launches and addition of landings related to the Project would result in more frequent occurrences of related activity, noise, lighting, and vibrations as compared to baseline operations. Eastern black rails are not presently known to occur in the Onshore Action Area. However, suitable habitat is present and could be occupied. Therefore, the increase in launch-related activity at the Project area has the potential to result in an increase in exposure of eastern black rails to such events, which could in turn disturb (e.g., elicit a startle response or flush) individuals that may be present within the Onshore Action Area during a launch event. These disturbances are part of the baseline conditions of the Onshore Action Area, and eastern black rails occurring in the Onshore Action Area during a launch or landing are expected to respond similarly (e.g., startle, flush) as they do under current operations. The threshold at which the frequency of such short-term and intermittent disturbances results in a measurable impact to the species is unknown, but there are no data to indicate that the increase in frequency of these disturbances would result in measurable effects to eastern black rails.

The effects of the Project represent an increase in the frequency of occurrence of, and not the introduction of new, potential disturbances to eastern black rails that may occur in the Onshore Action Area; the potential disturbances will be intermittent and short-term; and eastern black rails have potential for exposure only if occurring in the Action Area during a launch event. Further, eastern black rails occur in suitable wetland habitats containing dense vegetation, where they spend the majority of time under vegetative cover. This cover may act to limit or minimize exposure of eastern black rails to potential disturbances, such as lighting or noise. There is no suitable eastern black rail habitat beneath the estimated heat plume from the proposed Phantom and Vaya launches at SLC-13. For these reasons, effects to the species are expected to be insignificant and the Project may affect, but is not likely to adversely affect, the eastern black rail.

5.6.4 Cumulative Effects

The Project is not likely to adversely affect the eastern black rail. Therefore, cumulative effects are not considered.

5.6.5 Population-Level Biological Consequences

The Project is not likely to adversely affect the eastern black rail. Therefore, no population-level biological consequences will occur.

5.6.6 Conservation Measures

Minimal effects on eastern black rails and no effect on the habitat for eastern black rails were determined. Therefore, no conservation measures for this species would be implemented.

5.7 Everglade Snail Kite

5.7.1 Biology and Habitat

The Everglade snail kite ranges from southern Mexico to northern Argentina and resides in the US only in peninsular Florida (Reichert et al. 2020). This medium-sized raptor feeds almost exclusively on freshwater apple snails (*Pomacea paludosa*), which are found in their preferred habitat of large inland freshwater marshes, edges of shallow lakes, and open freshwater wetland areas (Reichert et al. 2020). The Everglade snail kite nests in trees usually less than 30 feet tall and on shrubbery or emergent vegetation such as sawgrass or cattails (Cornel Lab of Ornithology 2024c).

5.7.2 Environmental Baseline

USFWS listed the Everglade snail kite as endangered on 11 March 1967 (32 FR 4001). The current distribution of the Everglade snail kite in Florida is limited to six large freshwater ecosystems (Upper St. Johns marshes, Kissimmee River Basin, Lake Okeechobee, Loxahatchee Slough, the Everglades [i.e., areas south of Lake Okeechobee], and the Big Cypress basin) within the central and southern portions of the state (USFWS 2019a). The Upper St. Johns River and adjoining marshes do not include the Indian River Lagoon and Banana River (St. Johns River Water Management District 2024), which are the estuarine systems encompassed within the Action Area.

The Project Area lacks suitable habitat for the Everglade snail kite. However, the species may range across water conservation areas within the Onshore Action Area (USFWS 2019a).

5.7.3 Effects of the Action

The Project Area does not contain freshwater lakes or marshes that are habitat for the Everglade snail kite. The range of the Everglade snail kite extends into Brevard County within the Action Area where the species may utilize suitable habitat for breeding and foraging. Noise disturbance from launch and sonic booms may startle or flush individuals, if present. However, while it is possible for Everglade snail kites to occur in the Onshore Action Area, no Everglade snail kites are known to regularly use potential habitat in the Onshore Action Area and have not been detected at CCSFS. Therefore, it is not reasonably certain that any Everglade snail kites would be exposed to the physical consequences of the Project. Since Everglade snail kites have never been detected within CCSFS, where numerous avian surveys have been historically conducted and where the effects of the action would presumably be the most intense, it is also highly unlikely that any Everglade snail kites that do happen to occur in the broader extent of the Onshore Action Area would be adversely affected by the proposed increase in annual number of launches at SLC-13 and related activity, noise, lighting, and vibrations. The severity of these

impacts attenuates with distance. Therefore, the Project may affect, but is not likely to adversely affect, the Everglade snail kite.

5.7.4 Cumulative Effects

The Project is not likely to adversely affect the Everglade snail kite. Therefore, cumulative effects are not considered.

5.7.5 Population-Level Biological Consequences

The Project is not likely to adversely affect the Everglade snail kite. Therefore, no population-level biological consequences will occur.

5.7.6 Conservation Measures

Minimal effects on the Everglades snail kite and no effect on the habitat for Everglades snail kite were determined. Therefore, no conservation measures for this species would be implemented.

5.8 Florida Scrub-Jay

5.8.1 Biology and Habitat

The FLSJ, the only bird species endemic to Florida, inhabits sand pine and xeric oak scrub, and scrubby flatwoods where it feeds on small invertebrates, amphibians, reptiles, mice, bird eggs, and acorns (FWC 2024e). The species occupies year-round territories in family groups averaging 22 acres in size. Nesting occurs from 1 March through 30 June (USFWS 2019e). While FLSJs may use the same territory and nest site in consecutive years, they may also build a new nest or modify the existing one from year to year based on factors such as the condition of the previous nest, changes in vegetation, and other environmental considerations. FLSJs are nonmigratory, extremely sedentary, and permanently territorial. Most juveniles remain in their natal territory for at least one year, and males may remain as helpers in their natal territory for up to seven years before dispersing to become breeders (Woolfenden and Fitzpatrick 1996).

5.8.2 Environmental Baseline

The FLSJ was listed by the USFWS as threatened on 3 June 1987 (52 FR 20719). Primary threats to the species include range-wide population declines attributed to habitat loss and habitat degradation. KSC supports one of the largest remaining populations of FLSJ. FLSJ habitat is intensively managed on KSC and CCSFS property, primarily by controlled burning and mechanical treatment (Federal Aviation Administration 2020).

The USSF conducts annual FLSJ census surveys. Family groups documented in surveys proximate to the Project Area are shown in Figure 5-3. Although there have not been any FLSJ detections proximate to the Project Area, there are several FSLJ family groups within 0.8 mile of the Project Area that have been documented as recently as 2023 (Figure 5-3). FLSJ are mobile and thus family groups may move throughout the territory.

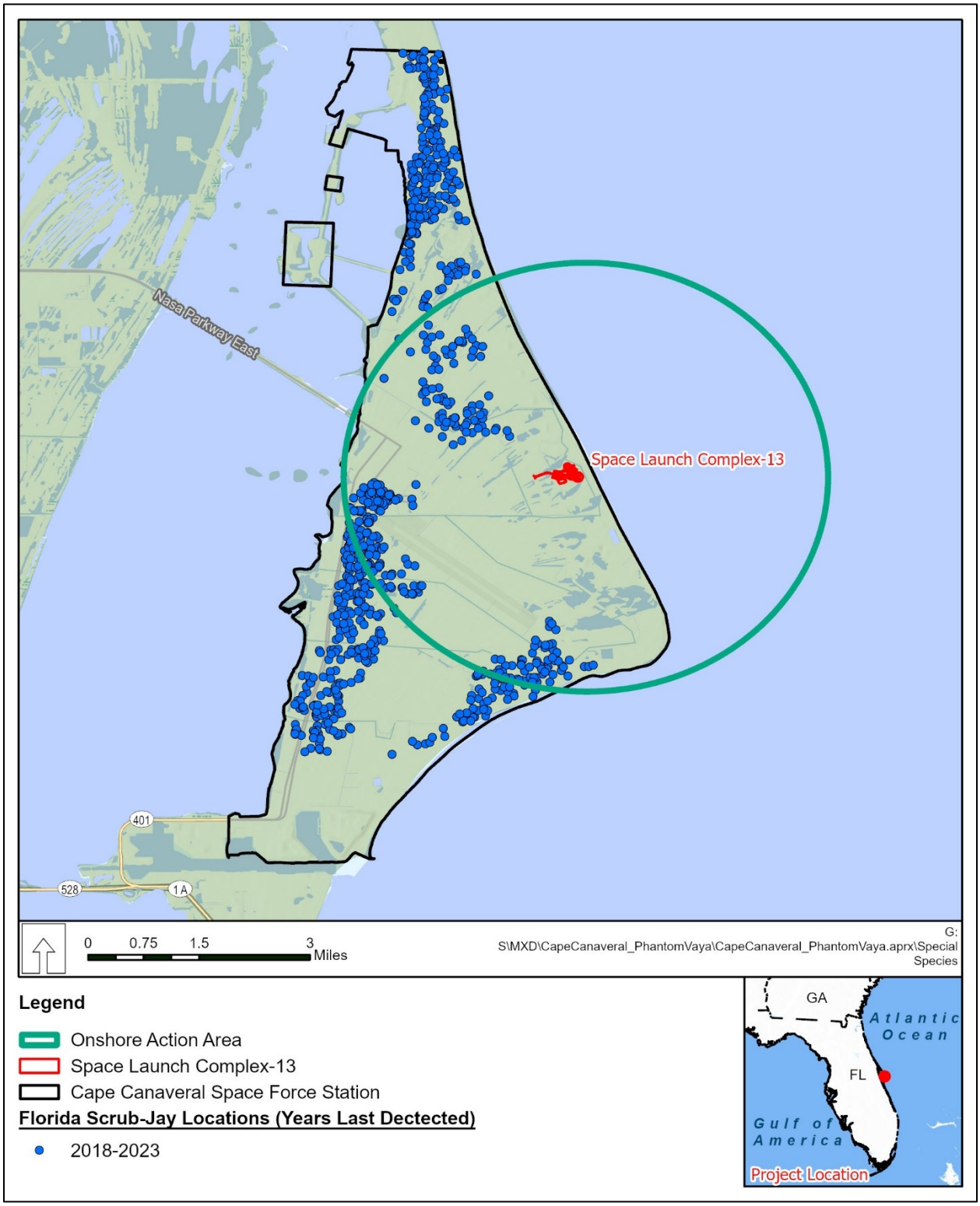


Figure 5-3. Florida Scrub-Jay Locations Detected on Cape Canaveral Space Force Station in the Action Area

5.8.3 Effects of the Action

The Project would not result in any direct loss of habitat known to be occupied by FLSJ or potentially suitable FLSJ habitat.

The Project proposes new launches at SLC-13, which would create more frequent occurrence of related activity, noise, lighting, and vibrations in FLSJ habitat. While the body of research on noise impacts to wildlife indicate that even relatively low-level noise can elicit a change in wildlife behavior or habitat use (Shannon et al. 2016), this body of work does not predict with reasonable certainty how individual species will respond to specific kinds of noise in specific environmental settings.

Morgan et al. (2012) tested the potential for roads and traffic to cause physiological stress and reduce reproductive success of FLSJ. The authors found that roadside environments (with regular noise and movement disturbances and the presence of modified edge habitat) were not stressful for FLSC and did not reduce FLSC reproductive success compared to environments with non-road habitat edges and natural interior scrub habitat.

One noise impact study on western scrub-jays in a wooded New Mexico habitat management area with operating oil and gas compressor stations (Francis et al. 2009) measured noise levels using C-weighted values (a conversion that considers more low frequency sound that A-weighted values commonly used to express noise levels relevant to humans) and reported overall mean sound pressure levels (representing an overall measure of ambient noise) at sample locations. This study reported the amplitude of noise (C-weighted) at compressor station sites to fall between approximately 90 to 100 dB, attenuating to levels approaching consistency with control sites after approximately 400 meters (0.25 mile). In this study the researchers found that western scrub-jay occupancy at quiet control sites was 32 percent higher than at the noisy compressor station sites, although western scrub-jays did not avoid noisy sites completely. Western (Woodhouse's) scrub-jays in New Mexico are now classified as *Aphelocoma woodhouseii*, recently split from the closely related California scrub-jay (*A. californica*).

Differences in how these two closely related species relate to noisy environments (represented by their occurrence in residential areas) highlight how their responses to noise and related human disturbances may differ. California scrub-jays are known to frequent residential areas, while Woodhouse's scrub-jays are not typically associated with such areas (Curry et al. 2020). FLSJ s, while habitat specialists, are also known to be exceptionally tolerant of human activity (Woolfenden and Fitzpatrick 2020). These differences illustrate that even among closely-related species, response to noise and human activity may be different and the findings of Francis et al. (2009) may not be representative of how FLSJs in the Action Area respond to noise and activity that is not novel on this landscape.

Noise impact studies of FLSJs and rocket programs are not available. However, these activities have been ongoing at the CCSFS and KSC for decades. Species that occur year-round within the CCSFS and KSC, such as the FLSJ, are likely habituated to rocket launch and landing operations. No behavior anomalies were observed in FLSJ after Delta, Atlas, and Titan

launches at CCSFS and similar studies during the Space Shuttle program, implying no measurable, noise-related impacts to the scrub-jay (Schmalzer 1998). Figure 5-3 shows the distribution of FLSJ groups proximate to SLC-13 and within the 100 dBA SEL noise contour that represents proposed launch noise, which defines the Action Area. Some FLSJ groups would be exposed to single-event maximum noise levels as loud as 115 dB during launch activities. Across CCSFS, FLSJs occur proximate to launch pads and other concentrations of human activity. These data do not suggest that FLSJ avoid areas with recurring and loud noise events.

Prescribed burns conducted at CCSFS, KSC, and the MINWR are crucial to providing adequate habitat for fire-dependent species including the FLSJ. Prescribed burns currently are conducted in accordance with the *Memorandum of Understanding between the Space Launch Delta 45, the United States Fish and Wildlife Service, and John F. Kennedy Space Center for Prescribed Burning on the Merritt Island National Wildlife Refuge, John F. Kennedy Space Center, and Cape Canaveral Space Force Station, Florida*. Research by KSC noted a sustainable population depends most on increasing the amount of open medium habitat, and that population decline will continue until a suitable amount of this habitat is created through prescribed fire and other mechanical treatments (KSC 2024). Outside of burn restrictions, such as operational smoke buffers or smoke sensitive activities/payloads, the decision on whether a burn is conducted is also influenced by the availability of burn crews, agency funding, and day-of weather. Phantom and Vaya would coordinate with CCSFS to avoid or reduce burn day impacts due to launch so that burns could continue to be conducted with sufficient frequency to maintain habitat.

Phantom and Vaya launch operations will not put undue stress on the SLD 45 Prescribed Burn Program. Prescribed burning shall be supported unless Phantom and Vaya communicate there is a specific impact on operations on a launch day. Phantom and Vaya acknowledge that potential exists to have to alter the timing of launch operations or associated launch support activities to allow for prescribed burning operations to be completed. Phantom and Vaya understand it is their responsibility to protect payloads/space flight hardware from smoke associated with prescribed burning or wildfires, and will properly maintain and operate clean rooms and/or processing facilities in accordance with established industry clean room standards to allow for prescribed burns to be conducted.

There are no documented FLSJ populations immediately adjacent to SLC-13. Therefore, heat plumes from launch activities would be unlikely to directly affect the FLSJ. Further, heat plumes would be angled upward from the heat plume diverter, with temperatures in excess of 140 degrees primarily occurring above the vegetation adjacent to SLC-13. Similarly, additional lighting associated with night launches would not adversely affect FLSJ, as FLSJ habitat beyond the perimeter of SLC-13 would not be lighted by launch activities.

There is no indication that noise from rocket launches has adversely affected FLSJ populations on CCSFS or KSC. The proposed construction activities at the SLC-13 site would not directly impact any suitable FLSJ habitat and all noise and movement associated with construction would cease when construction activities end. Phantom and Vaya rocket launches at SLC-13, which is proximate to FLSJ-occupied habitat, would cause intermittent noise levels of approximately 115 dB in areas where FLSJ nest and forage; however, the USFWS has

determined that take of FLSJ would not occur from indirect noise impacts less than 140 dBA SEL. Therefore, the noise and vibration of the Project's launch operations would not have an adverse effect on the FLSJ.

5.8.4 Cumulative Effects

There are four impacts analyzed in this BA that are associated with proposed construction and operational activities: habitat loss, habitat degradation, noise and visual disturbance, and collision (Section 5.1). Section 4.3 identifies additional non-federal projects within the Action Area that are primarily road maintenance and residential improvements in previously developed lands. These activities would have comparable effects related to construction and operational activities related to these types of land development. It is unlikely the projects identified in Section 4.3 would result in FLSJ habitat loss and would not be expected to have an adverse effect on the FLSJ.

5.8.5 Population-Level Biological Consequences

Because this species is adapted to a habitat that shifts in suitability depending mostly on the frequency and severity of fire and because there would be no direct habitat loss as a result of the Project, the Project is expected to have a minimal overall impact on the population of FLSJs in the vicinity of SLC-13. In addition, the *2023 Annual Update Using Florida Scrub-Jay Habitat Quality and Demography to Inform Management Decisions* (KSC 2024) did not identify noise or launch frequency as an impact or population-level risk to FLSJs.

5.8.6 Conservation Measures

There would be no direct effects on scrub-jay habitat from the construction activities at SLC-13. Therefore, no compensation measures for habitat loss for this species are proposed. However, surveys for FLSJs will be conducted in all suitable FLSJ habitat within 300 feet of proposed SLC-13 construction activities during the FLSJ nesting season (1 March to 30 June) to ensure that no FLSJs are nesting within 300 feet of proposed construction. Any FLSJ nests encountered would be flagged, and no clearing would be allowed within 300 feet until all birds have fledged.

Phantom and Vaya will comply with prescribed burn requirements as described in their lease agreements. Phantom and Vaya will protect flight hardware and payloads against smoke from wildfires and prescribed burning, and they will work closely with SLD 45 to ensure that their launch operations at SLC-13 do not impact the SLD 45 Prescribed Burn Program.

5.9 Piping Plover

5.9.1 Biology and Habitat

The piping plover is a migratory bird species with a breeding distribution in the Great Lakes region and Atlantic Coast and along central North America from Alberta, Canada, to Colorado and Oklahoma (USFWS 2020c). There are three populations of piping plover: subspecies *C. m. circumcinctus* which has one population that occurs on the shorelines of the Great Lakes and

another population that occurs along the rivers and lakes in the Northern Great Plains, as well as subspecies *C. m. melodus* that occurs along the Atlantic Coast. The USFWS uses Northern Great Plains to include the piping plover population that breeds from Alberta, Canada to Colorado; however, some sources refer to piping plovers in Canada as the Prairie Canada population.

The species uses habitats such as lakeshores, sandy beaches, sandy islands, sand bars, sand flats, mud bars in major rivers, playas, and mudflats contained within lagoons at water treatment plants (USFWS 2020c). The Florida population is not known to breed in the state, but they do spend a large portion of winter months foraging along the Atlantic and Gulf coasts. Migration to breeding grounds occurs from late March through April, with migration to wintering grounds occurring between late July and September. Migrating piping plovers likely use stopover sites opportunistically (USFWS 2020c). Haig and Plissner (1993) suggest that birds may fly nonstop between breeding and wintering grounds based on the scarceness of inland records during migration periods. However, records of occurrence of migrants at inland sites do exist, suggesting at least some birds make stops between nesting and wintering grounds. The diet of the Atlantic coast piping plover population consists of insects, crustaceans, and marine worms (FWC 2024f).

5.9.2 Environmental Baseline

On 11 December 1985, the Atlantic Coast and Northern Great Plains populations were listed as threatened, and the population in the Great Lakes watershed was listed as endangered (50 FR 50626). In 1988, a recovery plan was written for the Atlantic Coast population, which was revised in 1996. Also in 1988, a recovery plan was finalized for the Great Lakes and Northern Great Plains populations. However, future recovery plans separated the two populations. The recovery plan for the Great Lakes population was revised in 2003, and a revised recovery plan for the Northern Great Plains population was completed in 2015.

The species range overlaps the Action Area (Gratto-Trevor et al. 2012; USFWS 2020c). The species is an uncommon winter resident along the Gulf and Atlantic coasts and does not breed in Florida. Winter habitat is not present in the Project Area but is present in the Onshore Action Area. According to the 1991 International Winter Census, of 582 piping plovers sighted in Florida, 88 percent were recorded on the Gulf coast and far fewer (i.e., only 20 to 30 birds) were sighted along the Atlantic coast from Duval County south to Brevard, St. Lucie, and Miami-Dade counties (FNAI 2023). FWC does not include Brevard County in the piping plover distribution, and the species is not known to occur regularly in the county (FWC 2024f). Piping plovers have been observed on the beach of CCSFS as recently as 2025. No piping plover critical habitat occurs in the Action Area.

5.9.3 Effects of the Action

The increased annual number of launches and addition of landings related to the Project would result in more frequent occurrences of related activity, noise, lighting, and vibrations as compared to baseline operations. This increase in occurrence has the potential to result in an

increase in exposure of piping plovers to such events, which could in turn disturb (e.g., elicit a startle response) individual piping plovers in the Action Area if they occur concurrently with a launch or landing event. Piping plovers occurring in the Action Area during a launch event are expected to respond similarly (e.g., startle) as they do to current operations on CCSFS, with launches occurring approximately once every four days on the average. Due to the lack of suitable habitat within the Project Area, and the relatively low occurrence of the species within the Action Area, effects on piping plovers are expected to be insignificant. Therefore, the Project may affect, but is not likely to adversely affect, the piping plover.

5.9.4 Cumulative Effects

The Project is not likely to adversely affect the piping plover. Therefore, cumulative effects are not considered.

5.9.5 Population-Level Biological Consequences

The Project is not likely to adversely affect the species. Therefore, no population-level biological consequences will occur.

5.9.6 Conservation Measures

There would be minimal effects on the piping plover. There would be no effect on piping plover habitat. Therefore, no conservation measures for this species would be implemented.

5.10 Rufa Red Knot

5.10.1 Biology and Habitat

The rufa red knot is one of six subspecies of *Calidris canutus*, each with distinctive migration routes and annual cycles (USFWS 2020d). Rufa red knots (*Calidris canutus rufa*) are medium-sized shorebirds that migrate annually between their breeding grounds in the central Canadian Arctic and several wintering grounds, including Florida, where the southeast coast serves as a wintering ground for adult and juvenile populations (USFWS 2024d).

During both the northbound (spring) and southbound (fall) migrations, rufa red knots use staging and stopover areas to rest and feed. Stopover areas along the Atlantic coast include Florida through the Carolinas. Stopover habitat is similar to wintering and breeding habitat and consists of muddy/sandy coastal areas, tidal flats, unimproved tidal inlets, ocean/bayfront areas, and sheltered bays/lagoons (USFWS 2024e).

This rufa red knot produces one clutch of around four eggs per year in the summer, typically in June or July. Females are thought to leave the breeding grounds and start moving south soon after the chicks hatch in mid-July. Thereafter, parental care is provided solely by the males, but about 25 days later (around 10 August) males also abandon the newly fledged chicks and move south. Not long after, they are followed by the juveniles (USFWS website 2025).

5.10.2 Environmental Baseline

The USFWS listed the rufa red knot as threatened in 2014 (79 FR 73705). Primary threats to the species were loss of habitat; disruption of predator cycles in breeding areas; reduced prey availability in the nonbreeding range; and the increasing frequency and "severity of asynchronies (mismatches) in the timing of the birds' annual migratory cycle relative to favorable food and weather conditions" (USFWS 2020d). The USFWS indicates that human disturbance is a moderate, secondary threat (threats not expected to have effects at the level of a listed taxon) to the rufa red knot during migration and wintering life stages (USFWS 2020d). Specifically, the USFWS describes that coastal development accompanied by increased levels of recreation and other human activities can result in disturbance to red knots, and that "excessive disturbance can impact red knot energy budgets and weight gain and can also preclude red knot use of otherwise preferred foraging and roosting habitat" (USFWS 2020d).

The rufa red knot may winter in Florida, where it feeds along the shoreline of sandy beaches and occasionally in salt marshes, brackish lagoons, tidal mudflats, and mangroves (Baker et al. 2020). Florida serves as an important wintering area for adult and hatch-year populations (USFWS 2024d). Observations of the species on CCSFS are uncommon and the species is typically observed in small numbers. Proposed critical habitat for the rufa red knot occurs within the Action Area, and the species has potential to occur there and in other areas of suitable habitat within the Action Area. Suitable habitat is not present in the Project Area.

5.10.3 Effects of the Action

The increased annual number of launches and addition of landings related to the Project would result in more frequent occurrences of related activity, noise, lighting, and vibrations as compared to baseline operations. This increase in occurrence has the potential to result in an increase in exposure of rufa red knots to such events, which could in turn disturb (e.g., elicit a startle response) individuals in the Action Areas if they occur concurrently with a launch or landing event. These disturbances are part of the baseline conditions of the Project and Action Areas, and rufa red knots occurring in the Action Area during a launch or landing event are expected to respond similarly (e.g., startle) as they do to current operations. The threshold at which the frequency of such short-term and intermittent disturbances results in a measurable impact to rufa red knots is unknown, but there are no data to indicate that the increase in frequency of these disturbances would result in measurable effects to individual rufa red knots.

Because the effects of the Project represent an increase in the frequency of occurrence, and not the introduction of new, potential disturbances to rufa red knots in the Action Area; the potential disturbances will be intermittent and short-term; and rufa red knots have potential for exposure only if occurring in the Action Area during a launch or landing event, effects to rufa red knots are expected to be insignificant. Therefore, the Project may affect, but is not likely to adversely affect, the rufa red knot.

5.10.4 Cumulative Effects

The Project is not likely to adversely affect the rufa red knot. Therefore, cumulative effects are not considered.

5.10.5 Population-Level Biological Consequences

The Project is not likely to adversely affect the species. Therefore, no population-level biological consequences will occur.

5.10.6 Conservation Measures

There would be minimal effects on the rufa red knot. There would be no effect on rufa red knot habitat. Therefore, no conservation measures for this species would be implemented.

5.11 Wood Stork

5.11.1 Biology and Habitat

The wood stork is a large, white, wading bird with a dark, featherless head and neck and long, dark bill. The species is a year-round resident of Florida that breeds in large colonies of 100 to 500 nests primarily in mixed hardwood swamps, sloughs, mangroves, and cypress domes (FWC 2024g). Wood storks primarily eat fish and aquatic invertebrates but will also eat seeds, small amphibians, small reptiles, and nestlings of other bird species (Cornell Lab of Ornithology 2024d). In Florida, wood storks are capable of laying eggs from October to June (Rodgers 1990). They will have one clutch of one to five eggs per year, with an average incubation period of 30 days and a nesting period of about two months. Fledging occurs approximately 10 to 12 weeks after hatching (FWC 2024g).

5.11.2 Environmental Baseline

The USFWS listed the wood stork as endangered in 1984 (49 FR 7332). It was then downlisted to Threatened on 30 June 2014 (79 FR 37077). On 15 February 2023, the USFWS published a proposed rule to remove the Southeast US distinct population segment, which includes those found in Florida, from the Federal List of Endangered and Threatened Wildlife due to recovery (88 FR 9830). Previously identified threats to the species include agricultural development on wetlands and cypress stands, and predation from raccoons (FWC 2024g).

According to the most recent wood stork nesting colonies data published by the Florida Department of Environmental Protection (FDEP), last updated on 20 November 2018, there were no colonies on Cape Canaveral (FDEP 2018). The closest three are locations in Cocoa and Orlando Wetlands Park, Florida, but are not encompassed within the Action Area. FDEP also published wood stork foraging areas data last updated on 22 August 2023, based on a 15-mile radius from known nests (FDEP 2023). These foraging areas associated with the three closest colonies extend into the Action Area; however, although they are proximate to the Project Area, they do not extend to the Project Area.

5.11.3 Effects of the Action

There are no wood stork colonies known to be located within the Action Area. The foraging areas associated with the three closest documented nests are within the Action Area but do not extend to the Project Area. The Project proposes to increase the annual number of launches, which would create more frequent occurrence of related activity, noise, lighting, and vibrations at SLC-13. This increase has the potential to disturb wood storks foraging in the Action Area during a launch or landing event, and individuals would be expected to experience a similar effect as they do to current operations, but they would experience that more frequently. However, wood storks are known to establish and maintain colonies in areas close to human activities and observations of wood storks feeding in urban environments are not uncommon (88 FR 9830). The species uses foraging habitat opportunistically and USFWS has indicated that suitable breeding and foraging habitat is widely available across the species' current range (88 FR 9830).

Due to the absence of known nest colonies within either the Project Area or the Action Area, the apparent tolerance of wood storks to human activity, and the abundance of suitable habitat available for the species across its range, the Project may affect, but is not likely to adversely affect, the wood stork.

5.11.4 Cumulative Effects

The Project is not likely to adversely affect the wood stork. Therefore, cumulative effects are not considered.

5.11.5 Population-Level Biological Consequences

The Project is not likely to adversely affect the species. Therefore, no population-level biological consequences will occur.

5.11.6 Conservation Measures

There would be minimal effects on the wood stork. There would be no effect on wood stork habitat. Therefore, no conservation measures for this species would be implemented.

5.12 Black-Capped Petrel

5.12.1 Biology and Habitat

Black-capped petrels are pelagic seabirds that breed only in the highest elevations on the island of Hispaniola in the Caribbean. The species nests in Haiti and the Dominican Republic (88 FR 89611). Black-capped petrels produce one egg; incubation period is not known (Audubon 2024b). The species is widely distributed and forages in loose, small flocks associated with other seabirds (National Audubon Society 2024b). Black-capped petrels forage in high concentrations off the coast of North Carolina and in warm, deep waters far off the southeastern coast of North America, including Florida.

As a pelagic species, black-capped petrels inhabit the open ocean during the non-breeding season. The abundance of petrels is lower near the shore and increase across the deeper parts of the ocean (Northeast Regional Ocean Council 2009).

5.12.2 Environmental Baseline

The USFWS listed the black-capped petrel as endangered on 28 December 2023 (88 FR 89611). Main threats to the species include habitat loss due to deforestation and forest fires and predation by nonnative mammals. The species does not occur on CCSFS but is known to forage off the coast of Florida, including several miles off the coast of CCSFS within the Offshore Action Area, where the species has occasionally been observed (Satgé et al. 2024).

5.12.3 Effects of the Action

Foraging individuals could be exposed and subsequently startled by engine noise and/or sonic booms associated with ascent, or by noise associated with second stage descents to the Atlantic Ocean surface. The final listing rule for the black-capped petrel does not identify noise, sonic booms (or vibrations), movement of people or vehicles, or similar types of activity disturbances as a threat to the species; nor does the USFWS identify these kinds of impacts as among those that may potentially result in incidental take of individual petrels (noting, however, that this is not a comprehensive list) (88 FR 89611). The Species Status Assessment for the black-capped petrel discusses adverse effects from artificial lighting installed on communication towers, wind turbines, and similar structures located near petrel breeding areas (USFWS 2023). However, black-capped petrels do not nest in Florida and the proposed action does not involve the installation of tower lighting or construction of structures in the Offshore Action Area where petrels may forage.

Additionally, because the species that spends most of its life at sea, the potential exists, although unlikely, for rocket stage fallback to directly collide with individual black-capped petrels. However, foraging flocks of black-capped petrels are generally no larger than 65 birds (USFWS 2023), and black-capped petrels have the ability to avoid other moving objects, such as falling rocket stages, making the likelihood of a rocket or debris directly colliding with a black-capped petrel across an area the size of the Offshore Action Area exceedingly unlikely and therefore discountable.

It is not expected that rocket vehicle stages expended into the Atlantic Ocean would retain residual propellent upon contact with the ocean. In the unlikely event that residual fuel was released from a rocket it could potentially affect this species, as foraging in areas after a fuel spill could lead to mortality or sub-lethal effects (USFWS 2023). Because of the large size of the Offshore Action Area, the limited retention of propellant in rocket stages that are expended into the Atlantic Ocean, and the unlikely occurrence of one or more black-capped petrels occurring at the same time and place as a rocket stage expenditure, the likelihood of adverse effects occurring via this pathway is discountable.

USFWS describes the black-capped petrel as being efficient open-ocean foragers, with the ability to glide easily to cover long distances over water and to detect feeding opportunities at

great distances (USFWS 2023). Therefore, it is unlikely that occasional and short duration introduction of noise, sonic booms, or engine fire; fall back of rocket stages or debris; or release of unspent fuel or hazardous material to the vast Offshore Action Area would be reasonably certain to adversely affect the life, foraging behavior, or fitness of black-capped petrels.

In consideration of the above, the proposed action is not likely to adversely affect the black-capped petrel.

5.12.4 Cumulative Effects

The Project is not likely to adversely affect the black-capped petrel. Therefore, cumulative effects are not considered.

5.12.5 Population-Level Biological Consequences

The Project is not likely to adversely affect the black-capped petrel. Therefore, no population-level biological consequences will occur.

5.12.6 Conservation Measures

There would be minimal effects on the black-capped petrel. There would be no effect on black-capped petrel habitat. Therefore, no conservation measures for this species would be implemented.

5.13 Eastern Indigo Snake

5.13.1 Biology and Habitat

The eastern indigo snake occurs throughout Florida in a variety of habitats, including pine flatwoods, prairies, coastal plains, moist hammocks, and the edges of cypress swamps (University of Florida Museum 2024). The species' diet consists of small mammals, birds, reptiles, and amphibians. Breeding season is between fall (November) and spring (April). Females can have one to two clutches per year consisting of 4 to 12 eggs. The eastern indigo snake is a known commensal species of the gopher tortoise (*Gopherus polyphemus*), as it is known to inhabit and lay eggs in tortoise burrows (FWC 2024h). Habitat use often varies seasonally between upland and lowland areas, especially where the snakes habitually overwinter in gopher tortoise burrows in xeric sandhill habitats.

5.13.2 Environmental Baseline

The USFWS listed the eastern indigo snake as a threatened species on 3 March 1978 (43 FR 4026). Main threats to the species include habitat loss, degradation, and/or fragmentation as a result of urban development, pollution, vehicle strikes, captures for domestication, and intentional killings (FWC 2024h).

Gopher tortoise burrows occur within the Project Area; therefore, all undeveloped portions of SLC-13, which totals 18 acres, are considered suitable habitat for eastern indigo snakes in the Project Area. Because gopher tortoise burrows are present in the Project Area, SLD 45

assumes the eastern indigo snake could be present in the Project Area. The last confirmed observation of an eastern indigo snake on CCSFS was in 2023, and the next most recent detection (a vehicle strike) was in 2004. There was also a vehicle strike on KSC, just north of the CCSFS boundary, in 2018.

5.13.3 Effects of the Action

Construction and operation and maintenance activities may result in an increase in traffic on roadways proximate to SLC-13 as personnel access and leave the Project Area. Enge and Wood (2002) found no correlation between traffic volume and snake mortality (on roads) rates during a study involving 1,022 daily searches to document all observed snake mortality on roads in a central Florida study area between June 1998 and December 2001. During this study, searches occurred on 79 percent of available days during the study period and one juvenile eastern indigo snake was found dead on a road. The study also found that eastern indigo snakes were one of four large snake species proportionally trapped three times more frequently within intact habitats on public lands than they were found on roads in fragmented areas (Enge and Wood 2002).

The Species Status Assessment for the eastern indigo snake does not identify noise, light, or vibration as stressors on this species (USFWS 2019f). However, the eastern indigo snake could display a startle response when exposed to increased noise and vibrations from launches. These impacts would be short-term and intermittent and, in consideration of the baseline conditions within the Project and Action areas to which individual indigo snakes are inhabiting the area are currently exposed, would be insignificant.

Heat plumes from launch activities would be diverted upwards from the heat deflector used during launches. Although the heat from rocket launches within portions of the SLC-13 Project Area would greatly exceed ambient temperatures, the heat would not be dispersed along the ground surface, where snakes could be present. Further, indigo snakes are fossorial and would have a low probability of being on the ground surface beneath the heat plume during a launch. Therefore, heat-related impacts on indigo snakes are not anticipated from launch operations.

Although the indigo snake could be present within the Project Area during launch activities, conservation measures for the gopher tortoise and eastern indigo snake, described in Section 5.13.6, would reduce the effects of construction activities and launch operation at SLC-13 on the eastern indigo snake. Therefore, with the implementation of these conservation measures, the Project may affect, but is not likely to adversely affect, the eastern indigo snake from construction activities and potential vehicle strikes during launch operations at SLC-13.

5.13.4 Cumulative Effects

With the implementation of conservation measures, the Project is not likely to adversely affect the eastern indigo snake. Therefore, cumulative effects are not considered.

5.13.5 Population-Level Biological Consequences

With the implementation of conservation measures, the Project is not likely to adversely affect this species. Therefore, no population-level biological consequences will occur.

5.13.6 Conservation Measures

SLD 45 implements conservation measures for the gopher tortoise that would also minimize the potential for effects on the eastern indigo snake. To the extent possible, gopher tortoise burrows would not be disturbed, and a minimum 25-foot buffer around the surface opening of each gopher tortoise burrow will remain to connect the burrow to foraging areas. In accordance with FWC guidelines, no more than 90 days before and no fewer than 72 hours before any clearing or construction, a 100-percent pedestrian survey will be conducted to locate and flag and stake all burrows. Gopher tortoise burrows in areas to be cleared, in areas for new construction, or on the shoulder of roads to be rebuilt would be excavated. All captured tortoises would be relocated to a SLD 45-approved recipient site on CCSFS. Any eastern indigo snake present would be allowed to voluntarily leave the area before excavation continues. In addition, continued habitat enhancement/restoration by SLD 45 for the FLSJ and SEBM, including the 0.73 acre of proposed habitat restoration as compensation for the loss of SEBM habitat from the proposed access road improvements at SLC-13, will increase available habitat for the eastern indigo snake.

The SLD 45 Indigo Snake Protection/Education Plan will be presented to the Phantom and Vaya project managers, construction managers, and construction personnel. Educational signs will be displayed at the site to inform personnel of the indigo snake's appearance, its protected status, and who to contact if an indigo snake is spotted at SLC-13. If any eastern indigo snakes are encountered during vegetation removal or ground-disturbing activities, they will be allowed to safely move out of the project area. Any observations of live or dead eastern indigo snakes will be reported to SLD 45 immediately, who will then report it to USFWS, if appropriate.

5.14 Sea Turtles

5.14.1 Biology and Habitat

There are four species of sea turtles known to nest on Brevard County beaches within the Onshore Action Area: green sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, and loggerhead sea turtle. Additionally, the USFWS indicates hawksbill sea turtle has potential to occur in the Onshore Action Area. All these species are highly migratory and travel hundreds to thousands of miles between nesting, breeding, and feeding sites.

The green sea turtle occurs throughout the subtropical and temperate regions of the Atlantic Ocean and the Gulf of America (formerly the Gulf of Mexico). Important feeding areas in Florida include the Indian River Lagoon, the Florida Keys, Florida Bay, the Dry Tortugas, Homosassa, Crystal River, Cedar Key, and St. Joseph Bay. Green turtles are mostly herbivorous, feeding on algae and seagrasses; however, the species will also consume sponges, invertebrates, and discarded fish. Every two to five years, green sea turtles will return to their hatchling beach to

lay eggs, producing a clutch of around 110 eggs every two weeks in late spring. Eggs incubate for approximately two months (National Oceanic and Atmospheric Administration (NOAA) 2024a).

The Kemp's ridley sea turtle occurs in the Gulf of America. Juveniles may occur in the Atlantic Ocean as far north as Nova Scotia, and occasionally may occur in the eastern North Atlantic (NOAA 2024b). The species feeds on small animals and plants. Most nesting occurs on beaches along the western Gulf of America (formerly the Gulf of Mexico) and 95 percent of worldwide Kemp's ridley nesting occurs in Mexico (NOAA 2024b). Occasional nesting has been documented in Alabama, Georgia, Florida, North Carolina, South Carolina, and Texas. The species nests on CCSFS (Chambers, personal communication, as described in CCSFS 2024.). Nesting occurs during daylight hours from April to July. Females lay an average of two to three clutches of approximately 100 eggs per season and return to the beach to nest every one to three years. Average incubation time is 50 to 60 days (NOAA 2024b).

The leatherback sea turtle has the widest global distribution of any sea turtle or reptile, with major US nesting sites in Florida, Puerto Rico, and the Virgin Islands. The species tends to be present in tropical latitudes globally for nesting and feeding on mainly open-ocean species, including jellyfish and salps. However, leatherback sea turtles have occurred as far north as Nova Scotia, Canada, and the Netherlands. The typical breeding period for the US population is from March to July. Leatherback sea turtles will lay a brood of around 100 eggs at several nesting sites every two to four years, returning to the same nesting beaches each time. Average incubation time is around two months (NOAA 2024c).

The loggerhead sea turtle occurs primarily in subtropical and temperate regions of the Atlantic and Pacific oceans. The species is carnivorous, feeding on floating items in open waters and on bottom-dwelling invertebrates in coastal waters. Loggerhead sea turtles rarely consume plant material. Breeding season is from March to September. During this time, the species will lay three to five clutches of around 100 eggs. Incubation time is approximately two months (NOAA 2024d).

The hawksbill sea turtle occurs in tropical and sub-tropical ocean waters across the globe. This species persists on a diet of sea sponges, marine algae, coral, mollusks, crustaceans, sea urchins, small fish, and jellyfish. The species uses healthy coral reefs for feeding grounds, but have been observed in mangrove estuaries, rock formations, high energy shoals, and estuaries that provide good habitat for sponge growth. Hawkbill sea turtles, like many other sea turtles, return to their hatchling beaches to lay clutches of 130 to 160 eggs. Breeding season can vary but is typically between April and November. Eggs will hatch after two months of incubation (NOAA 2024e).

5.14.2 Environmental Baseline

The USFWS listed the hawksbill, leatherback, and Kemp's ridley sea turtles under a precursor to the ESA in 1970 (35 FR 18319), and the green and loggerhead sea turtles in 1978 (43 FR 32800). Main threats to these species include climate change, loss or degradation of nesting

habitat, disorientation of hatchlings by beachfront lighting, ocean pollution, direct harvesting, and bycatching in fishing gear (NOAA 2024a-e).

The combined sea turtle nesting season in Florida is March (NOAA 2024c) through October (USFWS 2020b). During the nesting season, sea turtles are very active along the beaches at CCSFS and KSC. Within the Onshore Action Area, from March through October, adult females come on shore at night, dig a hole, and lay a clutch of eggs, ranging from 100 to 200 eggs (number is dependent upon species). A female choosing to nest within the Onshore Action Area may lay multiple clutches in a season, and this frequency is species dependent. After approximately two months, during the night, the hatchlings emerge from the sand and make their way towards the ocean (NOAA 2024a-e). Ambient light can disorient hatchlings, occasionally luring them away from the ocean, and can cause adult females to make “false crawls” (i.e., when a female comes ashore but returns to the water without digging a nest). The Offshore Action Area encompasses the offshore area that sea turtles utilize for foraging, mating, and migration.

The FWC Florida Fish and Wildlife Research Institute’s Florida Sea Turtle Nesting Beach Monitoring Program indicates that 2022 is the most recent sea turtle nesting survey year for all of CCSFS, MINWR, and CANA beaches with data publicly available. In 2022, nesting occurrences of loggerhead, green, leatherback, and Kemp’s ridley sea turtles were recorded. Surveys recorded nest density classifications of medium for loggerhead sea turtles, high for green sea turtles, and medium for leatherback sea turtles (FWC 2025). In Brevard County in 2024, there were 26,671 loggerhead sea turtle nests, 6,312 green sea turtle nests, and 128 leatherback sea turtle nests (FWC 2025). No data on the number of Kemp’s ridley sea turtle nests in Brevard County were provided.

SLD 45 has been monitoring sea turtles on CCSFS, as well as Patrick Space Force Base, since 1986. Since 1986, the observed trend has been generally increasing numbers of sea turtle nests and false crawls, with an exception to this trend observed in 2006 - 2008 when low nest numbers and false crawls were observed. Since surveys began in 1986, the greatest number of sea turtle nests (5,571, all sea turtles combined) and false crawls (6,927, all sea turtles combined) that have been observed was in 2023 (Space Florida 2025).

5.14.3 Effects of the Action

The Project Area is approximately 1,000 feet from the beach where sea turtle nesting could occur. Construction is expected to occur during the day and occasionally at nighttime over approximately three months. Minimal construction lighting will be needed, and only during nighttime construction activities. Furthermore, USFWS-approved sea turtle lighting would be implemented during construction to minimize the potential to impact sea turtles in the Onshore Action Area. Because construction will not occur at the beach, will be intermittent and temporary, will use USFWS-approved lighting, and is not expected to materially increase the levels of activity, noise, and lighting to which turtles are currently exposed in the Onshore Action Area, potential construction impacts on sea turtles is expected to be discountable.

The Project will increase the annual number of launches at CCSFS from SLC-13, which will result in more frequent occurrences of related activity, noise, lighting, and vibrations. The deluge system would reduce the intensity of noise and vibrations during launch. The levels (i.e., intensity) of activity, noise, lighting, and vibrations per event are expected to be the same or similar to those that previously occurred at SLC-13. It is the frequency of these occurrences, and not the intensity or duration of discrete events, which will increase.

The impacts on nesting sea turtles from vibration is unknown. It is known that movement of eggs during early developmental stages can be lethal. However, studies have illustrated that mid-incubation relocation of sea turtle nests is in fact successful in promoting embryonic survival (Ahles and Milton 2015). These studies indicate that some amount of movement (i.e., vibration) can be and is tolerated by sea turtle eggs. Vibrations also have potential to collapse nests, and possibly solidify sand around nests, potentially impacting hatchling emergence. However, sea turtle nests occurring in the Onshore Action Area during Project operations would be exposed to levels of vibration to which many historic and successful, and current, nests are exposed, but the exposure to these vibrations may be more frequent with additional Phantom and Vaya launches. The impacts of vibrations associated with the Project are unlikely to be greater than that of wash-overs from fluctuating tides, which is a common occurrence particularly during the hurricane season, which overlaps substantially with the combined nesting season. Further, SLD 45 beach management, including implementation of sea turtle-friendly lighting, has supported an increase in the number of successful sea turtle nests on CCSFS as launch activity on CCSFS has also increased.

Lighting at night can disorient or disrupt the nesting activities of sea turtles that nest at night. Sky glow resulting from nighttime lighting at the Project area has potential to cause female turtles to avoid using beaches in the Onshore Action Area (particularly those closer to the Project Area) for nesting or to false crawl if they attempt to nest and could cause emerging hatchlings to become disoriented and crawl in the wrong direction (i.e., away from the ocean) (Witherington et al. 2014). The factors contributing to false crawls are not well studied; however, some researchers have found that lower sand surface temperature and physical barriers are correlated with increased incidents of false crawls by loggerhead sea turtles in Georgia, whereas anthropogenic light pollution had no effect on nesting activity by this species (Byrd 2022). Hatchlings that become disoriented may die from exhaustion, dehydration, predation, or other causes (Witherington et al. 2014).

There is the potential for the heat plume from Phantom and Vaya launches to extend beyond the dunes and over the beaches east of SLC-13, where there is suitable sea turtle nesting habitat. The launch pad is approximately 1,000 feet from the beaches where sea turtle nesting could occur, and temperatures from the heat plume at distances beyond 1,000 feet are predicted to be below 100 degrees Fahrenheit. Further, the heat plume would be angled upwards as a result of the flame diverters, further reducing the likelihood that heat from the heat plume would be experienced by sea turtles on the beach surface. Therefore, it is unlikely that increased temperatures from heat plumes during launches would affect nesting sea turtles nesting on nearby beaches. Heat from launches would have no effects on non-nesting sea turtles located in the Atlantic Ocean.

During Project operation, the launch cadence will result in an increase in the number of discrete, and temporary, lighting events that occur in the Project Area. The increase in frequency in light events is considered an adverse effect on sea turtles, with potential to cause adult females to avoid nesting on Onshore Action Area beaches or to false crawl, or cause hatchlings to become disoriented. Therefore, the Project is likely to adversely affect sea turtles.

5.14.4 Cumulative Effects

As identified in Section 5.14.1, main threats to sea turtles include loss or degradation of nesting habitat, disorientation of hatchlings by beachfront lighting, ocean pollution, direct harvesting, and bycatching in fishing gear. The project, if it occurs in or adjacent to nesting habitat – may create the same types of threats to the listed sea turtle species addressed in this BA and could result in adverse cumulative effects to the species when combined with the Project.

The USFWS is continually working with private and state entities to review proposed projects, offer technical assistance, and provide recommendations on avoidance and minimization measures to protect listed sea turtles addressed in this BA. With continued cooperative efforts to protect these species and their nesting habitats, the DAF does not believe that the potential cumulative effects are likely to jeopardize the continued existence of the listed sea turtles addressed in this BA.

5.14.5 Population-Level Biological Consequences

With the lighting-related conservation measures enacted, which minimize effects to sea turtles, it can be reasonably anticipated there will be no population-level effects to sea turtle species.

5.14.6 Conservation Measures

To minimize potential impacts on sea turtles from new or temporary lighting at SLC-13, exterior lighting proposed for this project would be in accordance with the 45 SWI 32-7001, *Exterior Lighting Management*. Clearing maintained grassland vegetation at the SLC-13 for the access road improvements will not have an impact on nesting or hatchling sea turtles; therefore, no compensation is required for those activities. Phantom and Vaya will prepare a Light Management Plan for SLC-13 and distribute the Light Management Plan to SLD 45 and USFWS for review and approval. The Light Management Plan will be implemented year-round.

5.15 Monarch Butterfly

5.15.1 Biology and Habitat

The monarch butterfly is a predominantly migratory insect with four life stages: egg, larvae, pupae, and adult (Midwest Association of Fish and Wildlife Agencies 2018). The annual migration cycle begins in the fall when individuals from the eastern population migrate south to overwintering areas in central Mexico (USFWS 2020e). Adults live for an extended period in overwintering areas until they break reproductive diapause in the early spring and begin to migrate to their breeding ranges (USFWS 2020e). Four to five generations are produced

annually to complete the migration, ending with the last generation migrating back to overwintering areas (Midwest Association of Fish and Wildlife Agencies 2018).

There are three monarch butterfly populations within continental North America. Two migratory populations are located east and west of the Rocky Mountains, and a third population is a non-migratory population located in southern Florida, where the climate supports year-round breeding (USFWS 2020e). Monarch butterflies occurring in the Action Area are part of this non-migratory population.

Breeding habitat is present where milkweed (*Asclepias* spp.) plants are found. Milkweed plants, which regularly grow in disturbed soils, are the sole host plant for monarch eggs and larvae (USFWS 2020e), and the presence of milkweed plants is vital to the species throughout its breeding and migratory range (Thogmartin et al. 2017). Monarch butterflies forage on a variety of blooming nectar resources throughout their range (USFWS 2020e).

5.15.2 Environmental Baseline

USFWS proposed listing the monarch butterfly as a threatened species (89 FR 100662 [12 December 2024]). USFWS has determined that the species is warranted for listing, but that listing is precluded by higher priority actions. The Service is seeking public input on a proposal to list the species as threatened with species-specific protections and flexibilities to encourage conservation under section 4(d) of the Endangered Species Act. Main threats to the species include loss and degradation of habitat from conversion of grasslands to agriculture, widespread use of herbicides, logging/thinning at overwintering sites in Mexico, urban development, and drought (85 FR 81813).

Monarch butterflies may occur throughout the Action Area year-round in suitable habitats including scrub, open fields, and roadsides (USFWS 2020e) The monarch butterfly may use suitable habitat in the Action Area.

5.15.3 Effects of the Action

The Project would temporarily modify potentially suitable for use by flying and foraging monarchs. Monarch butterflies often inhabit disturbed areas exposed to human activity (USFWS 2020e). USFWS (2020e) does not identify noise or visual disturbances as a threat to monarch butterflies. Therefore, noise and visual disturbance associated with implementation of Project activities is unlikely to have measurable impacts on monarch butterflies, and SLD 45 anticipates that monarch butterflies would continue to use habitat exposed to temporary disturbances related to Project construction and operation or would move to and utilize adjacent habitat. Monarch butterflies are active during the day and not at nighttime; therefore, lighting from night launch activities would have no effects on monarch butterflies.

Construction and operation and maintenance personnel would observe a reduced speed limit of 25 miles per hour while driving in the Project Area. Due to reduced speeds in the Project Area, adult monarch butterflies are expected to be able to avoid collisions with vehicles in most

instances. Because no milkweed would be removed as part of the construction of the Project, it is considered unlikely that monarch butterfly eggs, larvae, or pupae would be affected.

Monarch butterflies could be killed by heat from launch activities if they were flying or nectaring proximate to the SLC-13 launch pads during launches. However, there is no suitable nectaring habitat for monarch butterfly proximate to the launch pads or within the anticipated heat plumes at SLC-13. Therefore, the presence of adult monarch butterflies within the heat plume of launches is highly unlikely. Further, there are no larval host plants on SLC-13 to support monarch butterfly larvae, and the species would therefore not be affected by heat from launch activities.

The USFWS issued a Conference Opinion (USFWS Reference: 2025-0024332) for the Department of Defense's 7(a)(1) Conservation Strategy for the monarch butterfly for Mission and Sustainment Operations within the continental US. This opinion concluded that installations operating under an Installation Natural Resources Management Plan, which CCSFS does, would not jeopardize the continued existence of the monarch butterfly. Therefore, the Project may affect, but is not likely to adversely affect monarch butterflies.

5.15.4 Cumulative Effects

The Project is not likely to adversely affect the monarch butterfly. Therefore, cumulative effects are not considered.

5.15.5 Population-Level Biological Consequences

The Project is not likely to adversely affect the species. Therefore, no population-level biological consequences will occur.

5.15.6 Conservation Measures

Minimal effects on the monarch butterfly and its habitat (i.e., nectaring plants) were determined consistent with the USFWS Conference Opinion (2025-0024332) for this species. As only minimal effects on the monarch butterfly and no effect on this specie's habitat were determined, no conservation measures are proposed to be implemented for this species. SLD 45 will continue to implement its prescribed fire program, as defined in the INRMP, which would benefit the monarch butterfly by maintaining habitats that foster host and nectaring plants.

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6.0 SUMMARY AND CONCLUSIONS

The Project would increase the annual number of rocket launches at SLC-13. The Action Area includes the area within the 100 dBA SEL noise impact zone, and other sonic boom areas in the Atlantic Ocean where booster landings may occur.

The IPaC indicated the portion of the Action Area overlaps with the ranges of 22 listed, proposed, and candidate species and 3 designated or proposed critical habitats. This BA considered the effects of the Project on these species and critical habitats. This BA also considered the effects of the Project on three additional listed species and one additional proposed critical habitat not included on the official species list from USFWS.

The Project would have no effect on four of the species considered (i.e., Whooping crane, Atlantic salt marsh snake, Carter's Mustard, and Lewton's Polygala) and would have no effect on any designated or proposed critical habitat.

For each of the 18 species that may be affected by the Project, Table 6-1 summarizes the effect determinations.

Table 6-1. Effect Determinations for Species Protected by the Endangered Species Act and Species Proposed or Under Review for ESA Protection

Species of Critical Habitat	Status	Effect Determination
Southeastern Beach Mouse	Threatened	May Affect, Likely to Adversely Affect
Tricolored Bat	Proposed Endangered	May Affect, Not Likely to Adversely Affect
West Indian Manatee	Threatened	May Affect, Not Likely to Adversely Affect
Audubon's Crested Caracara	Threatened	May Affect, Not Likely to Adversely Affect
Eastern Black Rail	Threatened	May Affect, Not Likely to Adversely Affect
Everglade Snail Kite	Endangered	May Affect, Not Likely to Adversely Affect
Florida Scrub-jay	Threatened	May Affect, Not Likely to Adversely Affect
Piping Plover	Threatened	May Affect, Not Likely to Adversely Affect
Rufa Red Knot	Threatened	May Affect, Not Likely to Adversely Affect
Wood Stork	Threatened	May Affect, Not Likely to Adversely Affect
Black-capped Petrel	Endangered	May Affect, Not Likely to Adversely Affect
Eastern Indigo Snake	Threatened	May Affect, Not Likely to Adversely Affect
Green Sea Turtle	Threatened	May Affect, Likely to Adversely Affect
Hawksbill Sea Turtle	Endangered	May Affect, Likely to Adversely Affect
Kemp's Ridley Sea Turtle	Endangered	May Affect, Likely to Adversely Affect
Leatherback Sea Turtle	Endangered	May Affect, Likely to Adversely Affect
Loggerhead Sea Turtle	Threatened	May Affect, Likely to Adversely Affect
Monarch butterfly	Proposed Threatened	May Affect, Not Likely to Adversely Affect

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7.0 REFERENCES

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Appendix A. USFWS IPaC Report for the Project Area

FORMAT PAGE

IPaC resource list

Migratory bird information is currently unavailable. We are aware of the problem and working on a solution. In the meantime, you can obtain similar project-specific bird occurrence results using the AKN RAIL tool.

This
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below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

Location

Brevard County, Florida



Local office

Florida Ecological Services Field Office

(352) 448-9151
(772) 562-4288
fw4flesregs@fws.gov

777 37th St
Suite D-101
Vero Beach, FL 32960-3559

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

NOT FOR CONSULTATION

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Southeastern Beach Mouse Peromyscus polionotus niveiventris Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3951	Threatened
West Indian Manatee Trichechus manatus Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/4469	Threatened Marine mammal

Birds

NAME	STATUS
Crested Caracara (audubon""s) [fl Dps] Caracara plancus audubonii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8250	Threatened
Eastern Black Rail Laterallus jamaicensis ssp. jamaicensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10477	Threatened
Everglade Snail Kite Rostrhamus sociabilis plumbeus Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/7713	Endangered
Florida Scrub-jay Aphelocoma coerulescens Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6174	Threatened

NOT FOR CONSULTATION

Rufa Red Knot Calidris canutus rufa — Threatened

Wherever found

There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat.

https://ecos.fws.gov/ecp/species/1864

Reptiles

NAME	STATUS
Eastern Indigo Snake Drymarchon couperi	Threatened

Wherever found

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/646

Green Sea Turtle Chelonia mydas	Threatened

There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat.

https://ecos.fws.gov/ecp/species/6199

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus	Proposed Threatened

Wherever found

There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat.

https://ecos.fws.gov/ecp/species/9743

Flowering Plants

NAME	STATUS
Carter's Mustard Warea carteri	Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/5583

Lewton's Polygala Polygala lewtonii	Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6688

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Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their nests, should follow appropriate regulations and implement required avoidance and minimization measures, as described in the various links on this page.

The data in this location indicates that no eagles have been observed in this area. This does not mean eagles are not present in your project area, especially if the area is difficult to survey. Please review the 'Steps to Take When No Results Are Returned' section of the Supplemental Information on Migratory Birds and Eagles document to determine if your project is in a poorly surveyed area. If it is, you may need to rely on other resources to determine if eagles may be present (e.g. your local FWS field office, state surveys, your own surveys).

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Bald and Golden Eagle information is not available at this time

NOT FOR CONSULTATION

Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle (Bald and Golden Eagle Protection Act requirements may apply).

Proper interpretation and use of your eagle report

On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:

The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

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The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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Migratory birds

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (FWS). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The FWS interprets the MBTA to prohibit incidental take.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Migratory bird information is not available at this time

Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Avoidance & Minimization Measures for Birds describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the Bald and Golden Eagle Protection Act and those species marked as “Vulnerable”. See the FAQ “What are the levels of concern for migratory birds?” for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle (Bald and Golden Eagle Protection Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the Rapid Avian Information Locator (RAIL) Tool.

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

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To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Bald and Golden Eagle Protection Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ "Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce

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potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs
Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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Marine mammals

Marine mammals are protected under the Marine Mammal Protection Act. Some are also protected under the Endangered Species Act[1] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[2].

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries[3] [responsible for seals, sea lions, whales, dolphins, and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are **not** shown on this list; for additional information on those species please visit the Marine Mammals page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

1. The Endangered Species Act (ESA) of 1973.
2. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
3. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following marine mammals under the responsibility of the U.S. Fish and Wildlife Service are potentially affected by activities in this location:

NAME	
West Indian Manatee	Trichechus manatus https://ecos.fws.gov/ecp/species/4469

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Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location did not intersect any wetlands mapped by NWI.

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

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Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged

aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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Appendix B. USFWS IPaC Report for Onshore Action Area

FORMAT PAGE

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

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Location

Brevard County, Florida



Local office

Florida Ecological Services Field Office

(352) 448-9151
(772) 562-4288

777 37th St

Suite D-101
Vero Beach, FL 32960-3559

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Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

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The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Southeastern Beach Mouse Peromyscus polionotus niveiventris Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3951	Threatened
Tricolored Bat Perimyotis subflavus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10515	Proposed Endangered
West Indian Manatee Trichechus manatus Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/4469	Threatened Marine mammal

Birds

NAME	STATUS
Crested Caracara (audubon's) [fl Dps] Caracara plancus audubonii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8250	Threatened
Eastern Black Rail Laterallus jamaicensis ssp. jamaicensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10477	Threatened
Everglade Snail Kite Rostrhamus sociabilis plumbeus Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/7713	Endangered

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Florida Scrub-jay Aphelocoma coerulescens — Threatened

Wherever found

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6174

Rufa Red Knot Calidris canutus rufa — Threatened

Wherever found

There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat.

https://ecos.fws.gov/ecp/species/1864

Reptiles

NAME	STATUS

Eastern Indigo Snake Drymarchon couperi — Threatened

Wherever found

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/646

Green Sea Turtle Chelonia mydas — Threatened

There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat.

https://ecos.fws.gov/ecp/species/6199

Hawksbill Sea Turtle Eretmochelys imbricata — Endangered

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

https://ecos.fws.gov/ecp/species/3656

Kemp's Ridley Sea Turtle Lepidochelys kempii — Endangered

Wherever found

There is **proposed** critical habitat for this species.

https://ecos.fws.gov/ecp/species/5523

Leatherback Sea Turtle Dermochelys coriacea — Endangered

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

https://ecos.fws.gov/ecp/species/1493

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Loggerhead Sea Turtle Caretta caretta There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/1110	Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

Flowering Plants

NAME	STATUS
Carter's Mustard Warea carteri No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5583	Endangered
Lewton's Polygala Polygala lewtonii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6688	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

You should contact the local field office to determine whether critical habitat for the following species should be considered:

NAME	TYPE
West Indian Manatee Trichechus manatus https://ecos.fws.gov/ecp/species/4469#crithab	Final

Bald & Golden Eagles

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Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

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For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

Review the FAQs

The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

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3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

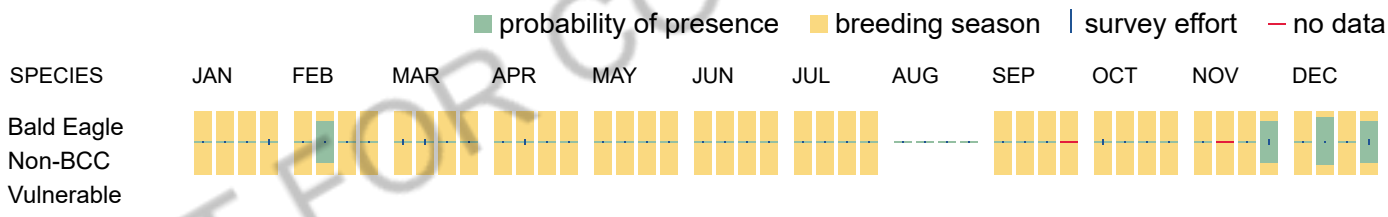
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



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Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle (Bald and Golden Eagle Protection Act requirements may apply).

Proper interpretation and use of your eagle report
On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there, and if they might be breeding (which means

nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

NOT FOR CONSULTATION

Migratory birds

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Measures for Proactively Minimizing Migratory Bird Impacts

Your IPaC Migratory Bird list showcases birds of concern, including Birds of Conservation Concern (BCC), in your project location. This is not a comprehensive list of all birds found in your project area. However, you can help proactively minimize significant impacts to all birds at your project location by implementing the measures in the Nationwide avoidance and minimization measures for birds document, and any other project-specific avoidance and minimization measures suggested at the link Measures for avoiding and minimizing impacts to birds for the birds of concern on your list below.

Ensure Your Migratory Bird List is Accurate and Complete

If your project area is in a poorly surveyed area, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles document, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

Review the FAQs

The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON

NOT FOR CONSULTATION

American Kestrel Falco sparverius paulus — Breeds Apr 1 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9587

Bald Eagle Haliaeetus leucocephalus — Breeds Sep 1 to Jul 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Black Scoter Melanitta nigra — Breeds elsewhere

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Black Skimmer Rynchops niger — Breeds May 20 to Sep 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5234

Brown Pelican Pelecanus occidentalis — Breeds Jan 15 to Sep 30

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/6034

Common Eider Somateria mollissima — Breeds Jun 1 to Sep 30

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Common Loon gavia immer — Breeds Apr 15 to Oct 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/4464

NOT FOR CONSULTATION

Cory's Shearwater Calonectris diomedea — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Double-crested Cormorant phalacrocorax auritus — Breeds Apr 20 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/3478

Great Blue Heron Ardea herodias occidentalis — Breeds Jan 1 to Dec 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Great Shearwater Puffinus gravis — Breeds elsewhere

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Least Tern Sternula antillarum antillarum — Breeds Apr 25 to Sep 5

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Magnificent Frigatebird Fregata magnificens — Breeds Oct 1 to Apr 30

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Pomarine Jaeger Stercorarius pomarinus — Breeds elsewhere

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Razorbill Alca torda — Breeds Jun 15 to Sep 10

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

NOT FOR CONSULTATION

Red-breasted Merganser Mergus serrator — Breeds elsewhere

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Red-necked Phalarope Phalaropus lobatus — Breeds elsewhere

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Reddish Egret Egretta rufescens — Breeds Mar 1 to Sep 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/7617

Ring-billed Gull Larus delawarensis — Breeds elsewhere

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Royal Tern Thalasseus maximus — Breeds Apr 15 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Ruddy Turnstone Arenaria interpres morinella — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Semipalmated Sandpiper Calidris pusilla — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

NOT FOR CONSULTATION

Sooty Tern Onychoprion fuscatus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Mar 10 to Jul 31
Swallow-tailed Kite Elanoides forficatus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8938	Breeds Mar 10 to Jun 30
Whimbrel Numenius phaeopus hudsonicus This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Willet Tringa semipalmata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 5
Wilson's Plover Charadrius wilsonia This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Aug 20
Wilson's Storm-petrel Oceanites oceanicus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere

NOT FOR CONSULTATION

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see

below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

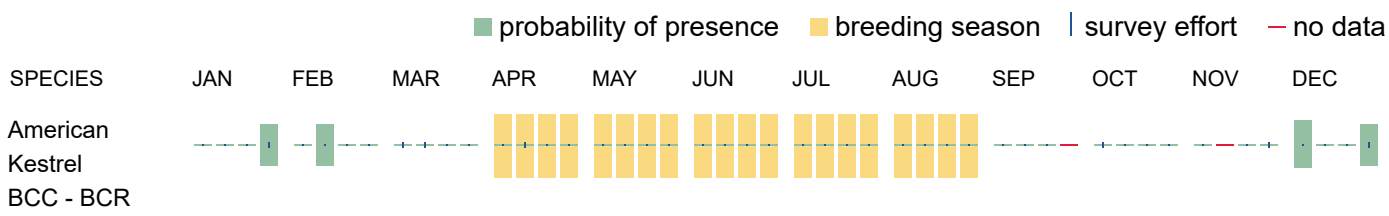
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

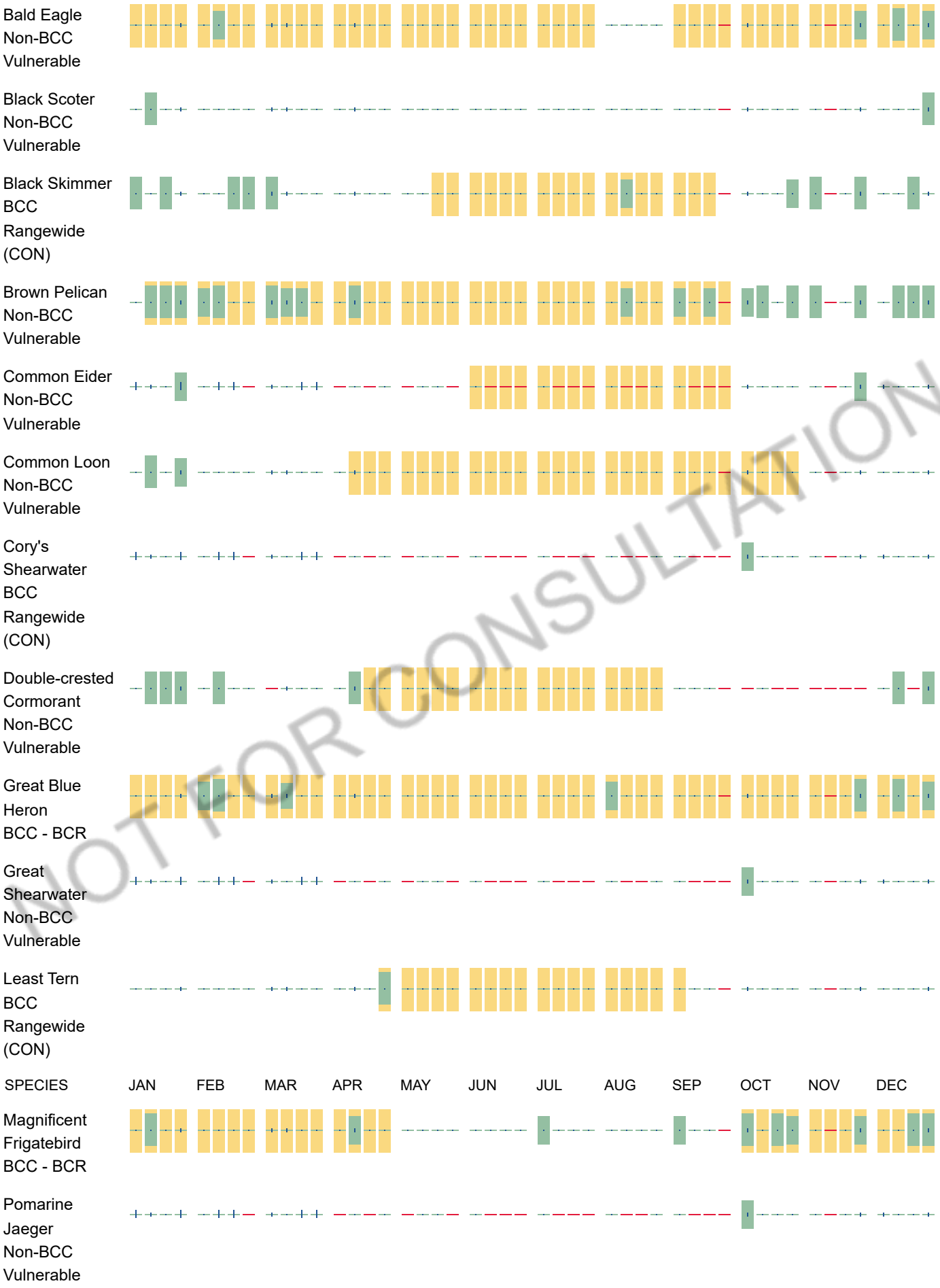
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

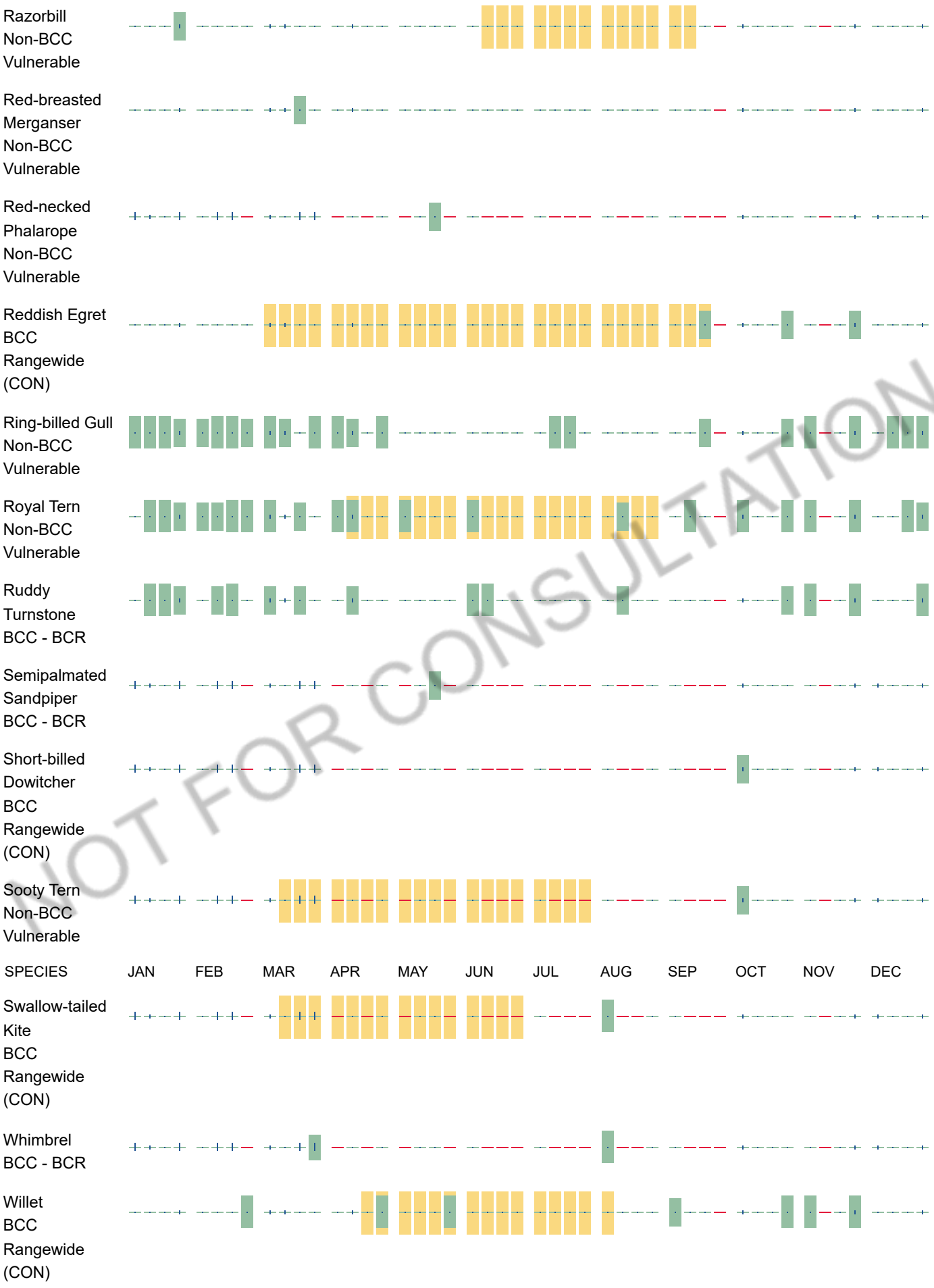
Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



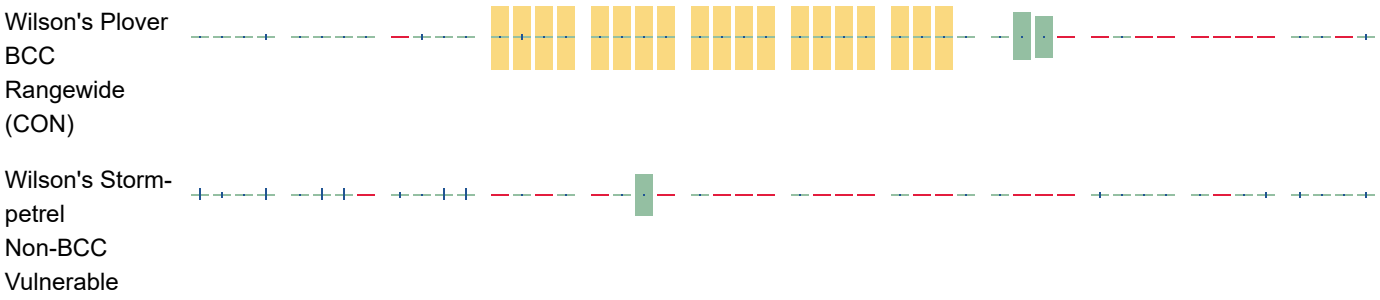
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Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Avoidance & Minimization Measures for Birds describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the Bald and Golden Eagle Protection Act and those species marked as "Vulnerable". See the FAQ "What are the levels of concern for migratory birds?" for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle (Bald and Golden Eagle Protection Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the Rapid Avian Information Locator (RAIL) Tool.

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

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What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Bald and Golden Eagle Protection Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ “Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds”.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Proper interpretation and use of your migratory bird report

NOT FOR CONSULTATION

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs
Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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Marine mammals

Marine mammals are protected under the Marine Mammal Protection Act. Some are also protected under the Endangered Species Act[1] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[2].

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries[3] [responsible for seals, sea lions, whales, dolphins, and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are **not** shown on this list; for additional information on those species please visit the Marine Mammals page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

1. The Endangered Species Act (ESA) of 1973.
2. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
3. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following marine mammals under the responsibility of the U.S. Fish and Wildlife Service are potentially affected by activities in this location:

NAME

West Indian Manatee Trichechus manatus
https://ecos.fws.gov/ecp/species/4469

NOT FOR CONSULTATION

Facilities

Wildlife refuges and fish hatcheries

Refuge and fish hatchery information is not available at this time

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

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Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in

activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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Appendix C. USFWS IPaC Report for Offshore Action Area

FORMAT PAGE

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

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Location



Local office

Florida Ecological Services Field Office

(352) 448-9151
(772) 562-4288
fw4flesregs@fws.gov

777 37th St

Suite D-101
Vero Beach, FL 32960-3559

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Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

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The following species are potentially affected by activities in this location:

Birds

NAME	STATUS
Black-capped Petrel Pterodroma hasitata Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4748	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

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Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their nests, should follow appropriate regulations and implement required avoidance and minimization measures, as described in the various links on this page.

The data in this location indicates that no eagles have been observed in this area. This does not mean eagles are not present in your project area, especially if the area is difficult to survey. Please review the 'Steps to Take When No Results Are Returned' section of the Supplemental Information on Migratory Birds and Eagles document to determine if your project is in a poorly surveyed area. If it is, you may need to rely on other resources to determine if eagles may be present (e.g. your local FWS field office, state surveys, your own surveys).

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds

- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle (Bald and Golden Eagle Protection Act requirements may apply).

Proper interpretation and use of your eagle report
On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the

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Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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Migratory birds

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Measures for Proactively Minimizing Migratory Bird Impacts

Your IPaC Migratory Bird list showcases birds of concern, including Birds of Conservation Concern (BCC), in your project location. This is not a comprehensive list of all birds found in your project area. However, you can help proactively minimize significant impacts to all birds at your project location by implementing the measures in the Nationwide avoidance and minimization measures for birds document, and any other project-specific avoidance and minimization measures suggested at the link Measures for avoiding and minimizing impacts to birds for the birds of concern on your list below.

Ensure Your Migratory Bird List is Accurate and Complete

If your project area is in a poorly surveyed area, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles document, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

Review the FAQs

The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
Audubon's Shearwater Puffinus lherminieri This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 1 to Aug 5
Band-rumped Storm-petrel Hydrobates castro This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Black-capped Petrel Pterodroma hasitata This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/4748	Breeds elsewhere
Cory's Shearwater Calonectris diomedea This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere

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Red-necked Phalarope Phalaropus lobatus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Sooty Tern Onychoprion fuscatus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Mar 10 to Jul 31
Wilson's Storm-petrel Oceanites oceanicus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the

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maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

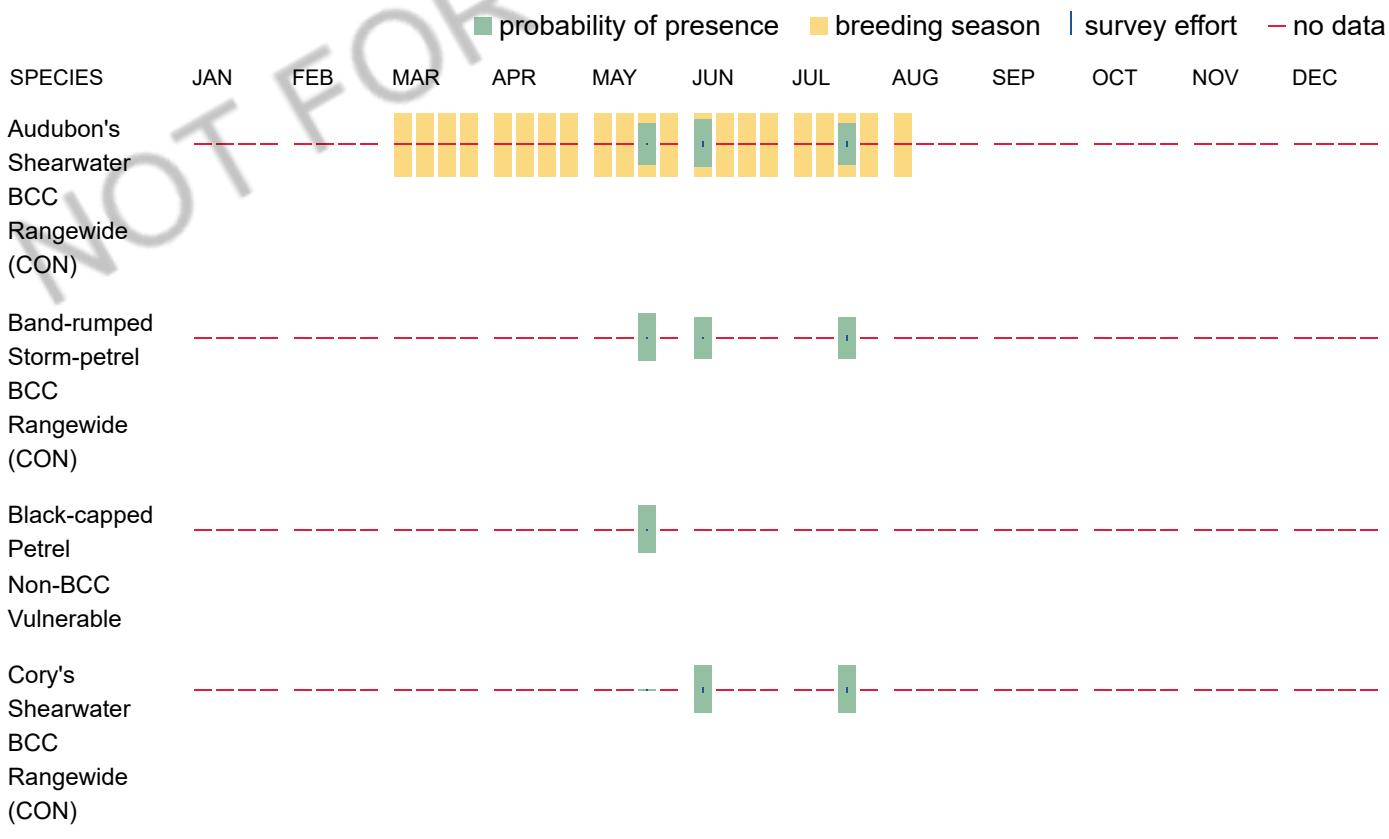
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

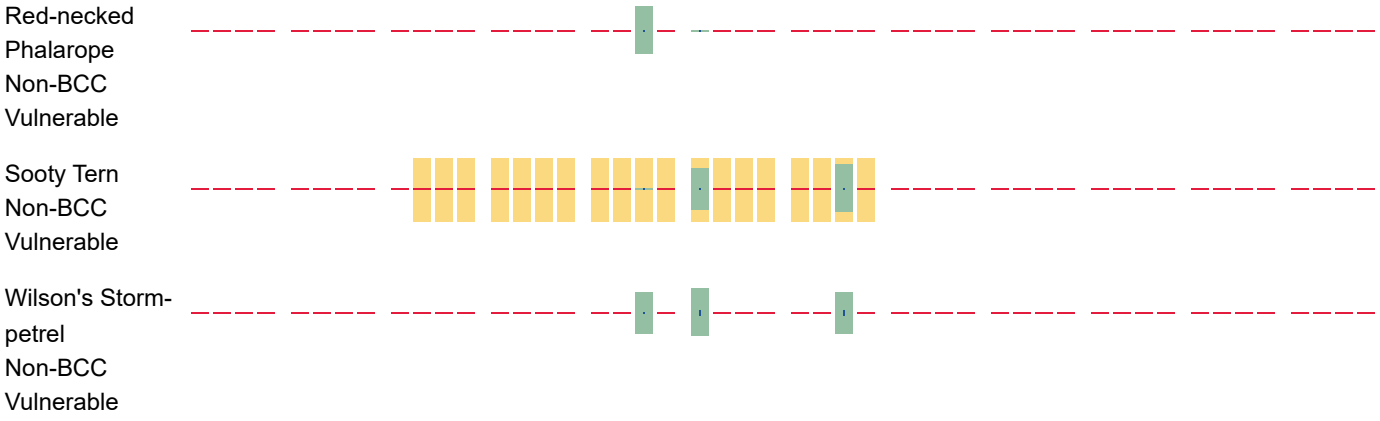
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Avoidance & Minimization Measures for Birds describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the Bald and Golden Eagle Protection Act and those species marked as “Vulnerable”. See the FAQ “What are the levels of concern for migratory birds?” for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle (Bald and Golden Eagle Protection Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the Rapid Avian Information Locator (RAIL) Tool.

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that

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subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Bald and Golden Eagle Protection Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ “Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds”.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

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Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs
Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

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Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

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The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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APPENDIX D – NATIONAL MARINE FISHERIES SERVICE CONSULTATION

DRAFT

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 45

8 January 2026

MEMORANDUM FOR UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
1315 EAST-WEST HIGHWAY
SILVER SPRING MD 20910
ATTN: EMILY CHOU

FROM: 45 CES/CEIE
1224 Jupiter Street
Patrick Space Force Base FL 32925-3343

SUBJECT: Endangered Species Action Section 7(d) Determination for Vaya Dauntless and Phantom Daytona/Laguna Operations at Space Launch Complex 13, Cape Canaveral Space Force Station, Florida

The U.S. Space Force (USSF) has determined that authorizing operations at Space Launch Complex 13 (SLC-13), Cape Canaveral Space Force Station (CCSFS) for Vaya Dauntless and Phantom Daytona/Laguna launch programs, with each launch operator launching up to 26 vehicles per year, is consistent with section 7(d) of the Endangered Species Act (ESA). Therefore, the proposed operations would not result in any irreversible or irretrievable commitment of resources by the USSF or Vaya/Phantom during the reinitiated programmatic consultation (**OPR 2021-02908**) that has the effect of foreclosing either the formulation or the implementation of any reasonable and prudent alternative measures that might be determined to be necessary to comply with ESA Section 7(a)(2).

Current Consultations and Need for Section 7(d) Review

The USSF is considering a proposal from Vaya Space (Vaya) and Phantom Space Corporation (Phantom) to redevelop SLC-13 into a Vaya and Phantom Launch Complex to support launching Vaya's Dauntless launch vehicle and Phantom's Daytona and Laguna launch vehicles Vaya's and Phantom's proposal includes up to 52 annual launches from SLC-13 combined.

The proposed Vaya and Phantom launch programs at SLC-13 are needed to meet current and near-term U.S. Government space launch requirements from the Eastern Range. The proposal also fulfills (in part) 10 United States Code (USC) Section 2276(a), "Commercial space launch cooperation" and, as directed by U.S. policy (10 USC Section 2273, "Policy regarding assured access to space: national security payloads"), provides greater launch and landing capabilities and infrastructure to support national security objectives, including deploying satellites and other space assets that enable intelligence, reconnaissance, and global security operations. The government's interest in commercial space, as identified in the National Space Policy, includes greater mission capability for space exploration, and advancing reliable and affordable access to space which in turn advances the scientific and national security benefits of the U.S. space program as a whole.

Because informal consultation has been reinitiated, the USSF has considered whether the proposed action of authorizing Vaya and Phantom launch operations at SLC-13 would be prohibited by ESA section 7(d).

Background

ESA section 7(a)(2) requires that federal agencies consult with the Services to "insure that any action authorized, funded, or carried out by such an agency (hereinafter in this section referred to as an 'agency action') is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [critical habitat]" (16 USC § 1536(a)(2)).

After initiation of consultation, ESA section 7(d) prohibits federal agencies and their applicants from "making any irreversible or irretrievable commitment of resources which has the effect of foreclosing the formulation or implementation of reasonable and prudent alternatives which would avoid jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat" (as summarized at 50 Code of Federal Regulations (CFR) § 402.01(a)). ESA-implementing regulations clarify that this prohibition also applies to reinitiation of consultation and remains in force until the requirements of section 7(a)(2) are satisfied (50 CFR § 402.09). ESA section 7(a)(2) is completed upon written concurrence from the Services that effects of the action are "not likely to adversely affect" listed species or designated critical habitats, or upon issuance of a biological opinion and, if appropriate, an incidental take statement.

*"*Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

"Destruction or adverse modification" means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species (50 CFR § 402.02).

"Reasonable and prudent alternatives" are defined in regulation as "alternative actions identified during formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction, that is economically and technologically feasible, and that the Director believes would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat" (50 CFR § 402.02).

Prior Consultations and Determinations

OPR-2021-02908: On August 25, 2021, the FAA, USSF, and National Aeronautics and Space Administration (action agencies) requested concurrence from the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) ESA Interagency Cooperation Division that industry-wide launch and reentry vehicle operations in the marine environment may affect, but are not likely to adversely affect ESA-listed species or designated critical habitat under the ESA. On January 31, 2022, NMFS issued a Programmatic Letter of Concurrence (PLOC) to the action agencies.

On July 29, 2025, the action agencies requested reinitiation of the programmatic consultation to address updates and changes to launch and reentry vehicle operations, including the cadence of

activities, action area, launch and landing locations, and launch service providers. The request for reinitiation includes Vaya and Phantom's proposed action at SLC-13. None of the construction activities have the potential to affect ESA-listed species under NMFS jurisdiction. Vaya and Phantom's proposed launch operations are consistent with the launch operations described in the programmatic consultation and would be contained to the "Atlantic Ocean Action Area" defined in the original consultation (see Figure 1 below). The proposed increase in operations in the marine environment included in the request for re-initiation includes Vaya's and Phantom's proposal. Therefore, Vaya's and Phantom's proposal is within the scope of the consultation.

The USSF's Assessment of Jeopardy and Adverse Modification

In the consultation process, reasonable and prudent alternatives are only developed when a federal action, as proposed, would likely jeopardize the continued existence of listed species or would likely destroy or adversely modify designated critical habitat. Therefore, the USSF had considered whether authorizing Vaya and Phantom launch programs at SLC-13 would likely "jeopardize the continued existence" of a listed species or cause the likely "destruction or adverse modification" of designated critical habitat.

Effect determinations of "may affect, not likely to adversely affect" mean that all effects of an action with respect to a listed species or critical habitat area are entirely beneficial or that any potentially adverse effects of an action are discountable or insignificant. The ESA Consultation Handbook (USFWS and National Marine Fisheries Service [NMFS] 1998 [1]) provides guidance for understanding the terms "discountable" and "insignificant." Discountable effects are defined as those that are extremely unlikely to occur and, based on best judgement, a person would not expect discountable effects to occur. Insignificant effects are effects that should never reach the scale where take occurs and, based on best judgement, a person would not be able to meaningfully measure, detect, or evaluate the effect (USFWS and NMFS 1998: xv–xvi).

Jeopardize the Continued Existence of a Listed Species

Only listed species that are likely to be adversely affected by a proposed agency action are considered, in the boarder context of the environmental baseline and cumulative effects, for jeopardy. Therefore, the USSF first considered whether the launches proposed by Vaya and Phantom would have an adverse effect on listed species.

Previously Considered Species

With the 2022 PLOC, NMFS agreed that the industry-wide launch cadence in the Atlantic Ocean Action Area was not likely to adversely affect any then-listed species, and implicitly, would <u>not</u> likely jeopardize the continued existence of any then-listed species.

The potential consequences of Vaya and Phantom launches and splashdown in the marine environment are primarily associated with falling objects; potential entanglement in unrecovered debris; potential ingestion of material from unrecovered debris; and potential exposure to sonic

[1] U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1998. Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act.

booms during launch. Below are summaries of the effects analysis in the 2022 PLOC, which remain true for this action.

It is worth nothing that materials have been expended from rocket launches for decades with no known interactions with any ESA-listed species considered in this consultation. In summary, because it would be extremely unlikely for an ESA-listed species to be directly struck by launch vehicle components, spacecraft, radiosondes, and any launch-related debris, the potential for effects to ESA-listed species from a direct impact by those fallen objects are discountable.

Vaya's and Phantom's launch vehicles are not currently reusable. Therefore, each operator would expend the booster (first stage) downrange in a broad ocean area dozens or hundreds of miles offshore in deepwater (Attachment 1). Vaya's Dauntless first stage would break apart upon impact with the ocean. There would be no residual propellant or explosion upon impact. Vaya's first stage remnants are not buoyant and would sink to the bottom of the ocean. The first stage would be completely inert upon impact in the ocean. Traces of plastic (HDPE) would be the only potential residual fuel and no explosive danger exists. All liquid oxygen (LOX) would have been used or vented during first stage descent. The second stage and payload fairings are expected to break apart and burn up entirely upon re-entry. Similarly, Phantom would expend Daytona and Laguna first stages offshore in the Atlantic Ocean within the area depicted in Figure 1. Daytona and Laguna first stages would break up upon atmospheric re-entry and there would be no residual propellant or explosion upon impact with the Atlantic Ocean. First stage remnants are not buoyant and would sink to the bottom of the ocean. Daytona and Laguna second stages are expected to break apart and burn up entirely during re-entry.

First stage remnants would settle at greater than 3,000 meters deep. None of the ESA-listed species considered in the consultation forage that deep and therefore are not expected to encounter the settled first stage remnants. Considering the limited time the debris would spend in the water column and settling in the deep ocean, exposure of ESA-listed species is extremely unlikely and the risk of entanglement is discountable.

Overpressure from sonic booms are not expected to affect marine species underwater. Acoustic energy in the air does not effectively cross the air/water interface and most of the noise is reflected off the water surface. Underwater sound pressure levels from in-air noise are not expected to reach or exceed threshold levels for injury or harassment to ESA-listed species. ESA-listed species surfacing at the exact time a sonic boom occurs is extremely unlikely, considering the length of a sonic boom is less than one second.

In consideration of the above, the proposed Vaya and Phantom launch operations are not likely to jeopardize the continued existence of any ESA-listed species.

New Species

No additional species in the Atlantic Ocean Action Area have been listed since the 2022 PLOC.

Destruction or Adverse Modification of Critical Habitat

NMFS previously determined that launch, reentry, and recovery operations in the marine environment would not adversely affect any designated critical habitat. Vaya and Phantom would operate in accordance with the Project Design Criteria outlined in the PLOC. The action would not result in the destruction or adverse modification of critical habitat.

Summary

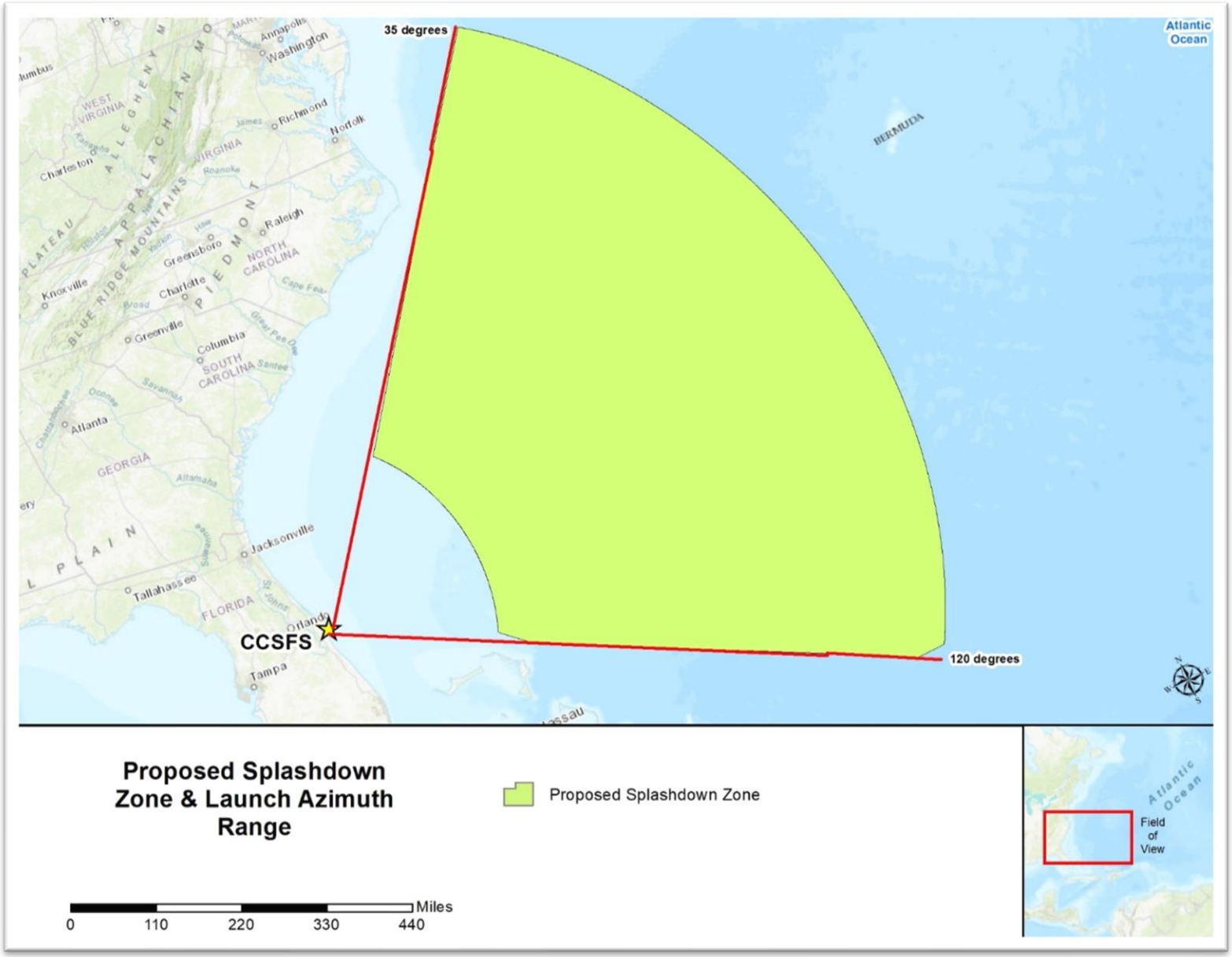
The USSF has determined that authorizing Vaya Dauntless operations and Phantom Daytona and Laguna operations at CCSFS SLC-13 is consistent with ESA section 7(d) and therefore would not result in any irreversible or irretrievable commitment of resources by the USSF or Vaya/Phantom during the reinitiated programmatic consultation that has the effect of foreclosing either the formulation or the implementation of any reasonable and prudent alternative measures that might be determined to be necessary to comply with ESA section 7(a)(2).

BLAYLOCK.MICHAEL.A.1061700630

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Date: 2026.01.08 15:51:52 -05'00'

MICHAEL A. BLAYLOCK, NH-03, DAF
Chief, Environmental Conservation

Attachment:
Proposed Splashdown Zone and Launch Azimuth Range


35 degrees
120 degrees
CCSFS
Atlantic Ocean
BERMUDA
Proposed Splashdown Zone & Launch Azimuth Range
Proposed Splashdown Zone
Field of View
Miles
0
110
220
330
440

APPENDIX E – PUBLIC PARTICIPATION

DRAFT

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 45

PUBLIC NOTICE
FOR THE POTENTIAL IMPACT FLOODPLAIN / WETLANDS AT CAPE CANAVERAL SPACE FORCE STATION, FLORIDA

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The Proposed Action includes construction of new infrastructure, the modification of existing infrastructure, ground support operations, and launch operations at SLC-13. Currently, SLC-13 is used to support SpaceX Falcon booster landings. Vaya and Phantom would utilize existing infrastructure at SLC-13 to the maximum extent in order to minimize construction and demolition activities. This Proposed Action is subject to requirements and objectives of Executive Order (EO) 11990, *Protection of Wetlands*, EO 11988, *Floodplain Management*, and EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, as the proposed infrastructure improvements could potentially impact wetlands and occur within the 100-year floodplain. There are no practicable alternatives outside of floodplains. Impacts would be minimized to the greatest practicable extent. Mitigation would be provided for unavoidable impacts to ensure no net loss of wetland or floodplain function in accordance with federal and state regulations.

Pursuant to EO 11990, EO 11988, EO 13690, and Air Force Instruction 32-7064, DAF requests advance public comment to determine if there are any public concerns regarding the Proposed Action's potential to impact floodplains. The Proposed Action will be analyzed in the forthcoming EA, which the public will have the opportunity to review and provide comment when the Draft EA is released. Comments may be submitted to Ms. Taylor Janise, 45 CES/CEIE, 1224 Jupiter Street, Mail Stop 9125, Patrick Space Force Base, Florida 32925 or via email at taylor.janise.1@spaceforce.mil and courtesy copy megan.nicely.1@spaceforce.mil. Comments will be accepted for 30 days from the publication of this notice.

Turtle

From page 1

ley nest. The Kemps Ridley is the smallest sea turtle in the world and is commonly found in the Gulf of America (formerly known as Gulf of Mexico).

STC offers guided night Sea Turtle Walks so visitors can safely observe nesting sea turtles. It's important to note that self-guided walks are not legal, according to Rhodes-Ondi.

"Approaching sea turtles is a Fish and Wildlife Conservation permitted activity only granted for educational and research purposes to trained individuals," Rhodes-Ondi said. "Guided night Sea Turtle Walks are a magical experience where visitors can directly connect with a nesting loggerhead sea turtle as she lays her eggs under a starry night sky."

Walks are offered at the Barrier Island Center on Mondays, Tuesdays, Thursdays and Fridays every June and July.

"Following sea turtle etiquette is critical because sea turtles are easily scared off their nesting beach," Rhodes-Ondi said. "Sea turtles spend only 10% of their life on land. Coming up on the nesting beach is stressful and exhausting."

Sea turtle etiquette includes being quiet and respectful of sea turtles, avoiding using any lights on a nesting beach, leaving pets at home if walking on the beach during nesting season, taking your beach toys and furniture with you when leaving the beach as well as leveling your sand sculptures.

"Bright lights can also disorient tired adult nesting sea turtles and their hatchlings, and they can end up in the road instead of back in the ocean," Rhodes-Ondi said. She added, "Please keep your shades drawn at night if you live on the beach."

Observing sea turtles nest is a bucket list item for many, so respecting these magnificent creatures can go a long way to ensuring their return.

To sign up for a walk, visit https://conserveturtles.org/form-page/sea-turtle-walk-agreement/

Calendar

From page 1

1501 S. Harbor City Blvd., Melbourne will have an open house on Saturday, June 28, from 10 a.m. to 2 p.m. (last tour begins at 1:30 p.m.). Donation: $12; children, 12 and younger, free. Info: www.greengables.org.

A DAY WITH DAD – INSPIRE's A Day With Dad will be at Carver Community Center, 1092 Swan St., Melbourne on Saturday, June 28, from 10 a.m. to 5 p.m. Admission: Free. Info: 3210-271-1538.

JACKIESTRONG BENEFIT – JackieStrong Benefit will be at Fox Lake Park, 4400 Fox Lake Rd., Titusville on Saturday, June 28, from 10 a.m. to 5 p.m. Go to www.facebook.com/events/s/jackiestrong-benefit/1029408835311996

BINGO AT ST. LUKE'S – St. Luke's Presbyterian Church, 1255 Knox McRae Drive, Titusville will have its monthly Bingo on Saturday, June 28 from 11 a.m. to 1 p.m. Lunch is available for a $5 donation. Info: 321-269-3260.

PALM BAY MAYOR'S BALL – The 2025 Palm Bay Mayor's Ball will be at Hilton Rialto, 200 Rialto Place, Melbourne on Saturday, June 28. Cocktail hour is at 6 p.m.; event begins at 7 p.m. Benefits Space Coast Discovery. Cost: $100 per person. Go to www.pbfl.org/mayors-ball.

SUNDAY, JUNE 29

SPACE COAST WOMEN'S DAY – Space Coast Women's Day will be at Melbourne Auditorium, 625 E. Hibiscus Blvd., Melbourne on Sunday, June 29, from 11 a.m. to 4 p.m. Admission: Free. Info: Info@touchofmagicevents.com.

BLOCK PARTY/CONCERT – A Stars & Stripes Block Party & Concert will be at Suntree United Methodist Church, 7400 N. Wickham Rd., Melbourne on Sunday, June 29 at 4:30 p.m. Concert at 6:30 p.m. will feature Melbourne Municipal Band, the Brevard Community Chorus, and the Suntree UMC Chancel Choir. Go to www.suntreeumc.org/events.

TUESDAY, JULY 1

YOUTH ENVIRONMENTAL SUMMIT – A Youth Environmental Summit will be at Brevard Zoo, 8225 N. Wickham Rd., Viera on Tuesday, July 1, from 9:30 a.m. to 4 p.m. For ages 12-18. Cost: $15. Email zooteens@brevardzoo.org.

THURSDAY, JULY 3

HEALTH FAIR – The Glenbrooke Community Health Fair will be at Glenbrooke Senior Living, 815 Briar Creek, Palm Bay on Thursday, July 3, from 11 a.m. to 1 p.m. Admission: Free. Call 310-497-9759.

FRIDAY, JULY 4

FIRECRACKER 5K – A Firecracker 5K will be at Eau Gallie Square Park, 1452 Highland Ave., Melbourne on Friday, July 4 at 7 a.m. Registration: $35 in advance, $40, race day; children, $20, advance, $25, race day. Go to runsignup.com/Race/FL/Melbourne/Firecracker.

INDEPENDENCE DAY PICNIC – The 38th Annual City of Rockledge Independence Day Picnic will be at McLarty Park, 790 Barton Blvd., Rockledge on Friday, July 4, from 10 a.m. to 2 p.m. Cost: $1 for hamburger or hot dog lunch. Go to www.cityofrockledge.org.

INDEPENDENCE DAY PARADE – Applications are being accepted to be part of the Independence Day Parade on Merritt Island on Friday, July 4 at 10 a.m. Route is from from Merritt Island High School, 100 Mustang Way, Merritt Island south to Courtenay Parkway east to Merritt Avenue to end at Edgewood Jr./Sr. High School, 180 E. Merritt Ave., Merritt Island. Lineup and preparation for the parade begins at 8 a.m. Registration fee: $25. Go to www.bcsocharity.org.

BLOCK PARTY – First United Methodist Church of Titusville will host its annual 4th of July Block Party at Connection Kids, 213 S. Palm Ave., Titusville on Friday, July 4, from 11 a.m. to 1 p.m. Info: www.fumctitusville.com.

LIFTING UP GOD & COUNTRY COMMUNITY CELEBRATION – Lifting Up God & Country Community Celebration will be at Wickham Park amphitheatre, 2500 Parkway Drive, Melbourne on Friday, July 4, from 11 a.m. to 4 p.m. Admission: Free. Go to www.jitk.org.

BLUE FLAME EVENING -- Blue Flame Evening will be at Valiant Air Command, 6600 Tico Rd., Titusville on Friday, July 4 at 3:30 p.m. Cost: $60. Go to qr.codes/M07Ngt.

MELBOOM 2025 – MelBOOM 2025, the City of Melbourne's 4th of July Celebration will be at Front Street Park, 2205 Front Street, Melbourne. Food trucks and KidZone open from 4 to 9 p.m; entertainment at 5:30 p.m.; fireworks (weather permitting) at 9 p.m. Admission: Free. Go to www.melbournefl.org.

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 45

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Brevard County Arrest Report

Editor's note: The individuals listed here have been arrested, not convicted, and are presumed innocent until proven guilty in a court of law. All information in this report is sourced directly from local law enforcement agencies and is part of the public record. Listings are published as space permits. To view the complete listings for this week, visit www.hometownnewsbrevard.com.

Cocoa Police

Jeffrey Kean Pierce, unlisted address, possession of controlled substance without prescription, possession of drug paraphernalia, resisting officer without violence.

John Evans Clark, of Cocoa, battery of person age 65 or older, felony battery of police officer or firefighter or EMT, violation of probation.

Barbara Ann Hooks, of Rockledge, third degree petit theft – third or subsequent offense.

Daniel Edwin Lowenthal, of Cocoa, possession of opium or derivative with intent to sell or distribute.

Shanice Ashley Jones, of Cocoa, child neglect without great bodily harm – four counts.

Terrence Sentron Battle, of Cocoa, child neglect without great bodily harm – four counts.

Eric Terrell Simpson, of Palm Bay, aggravated battery of pregnant person, lewd or lascivious battery of victim aged 12 to 16 – rape (two counts), robbery without firearm or weapon – two counts, possession of cocaine, second degree petit theft – two counts, battery.

Destiny Shanice Graham, of Cocoa, possession of firearm or weapon or ammunition by convicted felon.

Alice Marie Askew, of Cocoa, dealing in stolen property, grand theft from dwelling, first degree petit theft, giving false verification of ownership to pawnbroker, giving false verification of ownership to regulated metals dealer.

Cocoa Beach Police

Christopher Abreu Sanchez, of St. Cloud, driving while license suspended – habitual traffic offender.

Kenneth Eugine Manahan, homeless, child abuse without great bodily harm, trespassing.

Ronald Belot, homeless, felony battery of police officer or firefighter or EMT, resisting officer without violence, trespassing.

Ivy Elizabeth Kurtz, of Cocoa Beach, false imprisonment of adult, battery – dating violence, misuse of 911 system.

Titusville Police

Stevie Eugene Sanders, of Titusville, possession of cocaine.

Ruben Oquendo, of Cocoa, driving while license suspended – habitual traffic offender, resisting officer without violence.

Dennis Lee Jared, of Titusville, child neglect without great bodily harm – two counts, driving under the influence with minor in vehicle.

Donald Wade Bishop, of Titusville, possession of cocaine, possession of drug paraphernalia.

Matthew Charles Rutherford, of Titusville, possession of cocaine, possession of drug paraphernalia.

Raul Javier Garcia, of Mims, driving while license suspended – habitual traffic offender.

Nicholaus Ashton Stover, of Titusville, possession of 10 or more child pornography images.

Amanda Patricia Oliva, of Cocoa, possession of cocaine, resisting officer without violence.

Yamani Serrano, of Titusville, sexual battery of victim aged 12 to 18 by offender over age 18 – rape, tampering with first degree felony proceeding – aggravated assault, second degree petit theft.

Michael Johntaveous Hurst, of Titusville, trafficking in cocaine – 28 grams up to 150 kilograms, violation of probation.

Debra Marie Tinkler, homeless, child neglect without great bodily harm.

Jasmine Dae Edwards, of Titusville, felony retail theft.

Florida Highway Patrol

Jerrad Austin Cameron Kent, of Hokes Bluff, Ala., attempt to flee or elude police officer with lights or siren active, operation of motorcycle without valid license, operation of motor vehicle without valid license, failure to register motor vehicle.

Erik Michael Rubas, of Cocoa, possession of firearm or weapon or ammunition by convicted felon, leaving scene of crash involving property damage, driving while license suspended – second offense, operation of motor vehicle without valid license.

Christopher Louis Kornicki, of Melbourne, driving under the influence – third violation within 10 years, DUI causing injury or property

See ARRESTS, page 9



DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 45

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Torres

Continued from Page 3A

You have terror, humor, suspense, action, adventure and standout roles by three incredible actors directed by a newcomer by the name of Steven Spielberg. And is there another two-note combination (E-F) more recognizable than the unforgettable score by composer John Williams?

The movie pulls you into this world of suspense and horror from the very first scene when we see the female skinny-dipper get dragged beneath the surface multiple times. We never see the shark in the scene only her terror.

I can watch the late great Robert Shaw portray the ornery shark fisherman, "Quint," all day long. There's no scene better than when "Quint" tells the story of the shark feeding frenzy after the USS Indianapolis went down, sending more than 1,000 sailors into the water.



Robert Shaw, left, Roy Scheider and Richard Dreyfuss track a great white shark in "Jaws" (1975). UNIVERSAL PICTURES

Why does 'Jaws' still captivate us?

But what is it about "Jaws" that holds our attention, thrills and terrifies us half a century after it was first screened?

Well, according to Phil Simpson, who serves as Vice President of Academic and Student Affairs at Eastern Florida State College and recently co-authored and curated *"This shark, swallow you whole": Essays on the Cultural Influence of Jaws*, part of the reason is because the "monster" could be real.

"My main memory was how utterly terrifying and yet utterly thrilling it all was," he said, reflecting on seeing the movie in a theater for the first time in 1975. "A lot of kids my age couldn't get enough of it. The monster aspect of the shark really is most captivating. He's larger than life, but also not so large that it's completely implausible."

Like me, Simpson grew up fascinated by horror films. While he watched Universal horror films, I preferred Hammer horror films, and of course, Japanese monster films. While scary in their own right, I never really believed a Godzilla-like creature would pose a threat to my family or that someone I loved would turn into a werewolf under a full moon.

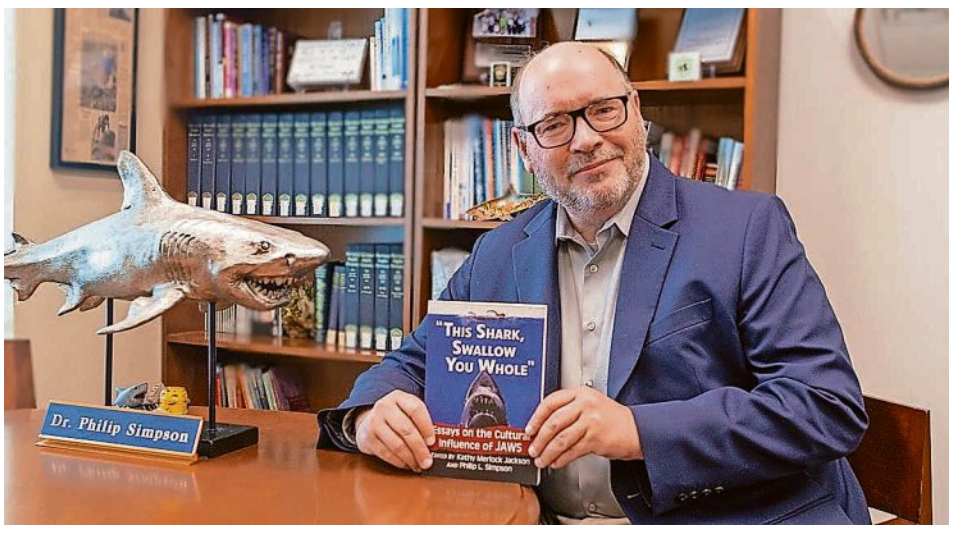
But a killer shark? That's a different type of "monster" that conjured deep-down fear in many of us because, well, they're real and they see almost everything as prey and those rows and rows of teeth!

There's nothing better than an underdog

Another reason why the movie stands the test of time is because, as Simpson says, it's not "Quint" the shark hunter or "Hooper" the scientist who kills the shark but the reluctant hero, Police Chief Martin Brody, who works on an island despite being afraid of water.

I agree that it probably makes for a more satisfying ending for most. And there's nothing better than pulling for the underdog — but I find myself rooting for the tragic and fatalistic Quint even after he starts descending into Ahab-like madness and destroys the radio with a baseball bat before anyone can radio for help.

In his book, Simpson explores the shark not just as a monster, but as a cinematic serial killer — a relentless, unseen force that mirrors the archetype of the calculating human predator in films like "Psycho." (Another of my favorites that I recently re-watched along with the television show "Bates Motel.")



Phil Simpson, who serves as vice president of Academic and Student Affairs at Eastern Florida State College, recently co-authored "This Shark, Swallow You Whole": Essays on the Cultural Influence of Jaws.
PROVIDED BY EASTERN FLORIDA STATE COLLEGE

"The shark is coded like a serial killer," Simpson explained. "It stalks its victims, eludes capture, and generates a sense of dread much like the classic horror villains do. And it's portrayed with a cunning that makes it feel almost human."

Another aspect of the film adding to the horror and dread of battling a cunning, calculating killer shark is the setting. In the same way the film "127 Hours" captured the helplessness and claustrophobic feeling of being pinned beneath a boulder in a remote cavern, *Jaws* is set in the open ocean with no help in sight.

That sinking feeling of hopelessness and vulnerability add to the film, causing the audience to feel a sense of unease.

Will anyone come rescue us? Will the boat sink? Will this shark ever give up?

"The fears explored in "Jaws" — of the unknown, of the monster beneath the surface, of our own inadequacies — are never going away," Simpson wrote. "That's why this film, and stories like it, will always matter."

Indeed. And thank goodness I have a swimming pool.

Contact Torres at jtorres@floridatoday.com. You can follow him on X @johnalbertorres or on Facebook at facebook.com/FTjohntorres.

NOW
IS THE TIME FOR ACTION

Now is the moment we've been waiting for. With new treatments emerging in the fight against Alzheimer's and all other dementia, now is the time for hope. But not the time to stop.

Help us keep the momentum going in your community at the Alzheimer's Association Walk To End Alzheimer's®, the world's largest fundraiser to fight the disease.

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2025 Walk to End Alzheimer's Space Coast
Cocoa Riverfront Park – Cocoa
September 27, 2025 | 8 a.m.

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WALK TO END ALZHEIMER'S
ALZHEIMER'S ASSOCIATION

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 45

PUBLIC NOTICE
FOR THE POTENTIAL IMPACT FLOODPLAIN / WETLANDS AT CAPE CANAVERAL SPACE FORCE STATION, FLORIDA

The Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) to evaluate the potential impacts associated with (1) DAF's authorization of the redevelopment of Space Launch Complex (SLC)-13, an existing SLC on Cape Canaveral Space Force Station (CCSFS), to support the Vaya Space (Vaya) Dauntless and Phantom Space Corporation (Phantom) Daytona and Laguna launch programs; and (2) the Federal Aviation Administration's (FAA's) issuance of a vehicle operator license along with potential renewals and modifications to licenses to Vaya for Dauntless operations at CCSFS and Phantom for Daytona and Laguna operations at CCSFS and approval of related airspace closures. The purpose of the Proposed Action is to increase the space launch mission capability of the United States, Department of Defense, National Aeronautics and Space Administration, and other federal and commercial customers, and to enhance the resilience and capacity of the nation's space launch infrastructure, while promoting a robust and competitive national space industry.

The Proposed Action includes construction of new infrastructure, the modification of existing infrastructure, ground support operations, and launch operations at SLC-13. Currently, SLC-13 is used to support SpaceX Falcon booster landings. Vaya and Phantom would utilize existing infrastructure at SLC-13 to the maximum extent in order to minimize construction and demolition activities. This Proposed Action is subject to requirements and objectives of Executive Order (EO) 11990, *Protection of Wetlands*, EO 11988, *Floodplain Management*, and EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, as the proposed infrastructure improvements could potentially impact wetlands and occur within the 100-year floodplain. There are no practicable alternatives outside of floodplains. Impacts would be minimized to the greatest practicable extent. Mitigation would be provided for unavoidable impacts to ensure no net loss of wetland or floodplain function in accordance with federal and state regulations.

Pursuant to EO 11990, EO 11988, EO 13690, and Air Force Instruction 32-7064, DAF requests advance public comment to determine if there are any public concerns regarding the Proposed Action's potential to impact floodplains. The Proposed Action will be analyzed in the forthcoming EA, which the public will have the opportunity to review and provide comment when the Draft EA is released. Comments may be submitted to Ms. Taylor Janise, 45 CES/CEIE, 1224 Jupiter Street, Mail Stop 9125, Patrick Space Force Base, Florida 32925 or via email at taylor.janise.1@spaceforce.mil and courtesy copy megan.nicely.1@spaceforce.mil. Comments will be accepted for 30 days from the publication of this notice.

FT-42101634

Palm Bay man charged with digital voyeurism

Tyler Vazquez
Florida Today
USA TODAY NETWORK – FLORIDA

A Palm Bay man detectives say took unwanted photos of a woman at Turkey Creek Sanctuary in April was arrested June 26 and is a suspect in a string of similar incidents dating to August 2023.

Palm Bay resident Joshua Barley, 30, is charged with digital voyeurism, false imprisonment and battery, Palm Bay police said in a June 27 statement.

An arrest report from the Palm Bay Police Department states that on April 26, 2025, Barley reportedly grabbed a woman at Turkey Creek and began attempting to take inappropriate photos of her. She was able to call police even as Barley tried to prevent her from leaving the area, according to the report.

Police said Barley grabbed the woman and began taking photos while repeatedly saying, "I'm taking photos in public."

The woman was then able to kick Barley away from her before running away. Once Barley realized the woman was calling authorities, he fled from the scene, police said.

A June 27 statement from Lt. Virginia Kilmer, Palm Bay Police spokesperson, said that in November 2024, the department received calls regarding a suspicious male who was approaching and taking photographs of women in the Turkey Creek Sanctuary.

"A sketch of the male in question was distributed through our social media platforms, which resulted in several potential leads" and linked Barley to similar incidents, Kilmer said. According to police, the suspect would run after lone women while recording them with his phone.

Detectives located and arrested Barley after he came to their attention in an unrelated Internet Crimes Against Children case, according to the arrest report.

Barley is being held at the Brevard County Jail without bond.

Tyler Vazquez is the Brevard County Watchdog Reporter at FLORIDA TODAY. Contact Vazquez at 321-480-0854 or tvazquez@floridatoday.com. Twitter: @tyler_vazquez

Spirit Halloween is hiring in these 3 Brevard cities

Michelle Spitzer
Florida Today
USA TODAY NETWORK – FLORIDA

It might be mid-summer, but apparently it's already time to start thinking about spooky season.

Or at least hiring workers for it. The seasonal store Halloween Spirit, known for its elaborate decorations and variety of costumes is hiring employees for stores in three different Brevard cities.

It's part of a nationwide event to onboard 50,000 people for more than 1,500 retail locations expected to open for the 2025 Halloween season.



Spirit Halloween is looking to hire as many as 50,000 employees to staff its stores this upcoming season. PROVIDE BY SPIRIT HALLOWEEN

What Brevard cities are hiring for Spirit Halloween stores in 2025

Melbourne, Merritt Island and Titusville

Jobs available at Spirit Halloween in Brevard and how to apply

There are roughly two dozen jobs available. They include sales associate, store manager and assistant store manager.

To apply, head to the Spirit Halloween website. Potential workers can also text "Reaper" to 85000 to apply for a position.

Where will the Spirit Halloween stores be located in Brevard in 2025?

That hasn't been announced yet.

However, the job site listed for the Merritt Island postings is 745 N Courtenay Pkwy. That is the location of one of the stores in 2024.

The address listed for the Titusville postings is 3259 Garden Street, the same location as last year's Titusville store.

There is no address listed for the Melbourne postings. Last year, the Melbourne store was at 4970 Stack Boulevard.

When do Spirit Halloween stores open?

Usually in early August.

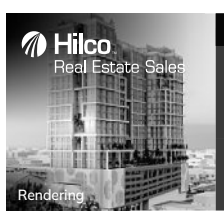
What is Spirit Halloween?

Spirit Halloween is a retailer that abruptly pops up at the end of the summer season, turning empty storefronts into the heart of haunted goods. It has become a pop culture phenomenon within the U.S over the years.

It opened its first pop-up store in the Bay area in 1983 before being purchased by Spencer Gifts in 1999. Spirit Halloween also has a website open throughout the year where you can buy costumes, decorations and giant towering animatronic characters.

C.B Bridges and Mike Snider contributed to this report.

Spitzer is a Trending Reporter. She can be reached at MSpitzer@Floridatoday.com.



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Subject to approval by U.S. Bankruptcy Court District of Florida (Miami). Petition No: 1:25-bk-11136-LMI | *In re:* Sky Gardens Residences, LLC.

Court's health care ruling could empower Kennedy

Adrianna Rodriguez
USA TODAY

On June 27, the U.S. Supreme Court preserved a key element of the Affordable Care Act that helps guarantee that health insurers cover preventive care at no cost to patients.

And it has implications that make some advocates uncomfortable as Health and Human Services Secretary Robert F. Kennedy Jr. flexes his authority.

Two Christian-owned businesses and several Texans argued that the health insurance plans they buy shouldn't have to cover medical tests and drugs they object to on religious grounds, such as the HIV-prevention drug PrEP.

But the legal question at the heart of the case was whether the U.S. Preventive Services Task Force, which under the 2010 law has a major role in choosing what services will be covered, is so powerful that, under the Constitution, its members must be appointed by the president and confirmed by the Senate.

A lower court ruled that the task force's members were not validly appointed. The high court overturned that decision. Justice Brett Kavanaugh wrote for the 6-3 majority that Kennedy can remove task force members at will and can review their recommendations before they take effect.

The Health and Human Services secretary has always appointed task force members and ratified their recommendations, said MaryBeth Musumeci, teaching associate professor of health policy and management at George Washington University.


Health and Human Services Secretary Robert F. Kennedy Jr. recently fired all 17 members of the CDC's Advisory Committee on Immunization Practices. EVELYN HOCKSTEIN/REUTERS

But the ruling expanded on that authority by clarifying that the secretary also could remove members and block recommendations, she said.

Given that Kennedy recently fired all 17 members of the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices, another expert panel that issues health recommendations, Musumeci said "there is reason to be worried."

The secretary has never removed access to preventive services that have been proven to help people stay healthy, nor has the secretary "sought to shape the membership of our expert panel in any way," Preventive Services Task Force chair Dr. Michael Silverstein said in a statement to USA TODAY.

Secretaries have historically "only acted to increase access to preventive care, occasionally going beyond the evidence to secure enhanced coverage for preventive services," he said. "Given our shared focus on preventing cancer and chronic disease, we certainly hope that the Secretary will allow our current work to continue unimpeded, as it has thus far."

Katherine Hempstead, senior policy officer at the Robert Wood Johnson Foundation, a health nonprofit, praised the high court's decision because it meant millions of Americans still have access to preventive care such as mental health screenings, cancer screenings, STI testing and important medications.

But she also called the ruling both an "ending and a beginning."

"It's the ending of the challenge, but now it's the beginning of something that's going to unfold where we're going to see someone exercise control over this expert panel that has very strong opinions about ... many aspects of medical care," she said.

Contributing: Maureen Groppe and Bart Jansen, USA TODAY; Reuters

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 45

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FT-42101634

MANTECH

John LaBonte <john.labonte@mantech.com>

FW: [Non-DoD Source] State Clearance Letter for FL202506260511C - NEPA Scoping for Environmental Assessment For The Vaya Dauntless and Phantom Daytona/Laguna Launch Programs at Program Launch Complex 13, Cape Canaveral Space Force Station, Brevard County,

1 message

NICELY, MEGAN E CIV USSF SSC 45 CES/CEIE-C <megan.nicely.1@spaceforce.mil> Tue, Aug 26, 2025 at 7:47 AM
To: "LaBonte, John P" <john.labonte@mantech.com>
Cc: "JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C" <taylor.janise.1@spaceforce.mil>

Hi John,

For your records.

Megan Nicely

NEPA Program Manager

45 CES/CEIE-C

WP: 321-853-6642 / CP: 386-316-0812

From: State_Clearinghouse <State.Clearinghouse@dep.state.fl.us>
Sent: Monday, August 25, 2025 5:52 PM
To: JANISE, TAYLOR M CIV USSF HQSF 45 CES/CEIE-C <taylor.janise.1@spaceforce.mil>
Cc: NICELY, MEGAN E CIV USSF SSC 45 CES/CEIE-C <megan.nicely.1@spaceforce.mil>; State_Clearinghouse <State.Clearinghouse@dep.state.fl.us>
Subject: [Non-DoD Source] State Clearance Letter for FL202506260511C - NEPA Scoping for Environmental Assessment For The Vaya Dauntless and Phantom Daytona/Laguna Launch Programs at Program Launch Complex 13, Cape Canaveral Space Force Station, Brevard County, ...

August 25, 2025

Taylor Janise

45 CES/CEIE

1224 Jupiter Street, M.S. 9125

Patrick Space Force Base, Florida 32925

RE: Department Of Defense, Department of the Air Force, NEPA Scoping for Environmental Assessment for the Vaya Dauntless and Phantom Daytona/Laguna Launch Programs at Program Launch Complex 13, Cape Canaveral Space Force Station, Brevard County, Florida

SAI# FL202506260511C

Dear Taylor:

Florida State Clearinghouse staff has reviewed the proposal under the following authorities: Presidential Executive Order 12372; § 403.061(42), Florida Statutes; the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. §§ 4321-4347, as amended and concurs that it appropriately outlines the information that will be developed after the feasibility study for submittal to the State.

Staff of the Florida Department of Environmental Protection, Florida Fish and Wildlife Conservation, and St. Johns River Water Management District reviewed the NEPA scoping letter for the upcoming Environmental Assessment for the proposed project and have no comments or recommendations at this time.

Based on the information submitted, the State of Florida has no concerns on the proposed project at this time. Thank you for the opportunity to review the proposed project. If you have any questions or need further assistance, please don't hesitate to contact me.

Sincerely,

Lindsay Weaver

Lindsay Weaver

Florida State Clearinghouse

Office of Intergovernmental Programs

Florida Department of Environmental Protection

State.Clearinghouse@FloridaDEP.gov

Office: 850-717-9037

APPENDIX F - TABLES

Table 2.1-1. Vaya Dauntless vehicle variant characteristics

Characteristics	Variant	
	Block 1	Block 2
Number of Stages	2	2
Total Length (m)	22.3	25
Stage 1 diameter (m)	3.35	3.25
Stage 2 diameter (m)	2.05	2.1
Gross Lift-Off Weight (kg)	46,000	100,000
Engines		
1st Stage	6x 143 kN	6x 200 kN
2nd Stage	1x 185 kN Vac	1x 218 kN Vac
Payload to LEO (kg)	1,000+	2,000+

Notes: m = meters; kg = kilograms; kN = kilonewtons; LEO = low-earth orbit; Vac = vacuum

Table 2.1-2. Phantom Daytona and Laguna vehicle variant characteristics

Characteristics	Variant		
	Daytona 1	Daytona 2	Laguna
Number of Stages	2	2	2
Total Length (m)	18.7	19.5	21.2
Stage 1 diameter (m)	1.85	2	2
Stage 2 diameter (m)	1.5	1.5	2
Gross Lift-Off Weight (lbm)	78,000	110,000	153,117
Engines			
1st Stage	4x Vast/ Launcher E2	5x Vast/ Launcher E2	9x Vast/ Launcher E2
2nd Stage	1x Ursa Major Hadley ITV	1x Ursa Major Hadley ITV	1x Vast/ Launcher E2
Payload Capacity (kg) (500km x 500km)	800	950	2,000

Notes: m = meters; kg = kilograms; kN = kilonewtons; Vac = vacuum; lbm = pounds-mass

Table 2.1-3. Estimated equipment usage during construction – Phase I

Equipment Description	Horsepower (bhp)	Estimated Hours of Use
Caterpillar D4 Dozer	130	200
Caterpillar 315C L Hydraulic Excavator	110	120
Caterpillar 950 Wheel Loader	130	100
Caterpillar 12H Motor Grader	145	200
Dynapac CA 252 Vibratory Drum Roller	125	160
Caterpillar 279C Multi-terrain Loader/Skid-steer	80	200
Mack GU713 Dump Truck	300	250
Dewater Pump -MWI Rotoflo RWP008	150	120

Kenworth T880 Concrete Mixer Truck	405	80
Caterpillar AP300 Asphalt Paver	70	40
Link-Belt HTC 100-ton Hydraulic Truck Crane	450	200
Lull 944E-42 Telescoping Loader	110	160
Caterpillar 420E Backhoe Loader	100	200

1 **Table 2.1-4. Estimated equipment usage during construction – Phase II**

Equipment Description	Horsepower (bhp)	Estimated Hours of Use
Caterpillar D4 Dozer	130	120
Caterpillar 315C L Hydraulic Excavator	110	80
Caterpillar 950 Wheel Loader	130	80
Caterpillar 12H Motor Grader	145	120
Dynapac CA 252 Vibratory Drum Roller	125	80
Caterpillar 279C Multi-terrain Loader/Skid-steer	80	100
Mack GU713 Dump Truck	300	160
Dewater Pump -MWI Rotoflo RWP008	150	80
Kenworth T880 Concrete Mixer Truck	405	80
Caterpillar AP300 Asphalt Paver	70	25
Lull 944E-42 Telescoping Loader	110	80
Caterpillar 420E Backhoe Loader	100	80

2 **Table 2.4-1. Permits, Licenses, and Other Requirements**

Permit/License	Requirement
FAA Licensing Requirements	Under 14 CFR 450, Vaya and Phantom would be required to obtain new vehicle operator licenses for Dauntless, Daytona, and Laguna operations at CCSFS.
Endangered Species Act	Under Section 7 of the ESA, if the DAF determines the proposed action may affect Federally listed species, DAF is required to consult with USFWS and NMFS to obtain a Letter of Concurrence or a Biological Opinion (BO).
National Historic Preservation Act	Under Section 106 of the NHPA, DAF would be required to consult with the State Historic Preservation Office (SHPO) and federally recognized tribes on potential impacts to cultural resources.
45 SWI 32-7001, Exterior Lighting Management	Use full cut off, well shielded, low wattage, limited wavelength amber LED lights to reduce the amount of exterior lighting visible from the beach during the sea turtle nesting season to reduce mortality.
ERP & Industrial Wastewater Permit	Florida's ERP program regulates activities involving the alteration of surface water flows. ERPs are required for the construction of stormwater management systems that discharge to those waters. SLC-13 modifications would include stormwater and wastewater management in engineering design plans. In Brevard County, the ERP program is implemented by the St. Johns River Water Management

	District (SJRWMD). These stormwater and wastewater management designs would be reviewed and cosigned by SLD 45 before submitting a request to SJRWMD for an ERP and FDEP for an Industrial Wastewater Permit.
Air General Permit	Vaya and Phantom are required to apply for an Air General Permit from FDEP for use of generators.

1 **Table 2.5-1. Comparison of Environmental Consequences by Alternative**

Environmental Resource	Proposed Action	No Action Alternative
Aviation Emissions and Air Quality	Aviation emissions and air quality impacts from C&D activities associated with the Proposed Action would be temporary. Launch activities included in the Proposed Action would result in an increase in emissions. However, net annual emissions would not exceed the DAF insignificance thresholds, and EPMs, such as fugitive dust control and internal combustion engine emissions controls, would be used to limit and reduce air quality impacts.	Under the No Action Alternative, there would be no increase in emissions.
Noise	C&D activities would result in temporary, localized increases in noise levels. Due to the location of SLC-13, the noise impacts from C&D activities would be far removed from any human sensitive receptors. Launch operations would result in increased noise levels and increase frequency of noise events within the region. However, noise modeling indicates that potential launch activities would not exceed 65 dBA outside of CCSFS boundaries.	Under the No Action Alternative, there would be no new noise impacts.
Terrestrial/Freshwater And Marine Biological Resources	Construction, demolition, and launch activities would potentially result in impacts to wildlife due to noise, vibration, and visual disturbances. Additionally, there is a risk of harm to wildlife during construction. However, no significant impacts to vegetation or wildlife are anticipated from the implementation of the Proposed Action, as EPMs, as outlined in Section 7 consultation	Under the No Action Alternative, there would be no new impacts on biological resources. The potential for effects on biological resources from noise, sonic boom overpressure, habitat destruction, artificial lighting, and general disturbance could occur from present and reasonably foreseeable actions.

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Environmental Resource	Proposed Action	No Action Alternative
	with USFWS and the NMFS PLOC, would be implemented to avoid, minimize, or characterize potential effects.	
Water Resources	Construction, demolition, and launch activities associated would lead to potential direct and indirect impacts to water resources. The Proposed Action would result in minor disturbance of soils, the use of hazardous materials and generation of wastewater, and wastewater discharges. Impacts to water resources would be reduced or avoided through the use of BMPs to manage pollutants in stormwater and non-stormwater runoff, and sediment control and erosion management. Therefore, there would be no significant impacts to water resources from the Proposed Action.	Under the No Action Alternative, there would be no new impacts on water resources.
Cultural Resources	The DAF initiated consultation with the SHPO under Section 106 of the NHPA. SLD also initiated government to government consultation with the Seminole Tribe of Florida, Seminole Nation of Oklahoma, and the Miccosukee Tribe of Indians of Florida. The DAF received concurrence from the Seminole Tribe of Florida on 17 December 2025 (Appendix B).	Under the No Action Alternative, there would be no new impacts on cultural resource.
Coastal Resources	Construction activities related to the Proposed Action would not impact marine ecosystems, would be limited to SLC-13, and would have very minimal disturbance to undeveloped areas. DAF has prepared a CZMA consistency determination, and the Proposed Action is consistent with CZMA and Florida Coastal Management Program requirements.	Under the No Action Alternative, there would be no new impacts on coastal resources.

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Environmental Resource	Proposed Action	No Action Alternative
Department of Transportation Section 4(f) Resources	The Proposed Action would not include any direct impacts on Section 4(f) resources. The Proposed Action would have minimal potential for annoyance to the recreational experience around CCSFS from launch activities.	Under the No Action Alternative, there would be no new permanent incorporation, temporary use, or constructive use of Section 4(f) properties.
Socioeconomics	The Proposed Action would have negligible short-term beneficial impacts and long-term negative impacts would not be significant.	Under the No Action Alternative, there would be no new impacts on socioeconomics.
Transportation	The Proposed Action would not result in adverse impacts to transportation resources due to the low traffic volumes from increased operations, existing capacity of the roadways at and near CCSFS, and the temporary increase in daily vehicle traffic during C&D.	Under the No Action Alternative, there would be no new impacts to local roadways or transportation corridors.
Human Health and Safety	Activities under the Proposed Action could result in increased risks to workers at project locations. However, the establishment and use of safety programs, policies, and procedures for workers and contractors would mitigate impacts to human health and safety. Therefore, there would be no adverse impacts to human health and safety associated with the Proposed Action.	Under the No Action Alternative, there would be no new impacts on human health and safety.
Hazardous Materials and Waste Management	Activities associated with the Proposed Action would require compliance with all pertinent federal, state, and local laws and regulations. Hazardous materials and wastes would be properly identified, labeled, contained, and managed per all applicable regulations. Additionally, relatively small amounts of hazardous materials would be required for the Proposed Action, and the waste generated would have little to no impact on waste processing capacity.	Under the No Action Alternative, there would be no new impacts on hazardous materials and waste management.

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Environmental Resource	Proposed Action	No Action Alternative
	Therefore, the Proposed Action would not result in significant impacts to hazardous materials and waste management.	
Geology and Soils	The Proposed Action would result in a minor increase to the amount of impervious areas at SLC-13 and any potential impacts to geology and soils would largely be associated with the construction of new structures. However, a SWPPP would be prepared to include erosion control measures and BMPs would be implemented during ground-disturbing activities. Therefore, no long-term or significant impacts to geology or soils are anticipated from the Proposed Action.	Under the No Action Alternative, there would be no new impacts to geology and soils.
Solid Waste Management	Construction, demolition, and launch activities associated with the Proposed Action would generate solid waste that can either be recycled or disposed of in existing solid waste facilities. Local solid waste facilities have adequate capacity for the amount of solid waste that would be generated. Therefore, no significant impacts to solid waste management are anticipated from the Proposed Action.	Under the No Action Alternative there would be no new impacts on solid waste management.
Utilities	While the Proposed Action would increase the amount of utility usage at CCSFS, the increases would be negligible when compared to the existing available capacity. Neither CCSFS's infrastructure nor local/regional utility infrastructure would need to be upgraded in order to support the increased utility usage. There would be no significant impacts on utilities.	Under the No Action Alternative, there would be no new impacts on utilities.

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Table 3.1-1. Resources not Analyzed

Resource	Reason not Analyzed
Land Use and Aesthetics	The activities under the Proposed Action are consistent with those already conducted at CCSFS. A former launch site (SLC-13) would be used for the proposed construction and launch activities. The proposed activities would be similar to launch activities that have been performed at this site and nearby launch sites on CCSFS. The proposed addition of Vaya and Phantom launches would increase overall launch cadence on CCSFS but would be consistent with existing land use at the project site, would not result in a change to land use or be incompatible with adjacent land uses, such as agricultural land, and would not alter the existing industrial character of the area. Views along the coastline would not change and no alterations to the visual landscape would occur. Therefore, this resource was considered but not analyzed in this EA.
Visual Effects, Light Emissions, and Visual Resources/Visual Character	The Proposed Action would not change the existing or planned use of CCSFS. Launches would occur from an existing launch site on CCSFS at any time of the day. Lighting would be used to support night launches; however, nighttime lighting is already present as CCSFS, and therefore there would not be additional impacts from lighting to support launch operations. The Proposed Action would conform to the existing designated land uses. The additional proposed launch activities would not differ visually from those activities already occurring at CCSFS. Therefore, this resource was considered but not analyzed in this EA.
Protection of Children from Environmental Health Risks and Safety Risks	The Proposed Action includes activities that regularly occur at CCSFS. No component of the Proposed Action would result in a disproportionate health and safety risk to children. Therefore, this resource was considered but not analyzed in this EA.
Farmlands	The Proposed Action would not convert prime agricultural land to other uses or result in a decrease in the land's productivity. Therefore, this resource was considered but eliminated from detailed analysis in this EA.
Natural Resources and Energy Supply	The Proposed Action would minimally affect supplies of energy, water, and would not affect asphalt, aggregate, and wood, and other natural resources in the region because the Proposed Action either requires none or relatively small amounts of these resources or there are abundant suppliers and resources available in the region. Therefore, the potential impacts to natural resources are considered but eliminated from detailed analysis in this EA.
Wild and Scenic Rivers	There are no rivers designated Wild and Scenic Rivers within the affected environment. Therefore, this resource was considered but eliminated from detailed analysis in this EA.

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Table 3.1-2. Reasonably Foreseeable Actions with Approved NEPA Documentation

Approved Document	Launch Provider	Project Status	Approved Annual Launches from CCSFS
Environmental Assessment for SpaceX Falcon Launches at Kennedy Space Center and Cape Canaveral Air Force Station (2020, supplemented in 2025)	SpaceX	Active	120
Environmental Assessment for the Reconstitution and Enhancement of Space Launch Complex 20 Multi-User Launch Operations at Cape Canaveral Air Force Station (2020)	Space Florida	Under Construction	24
Environmental Assessment for the United Launch Alliance Vulcan Centaur Program Space Launch Complex 41 at Cape Canaveral Air Force Station (2019)	ULA	Active	20
Environmental Assessment for Blue Origin Orbital Launch Site at Cape Canaveral Air Force Station, Florida (2016)	Blue Origin	Active	12
Environmental Assessment for Space Florida Launch Site Operator License at Launch Complex- 46 (2008)	Space Florida	Active	24
Supplemental Environmental Assessment for the Relativity Space Terran R Launch Program CCSFS, FL (2025)	Relativity	Under Construction	24
Environmental Assessment for the Stoke Nova Launch Program CCSFS, FL (2024)	Stoke Space	Under Construction	10
Total Approved Launch Cadence Approved Under NEPA	Not Applicable	Not Applicable	234

Table 3.1-3. Past Space Launches at CCSFS and KSC

Year	Total Launches
2019	15
2020	31
2021	31
2022	57
2023	72
2024	93
2025	135
Total Launches	**434**

Table 3.1-4. Planned Future and Potential Launch Actions at CCSFS and KSC

Year	Future Predictions
2026	165
2027	120
2028	115
2029	150
Total Predicted Launches	**550**

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1 **Table 3.1-5. Past, Present, and Reasonably Foreseeable Future Actions**

Project	Project Summary	Location	Time Frame	Relevance to Proposed Action
NASA refurbishment of SLC-39B to launch multiple vehicle types	Construction and launch activities at SLC-39B to support NASA's Space Launch System	KSC	Past	Existing conditions; Proposed Action would be in proximity to this activity
Space Florida launch activities at SLC-46	Launch activities at SLC-46. EA for Space Florida Launch Site Operator License at Launch Complex-46	CCSFS	Past	Existing conditions; Proposed Action would be in proximity to this activity
Canaveral Port Authority construction of Cruise Terminal Three	Construction and operation of the largest terminal at Port Canaveral.	Port Canaveral	Past	Existing conditions; Proposed Action would be in proximity to this activity
Canaveral Port Authority repair of Cruise Terminals Five, Eight, & Ten	Repairs and upgrades to moorings and facilities to accommodate larger cruise ships.	Port Canaveral	Past	Existing conditions; Proposed Action would be in proximity to this activity
Canaveral Port Authority reconstruction of Port Canaveral North Cargo Berth 3	Reconstruction of berthing space to meet cargo and space mission requirements.	Port Canaveral	Past	Existing conditions; Proposed Action would be in proximity to this activity
NASA construction of Florida Power and Light solar farm	Construction of a 500-acre solar farm	KSC	Past	Proposed Action would be in proximity to this activity
NASA construction of SLC-48	Construction and launch activities at SLC-48	KSC	Past	Existing conditions; Proposed Action would be in proximity to this activity
SpaceX Falcon program at SLC-39A and SLC-40	Construction and launch activities at SLC-39a (KSC) and SLC-40 (CCSFS). EA and FONSI for SpaceX Falcon Launches at KSC and CCSFS	KSC/CCSFS	Present	Existing conditions; Proposed Action would be in proximity to this activity
U.S. Navy Naval Ordnance Test Unit campus development	Development of the Naval Ordnance Test Unit campus on CCSFS	CCSFS	Present	Existing conditions; Proposed Action would be in proximity to this activity

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Blue Origin refurbishment of SLC-11 and SLC-36	Construction and launch activities at SLC-11 and SLC-36. EA for the Blue Origin Orbital Launch Site Construction at Launch Complex 11 and 36 CCSFS, FL	CCSFS	Present	Existing conditions; Proposed Action would be in proximity to this activity
ULA modifications of SLC-41 and nearby facilities for the Vulcan Centaur launch program	Construction and launch operations at SLC-41. EA for the United Launch Alliance Vulcan Centaur Program SLC-41 CCSFS, FL	CCSFS	Present	Existing conditions; Proposed Action would be in proximity to this activity
Space Florida development at Exploration Park	Construction of facilities at Exploration Park.	KSC	Present	Existing conditions; Proposed Action would be in proximity to this activity
SpaceX Roberts Road Operations Area	Paving of Roberts Road and A Avenue and development of 67-acre site for SpaceX Operations.	KSC	Present	Existing conditions; Proposed Action would be in proximity to this activity
SpaceX refurbishment of SLC-39A	Construction and launch operations of Starship Superheavy program at SLC-39A	KSC	Present	Existing conditions; Proposed Action would be in proximity to this activity
Widening of Space Commerce Way	Widening 2.7 miles of Space Commerce Way to four lanes to support future growth at KSC.	KSC	Present	Existing conditions; Proposed Action would be in proximity to this activity
Space Florida refurbishment of SLC-20	Construction of multi-user launch pad at SLC-20 and associated improvements.	CCSFS	Present	Existing conditions; Proposed Action would be in proximity to this activity
Relativity renovation of SLC-16 for Terran R launch program	Renovate SLC-16 for Terran R launch program	CCSFS	Present	Existing conditions; Proposed Action would be in proximity to this activity
Stoke Space renovation of SLC-14 for Nova launch program	Refurbishment and reactivation of SLC-14 for the Nova launch program. In Phase 2, Stoke may construct first stage landing pads at SLC-14.	CCSFS	Present	Proposed Action would be in close proximity to this activity

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USSF repair and construction of airfield infrastructure	Repairs and new construction at Skid Strip, including paved overruns, administrative facility, hangar, and apron	CCSFS	Future	Proposed Action would be in proximity to this activity
Range of the Future infrastructure improvements	Update of CCSFS infrastructure and processes over the next decade.	CCSFS	Future	Proposed Action would be in proximity to this activity
SpaceX Starship/ Superheavy launch complex and program	Construction of a new launch complex to support Starship/Super Heavy launch operations	KSC	Future	Proposed Action would be in proximity to this activity
NASA SLC-49 construction	Construction of SLC-49 to support future launch operations.	KSC	Future	Proposed Action would be in proximity to this activity
Construction at shuttle landing facility	Construction to support commercial spaceflight, aviation testing, research, development, and training.	KSC	Future	Proposed Action would be in proximity to this activity
Florida City Gas construction of natural gas pipeline on KSC	Construction of a natural gas pipeline operated by Florida City Gas which would provide natural gas to KSC.	KSC	Future	Proposed Action would be in proximity to this activity
Florida Department of Transportation (FDOT) replacement of SR 401 Drawbridge	Replace the drawbridge on SR 401 over the Canaveral Barge Canal.	Port Canaveral	Future	Proposed Action would be in proximity to this activity
Expansion of Middle Turning Basin at Port Canaveral	Enlarge the central turning area within the port by creating more wharf space and allowing larger vessels to accommodate growing needs of the space industry.	Port Canaveral	Future	Proposed Action would be in proximity to this activity
Starship at SLC-37	Starship at SLC-37 to support future heavy-lift launch vehicle operations	CCSFS	Future	Proposed Action would be in proximity to this activity

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Table 3.2-1. Estimated criteria pollutant emissions produced under the Proposed Action from construction activities

Source	Annual Emissions (tpy)					
	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Site Construction (Phase 1)	0.06	0.33	0.44	0.00	0.01	0.01
Site Construction (Phase 2)	0.04	0.02	0.31	0.00	0.01	0.01
Total	**0.10**	**0.35**	**0.75**	**0.00**	**0.02**	**0.02**
DAF Insignificance Thresholds	250	250	250	250	250	250
Threshold Exceeded	**No**	**No**	**No**	**No**	**No**	**No**

Notes: (1) Table includes criteria pollutant precursors (e.g., VOCs). Ozone is a secondary pollutant tracked by its precursor. (2) CO = carbon monoxide, NOX = nitrogen oxides, PM10 = particulate matter ≤ 10 microns in diameter, PM2.5 = particulate matter ≤ 2.5 microns in diameter, SOX = sulfur oxides, tpy = tons per year, VOC = volatile organic compound (3) Individual values may not add up exactly to total values due to rounding.

Table 3.2-2. Estimated criteria pollutant emissions produced under the Proposed Action from launch activities

Source	Annual Emissions (tpy)					
	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Vaya 2 Engine Static Fire	0.00	0.00	0.00	0.00	0.00	0.00
Vaya 4 Engine Static Fire	0.00	0.00	0.01	0.00	0.00	0.00
Vaya 6 Engine Static Fire	0.00	0.00	1.38	0.00	0.00	0.00
Vaya Launches	0.00	0.00	0.85	0.00	0.00	0.00
Phantom Daytona Launches	0.00	3.92	0.00	0.00	0.00	0.00
Phantom Daytona Static Fires	0.00	0.30	0.00	0.00	0.00	0.00
Phantom Laguna Launches	0.00	1.08	0.00	0.00	0.00	0.00
Phantom Laguna Static Fires	0.00	0.30	0.00	0.00	0.00	0.00
Total	**0.00**	**5.61**	**2.24**	**0.00**	**0.00**	**0.00**
DAF Insignificance Thresholds	250	250	250	250	250	250
Threshold Exceeded	**No**	**No**	**No**	**No**	**No**	**No**

Notes: (1) Table includes criteria pollutant precursors (e.g., VOCs). Ozone is a secondary pollutant tracked by its precursor. (2) CO = carbon monoxide, NOX = nitrogen oxides, PM10 = particulate matter ≤ 10 microns in diameter, PM2.5 = particulate matter ≤ 2.5 microns in diameter, SOX = sulfur oxides, tpy = tons per year, VOC = volatile organic compounds (3) Individual values may not add up exactly to total values due to rounding. (4) Vaya 2 Engine Static Fire is a 5-second test. Vaya 4 Engine Static Fire is 4 engines for 5-second test. Vaya 6 Engine Static Fire is 6 engines burning for the full duration of 590 seconds.

Table 3.4-1. Federally Listed Terrestrial Species and Critical Habitat in the Region of Influence

Common Name (Scientific Name)	Federal Status	State Status	Listed as Potentially Occurring at SLC-13	Listed as Potentially Occurring in the Launch Area Noise 100 dBA SEL Contour	Potential to Occur at SLC-13
Mammals					
Southeastern Beach Mouse (*Peromyscus polionotus niveiventris*)	T	T	Yes	Yes	Yes; suitable habitat is present.
Tricolored Bat (*Perimyotis subflavus*)	PE	-	Yes	Yes	Yes; suitable habitat is present.
Birds					
Crested Caracara (Audubon's) [Florida DPS] (*Polyborus plancus audubonii*)	T	T	Yes	Yes	Yes; suitable habitat is present.
Eastern Black Rail (*Laterallus jamaicensis* ssp. *jamaicensis*)	T	T	Yes	Yes	Yes; suitable habitat is present.
Everglade Snail Kite (*Rostrhamus sociabilis plumbeus*)	E	E	Yes	Yes	Yes; suitable habitat is present.
Florida Scrub-Jay (*Aphelocoma coerulescens*)	T	T	Yes	Yes	Yes; known to occur on CCSFS proximate to SLC-13.
Piping Plover (*Charadrius melodus*)	T	T	No	Yes	Yes; suitable habitat is present.
Rufa Red Knot (*Calidris canutus rufa*)	T	T	Yes	Yes	Yes; suitable habitat is present.

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Common Name (Scientific Name)	Federal Status	State Status	Listed as Potentially Occurring at SLC-13	Listed as Potentially Occurring in the Launch Area Noise 100 dBA SEL Contour	Potential to Occur at SLC-13
Whooping Crane (*Grus americana*)	NEEP	E	No	No	None; no occurrences in the project area.
Wood Stork (*Mycteria americana*)	T	T	No	Yes	Yes; suitable habitat is present.
Black-Capped Petrel (*Pterodroma hasitata*)	E	-	No	No	Yes; suitable habitat is present.
Reptiles					
Atlantic Salt Marsh Snake (*Nerodia clarkii taeniata*)	T	T	No	Yes	None; distribution does not include the project area.
Eastern Indigo Snake (*Drymarchon couperi*)	T	T	Yes	Yes	Yes; suitable habitat is present.
Green Sea Turtle (*Chelonia mydas*)	T	T	Yes	Yes	None; there is no suitable habitat
Hawksbill Sea Turtle (*Eretmochelys imbricata*)	E	E	No	Yes	None; there is no suitable habitat
Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)	E	E	No	Yes	None; there is no suitable habitat
Leatherback Sea Turtle (*Dermochelys coriacea*)	E	E	No	Yes	None; there is no suitable habitat
Loggerhead Sea Turtle (*Caretta caretta*)	T	T	No	Yes	None; there is no suitable habitat

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Common Name (Scientific Name)	Federal Status	State Status	Listed as Potentially Occurring at SLC-13	Listed as Potentially Occurring in the Launch Area Noise 100 dBA SEL Contour	Potential to Occur at SLC-13
Insects					
Monarch Butterfly (*Danaus plexippus*)	PT	-	Yes	Yes	Yes; suitable habitat is present.
Plants					
Carter's Mustard (*Warea carteri*)	E	-	Yes	Yes	None; considered extirpated from the area.
Lewton's Polygala (*Polygala lewtonii*)	E	-	Yes	Yes	None; no suitable habitat present.
Critical Habitat					
Rufa Red Knot (*Calidris canutus rufa*)	P	-	No	Yes	None; no effects on critical habitat located 7.1 miles from SLC-13.

dBA – A-weighted decibel; SEL – sound exposure level; T – Threatened; E – Endangered; CCSFS – Cape Canaveral Space Force Station; SLC-13 – Space Launch Complex 13; NEEP - Experimental Population, Non-Essential; PE – Proposed Endangered; PT – Proposed Threatened; F- Final; P - Proposed

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Table 3.4-2. Effect Determinations for Terrestrial Species Protected by the Endangered Species Act and Species Proposed or Under Review for ESA Protection

Species of Critical Habitat	Federal Status	Effect Determination
Southeastern Beach Mouse	T	May Affect, Likely to Adversely Affect
Tricolored Bat	PE	May Affect, Not Likely to Adversely Affect
Audubon's Crested Caracara	T	May Affect, Not Likely to Adversely Affect
Eastern Black Rail	T	May Affect, Not Likely to Adversely Affect
Everglade Snail Kite	E	May Affect, Not Likely to Adversely Affect
Florida Scrub-jay	T	May Affect, Likely to Adversely Affect
Piping Plover	T	May Affect, Not Likely to Adversely Affect
Rufa Red Knot	T	May Affect, Not Likely to Adversely Affect
Wood Stork	T	May Affect, Not Likely to Adversely Affect
Black-capped Petrel	E	May Affect, Not Likely to Adversely Affect
Eastern Indigo Snake	T	May Affect, Not Likely to Adversely Affect
Monarch butterfly	PT	May Affect, Not Likely to Adversely Affect

T – Threatened; E – Endangered; PT – Proposed Threatened; PE – Proposed Endangered

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Table 3.5-1. ESA-listed Cetaceans and Fish Species Potentially Occurring in the Region of Influence

Common Name (Scientific Name)	**Federal Status**	**Potential to Occur in Proposed Splashdown Area (**Figure 2.1-6 in Appendix A.**)**
Blue Whale (*Balaenoptera musculus*)	E	Yes; suitable habitat is present.
Fin Whale (*Balaenoptera physalus*)	E	Yes; suitable habitat is present.
Sei Whale (*Balaenoptera borealis*)	E	Yes; suitable habitat is present.
North Atlantic Right Whale (*Eubalaena glacialis*)	E	Yes; suitable habitat is present.
Sperm Whale (*Physeter macrocephalus*)	E	Yes; suitable habitat is present.
Humpback Whale (*Megatera novaeangliae*) West Indies DPS	-	Yes; suitable habitat is present.
Atlantic Sturgeon (*Acipenser oxyrinchus*) Carolina DPS & South Atlantic DPS	E	Yes; suitable habitat is present.
Giant Manta Rays (*Manta birostris*)	T	Yes; suitable habitat is present.
Oceanic Whitetip Shark (*Carcharhinus longimanus*)	T	Yes; suitable habitat is present.
Scalloped Hammerhead Shark (*Sphyrna lewini*) Central & Southwest Atlantic DPS	T	Yes; suitable habitat is present.
Shortnose Sturgeon (*Acipenser brevirostrum*)	E	Unlikely, suitable habitat is present in coastal waters
Smalltooth Sawfish (*Pristis pectinata*)	E	Unlikely, suitable habitat is present in coastal waters

T – Threatened; E – Endangered

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Table 3.5-2. Effect Determinations for Marine Species Protected by the Endangered Species Act under Jurisdiction of the USFWS

Species of Critical Habitat	Status	Effect Determination
West Indian Manatee	Threatened	May Affect, Not Likely to Adversely Affect
Green Sea Turtle	Threatened	May Affect, Likely to Adversely Affect
Hawksbill Sea Turtle	Endangered	May Affect, Likely to Adversely Affect
Kemp's Ridley Sea Turtle	Endangered	May Affect, Likely to Adversely Affect
Leatherback Sea Turtle	Endangered	May Affect, Likely to Adversely Affect
Loggerhead Sea Turtle	Threatened	May Affect, Likely to Adversely Affect

Table 3.7-1. NRHP-Listed Properties in the Launch Noise/Vibration APE

Property Name (FMSF No.)	NRHP Reference No.	Resource Type	Description	Significance
Cape Canaveral Air Force Station (8BR216)	84003872	District	Discontinuous district at the CCAFS, including LC 5/6, LC 13, LC 14, LC 19, LC 26, LC 34, and the Original Mission Control Center	NRHP and NHL

Table 3.11-1. Potential Commercial Aircraft Impacted by Phantom and Vaya Launches (Note: AHA = Aircraft Hazard Area.)

Operations/ Year	Timing	Aircraft/Hour	Minimum AHA Duration	Maximum AHA Duration	Number of Aircraft Impacted/ Launch	Number of Aircraft Impacted/ Year
26	Lowest Period of Midnight Hours	10 (minimum)	40 minutes	4 hours	7 to 40	182 to 1,040
26	Peak Daily Travel Periods	220 (maximum)	40 minutes	4 hours	145 to 880	3,770 to 22,880

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APPENDIX G – AIR QUALITY

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Example Calculations of Launch and Static Fire Emissions Estimates (see Table G-1 for variables used in calculations and resulting emissions estimates.

Vaya Dauntless:

N = Number of Events

NEE = Number of Engines Per Event

FrPE = Flow Rate Per Engine (kg/s)

TBT = Total Burn Time (s) (only emissions under 3,000 feet agl)

EF = Emission Factor (g/kg)

CF = Conversion Factor (grams to tons)

$$Total\ Emissions = \frac{N \text{ x } NEE \text{ x } FrPE \text{ x } TBT \text{ x } EF}{\text{CF}}$$

Phantom Daytona and Laguna

N = Number of Events

NEE = Number of Engines Per Event

TBT = Total Burn Time (s) (only emissions under 3,000 feet agl)

EF = Emission Factor (lb/s)

CF = Conversion Factor (lbs to tons)

$$Total\ Emissions = \frac{N \text{ x } E \text{ x } NEE \text{ x } EF}{\text{CF}}$$

Table G-1. Vehicle and event specifications and emissions factors used to calculate Vaya and Phantom emissions estimates for launch and static fire emissions.

Emissions	Number of Events	# Engines	Flow Rate Per Engine (kg/s)	Total Burn Time Below 3,000 feet (s)	Emission Factor			Emission Estimates (tons)					
					CO (g/Kg)	CO2 (g/Kg)	Nox (lb/s)	VOC	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$
Vaya 2 Engine Static Fire[1]	1	2	50	5	7.0692	19.864	-	0.00	0.00	0.00	0.00	0.00	0.00
Vaya 4 Engine Static Fire[1]	1	4	50	5	7.0692	19.864	-	0.00	0.00	0.01	0.00	0.00	0.00
Vaya 6 Engine Static Fire[1]	1	6	50	590	7.0692	19.864	-	0.00	0.00	1.38	0.00	0.00	0.00
Vaya Dauntless Launches[1]	26	6	50	14	7.0692	19.864	-	0.00	0.00	0.85	0.00	0.00	0.00
Phantom Daytona Launches[2]	13	9		29	-	-	2.313	0.00	3.92	0.00	0.00	0.00	0.00
Phantom Daytona Static Fires[2]	13	1		20	-	-	2.313	0.00	0.30	0.00	0.00	0.00	0.00
Phantom Laguna Launches[2]	13	3		24	-	-	2.313	0.00	1.08	0.00	0.00	0.00	0.00
Phantom Laguna Static Fires[2]	13	1		20	-	-	2.313	0.00	0.30	0.00	0.00	0.00	0.00
Site Construction (Phase 1 - 2026)[3]								0.06	0.33	0.44	0.00	0.01	0.01
Site Construction (Phase 2 - 2027) [3]								0.04	0.02	0.31	0.00	0.01	0.01
Total								**0.10**	**5.94**	**2.99**	**0.00**	**0.02**	**0.02**
DAF Insignificance Threshold								250.00	250.00	250.00	250.00	250.00	250.00
Exceeds *de minimis* Level?								**No**	**No**	**No**	**No**	**No**	**No**

Notes:
[1]Emissions factors for Vaya were derived from mass fractions modeling provided by Vaya.
[2]Emissions factors for Phantom are from Environmental Assessment for SpaceX Falcon Launches at Kennedy Space Center and Cape Canaveral Air Force Station, February 2020.
[3]Site construction emissions presented here are provided in detail in the ACAM report below.

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: CAPE CANAVERAL AFS
State: Florida
County(s): Brevard
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Vaya/Phantom Contstruction

- Project Number/s (if applicable):

- Projected Action Start Date: 3 / 2026

- Action Purpose and Need:

- Action Description:
Construction of pad and support facilities

- Point of Contact
Name: Lawrence F. Wolski
Title: Technical Projects Director
Organization: ManTech Incorporated
Email:
Phone Number:

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Phase 1 Construction Activities
3.	Construction / Demolition	Phase II

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Brevard
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Phase 1 Construction Activities

- Activity Description:
Heavy Equipment List - Phase 1

- Activity Start Date
Start Month: 3
Start Month: 2026

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity End Date
Indefinite: False
End Month: 4
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.059721
SO_x	0.001034
NO_x	0.331964
CO	0.442731
PM 10	0.012824

Pollutant	Total Emissions (TONs)
PM 2.5	0.012824
Pb	0.000000
NH_3	0.000388
CO_2e	101.3

2.1 Building Construction Phase

2.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 2
Number of Days: 0

2.1.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 1
Height of Building (ft): 10
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	1	6.7
Cranes Composite	1	5
Dumpers/Tenders Composite	1	6.25
Excavators Composite	1	3
Graders Composite	1	5
Pavers Composite	1	1
Pumps Composite	1	3
Rollers Composite	1	4
Rubber Tired Dozers Composite	1	5
Rubber Tired Loaders Composite	1	2.5
Skid Steer Loaders Composite	1	0.5
Tractors/Loaders/Backhoes Composite	2	5

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Cement and Mortar Mixers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0085	0.0001	0.0533	0.0413	0.0020	0.0020	0.0007	7.2673
Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Dumpers/Tenders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0091	0.0001	0.0581	0.0313	0.0021	0.0021	0.0008	7.6451
Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0559	0.0013	0.2269	0.5086	0.0086	0.0086	0.0050	119.70
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Pavers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0717	0.0008	0.3858	0.4744	0.0219	0.0219	0.0064	78.094
Pumps Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0269	0.0005	0.2079	0.2616	0.0078	0.0078	0.0024	49.667
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0409	0.0007	0.2500	0.3762	0.0122	0.0122	0.0036	67.123
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Rubber Tired Loaders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0558	0.0012	0.2834	0.4310	0.0120	0.0120	0.0050	108.73

Skid Steer Loaders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0185	0.0003	0.1353	0.2104	0.0019	0.0019	0.0016	30.315
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.217	000.002	000.097	003.798	000.003	000.003		000.024	00318.106
LDGT	000.234	000.003	000.176	004.231	000.004	000.004		000.026	00412.011
HDGV	000.995	000.006	000.827	014.430	000.023	000.021		000.052	00945.995
LDDV	000.053	000.001	000.078	003.752	000.003	000.002		000.008	00323.574
LDDT	000.060	000.001	000.117	002.519	000.003	000.003		000.008	00374.999
HDDV	000.103	000.004	002.324	001.630	000.044	000.041		000.032	01247.498
MC	003.040	000.003	000.567	012.758	000.024	000.021		000.052	00387.105

2.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

- Activity Location
County: Brevard
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Phase II

- Activity Description:
Phase II Heavy Equipment

- Activity Start Date
Start Month: 10
Start Month: 2026

- Activity End Date
Indefinite: False
End Month: 11
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.041955
SO_x	0.000773

Pollutant	Total Emissions (TONs)
PM 2.5	0.007818
Pb	0.000000

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NO_x	0.210864
CO	0.309037
PM 10	0.007818

NH_3	0.000358
CO_2e	76.9

3.1 Building Construction Phase

3.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 2
Number of Days: 0

3.1.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 1
Height of Building (ft): 10
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	1	2
Excavators Composite	1	2
Graders Composite	1	3
Off-Highway Trucks Composite	1	4
Pavers Composite	1	0.65
Pumps Composite	1	2
Rollers Composite	1	2
Rubber Tired Dozers Composite	1	3
Rubber Tired Loaders Composite	1	2
Skid Steer Loaders Composite	1	2
Tractors/Loaders/Backhoes Composite	2	2.5

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

3.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Cement and Mortar Mixers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0085	0.0001	0.0533	0.0413	0.0020	0.0020	0.0007	7.2673
Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0559	0.0013	0.2269	0.5086	0.0086	0.0086	0.0050	119.70
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Off-Highway Trucks Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1140	0.0026	0.4769	0.5384	0.0142	0.0142	0.0102	260.32
Pavers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0717	0.0008	0.3858	0.4744	0.0219	0.0219	0.0064	78.094
Pumps Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0269	0.0005	0.2079	0.2616	0.0078	0.0078	0.0024	49.667
Rollers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0409	0.0007	0.2500	0.3762	0.0122	0.0122	0.0036	67.123
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Rubber Tired Loaders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0558	0.0012	0.2834	0.4310	0.0120	0.0120	0.0050	108.73
Skid Steer Loaders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0185	0.0003	0.1353	0.2104	0.0019	0.0019	0.0016	30.315
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.217	000.002	000.097	003.798	000.003	000.003		000.024	00318.106
LDGT	000.234	000.003	000.176	004.231	000.004	000.004		000.026	00412.011
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LDDV	000.053	000.001	000.078	003.752	000.003	000.002		000.008	00323.574

LDDT	000.060	000.001	000.117	002.519	000.003	000.003		000.008	00374.999
HDDV	000.103	000.004	002.324	001.630	000.044	000.041		000.032	01247.498
MC	003.040	000.003	000.567	012.758	000.024	000.021		000.052	00387.105

3.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

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VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

APPENDIX H – SOUND

Background & Regulatory Requirements

H.1 Definition of Sound and Characteristics

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although continuous and extended exposure to high noise levels (e.g., through occupational exposure) can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual.

The perception and evaluation of sound involves three basic physical characteristics:

Intensity – the acoustic energy, which is expressed in terms of sound pressure, in decibels (dB)
Frequency – the number of cycles per second the air vibrates, in Hertz (Hz)
Duration – the length of time the sound can be detected

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. The primary human response to noise is annoyance, which is defined by the United States (U.S.) Environmental Protection Agency (EPA) as any negative subjective reaction on the part of an individual or group (U.S. Environmental Protection Agency 1974). The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual. While aircraft are not the only sources of noise in an urban or suburban environment, they are readily identified by their noise output.

H.2 Sound Intensity and Weighting

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be heard. Because of this vast range, it is unwieldy to use a linear scale to represent the intensity of sound. As a result, a logarithmic unit known as the decibel represents the intensity or amplitude of a sound, also referred to as the sound level. The dB scale simplifies the broad range of encountered sound pressures detected by the human ear and allows the measurement of sound to be more easily understood. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 and 140 dB are felt as pain (Berglund 1995).

All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second or Hz. To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements are usually on an "A-weighted" scale, which places less weight on very low and very high frequencies in order to replicate human hearing sensitivity. The general range of human hearing is from 20 to 20,000 cycles per second, or Hz; humans hear best in the range of 1,000–4,000 Hz. A-weighting is a frequency-dependent adjustment of sound level used to approximate the natural range and sensitivity of the human auditory system. Table H-1 provides a comparison of how the human ear perceives changes in loudness on the logarithmic scale.

Table H-1: Subjective Responses to Changes in A-Weighted Decibels

Change	Change in Perceived Loudness
3 dB	Barely perceptible
5 dB	Quite noticeable
10 dB	Dramatic – twice or half as loud
20 dB	Striking – fourfold change

Note: dB = decibel(s)

Figure H-1 provides a chart of A-weighted sound levels from typical noise sources (Cowan 1994; Harris 1979). Some noise sources (e.g., air conditioner, vacuum cleaner) are continuous sounds that maintain a constant sound level for some period of time. Other sources are time-varying events and reach a maximum sound level during an event, such as a vehicle passing by. Sounds can also be part of the ambient environment (e.g., urban daytime, urban nighttime) and are described by averages taken over extended periods. A variety of noise metrics has been developed to describe noise, particularly aircraft noise, in different contexts and over different time periods.

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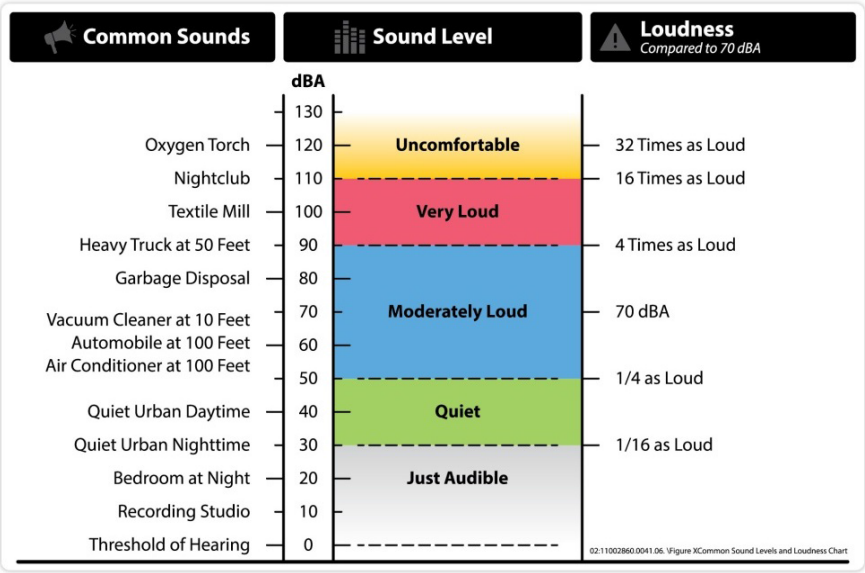


Figure H-1: A-Weighted Sound Levels from Typical Sources

H.3 Sound Metrics

A "metric" is a system for measuring or quantifying a particular characteristic of a subject. Since noise is a complex physical phenomenon, different noise metrics help to quantify the noise environment. The Day-Night Average Sound Level (DNL) metric is the energy-averaged sound level measured over a 24-hour period, with a 10 dB nighttime adjustment to account for heightened human sensitivity to noise when ambient sound levels are low, such as when sleep disturbance could occur. DNL does not represent a sound level heard at any given time but instead represents long-term exposure. Scientific studies have found good correlation between the percentages of groups of people highly annoyed and the level of their average noise exposure measured in DNL (U.S. Department of the Navy et al. 1978; U.S. Environmental Protection Agency 1999). DNL is the primary metric used to determine noise impacts by the U.S. Department of Housing and Urban Development, Federal Aviation Administration (FAA), and EPA.

H.4 Sound Propagation

In an ideal setting in which sound propagates away from a point source without any outside influence (e.g., a barrier reflecting or attenuating the sound), sound energy radiates uniformly outward in all directions from the source in a pattern referred to as spherical spreading. As sound energy propagates away from the sound source, both the sound level and frequency change. For each doubling of distance from the source, the sound level attenuates (or drops off) at a rate of 6 dBA.

In a real-world setting, a number of factors can influence how sound propagates in the environment; the ideal case of spherical spreading is at best only an approximation of attenuation with distance. Wind has been shown to be the single most important meteorological factor within approximately 500 feet (152 meters) of the sound source, while vertical air temperature

gradients are more important in sound propagation over longer distances. Other atmospheric conditions such as air temperature, humidity, and turbulence also can have a major effect on received sound levels.

Whether natural or manmade, a large object or barrier in the path between a sound source and a receptor can attenuate sound levels substantially. The impact of this shielding depends on the size and material of the object as well as the frequency content of the sound source. Natural terrain, buildings, and walls can serve as noise barriers in which attenuation of 5–10 dB is often not noticeable.

H.5 Noise Control Act

The Noise Control Act (NCA) (42 United States Code 4901 et seq.) sought to limit the exposure and disturbance that individuals and communities experience from noise. It focuses on surface transportation and construction sources, particularly near airport environments. The NCA also specifies that performance standards for transportation equipment be established with the assistance of the U.S. Department of Transportation. Section 7 of the NCA regulates sonic booms and gave the FAA regulatory authority after consultation with the EPA. Furthermore, the 1987 Quiet Community amendment gave state and local authorities greater involvement in controlling noise.

H.6 Ambient Sound Guidance Documents

Ambient sound standards regulate ambient sound levels through time-averaged sound limits. Sound standards for land use compatibility established by DoD and civilian jurisdictions are expressed in terms of the DNL.

H.7 Federal Interagency Committee on Urban Noise Criteria

The federal government has established suggested land use compatibility criteria for different noise zones. However, land use compatibility with differing noise levels is regulated at the local level (Federal Interagency Committee on Urban Noise 1980). Residential areas and schools are considered compatible where the DNL is less than or equal to 65 dBA, and outdoor recreational activities are compatible with noise levels less than or equal to 70 dBA. Furthermore, parks are compatible with noise levels less than or equal to 75 dBA based on Land Use Guidelines.

H.8 U.S. Environmental Protection Agency Noise Standards

The level of environmental noise at which no measurable hearing loss would be expected to occur over a lifetime, as identified by the EPA, is a 24-hour exposure level of 70 dB (U.S. Environmental Protection Agency 1974).

H.9 Bibliography

Cowan, J. P. 1994. Handbook of Environmental Acoustics. New York, NY: John Wiley & Sons.

Federal Interagency Committee on Urban Noise. 1980. Guidelines for Considering Noise in Land Use Planning and Control. Washington, DC: U.S. Environmental Protection Agency, U.S. Department of Transportation, U.S. Department of Housing and Urban Development, U.S. Department of Defense, and Veterans Administration.

Harris, C. 1979. Handbook of Noise Control. New York, NY: McGraw-Hill.

U.S. Department of the Navy, U.S. Department of the Air Force, and U.S. Department of the Army. 1978. Environmental Protection: Planning in the Noise Environment. (AFM 19-10 TM 5-803-2). Washington, DC.

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APPENDIX I – COASTAL ZONE MANAGEMENT ACT CONSISTENCY DETERMINATION

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FEDERAL AGENCY COASTAL ZONE MANAGEMENT ACT CONSISTENCY DETERMINATION

The Coastal Zone Management Act (CZMA) requires that federal agency activities be fully consistent with a state's approved coastal management program, to the extent practicable, unless consistency is prohibited by federal law. Federal agencies comply with this requirement by providing a statement determining consistency with the state's coastal management program as well as supporting documentation. The following is the Department of the Air Force's (DAF's) Consistency Determination under CZMA Section 307 and 15 Code of Federal Regulations (CFR) Part 930 and in accordance with the state of Florida's approved Coastal Management Program.

This Consistency Determination addresses the proposal by the DAF to authorize the redevelopment of Space Launch Complex (SLC)-13, an existing SLC on Cape Canaveral Space Force Station (CCSFS; Figure 1), into a Vaya and Phantom Launch Complex (VPLC) to support the Vaya Space (Vaya) Dauntless and Phantom Space Corporation (Phantom) Daytona and Laguna launch programs. This Consistency Determination also addresses the Federal Aviation Administration's (FAA's) issuance of a vehicle operator license, along with potential renewals and modifications to licenses, to Vaya for Dauntless operations at CCSFS and Phantom for Daytona and Laguna operations at CCSFS and approval of related airspace closures. The DAF is the lead agency for the Proposed Action and is responsible for the scope and content of this Environmental Assessment (EA). The FAA, National Aeronautics and Space Administration (NASA), and United States Coast Guard (USCG) are cooperating agencies.

Proposed Federal Agency Action

The purpose and need of the Proposed Action as well as the Proposed Action description are provided in Chapters 1 and 2 of the Environmental Assessment.

Federal Consistency Review

The Florida Coastal Management Program is a network of 24 Florida statutes administered by eight state agencies and five water districts. A consistency review of those Florida statutes is considered in the analysis of the Proposed Action and is discussed in Table 1. Pursuant to 15 CFR § 930.41, the Florida State Clearinghouse has 60 days in which to concur with or object to this Consistency Determination, or to request an extension, in writing, under 15 CFR § 930.41(b). Florida's concurrence will be presumed if the DAF does not receive its response on the 60th day following the Florida State Clearinghouse's receipt of this Consistency Determination.

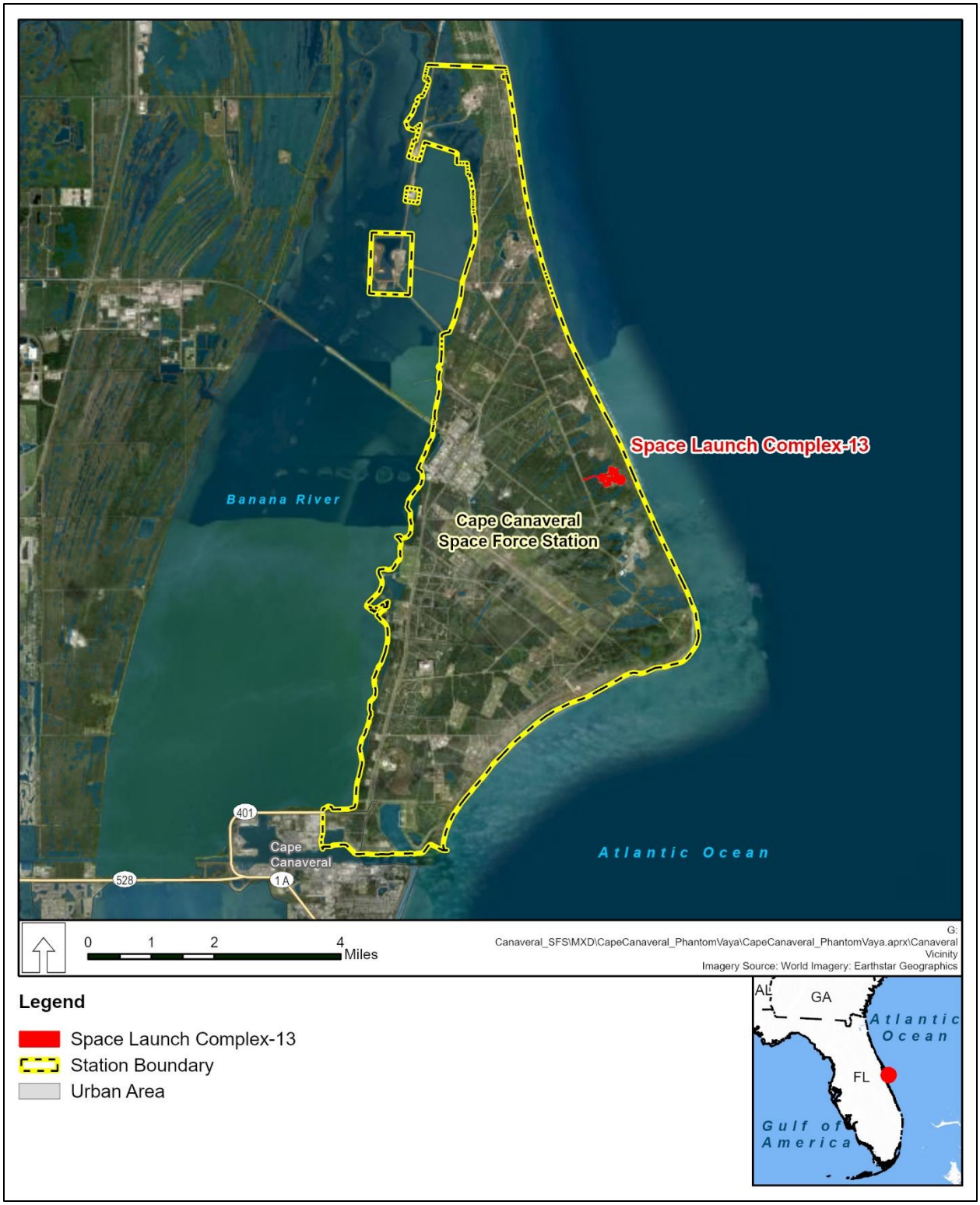


Figure 1. Location of Cape Canaveral Space Force Station and Space Launch Complex-13

1 **Table 1. Florida Coastal Management Program Consistency Review**

Florida Statute	Scope	Consistency Determination
Chapter 161, *Beach and Shore Preservation*	Provides policy for the regulation of construction projects located seaward of the mean high-water line and establishes beach and shore preservation districts.	The Proposed Action does not affect beach and shore preservation efforts and is consistent with this statute.
Chapter 163, Part II, *Intergovernmental Programs: Growth Policy, County and Municipal Planning, Land Development Regulation*	Provides for the implementation of comprehensive planning programs to guide and control future development of the state, including the State Comprehensive Plan.	The Proposed Action would not alter any state comprehensive planning efforts and is consistent with this statute.
Chapter 186, *State and Regional Planning*	Provides for intergovernmental coordination, offers direction for the delivery of governmental services, serves a means for defining and achieving the specific goals of the state, and presents a method for evaluating the accomplishment of those goals in regard to the State Comprehensive Plan.	The Proposed Action was coordinated with federal, state, and local governments and agencies, including the Florida State Clearinghouse.
Chapter 252, *Emergency Management*	Creates a state emergency management agency; directs the state to reduce the vulnerability of its people and property to natural and human-made disasters; prepares for, responds to, and reduces the impacts of disasters; and decreases the time and resources needed to recover from disasters.	The Proposed Action would not alter emergency response by the state or local governments and would not increase the vulnerability of people to disasters.
Chapter 253, *State Lands*	Governs the acquisition, administration, management, control, supervision, conservation, protection, and disposition of all public lands, including submerged state lands.	The Proposed Action would not involve any property acquisition or management and is consistent with this statute.

Florida Statute	Scope	Consistency Determination
Chapter 258, *State Parks and Preserves*	Authorizes the state to manage state parks and preserves.	The Proposed Action would not directly impact state park lands or preserves. Some increased noise from launch operations may be perceptible at state parks and preserves; however, launch noise from proposed Phantom and Vaya launch operations would be similar to the noise already experienced at these nearby state parks and preserves from ongoing launch operations at Cape Canaveral Space Force Station and Kennedy Space Center. CCSFS has coordinated with the Florida Department of Environmental Protection on potential noise impacts on state parks and preserves through the US Department of Transportation Act Section 4(f) process.
Chapter 259, *Land Acquisitions for Conservation or Recreation*	Addresses the acquisition of land for environmental, conservation, and recreational purposes.	The Proposed Action would not affect the opportunity for acquisition or use of state lands.
Chapter 260, *Florida Greenways and Trails Act*	Provides planning for a system of multipurpose greenways and trails.	The Proposed Action would not alter the planning, development, and use of greenways and trails.
Chapter 267, *Historical Resources*	Addresses the management and preservation of the state's archaeological and historical resources.	The Proposed Action would have no effect on the state's archaeological and historical resources and is consistent with this statute.
Chapter 288, *Commercial Development and Capital Improvements*	Promotes and provides guidance for general business, trade, and tourism components of the state economy.	The Proposed Action would not inhibit or adversely impact the economic development efforts of Brevard County or the state. Alternatively, Brevard County uses its preeminence in worldwide space launch activities as a tourism draw and benefits economically from these activities. Brevard County uses the marketing moniker "Space Coast" to attract rocket launch-related tourism and businesses.
Chapter 334, *Transportation Administration*	Authorizes the planning and development of transportation systems.	The Proposed Action would not adversely impact any local or state transportation system and would not alter transportation patterns.

Florida Statute	Scope	Consistency Determination
Chapter 339, *Transportation Finance and Planning*	Addresses the financial and planning needs of the state's transportation system.	No impacts would occur to the financing of the state's transportation planning system as a result of the Proposed Action.
Chapter 373, *Water Resources*	Provides the authority to regulate the withdrawal, diversion, storage, and consumption of water within the state.	The Proposed Action would not impact the water resources of the state.
Chapter 375, *Outdoor Recreation and Conservation Lands*	Addresses the development of a comprehensive multipurpose Outdoor Recreation Plan, with the purpose of documenting recreational supply and demand, describing current recreational opportunities, estimating the need for additional recreational opportunities, and proposing the means to meet the identified needs.	The Proposed Action would not impact the state's recreation and conservation lands or recreational opportunities within the state. However, on launch days, there is the possibility of temporary restricted access at Merritt Island National Wildlife Refuge and Canaveral National Seashore due to high visitor volume. CCSFS has coordinated with the US Fish and Wildlife Service and National Park Service on potential noise impacts through the US Department of Transportation Act Section 4(f) process.
Chapter 376, *Pollutant Discharge Prevention and Removal*	Regulates transfer, storage, and transportation of pollutants, and cleanup of pollutant discharges.	No new or additional pollutants would be discharged as a result of the Proposed Action.
Chapter 377, *Energy Resources*	Addresses regulation, planning, and development of the energy resources of the state.	The Proposed Action would not adversely impact any energy resources of the state that are limited in availability. There would be no substantial increase in fuel demand from the implementation of the Proposed Action.

Florida Statute	Scope	Consistency Determination
Chapter 379, *Fish and Wildlife Conservation*	Establishes the framework for the management and protection of the state of Florida's fish and wildlife resources.	The proposed action would have minor impacts on biological resources. Direct impacts on vegetation and wildlife would occur from the conversion of 6,500 square feet of turf areas to pavement for road access improvements. The DAF prepared a Biological Assessment for Endangered Species Act Section 7 consultation and will complete formal consultation with the US Fish and Wildlife Service prior to the implementation of the proposed Phantom and Vaya launch program.
Chapter 380, *Land and Water Management*	Establishes procedures for land and water management to guide local decisions relating to growth and development. Provides for the Area of Critical State Concern Program and the Coastal Infrastructure Policy.	The Proposed Action would be consistent with all local and state Land and Water Management Plans.
Chapter 381, *Public Health: General Provisions*	Establishes public policy concerning the public health of the state.	The Proposed Action would not impact public policy regarding public health.
Chapter 388, *Mosquito Control*	Provides for comprehensive mosquito control efforts in the state.	The Proposed Action would not affect local or state mosquito control efforts or contribute to the increased propagation of mosquitoes.
Chapter 403, *Environmental Control*	Authorizes the state to regulate air and water pollution.	The Proposed Action would not cause an increase in air and water pollution. Air pollutants from launch activities would be de minimis and not contribute to any regional or state air quality concerns. All deluge water would be contained on site and an evaporation pond utilized to ensure that deluge water would not join any surface water or groundwater.
Chapter 553, *Building and Construction Standards*	Addresses building construction standards and provides for a unified Florida Building Code.	Phantom and Vaya will build the facilities in compliance the DAF building construction requirements and with the Florida Building Codes and will ensure that facilities are Americans with Disabilities Act compliant.

Florida Statute	Scope	Consistency Determination
Chapter 582, *Soil and Water Conservation*	Provides the Department of Agriculture policy regarding the control and prevention of soil erosion.	The Proposed Action would not affect soils or farmland and is consistent with this statute.
Chapter 597, *Aquaculture*	Establishes policy concerning the cultivation of aquatic organisms of the state.	No impacts on aquaculture locally or in the state would occur from the implementation of the Proposed Action.

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