



FALCON 9 POST LAUNCH REPORT #2

BOOSTER RE-ENTRY AND LANDING IN EXUMA SOUND, BAHAMAS



Submitted to:

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Table 1-1. Permitting Record. DEPP = Department of Environmental Planning and Protection, p = physical submission, d = digital submission.

Name / Type of Document	Date Submitted / Received
DEPP communication to SpaceX Reference DEPP/DEV/EXU/ISL/EIA/	1 March 2024
Environmental Baseline Statement (EBS) submitted to DEPP	25 March 2024
DEPP letter sent to BRON – Re: SpaceX, Starlink, Exuma Sound Booster Re-entry, EBS	4 April 2024
Environmental Management Plan (EMP) Terms of Reference (TOR) submitted to DEPP	1 May 2024
DEPP communication approving EMP TOR	15 May 2024
EMP submitted to DEPP	19 June 2024 d 25 June 2024 p
Launch Coordination Meeting with Project Team	16 January 2025
Certificate of Environmental Clearance (CEC) application submitted to DEPP	17 January 2025
EMP update submitted to DEPP	17 February 2025
Certificate of Environmental Clearance Landing #2 submitted to DEPP	15 April 2025 d 17 April 2025 p
Post Launch Report submitted to DEPP	17 April 2025 d 25 April 2025 p
Environmental Impact Assessment (EIA) Terms of Reference submitted to DEPP	30 April 2025 d 2 May 2025 p
DEPP Letter to BRON File Ref: DEPP/DEV/NP/50	8 May 2025
Post Launch Report Revision 1 submitted to DEPP	30 May 2025
EIA submitted to DEPP	17 June 2025 d and p
EIA Revision 1 submitted to DEPP	1 August 2025 d 5 August 2025 p
DEPP letter sent to BRON – Re: Review of revised EIA FILE REF: DEPP/DEV/NP/50	25 August 2025 d
EIA Revision 2 submitted to DEPP	29 August 2025 d 1 September 2025 p
Public Consultation Report (PCR) submitted to DEPP	25 November 2025 d 27 November 2025 p
DEPP Letter Re: Review of Public Consultation Report FILE REF: DEPP/DEV	2 December 2025 d
Public Consultation Report Revision 1 submitted to DEPP	10 December 2025 d 11 December 2025 p
Environmental Management Plan Revision 1 submitted to DEPP	18 December 2026 d
Environmental Management Plan Revision 2 submitted to DEPP	21 January 2026 d 22 January 2026 p
DEPP EMP Revision 2 approved to post on website	23 January 2026 d



Certificate of Environmental Clearance	26 January 2026 d
Environmental Management Plan with Public Consultation Report Appendix made available online	27 January 2026 d
Post Launch Report #2 submission to DEPP	17 April 2026 d





1 EXECUTIVE SUMMARY

Environmental monitoring was conducted in support of the SpaceX Falcon9 booster reentry exercise in Exuma Sound, The Bahamas, to assess marine, terrestrial, acoustic, and ambient environmental conditions before, during, and after the landing event. This activity builds on the successful February 18, 2025 landing, which demonstrated the feasibility of conducting booster recovery operations within Bahamian waters without measurable adverse environmental effects.

The 2026 monitoring program represents a significant advancement over the previous year through the expansion of the observation window to seven days prior to and seven days following the landing. This extended monitoring period improved the ability to compare baseline, during-activity, and post-activity conditions and increased overall confidence in the assessment results.

Monitoring activities included marine surveys within the Minimum Safe Area (MSA), marine mammal observations from vessel-based and aerial platforms, water quality sampling, hydroacoustic monitoring, terrestrial avian surveys, and community-based sound perception assessments. Acoustic monitoring was conducted both in-air and underwater using calibrated instrumentation and hydrophone deployments, supplemented by sound mapping surveys across New Providence, Eleuthera, and Cat Island.

The results demonstrate that the booster landing did not result in measurable adverse environmental impacts.

- Water quality parameters remained consistent with expected baseline conditions, with no evidence of sustained impacts or environmental degradation.
- Marine observations indicated normal ecological activity, including active feeding behavior, with marine mammals observed only during the early pre-landing period and not during or after the landing event.
- Acoustic monitoring confirmed the occurrence of the sonic boom associated with the landing event. Measured sound levels and hydroacoustic data demonstrate that while the event was clearly detectable, it remained below established thresholds associated with marine mammal injury or permanent hearing effects. Community-based observations indicate that the sonic boom was widely perceived across multiple islands, with responses primarily characterized by perceived loudness and brief startle reactions. While a localized startle response was observed in some terrestrial fauna and reported within nearby communities, no sustained behavioral or structural impacts were identified.
- Terrestrial monitoring similarly demonstrated stable environmental conditions, with no measurable changes in avian diversity or abundance before and after the landing event.
- Ambient environmental conditions remained within expected ranges throughout the monitoring period.



- Operational and environmental factors, including weather conditions, access constraints to the immediate landing area, and minor equipment limitations, influenced certain aspects of data collection. However, these factors did not compromise the overall findings.
- All monitored environmental parameters remained within acceptable ranges, and no EMP trigger thresholds were exceeded during the monitoring period based on verified field data.

Acoustic monitoring and community-based sound mapping provide a consistent and integrated interpretation of the sonic boom. Instrumentation confirmed that the event was short in duration and below thresholds associated with ecological harm, while community responses indicate that although the event was perceptible and occasionally startling, its effects were temporary and non-persistent.

The expanded monitoring program significantly improved data confidence relative to previous exercise. Continued implementation and refinement of this integrated monitoring approach is recommended to further strengthen long-term environmental understanding and support future landing operations in Exuma Sound.

2 INTRODUCTION

2.1 OVERVIEW OF FALCON9 OPERATIONS IN THE BAHAMAS

Space Exploration Technologies Corp. (SpaceX), an American aerospace manufacturer and space transportation company, successfully conducted the first Falcon 9 booster landing within Bahamian waters on February 18, 2025. The landing occurred on an autonomous droneship stationed in the Exuma Sound, marking a historic milestone as the first international Falcon 9 landing of its kind.

This operation was facilitated through a private public partnership between SpaceX and the Government of The Bahamas, led by the Ministry of Tourism, Investments and Aviation. Under this agreement, multiple Falcon9 booster reentry and landing operations are planned within Bahamian territory, subject to environmental review and approval by the Department of Environmental Planning and Protection (DEPP) and relevant regulatory agencies, including the Civil Aviation Authority of The Bahamas (CAA-B).

As part of this partnership, SpaceX has committed to several national development initiatives, including the donation of Starlink satellite internet terminals to schools across The Bahamas, a financial contribution of \$1 million to the University of The Bahamas, and support for satellite-based research initiatives aimed at advancing national capacity in science and technology.

Falcon 9 operations within The Bahamas involve the controlled reentry of the first-stage booster following orbital launch, culminating in a precision landing on a droneship positioned offshore in



the Exuma Sound. These operations are short in duration (typically approximately eight minutes from launch to landing) but have the potential to generate environmental impacts, including a sonic boom and localized marine disturbances.

To support regulatory compliance and environmental stewardship, a Post Launch Reports (PLR) will be prepared following each mission. The purpose of the PLR is to document environmental conditions before, during, and after each landing event, and to evaluate any potential impacts associated with the mission. Monitoring typically includes ambient air quality, underwater and atmospheric sound levels, and water quality, as well as biodiversity observations. Biological monitoring focuses on avian species at selected terrestrial locations proximate to the landing site and marine species within the Exuma Sound, including fish, marine mammals, and other pelagic organisms.

The landing incorporated participation from Bahamian personnel across environmental monitoring, regulatory oversight, and operational support roles. BRON engaged four subconsultants (totaling five personnel) and one intern, in addition to its core team of eight staff. The Department of Environmental Planning and Protection (DEPP) was also present on-site, with five representatives participating in monitoring activities. Additional local involvement was facilitated through project logistics and support services, including vessel operations, accommodation, transportation, and fuel supply within Eleuthera and Cat Island. This level of local engagement contributed to the implementation of monitoring activities and supported broader economic participation associated with the landing.

The second Falcon 9 booster reentry and landing operation was conducted on February 19, 2026, following the issuance of a Certificate of Environmental Clearance (CEC) by the DEPP and the necessary approvals from CAA-B. Findings from this and subsequent missions will continue to inform an adaptive management approach, ensuring that environmental safeguards remain effective and that operations are conducted in a responsible and sustainable manner.

2.2 PURPOSE OF THE POST LANDING MONITORING PROGRAM

The purpose of the Post Landing Monitoring Program is to systematically assess, and document environmental conditions associated with Falcon9 booster reentry and landing operations within Bahamian waters. The Program has been developed to fulfill the monitoring and reporting requirements outlined by the Department of Environmental Planning and Protection (DEPP) as part of the Certificate of Environmental Clearance (CEC) issued.

The monitoring program is designed to evaluate potential environmental effects arising from each landing event by collecting data before, during, and after the landing. Key parameters include ambient air and noise quality, atmospheric and underwater noise levels, water quality, and



biological observations, with a focus on avian and marine species within and adjacent to the Exuma Sound.

A central objective of the program is to verify predicted impacts and determine whether operational activities result in measurable changes to environmental conditions. This includes assessing the extent, duration, and significance of any observed effects, particularly in relation to sensitive marine ecosystems and wildlife.

In addition, the Post Landing Monitoring Program supports an adaptive management approach by providing data-driven insights that inform ongoing environmental management and regulatory decision-making. Findings from each monitoring event are used to refine mitigation measures, improve monitoring methodologies, and ensure that future operations are conducted in a manner that minimizes environmental risk and aligns with national environmental protection objectives.

2.3 SUMMARY OF LANDING EVENTS

2.3.1 Landing 1 (February 18th, 2025 - Mission Overview)

The mission followed a standard Falcon9 flight profile, whereby the first-stage booster separated from the second stage and executed a controlled descent to the dronship, generating a sonic boom which sounded like 3 distinct sounds, upon approach and landing. Concurrently, the payload fairing, designed to protect the satellite payload during ascent, was deployed and descended via a parachute and parafoil system to designated recovery zones as planned. Both fairing halves, as well as associated parachute and parafoil systems, were successfully recovered by dedicated support vessels, consistent with SpaceX's operational objective of maximizing equipment reuse and minimizing marine debris.

Following landing and recovery operations, the secured booster and associated recovery assets transited safely from the Exuma Sound back to Florida for refurbishment and reuse in future missions. Environmental monitoring was conducted before, during, and after the landing event, where possible, including marine surveys at the landing site, terrestrial avian surveys on nearby islands, and the collection of ambient environmental data (air quality, water quality, weather, and acoustic conditions). A sonic boom was observed at touchdown. However, no visible surface contamination, debris, or anomalies in environmental parameters were recorded. Observed environmental conditions remained within expected baseline ranges, with only temporary and localized biological responses, such as brief seabird startle behavior. The final [Post Launch Report](#) is available online.

2.3.2 Landing 2 (February 19th, 2026, Mission Overview)

As with the initial mission, the Falcon9 first-stage booster successfully completed re-entry and was recovered on an autonomous dronship stationed within the Exuma Sound. The landing



location and operational approach remained consistent with the first landing, reflecting continued adherence to established environmental safeguards and regulatory expectations.

The mission followed a standard flight and recovery profile, including stage separation, controlled descent of the first-stage booster, and the generation of a sonic boom during re-entry and landing. The sonic boom was characterized by three distinct acoustic signatures associated with the re-entry and landing sequence. Payload fairing halves were deployed and descended via parachute and parafoil systems into designated offshore recovery zones. Recovery operations were conducted by support vessels, with efforts focused on retrieval and reuse of fairing components and associated equipment.

Environmental monitoring activities were conducted before, during, and after the landing event in accordance with the approved monitoring framework in the [Environmental Management Plan](#). The monitoring program for Landing 2 expanded upon the initial mission by incorporating a seven-day pre-landing and seven-day post-landing observation window, as well as enhanced spatial coverage across the Exuma Sound, Cat Island, and South Eleuthera.

A sonic boom associated with the landing was observed and recorded across multiple monitoring locations. Concurrent environmental monitoring was undertaken to assess potential marine, terrestrial, and atmospheric responses to the event.

Observations from Cat Island were consistent with those recorded at other monitoring locations, supporting the interpretation that conditions observed during the monitoring period reflect broader environmental variability rather than localized effects associated with the landing.

The second landing further validated both the operational approach and the environmental management framework established for Falcon9 recovery activities in The Bahamas. The enhanced monitoring program implemented for this mission provides a more comprehensive dataset to support evaluation of environmental conditions associated with landing events and reinforces the effectiveness of existing mitigation and monitoring measures.

2.4 OBJECTIVES OF THE CONSOLIDATED REPORT

The objective of this Consolidated Post Launch Report is to integrate and evaluate environmental monitoring data collected during the first and second Falcon9 booster reentry and landing operations conducted within the Exuma Sound. This PLR was prepared in accordance with guidance provided by the Department of Environmental Planning and Protection (DEPP), with a focus on both individual and cumulative impact assessment. The PLR #2 aims to

- Assess the environmental conditions associated with the second Falcon9 mission independently, including evaluation of air and noise quality, atmospheric and underwater



noise, water quality, and biological observations, to determine whether any measurable impacts occurred.

- Compare monitoring results from the first and second missions to identify trends, consistencies, or variations in environmental responses across missions.
- Evaluate the cumulative effects of multiple landing events within the Exuma Sound, with particular consideration of potential repeated or additive impacts on marine and terrestrial ecosystems.
- Validate or refine previously predicted impact levels and the effectiveness of implemented mitigation measures, in the event mitigation measures were required.
- Provide evidence-based conclusions regarding the significance, extent, and duration of observed environmental effects.

3 METHODOLOGY

3.1 MARINE SURVEYS

Marine Species Observation Methodology

Marine species observations were conducted using a standardized monitoring form ([Appendix A](#)) to ensure consistent and comprehensive data collection across all survey periods. The methodology incorporated both environmental parameters and biological observations to support accurate assessment of species presence and distribution within the project area.

Each survey was conducted by BRON, with the observer(s) recorded at the start of each monitoring session. Monitoring effort included documentation of start and end times, ensuring that only active survey periods were considered for analysis. Any changes in observers or breaks in monitoring were recorded accordingly.

At the beginning of each survey and at regular intervals throughout the monitoring period, key environmental parameters were recorded, including:

- Weather conditions (e.g., sunny, overcast, rainy)
- Ocean conditions (including sea state and surface conditions)
- Tide state (e.g., rising, falling, high, low)
- Air quality (general qualitative observations)
- Coordinates (GPS location of each observation point)

These parameters were used to assess survey conditions and potential influences on species detectability and distribution.

Marine species observations were conducted using a combination of visual survey techniques and remotely operated vehicle (ROV) surveys. Visual surveys were carried out from a vessel at fixed observation points, with observers systematically scanning the surrounding marine environment using the naked eye and visual aids.



To supplement surface observations, a marine ROV was deployed to capture underwater footage and document benthic and mid-water species that may not be visible from the surface. The ROV allowed for enhanced detection and identification of marine organisms, particularly in deeper or low-visibility conditions, and provided additional insight into habitat characteristics within the survey area.

Upon detection of marine organisms, the following information was recorded:

- Common name
- Scientific (species) name
- Taxonomic classification (Phylum)
- Abundance (number of individuals observed)

Where species-level identification was not possible, the lowest possible taxonomic classification was recorded. Observations obtained from both visual surveys and ROV footage were incorporated into the dataset.

All observations were documented in real-time on the monitoring form. Additional comments were included to capture notable observations such as:

- Species behavior (e.g., feeding, schooling, resting)
- Habitat characteristics
- Interactions with vessels or project activities
- Any unusual or noteworthy environmental conditions

3.1.1 Remote Operated Vehicle (ROV) Survey

Overview

Remotely Operated Vehicle (ROV) surveys were conducted to document midwater and near-surface pelagic conditions within the Exuma Trough. The primary objective of these surveys was to obtain visual and photographic records of ambient biological and physical conditions to support baseline ecological characterization of the study area. ROV operations were integrated with concurrent passive acoustic monitoring, with deployments coordinated to minimize interference between survey equipment.

Equipment Description

Surveys were conducted using a QYSEA Fifish ROV, a tethered, remotely operated underwater with the following specifications:

- Maximum Depth Capability: 100 m (328 ft)
- Operational Survey Limit: ~200 m (656 ft)



- Camera System: 4K UHD, 30 FPS
- Lighting: 10,000-lumen dual LED arrays, ~160° illumination
- Thrusters: Six-thruster omnidirectional control
- Tether Length: 200 m
- Live-feed camera system with real-time surface control

The ROV was connected to the surface via a 200 m tether, enabling controlled descents to target depths of up to approximately 300 ft (91 m), subject to prevailing environmental conditions.

Deployment Procedure

At each designated survey station, vessel engines were shut down prior to deployment to:

- reduce acoustic interference with hydrophone recordings
- minimize turbulence and disturbance in the water column

Following vessel stabilization, a hydrophone array was deployed. The ROV deployment was then conducted from the stern of the vessel.

To reduce the risk of entanglement between the ROV tether and the hydrophone array, the ROV was deployed from the opposite side (port or starboard) relative to the hydrophone cable position. Deployment side selection was determined on a station-by-station basis.

Pre-Deployment Calibration and System Checks

Prior to descent, the ROV underwent:

- system calibration
- functional self-checks

These checks verified:

- thruster responsiveness
- camera and recording functionality
- lighting systems
- tether integrity and communication with the surface control unit

After completion of all system checks was the ROV advanced into the water column.

Survey Protocol

A Minimum Safe Area (MSA) with a radius of approximately 5 nautical miles was established around the landing coordinates provided by SpaceX, with the landing location serving as the central reference point. The MSA defined the primary marine survey area for monitoring activities.



The landing coordinates for Landing #2 are presented in [Table 3-1](#), and the extent of the MSA is illustrated in [Figure 3-1](#).

Marine surveys were conducted at the booster landing location (BL) and at designated monitoring stations distributed along the perimeter of the MSA to provide spatial coverage of the surrounding environment. Marine Survey Datasheets were completed during the ROV surveys ([Appendix A](#))

The landing location (BL) was surveyed daily to ensure consistent monitoring of the primary activity area. In addition, up to three (3) perimeter stations were surveyed per day, based on transit time between the survey area and the departure point at Cape Eleuthera Resort. This approach allowed for rotational coverage of the full set of monitoring stations over the survey period while maintaining consistent daily observations at the landing site.

Survey locations were selected to provide representative coverage of the MSA, including areas both proximal and distal to the landing location, enabling assessment of localized and broader environmental conditions.

Table 3-1. Marine Survey locations in the Exuma Sound.

Survey Location	Latitude	Longitude
Point 1 (P1)	24° 33.958'N	76° 27.569'W
Point 2 (P2)	24° 32.962'N	76° 25.697'W
Point (P3)	24° 30.989'N	76° 25.711'W
Point (P4)	24° 30.013'N	76° 27.595'W
Point (P5)	24° 31.010'N	76° 29.467'W
Point (P6)	24° 32.983'N	76° 29.453'W
Landing Location (BL)	24° 31' 59.16" N	076° 27' 34.92" W



Figure 3-1. Survey locations in the Exuma Sound around the landing location (Basemap from Google Earth, 2026)

Hydrophone Verification

Immediately following deployment, the ROV was maneuvered beneath the vessel to:



- visually confirm the position and orientation of the hydrophone array
- perform a depth verification check

This step ensured accurate documentation of hydrophone placement relative to the water column and vessel position.

Vertical Profiling and Ambient Documentation

Following hydrophone verification, the ROV was guided through a vertical survey profile to document ambient conditions within the water column.

The standard survey depths included:

- 91 m (~300 ft) (target depth)
- 46 m (~150 ft) (midwater reference depth)
- 3 m – 10 m (~10 ft – ~30 ft)

At each depth, the ROV operator conducted:

- video recordings
- still image capture in the four cardinal directions

Documentation focused on:

- plankton presence and density
- gelatinous organisms
- fish abundance and behavior
- suspended particulate matter (e.g., marine snow)
- overall water clarity and turbidity

In cases where environmental conditions (e.g., strong currents) prevented reaching 300 ft, the maximum attainable depth was recorded and used as the primary observation depth.

Near-Surface and Roving Survey

Following completion of the vertical profile, the ROV was returned to near-surface depth where a roving survey around the vessel was conducted.

This component of the survey was used to:

- document surface-associated organisms (e.g., neuston, juvenile fish)
- observe interactions with floating material (e.g., sargassum, debris)
- identify any aggregation of marine life in proximity to the vessel



The roving survey provided contextual observations linking subsurface conditions with surface ecological features.

Retrieval Procedure

Upon completion of all survey components, the ROV was carefully retrieved to the vessel via the tether. Retrieval procedures were conducted in a controlled manner to:

- prevent damage to the ROV
- avoid entanglement with deployed equipment
- maintain safety of personnel and instrumentation

Post-Survey Maintenance

At the conclusion of each survey day, routine maintenance procedures were performed to ensure optimal performance and longevity of the ROV system.

Maintenance included:

- execution of the manufacturer's system maintenance protocol
- submersion of the ROV in freshwater during maintenance cycles to remove salt residue
- inspection of tether, thrusters, and camera systems

These procedures were critical for preventing corrosion, maintaining image quality, and ensuring consistent system performance across survey days.

Operational Considerations

ROV operations were subject to environmental constraints, including:

- strong currents limiting achievable depth and maneuverability
- reduced visibility associated with increased turbidity
- equipment limitations, including occasional propulsion or navigation challenges

All deviations from the standard protocol (e.g., reduced maximum depth) were documented in field notes and considered during data interpretation.

Data Application

ROV-derived video and imagery were used to:

- characterize baseline pelagic ecological conditions
- identify vertical distribution of plankton and midwater fauna



- document species presence and behavior
- support interpretation of concurrent acoustic and environmental data

These observations contribute to establishing a baseline ecological dataset against which potential future impacts associated with offshore activities, including rocket landing operations, can be assessed.

3.1.2 Marine Mammal Spotting

Marine mammal monitoring was conducted in accordance with standardized observation protocols and data collection procedures outlined in the Marine Monitoring Observation Data Form ([Appendix B](#)) and supporting guidance. The methodology was designed to document marine mammal presence, behavior, and any potential interactions with project-related in-water activities.

Monitoring was undertaken within the Minimum Safe Area (MSA) and surrounding Exuma Sound using both vessel-based and aerial survey approaches. Vessel-based observations were conducted by the BRON environmental team from a catamaran operating at designated monitoring stations, including the primary landing location and surrounding points. Aerial surveys were conducted using Cirrus SR20 aircraft (N50068 and N306LM), providing broader spatial coverage of the Project area, including the landing location and adjacent offshore waters.

Monitoring effort was recorded daily, including start and end times, with only active observation periods considered “on-effort” time. Breaks in monitoring and any interruptions were documented in accordance with the observation form guidance. Surveys were primarily conducted during daylight hours, with limited early morning and late evening observations where conditions permitted.

Survey Duration and Coverage

Marine mammal monitoring was designed to be conducted over a 15-day survey period, comprising:

- Seven (7) days prior to the booster landing (baseline monitoring)
- Monitoring during the landing event and associated in-water activities
- Seven (7) days following the landing (post-landing monitoring)

Due to scheduling adjustments associated with the landing date, the monitoring program was adaptively implemented, resulting in an extended pre-landing survey period and a corresponding shift in post-landing surveys to ensure that a minimum of seven (7) days of post-activity monitoring was achieved. This approach allowed for the assessment of baseline conditions, real-time interactions during the landing, and short-term post-landing changes in marine mammal presence.



Monitoring was conducted across multiple observation stations within the Project area, extending from the Landing Point to Point 6, as documented in the Observation Forms. The Landing Point was monitored daily to ensure consistent coverage within the primary activity area, while the remaining stations (Points 1 through 6) were rotated to provide broader spatial coverage of the surrounding environment.

Aerial and vessel-based surveys were planned to occur concurrently, with separate observation forms completed for each monitoring platform on each survey day, where conditions allowed.

Project Activity Monitoring

Project-related in-water activities were recorded concurrently with marine mammal monitoring. These included vessel operations, hydrophone deployment, and remote operated vehicle (ROV) surveys. Start and end times for all activities, including any interruptions, were documented to allow correlation between observed marine mammal presence and project activities.

Environmental Conditions Recording

Environmental conditions were recorded at the start of monitoring and at regular intervals (approximately every 30 minutes or when conditions changed). The following parameters were documented:

- Monitoring conditions (ranked 1–10, from poor to excellent)
- Weather conditions (e.g., sunny, partly cloudy, overcast)
- Light conditions (daylight, twilight, or dark)
- Beaufort Sea State (0–4; monitoring was reduced or suspended under unsafe conditions)
- Visibility (distance at which marine mammals could be reliably detected; typically, ~20–40 m from the marine vessel and 2.5 – 3 miles from the plane)
- Glare (percentage of observation area obscured)

These parameters were used to assess detection probability and overall data reliability. Monitoring was reduced or suspended during periods of poor weather, elevated sea states, or operational constraints (e.g., aircraft technical issues), as documented in the field records.

Marine Mammal Observation Protocol

Observers conducted systematic visual scans of the monitoring area using the naked eye and binoculars. Upon detection of marine mammals, the following information was recorded:

- Species identification (or lowest possible taxonomic level)
- Number of individuals and groups
- Behavioral observations (e.g., traveling, foraging, socializing, vessel interaction)
- Movement patterns and relative location to the observation platform



Acoustic Monitoring Integration

Passive acoustic monitoring was conducted from the marine monitoring vessel using deployed hydrophones to supplement visual observations. Acoustic data collection was limited to vessel-based operations and was not conducted during aerial surveys. This approach provided additional detection capability for marine mammals during periods of reduced visibility or when individuals were not observable at the surface.

A detailed analysis of the acoustic monitoring data, including methodology, equipment specifications, and results, is provided in a separate report prepared by ManTech SRS Technologies, Inc. and included as [Appendix C](#) of this report. The findings of that report are referenced herein where relevant.

Data Recording and Quality Assurance / Quality Control (QA/QC)

All data were recorded in real time using standardized observation forms. Each datasheet was reviewed daily to ensure completeness and accuracy, with QA/QC initials and dates recorded as required. Unknown or unavailable data fields were documented using standardized notation (e.g., “N/A” or dashes) to maintain consistency across datasets.

3.1.3 Ambient Environmental Conditions Survey

3.1.3.1 Sound in Air Data Collection & Analysis

Sound-in-air measurements were obtained using a handheld Reed R8080 data-logging sound level meter to characterize baseline acoustic conditions before and after the landing event. The instrument records sound pressure levels in A-weighted decibels (dBA) and was configured with a 30-second logging interval. At each survey location, measurements were conducted over a one-minute sampling period at the bow of the vessel to minimize contamination from concurrent onboard noise sources. Supplemental measurements were acquired during aerial overflights to quantify sound levels associated with low-altitude aircraft operations.

3.1.3.2 Sound in Water Data Collection & Analysis

In-water acoustic monitoring was conducted by ManTech SRS Technologies, Inc. to characterize underwater sound conditions associated with launch and landing activities. The study area consisted of six (6) peripheral monitoring stations arranged in a hexagonal pattern surrounding the dronship to capture spatial variability in underwater bioacoustic conditions. Monitoring locations were rotated daily between alternating stations to ensure equal spatial coverage, while extended monitoring was conducted at the landing site on the final pre- and post-launch monitoring days.

Acoustic data collection was conducted across three phases: pre-launch, landing, and post-launch. During standard monitoring days, surveys consisted of 30-minute recordings at the landing site followed by 30-minute recordings at three rotating peripheral stations. On the day of launch, additional monitoring was conducted at two terrestrial locations on nearby populated



islands, Cape Eleuthera and eastern Nassau, to capture airborne sound conditions relative to in-water measurements.

To capture impulsive sound pressure levels (SPL) during landing, the monitoring vessel was positioned northeast of the droneship, just outside of the hazard zone. During landing, bioacoustic data were collected using a SoundTrap 400HF recorder, while in-water SPLs were measured using Larson Davis 831c sound level meters coupled with Teledyne Reson 4013 hydrophones. Simultaneous airborne SPL measurements were also recorded onboard the vessel to support comparison with underwater measurements.

Underwater SPL monitoring utilized a vertical hydrophone array deployed at depths of 3 m, 10 m, and 40 m to capture depth-dependent acoustic conditions while minimizing mechanical interference from currents and vessel motion. Teledyne Reson TC4013 hydrophones were integrated with Larson Davis 831c Class 1 sound level meters and deployed along a weighted vertical line to maintain stability and consistent depth positioning. Calibration was conducted using a G.R.A.S. 42AA pistophone and corrected for in-water conversion, coupler value, and atmospheric conditions prior to deployment.

To establish baseline ambient noise conditions, equivalent continuous sound pressure level (LZeq) and 90th percentile exceedance level (L90) metrics were calculated for each 30-minute survey. Data were excluded where differences between LZeq and L90 exceeded 5 dB, or where depth-based measurements varied by more than 5 dB, to minimize interference effects. Averaging of decibel values was conducted by converting logarithmic readings to linear values before averaging and reconverting to decibels.

High-frequency marine mammal activity was monitored using a SoundTrap 400HF deployed at approximately 100 m depth to minimize surface noise and target deep-diving odontocetes. The recorder was configured with a 388 kHz sampling rate, enabling detection of ultrasonic vocalizations up to 194 kHz in accordance with the Nyquist-Shannon Sampling Theorem. Calibration checks were performed prior to deployment using a G.R.A.S. 42AP pistophone.

All acoustic recordings were processed using Raven Pro software. Initial review of full recordings was conducted to identify deployment interference and artifacts, with broad spectrograms. Detailed analysis was subsequently conducted in 300-second windows across a frequency range of 20 kHz to 80 kHz to identify marine mammal vocalizations and characterize bioacoustic activity. Spectrogram contrast and brightness were adjusted as necessary to optimize signal detection and data visualization. Further details on the in-water sound monitoring methodology are provided in the *In-Air and In-Water Sound Measurement Monitoring Report for SpaceX Starlink G10-36 Mission on 19 February 2026 at Exuma Sound, Bahamas*, document included in [Appendix C](#).



3.1.3.3 Air Quality and Weather Data Collection

Air quality monitoring was conducted using a handheld Temtop Qir Air Quality Meter to establish baseline conditions prior to, during, and following the landing event. The instrument measured key parameters including particulate matter (PM_{2.5} and PM₁₀), formaldehyde (HCHO), total volatile organic compounds (TVOCs), and the Air Quality Index (AQI). Measurements were systematically collected at each survey point and recorded in the Ambient Conditions Datasheet ([Appendix D](#)) to ensure consistent documentation of air quality conditions throughout the monitoring period.

In conjunction with air quality monitoring, meteorological data were collected at each survey location using a Kestrel handheld weather meter. Environmental parameters recorded included wind speed and direction, temperature, humidity, and atmospheric pressure. These measurements were taken simultaneously with air quality readings to provide contextual environmental conditions that may influence air quality results. The combined dataset supports a comprehensive assessment of ambient conditions during the survey period.

3.1.3.4 Water Quality Data Collection

Water quality monitoring was conducted within the open marine waters at the Project site using a Horiba U-52G multi-parameter water quality meter. Sampling was undertaken at multiple designated locations, including the landing area and surrounding points, to establish representative baseline environmental conditions.

At each sampling location, two (2) measurements were collected at both shallow and deeper depths, resulting in a total of four (4) readings per monitoring station. Only two (2) readings were collected on February 10, 2026, due to late departure. Approximately four (4) stations were surveyed per day, inclusive of the landing point. This approach was implemented to capture both vertical variability within the water column and to provide replicate measurements for quality assurance and control. Sampling at different depths allows for the detection of stratification effects, while duplicate readings help verify instrument accuracy and reduce uncertainty associated with anomalous measurements.

The following water quality parameters were recorded during each sampling event; temperature, pH, dissolved oxygen, oxygen reduction potential, conductivity, total dissolved solids, salinity, depth and turbidity.

Water temperature reflects the thermal energy within the marine environment and plays a critical role in regulating ecological processes. It influences metabolic rates of marine organisms, as well as chemical processes such as dissolved oxygen solubility and conductivity. In tropical marine systems, temperatures typically range between 24°C and 30°C.



pH measures the acidity or alkalinity of seawater on a scale of 1 to 14. Marine environments are naturally slightly alkaline, with typical ocean values ranging from ~7.5 to 8.5, although a broader tolerance range of 6 to 9 is considered suitable for most aquatic life. Deviations outside this range may indicate contamination or biological stress.

ORP reflects the ability of the water to either gain or lose electrons, indicating the oxidative or reductive state of the environment. Positive ORP values typically indicate well-oxygenated (oxidizing) conditions, which are favorable for marine life, whereas low or negative values may indicate reduced or stressed conditions.

Conductivity measures the ability of water to conduct electrical current, which is directly related to the concentration of dissolved ions. In marine environments, conductivity typically ranges between ~50–60 mS/cm and is closely linked to salinity.

TDS represents the total concentration of dissolved substances, including salts and minerals. In seawater, TDS values typically range between ~30–35 g/L, consistent with natural ocean salinity.

Salinity measures the concentration of dissolved salts in seawater, with average ocean salinity approximately 35 parts per thousand (ppt). Variations in salinity can indicate freshwater inputs, evaporation, or contamination events.

Dissolved oxygen represents the amount of oxygen available for aquatic organisms. According to environmental quality guidelines, DO levels should generally remain above 4.0 mg/L to support marine life. Typical healthy marine systems often exhibit values between ~5–8 mg/L or higher.

Turbidity measures water clarity by quantifying suspended particles. Low turbidity values (generally <5 NTU) indicate clear water conditions, which are important for light penetration and primary productivity. Elevated turbidity may indicate sediment disturbance or reduced water quality.

Depth measurements were recorded to contextualize all water quality readings and assess variation within the water column.

The collection of paired measurements at both shallow and deeper depths ensures a comprehensive assessment of water quality by accounting for vertical gradients that may occur due to stratification, sediment interaction, or biological processes. Additionally, duplicate sampling at each depth provides a level of quality control, allowing for the identification and minimization of potential instrument or recording errors.



This methodology ensures that the dataset is both robust and representative, supporting accurate characterization of baseline marine water quality conditions within the Project area.

3.2 TERRESTRIAL SURVEYS

3.2.1 Avian and Wildlife Surveys

Terrestrial surveys were conducted on two islands within The Bahamas in regions identified as Important Bird Areas (IBA). The IBA's surveyed were those nearest to the landing of the Falcon 9 dronship. These areas are the north-western coastline of Cat Island, and the southern coastline Eleuthera. Pre-Launch surveys were conducted from Tuesday February 10th, 2026, to Thursday February 19th, 2026. Post landing surveys were conducted from Friday February 20th to Wednesday February 25th for Cat Island and Thursday February 26th for Eleuthera.

Terrestrial surveys focused on avifauna diversity, abundance, and utilization of habitat, as well as other faunal diversity and presence. Ambient data inclusive of weather, sound, and air quality was recorded along with non-avian wildlife observations and anthropogenic influence on habitats and surveying. Avifauna and wildlife monitoring was conducted using point counts and walking in transects. Observers started at a pre-designated area to conduct surveys and began point counts by marking their location in a GPS and recording the start time. Avian species heard or seen were recorded in data sheets within four-time intervals culminating at 10 minutes: 0-2.5 minutes, 2.5-5 minutes, 5-7.5 minutes, and 7.5-10 minutes. Their distance from the surveyor was also recorded: 0-25m, 25-50m, >50m, or flying. The same method was used to record other faunal observations. Observation points on both islands were spaced 300 meters apart with an exception to point counts 1-8 on Eleuthera which were spaced 250 meters apart. The spaces between each point count were regarded as transects. Avifauna and other wildlife observed on land and the shoreline/in the immediate waters were recorded within the transects.

During the landing, February 19th, terrestrial monitoring was conducted with data recording of air quality, weather conditions, and sound levels. Air quality and weather conditions were recorded five minutes prior to the landing (8:44pm), at the anticipated time of the landing (8:49pm) and five minutes after the landing (8:54pm). Sound data was recorded continuously for a ten-minute duration from 8:44pm to 8:54pm.

Species observation and identification were aided through the use of Vortex Razor HD Spotting Scopes and Vortex Diamondback 8x42 binoculars. Once point counts were completed the end temperature, wind and humidity for the survey point were recorded using a Kestrel Weather Meter. Air quality data was taken for the Cat Island surveys using a Temtop Air Quality Meter. Air Quality for Eleuthera terrestrial surveys were not conducted because of device error. Sound data was recorded after every point count using a REED 8080 Sound Level Meter. The sound meter was positioned facing the anticipated direction of the Falcon9 booster landing. Weather data was recorded before the start of each transect and the end of the transect where a new point count would begin. Water quality was monitored using hydrocarbon test strips. The test strips, once in



contact with a hydrocarbon would turn a dark blue indicating the presence of oil. The strips were tested prior to use in the field to confirm their accuracy. In the field they were used at some point counts at the end of point counts. Surveyors also made visual observations regarding water quality and noted if any sheen or anything was seen on top of the water that may be indicative of an oil spill.

The location of survey points for each island are shown on the following pages in *Figure 3-2* and *Figure 3-3*.





Figure 3-2. Cat Island Survey Area, Terrestrial Assessments 2026





3.2.2 Ambient Environmental Conditions Survey

3.2.2.1 Sound in Air Data Collection and Analysis

Ambient sound during avian and wildlife surveys were conducted using a Reed 8080 sound meter. Methodology included the meter recording in slow dBA levels for thirty seconds after each point count. dBA, or A-weighted decibels, is an adjustment applied to sound measurements to reflect how a noise is perceived by the human ear. The normal frequency range of hearing for most people extends from a low of approximately 20 Hz to a high of 10,000 to 20,000 Hz. However, people are most sensitive to sounds in the voice range, between approximately 500 Hz to 6,000 Hz¹. Therefore, to correlate the amplitude of a sound with its level as perceived by people, the sound energy spectrum is adjusted, or weighted. The slow recording measurement was selected because it is the standard for measuring ambient sound levels.

Impulsive sounds, such as a firework or sonic boom, are typically measured in pounds per square foot and then converted to C-weighted decibels rather than A-weighted decibels. C-weighting emphasizes low frequency waves that are more prominent in impulsive sounds. A sonic boom is a loud, thunderous sound caused by an object traveling faster than the speed of sound. The exact time that the sonic boom would be experienced at each island for the terrestrial surveys was not ascertained, as a result, recording during the landing was still measured in dBA as opposed to dBC.

Sound data was saved on the recording device and uploaded into its software. The software displayed the date, time, rate, decibel level, and recording speed of the sound meter. Point numbers per recording were used to obtain the maximum (max), minimum (min), and average sound levels for each point count at the various surveyed islands. The average sound level for each point count was plotted on a line graph and is displayed in [Section 4.2.2.4.4](#).

3.2.2.2 Air Quality and Weather Data Collection

Air quality and weather conditions were documented during the terrestrial surveys. Air quality was consistently monitored on Cat Island throughout the duration of the survey. Device error resulted in inconsistent and unreliable monitoring in Eleuthera. A Temtop air quality meter was used for monitoring and documenting multiple parameters for air quality. These include formaldehyde (HCHO) levels, total volatile organic compounds (TVOC) levels, particulate matter at 2.5, and 10, number of particles (NOP) per litre, and the overall air quality index.

Formaldehyde is a naturally occurring compound found in indoor and outdoor in small amounts. However, elevated levels of formaldehyde may impact human health through eye, nose, and throat irritation or may cause respiratory issues. Elevated levels of TVOCs will result in similar impacts as elevated levels of formaldehyde. TVOCs are carbon-based compounds. Particulate matter (measured in $\mu\text{m}/\text{m}^3$) refers to particles, whether solid or liquid, suspended in the air, their

¹ [https://pulsarinstruments.com/news/understanding-a-c-z-noise-frequency-weightings/#:~:text=A%2DWeighting%20Explained%20\(dB{,as%20LAeq%2C%20LAFmax%2C%20LAE](https://pulsarinstruments.com/news/understanding-a-c-z-noise-frequency-weightings/#:~:text=A%2DWeighting%20Explained%20(dB{,as%20LAeq%2C%20LAFmax%2C%20LAE).



size and amount. The overall air quality index takes into account a combination of all measured elements to provide a value that indicates whether the air quality is good, healthy, moderate, or unsafe.

3.3 SOUND MAPPING STUDY

The Sound Mapping Study conducted by The Heritage Partners utilized a mixed-methods approach combining quantitative and qualitative data collection to assess community perception of the sonic boom event. Data were collected through both face-to-face interviews and a web-based survey administered across New Providence, Eleuthera, and Cat Island, resulting in a combined dataset of over 700 responses. The survey instrument was developed in accordance with ISO/TS 15666:2021 standards and informed by NASA's Wallops Sonic Boom Perception and Response (WSPR) framework, enabling standardized assessment of perceived loudness, annoyance, interference, and behavioral responses. Respondents were categorized based on whether the event was heard or not, allowing for comparative analysis of perception and response across geographic locations and exposure levels. The report is included in [Appendix E](#).

3.4 MONITORING SCHEDULE ACROSS BOTH LANDINGS

*Table 3-2. Monitoring Schedule across both landings. Pre = Prelanding Surveys, Post = Post Landing Surveys, MSA=Minimum Safe Area, * Northern Exuma Cays were not surveyed during Landing 2 monitoring, **SPL converted frequency for Landing 1 only.*

Monitoring	Landing 1	Landing 2	Locations	Parameters
Marine Surveys	Pre and Post	Pre and Post	Exuma Sound MSA	Species presence, abundance, behaviour
Marine Mammal Observations	Pre, During and Post	Pre, During and Post	Exuma Sound MSA	
Avian & Wildlife Surveys	Pre (some locations) Limited Post	Pre and Post	Cat Island, South Eleuthera, Northern Exuma Cays*	Avian species diversity, counts
Acoustic Monitoring (Air)	Pre and Post, During	Pre, During, and Post	Cat Island, South Eleuthera, Northern Exuma Cays*	decibels
Hydroacoustic Monitoring	Pre and During at limited depth	Pre, During, and Post	MSA	SPL **
Water Quality	Pre and Post	Pre and Post	Cat Island, South Eleuthera, MSA	Seawater Specific Gravity, Depth, pHmV, pH, Temperature, Conductivity, Dissolved Oxygen,



				Total Dissolved Solids, Turbidity Oxygen Reduction Potential, Salinity, Hydrocarbon
Air Quality	Pre, During and Post	Pre, During and Post	Both Landings: MSA, Cat Island, First Landing only: South Eleuthera ² , Northern Exuma Cays*	Particulate Matter (PM) less than 2.5 micrometers in diameter, PM less than 10 micrometers in diameter, Formaldehyde, Total Volatile Organic Compounds, Temperature, Humidity, Air Quality Indicator
Meteorological Conditions	Pre, During and Post	Pre and Post	MSA, Cat Island, South Eleuthera, Northern Exuma Cays*	Sea State Conditions, Air Temperature, Wind Speed, Humidity

Table 3-3. Monitoring Timeline

Monitoring Phase	Landing 1	Landing 2
Prelaunch Monitoring	February 14 -18 to 2025 (avian) February 17, 2025 (marine)	February 10 – 19, 2026 (both)
Landing	February 18, 2025	February 19, 2026 (acoustic only)
Immediate Post Landing	February 19, 2025 (marine ambient conditions only)	N/A
Post Landing	February 19-25, 2025 (avian)	February 20 – 26, 2026

3.5 REGULATORY COORDINATION AND REPORTING

In accordance with the Environmental Management Plan (EMP), the Environmental Manager maintained daily communication with the Department of Environmental Planning and Protection

² Air quality monitoring was not conducted as planned due to a malfunction of the air quality meter and the inability to secure a replacement within the field schedule. On days when vessel-based surveys were suspended due to weather conditions, the available unit was used during terrestrial surveys in South Eleuthera.



(DEPP) throughout the monitoring period. This included direct updates on monitoring activities, environmental conditions, and any notable observations. Prior to the landing event, a briefing meeting was conducted with DEPP to summarize pre-landing monitoring results, particularly for periods during which DEPP representatives were not present on site. DEPP representatives were also present during portions of the monitoring program and participated in field activities, including observation of surveys conducted before, during, and after the landing event. Daily communication with DEPP continued following their departure from the field, ensuring that monitoring updates were consistently provided throughout the full duration of the monitoring period. An Environmental Monitoring Checklist (EMC) was completed for the day of the landing. The EMC is provided in [Appendix A](#). This approach ensured ongoing regulatory engagement and adherence to EMP reporting requirements.

4 RESULTS & FINDINGS

4.1 LANDING 1 RESULTS (SUMMARY)

4.1.1 Marine Surveys

Marine baseline, during, and post-landing surveys were conducted between February 17th and 19th, 2025 within the Exuma Sound to characterize environmental conditions and assess potential impacts associated with the Falcon9 booster landing. The results of the marine monitoring program indicate that the first Falcon9 booster landing did not result in measurable or lasting impacts to marine water quality or observed marine biodiversity within the study area.

Baseline marine conditions were observed to be stable and representative of a well-mixed open ocean environment. Water quality parameters, including temperature, pH, salinity, dissolved oxygen, and turbidity, showed minimal variation between surface and subsurface measurements, with consistently clear water conditions (0.00 NTU) and no indication of stratification or anomalies. Air quality and weather conditions were within normal ranges for the region and did not present any constraints to monitoring activities.

Monitoring conducted on the day of landing indicated that environmental conditions remained consistent with baseline observations. While a temporary increase in sound levels was recorded during the landing event, this was short in duration and consistent with expected impulsive noise associated with sonic booms. No sustained exceedances or anomalies in water or air quality parameters were identified during the landing window.

Post-launch marine surveys conducted on February 19th, 2025, indicated that environmental conditions remained comparable to pre-launch baseline conditions. No measurable deterioration in water quality was observed, and parameters remained within expected natural variability.



Marine biodiversity observations, including Remote Operated Vehicle (ROV) surveys and marine mammal monitoring, did not identify any significant presence of marine fauna within the immediate landing area during survey periods. This was largely attributed to the depth of the Exuma Sound and limitations in seabed visibility. No evidence of mortality, injury, or behavioral disturbance of marine species was documented that could be attributed to the first mission.

4.1.2 Terrestrial Surveys

During the first booster landing in February 2025, terrestrial surveys occurred across two main islands and three cays. These were North Cat Island, South Eleuthera, Normans Cay, Highbourne Cay, and Ship Channel Cay in the Exuma archipelago. A total of 182-point counts were surveyed across the study areas with the following distribution: North Cat Island: n=41, South Eleuthera: n=100, North Exuma Cays: n=41.

Twenty-Nine different species of birds were observed on North Cat Island before the launch. Of these, 3 are currently listed on the International Union for Conservation (IUCN) Red List as Near Threatened. Thirty-two avian species were observed in South Eleuthera (six Near Threatened, one Vulnerable) and thirty-four were observed across the Exumas (four Near Threatened, two Vulnerable, one Endangered). Near threatened birds observed include the White-crowned Pigeon, Killdeer, Ruddy Turnstone, Piping Plover, Reddish Egret, Semipalmated Sandpiper, Long-billed Dowitcher and the Least Sandpiper. The identified Vulnerable avifauna seen was the Black-bellied (Grey) Plover and the Short-billed Dowitcher. The Bahama Swallow was the only avifauna observed within the Endangered IUCN listing.

Species abundance across the islands surveyed pre-launch were all above 200. Cat Island surveys yielded 215 species, South Eleuthera had 253, and Exuma had 250. No anomalies or detrimental impacts to survey areas were observed after the landing of the SpaceX Falcon9 on the dronship. After the booster landing, avian surveys were duplicated and a decline in species diversity was noted across each island and documented as following. Avian diversity experienced the highest decline at the Exuma Cays with only 12 different species observed post-launch compared to the 34 pre-launch. Cat Island post-launch surveys counted 25 different species to its original 29 and South Eleuthera counted 21 to its original 32. The concluding statement based on the results of the surveys were that studies should be continued and an accurate statement could not be made on the impact of the booster landing to avian behaviour. This was largely due to the cold front and inclement weather experienced during the post launch surveys which impacted data collection.

The following tables and graphs depict the differences between avian diversity and abundance across survey areas for the first booster landing event.



Table 4-1. Species observation comparison pre-launch vs post-launch in North Cat Island

Species		Observation	
Common Name	Scientific Name	Pre Launch	Post Launch
American Redstart	<i>Setophaga ruticilla</i>	Yes	Yes
American Kestrel	<i>Falco sparverius sparverioides</i>	Yes	Yes
Bahama Mockingbird	<i>Mimus gundlachii</i>	Yes	Yes
Bahama Woodstar	<i>Nesophlox evelynae</i>	Yes	Yes
Black-faced Grassquit	<i>Melanospiza bicolor</i>	Yes	Yes
Cape-May Warbler	<i>Setophaga tigrina</i>	Yes	Yes
Common Ground Dove	<i>Columbina passerina</i>	Yes	Yes
Cuban Pewee	<i>Contopus caribaeus</i>	Yes	Yes
Greater Antillean Bullfinch	<i>Melopyrrha loxigilla</i>	Yes	Yes
Grey Catbird	<i>Dumetalla carolinensis</i>	Yes	Yes
Great Blue Heron	<i>Ardea herodias</i>	Yes	No
Killdeer*	<i>Charadrius vociferus</i>	Yes	No
Great Egret	<i>Ardea alba</i>	Yes	No
LaSagras Flycatcher	<i>Myiarchus lucaysiensis</i>	No	Yes
Little Blue Heron	<i>Egretta caerulea</i>	Yes	No
Mourning Dove	<i>Zenaida macroura</i>	Yes	Yes
Northern Mockingbird	<i>Mimus polyglottus</i>	Yes	Yes
Northern Waterthrush	<i>Parkesia noveboracensis</i>	Yes	Yes
Osprey	<i>Pandion haliaetus ridgewayi</i>	Yes	Yes
Palm Warbler	<i>Setophaga palmarum</i>	Yes	Yes
Royal Tern	<i>Thalasseus maximus</i>	Yes	Yes
Ruddy Turnstone*	<i>Arenaria interpres</i>	Yes	No
Smooth-billed Ani	<i>Crotophaga ani</i>	Yes	No
Semipalmated Plover	<i>Charadrius semipalmatus</i>	Yes	No
Spotted Sandpiper	<i>Actitis macularia</i>	No	Yes
Thick-billed Vireo	<i>Vireo crassirostris crassirostris</i>	Yes	Yes
White-crowned Pigeon*	<i>Patagioenas leucocephala</i>	Yes	No
Yellow-throated Warbler	<i>Setophaga dominica</i>	No	Yes
Bananaquit	<i>Coereba flaveola bahamensis</i>	Yes	Yes
Yellow-crowned Night Heron	<i>Nyctanassa violacea</i>	Yes	Yes
Western Spindalis	<i>Spindalis zena zena</i>	Yes	No
Prairie Warbler	<i>Setophaga discolor</i>	No	Yes



Ovenbird	<i>Seiurus aurocapilla</i>	Yes	Yes
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Table 4-2. Species observation comparison pre-launch vs post-launch in South Eleuthera

Species		Observation	
Common Name	Scientific Name	Pre Launch	Post Launch
American Oystercatcher	<i>Haematopus palliatus</i>	Yes	Yes
Bahama Mockingbird	<i>Mimus gundlachii</i>	Yes	Yes
Bahama Woodstar	<i>Nesophlox evelynae</i>	Yes	No
Bananaquit	<i>Coereba flaveola bahamensis</i>	Yes	No
Belted Kingfisher	<i>Megaceryle alcyon</i>	Yes	Yes
Black and White Warbler	<i>Mniotilta varia</i>	Yes	Yes
<i>Black-bellied Plover*</i>	<i>Pluvialis squatarola</i>	Yes	Yes
Black-faced Grassquit	<i>Melanospiza bicolor</i>	Yes	Yes
Common Ground Dove	<i>Columbina passerina</i>	Yes	Yes
Cuban Pewee	<i>Contopus caribaeus</i>	Yes	No
Great Blue Heron	<i>Ardea herodias</i>	Yes	No
Great Egret	<i>Ardea alba</i>	Yes	Yes
Greater Antillean Bullfinch	<i>Melopyrrha loxigilla</i>	Yes	Yes
Green Heron	<i>Butoroides virescens bahamensis</i>	No	Yes
Grey Catbird	<i>Dumetalla carolinensis</i>	Yes	No
<i>Killdeer*</i>	<i>Charadrius vociferus</i>	Yes	No
<i>Least Sandpiper*</i>	<i>Calidris minutilla</i>	Yes	No
Little Blue Heron	<i>Egretta caerulea</i>	No	Yes
<i>Long-billed dowitcher*</i>	<i>Limnodromus scolopaceus</i>	Yes	Yes
Northern Mockingbird	<i>Mimus polyglottus</i>	Yes	Yes
Northern Waterthrush	<i>Parkesia noveboracensis</i>	No	Yes
Osprey	<i>Pandion haliaetus ridgewayi</i>	Yes	No
Palm Warbler	<i>Seophaga palmarum</i>	Yes	No
Prairie Warbler	<i>Setophaga discolor</i>	Yes	Yes
<i>Reddish Egret*</i>	<i>Egretta rufescens</i>	No	Yes
Royal Tern	<i>Thalasseus maximus</i>	No	Yes
<i>Ruddy Turnstone*</i>	<i>Arenaria interpres</i>	Yes	Yes
Semipalmated Plover	<i>Charadrius semipalmatus</i>	Yes	No
<i>Semipalmated Sandpiper*</i>	<i>Calidris pusilla</i>	Yes	No
Smooth-billed Ani	<i>Crotophaga ani</i>	Yes	No
Thick-billed Vireo	<i>Vireo crassirostris crassirostris</i>	Yes	No



Tree Swallow	<i>Tachycineta bicolor</i>	No	Yes
Tricolored Heron	<i>Egretta tricolor</i>	Yes	No
White-crowned Pigeon*	<i>Patagioenas leucocephala</i>	Yes	No
White-winged dove	<i>Zenaida asiatica</i>	Yes	No
Wilson's Plover*	<i>Anarhynchus wilsonia</i>	Yes	Yes
Yellow-crowned Night Heron	<i>Nyctanassa violacea</i>	Yes	No
Zenaida dove	<i>Zenaida aurita</i>	Yes	Yes

Table 4-3. Species observation comparison pre-launch vs post-launch across Exuma Cays

Species		Observation	
Common Name	Scientific Name	Pre Launch	Post Launch
American Kestrel	<i>Falco sparverius sparveroides</i>	Yes	No
American Oystercatcher	<i>Haematopus palliatus</i>	Yes	Yes
Bahama Mockingbird	<i>Mimus gundlachii</i>	Yes	Yes
Bahama Swallow*	<i>Tachycineta cyaneoviridis</i>	Yes	No
Bahama Woodstar	<i>Nesophlox evelynae</i>	Yes	No
Bananaquit	<i>Coereba flaveola bahamensis</i>	Yes	Yes
Belted Kingfisher	<i>Megaceryle alcyon</i>	Yes	No
Black and White Warbler	<i>Mniotilta varia</i>	Yes	No
Black-bellied Plover*	<i>Pluvialis squatarola</i>	Yes	Yes
Black-faced Grassquit	<i>Melanospiza bicolor</i>	Yes	No
Brown Noddy	<i>Anous stolidus</i>	Yes	No
Cape-May Warbler	<i>Setophaga tigrina</i>	Yes	Yes
Common Yellowthroat	<i>Geothlypis trichas</i>	Yes	No
Cuban Pewee	<i>Contopus caribaeus</i>	Yes	No
Great Egret	<i>Ardea alba</i>	No	Yes
Greater Antillean Bullfinch	<i>Melopyrrha loxigilla</i>	Yes	No
Grey Catbird	<i>Dumetalla carolinensis</i>	Yes	No
Grey Kingbird	<i>Tyrannus dominicensis</i>	Yes	No
Northern Mockingbird	<i>Mimus polyglottus</i>	Yes	No
Osprey	<i>Pandion haliaetus ridgewayi</i>	Yes	No
Ovenbird	<i>Seiurus aurocapilla</i>	Yes	No
Palm Warbler	<i>Seophaga palmarum</i>	Yes	Yes
Piping Plover	<i>Charadrius melodus</i>	Yes	Yes
Prairie Warbler	<i>Setophaga discolor</i>	Yes	No



Red-breasted Merganser	<i>Mergus serrator</i>	Yes	No
Reddish Egret*	<i>Egretta rufescens</i>	Yes	No
Ruddy Turnstone*	<i>Arenaria interpres</i>	Yes	Yes
Short-billed Dowitcher*	<i>Limnodromus griseus</i>	Yes	Yes
Solitary Sandpiper	<i>Tringa solitaria</i>	Yes	No
Thick-billed Vireo	<i>Vireo crassirostris</i> <i>crassirostris</i>	Yes	No
Tricolored Heron	<i>Egretta tricolor</i>	No	Yes
White-crowned Pigeon*	<i>Patagioenas leucocephala</i>	Yes	No
White-tailed Tropicbird	<i>Phaethon lepturus</i>	Yes	Yes
Yellow-crowned Night Heron	<i>Nyctanassa violacea</i>	Yes	No
Yellow-rumped Warbler	<i>Setophaga coronata</i>	Yes	No
Yellow-throated Warbler	<i>Setophaga dominica</i>	Yes	No

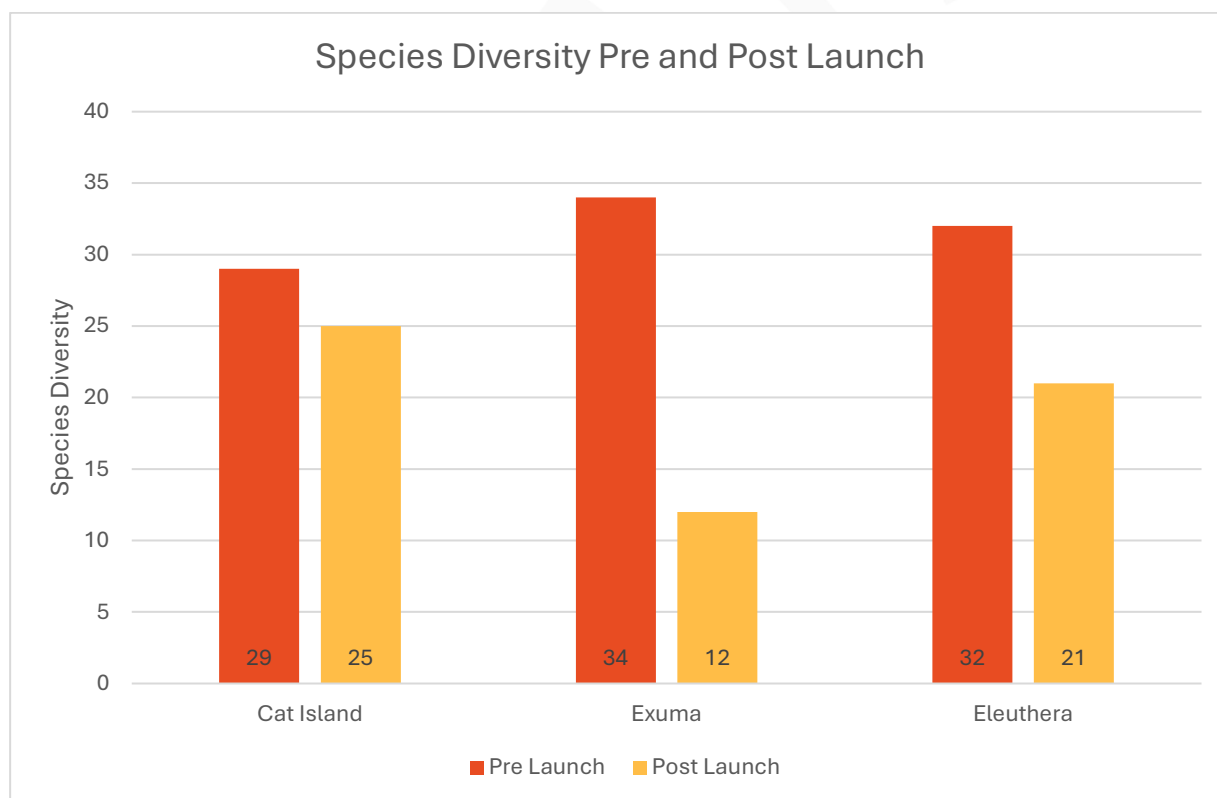


Figure 4-1. Species diversity comparison across survey areas Pre and Post Launch

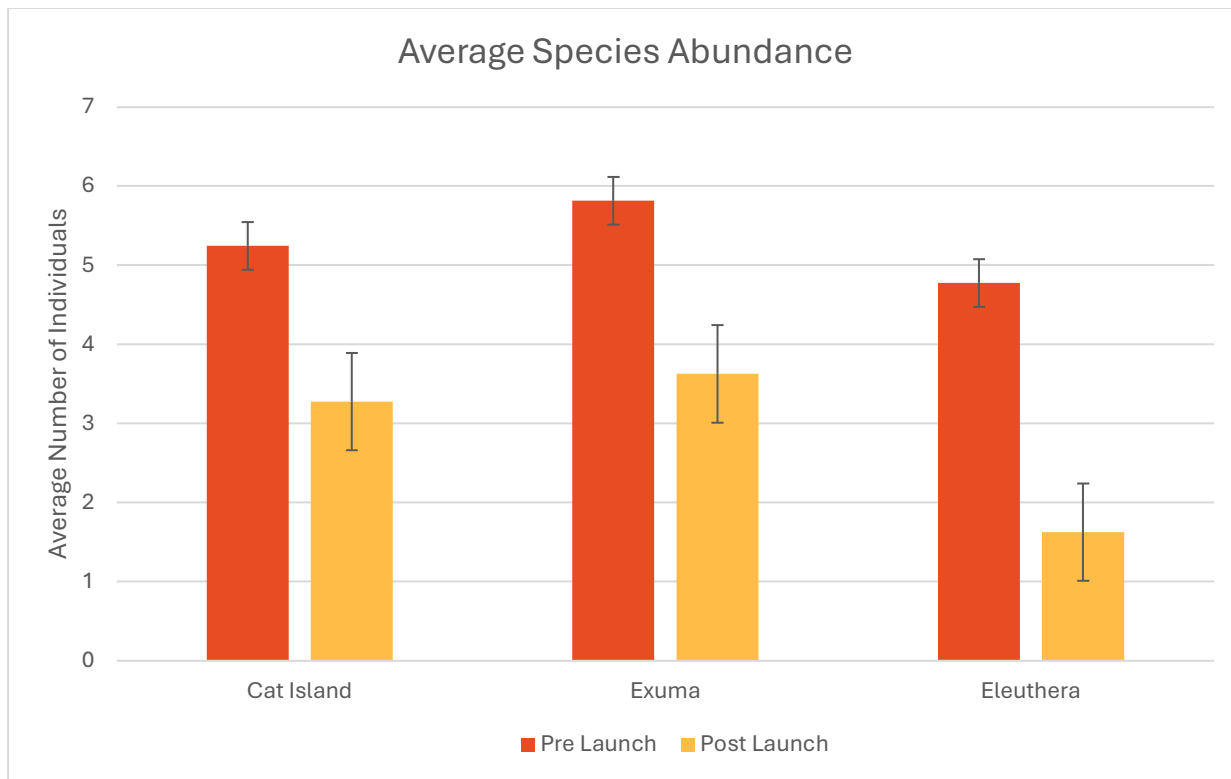


Figure 4-2. Average Species Abundance seen across sites during pre and post launch surveying

4.1.3 Limitations, Considerations, and Conclusions

The findings from the first Falcon9 booster landing indicate that environmental conditions across both marine and terrestrial environments remained stable, with no measurable or sustained impacts identified. However, several methodological and operational limitations associated with the monitoring program should be acknowledged, as they influenced the level of certainty and interpretation of results.

From a marine perspective, survey methodologies were adapted due to vessel and operational constraints. The originally proposed manta tow surveys were not conducted, and reliance was placed on Remote Operated Vehicle (ROV) deployments and visual observations. ROV surveys were limited in duration (approximately 10 minutes per site) and spatial coverage, and strong currents combined with deep-water conditions restricted the ability to consistently reach or document the seafloor. As a result, direct assessment of benthic habitats and associated communities were limited. Additionally, immediate post-launch ROV surveys were not conducted due to the timing of the landing event at dusk and unfavorable sea conditions on the following day, constraining direct pre- and post-event comparisons.

Marine fauna observations were also inherently limited by the open-ocean environment of the Exuma Sound, where species are typically transient and occur at low observable densities. The



absence of observed marine mammals or other fauna within the survey area does not necessarily indicate absence, but rather reflects the challenges associated with detecting mobile species in deep offshore environments.

From a terrestrial perspective, monitoring was conducted across multiple islands and cays within designated Important Bird Areas. However, variability in site conditions, background environmental noise, and observer detection influenced survey consistency. Avifauna surveys relied on point counts and transects, which are subject to detection bias based on species behavior, weather conditions, and ambient sound levels. In some instances, background noise, both natural (e.g., wind, wave action) and anthropogenic, may have affected the ability to detect and accurately record bird calls.

Temporal constraints also influenced terrestrial data collection. While surveys were conducted before and after the landing event, the short monitoring window may not fully capture delayed or longer-term behavioral responses of wildlife. Additionally, differences in timing, weather conditions, and observer coverage between survey days introduce variability that may limit direct comparability of pre-launch and post-launch datasets.

Across both marine and terrestrial components, the short duration of the landing event and the limited temporal scope of monitoring constrain the ability to detect subtle, cumulative, or delayed environmental effects. Furthermore, environmental conditions such as wind, sea state, and visibility influenced both data quality and survey execution.

Insights gained from the first landing have been incorporated into adapted monitoring approaches for subsequent missions, as described in the following sections. These adapted measures are as follows.

- Enhancing spatial and temporal coverage of both marine and terrestrial surveys.
- Expanding the use of passive monitoring techniques (e.g., hydroacoustic monitoring) to supplement visual observations.
- Increasing standardization of terrestrial survey conditions to improve comparability across monitoring periods.

4.2 LANDING 2 RESULTS

4.2.1 Marine Surveys

4.2.1.1 Pre-Landing

Pre-launch marine monitoring was conducted between February 10 and February 18, 2026, across multiple designated points inclusive of the landing location. Observations were carried out using a combination of visual surveys and the deployment of a remotely operated vehicle (ROV) and hydrophone, where conditions permitted. Environmental conditions during the monitoring period ranged from calm to moderately rough seas, with some days experiencing poor weather that limited survey effort.



Marine mammal observations during the pre-launch period were limited but notable. On February 10, approximately three (3) juvenile Atlantic Spotted Dolphins was observed traveling alongside the vessel and exhibiting wave-riding behavior while on approach to the Landing Point. On February 11, additional dolphin activity was recorded, including two (2) adults and one (1) juvenile, a total of approximately three (3) Atlantic Spotted Dolphins. These individuals were observed at Point 3, swimming slowly near the vessel and displaying curious behavior. No further marine mammals were observed on subsequent survey days, and several monitoring periods (February 15–16, 2026) were constrained or suspended due to unsafe sea conditions and poor visibility.

Marine species observations indicated a relatively low to moderate diversity of organisms within the survey area. Frequently recorded taxa included unidentified jellyfish and plankton, which were consistently observed in moderate to high abundances across multiple survey points. Additional species documented included an Ocean Triggerfish, Caribbean Reef Squid (observed as single individuals), Atlantic Pearlside (recorded in small groups) and Flying Fish, typically in low abundances.

Avifauna associated with the marine environment were also noted, including Frigatebirds observed in small numbers, often circling offshore waters. In some instances, fish and plankton aggregations were recorded concurrently with bird activity, suggesting localized feeding interactions.

The pre-launch monitoring results indicate that the Project area supports typical pelagic and nearshore marine assemblages characterized by transient marine mammals, small schooling fish, invertebrates such as jellyfish and plankton, and opportunistic seabirds. Observations were influenced by variable environmental conditions, with reduced data collection on days with elevated sea states and poor weather. [Table 4-4](#), [Table 4-5](#), and [Table 4-6](#) list the species observed during pre launch surveys. [Appendix F](#) provides the photo log of species observed. [Table 4-4](#). Pre-launch marine species list.

Table 4-4. Pre-launch marine species list.

Common Name	Scientific Name	Abundance ³	Location
Atlantic Spotted Dolphin	<i>Stenella frontalis</i>	Few	Landing, Point 3
Jellyfish	<i>Scyphozoa sp.</i>	Many	Point 2, Point 4, Point 6
Zooplankton	<i>Zooplankton spp.</i>	Many	Point 2, Point 4, Point 6
Ocean Triggerfish	<i>Canthidermis sufflamen</i>	Single	Point 4
Frigate Bird (Marine Avifauna)	<i>Fregata magnificens</i>	Few	Landing, Point 1,

³ **Species Abundance Definition:** Single = 1, Few = 2 - 11, Many = 11- 100, and Abundant = > 100



Flying Fish	<i>Exocoetus obtusirostris</i>		Landing
Caribbean Reef Squid	<i>Sepioteuthis sepioidea</i>	Few	Point 6
Atlantic Pearlsides	<i>Maurollicus weitzmani</i>	Few	Point,6, Point 3, Point 4, Point 2

Table 4-5. Pre-Launch Species Inventory and Relative Abundance

Taxonomic Group	Species	Scientific Name	Observation Summary	Abundance
Pelagic Fish	Flying Fish	Exocoetidae	Frequent groups (4–15 individuals) across stations	Dominant
Pelagic Fish	Triggerfish	Balistidae	Observed near floating debris	Rare
Mesopelagic Fish	Atlantic Pearlsides	Maurollicus weitzmani	Repeated ROV observations	Common
Cephalopod	Caribbean Reef Squid	Sepioteuthis sepioidea	Observed midwater and near surface	Occasional
Marine Mammal	Atlantic Spotted Dolphin	Stenella frontalis	Pod (5–6) and solitary interaction across two days	Occasional
Seabird	Sargasso Shearwater	Puffinus lherminieri	Repeated foraging observations	Common
Seabird	Sooty Tern	Onychoprion fuscatus	Groups observed	Occasional
Seabird	Frigatebird	Fregata spp.	Circling/diving behavior	Occasional
Seabird	Masked Booby	Sula dactylatra	Confirmed pre-launch observation	Rare
Plankton	Gelatinous plankton	(various taxa)	Jellyfish and larvae present	Common
Plankton	Neuston assemblage	(mixed taxa)	Defined layer to ~300 ft	Common
Plankton	Marine snow	(organic aggregates)	Frequently observed	Common
Macroalgae	Sargassum	Sargassum spp.	Patches and convergence lines	Common

Table 4-6. During the aerial surveys megafauna was observed on February 10th, 11th and 14th, 2026. No marine mammals or other megafauna was observed for the remainder of the monitoring period.

Date Observed	Species Observed
February 10, 2026	2 Dolphins and 1 Stingray
February 11, 2026	1 Whale and 1 Calf ⁴
February 14, 2026	1 Dolphin

⁴ There were several social media posts describing a humpback whale and calf in the northern Exuma Sound after the landing. This is believed to be the first observed before the landing on February 11, 2026.



4.2.1.2 During Landing

Marine monitoring activities were conducted on February 19, 2026, coinciding with the launch event. Surveys were performed at multiple intervals and locations, including the landing area during daytime conditions, the designated viewing point (MSP1) during nighttime conditions both prior to and during landing, and the landing area again following the landing event at night.

Avifaunal species associated with the marine environment were observed. Notably, a small aggregation of Sargasso Shearwaters was observed actively foraging, exhibiting surface-skimming behavior indicative of feeding.

No marine mammals were detected during any survey period on the day of landing.

Overall, marine species observations indicated relatively low biodiversity during the monitoring period. ROV surveys conducted during daylight hours documented the presence of unidentified gelatinous zooplankton and planktonic organisms. No marine fauna were observed during or immediately following the landing event.

Anthropogenic debris was present throughout the survey period, including items such as a plastic cooler and Styrofoam.

Table 4-7. Pre-Launch Species Inventory and Relative Abundance

Taxonomic Group	Species	Scientific Name	Observation Summary	Abundance
Seabird	Sargasso Shearwater	<i>Puffinus lherminieri</i>	Continued foraging	Common
Marine Mammal	(None observed)	—	No sightings post-launch	—
Plankton	Gelatinous plankton	(various taxa)	Less consistent presence	Occasional
Plankton	Neuston assemblage	(mixed taxa)	Patchy and less defined	Occasional
Plankton	Marine snow	(organic aggregates)	Persistent but variable	Common
Macroalgae	Sargassum	Sargassum spp.	Continued presence	Common



4.2.1.3 Post-Landing

Pre-launch marine monitoring was conducted between February 20 and February 26, 2026, across multiple designated points inclusive of the landing location. Observations were carried out using a combination of visual surveys and the deployment of a remotely operated vehicle (ROV) and hydrophone, where conditions permitted. Environmental conditions during the monitoring period ranged from calm to moderately rough seas, with some days experiencing poor weather that limited survey effort. Surveying during February 23-24, 2026, was suspended due to unsafe sea conditions and poor visibility.

There were no marine mammals observed during post launch surveys.

Marine species observations indicated a relatively low to moderate diversity of organisms within the survey area. Frequently recorded taxa included unidentified jellyfish and plankton, which were consistently observed in moderate to high abundances across multiple survey points. Additional species documented included Mahi Mahi (recorded in a school), Atlantic Pearlside (recorded in small groups), Atlantic Silverside (recorded in small groups) and Flying Fish, typically in low abundances.

Avifauna associated with the marine environment were noted, including Sooty Tern (observed in small group), Frigatebird (found circling), Brown Booby (observed circling), White Tailed Tropicbird, and Sargasso Shearwater observed in the act of foraging.

The post-launch monitoring results indicate that the Project area showed little to no sign of change in species and habitat. This is shown through the continues observation of typical pelagic and nearshore marine assemblages, small schooling fish, invertebrates such as jellyfish and plankton, and opportunistic seabirds. Observations were influenced by variable environmental conditions, with reduced data collection on days with elevated sea states and poor weather.

Table 4-8. Post-Launch Species Inventory and Relative Abundance

Taxonomic Group	Species	Scientific Name	Observation Summary	Abundance
Pelagic Fish	Flying Fish	<i>Exocoetidae</i>	Continued frequent sightings and schooling	Dominant
Pelagic Fish	Mahi-mahi	<i>Coryphaena hippurus</i>	Observed near debris and prey fish	Occasional
Pelagic Fish	Wahoo	<i>Acanthocybium solandri</i>	Single confirmed observation	Rare
Pelagic Fish	Atlantic Silverside	<i>Menidia menidia (probable)</i>	Small schooling silver fish near surface/ROV	Occasional



Mesopelagic Fish	Atlantic Pearlsides	<i>Maurolicus weitzmani</i>	Persistent midwater presence	Common
Elasmobranch	Manta Ray	<i>Mobula spp.</i>	Observed post-launch only	Rare
Seabird	Sargasso Shearwater	<i>Puffinus lherminieri</i>	Continued foraging	Common
Seabird	Sooty Tern	<i>Onychoprion fuscatus</i>	Observed in groups	Occasional
Seabird	Frigatebird	<i>Fregata spp.</i>	Circling/diving behavior	Occasional
Seabird	Brown Booby	<i>Sula leucogaster</i>	First observed post-launch	Occasional
Seabird	White-tailed Tropicbird	<i>Phaethon lepturus</i>	First observed post-launch	Rare
Marine Mammal	(None observed)	—	No sightings post-launch	—
Plankton	Gelatinous plankton	(various taxa)	Less consistent presence	Occasional
Plankton	Neuston assemblage	(mixed taxa)	Patchy and less defined	Occasional
Plankton	Marine snow	(organic aggregates)	Persistent but variable	Common
Macroalgae	Sargassum	<i>Sargassum spp.</i>	Continued presence	Common

4.2.1.4 Ambient Environmental Conditions

There were various environmental conditions recorded inclusive of marine conditions such as water quality, air quality, weather, sound in air, and sound in water.

4.2.1.4.1 Water Quality

Water quality monitoring was conducted from February 10 to February 22, 2026, across multiple sampling locations, including the landing site and designated monitoring points. Parameters measured included temperature, pH, salinity, conductivity, dissolved oxygen (DO), total dissolved solids (TDS), turbidity, and oxidation-reduction potential (ORP).

No water quality data were collected on February 15–16 and 23–24, 2026 due to adverse weather conditions that rendered survey activities unsafe and unsuitable.

Water quality conditions throughout the monitoring period were stable and representative of typical marine conditions for the study area. Most parameters exhibited minimal spatial and temporal variability, indicating a relatively undisturbed marine environment.

Seawater temperature remained consistent, generally ranging between ~24.6°C and 25.3°C, with only minor fluctuations. Salinity values were also stable, averaging between ~33 and 36 ppt, which



is characteristic of normal open ocean conditions. Similarly, conductivity and TDS values remained within expected marine ranges and showed strong correlation with salinity trends.

Elevated pH values were recorded on February 10, 2026, with readings ranging from approximately 11.9 to 13.6, which are not representative of natural seawater conditions. These anomalous values were attributed to instrument related issues, as confirmed by subsequent corrective actions. While instruments were calibrated prior to initial deployment, based on the anomalous values observed, the instruments were calibrated again. Following calibration, pH values stabilized and remained within a more typical marine range of approximately 8.6 to 9.2 for the remainder of the monitoring period. This consistency confirms that baseline seawater conditions were slightly alkaline, as expected, and that the initial exceedances were not environmentally driven. Given that the initial elevated readings were determined to be non-representative of actual environmental conditions, the EMP trigger threshold for pH variation was not considered to have been exceeded in situ. As such, no operational response (i.e. stop work) was required.

These findings highlight the importance of routine instrument verification and quality control during field monitoring to ensure data reliability.

Dissolved oxygen concentrations showed moderate variability, ranging from approximately ~2.0 mg/L to 10.6 mg/L. Most readings fell within a typical marine range of ~6–8 mg/L, indicating generally well-oxygenated conditions. Occasional lower DO values (e.g., ~2–4 mg/L) were observed at certain locations and times. These may be attributed to:

- Localized biological activity
- Water column stratification
- Temporal variation (e.g., time of day)

Isolated elevated values (e.g., >9 mg/L) may reflect increased aeration, wave action, or instrument variability. No persistent hypoxic conditions were identified.

Turbidity levels were generally low (0–3 NTU) across most sampling events, indicating clear water conditions and minimal suspended sediment. However, sporadic elevated turbidity values were recorded (up to ~13–14 NTU), particularly on select dates (e.g., February 14, 2026). These increases are likely associated with:

- Temporary seabed disturbance
- Vessel movement
- Natural resuspension due to localized wave or current activity

These turbidity spikes were short-lived and not indicative of sustained water quality degradation.



Sampling depths ranged from approximately ~0.5 m to 17 m, capturing both surface and deeper offshore conditions. Despite this variation, water quality parameters remained broadly consistent across depths and locations, suggesting good mixing and homogeneity within the water column.

ORP values varied throughout the monitoring period, generally indicating well-oxygenated and oxidizing conditions typical of marine environments. No prolonged reducing conditions were observed.

The water quality data indicate that the MSA maintained stable baseline environmental conditions throughout the monitoring period. Aside from an initial outlier pH measurement, which was not observed in subsequent readings and is considered non-representative, all parameters fell within expected ranges for a healthy marine system.

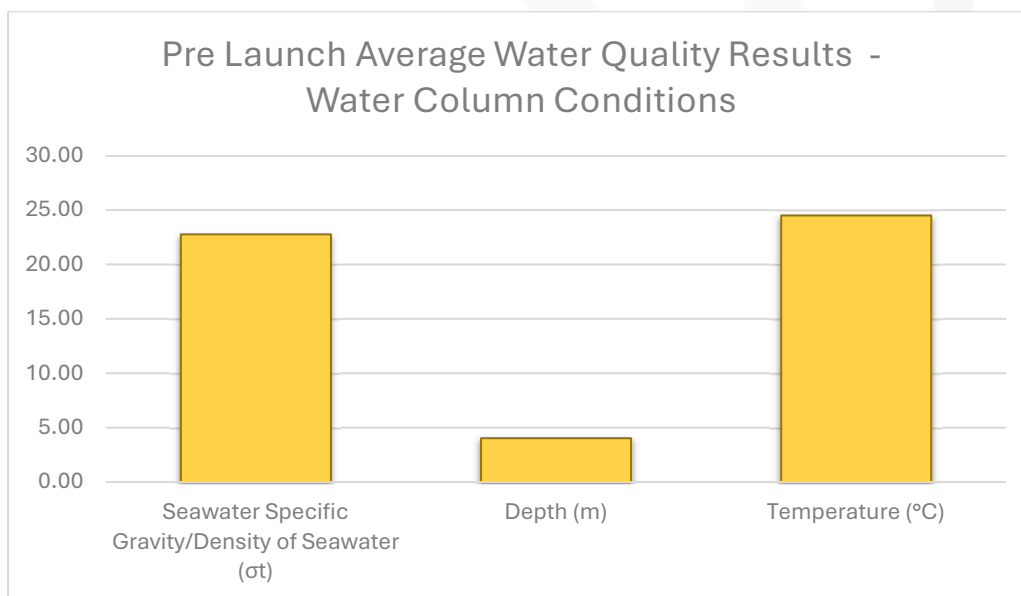


Figure 4-3. Pre-launch water quality results-water column conditions.

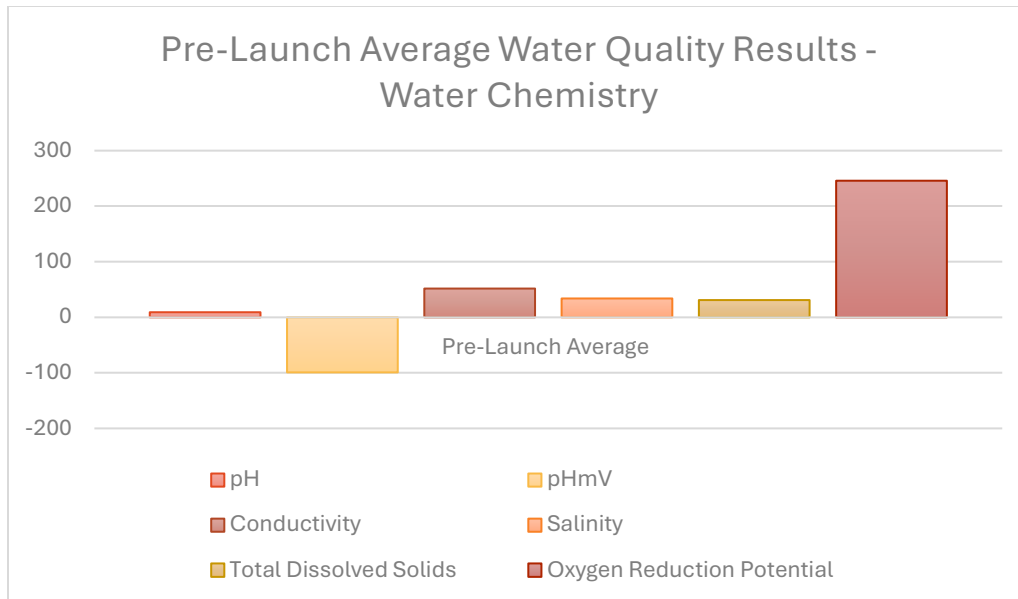


Figure 4-4. Pre-launch water quality results – water chemistry.

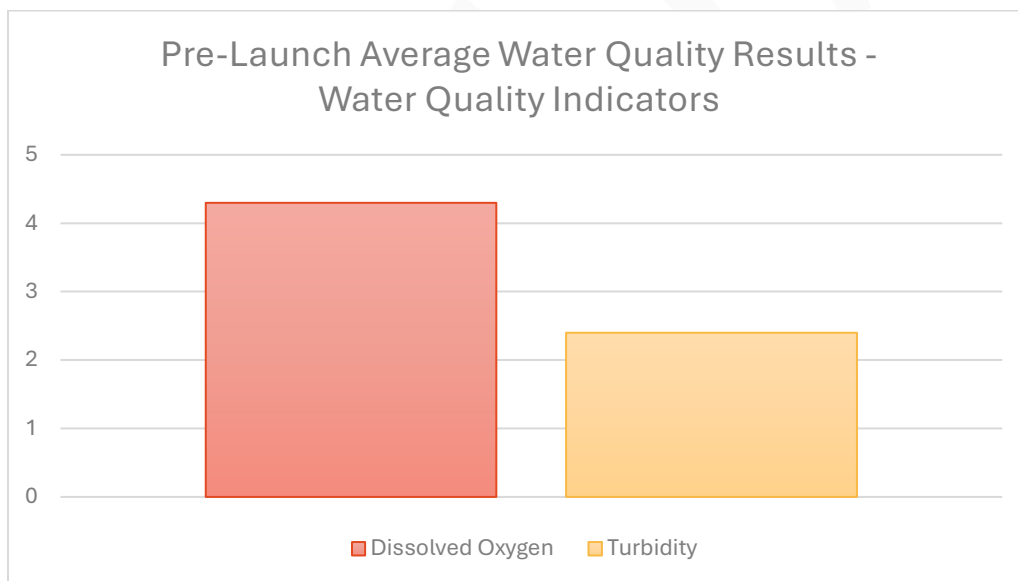


Figure 4-5. Pre-launch water quality results – water quality indicators.

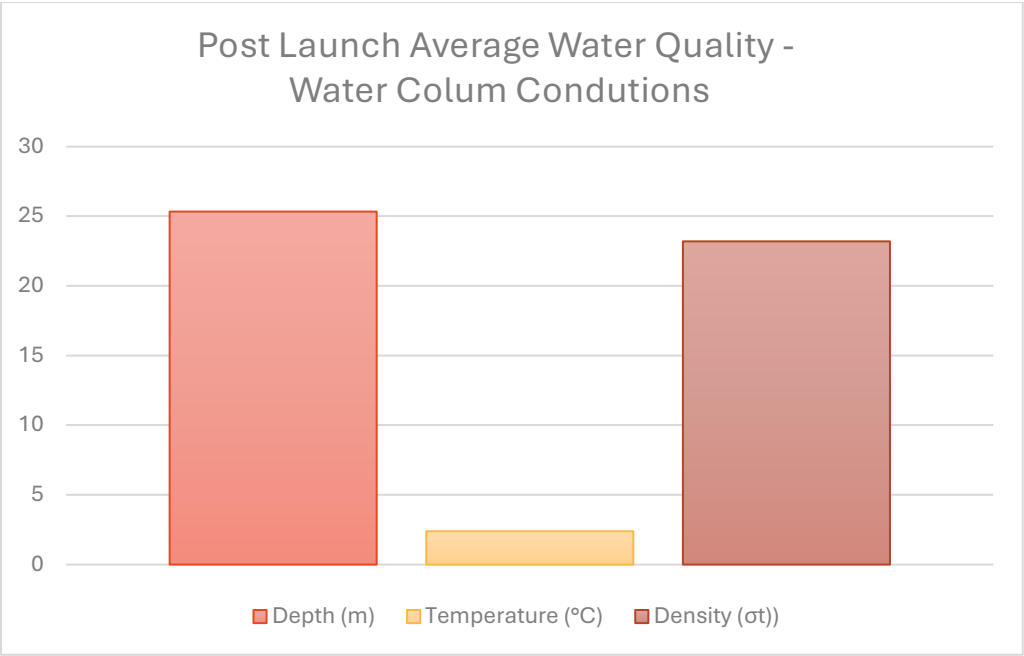


Figure 4-6. Post Launch water quality result – water column conditions.

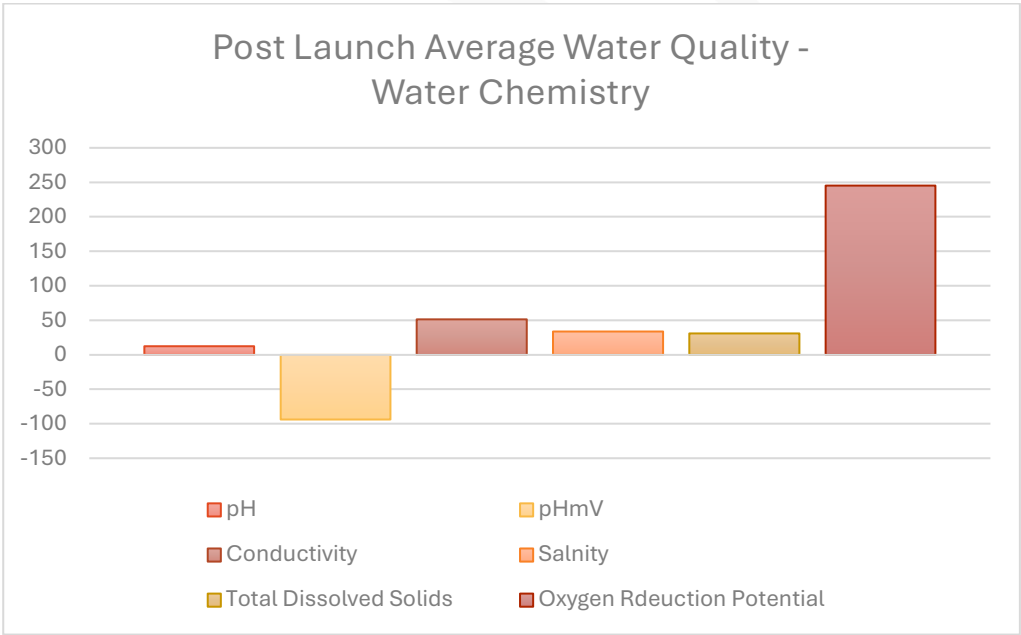


Figure 4-7. Post Launch water quality result – water chemistry.

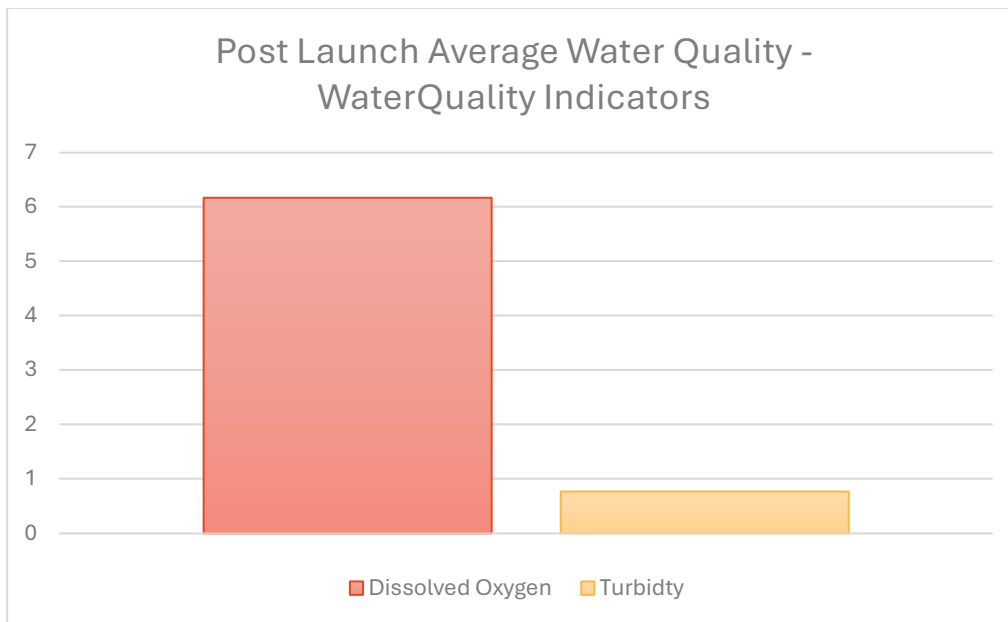


Figure 4-8. Post Launch water quality result – water quality indicators

4.2.1.4.2 Air Quality

Air quality monitoring was conducted February 10-26, 2026, across multiple sampling locations including the landing site and designated points. Parameters measured included:

- Particulate Matter less than 2.5 micrometers in diameter (PM2.5 in $\mu\text{g}/\text{m}^3$)
- Particulate Matter less than 10 micrometers in diameter (PM10 in $\mu\text{g}/\text{m}^3$)
- Formaldehyde (HCHO in $\mu\text{g}/\text{m}^3$)
- Total Volatile Organic Compounds (TVOC in $\mu\text{g}/\text{m}^3$)
- Temperature ($^{\circ}\text{F}$)
- Humidity (%)
- Air Quality Indicator (AQI)
- Particle Count

Data tables below show recorded measurements for each air quality parameter. No air quality data was recorded February 15-16 & 23-24, 2026, due to poor weather conditions which made monitoring unsafe.



Table 4-9. Air Quality Data – February 10-11, 2026.

Time	12:25 PM	2:07 PM	9:47 AM	11:52 AM	1:13 PM	2:26 PM
Date	10-Feb-26	10-Feb-26	11-Feb-26	11-Feb-26	11-Feb-26	11-Feb-26
Sample Location	Landing	Point 6	Landing	Point 1	Point 5	Point 3
PM2.5 (µg/m³)	3.3	3	9.7	7.4	5.6	5.3
PM10 (µg/m³)	5.6	5.4	16.5	12	9.2	9.8
HCHO (µg/m³)	0.02	0.01	0.01	0.01	0.01	0.01
TVOC (µg/m³)	0.02	0.02	0.01	0.01	0.02	0.01
Temperature (°F)	77.8	77	81.2	87.4	94.4	93
Humidity (%)	59.6	59.4	47.7	44.5	37.6	37.6
AQI	13	14	42	33	29	21
Particle Count	559	607	1501	1119	928	822

Table 4-10. Air Quality Data – February 12-13, 2026.

Time	9:22 AM	10:33 AM	11:57 AM	1:06 PM	9:09 AM	10:45 AM	11:55 AM	1:16 PM
Date	12-Feb-26	12-Feb-26	12-Feb-26	12-Feb-26	13-Feb-26	13-Feb-26	13-Feb-26	13-Feb-26
Sample Location	Landing	Point 4	Point 6	Point 2	Landing	Point 5	Point 3	Point 1
PM2.5 (µg/m³)	3.9	3.9	8.5	5	7.1	4.9	3.8	4.2
PM10 (µg/m³)	6.8	6.8	14.5	8.6	11.9	7.6	5.7	7
HCHO (µg/m³)	0.01	0	0.02	0.01	0.01	0.01	0.02	0.01
TVOC (µg/m³)	0.02	0	0.02	0.01	0.01	0.01	0.02	0.01
Temperature (°F)	81.2	81.2	79.1	78.5	76	79.1	84.2	91.6
Humidity (%)	53.1	53.1	59.7	57.8	71.4	64.6	57	47.5
AQI	16	16	33	23	29	21	15	20
Particle Count	679	679	1298	805	1091	793	608	696

Table 4-11. Air Quality Data – February 14 & 17, 2026.

Time	8:58 AM	10:10 AM	11:26 AM	12:30 PM	8:57 AM	10:24 AM	11:27 AM	12:38 PM
Date	14-Feb-26	14-Feb-26	14-Feb-26	14-Feb-26	17-Feb-26	17-Feb-26	17-Feb-26	17-Feb-26
Sample Location	Landing	Point 6	Point 4	Point 2	Landing	Point 3	Point 5	Point 1
PM2.5 (µg/m³)	7.6	6.4	6.1	5.6	4.3	2.7	3.9	3.5
PM10 (µg/m³)	13.2	9.5	10.7	9	7.4	4.5	6.5	5.9
HCHO (µg/m³)	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01



TVOC ($\mu\text{g}/\text{m}^3$)	0.2	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Temperature ($^{\circ}\text{F}$)	76.7	78.5	84	80.3	81.5	78.8	88	83.7
Humidity (%)	69	62.2	56.7	62.1	62.7	67.7	51.1	56.6
AQI	32	26	26	23	11	11	15	11
Particle Count	1183	1012	943	915	696	993	665	596

Table 4-12. Air Quality Data – February 18-19, 2026.

Time	9:22 AM	10:16 AM	11:06 AM	12:09 PM	9:37 AM	11:13 PM
Date	18-Feb-26	18-Feb-26	18-Feb-26	18-Feb-26	19-Feb-26	19-Feb-26
Sample Location	Landing	Point 4	Point 6	Point 2	Landing	Landing
PM2.5 ($\mu\text{g}/\text{m}^3$)	4.9	4.4	1.6	3.4	3.1	6
PM10 ($\mu\text{g}/\text{m}^3$)	8.9	8.4	3.8	5.6	4.5	10.9
HCHO ($\mu\text{g}/\text{m}^3$)	0.01	0.02	0.01	0.01	0.01	0.03
TVOC ($\mu\text{g}/\text{m}^3$)	0.02	0.02	0.01	0.01	0.01	0.11
Temperature ($^{\circ}\text{F}$)	75.1	84.9	79.7	82.4	83.9	74.9
Humidity (%)	73.1	56.7	63.6	61.8	64.6	79.6
AQI	71	22	16	15	8	24
Particle Count	752	754	640	626	389	913

Table 4-13. Air Quality Data – February 20-21, 2026.

Time	9:25 AM	10:23 AM	11:25 AM	12:22 PM	9:22 AM	10:24 AM	11:11 AM	12:08 PM
Date	20-Feb-26	20-Feb-26	20-Feb-26	20-Feb-26	21-Feb-26	21-Feb-26	21-Feb-26	21-Feb-26
Sample Location	Landing	Point 5	Point 3	Point 1	Landing	Point 4	Point 6	Point 2
PM2.5 ($\mu\text{g}/\text{m}^3$)	7.3	6.9	6.3	6.3	5.3	11.3	5.4	4
PM10 ($\mu\text{g}/\text{m}^3$)	12.6	12.7	11.4	10.01	10	18.4	9.9	6.9
HCHO ($\mu\text{g}/\text{m}^3$)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TVOC ($\mu\text{g}/\text{m}^3$)	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01
Temperature ($^{\circ}\text{F}$)	87.1	92.9	89.3	89.8	72.9	81.4	85.7	87.5
Humidity (%)	67.4	55.6	60.7	59.6	79.8	73.7	67.6	63
AQI	29	35	33	36	28	47	21	37
Particle Count	1229	1198	1122	984	1123	1743	889	780

Table 4-14. Air Quality Data – February 22 & 25, 2026.

Time	9:07 AM	10:12 AM	11:18 AM	12:18 PM	9:23 AM	10:20 AM	11:21 AM	12:26 PM
Date	22-Feb-26	22-Feb-26	22-Feb-26	22-Feb-26	25-Feb-26	25-Feb-26	25-Feb-26	25-Feb-26
Sample Location	Landing	Point 3	Point 5	Point 1	Landing	Point 6	Point 4	Point 2
PM2.5 ($\mu\text{g}/\text{m}^3$)	4.7	5.8	6.3	6.2	1.5	1.8	1.7	1.8



PM10 ($\mu\text{g}/\text{m}^3$)	8.2	9.6	11.8	10.8	2.3	2.7	2.9	3.4
HCHO ($\mu\text{g}/\text{m}^3$)	0.01	0.01	0.04	0.01	0.01	0.01	0.01	0.01
TVOC ($\mu\text{g}/\text{m}^3$)	0.02	0.02	0.61	0.01	0.01	0.01	0.01	0.01
Temperature ($^{\circ}\text{F}$)	81	91.7	85.7	88.1	78.1	79.3	76	77.4
Humidity (%)	73.9	54.5	65.3	61.2	53.1	46.5	54.6	50.7
AQI	12	21	24	33	6	7	8	9
Particle Count	731	800	1054	979	260	348	304	342

Table 4-15. Air Quality Data – February 26, 2026.

Time	9:10 AM	11:23 AM
Date	26-Feb-26	26-Feb-26
Sample Location	Landing	Landing
PM2.5 ($\mu\text{g}/\text{m}^3$)	6.7	6.4
PM10 ($\mu\text{g}/\text{m}^3$)	11	11.7
HCHO ($\mu\text{g}/\text{m}^3$)	0.01	0.01
TVOC ($\mu\text{g}/\text{m}^3$)	0.01	0.01
Temperature ($^{\circ}\text{F}$)	82.3	81.2
Humidity (%)	67.1	67
AQI	21	25
Particle Count	1085	946

Measurements for PM2.5 ranged between $1.5 \mu\text{g}/\text{m}^3$ and $11.3 \mu\text{g}/\text{m}^3$, with an average of $5.1 \mu\text{g}/\text{m}^3$. Measurements for PM10 ranged between $2.3 \mu\text{g}/\text{m}^3$ and $18.4 \mu\text{g}/\text{m}^3$, with an average of $8.75 \mu\text{g}/\text{m}^3$. These averages are typical and indicate typical air quality. The maxima were recorded days after the landing, and the minima were recorded nearly a week after the landing.

Measurements for HCHO ranged between $0.0 \mu\text{g}/\text{m}^3$ and $0.1 \mu\text{g}/\text{m}^3$, with an average of $0.01 \mu\text{g}/\text{m}^3$. This average is lower than typical, however, still indicates typical air quality. The maximum was recorded days before the landing, and the minimum was recorded nearly a week before the landing.

Measurements for TVOC ranged between $0.0 \mu\text{g}/\text{m}^3$ and $0.61 \mu\text{g}/\text{m}^3$, with an average of $0.03 \mu\text{g}/\text{m}^3$. This average is lower than typical, however, still indicates typical air quality. The maximum was recorded days after the landing, and the minimum was recorded nearly a week before the landing.

Measurements for Temperature ranged between 72.9°F and 94.4°F , with an average of 82.64°F . This average is typical and indicates typical air quality. The maximum was recorded a week before the landing, and the minimum was recorded days after the landing.



Measurements for Humidity ranged from 37.6% to 79.8%, with an average of 59.9%. This average is lower than typical, however, still indicates typical air quality. The maximum was recorded days after the landing, and the minimum was recorded nearly a week before the landing.

Measurements for AQI ranged from 6 to 71, with an average of 23.22. This is average is typical and indicates typical air quality. The maximum was recorded the day before the landing, and the minimum was recorded nearly a week after the landing.

Measurements for Particle Count ranged from 260 to 1742, with an average of 851.72. This average is lower than typical, however, still indicates typical air quality. The maximum was recorded days after the landing, and the minimum was recorded nearly a week after the landing.

Table 4-16. References for Typical Open Ocean Air Quality

Parameter	Typical Range	Supporting Sources	Bahamas-Specific Interpretation
PM2.5 (µg/m³)	1 – 10 µg/m³	(World Health Organization, 2021 ^{5,6} ; NOAA, 2020 ⁷ ; NASA, 2019 ⁸ ; Heintzenberg, J., 1989 ⁹)	Typically very clean (2–8 µg/m³) around The Bahamas. Seasonal spikes (10–25 µg/m³) occur during Saharan dust transport events (June–August). Slight increases near Nassau due to traffic and port activity.
PM10 (µg/m³)	5 – 20 µg/m³	(World Health Organization, 2021; NOAA, 2020; O'Dowd, C. D. & de Leeuw, G., 2007 ¹⁰)	Naturally elevated due to sea salt aerosols from waves and wind. During Saharan dust events, PM10 can rise significantly (20–80+ µg/m³), often more than PM2.5.
HCHO (ppb)	0.1 – 1.0 ppb	(NASA, 2019; NOAA, 2020; Chance, K. & Palmer, P. I., 2003 ¹¹)	Generally low in marine air. Slight increases may occur from photochemical reactions in strong tropical sunlight or near urban/port emissions.

⁵ World Health Organization. (2021). WHO global air quality guidelines: Particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. Geneva: WHO. <https://www.who.int/publications/i/item/9789240034228>

⁶ World Meteorological Organization. (2021). State of the global climate. <https://public.wmo.int>

⁷ NOAA. (2020). Aerosols and marine boundary layer observations. <https://www.noaa.gov>

⁸ NASA. (2019). Global aerosol and atmospheric composition observations (MODIS, MERRA-2). <https://earthdata.nasa.gov>

⁹ Heintzenberg, J.. (1989). Fine particles in the global troposphere: A review. Tellus B, 41(2), 149–160.

¹⁰ O'Dowd, C. D., & de Leeuw, G.. (2007). Marine aerosol production: A review of the current knowledge. Philosophical Transactions of the Royal Society A, 365(1856), 1753–1774.

¹¹ Chance, K., & Palmer, P. I.. (2003). Satellite measurements of formaldehyde over North America from GOME. Geophysical Research Letters, 30(17).



TVOC ($\mu\text{g}/\text{m}^3$)	50 – 300 $\mu\text{g}/\text{m}^3$	(World Health Organization, 2021; European Environment Agency, 2019 ¹² ; Carpenter, L. J. et al., 2012 ¹³)	Typically low offshore. Can increase slightly due to marine biogenic emissions (e.g., phytoplankton) and locally from fuel, tourism, and marine vessels near populated islands.
Temperature (°F)	75 – 88°F (24–31°C)	(NOAA, 2022 ¹⁴ ; World Meteorological Organization, 2021)	Consistent tropical marine climate. Minimal variation offshore; slightly higher near land due to urban heat effects in Nassau.
Humidity (%)	70 – 90%	(NOAA, 2020; World Meteorological Organization, 2018 ¹⁵)	Persistently high humidity. Important because it can bias low-cost PM sensors upward (particle swelling effect).
AQI	0 – 50 (Good)	(United States Environmental Protection Agency, 2023 ¹⁶ ; World Health Organization, 2021)	Usually “Good.” Can shift to Moderate (50–100) during Saharan dust episodes or localized pollution events (traffic, port emissions).
Particle Count (#/cm ³)	1,000 – 10,000 particles/cm ³	(NOAA, 2020; NASA, 2019; Heintzenberg, J., 1989)	Dominated by sea spray and sulfate particles. Counts increase with wind speed and wave action. Higher near shipping lanes and during dust intrusions.

Overall, the data indicated typical air quality was recorded during the air quality monitoring with no extremes measured during the landing.

4.2.1.4.3 Weather

Weather monitoring was conducted February 10-26, 2026, across multiple sampling locations including the landing site and designated points. Parameters measured included:

- Wind Speed (mph)
- Temperature (°F)
- Wind Direction
- Humidity (%)
- Pressure (hPa)
- Barometric Pressure (hPa)
- Density Altitude (ft.)
- Wind Chill (°F)

¹² European Environment Agency. (2019). EMEP/EEA air pollutant emission inventory guidebook. <https://www.eea.europa.eu>

¹³ Carpenter, L. J., et al. (2012). Atmospheric iodine levels influenced by sea surface emissions of inorganic iodine. *Nature Geoscience*, 5, 618–622.

¹⁴ NOAA. (2022). National Centers for Environmental Information: Climate normals. <https://www.ncei.noaa.gov>

¹⁵ World Meteorological Organization. (2018). Guide to meteorological instruments and methods of observation (WMO-No. 8). <https://library.wmo.int>

¹⁶ United States Environmental Protection Agency. (2023). Technical assistance document for the reporting of daily air quality – the Air Quality Index (AQI). <https://www.epa.gov/aqi>



- Heat Index (°F)
- Dew Point (°F)
- Wet Bulb (°F)
- Altitude (ft.)

Data tables below show recorded measurements for each weather parameter. No weather data was recorded February 15-16 & 23-24, 2026, and limited data was recorded February 25-26, 2026, due to poor weather conditions which made monitoring unsafe.

Meteorological data were collected using a handheld Kestrel device between 10 February and 26 February 2026 across multiple sampling locations. No data were collected on 15, 16, 23, and 24 February 2026 due to weather conditions exceeding acceptable Beaufort scale limits. Additionally, on 26 February 2026, data collection was restricted to a single location (Landing Point) as a result of elevated weather conditions. Despite these limitations, the dataset is considered representative, with results indicating generally stable atmospheric conditions throughout the survey period.

Wind speeds ranged from 0.90 to 10.60 mph, with an average of 5.12 mph, reflecting predominantly light to moderate wind conditions. These conditions are considered suitable for field surveys, with minimal interference expected for observational activities. However, occasional higher wind speeds (>9 mph) may have resulted in minor disturbances to increased sea state, including the formation of whitecaps and enhanced wave activity as well as auditory-based observations, such as bird call detection.

Ambient temperatures ranged from 70.4°F to 87.5°F, with an average of 78.04°F, indicating consistently warm conditions typical of the region. Peak temperatures were generally recorded during late morning to early afternoon periods, which may have influenced species activity patterns, particularly for temperature-sensitive fauna.

Relative humidity varied between 49.0% and 81.3% (average 65.8%), indicating moderate to high atmospheric moisture. Elevated humidity, particularly during morning periods, likely contributed to increased heat index values, which ranged from 73.9°F to 93.2°F (average 80.85°F). These conditions may have influenced observer comfort and endurance, though no significant limitations to data collection were identified.

Dew point temperatures (58.0°F to 75.9°F; average 66.23°F) further confirm consistently humid conditions, while wet bulb temperatures (63.5°F to 77.4°F; average 70.17°F) support the presence of moderate atmospheric moisture throughout the study.

Atmospheric pressure remained relatively stable, ranging from 1,019.0 to 1,026.8 mb (average 1022.05 mb), with barometric pressure showing a similar range of 1,018.7 to 1,026.2 mb (average



1021.93 mb). This stability indicates the absence of significant weather systems (e.g., storms or frontal passages) during the monitoring period, thereby ensuring consistent survey conditions.

Recorded wind directions were predominantly from the east to southeast (E, ESE, SE), with occasional variability to the northeast (N/NE) and west (W). These patterns are consistent with prevailing regional trade winds and are not expected to have significantly influenced survey outcomes, aside from localized variations in exposure at certain sampling points.

Density altitude values ranged from 788 to 1,910 ft (average 1,283.48 ft), reflecting combined effects of temperature and pressure fluctuations. Wind chill values (73.9°F to 85.3°F; average 78.62°F) were closely aligned with ambient temperatures due to generally low wind speeds.

The meteorological conditions recorded during the survey period were considered favorable and within acceptable limits for environmental fieldwork. The absence of extreme weather events and the presence of relatively stable atmospheric conditions suggest that data quality and consistency were maintained across sampling days. Wildlife observations were not significantly constrained, although minor variability may have occurred due to wind and temperature fluctuations. Marine survey conditions remained suitable, with only limited influence from wind-driven surface disturbance.

Table 4-17. Weather Data – February 10-11, 2026.

Time	1:17 PM	2:13 PM	9:59 AM	11:58 AM	1:15 PM	2:26 PM
Date	10-Feb-26	10-Feb-26	11-Feb-26	11-Feb-26	11-Feb-26	11-Feb-26
Sample Location	Landing	Point 6	Landing	Point 1	Point 5	Point 3
Wind Speed (mph)	3.8	0.9	2.1	0.9	4.8	1.4
Temperature (°F)	74.8	76.3	75.8	80.1	74.8	82.1
Wind Direction	-	-	-	-	-	-
Humidity (%)	61.8	64.2	54.1	49	54.6	50.5
Heat Index (°F)	74.3	76.8	75	79.7	73.9	83.8
Dew Point (°F)	60.2	63.5	58	59.1	58	62.6
Pressure	1026.8	1025.6	1026.4	1024.5	1024.2	1023.1
Barometric Pressure	1026.2	1026	1026.2	1024.8	1024.1	1023.5
Density Altitude	788	945	831	1194	977	1465
Wind Chill (°F)	75.5	76.3	75.6	80.1	74.4	82.4
Wet Bulb	65.1	67.6	63.5	66.4	64.4	69.4
Altitude	-349	-344	-359	-322	-298	-300

Table 4-18. Weather Data – February 12-13, 2026.

Time	9:23 AM	10:28 AM	11:59 AM	1:05 PM	9:08 AM	10:46 AM	11:57 AM	1:13 PM
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Date	12-Feb-26	12-Feb-26	12-Feb-26	12-Feb-26	13-Feb-26	13-Feb-26	13-Feb-26	13-Feb-26
Sample Location	Landing	Point 4	Point 6	Point 2	Landing	Point 5	Point 3	Point 1
Wind Speed (mph)	1.1	3.2	2.3	3.9	5.7	4.5	5.1	6.1
Temperature (°F)	77.1	78.2	76.8	75.8	74	80.3	76.7	79.9
Wind Direction	-	-	-	-	-	-	-	-
Humidity (%)	59.4	55.2	60.9	56.2	81.3	61.8	70.9	65.4
Heat Index (°F)	77.5	75.7	77.2	74.8	75.7	83.1	78.3	82.4
Dew Point (°F)	62.3	58.6	62.8	58.9	67.9	66.6	67.4	67.3
Pressure	1023.4	1023.1	1023	1021.3	1021.9	1021.9	1021.3	1021
Barometric Pressure	1023.2	1023.2	1022.4	1021.3	1021.6	1021.8	1021.7	1020.4
Density Altitude	1114	974	1032	1002	941	1405	1181	1477
Wind Chill (°F)	77	78.3	76.8	75.6	73.9	80.2	76.6	79.9
Wet Bulb	67.5	64.4	67.6	64.6	69.6	70.9	70.5	71.1
Altitude	-281	-279	-257	-221	-228	-243	-229	-197

Table 4-19. Weather Data – February 14 & 17, 2026.

Time	8:59 AM	10:11 AM	11:24 AM	12:32 PM	9:02	10:24	11:27	12:41
Date	14-Feb-26	14-Feb-26	14-Feb-26	14-Feb-26	17-Feb-26	17-Feb-26	17-Feb-26	17-Feb-26
Sample Location	Landing	Point 6	Point 4	Point 2	Landing	Point 3	Point 5	Point 1
Wind Speed (mph)	2.7	3.7	1.6	4.8	6.4	7.1	2.8	1.4
Temperature (°F)	75.6	76.7	77.7	80	78.5	77.2	81.1	85.6
Wind Direction	-	-	-	-	ESE	ESE	ESE	ESE
Humidity (%)	69.2	63.6	63.1	60	67.1	69.8	59.8	58.2
Heat Index (°F)	76.3	77	79	81	80.6	84	87.3	89.4
Dew Point (°F)	64.7	63.6	64.5	64.5	66.9	67.8	68.4	68.1
Pressure	1022.8	1023.8	1022.6	1022.7	1021.9	1022.4	1022.1	1021.3
Barometric Pressure	1022.8	1023	1022.6	1022.1	1022	1022.2	1022.2	1021.2



Density Altitude	1011	1094	1177	1321	1273	1462	1776	1675
Wind Chill (°F)	75.4	76.6	77.9	79.7	79.5	81.7	81.7	85.3
Wet Bulb	68.2	67.8	69.8	69.1	70.5	71.8	72.2	73.6
Altitude	-265	-270	-262	-243	-241	-248	-247	-216

Table 4-20. Weather Data – February 18-19, 2026.

Time	9:24	10:20	11:07	12:10	9:38	22:15
Date	18-Feb-26	18-Feb-26	18-Feb-26	18-Feb-26	19-Feb-26	19-Feb-26
Sample Location	Landing	Point 4	Point 6	Point 2	Landing	Landing
Wind Speed (mph)	4.5	6.7	7.5	4	5.4	9.8
Temperature (°F)	75.2	78.4	79.5	78.4	80.3	74.8
Wind Direction	E	E	E	E	N/NE	N/NE
Humidity (%)	68.8	69.1	70.7	67	68.8	73
Heat Index (°F)	75.9	76.8	84.9	79.9	84.4	76.6
Dew Point (°F)	64.4	65.4	71.3	66.1	69.5	66.3
Pressure	1022.8	1023.3	1023.1	1021.9	1021.5	1019.3
Barometric Pressure	1022.6	1023.4	1022.9	1021.9	1021.5	1018.9
Density Altitude	962	1111	1398	1210	1433	1148
Wind Chill (°F)	75.2	76.1	80.4	78.3	80.2	74.8
Wet Bulb	67.8	69.1	71.2	71.2	72.9	69.1
Altitude	-275	-279	-267	-243	-243	-164

Table 4-21. Weather Data – February 20-21, 2026.

Time	9:27	10:25	11:27	12:25	9:23	10:26	11:12	12:12
Date	20-Feb-26	20-Feb-26	20-Feb-26	20-Feb-26	21-Feb-26	21-Feb-26	21-Feb-26	21-Feb-26
Sample Location	Landing	Point 5	Point 3	Point 1	Landing	Point 4	Point 6	Point 2
Wind Speed (mph)	4.5	7	9.8	4.2	6.2	7.3	4.6	10.6
Temperature (°F)	81.5	84.1	79.5	82.9	78.6	78.3	81.6	77.8
Wind Direction	ESE	ESE	ESE	ESE	SE	SE	SE	SE
Humidity (%)	77.3	79	77.7	74.2	72.6	76.9	69	79
Heat Index (°F)	86.5	88	85.1	93.2	81.7	82.6	85.1	80.6
Dew Point (°F)	71.7	75.9	73.2	74.2	69.2	71.1	70	71.2
Pressure	1019.7	1019.9	1019.5	1019	1021.2	1021	1020.9	1020.7



Barometric Pressure	1019.7	1019.9	1019.2	1018.7	1021.1	1021	1020.9	1020.4
Density Altitude	1580	1551	1566	1910	1321	1381	1480	1290
Wind Chill (°F)	81.5	80.1	79.5	83.3	78.6	78.3	81.1	77.8
Wet Bulb	74.7	75	75.7	77.4	72	73.4	73.2	73.2
Altitude	-181	-187	-167	-169	-219	-224	-214	-207

Table 4-22. Weather Data – February 22 & 25, 2026.

Time	9:15	10:18	11:24	12:19	9:14 AM	10:17 AM	11:15 AM	12:21 PM
Date	22-Feb-26	22-Feb-26	22-Feb-26	22-Feb-26	25-Feb-26	25-Feb-26	25-Feb-26	25-Feb-26
Sample Location	Landing	Point 3	Point 5	Point 1	Landing	Point 6	Point 4	Point 2
Climate/Weather Parameters								
Wind Speed (mph)	7.3	7.4	6.1	6.6	6.6	6.7	3.5	5.1
Temperature (°F)	78.4	78.6	87.5	79.8	70.4	72.2	71.5	72.9
Wind Direction	W	W	W	W				
Humidity (%)	66.2	65	55.4	66.2				
Heat Index (°F)	79.9	81.1	85.8	83.1				
Dew Point (°F)	66.6	66.8	66.3	68.3				
Pressure	1020.2	1020.4	1020.5	1019.9				
Barometric Pressure	1020	1020.1	1020.7	1019.9				
Density Altitude	1289	1362	1684	1548				
Wind Chill (°F)	78.3	78.6	82.6	79.8				
Wet Bulb	70.3	70.7	71.8	72.3				
Altitude	-192	-188	-210	-164				

Table 4-23. Weather Data – February 26, 2026.

Time	9:00 AM	11:19 AM
Date	26-Feb-26	26-Feb-26
Sample Location	Landing	Landing
Climate/Weather Parameters		
Wind Speed (mph)	8.7	9.1
Temperature (°F)	75.9	76.8



Measurements for Wind Speed ranged from 0.9 mph to 10.6 mph, with an average of 5.12 mph. This average is typical and indicates normal weather conditions. The maximum was recorded days after the landing, and the minimum was recorded a week before the landing.

Measurements for Temperature ranged from 70.4 °F to 87.5 °F, with an average of 78.4 °F. This average is typical and indicates normal weather conditions. The maximum was recorded days after the landing, and the minimum was recorded nearly a week after the landing.

Measurements for Wind Direction ranged from North-Northeast to West, with an average of East-Southeast. This average is more southerly than typical and reflects the cold fronts that were experienced during the monitoring. The most northern wind direction was recorded the day of the landing, and the most western wind direction was recorded days after the landing.

Measurements for Humidity ranged from 49% to 81.3%, with an average of 65.8%. This average is lower than typical and reflects drier conditions during winter. The maximum was recorded a week before the landing, and the minimum was recorded nearly a week before the landing.

Measurements for Heat Index ranged from 73.9 °F to 93.2 °F, with an average of 80.85 °F. Measurements for Dew Point ranged from 58 °F to 75.9 °F, with an average of 66.23 °F. Measurements for Pressure ranged from 1019 hPA to 1026.8 hPA, with an average of 1022.05 hPA. Measurements for Barometric Pressure ranged from 1018.7 hPA to 1026.2 hPA, with an average of 1021.93 hPA. Measurements for Density Altitude ranged from 788 feet to 1910 feet, with an average of 1283.48 feet. Measurements for Wet Bulb ranged from 63.5 °F to 77.4 °F, with an average of 70.17 °F. The pressure values are above average but the other averages are typical, and indicate low heat stress, dry, stable, winter weather conditions. The maxima was recorded the day after the landing, and the minima was recorded a week before the landing.

Measurements for Wind Chill ranged from 73.9 °F to 85.3 °F, with an average of 78.62 °F. This average is typical of the cold fronts that were experienced during the monitoring. The maximum was recorded days before the landing, and the minimum was recorded a week before the landing.

Measurements recorded as “altitude” by the Kestrel 5500 Pocket Weather Meter ranged from -359 ft to -164 ft, with an average of -242.3 ft. As surveys were conducted at sea level, these values reflect barometric pressure-derived altitude estimates rather than true elevation. Variability in these readings is attributed to changes in atmospheric pressure and calibration conditions. As such, this parameter is not considered representative of site elevation and was not used in the interpretation of results. This parameter is included for completeness of field records only.



Table 4-24. References for Typical Open Ocean Weather Conditions

Parameter	Typical Range	Supporting Sources	Bahamas-Specific Interpretation
Wind Speed (mph)	5 – 20 mph	(NOAA, 2022 ¹⁷ ; World Meteorological Organization, 2018) ¹⁸	Generally moderate due to trade winds. Higher speeds (15–25 mph) common in winter and during weather systems.
Temperature (°F)	75 – 88°F (24–31°C)	(NOAA, 2022; World Meteorological Organization, 2021) ¹⁹	Stable tropical marine climate. Slightly warmer in summer; coastal moderation limits extremes.
Wind Direction	Predominantly E–NE	(NOAA, 2022; World Meteorological Organization, 2018)	Dominated by northeast trade winds. Shifts may indicate fronts, storms, or local weather changes.
Humidity (%)	70 – 90%	(NOAA, 2020; World Meteorological Organization, 2018)	Persistently high. Drops (50–70%) during Saharan Air Layer events or midday heating.
Heat Index (°F)	80 – 105°F	(United States Environmental Protection Agency, 2023 ²⁰ ; NOAA, 2022) ²¹	Often exceeds actual temperature due to high humidity. Important for heat stress risk, especially in summer.
Dew Point (°F)	70 – 80°F	(NOAA, 2020; World Meteorological Organization, 2018)	Typically high indicates moist tropical air. Values >75°F feel very humid/uncomfortable.
Pressure (hPa / mb)	1010 – 1020 hPa	(NOAA, 2022; World Meteorological Organization, 2018)	Fairly stable. Drops may indicate storms, tropical systems, or low-pressure systems.
Barometric Pressure (hPa / inHg)	~1010–1020 hPa (29.8–30.1 inHg)	(NOAA, 2022; World Meteorological Organization, 2018)	Same as pressure; used for weather forecasting. Falling pressure indicates worsening weather.

¹⁷ NOAA. (2022). National Centers for Environmental Information: Climate normals. <https://www.ncei.noaa.gov>

¹⁸ World Meteorological Organization. (2018). Guide to meteorological instruments and methods of observation (WMO-No. 8). <https://library.wmo.int>

¹⁹ World Meteorological Organization. (2021). State of the global climate 2021. <https://public.wmo.int>

²⁰ United States Environmental Protection Agency. (2023). Technical assistance document for the reporting of daily air quality – the Air Quality Index (AQI). <https://www.epa.gov/aqi>

²¹ NOAA National Weather Service. (2022). Heat index and wind chill charts. <https://www.weather.gov>



Parameter	Typical Range	Supporting Sources	Bahamas-Specific Interpretation
Density Altitude (ft)	~0 – 1,500 ft (near sea level)	(Federal Aviation Administration, 2016 ²² ; NOAA, 2022)	Usually low due to sea level location. Can increase with high heat/humidity—relevant for aviation.
Wind Chill (°F)	Rarely applicable (>70°F)	(NOAA, 2022)	Not typically relevant in tropical climates; only meaningful during rare cold fronts.
Wet Bulb (°F)	75 – 82°F	(World Meteorological Organization, 2018; NOAA, 2020)	Important for heat stress. High wet bulb (>80°F) indicates dangerous human heat exposure conditions.
Altitude (ft / m)	~0 – 50 ft (0–15 m)	(NOAA, 2022)	The Bahamas are low-lying islands; minimal variation unless measuring aircraft or elevated sensors.

Overall, the data indicated winter weather inclusive of cold front conditions were recorded during the Weather monitoring with no extremes measured during the landing.

4.2.1.4.4 Sound in Air

Sound in Air monitoring was conducted February 10-26, 2026, across multiple sampling locations including the landing site and designated points. Parameters measured included:

- Sound in Air (dBA)

Data tables below show recorded measurements for Sound in Air. No Sound in Air data was recorded February 15-16 and 23-24, 2026 due to weather conditions which made it unsafe and inconducive to surveying.

Table 4-25. Sound in Air Data – February 10-14 & 25-26, 2026.

Date	Sample Location	Time	Max	Min	Average
10-Feb-26	Landing	12:57-12:58 PM	64.80	54.50	57.40
10-Feb-26	Point 6				
11-Feb-26	Landing	9:57-9:58 AM	51.80	40.90	46.35
11-Feb-26	Point 1	11:55-11:56 AM	54.20	42.80	47.52
11-Feb-26	Point5	1:10-1:11 PM	56.30	46.70	50.60

²² Federal Aviation Administration. (2016). Pilot's handbook of aeronautical knowledge (FAA-H-8083-25B). <https://www.faa.gov>



11-Feb-26	Point 3	2:23-2:25 PM	67.40	30.20	43.56
12-Feb-26	Landing	9:26-9:27 AM	45.90	38.60	41.86
12-Feb-26 ²³	Point 4	10:36-10:48 AM	63.20	37.00	50.59
12-Feb-26	Point 6	11:56 AM	47.80	11.56	43.59
12-Feb-26	Point 2	1:03-1:04 PM	46.70	38.80	41.45
13-Feb-26	Landing	9:10-9:11 AM	52.50	45.10	49.56
13-Feb-26	Point 5	10:48-10:49 AM	41.00	34.00	37.81
13-Feb-26	Point 3	11:58-11:59 AM	45.40	39.40	42.38
13-Feb-26	Point 1	1:20-1:21 PM	43.40	39.40	40.99
14-Feb-26	Landing	9:02-9:03AM	51.70	45.80	49.40
14-Feb-26	Point 6	10:08-10:09 AM	63.50	47.40	53.19
14-Feb-26	Point 4	11:28-11:29AM	46.10	39.70	42.02
14-Feb-26	Point 2	12:38-12:39 PM	79.40	47.00	51.92
17-Feb-26	Landing	9:57-9:58 AM	59.9	45.2	49.58
17-Feb-26	Point 3	10:31-10:32 AM	56.2	45.7	50.77
17-Feb-26	Point 5	11:23-11:24 AM	47.4	43	44.82
17-Feb-26	Point 1	12:10-12:11 PM	46.8	39.9	42.6
18-Feb-26	Landing	9:03-9:15 AM	90.1	68.3	80.04
18-Feb-26	Point 4	9:59-10:00 AM	79.1	71.2	75.5
18-Feb-26	Point 6	10:51-10:52 AM	93	87.8	89.8
18-Feb-26	Point 2	11:19-11:20AM	86.3	81.2	83.8
19-Feb-26	Landing	9:21-9:22 AM	59.6	49.7	54.9
19-Feb-26	Landing	10:00-10:01 AM	56.5	49.9	52.9
20-Feb-26	Landing	9:15-9:18 AM	48.3	42.3	46
20-Feb-26	Point 5	10:14-10:15 AM	49.7	46.2	47.6
20-Feb-26	Point 3	11:14-11:16 AM	56.5	53.8	55.4
20-Feb-26	Point 1	12:15-12:16 PM	51.3	47.3	45
21-Feb-26	Landing	9:10-9:11 AM	53.1	46.4	50.6

²³ Measurements include plane noise.



21-Feb-26	Point 4	10:13-10:14 AM	54.3	50.6	52.4
21-Feb-26	Point 6	10:55-10:56 AM	46.8	46.3	46.5
21-Feb-26	Point 2	11:56-11:57 AM	54.3	52.5	49.7
22-Feb-26	Landing	9:00-9:01 AM	47.6	47.2	47.4
22-Feb-26	Point 3	10:06-10:07 AM	60.9	54.8	57.2
22-Feb-26	Point 5	11:11-11:12 AM	56.3	55.4	55.7
22-Feb-26	Point 1	12:03-12:04 PM	54.8	54.7	54.8
25-Feb-26	Landing	9:29-9:30 AM	62.50	54.20	55.69
25-Feb-26	Point 6	10:22-10:23 AM	59.00	54.40	56.00
25-Feb-26	Point 4	11:21-11:22 AM	69.60	54.20	55.16
25-Feb-26	Point 2	12:29-12:30 PM	57.10	53.90	54.83
26-Feb-26	Landing	9:11-9:12 AM	57.90	54.60	55.95
26-Feb-26	Landing	11:25-11:26 AM	58.20	55.10	56.04

Measurements for Sound in Air ranged from 34 dBA to 90.1 dBA, with an average of 54.3. This average is typical and indicates normal Sound in Air levels. The maximum was recorded a day before the landing, and the minimum was recorded nearly a week before the landing.

Table 4-26. References for Normal Sound in Air Levels

Parameter	Typical Range	Supporting Sources	Bahamas-Specific Interpretation
Sound in Air (dBA)	30 – 60 dBA	(World Health Organization, 2018 ²⁴ ; United States Environmental Protection Agency, 1974 ²⁵ ; NOAA, 2020 ²⁶)	Remote offshore areas are typically very quiet (30–45 dBA), dominated by natural sounds (wind, waves). Near Nassau or shipping lanes, levels may rise to 50–65 dBA due to vessels, ports, and urban activity. Windy conditions can increase ambient noise naturally.

²⁴ World Health Organization. (2018). Environmental noise guidelines for the European region. Copenhagen: WHO Regional Office for Europe. <https://www.who.int/europe/publications/item/9789289053563>

²⁵ United States Environmental Protection Agency. (1974). Information on levels of environmental noise requisite to protect public health and welfare with an adequate margin of safety. Washington, DC: U.S. EPA.

²⁶ NOAA. (2020). Ocean noise and marine environmental conditions. <https://www.noaa.gov>



Overall, the data indicated normal Sound in Air levels were recorded during the Sound in Air monitoring before and after the landing.

4.2.1.4.5 Sound in Water

Ambient underwater noise baselines were established using Larson Davis 831c sound level meters and hydrophone attachments. The L90 metric was applied to isolate steady-state background noise and remove transient or mechanically influenced readings. Values affected by mechanical or electrical interference were excluded from ambient calculations, with preference given to L90 measurements where discrepancies occurred.

The average ambient underwater noise level was calculated at 133.3 dB re 1 μ Pa using L90 values, while the average using LZeq values was slightly higher at 135.0 dB re 1 μ Pa.

During the landing event, increased low-frequency interference was observed at the 3 m and 10 m depths, preventing clear detection of the sonic boom at these levels. However, the 40 m depth sensor recorded reduced interference and successfully captured the landing event. However, during the day of landing there were other commercial vessels passing by the monitoring vessel as well as vessels patrolling the waters, including the Royal Bahamian Defence Force, which contributed to higher ambient acoustic levels prior to the landing operation.

Analysis of the 40 m recording identified a peak sound pressure level (LZpeak) of 142.64 dB re 1 μ Pa, with a characteristic “triple boom” waveform detected approximately 0.3 seconds after the initial impulse. The recorded energy was primarily concentrated below 500 Hz, with most frequency strength occurring below 250 Hz, consistent with expected descent boom characteristics.

Compared to the pre-launch ambient baseline of 133.3 dB re 1 μ Pa, the landing event resulted in an approximate 9.34 dB increase in underwater sound levels at 40 m depth, approximately 10.7 nautical miles from the droneship.

Additional analysis identified persistent low-frequency noise between 0 and 125 Hz, likely associated with deployment line movement and shallow wave interaction. While this noise may limit detection of very low-frequency vocalizations, it was not expected to significantly affect detection of cetacean species of interest.

Marine mammal monitoring detected Atlantic spotted dolphin (*Stenella frontalis*) during surveys conducted on 11 and 12 February, with detections confirmed through visual observations. No additional marine mammal species were identified during the monitoring period. Further details on the in-water sound monitoring results are provided in the *In-Air and In-Water Sound Measurement Monitoring Report for SpaceX Starlink G10-36 Mission on 19 February 2026 at Exuma Sound, Bahamas*, document included in [Appendix C](#).



4.2.2 Terrestrial Surveys

4.2.2.1 Pre-Landing

4.2.2.1.1 Avian Observations

Survey areas across Cat Island, and Eleuthera included different habitats such as Coastal Rock Community, Beach Sand Community with nearby Mixed Disturbed Vegetation, Dry-Broadleaf Evergreen Forests, and Mangrove Wetlands. These different habitats and their geolocation on the different surveyed areas allowed for a range of avifauna to be observed by surveyors. A total of 116 counts was conducted between the two islands (Cat Island: n=58, Eleuthera: n=58).

Areas surveyed on both Cat Island and Eleuthera fall within designated Important Bird Areas (IBA). IBA's are internationally recognized sites of importance that are significant for bird conservation. These sites are designated based on their capacity to support threatened, endemic, and migratory species. Observed avifauna were a mix of permanent residents, migratory species, and endemic species. Some species are also on the International Union for Conservation (IUCN) Red List as Near Threatened (NT) and Vulnerable (VU). The IUCN Red List is a comprehensive list of the global conservation status of animals, plants, and fungi. It notes estimated population densities within a region and cumulatively worldwide and aids in conservation strategies for species most threatened.

Thirty different species of birds were observed on the northwestern coastline of Cat Island before the launch. Of these, 3 are currently listed on the International Union for Conservation (IUCN) Red List as Near Threatened, 1 is listed as Vulnerable. Four hundred seventy-three individuals were counted across the point counts and transects of the survey. Survey counts were not conducted on the day of the landing (February 19th) as they were completed the day prior in anticipation of the landing occurring as planned on February 18th. Surveyors instead revisited point counts 1-10 and conducted a brief survey to record if any observable changes had occurred in the area compared to the first day of surveys.

Forty-two different avifauna were observed on the southern coastline of Eleuthera pre-launch. Of these species, four of them are listed as Near Threatened. Two hundred thirty-two individuals were counted across the survey area. Weather constraints did not permit for sampling February 16th on neither Eleuthera nor Cat Island. Avifauna observed on each island during pre-landing surveys are detailed in [Table 4-27](#) and [Table 4-28](#) below.



Table 4-27. Avifauna observed during terrestrial surveys in Cat Island. IUCN= International Union for Conservation of Nature, LC= Least Concerned, VU= Vulnerable, NT=Near Threatened

Common Name	Scientific Name	IUCN Status	Range
American Kestrel	<i>Falco sparverius sparveroides</i>	LC	Year-round; non-breeding
American Oystercatcher	<i>Haematopus palliatus</i>	LC	Year-round; breeding
American Redstart	<i>Setophaga ruticilla</i>	LC	Migratory; non-breeding
Bahama Mockingbird	<i>Mimus gundlachii</i>	LC	Year-round; breeding
Bahama Woodstar	<i>Nesophlox evelynae</i>	LC	Year-round; breeding
Bananaquit	<i>Coereba flaveola bahamensis</i>	LC	Year-round; breeding
Barn Swallow	<i>Hirundo rustica</i>	LC	Migratory; non-breeding
Black-bellied Plover	<i>Pluvialis squatarola</i>	VU	Migratory; non-breeding
Black-faced Grassquit	<i>Melanospiza bicolor</i>	LC	Year-round; breeding
Common ground dove	<i>Columbina passerina</i>	LC	Year-round; breeding
Common Yellowthroat	<i>Geothlypis trichas</i>	LC	Migratory; non-breeding
Cuban Pewee	<i>Contopus caribaeus</i>	LC	Year-round; breeding
Eurasian Collared dove	<i>Streptopelia decaocto</i>	LC	Year-round; breeding
Great Egret	<i>Ardea alba</i>	LC	Year-round; breeding
Greater Antillean Bullfinch	<i>Melopyrrha violacea</i>	LC	Year-round; breeding
Grey Catbird	<i>Dumetella carolinensis</i>	LC	Migratory; non-breeding
Killdeer	<i>Charadrius vociferus</i>	NT	Migratory; non-breeding
Little Blue Heron	<i>Egretta caerulea</i>	LC	Year-round; breeding
Merlin	<i>Falco columbarius</i>	LC	Migratory; non-breeding
Mourning Dove	<i>Zenaida macroura</i>	LC	Year-round; breeding
Northern Mockingbird	<i>Mimus polyglottus</i>	LC	Year-round; breeding
Osprey	<i>Pandion haliaetus ridgewayi</i>	LC	Year-round; breeding
Palm Warbler	<i>Setophaga palmarum</i>	LC	Migratory; non-breeding



Common Name	Scientific Name	IUCN Status	Range
Ruddy Turnstone	<i>Arenaria interpres</i>	NT	Migratory; non-breeding
Smooth-billed Ani	<i>Crotophaga ani</i>	LC	Year-round; breeding
Spotted Sandpiper	<i>Actitis macularius</i>	LC	Migratory; non-breeding
Thick billed Vireo	<i>Vireo crassirostris</i>	LC	Year-round; breeding
Tricolored Heron	<i>Egretta tricolor</i>	LC	Year-round; breeding
White-crowned Pigeon	<i>Patagioenas leucocephala</i>	NT	Year-round; breeding
Yellow-throated Warbler	<i>Setophaga dominica</i>	LC	Migratory; non-breeding

Table 4-28. Avifauna observed during terrestrial surveys in Eleuthera. IUCN= International Union for Conservation of Nature, LC= Least Concerned, NT=Near Threatened

Common Name	Scientific Name	IUCN Status	Range
American Coot	<i>Fulica americana</i>	LC	Migratory; non-breeding
American Oystercatcher	<i>Haematopus palliatus</i>	LC	Year-round; breeding
Bahama Mockingbird	<i>Mimus gundlachii</i>	LC	Year-round; breeding
Bahama Woodstar	<i>Nesophlox evelynae</i>	LC	Year-round; breeding
Bananaquit	<i>Coereba flaveola bahamensis</i>	LC	Year-round; breeding
Black-and-white Warbler	<i>Mniotilta varia</i>	LC	Migratory; non-breeding
Belted Kingfisher	<i>Megaceryle alcyon</i>	LC	Migratory; non-breeding
Black bellied plover	<i>Pluvialis squatarola</i>	LC	Migratory; non-breeding
Black-faced Grassquit	<i>Tiaris bicolor</i>	LC	Year-round; breeding
Blue-winged teal	<i>Spatula discors</i>	LC	Year-round; breeding
Common ground dove	<i>Columbina passerina</i>	LC	Year-round; breeding
Cuban Peewee	<i>Contopus caribaeus</i>	LC	Year-round; breeding
Great Black-backed Gull	<i>Larus marinus</i>	LC	Migratory; non-breeding
Great Blue Heron	<i>Ardea herodias</i>	LC	Year-round; breeding
Greater Antillean Bullfinch	<i>Melopyrrha violacea</i>	LC	Year-round; breeding
Green Heron	<i>Butorides virescens</i>	LC	Year round; breeding
Herring Gull	<i>Larus argentatus</i>	LC	Migratory; non-breeding
Killdeer	<i>Charadrius vociferus</i>	NT	Migratory; non-breeding
La'Sagras Flycatcher	<i>Myiarchus sagrae</i>	LC	Year round; breeding
Mourning Dove	<i>Zenaida macroura</i>	LC	Year round; breeding
Northern Mockingbird	<i>Mimus polyglottus</i>	LC	Year round; breeding
Northern Waterthrush	<i>Parkesia noveboracensis</i>	LC	Migratory; non-breeding



Osprey	<i>Pandion haliaetus ridgewayi</i>	LC	Year-round; breeding
Ovenbird	<i>Seiurus aurocapilla</i>	LC	Migratory; non-breeding
Palm Warbler	<i>Setophaga palmarum</i>	LC	Migratory; non-breeding
Piping Plover	<i>Charadrius melodus</i>	LC	Migratory; non-breeding
Prairie Warbler	<i>Setophaga discolor</i>	LC	Migratory; non-breeding
Reddish Egret	<i>Egretta rufescens</i>	LC	Year-round; breeding
Royal Tern	<i>Thalasseus maximus</i>	LC	Year-round; breeding
Ruddy Turnstone	<i>Arenaria interpres</i>	NT	Migratory; non-breeding
Sanderling	<i>Calidris alba</i>	LC	Migratory; non-breeding
Semipalmated Sandpiper	<i>Calidris pusilla</i>	NT	Migratory; non-breeding
Smooth-billed Ani	<i>Crotophaga ani</i>	LC	Year-round; breeding
Thick-billed Vireo	<i>Vireo crassirostris</i>	LC	Year-round; breeding
Western Spindalis	<i>Spindalis zena</i>	LC	Year-round; breeding
White-crowned Pigeon	<i>Patagioenas leucocephala</i>	NT	Year-round; breeding
White-eyed vireo	<i>Vireo griseus</i>	LC	Migratory; non-breeding
Wilsons Plover	<i>Charadrius wilsonia</i>	LC	Year-round; breeding
Yellow-crowned Night Heron	<i>Nyctanassa violacea</i>	LC	Year-round; breeding
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	LC	Migratory; non-breeding
Yellow-rumped Warbler	<i>Setophaga coronata</i>	LC	Migratory; non-breeding
Yellow-throated Warbler	<i>Setophaga dominica</i>	LC	Migratory; non-breeding

4.2.2.1.2 Other Wildlife Observations

Wildlife observations were made concurrently with avian point counts and transects. Fauna observed on land in the nearby shoreline was recorded and counted. Cat Island recorded 28 other wildlife including reptiles, mammals, insects, and invertebrates. Eleuthera recorded 20 other wildlife. Some invertebrates and other marine species were observed deceased and washed ashore. A deceased bird was observed within survey areas on both Cat Island and Eleuthera, unrelated to SpaceX operations.

Table 4-29. Observed Wildlife during pre-landing surveys on Cat Island

Common Name	Scientific Name
Brown Anole	<i>Anolis sagrei</i>
Caribbean Buckeye	<i>Junonia evarete</i>
Carpenter Bee	<i>Xylocopa cubaecola</i>
Cloudless Sulphur	<i>Phoebe sennae sennae</i>
Coral Crab	<i>Carpillus corallinus</i>
Cuban Whiptail	<i>Pholidoscelis auberi thoracica</i>
Curly-tailed Lizard	<i>Leiocephalus carinatus</i>
Dog	<i>Canus familiaris</i>



Common Name	Scientific Name
Feral Cat	<i>Felis catus</i>
Fiery Skipper	<i>Hylephila phyleus</i>
Ghost Crab	<i>Ocypode quadrata</i>
Goat	<i>Capra hircus</i>
Great Southern White	<i>Ascia monuste</i>
Gulf Fritillary	<i>Agraulis vanilla</i>
Hammock Skipper	<i>Polygonus leo</i>
Honeybee	<i>Apis mellifera</i>
Jamaican Digger Wasp	<i>Sphex jamaicensis</i>
Julia	<i>Dryas Julia</i>
Mangrove Crab	<i>Aratus pisonii</i>
Paper Wasp	<i>Polistes spp</i>
Periwinkle Snail	<i>Cenchritis muricatus</i>
Sea Urchin	<i>Diadema spp</i>
Soldier Crab	<i>Coenobita clypeatus</i>
Spinybacked orbweaver	<i>Gasteracantha cancriformis</i>
Star Fish	<i>Oreaster resticulatus</i>
Termite	<i>Reticulitermes flavipes</i>
Three-spotted Skipper	<i>Cymaenes tripunctus</i>
White Peacock	<i>Anartia jatrophae quantanmo</i>

Table 4-30. Observed Wildlife during pre-landing surveys on Eleuthera

Common Name	Scientific Name
Bahamian Racer	<i>Cubophis vudii</i>
Brown Anole	<i>Anolis sagrei</i>
Cloudless Sulphur	<i>Phoebe sennae sennae</i>
Cuban Whiptail	<i>Pholidoscelis auberi thoracica</i>
Curly-tailed Lizard	<i>Leiocephalus carinatus</i>
Dragonfly	<i>Orthetrum sp.</i>
Golden Silk Orb-weaver	<i>Trichonephila clavipes</i>
Green Sea Turtle	<i>Chelonia mydas</i>
Gulf Fritillary	<i>Agraulis vanilla</i>
Honeybee	<i>Apis mellifera</i>
Julia	<i>Dryas Julia</i>
Mussels	<i>Mytilus sp.</i>
Paper Wasp	<i>Polistes spp</i>
Periwinkle Snail	<i>Cenchritis muricatus</i>
Red Admiral	<i>Vanessa atalanta</i>
Sea Urchin	<i>Diadema spp</i>
Hermit Crab	<i>Coenobita clypeatus</i>
Spinybacked Orb-weaver	<i>Gasteracantha cancriformis</i>
Stingray	<i>Hypanuss p.</i>



Termite	<i>Reticulitermes flavipes</i>
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4.2.2.2 During Landing

Terrestrial monitoring efforts during the time of the landing did not include any direct avian or other wildlife observations. This is largely due to the landing occurring at night making it difficult to near impossible to accurately search and identify fauna. Monitoring included air, weather, and sound recording as described in Section 3.2.2. Air and weather were recorded 5 minutes before, 5 minutes after, and during the anticipated time of the landing. No significant change was observed in the recorded data during the time of observation. These results are provided in [Table 4-31](#) below.

Table 4-31. Air and Weather Data Captured During Booster Landing Event on February 19, 2026, during the landing on Cat Island (CI) and Eleuthera (EL). H = Humidity, HCHO was not recorded.

Location	Time	NOP (per/ L)	PM 2.5 µg/ m ³	PM 10 µg/m ³	HCHO mg/m ³	TVOC mg/m ³	AQI	Temp (°F)	Wind (mph)	H (%)
CI	8:44 PM	558	3.7	6.3	0.01	0.03	14	72.8	0	82.4
CI	8:49 PM	1060	7.5	14.4	0.01	0.04	31	71.9	0	87.8
CI	8:54 PM	540	3.4	5.4	0.01	0.03	13	75.8	0	86.8
EL	8:44 PM							76.3	0	77.3
EL	8:49 PM				Nil			74.8	0	81.6
EL	8:54 PM							75.2	0	81.2

Sound levels were recorded for both islands from 8:47pm to 8:57pm in dBA. As dBA is used for recording ambient noise levels as opposed to impulse sounds, no spike was observed in the recorded data. Sound levels ranged between 40 – 55 dBA in Eleuthera and 51 – 70 dBA in Cat Island. Recorded sound levels may likely be influenced by waves crashing and nearby locals.

Although no change was observed in recorded sound data the sonic boom and thundering of the booster landing was very audible to both the North Cat Island and South Eleuthera team at their observation point. An auditory response from the herons and egrets within the wetland adjacent to the South Eleuthera observation point was heard during the time of the sonic boom. Recorded sound data is graphed in [Figure 4-9](#) and [Figure 4-10](#) below.

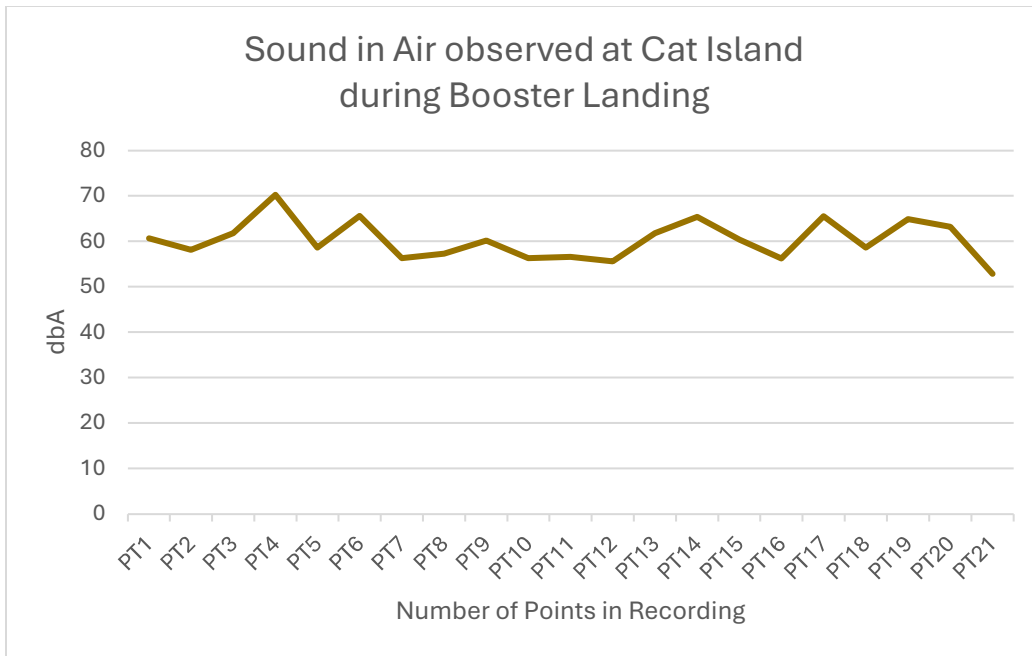


Figure 4-9. Cat Island Sound Recorded During Landing Event

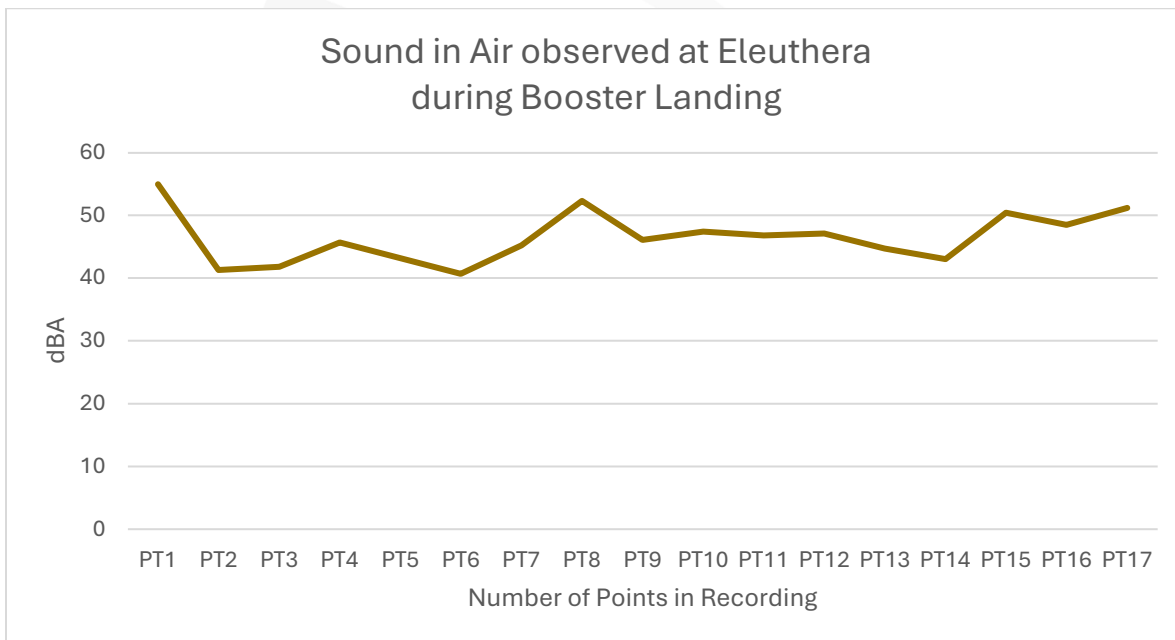


Figure 4-10. Eleuthera Sound Recorded During Landing Event



4.2.2.3 Post-Landing

4.2.2.3.1 Avian Observations

Post Landing species counts for Cat Island yielded 298 individuals across 50 survey points. Five new species were observed post landing that were not recorded during pre-landing surveys. This made for a total count of 37 different avifauna observed between pre-landing and post landing survey efforts. Yet still, only 30 different avifauna were observed in post landing counts. Table 4-40 depicts avifauna observed pre-landing as compared to post-landing.

In Eleuthera, 239 individuals were counted across the 58 survey points post-landing. These individuals were encompassed within 40 different species. A total of 50 different avifauna were observed between pre-landing and post landing survey efforts. The comparison of species observed pre- vs post landing is presented in [Table 4-32](#).

Table 4-32. Species observation comparison pre-landing vs post landing in Cat Island

Species		Observation	
Common Name	Scientific Name	Pre Landing	Post Landing
American Kestrel	<i>Falco sparverius sparverioides</i>	Yes	Yes
American Oystercatcher	<i>Haematopus palliatus</i>	Yes	Yes
American Redstart	<i>Setophaga ruticilla</i>	Yes	Yes
Bahama Mockingbird	<i>Mimus gundlachii</i>	Yes	Yes
Bahama Woodstar	<i>Nesophlox evelynae</i>	Yes	Yes
Bananaquit	<i>Coereba flaveola bahamensis</i>	Yes	Yes
Barn Swallow	<i>Hirundo rustica</i>	Yes	No
Black-bellied Plover	<i>Pluvialis squatarola</i>	Yes	Yes
Black-faced Grassquit	<i>Melanospiza bicolor</i>	Yes	Yes
Common ground dove	<i>Columbina passerina</i>	Yes	Yes
Common Yellowthroat	<i>Geothlypis trichas</i>	Yes	No
Cuban Pewee	<i>Contopus caribaeus</i>	Yes	Yes
Eurasian Collared-dove	<i>Streptopelia decaocto</i>	Yes	No
Glossy Ibis	<i>Plegadis falcinellus</i>	No	Yes
Great Egret	<i>Ardea alba</i>	Yes	No
Greater Antillean Bullfinch	<i>Melopyrrha violacea</i>	Yes	Yes
Grey Catbird	<i>Dumetella carolinensis</i>	Yes	No
Killdeer	<i>Charadrius vociferus</i>	Yes	Yes
Little Blue Heron	<i>Egretta caerulea</i>	Yes	No
Magnificent Frigatebird	<i>Fregata magnificens</i>	No	Yes
Magnolia Warbler	<i>Setophaga magnolia</i>	No	Yes
Merlin	<i>Falco columbarius</i>	Yes	Yes
Mourning Dove	<i>Zenaida macroura</i>	Yes	Yes



Northern Mockingbird	<i>Mimus polyglottus</i>	Yes	Yes
Northern Waterthrush	<i>Parkesia noveboracensis</i>	No	Yes
Osprey	<i>Pandion haliaetus ridgewayi</i>	Yes	Yes
Palm Warbler	<i>Setophaga palmarum</i>	Yes	Yes
Prairie Warbler	<i>Setophaga discolor</i>	No	Yes
Ruddy Turnstone	<i>Arenaria interpres</i>	Yes	Yes
Smooth-billed Ani	<i>Crotophaga ani</i>	Yes	Yes
Spotted Sandpiper	<i>Actitis macularius</i>	Yes	Yes
Thick billed Vireo	<i>Vireo crassirostris</i>	Yes	Yes
Tricolored Heron	<i>Egretta tricolor</i>	Yes	No
White-crowned Pigeon	<i>Patagioenas leucocephala</i>	Yes	Yes
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	No	Yes
Yellow-crowned Night Heron	<i>Nyctanassa violacea</i>	No	Yes
Yellow-throated Warbler	<i>Setophaga dominica</i>	Yes	Yes

Table 4-33. Species observation comparison pre-landing vs post landing in Eleuthera

Species		Observation	
Common Name	Scientific Name	Pre Launch	Post Launch
American Coot	<i>Fulica americana</i>	Yes	Yes
American Oystercatcher	<i>Haematopus palliatus</i>	Yes	Yes
American Redstart	<i>Setophaga ruticilla</i>	No	Yes
Bahama Mockingbird	<i>Mimus gundlachii</i>	Yes	Yes
Bahama Woodstar	<i>Nesophlox evelynae</i>	Yes	Yes
Bananaquit	<i>Coereba flaveola bahamensis</i>	Yes	Yes
Belted Kingfisher	<i>Megaceryle alcyon</i>	Yes	Yes
Black-and-White Warbler	<i>Mniotilta varia</i>	Yes	Yes
Black-bellied Plover	<i>Pluvialis squatarola</i>	Yes	Yes
Black-faced Grassquit	<i>Melanospiza bicolor</i>	Yes	Yes
Blue-winged Teal	<i>Spatula discors</i>	Yes	No
Common Ground Dove	<i>Columbina passerina</i>	Yes	Yes
Common Yellowthroat	<i>Geothlypis trichas</i>	No	Yes
Cuban Pewee	<i>Contopus caribaeus</i>	Yes	Yes
Great Black-backed Gull	<i>Larus marinus</i>	Yes	No
Great Blue Heron	<i>Ardea herodias</i>	Yes	No
Great Egret	<i>Ardea alba</i>	No	Yes
Greater Antillean Bullfinch	<i>Melopyrrha violacea</i>	Yes	Yes
Green Heron	<i>Butorides virescens</i>	Yes	No
Grey Catbird	<i>Dumetella carolinensis</i>	No	Yes
Herring Gull	<i>Larus argentatus</i>	Yes	No



Killdeer	<i>Charadrius vociferus</i>	Yes	Yes
La'Sagras Flycatcher	<i>Myiarchus sagrae</i>	Yes	Yes
Little Blue Heron	<i>Egretta caerulea</i>	No	Yes
Mourning Dove	<i>Zenaida macroura</i>	Yes	Yes
Northern Mockingbird	<i>Mimus polyglottus</i>	Yes	Yes
Northern Waterthrush	<i>Parkesia noveboracensis</i>	Yes	Yes
Osprey	<i>Pandion haliaetus ridgewayi</i>	Yes	Yes
Ovenbird	<i>Seiurus aurocapilla</i>	Yes	No
Palm Warbler	<i>Setophaga palmarum</i>	Yes	Yes
Piping Plover	<i>Charadrius melodus</i>	Yes	No
Prairie Warbler	<i>Setophaga discolor</i>	Yes	Yes
Reddish Egret	<i>Egretta rufescens</i>	Yes	No
Royal Tern	<i>Thalasseus maximus</i>	Yes	Yes
Ruddy Turnstone	<i>Arenaria interpres</i>	Yes	Yes
Sanderling	<i>Calidris alba</i>	Yes	Yes
Semipalmated Plover	<i>Charadrius semipalmatus</i>	Yes	Yes
Semipalmated Sandpiper	<i>Calidris pusilla</i>	Yes	Yes
Short-billed Dowitcher	<i>Limnodromus griseus</i>	No	Yes
Smooth-billed Ani	<i>Crotophaga ani</i>	Yes	Yes
Thick-billed Vireo	<i>Vireo crassirostris</i>	Yes	Yes
Tricolored Heron	<i>Egretta tricolor</i>	No	Yes
Western Spindalis	<i>Spindalis zena</i>	Yes	Yes
White -crowned Pigeon	<i>Patagioenas leucocephala</i>	Yes	Yes
White-eyed vireo	<i>Vireo griseus</i>	No	Yes
Wilsons Plover	<i>Charadrius wilsonia</i>	Yes	Yes
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Yes	No
Yellow-crowned Night Heron	<i>Nyctanassa violacea</i>	Yes	Yes
Yellow-rumped Warbler	<i>Setophaga coronata</i>	Yes	No
Yellow-throated Warbler	<i>Setophaga dominica</i>	Yes	Yes

For statistical analysis, species abundance on both islands were average and graphed in a bar chart for pre-landing and post-landing comparison. Cat Island analysis was completed with the removal of data from survey points 30-37 pre-landing as these points were not recorded post landing and would skew the data. On average, three more birds were surveyed per point count pre-landing vs post landing in Cat Island. Eleuthera counts remained the same pre-landing vs post landing with an average of four birds surveyed per point count each time.

Species diversity observed pre-landing compared to post landing were fairly similar for both islands. Species diversity did not differ in Cat Island with 30 different avifauna observed during



pre-landing and post landing surveys. In Eleuthera, species diversity differed by 2 with 42 avian species observed pre-landing compared to post-landing.

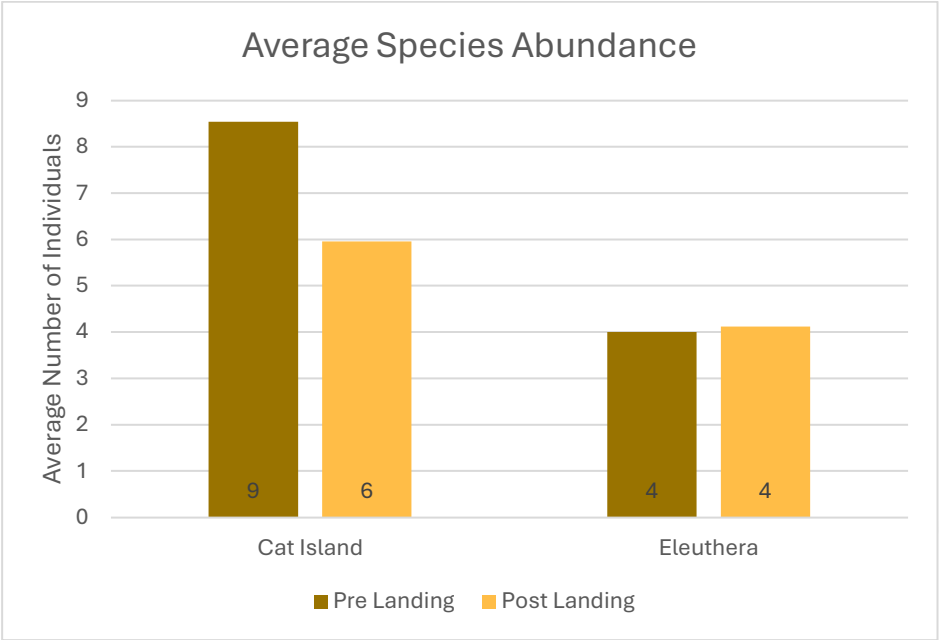


Figure 4-11. Average Species Abundance observed in Cat Island and Eleuthera during monitoring efforts

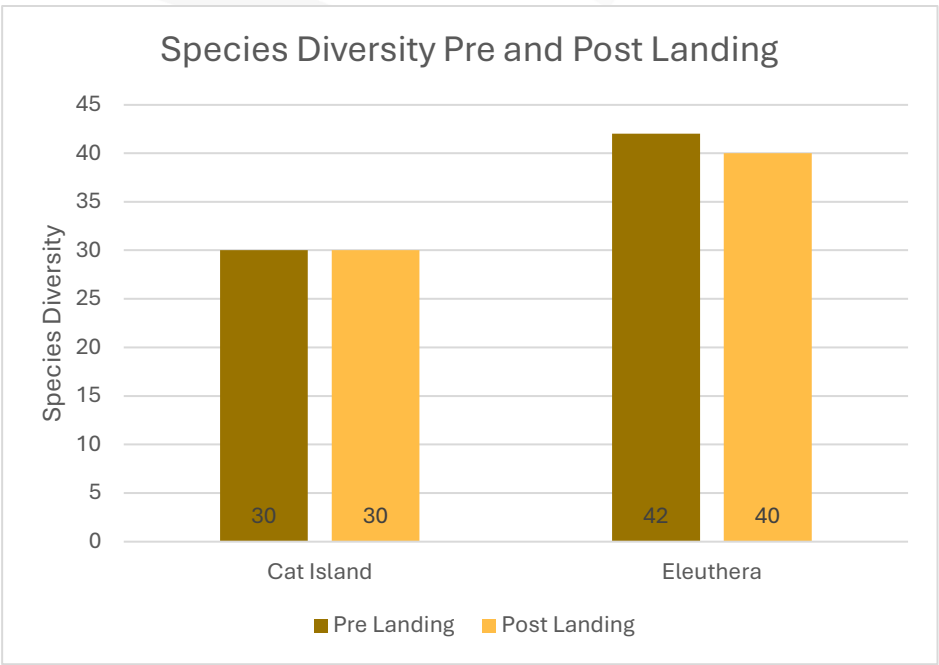


Figure 4-12. Species Diversity observed in Cat Island and Eleuthera during monitoring efforts



4.2.2.3.2 Other Wildlife Observations

Wildlife observations in Cat Island yielded eight new species observed post landing compared to pre-landing. A total of 34 wildlife species were observed pre-landing and post landing. In Eleuthera, no new species were recorded during post landing survey efforts.

Table 4-34. Wildlife Observation Comparison in Cat Island

Species		Observation	
Common Name	Scientific Name	Pre-Landing	Post Landing
American Bird Grasshopper	<i>Schistocerca americana</i>	No	Yes
Band-winged Dragonlet	<i>Erythrodiplax umbrata</i>	No	Yes
Banded Yellow	<i>Eurema elathea</i>	No	Yes
Black-backed Crab	<i>Gecarcinus lateralis</i>	No	Yes
Blue-tailed Lizard	<i>Pholidoscelis auberi thoracica</i>	Yes	No
Brown Anole	<i>Anolis sagrei</i>	Yes	Yes
Cerion Snail	<i>Cerion spp.</i>	No	Yes
Coral Crab	<i>Carpillus corallinus</i>	Yes	No
Carpenter Bee	<i>Xylocopa cubaecola</i>	Yes	Yes
Caribbean Buckeye	<i>Junonia evarete</i>	Yes	No
Cloudless Sulphur	<i>Phoebe sennae sennae</i>	Yes	Yes
Curly-tailed Lizard	<i>Leiocephalus carinatus</i>	Yes	Yes
Dog	<i>Canus familiaris</i>	Yes	Yes
Feral Cat	<i>Felis catus</i>	Yes	Yes
Fiery Skipper	<i>Hylephila phyleus</i>	Yes	Yes
Ghost Crab	<i>Ocypode quadrata</i>	No	Yes
Goat	<i>Capra hircus</i>	Yes	Yes
Golden Rim Swallowtail	<i>Battus polydamas</i>	No	Yes
Great Southern White	<i>Ascia monuste</i>	Yes	No
Gulf Fritillary	<i>Agraulis vanilla</i>	Yes	No
Three-spotted Skipper	<i>Cymaenes tripunctus</i>	Yes	No
Honeybee	<i>Apis mellifera</i>	Yes	Yes
Jamaican Digger Wasp	<i>Sphex jamaicensis</i>	Yes	No
Julia	<i>Dryas Julia</i>	Yes	Yes
Mangrove Crab	<i>Aratus pisonii</i>	Yes	Yes
Paper Wasp	<i>Polistes spp</i>	Yes	Yes
Periwinkle Snail	<i>Cenchritis muricatus</i>	Yes	Yes



Sea Urchin	<i>Diadema spp</i>	Yes	Yes
Silver Garden Spider	<i>Argiope argentata</i>	No	Yes
Soldier Crab	<i>Coenobita clypeatus</i>	Yes	Yes
Spittlebugs	<i>Philagra spp.</i>	No	Yes
Star Fish	<i>Oreaster resticulatus</i>	Yes	No
Termite	<i>Reticulitermes flavipes</i>	Yes	Yes
White Peacock	<i>Anartia jatrophae guantanmo</i>	Yes	Yes

Table 4-35. Wildlife Observation Comparison in Eleuthera

Species		Observation	
Common Name	Scientific Name	Pre-Landing	Post Landing
Bahamian Racer	<i>Cubophis vudii</i>	Yes	No
Brown Anole	<i>Anolis sagrei</i>	Yes	Yes
Cloudless Sulphur	<i>Phoebe sennae sennae</i>	Yes	Yes
Cuban Whiptail	<i>Pholidoscelis auberi thoracica</i>	Yes	Yes
Curly-tailed Lizard	<i>Leiocephalus carinatus</i>	Yes	Yes
Dragonfly	<i>Orthetrum sp.</i>	Yes	Yes
Golden Silk Orb-weaver	<i>Trichonephila clavipes</i>	Yes	Yes
Green Sea Turtle	<i>Chelonia mydas</i>	Yes	Yes
Gulf Fritillary	<i>Agraulis vanilla</i>	Yes	Yes
Honeybee	<i>Apis mellifera</i>	Yes	Yes
Julia	<i>Dryas Julia</i>	Yes	Yes
Mussels	<i>Mytilus sp.</i>	Yes	Yes
Paper Wasp	<i>Polistes spp</i>	Yes	Yes
Periwinkle Snail	<i>Cenchritis muricatus</i>	Yes	Yes
Red Admiral	<i>Vanessa atalanta</i>	Yes	No
Sea Urchin	<i>Diadema spp</i>	Yes	Yes
Hermit Crab	<i>Coenobita clypeatus</i>	Yes	Yes
Spinybacked Orb-weaver	<i>Gasteracantha cancriformis</i>	Yes	Yes
Stingray	<i>Hypanuss p.</i>	Yes	Yes
Termite	<i>Reticulitermes flavipes</i>	Yes	Yes

4.2.2.4 Ambient Environmental Conditions

4.2.2.4.1 Water Quality

Changes in water quality was analysed based on visual observations and physical hydrocarbon test strips. No oil slick, remnant debris, or visible impacts to water quality was observed prior to the Falcon9 booster landing nor after at neither Cat Island survey points nor Eleuthera's. Water quality was tested at 3 survey points in Cat Island and 5 survey points in Eleuthera prior to the landing to document the possible presence of oil within the water. No test strip tested positive



prior to the landing. Post-landing, test strips were used at 14 survey points on Cat Island 12 survey points on Eleuthera. No test strip tested positive in water sampling post-landing. An image is provided below on the visual change expected to occur on the test strip if hydrocarbons were present in a water sample.

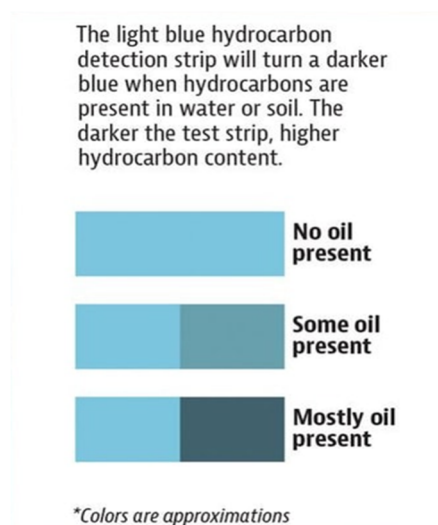


Figure 4-13. Observable color change in hydrocarbon test strips

4.2.2.4.2 Air Quality

Air quality measured during terrestrial surveys on Cat Island were collated and averaged to document the general air quality in the area. Air quality measured on point counts 30-37 pre-landing were not averaged for comparison as these points were not conducted post landing. Individual measurements of recorded air quality data can be found in [Appendix D](#).

Averages were slightly higher post landing in comparison to pre-landing. Although higher, the increased values were not significantly higher and still fall within standards of good air quality.

Table 4-36. Average of recorded Air Quality readings during Cat Island Avifauna and Wildlife surveys

	NOP (per/L)	PM2.5 µg/m ³	PM10 µg/m ³	HCHO mg/m ³	TVOC mg/m ³	AQI
Average of Recordings Pre-Landing	915.2	6.1	10.1	0.01	0.04	22
Average of Recordings Post Landing	1077	6.9	12.00	0.03	0.09	29

4.2.2.4.3 Weather Conditions

Weather during pre-landing surveys were mostly consistent with warm temperatures and cloudy to partly cloudy skies. Nearing the first proposed date of the launch, inclement weather occurred rendering surveyors in both Cat Island and Eleuthera unable to conduct surveys due to safety as well as preconceived impact to data. Following the landing event, a cold front was experienced on both islands. The weather system continuously impacted survey efforts on Cat Island. The



following tables present the averaged temperature, wind speed, and humidity levels recorded on both islands during the 2nd landing monitoring efforts.

Table 4-37. Average Weather data recorded during Cat Island Avifauna and Wildlife Surveys

	Temperature (°F)	Wind (mph)	Humidity %
Pre-Landing	78.4	3.3	62.6
Post Landing	76.6	3.2	69.5

Table 4-38. Average Weather data recorded during Eleuthera Avifauna and Wildlife Surveys

	Temperature (°F)	Wind (mph)	Humidity %
Pre-Landing	79.5	3.6	58.0
Post Landing	78.8	5.1	57.7

4.2.2.4.4 Sound in Air

The average sound recorded was graphed for each point count. Sound recorded in Cat Island prior to the landing ranged between 39 and 72 dBA. These levels are considered safe even with long-term exposure and represent the range of ambient and everyday sound levels. Comparatively, in Eleuthera, sound levels ranged between 35 and 65 dBA pre-landing. Sound levels in Cat Island after the landing were consistent with a range average between 56 and 71 dBA. In Eleuthera, the post landing sound ranged between 41 and 73 dBA. It is noted that during some point counts, there were disturbances including boat activity that played loud music, dogs barking, and people passing and talking.

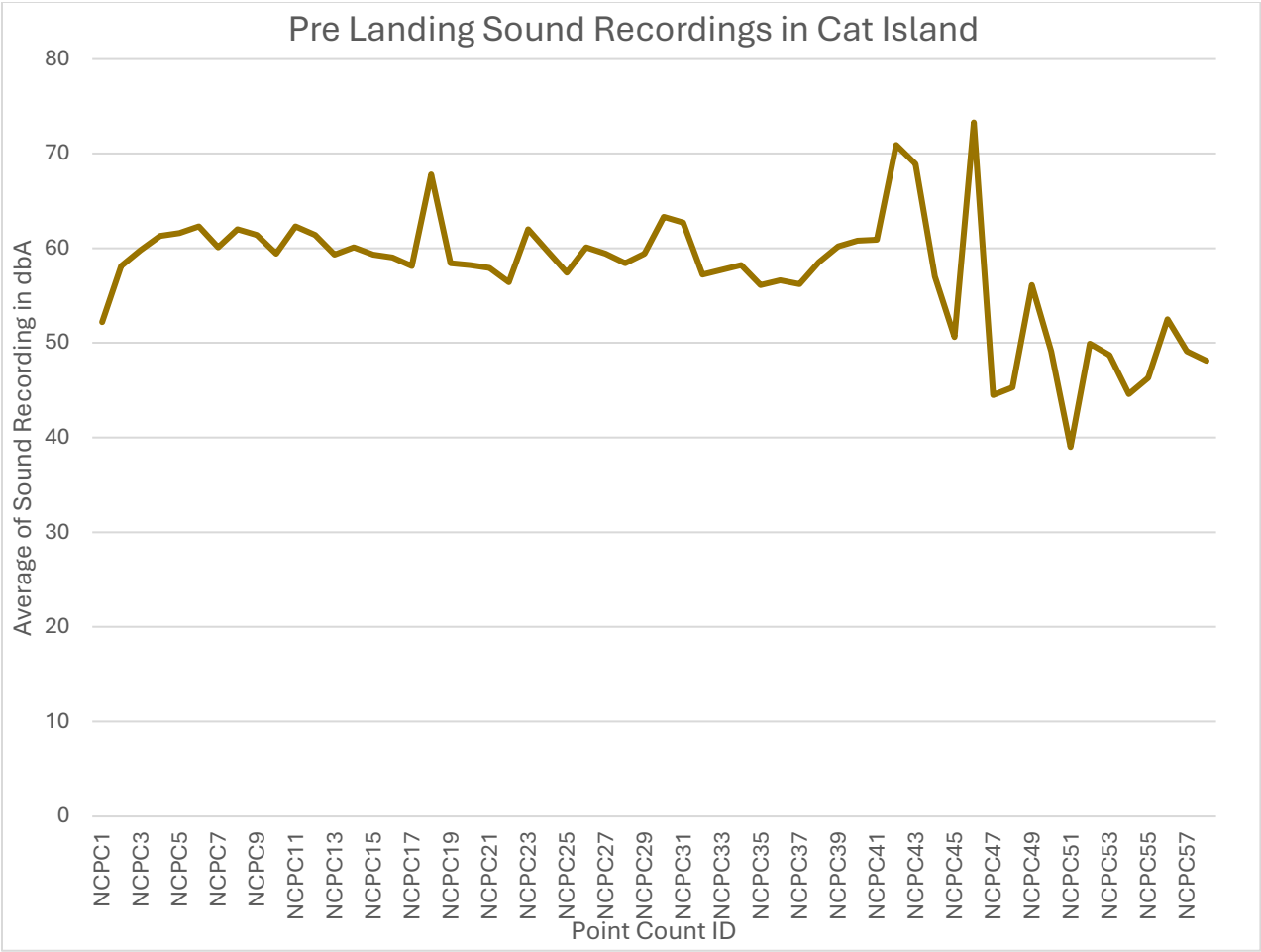


Figure 4-14. Cat Island pre-landing acoustic results.

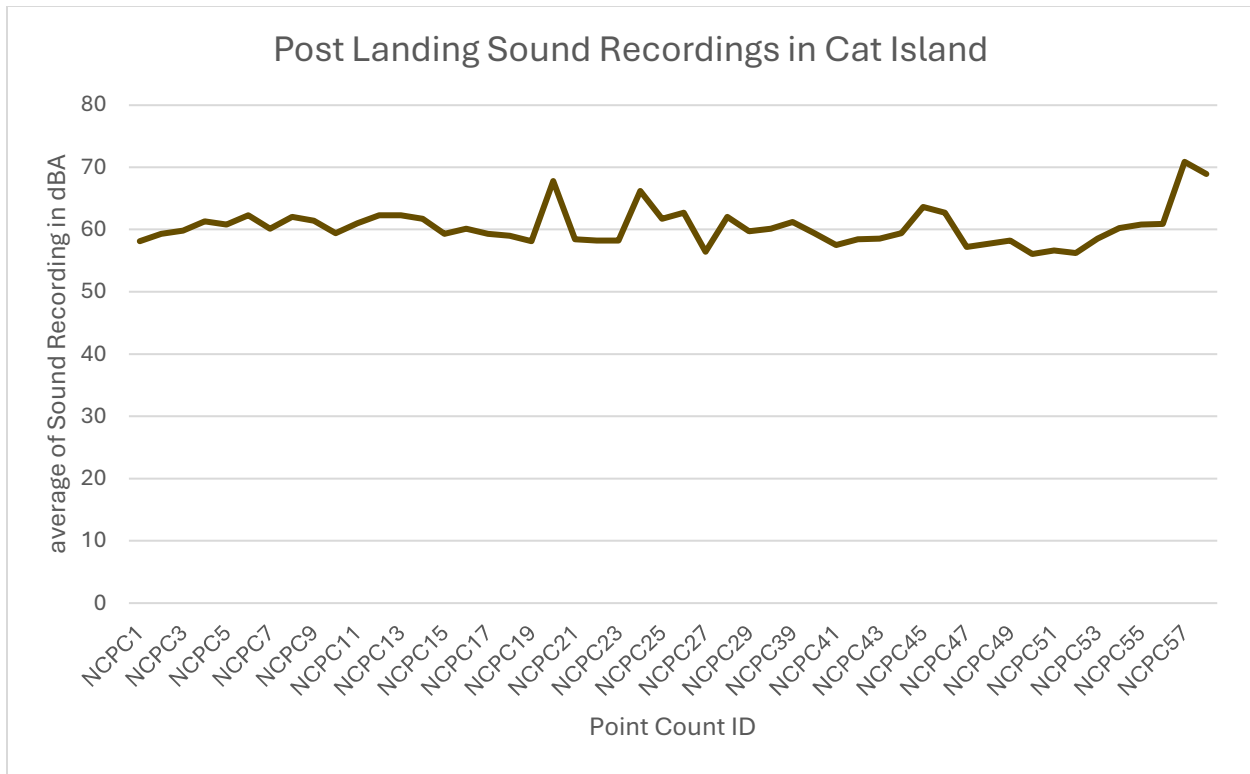


Figure 4-15. Cat Island post-landing acoustic results.

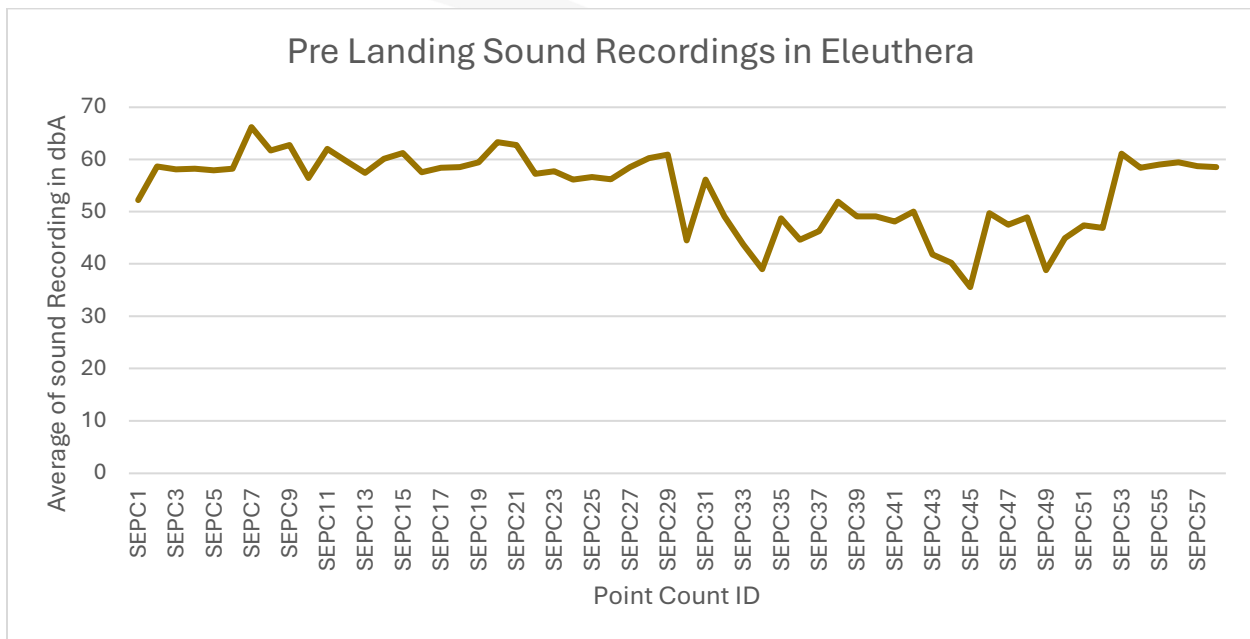


Figure 4-16. Eleuthera pre-landing acoustic results.

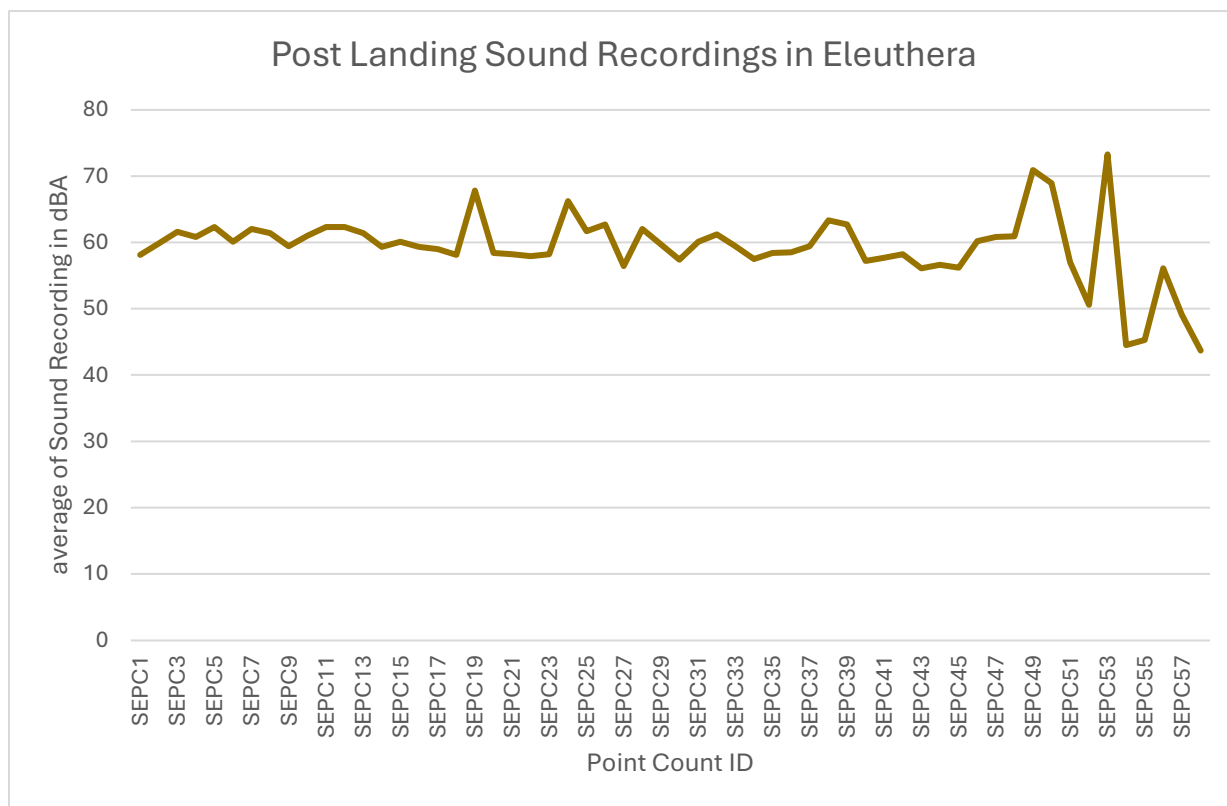


Figure 4-17. Eleuthera post landing acoustic results.

4.3 SOUND MAPPING STUDY RESULTS

The Sound Mapping Study indicated that the sonic boom associated with the landing event was widely perceptible across surveyed locations, with approximately 70% or more of respondents reporting that they heard the event. The most common response was a short-duration, loud sound typically described as a “boom” or “explosion-like” noise, with many respondents noting a brief startle reaction at the time of occurrence. Reported effects were transient in nature, with no evidence of sustained disturbance or lasting impacts. Variability in perception was observed across locations, likely influenced by distance from the flight path, local environmental conditions, and individual sensitivity. Additionally, the study identified that awareness of the event influenced response levels, with individuals who were informed in advance generally reporting lower levels of concern. The findings indicate that while the sonic boom was noticeable and elicited short-term reactions, it did not result in measurable or persistent community-level impacts.



4.4 COMPARATIVE RESULTS – LANDING 1 VS LANDING 2

4.4.1 Marine Environmental Conditions

4.4.1.1 Water Quality Comparison

Water quality conditions recorded during Post Launch 1 (February 17–19, 2025) and Post Launch 2 (February 10–22, 2026) indicate generally stable marine environmental conditions with minor temporal and spatial variability. Both monitoring periods demonstrated well-mixed water columns, minimal variation across depths, and water quality parameters consistent with typical marine conditions.

During Post Launch 1 (February 17–19, 2025), seawater temperatures remained stable across sampling dates and depths. On February 17, temperatures ranged from approximately 77.25°F to 78.08°F. On February 18, temperatures ranged from 77.14°F to 78.72°F, while February 19 recorded consistent temperatures between 77.36°F and 77.58°F. These results indicate minimal thermal stratification and well-mixed conditions across the monitoring area. Similarly, Post Launch 2 temperatures remained stable, ranging from approximately 24.6°C to 25.3°C (76.3°F–77.5°F). The consistency in temperature across both monitoring periods suggests stable ambient marine conditions and minimal environmental disturbance.

pH values during Post Launch 1 remained consistent across all sampling days. On February 17, pH ranged from 8.43 to 8.50. On February 18, pH values ranged from 8.51 to 8.56, while February 19 recorded pH values between 8.52 and 8.59. These values indicate slightly alkaline seawater typical of marine environments and demonstrate minimal variability across locations and depths. During Post Launch 2, elevated pH readings (11.9–13.6) were recorded initially on February 10, 2026, but were attributed to instrument calibration issues. Following recalibration, pH values stabilized within a typical marine range of approximately 8.6 to 9.2. Overall, both monitoring periods confirmed stable, slightly alkaline marine conditions.

Dissolved oxygen (DO) exhibited moderate variability during Post Launch 1. On February 17, DO values ranged from approximately 0.94% to 9.05%. On February 18, deeper measurements (5.75–6 m) recorded lower DO levels (0.75%–1.42%), while shallower depths (1.4–1.55 m) recorded higher DO values (4.84%–5.54%), suggesting decreased oxygen levels with depth. On February 19, DO values showed wider variability, ranging from approximately 0.98% to 48.3%. Lower values were observed at some deeper sampling locations, while higher values were recorded at shallower depths. These variations likely reflect localized biological activity, atmospheric exchange, and mixing conditions. Similarly, Post Launch 2 recorded DO concentrations ranging from approximately 2.0 mg/L to 10.6 mg/L, with most values falling within a typical marine range of approximately 6–8 mg/L. Variability observed during both monitoring periods appears localized and transient, with no persistent hypoxic conditions identified.



During Post Launch 1, salinity values remained relatively stable across all monitoring days. On February 17, salinity ranged from approximately 27.36 to 28.32 ppt. On February 18, salinity ranged from 26.71 to 27.7 ppt, and on February 19, values ranged from approximately 25.89 to 28.05 ppt. These values indicate relatively homogeneous salinity conditions throughout the water column. Total dissolved solids (TDS) during Post Launch 1 also remained consistent. On February 17, TDS values ranged from approximately 26.0 to 27.55 g/L. On February 18, TDS ranged from 25.8 to 26.71 g/L, while February 19 values ranged from approximately 24.6 to 26.8 g/L. These results indicate stable dissolved solids concentrations across the monitoring area. Post Launch 2 recorded slightly higher salinity values, generally ranging from approximately 33 to 36 ppt, consistent with typical open ocean conditions. Conductivity and TDS values remained stable and correlated with salinity trends. Despite differences in absolute salinity values between monitoring periods, overall conditions remained stable and representative of marine environments.

Turbidity during Post Launch 1 remained consistently low across all sampling dates. On February 17, 18, and 19, turbidity readings were recorded at 0 NTU, indicating exceptionally clear water conditions with minimal suspended sediment. Similarly, Post Launch 2 recorded generally low turbidity levels ranging from 0 to 3 NTU, with occasional short-term increases up to approximately 13–14 NTU. These temporary increases were attributed to localized disturbances such as vessel movement, seabed resuspension, or wave activity. These events were short-lived and not indicative of long-term water quality degradation.

Post Launch 1 observations indicated generally well-mixed water conditions across sampling depths ranging from approximately 1 m to 6 m. While February 18 showed reduced dissolved oxygen at deeper depths, overall parameters remained consistent, suggesting limited stratification. Additionally, weather conditions on February 18 included choppy waters and partly cloudy skies, which influenced sampling efforts but did not significantly impact overall water quality.

On February 19, average surface depth ($1.17 \text{ m} \pm 0.26 \text{ m}$) and deeper measurements ($3.91 \text{ m} \pm 1.31 \text{ m}$) showed stable water quality conditions, reinforcing the presence of a well-mixed water column. Post Launch 2 sampling depths ranged from approximately 0.5 m to 17 m, and water quality parameters remained consistent across depths and locations, further supporting homogeneous water column conditions.

The comparison between Post Launch 1 (February 17–19, 2025) and Post Launch 2 (February 10–22, 2026) indicates that water quality conditions remained stable and representative of typical marine environments. Minor variations in dissolved oxygen and turbidity were localized and transient, with no evidence of sustained environmental impacts. The consistent temperature, pH,



salinity, and turbidity measurements across both monitoring periods support the conclusion that the marine environment remained relatively undisturbed following launch activities.

4.4.1.2 Air Quality Comparison

Air quality monitoring conducted during Post Launch 1 (February 17–19, 2025) and Post Launch 2 (February 10–26, 2026) indicated generally good air quality conditions with minor temporal variability. Across both monitoring periods, measured parameters including particulate matter (PM_{2.5} and PM₁₀), formaldehyde (HCHO), total volatile organic compounds (TVOC), temperature, humidity, and atmospheric conditions remained within typical ranges for open ocean environments within The Bahamas archipelago.

During Post Launch 1, PM_{2.5} concentrations ranged from approximately 3.2 to 8.2 µg/m³ on February 17, with similar values recorded on February 18 (3.5–7.6 µg/m³). On February 19, average PM_{2.5} concentrations were approximately 5.65 µg/m³. PM₁₀ values ranged from 5.8 to 14.4 µg/m³ on February 17 and from 6.2 to 12.5 µg/m³ on February 18, with an average of approximately 11 µg/m³ recorded on February 19. These values indicate low particulate concentrations consistent with clean marine air conditions. Similarly, Post Launch 2 recorded PM_{2.5} values ranging from 1.5 to 11.3 µg/m³, with an average of 5.1 µg/m³. PM₁₀ values ranged from 2.3 to 18.4 µg/m³, with an average of 8.75 µg/m³. These measurements fall within typical open ocean air quality ranges and are comparable to those observed during Post Launch 1. Minor fluctuations in particulate matter during both monitoring periods likely reflect natural variations in wind speed, sea spray, and atmospheric conditions.

During Post Launch 1, HCHO concentrations remained very low, ranging between approximately 0.01 and 0.11 ppm. TVOC levels were also minimal, ranging between 0.02 and 0.54 ppm, with most values remaining below 0.1 ppm. These low concentrations indicate minimal presence of airborne chemical pollutants. Post Launch 2 recorded HCHO values ranging from 0.00 to 0.1, with an average of 0.01, while TVOC values ranged from 0.00 to 0.61, with an average of 0.03. These values were comparable to Post Launch 1 and consistent with typical offshore marine air quality conditions. Occasional elevated TVOC values were short-term and did not indicate sustained air quality degradation.

Post Launch 1 temperatures ranged from approximately 74.8°F to 91.3°F across sampling locations, with humidity ranging from approximately 57.6% to 84.3%. Weather conditions were generally warm and humid, typical of tropical marine environments. Wind speeds averaged approximately 7.1 mph, reflecting gentle breeze conditions conducive to atmospheric mixing. Similarly, Post Launch 2 recorded temperatures ranging from 72.9°F to 94.4°F, with an average of 82.64°F. Humidity ranged from 37.6% to 79.8%, with an average of 59.9%. These conditions were also consistent with typical tropical marine climates and comparable to those observed during Post Launch 1.



Air Quality Index (AQI) measurements were not recorded during Post Launch 1; however, particulate matter concentrations indicate that air quality would fall within the "Good" category. During Post Launch 2, AQI values ranged from 6 to 71, with an average of 23.22, indicating predominantly "Good" air quality conditions throughout the monitoring period.

Particle count data was only recorded during Post Launch 2, with values ranging from 260 to 1,742 particles per unit, averaging approximately 851.72. These values fall within expected marine atmospheric conditions and are influenced primarily by sea spray, wind activity, and natural atmospheric processes.

Weather conditions during Post Launch 1 included moderate wind speeds (1.8–9.6 mph), steady atmospheric pressure (~1017–1019 hPa), and high humidity typical of the region. These conditions supported effective atmospheric dispersion and minimized pollutant accumulation. Similarly, Post Launch 2 conditions included typical tropical weather patterns, with variable temperatures, moderate humidity, and natural atmospheric mixing. Monitoring gaps occurred on February 15–16 and 23–24 due to poor weather conditions; however, overall air quality remained stable.

Air quality conditions during Post Launch 1 and Post Launch 2 were consistent and representative of clean marine environments. Particulate matter, HCHO, and TVOC concentrations remained low during both monitoring periods, with minor variations attributed to natural environmental factors such as wind, humidity, and sea spray. Temperature and humidity conditions were typical for tropical marine environments, and no sustained air quality degradation was observed.

The comparison indicates that air quality remained stable and within expected ranges following launch activities during both monitoring periods, suggesting minimal atmospheric impact associated with launch operations.

4.4.1.3 Acoustic Observations

A comparative review of the Post-Launch 1 and Post-Launch 2 in-water acoustic monitoring results indicates notable differences in instrumentation, data quality, detection capability, and overall reliability of findings.

Post-Launch 1 monitoring utilized an Aquarian A5 Hydrophone paired with a Zoom AMS-22 audio interface. Recordings were captured in decibels relative to full scale (dBFS) and later converted to sound pressure levels (SPL), as the system was not calibrated to measure dB re 1 μ Pa, the standard unit for underwater acoustic monitoring. In contrast, Post-Launch 2 monitoring employed calibrated hydrophones and sound level meters (Larson Davis 831c and SoundTrap 400HF) deployed at multiple depths (3 m, 10 m, 40 m, and 100 m), allowing for more accurate and depth-dependent acoustic measurements. As a result, Post-Launch 2 data are considered more robust and reliable.



Additionally, during Post-Launch 2 monitoring, the monitoring vessel engines were powered off during in-water sound monitoring, reducing vessel-related noise and improving data quality. This represents a significant methodological improvement over Post-Launch 1, where vessel engines, generator, and bilge pump were operating during most recordings and contributed to elevated background noise. However, during the day of landing there were other commercial vessels passing by the monitoring vessel as well as vessels patrolling the waters, including the Royal Bahamian Defence Force, which contributed to higher ambient acoustic levels prior to the landing operation.

During Post-Launch 1, estimated ambient sound levels ranged from approximately 162.2 to 167.7 dB re 1 μ Pa, though these values were considered uncertain due to calibration limitations and vessel noise interference. In contrast, Post-Launch 2 recorded an average ambient noise level of 133.3 dB re 1 μ Pa (L90) and 135.0 dB re 1 μ Pa (LZeq), derived from calibrated instruments and filtered for interference. These lower and more consistent values suggest that Post-Launch 2 provided a more representative baseline of ambient ocean conditions.

Post-Launch 1 identified a modest increase in sound levels during the landing event at MSP1, with estimated SPLs increasing from 151.9 to 155.7 dB re 1 μ Pa. However, the detection was uncertain due to vessel noise, limited hydrophone bandwidth (20 Hz–10 kHz), and shallow deployment depth. Additionally, an anomalous dominant frequency of 18,750 Hz was recorded, which is inconsistent with typical sonic boom characteristics and likely attributed to vessel noise or recording artifacts.

In contrast, Post-Launch 2 successfully captured the landing event at 40 m depth, recording a peak sound pressure level of 142.64 dB re 1 μ Pa and identifying a distinct triple-boom waveform approximately 0.3 seconds after the initial impulse. The recorded frequencies were primarily below 500 Hz, with strongest energy below 250 Hz, consistent with expected sonic boom characteristics. These results demonstrate improved detection capability in Post-Launch 2.

Post-Launch 1 recordings were significantly affected by vessel noise, including engine, generator, and hull reflections. The 30-ft tether limited hydrophone depth and increased susceptibility to surface noise and vessel interference. Additionally, gain settings were later determined to be suboptimal, reducing sensitivity and data quality.

While Post-Launch 2 also noted some low-frequency noise attributed to deployment line movement and a passing vessel, these effects were minimized through multi-depth deployment, improved calibration, filtering using L90 metrics, and vessel shutdown during monitoring, resulting in higher confidence in the recorded data.



Post-Launch 1 monitoring did not report confirmed marine mammal acoustic detections due to data limitations. In contrast, Post-Launch 2 successfully detected Atlantic spotted dolphins (*Stenella frontalis*) during multiple surveys, confirmed through visual observations, demonstrating improved bioacoustic monitoring capability. Post-Launch 2 represents a significant improvement in acoustic monitoring methodology and data reliability compared to Post-Launch 1. Post-Launch 2 utilized calibrated equipment, multi-depth deployment, and improved analytical techniques, allowing for clearer detection of the landing event and marine mammal activity. In contrast, Post-Launch 1 results were considered preliminary due to calibration limitations, vessel noise interference, and shallow deployment constraints.

4.4.2 Terrestrial Environmental Conditions

4.4.2.1 Air Quality and Weather Comparison

Similar devices were used for recording air and weather in the first and second booster landing monitoring efforts. Air quality meters differ between years with an Igeress Air Quality Monitor being used on Cat Island in 2025 compared to the Temtop Air Quality Monitor in 2026. The difference between the two devices was primarily present with recording of particulate matter. PM 2.5 and 10 were recorded in $\mu\text{m}/\text{m}^3$ on both monitors but the Igeress model also recorded PM 1.0 in $\mu\text{m}/\text{m}^3$ where the Temtop model recorded number of particles (NOP) per litre. The difference in measurement unit is evidently shown in the table below. The results of all recorded individual measurements for each landing were averaged and are displayed in Table 4-39 and 4-40 for comparison.

Each recorded average for air quality parameters, with the exception of PM 2.5 experienced a significant increase compared to measurements the year prior. This may be due to device error or user error. Nonetheless, conclusions can not be drawn from results as the data sets for each year differ in total point counts. The same can be said for recorded weather data. It is important to note, however, that both monitoring efforts experience inclement weather inclusive of a cold front during survey efforts.

Table 4-39. Average Air Quality Recording Comparison between 1st and 2nd landing events measured in Cat Island.

	PM1.0 $\mu\text{g}/\text{m}^3$	NOP per/L	PM2.5 $\mu\text{g}/\text{m}^3$	PM10 $\mu\text{g}/\text{m}^3$	HCHO mg/m^3	TVOC mg/m^3	AQI
Pre-Landing 2025	3	-	17	5	0.02	0.016	6
Pre-Landing 2026	-	915.2	6.1	10.1	0.01	0.04	22
Post Landing 2025	4	-	17	6	0.02	0.008	7
Post Landing 2026	-	1077	6.9	12.00	0.03	0.09	29



Table 4-40. Average Weather Recording Comparison between 1st and 2nd landing events measured in Cat Island and Eleuthera

	Temp (°F)	Wind(mph)	Humidity (%)
Cat Island			
Pre-Landing 2025	83.1	3.4	66.7
Pre-Landing 2026	78.4	3.3	62.6
Post Landing 2025	77.8	6.7	71.4
Post Landing 2026	76.6	3.2	69.5
Eleuthera			
Pre-Landing 2025	83.8	2.5	66.5
Pre-Landing 2026	79.5	3.6	58.0
Post Landing 2025	80.4	7.1	70.6
Post Landing 2026	78.8	5.1	57.7

4.4.2.2 Acoustic Observations

Sound levels recorded in dBA during the first landing and second landing were averaged and graphed for visual comparison. The result is depicted in Figure 4-18 below. Sound levels in Cat Island and Eleuthera were similar pre and post landing for both the first and second landing event. The highest average of sounds was experienced in Eleuthera during post landing surveys for the first landing. Sound comparisons are not directly comparable as point counts were not the same in the second landing monitoring efforts as the first landing.

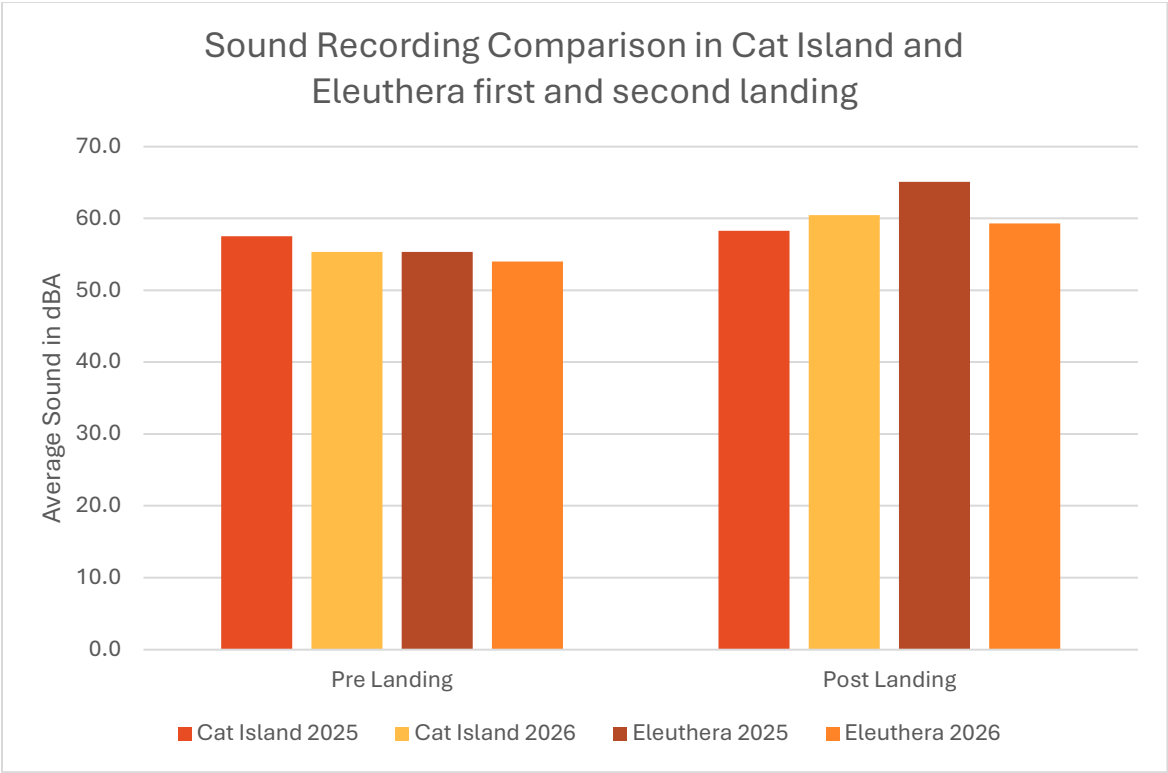


Figure 4-18. Average Sound Levels Recorded in Survey Areas during the first and second landing.

4.4.3 Terrestrial Avifauna Observations

Compared to 2025 survey efforts, 11 different avifauna was observed on Cat Island in the 2026 survey. With regards to Eleuthera, 16 new species were observed in 2026 as compared to 2025. The following tables and charts show the differences in species diversity and abundance in the first landing monitoring efforts compared to the second landing monitoring efforts.

Table 4-41. Observed Avifauna Comparisons in Cat Island 1st landing vs 2nd landing

Species		Observations	
Common Name	Scientific Name	2025	2026
American Kestrel	<i>Falco sparverius sparverioides</i>	Yes	Yes
American Oystercatcher	<i>Haematopus palliatus</i>	No	Yes
American Redstart	<i>Setophaga ruticilla</i>	Yes	Yes
Bahama Mockingbird	<i>Mimus gundlachii</i>	Yes	Yes
Bahama Woodstar	<i>Nesophlox evelynae</i>	Yes	Yes
Bananaquit	<i>Coereba flaveola bahamensis</i>	Yes	Yes
Barn Swallow	<i>Hirundo rustica</i>	No	Yes
Black-bellied Plover	<i>Pluvialis squatarola</i>	No	Yes



Species		Observations	
Black-faced Grassquit	<i>Melospiza bicolor</i>	Yes	Yes
Cape-May Warbler	<i>Setophaga tigrina</i>	Yes	No
Common Ground Dove	<i>Columbina passerina</i>	Yes	Yes
Common Yellowthroat	<i>Geothlypis trichas</i>	No	Yes
Cuban Pewee	<i>Contopus caribaeus</i>	Yes	Yes
Eurasian Collared-dove	<i>Streptopelia decaocto</i>	No	Yes
Glossy Ibis	<i>Plegadis falcinellus</i>	No	Yes
Great Blue Heron	<i>Ardea herodias</i>	Yes	No
Great Egret	<i>Ardea alba</i>	Yes	Yes
Greater Antillean Bullfinch	<i>Melopyrrha violacea</i>	Yes	Yes
Grey Catbird	<i>Dumetalla carolinensis</i>	Yes	Yes
Killdeer	<i>Charadrius vociferus</i>	Yes	Yes
LaSagras Flycatcher	<i>Myiarchus lucaysiensis</i>	Yes	No
Little Blue Heron	<i>Egretta caerulae</i>	Yes	Yes
Magnificent Frigatebird	<i>Fregata magnificens</i>	No	Yes
Magnolia Warbler	<i>Setophaga magnolia</i>	No	Yes
Merlin	<i>Falco columbarius</i>	No	Yes
Mourning Dove	<i>Zenaida macroura</i>	Yes	Yes
Northern Mockingbird	<i>Mimus polyglottus</i>	Yes	Yes
Northern Waterthrush	<i>Parkesia noveboracensis</i>	Yes	Yes
Osprey	<i>Pandion haliaetus ridgewayi</i>	Yes	Yes
Ovenbird	<i>Seiurus aurocapilla</i>	Yes	No
Palm Warbler	<i>Setophaga palmarum</i>	Yes	Yes
Prairie Warbler	<i>Setophaga discolor</i>	Yes	Yes
Royal Tern	<i>Thalasseus maximus</i>	Yes	No
Ruddy Turnstone	<i>Arenaria interpres</i>	Yes	Yes
Semipalmated Plover	<i>Charadrius semipalmatus</i>	Yes	No
Smooth-billed Ani	<i>Crotophaga ani</i>	Yes	Yes
Spotted Sandpiper	<i>Actitis macularius</i>	Yes	Yes
Thick billed Vireo	<i>Vireo crassirostris</i>	Yes	Yes
Tricolored Heron	<i>Egretta tricolor</i>	No	Yes
Western Spindalis	<i>Spindalis zena zena</i>	Yes	No
White-crowned Pigeon	<i>Patagioenas leucocephala</i>	Yes	Yes
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	No	Yes
Yellow-crowned Night Heron	<i>Nyctanassa violacea</i>	Yes	Yes
Yellow-throated Warbler	<i>Setophaga dominica</i>	Yes	Yes



Table 4-42. Observed Avifauna Comparison in Eleuthera 1st landing vs 2nd landing

Species		Observations	
Common Name	Scientific Name	2025	2026
American Coot	<i>Fulica americana</i>	No	Yes
American Oystercatcher	<i>Haematopus palliatus</i>	Yes	Yes
American Redstart	<i>Setophaga ruticilla</i>	No	Yes
Bahama Mockingbird	<i>Mimus gundlachii</i>	Yes	Yes
Bahama Woodstar	<i>Nesophlox evelynae</i>	Yes	Yes
Bananaquit	<i>Coereba flaveola bahamensis</i>	Yes	Yes
Belted Kingfisher	<i>Megaceryle alcyon</i>	Yes	Yes
Black-and-White Warbler	<i>Mniotilta varia</i>	Yes	Yes
Black-bellied Plover	<i>Pluvialis squatarola</i>	Yes	Yes
Black-faced Grassquit	<i>Melanospiza bicolor</i>	Yes	Yes
Blue-winged Teal	<i>Spatula discors</i>	No	Yes
Common Ground Dove	<i>Columbina passerina</i>	Yes	Yes
Common Yellowthroat	<i>Geothlypis trichas</i>	No	Yes
Cuban Pewee	<i>Contopus caribaeus</i>	Yes	Yes
Great Black-backed Gull	<i>Larus marinus</i>	No	Yes
Great Blue Heron	<i>Ardea herodias</i>	Yes	Yes
Great Egret	<i>Ardea alba</i>	Yes	Yes
Greater Antillean Bullfinch	<i>Melopyrrha violacea</i>	Yes	Yes
Green Heron	<i>Butorides virescens</i>	Yes	Yes
Grey Catbird	<i>Dumetella carolinensis</i>	Yes	Yes
Herring Gull	<i>Larus argentatus</i>	No	Yes
Killdeer	<i>Charadrius vociferus</i>	Yes	Yes
La'Sagras Flycatcher	<i>Myiarchus sagrae</i>	No	Yes
Least Sandpiper*	<i>Calidris minutilla</i>	Yes	No
Little Blue Heron	<i>Egretta caerulea</i>	Yes	Yes
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>	Yes	No
Mourning Dove	<i>Zenaida macroura</i>	No	Yes
Northern Mockingbird	<i>Mimus polyglottus</i>	Yes	Yes
Northern Waterthrush	<i>Parkesia noveboracensis</i>	Yes	Yes
Osprey	<i>Pandion haliaetus ridgewayi</i>	Yes	Yes
Ovenbird	<i>Seiurus aurocapilla</i>	No	Yes
Palm Warbler	<i>Setophaga palmarum</i>	Yes	Yes
Piping Plover	<i>Charadrius melodus</i>	No	Yes
Prairie Warbler	<i>Setophaga discolor</i>	Yes	Yes
Reddish Egret	<i>Egretta rufescens</i>	Yes	Yes



Royal Tern	<i>Thalasseus maximus</i>	Yes	Yes
Ruddy Turnstone	<i>Arenaria interpres</i>	Yes	Yes
Sanderling	<i>Calidris alba</i>	No	Yes
Semipalmated Plover	<i>Charadrius semipalmatus</i>	Yes	Yes
Semipalmated Sandpiper	<i>Calidris pusilla</i>	Yes	Yes
Short-billed Dowitcher	<i>Limnodromus griseus</i>	No	Yes
Smooth-billed Ani	<i>Crotophaga ani</i>	Yes	Yes
Thick-billed Vireo	<i>Vireo crassirostris</i>	Yes	Yes
Tree Swallow	<i>Tachycineta bicolor</i>	Yes	No
Tricolored Heron	<i>Egretta tricolor</i>	Yes	Yes
Western Spindalis	<i>Spindalis zena</i>	No	Yes
White -crowned Pigeon	<i>Patagioenas leucocephala</i>	Yes	Yes
White-eyed vireo	<i>Vireo griseus</i>	No	Yes
White-winged dove	<i>Zenaida asiatica</i>	Yes	No
Wilson's Plover	<i>Charadrius wilsonia</i>	Yes	Yes
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	No	Yes
Yellow-crowned Night Heron	<i>Nyctanassa violacea</i>	Yes	Yes
Yellow-rumped Warbler	<i>Setophaga coronata</i>	No	Yes
Yellow-throated Warbler	<i>Setophaga dominica</i>	No	Yes
Zenaida dove	<i>Zenaida aurita</i>	Yes	Yes

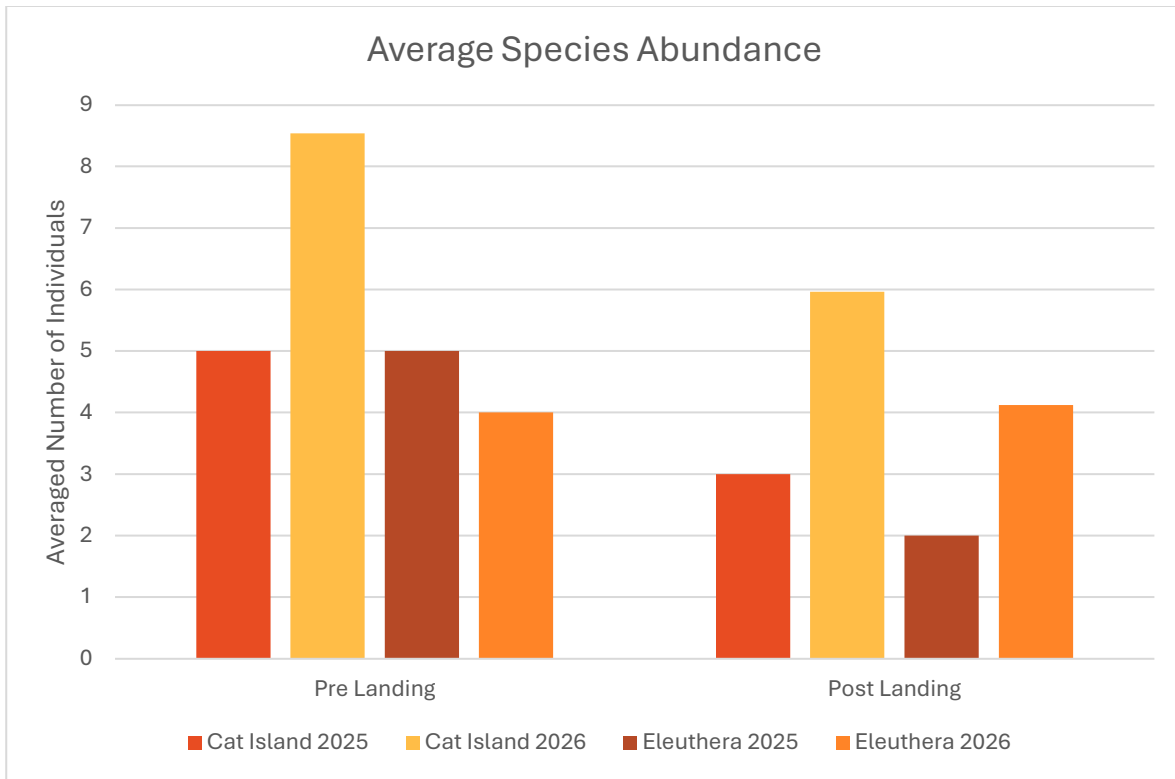


Figure 4-19. Average Species Abundance Comparison between 1st and 2nd landing in Cat Island and Eleuthera

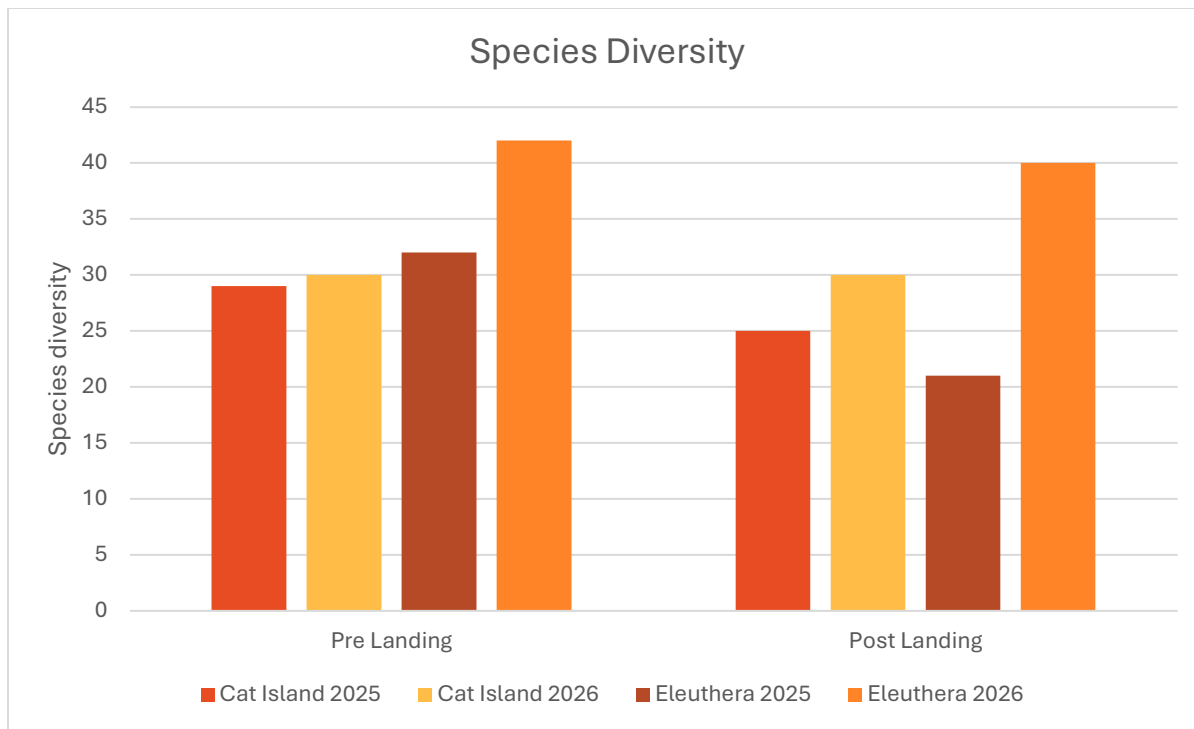


Figure 4-20. Species Diversity Comparison between 1st and 2nd landing in Cat Island and Eleuthera

5 DISCUSSION & INTERPRETATION

5.1 MARINE ENVIRONMENT

Species Composition

Species composition across the two monitoring periods remained consistent at the functional level, with all major trophic roles continuously represented. Although individual species differed between periods, the overall structure of the pelagic community was maintained. Prior to the launch, the assemblage included Atlantic Spotted Dolphins, Caribbean Reef Squid, and several reef-associated taxa such as triggerfish, reflecting the periodic intrusion of coastal–pelagic species into the Exuma Trough. Following the launch, observations expanded to include characteristically pelagic predators (Mahi-mahi, Wahoo), surface-oriented prey (Atlantic Silversides), large filter feeders (Manta Rays), and surface-foraging seabirds such as Brown Boobies and White-tailed Tropicbirds. These changes represent taxonomic turnover rather than any shift in functional diversity.

Relative abundance patterns further support the conclusion that the ecosystem remained stable through both periods. Flying Fish continued to dominate the forage base, and Atlantic Pearlsides remained reliably common, indicating consistent mid-water structure. Predatory fish and elasmobranchs were present before and after the launch, with variation occurring only in species



identity, which is typical of pelagic predator communities responding to mobile prey fields and shifting hydrographic conditions.

Plankton distribution exhibited a notable change between periods, with a continuous, well-defined layer observed pre-launch and increased turbidity and patchiness post-launch. This shift is consistent with recent physical forcing, particularly frontal mixing or current variability. Such changes in the plankton layer influence the spatial organization of the entire pelagic food web, affecting prey distribution, predator movements, and seabird foraging behavior.

Despite species turnover, ecological function remained intact. The forage base persisted, the predator guild remained active, and seabird-mediated trophic exchanges continued. Higher trophic species occurred episodically during both periods, reflecting the inherent variability of the pelagic environment rather than disturbance. The post-launch increase in pelagic predators, filter feeders, and surface-associated prey is consistent with natural prey-field redistribution and does not suggest ecological change or degradation.

The absence of Atlantic Spotted Dolphins post-launch can be explained by their transient use of habitat and opportunistic feeding and vessel-interaction behavior. Their occurrence in the region is naturally variable and influenced by short-term prey availability; therefore, absence during the post-launch window does not indicate displacement or disturbance.

Physical drivers provide the most parsimonious explanation for the observed changes. Cold-front-induced mixing, current variability, and the shifting position of convergence zones directly shape plankton biomass, predator aggregation, and seabird distribution. These mechanisms are known to produce short-term variability in species presence and detectability within the Exuma Trough pelagic system.

There is no evidence of short-term ecological impact associated with launch activities. Dominant species remained abundant, trophic levels were fully represented, and key ecological processes persisted without disruption. Species differences observed post-launch represent natural additions and redistributions rather than losses.

The Exuma Trough exhibited typical temporal variability with stable ecological function. Changes in species composition and distribution are attributable to oceanographic forcing and prey dynamics, not to launch operations.

5.2 TERRESTRIAL ENVIRONMENT

No significant changes were observed in recorded ambient environmental conditions. Inclement weather was experienced prior to the landing event and after the landing event that impacted survey ability on both Cat Island and Eleuthera. As a result, not all survey points were able to be



conducted for Cat Island, but an analysis was still able to be ascertained based on the available data. All of Eleuthera's survey points were conducted post landing. It is likely that weather may have influenced avian diversity or abundance, but conclusions cannot be made as other factors may play a role. These include migratory patterns, food availability, and the presence of feral animals.

During the landing, auditory observations indicated a brief startle response from birds in a wetland nearby Eleuthera's observation point. Although post landing avian abundance in Eleuthera is not significantly different from pre-landing conditions, some variation in species presence was noted between survey periods. The cause of this variation cannot be definitively attributed to the landing event and may reflect natural movement patterns or short-term behavioral responses.

While no measurable or sustained impacts to avian communities were identified, continued monitoring is recommended to further evaluate potential long-term trends in species presence and distribution, particularly under repeated landing scenarios. Surveys conducted across multiple seasons would support a more comprehensive understanding of natural variability and potential cumulative effects.

Seasonal monitoring is recommended to support differentiation between natural variability and potential project-related responses, consistent with long-term monitoring commitments established for the Project..

5.3 ACOUSTIC ENVIRONMENT

The acoustic environment exhibited minimal variation between pre- and post-launch conditions. Measured sound pressure levels in air ranged from 34 dBA to 90.1 dBA, with a mean value of 54.3 dBA. Remote offshore environments are typically characterized by low ambient noise levels (approximately 30–45 dBA), primarily driven by natural sources such as wind and wave activity. The elevated mean sound level observed during the survey period is likely attributable to increased wave action. Notably, the average sound level of 54.3 dBA remains within a range considered safe for human exposure under typical environmental conditions.

Sea state conditions were frequently recorded at Beaufort Scale 3 or 4, indicating moderate wave activity with intermittent whitecaps, which would contribute to elevated ambient noise levels. Additionally, seasonal meteorological patterns, including the passage of cold fronts during the survey period, likely resulted in increased wind speeds, further amplifying background acoustic levels.

Intermittent aerial operations were also conducted to assess sound variability associated with aircraft approach. These events likely contributed to transient increases in recorded sound levels and influenced the overall average.



Despite these contributing factors, comparative analysis indicates that acoustic conditions before and after the launch event remained consistent, with no measurable change attributable to the landing activities.

Although predictive modelling did not indicate a sonic boom footprint extending over North Cat Island, auditory observations from that location confirm that the event was perceptible. Variability in atmospheric conditions (e.g., temperature gradients, wind profiles, and humidity), as well as minor differences in the re-entry trajectory, can influence sound propagation and result in localized deviations from modelled footprints. Such variability is consistent with known uncertainties in acoustic modelling of impulsive events and may result in the sonic boom being audible outside of the predicted footprint under certain conditions.

Sound in air monitoring during the landing event was conducted at selected locations based on the predicted acoustic footprint and operational planning. As a result, a dedicated sound level meter was not deployed at North Cat Island during the landing event. While this resulted in a lack of instrument-based acoustic data at that location, the Sound Mapping Study results and observations from the Cat Island Survey team confirm that the event was audible. This represents a limitation in the dataset and highlights the importance of adaptive monitoring design in response to observed conditions. Future monitoring programs may consider incorporating additional or more flexible acoustic monitoring locations to better capture spatial variability in sonic boom propagation.

5.4 ENVIRONMENTAL CONSISTENCY ACROSS LAUNCHES

A comparison of monitoring results from Landing 1 (February 18, 2025) and Landing 2 (February 19, 2026) indicates a high degree of environmental consistency across both events, despite the expanded monitoring scope implemented for the second landing.

Across both landings, marine surveys conducted within the Exuma Sound Minimum Safe Area (MSA) consistently documented normal ecological conditions, including typical species presence, abundance, and behavior. Marine mammal observations were limited and primarily recorded during pre-landing periods, with no consistent detections during or after the landing events. These observations suggest that the landing activities did not result in sustained changes to marine fauna presence or behavior.

Terrestrial monitoring conducted on Cat Island, South Eleuthera, and the Northern Exuma Cays similarly demonstrated stable avian and wildlife conditions across both landings. While a brief startle response was observed during landing events, no long-term or measurable changes in species diversity or abundance were identified.



Acoustic monitoring results were consistent between both events, confirming that the sonic boom was a short-duration, high-intensity but transient acoustic event. Measurements from both landings indicate that sound levels remained below thresholds associated with permanent hearing effects. Community-based observations further support that while the sonic boom was widely perceptible, responses were short-term and non-persistent.

Water quality monitoring results across both landings remained within expected baseline ranges, with no evidence of sustained impacts or degradation. Minor variability observed in certain parameters was transient and consistent with natural environmental fluctuations. Similarly, air quality and meteorological conditions remained within typical ranges for the region and did not indicate any measurable impact associated with the landing activities.

The 2026 monitoring program incorporated expanded pre- and post-landing data collection, additional monitoring locations, and enhanced acoustic and environmental data collection relative to 2025. Despite this increased resolution and broader dataset, the overall findings remain consistent with those of the first landing.

Collectively, these results demonstrate that Falcon9 booster landings in Exuma Sound, when conducted under the current environmental management program, result in temporary and localized environmental responses with no measurable adverse or long-term impacts. The consistency of findings across both landing events provides increased confidence in the environmental management approach and supports the continued implementation of similar operations under an adaptive monitoring framework.

5.5 INTEGRATED ACOUSTIC AND COMMUNITY RESPONSE ASSESSMENT

Acoustic monitoring conducted during the landing event confirmed the occurrence of a sonic boom associated with booster touchdown. Measured in-air and in-water sound levels indicate that the event was short in duration and within expected ranges for this type of operation, with no exceedance of established thresholds associated with marine mammal auditory injury or permanent hearing effects, as detailed in the acoustic monitoring report prepared by ManTech.

While transient background noise sources (e.g., vessel activity) were present in the survey area during portions of the monitoring period, field observations confirm that vessel traffic did not coincide with the timing of the landing event, and therefore did not influence the primary acoustic signature associated with the sonic boom.

Community-based observations collected through the sound mapping study indicate that the sonic boom was widely perceived across multiple islands, with a majority of respondents reporting that the event was audible. Reported responses were primarily characterized by startle reactions,



perceived loudness, and short-term disturbance, with variation in response influenced by proximity to the landing site and prior awareness of the event.

When considered together, the acoustic measurements and community observations provide a consistent interpretation of the event. The sonic boom was clearly perceptible and, in some cases, startling, particularly in areas closest to the landing site. However, both datasets indicate that these effects were short-lived and did not result in sustained environmental or structural impacts.

Importantly, acoustic monitoring confirmed that sound levels remained below established injury thresholds for marine mammals, and field observations did not indicate changes in marine mammal presence or behavior during or after the landing event. Similarly, terrestrial monitoring identified only a brief and localized startle response in avian species, with no evidence of long-term behavioral change.

The integration of acoustic measurements and community perception data therefore supports the conclusion that, while the sonic boom is a noticeable and sometimes startling event, its effects are temporary and do not result in measurable adverse environmental impacts under the conditions observed.

5.6 LIMITATIONS

Marine Monitoring Limitations

Marine surveys were conducted successfully throughout the monitoring period. Environmental conditions, including weather, sea state, visibility, and light levels, varied and may have influenced detection probability. However, these factors did not prevent the collection of representative observational data.

Survey effectiveness was influenced by environmental conditions, including weather, sea state, visibility, and light levels, all of which affect detection probability. Adverse conditions such as elevated sea states, surface glare, and low light levels reduced the ability to detect marine fauna, particularly at the water surface.

Several operational and instrumentation-related factors also introduced limitations during data collection. Ocean currents resulted in the vessel drifting at sampling locations, preventing measurements from being consistently obtained at fixed GPS coordinates. On the initial day of surveying, recorded pH values indicated elevated alkalinity. However, the instrument was calibrated on the same day, after which measurements fell within expected marine ranges. Slight elevations observed later in the survey period are considered to reflect instrument-related variability rather than true environmental conditions. Ambient environmental data (e.g., air and noise quality and climate parameters) were not recorded during marine surveys on the day of the launch due to a lapse in field data recording.



The deployment of the marine ROV enhanced subsurface observations. However, ROV operations were restricted during periods of rough seas and poor weather, resulting in some monitoring sessions being shortened or canceled, as documented in the observation logs. As ROV surveys were conducted concurrently with surface-based marine surveys, cancellations affected both survey types. Consequently, the ability to fully characterize subsurface marine communities was occasionally constrained.

Marine mammal detection probability was similarly reduced under conditions of low visibility, elevated sea state, and nighttime conditions. These factors limited visual detection from the vessel and may have reduced monitoring effectiveness due to increased ambient noise from wind and wave action. In addition, aerial marine mammal surveys were not conducted on the day of the launch, as the timing of the landing occurred after sunset, when visibility conditions were insufficient for effective observation.

Operational constraints also limited post-landing data collection. The monitoring vessel was not able to safely access the immediate vicinity of the booster following landing, and therefore near-field, immediate post-landing observations could not be collected.

A cold front passed through the region during the monitoring period, resulting in periods of increased wind, elevated sea states, and reduced visibility. These conditions limited survey effort on certain days and contributed to temporary gaps in data collection.

Terrestrial Monitoring Limitations

Similar environmental and logistical constraints affected terrestrial monitoring efforts. Weather conditions on both Cat Island and Eleuthera limited survey coverage, and as a result, not all planned point counts (58 total) were completed during the post-landing period. Statistical analyses were adjusted accordingly to account for differences in sampling effort.

Additional limitations included equipment malfunction and field conditions. The air quality meter was not available during portions of the South Eleuthera surveys due to instrument malfunction and the inability to secure a replacement within the survey timeframe. The presence of feral animals at some survey locations also influenced field conditions and survey efficiency.

Sound in air monitoring during the landing event was conducted at selected locations based on the predicted acoustic footprint and operational planning. As a result, a dedicated sound level meter was not deployed at North Cat Island during the landing event.

While this resulted in a lack of instrument-based acoustic data at that location, auditory observations confirmed that the event was perceptible. This represents a limitation in the dataset and reflects the inherent uncertainty associated with predicting the spatial extent of sonic boom propagation under variable atmospheric conditions.



This limitation highlights the importance of adaptive monitoring design, and future monitoring programs may consider incorporating additional or more flexible acoustic monitoring locations to better capture spatial variability in sonic boom propagation.

Across all monitoring components, including water quality, air quality, acoustic conditions, and marine observations, no verified exceedances of EMP defined trigger thresholds were identified. Observed variability in environmental parameters remained within expected natural ranges or was attributable to non-environmental factors (e.g., instrument-related anomalies). Accordingly, no corrective actions, suspension measures, or operational responses as defined in the EMP were required during the monitoring period.

6 RECOMMENDATIONS

The monitoring program implemented for the 2026 landing campaign represents a meaningful advancement over the previous year through the expansion of the observation window to seven days before and seven days after the landing event. This extended monitoring period improves the ability to interpret environmental conditions associated with the landing and to compare these observations with baseline conditions. However, the program remains focused on a relatively short monitoring window when considered in the context of broader environmental variability within the Exuma Sound.

Future monitoring should evolve toward a hybrid approach that retains focused, event-based surveys while incorporating autonomous instrumentation and remote sensing to support year-round environmental observation. Establishing a continuous environmental baseline would strengthen interpretation of field observations collected during landing missions and improve understanding of natural variability in the study area.

Monitoring efforts may be optimized by focusing data collection on parameters and locations most directly relevant to the landing area, while maintaining sufficient baseline data to support interpretation of observed conditions.

In this context, locations such as Cat Island may continue to provide value as a comparative reference point, supporting differentiation between natural environmental variability and conditions observed closer to the landing footprint.

The existing field methodology provides a comprehensive framework for assessing environmental conditions associated with landing events and should be retained, with consideration given to optimizing the spatial and temporal focus. The combined use of marine surveys, water quality measurements, ROV deployments, hydrophone monitoring, aerial surveys, and terrestrial fauna assessments supports a multi-disciplinary evaluation of environmental conditions and allows for continued confirmation of consistent environmental responses across landing events. Within this framework, passive acoustic monitoring should play an expanded role, given its importance in



detecting marine mammals and characterizing underwater sound conditions. Increasing the deployment of hydrophones from vessels or autonomous platforms would enhance the ability to assess acoustic conditions during landing events. Consideration may also be given to refining monitoring locations and parameters over time, focusing effort on those most directly relevant to the landing footprint and areas of potential impact, while maintain sufficient baseline data to support comparison and regulatory requirements by the DEPP.

In addition, consideration should be given to the deployment of a hydrophone directly on the dronship, where operationally feasible, to capture near-field hydroacoustic conditions at the point of landing. This would provide valuable data on sound levels and propagation in the immediate vicinity of the booster during touchdown.

ROV surveys should continue to provide visual documentation of the upper water column within operational depth limits, particularly during daylight conditions, while serving as a complementary tool rather than the primary method for assessing deeper offshore environments.

To improve the collection of time-sensitive data, immediate post-landing access to the landing area should be facilitated where safe and operationally feasible. During the monitoring program, access to the immediate landing location was planned. However, operational constraints limited the ability to approach the landing site as intended. When feasible, ensuring timely and close access to the landing location would enhance the ability to collect near-field data shortly after touchdown, improving the ability to assess any short-term or localized effects.

Operational efficiency of marine surveys could be enhanced through the use of a dedicated, high-speed monitoring vessel, allowing for faster transit between shore and the landing site. This would support more efficient survey execution by reducing transit time and enabling streamlined monitoring with fewer onboard requirements. In turn, this approach would allow for an increased number of points to be surveyed within a given day, improving spatial overage within the MSA while minimizing constraints associated with the travel time. .

To strengthen aerial monitoring, it is recommended that internally mounted cameras within the survey aircraft to provide continuous visual documentation during aerial surveys. This would supplement observer-based data collection and allow for post-survey review and verification of observations, without requiring modifications to aircraft certification.

To improve monitoring efficiency over time, consideration may be given to the phased incorporation of autonomous ocean observing systems to complement field-based surveys. During initial deployment, these systems (e.g., buoy-based platforms with integrated environmental and acoustic sensors) could be used alongside vessel-based monitoring to support validation and comparison of datasets.



Following this initial phase, and where data consistency is demonstrated, such systems may support a transition toward a more targeted monitoring approach, reducing reliance on extensive vessel-based surveys and focusing effort on key locations within the landing footprint. This would allow for a more efficient monitoring program that maintains data quality while reducing operational requirements.

A similar approach may be considered for terrestrial monitoring, where passive acoustic recorders could be deployed in select locations to supplement and, where appropriate, streamline observer-based surveys. As with marine systems, initial deployment alongside field surveys would support validation, with potential for longer-term use to reduce field intensity while maintaining continuity of data collection²⁷.

Satellite-based observations may be incorporated as part of a broader, long-term environmental monitoring framework, rather than as a primary component of landing-specific surveys. Optical imagery (e.g., Sentinel-2 and Landsat) can support periodic assessment of coastal water conditions, turbidity patterns, and floating vegetation, while Synthetic Aperture Radar (e.g., Sentinel-1) enables observation of ocean surface conditions regardless of cloud cover or lighting.

²⁸

These tools are particularly useful during periods when field monitoring is not being conducted and can provide supplementary baseline data to support long-term environmental assessment, as required under the Project's monitoring commitments. When used alongside in situ observations collected during landing events, satellite data can enhance interpretation of environmental conditions by providing broader spatial and temporal context.

To improve consistency and completeness of field data collection, it is recommended that standardized field checklists be implemented, ensuring that all required environmental parameters are recorded during each survey period. Additionally, backup instrumentation should be made available where feasible to minimize data gaps associated with equipment malfunction.

²⁷ NOAA National Centers for Environmental Information, Passive Acoustic Data Collection, <https://www.ncei.noaa.gov/products/passive-acoustic-data> and Blumstein et al., 2011, *Acoustic monitoring in terrestrial environments using microphone arrays: Applications, technological considerations and prospectus*, Journal of Applied Ecology <https://doi.org/10.1111/j.1365-2664.2011.01993.x>

²⁸ European Space Agency Sentinel 1 Mission Overview <https://sentiwiki.copernicus.eu/web/s1-mission>.



Collaboration with the University of The Bahamas is recommended to support long-term monitoring and data analysis. Engagement of students in marine science, environmental science, and geospatial disciplines could assist with the analysis of satellite imagery, acoustic datasets, and environmental observations, while contributing to local capacity building and sustained environmental monitoring efforts.

6.1 HIGH PRIORITY ACTIONS (NEXT LANDING – OPERATIONAL IMPROVEMENTS)

- Improved intergovernmental coordination to streamline monitoring to improve the best chance of success on the day of the event.
- Facilitate Immediate Post-Landing Monitoring Access - Where safe and operationally feasible, enable access to the landing area immediately following booster recovery.
- Secure a Dedicated High-Speed Monitoring Vessel - Utilize a faster vessel to reduce transit time between shore and the landing site, improving spatial coverage and survey efficiency.
- Implement Standardized Field Checklists - Introduce field protocols to ensure all required environmental parameters (e.g., ambient data) are consistently recorded during each survey period.
- Provide Backup Field Equipment - Ensure redundancy for critical instruments (e.g., air quality meters, handheld sensors) to prevent data gaps due to equipment malfunction.
- Install Fixed Cameras within Aerial Survey Aircraft - Equip aircraft with internally mounted cameras to provide continuous visual documentation and allow for post-survey verification of observations.

6.2 MEDIUM PRIORITY ACTIONS (PROGRAM ENHANCEMENTS – NEAR-TERM IMPROVEMENTS)

- Expand Passive Acoustic Monitoring Coverage - Increase the number and duration of hydrophone deployments from vessels and mobile platforms to improve detection of marine mammals and characterization of underwater sound conditions.
- Deploy Hydrophone at the Droneship - Install a hydrophone on or near the droneship to capture near-field hydroacoustic data during booster landing.
- Enhance ROV Survey Planning - Incorporate flexible deployment windows to account for weather conditions and maximize opportunities for subsurface observations.
- Improve Coordination of Monitoring Schedule - Align monitoring activities more closely with confirmed landing schedules to minimize gaps caused by postponements or operational changes.
- Refine Data Integration Across Monitoring Components - Strengthen integration between marine, terrestrial, and acoustic datasets to support more cohesive interpretation of



environmental conditions. This would involve centralizing datasets, standardizing time and location references, and using GIS and time-series analysis to directly compare marine, terrestrial, and acoustic observations with project activities.

6.3 FUTURE / LONG-TERM ACTIONS (STRATEGIC MONITORING DEVELOPMENT)

- Implement Autonomous Ocean Monitoring Systems - Deploy solar-powered surface platforms (e.g., Spotter-type buoys) equipped with environmental sensors and hydrophones to provide continuous, real-time oceanographic and acoustic data.
- Establish Fixed Coastal Monitoring Stations - Install long-term monitoring stations near South Eleuthera and North Cat Island to provide baseline environmental conditions for comparison with landing events.
- Incorporate Satellite-Based Environmental Monitoring - Use optical (Sentinel-2, Landsat) and radar (Sentinel-1) imagery to assess large-scale ocean conditions, turbidity patterns, and surface dynamics.
- Expand Terrestrial Passive Acoustic Monitoring - Deploy acoustic recorders in coastal habitats to monitor avian activity over seasonal and long-term timescales.
- Develop Academic Partnerships - Collaborate with the University of The Bahamas to support long-term data analysis, monitoring continuity, and capacity building through student involvement.

7 CONCLUSION

The environmental monitoring program conducted for the 2026 Falcon9 booster re-entry exercise provides a comprehensive and integrated assessment of marine, terrestrial, acoustic, and ambient environmental conditions associated with the landing event. The expanded monitoring window and multi-disciplinary approach represent a significant improvement over the previous monitoring effort and provide increased confidence in the interpretation of observed conditions.

Results from marine surveys, water quality monitoring, hydroacoustic measurements, terrestrial assessments, and community-based observations consistently indicate that environmental conditions remained stable throughout the monitoring period. Marine ecosystems exhibited normal patterns of activity, with no evidence of sustained disturbance or degradation. Marine mammal observations were limited to a few days during the pre-landing period, with no sightings recorded during or after the landing event.

Water quality parameters remained within expected ranges, and observed variability was minor and transient. Acoustic monitoring confirmed the occurrence of the sonic boom. However, measured sound levels and hydroacoustic data indicate that these effects were temporary and



did not result in measurable ecological impacts. Community perception data further support that while the sonic boom was widely experienced, responses were primarily short-term in nature, with no evidence of lasting environmental or structural effects.

Terrestrial monitoring similarly showed no measurable changes in avian communities, aside from a brief and localized startle response observed at the time of landing. No long-term behavioral impacts were identified.

Several limitations, including weather conditions, access constraints to the immediate landing area, and minor equipment challenges, influenced certain aspects of data collection. These limitations are typical of offshore environmental monitoring programs and were effectively managed through adaptive survey approaches. Importantly, they do not affect the overall interpretation of the results.

The findings of this study indicate that the Falcon9 booster landing in Exuma Sound was conducted without measurable adverse environmental impact. The monitoring program has demonstrated effectiveness in capturing environmental conditions associated with landing events and provides a strong foundation for future monitoring.

Continued implementation of the monitoring program, along with the recommended enhancements, will further improve data completeness, strengthen interpretation of environmental conditions, and support ongoing evaluation of potential impacts. Over time, the integration of continuous monitoring technologies and expanded datasets will further enhance understanding of environmental variability and ensure that future landing operations remain environmentally responsible.

8 APPENDICES



8.1 APPENDIX A – MARINE SURVEY DATASHEETS



Marine Observation Data Sheet

Observer: Gabrielle Collie Date: Feb-10, 2026
Mark Daniels
 Time Started: 10:15am Time Ended: 5:00pm Temperature: 71°
 Method of Survey: vessel observation Tide: High Low
 Coordinates: 24°32'29"N Air Quality: Good
76°27'15"W
(observed sighting)
 Ocean Conditions: high, choppy seas, strong NE to E winds
 Weather: ☒ Sunny ☒ Cloudy ☒ Partly Cloudy ☐ Rainy ☐ Thunderstorm

11:59
am
GPS
above

#	Common Name	Scientific Name	Abundance	Phylum
1	Dolphin (spotted) juvenile		3	chordata
2				
3				
4				
5				
6				
7				
8				

Marine Observation Data Sheet

Observer: Mark Daniels Date: 2/11/2026
Garbrielle Callie
 Time Started: 7:52am Time Ended: 5:01pm Temperature: _____
 Method of Survey: vessel observation Tide: Low
High @ 3:13pm
 Coordinates: Landing Air Quality: Good
 Ocean Conditions: Moderate ESE winds 10-15 knots, seas 3-5ft
on Atlantic side
 Weather: ☒ Sunny ☐ Cloudy ☒ Partly Cloudy ☐ Rainy ☐ Thunderstorm

#	Common Name	Scientific Name	Abundance	Phylum
1	Bird • sitting on the sea • dark back • Flew away while passing • white under belly			Chordata
2	Frigate bird		1	
3				
4				
5				
6				
7				
8				

Marine Observation Data Sheet

Observer: Gorbrielle Collie Date: Feb. 12, 2026
Mark Daniels
 Time Started: 7:27am Time Ended: 4:00pm Temperature: 77.1
 Method of Survey: vessel observation Tide: Low (High @ 4:16pm)
 Coordinates: _____ Air Quality: Good
 Ocean Conditions: 2-4 ft seas; 10-15 knots northeast to east winds
 Weather: ☒ Sunny ☐ Cloudy ☒ Partly Cloudy ☐ Rainy ☐ Thunderstorm

#	Common Name	Scientific Name	Abundance	Phylum
1	^{at} ocean triggerfish		1	Chordata
2	Flyingfish			Chordata
3				
4				
5				
6				
7				
8				

point
4 →
approach
on
landing
site →

Marine Observation Data Sheet

Observer: Garbrielle Collie Date: Feb. 13, 2026
Mark Daniels
 Time Started: 7:20 Time Ended: 3:21 pm Temperature: 71°
7:27 am
 Method of Survey: vessel observation Tide: High
Low @ 11:45 am
 Coordinates: _____ Air Quality: Good
 Ocean Conditions: NE to E 10-15 knots ; 2-4ft seas
 Weather: ☒ Sunny ☐ Cloudy ☐ Partly Cloudy ☐ Rainy ☐ Thunderstorm

#	Common Name	Scientific Name	Abundance	Phylum
1	Frigate Bird Point 1		2	chordata
2				
3				
4				
5				
6				
7				
8				

Marine Observation Data Sheet

Observer: Gabrielle Collie & Mark Daniel Date: Feb. 14, 2026

Time Started: 7:14am Time Ended: 2:52pm Temperature: 71°F

Method of Survey: vessel observation Tide: High
Low @ 12:20pm

Coordinates: _____ Air Quality: Good

Ocean Conditions: Moderate - rough conditions easterly winds 12-20 knots
4-6 ft. seas

Weather: ☒ Sunny ☐ Cloudy ☐ Partly Cloudy ☐ Rainy ☐ Thunderstorm

#	Common Name	Scientific Name	Abundance	Phylum
1	squid		1	Mollusca
2	Pearl Atlantic side		5	Chordata
3				
4				
5				
6				
7				
8				

pair in
6 @
opain
(24 & 6 (3))

Marine Species Observation Data Sheet

Observer (s): Franchesca Mark Glabe Date: Feb 17, 2026

Time Started: 9:00 am Time Ended: 1:00 pm Temperature: 81°F

Method of Survey: ROV, Spotting Tide: _____

Coordinates: _____ Air Quality: good

Ocean Conditions: mostly calm

Weather: ☒ Sunny ☐ Cloudy ☐ Partly Cloudy ☐ Rainy ☐ Thunderstorm

#	Location / Coordinates	Common Name	Scientific Name	Abundance	Phylum
1	landing	Caribbean Reef Squid	Sepio tenthis Sepioides	single	Mollusca
2	landing point 1, 3, 5	identified jellyfish		few	
3	landing point 1, 3, 5	unidentified plankton		many	
4					
5					
6					
7					
8					
9					

Marine Species Observation Data Sheet

Observer (s): Francher Mark Glaze Date: Feb 18, 2026

Time Started: 9:20 am Time Ended: 12:30 pm Temperature: 78°F

Method of Survey: ROV, Spawning Tide: _____

Coordinates: _____ Air Quality: Good

Ocean Conditions: Waves

Weather: ☐ Sunny ☒ Cloudy ☐ Partly Cloudy ☐ Rainy ☐ Thunderstorm

#	Location / Coordinates	Common Name	Scientific Name	Abundance	Phylum
1	landing Point 2, 4, 6	unidentified jellyfish		many	
2	landing Point 2, 4, 6	unidentified plankton		many	
3					
4					
5					
6					
7					
8					
9					

Marine Species Observation Data Sheet

Observer (s): Francoise Marie Chise Date: Feb 14, 2021
 Time Started: 6:20 am Time Ended: 10:35 am Temperature: 50°F 74°F
 Method of Survey: Rov, Spotting Tide: _____
 Coordinates: _____ Air Quality: good
 Ocean Conditions: mostly calm
 Weather: ☐ Sunny ☐ Cloudy ☒ Partly Cloudy ☐ Rainy ☐ Thunderstorm

#	Location / Coordinates	Common Name	Scientific Name	Abundance	Phylum
1	<u>landing</u>	<u>unidentified jellyfish</u>		<u>many</u>	<u>mollusca</u>
2	<u>landing</u>	<u>unidentified plankton</u>		<u>abundant</u>	
3					
4					
5					
6					
7					
8					
9					

Marine Species Observation Data Sheet

Observer(s): Francesca Mark Glaze Date: Feb 20 2021

Time Started: 9:24 am Time Ended: 12:30 pm Temperature: 81°F

Method of Survey: Rov, Spotting Tide: _____

Coordinates: _____ Air Quality: good

Ocean Conditions: Slightly Rough

Weather: ☐ Sunny ☒ Cloudy ☐ Partly Cloudy ☐ Rainy ☐ Thunderstorm

#	Location / Coordinates	Common Name	Scientific Name	Abundance	Phylum
1	point 5	Manta Ray	Mantella sp.	single	Chordata
2	Point 1,3,5	unidentified small Jellyfish		few	Cnidaria
3	Point 1,3,5	unidentified plankton		many	
4					
5					
6					
7					
8					
9					

Marine Species Observation Data Sheet

Observer (s): Franchese Mark Glise Date: Feb 21, 2016

Time Started: 9:20 am Time Ended: 12:35 pm Temperature: 78° F

Method of Survey: ROV, Snorkeling Tide: _____

Coordinates: _____ Air Quality: good

Ocean Conditions: Slightly Rough

Weather: ☐ Sunny ☐ Cloudy ☒ Partly Cloudy ☐ Rainy ☐ Thunderstorm

#	Location / Coordinates	Common Name	Scientific Name	Abundance	Phylum
1	launching Point 2, 4, 6	unidentified jelly fish		many	mollusca.
2	launching Point 2, 4, 6	unidentified plankton		abundant	
3					
4					
5					
6					
7					
8					
9					

Marine Species Observation Data Sheet

Observer (s): Francesca Mark Chase Date: Feb 22, 2020

Time Started: 9:00 Time Ended: 12:30 Temperature: 79 °F

Method of Survey: RUV, spotting Tide: _____

Coordinates: _____ Air Quality: good

Ocean Conditions: mostly calm

Weather: ☐ Sunny ☐ Cloudy ☒ Partly Cloudy ☐ Rainy ☐ Thunderstorm

#	Location / Coordinates	Common Name	Scientific Name	Abundance	Phylum
1	Between landing & Point 3	Flying fish	Exocoetidae sp.	few	Chordata
2	Point 5	Mahi Mahi	Coryphaena hippurus	few	Chordata
3					
4					
5					
6					
7					
8					
9					



SPACEX FALCON 9 ENVIRONMENTAL MONITORING CHECKLIST

Observer: <u>BRON</u>	Date: <u>February 19, 2026</u>
Time Started: <u>9:30 am</u> Time Ended: <u>10:10 pm</u>	
SpaceX Representative: <u>Brian Pownall</u>	
Site Description: <u>"Good" air quality, calm sea state, MSA and Monitoring Location 24.69930 °N 76.40590 °W</u>	
Weather: ☒ Sunny ☐ Cloudy ☐ Partly Cloudy ☐ Rainy ☐ Thunderstorm	
Project Phase	
☒ Pre Launch / Launch Preparations ☐ During Launch ☐ Post Launch	

SITE SAFETY AND HEALTH CONDITIONS

Areas of Compliance with the Approved EMP	Compliance with EMP			Remarks
	Yes	No	N/A	
i. Appropriate usage of Personal Protective Equipment (PPE).	X			
ii. Proper maintenance and availability of fire extinguishers	X			
iii. Proper maintenance and availability of first aid resources	X			
iv. Marine Traffic Notice (NOTMAR) published.	X			
v. Good housekeeping practices and general cleanliness of vessel.	X			
vi. Sewage being properly disposed of, with no	X			



drainage into marine environment.				
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MARINE RESOURCE MANAGEMENT

Areas of Compliance with the Approved EMP	Compliance with EMP			Remarks
	Yes	No	N/A	
i. Megafauna observed on site.	X			none observed
ii. Preclearance survey conducted.	X			
i. Spill kits and absorbents easily accessible for quick spill response.	X			

INCIDENTS / EMERGENCIES

ACCIDENT/INCIDENT REPORTING

Areas of Compliance with the Approved EMP	Yes	No	Remarks
i. Did an accident or emergency occur on-site?		X	
ii. Was the Incident Investigation Report completed?			N/A
iii. Were external Emergency First Responders contacted?			N/A

DAILY EMP COMPLIANCE CODE

Compliance Code:	X Green	☐ Orange	☐ Red
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8.2 APPENDIX B – MARINE MAMMAL OBSERVATION FORMS



Marine Monitoring Observation Form	
Project Name:	Feb 10, 2026 Survey
Location / Observation Station:	SpaceX ¹ Pre-launch
Observer(s) (include time of switch if applicable):	Aerial Surveys Agnessa Lundy
Monitoring Effort	
Start Time:	1:00pm
End Time:	2:30pm
Project Activities (In-Water)	
Start Time:	11:00AM
End Time:	2:00 PM
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	Marine Monitoring - deploying equipment - collecting data
Environmental Conditions	
Time:	1:00pm; 1:26; 1:32
Monitoring Conditions (1-10):	10
Weather (S/PC/OC/L/R/F/LS/SN):	PC
Light (1/2/3):	1
Beaufort Sea State (0-4):	1
Visibility (m):	6 miles / ~9656 meters
Glare (%):	0
Notes:	
Daily Total Marine Mammal Count	
Species Observed:	
Number of Groups:	2
Total Number of Animals:	3 : 2 dolphins, 1 stingray
Additional Notes:	Flight at 2000ft ? N50068 at 2pm flight path changed to fly over the length of South Eleuthera coastline.
QA/QC Verification	
QA/QC Initials:	G.C. Shall
Date:	Feb. 10, 2026

Marine Monitoring Observation Form	
Project Name:	Feb 11, 2026
Location / Observation Station:	Space X Prelaunch
Observer(s) (include time of switch if applicable):	Aerial Survey S Agnessa Lundy
Monitoring Effort	
Start Time:	1:00pm 1:26pm 2pm (landing area) 2:40pm
End Time:	
Project Activities (In-Water)	
Start Time:	
End Time:	
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	Monitoring - data collection
Environmental Conditions	
Time:	
Monitoring Conditions (1-10):	10
Weather (S/PC/OC/L/R/F/LS/SN):	S
Light (1/2/3):	1
Beaufort Sea State (0-4):	4
Visibility (m):	
Glare (%):	~20%
Notes:	
Daily Total Marine Mammal Count	
Species Observed:	whale
Number of Groups:	1
Total Number of Animals:	2 (mom & calf) unkn species whale
Additional Notes:	1:26 @ Highbourne Cay fly down along south direction. Over Normans at 1:30pm 2pm by Blackpoint Compass Cay at 1:42pm.
QA/QC Verification	
QA/QC Initials:	<i>[Signature]</i>
Date:	

2:24pm → moved to go over dromeship / landing area zone.
2:53pm → headed over to S. Eleuthera (PC, 1, 1)

Feb 12, 2026

Marine Monitoring Observation Form

Project Name:

SpaceX Prelaunch Surveys.

Location / Observation Station:

S. Eleuthera; down Cat Island landing area

Observer(s) (include time of switch if applicable):

Agnessa Lundy

Monitoring Effort

Start Time:

10:15AM took off

End Time:

Project Activities (In-Water)

Start Time:

End Time:

Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):

Environmental Conditions

Time:

10:25AM; 10:45AM (landing); 11:44am

Monitoring Conditions (1-10):

10; 10; 10

Weather (S/PC/OC/L/R/F/LS/SN):

S; 1; S; S

Light (1/2/3):

1; 1; 1; 1

Beaufort Sea State (0-4):

2; 2; 1

Visibility (m):

Glare (%):

0; 25-50%; 0

Notes:

Daily Total Marine Mammal Count

Species Observed:

Number of Groups:

Total Number of Animals:

Additional Notes:

Several Cruise ships in the area that would be outlined in the NOTMAR. Disney, Carnival, other, Sailboats too.

QA/QC Verification

QA/QC Initials:

Galathea

Date:

- 4 miles off of the perimeter of the hexagon.
- 2.5 miles turns around all the points
- 10:35AM reduced altitude bc of glare 1500ft.
- 2 sailboats in the hexagon.

11:44AM @ North Cat Island.

19:39 east coast of Rock Sound 25-500 ft S, 2800 ft

noon - South Cat Island north sunny & clear, no mammals

10:34 - no glare sunny calm sea - leaving Cat Island

Marine Monitoring Observation Form	
Project Name:	Space X Prelaunch S. Eleuthera; Exuma Cays
Location / Observation Station:	Landing Zone
Observer(s) (include time of switch if applicable):	Agnessa Lundy
Monitoring Effort	
Start Time:	2:50pm
End Time:	3:20pm 4pm
Project Activities (In-Water)	
Start Time:	
End Time:	
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	monitoring deploying ROV & hydrophone
Environmental Conditions	
Time:	3pm; 3:30; 4pm
Monitoring Conditions (1-10):	10; 9; 10
Weather (S/PC/OC/L/R/F/LS/SN):	PC; PC; PC
Light (1/2/3):	1; 1; 1
Beaufort Sea State (0-4):	1; 1; 1
Visibility (m):	1; 1; 1
Glare (%):	10%; 0; 0
Notes:	
Daily Total Marine Mammal Count	
Species Observed:	1 unknown observed blow by Pipe Cay, n.e. rock LOL
Number of Groups:	
Total Number of Animals:	0
Additional Notes:	1500ft alt
QA/QC Verification	
QA/QC Initials:	Dr. Will Galt
Date:	Feb 13, 2026

→ 4:45pm moving across the Exuma Sound - over landing area
 → PC, no waves, 3 mile turns based on visibility,
 → 1 1/2 miles north of northern markers is photo w/ sun reflection &
 2 miles to go to the other side of the Sound.

Marine Monitoring Observation Form	
Project Name:	Space X over landing 3 South of landing
Location / Observation Station:	Aerial Survey
Observer(s) (include time of switch if applicable):	Agnessa Lundy
Monitoring Effort	
Start Time:	9:56am
End Time:	
Project Activities (In-Water)	
Start Time:	
End Time:	
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	Monitoring vessel deploying sound equipments and collecting data.
Environmental Conditions	
Time:	10:10am - 10:40am ; 11:10am ; 12 noon
Monitoring Conditions (1-10):	10 ; 10 ; 10 ; 10
Weather (S/PC/OC/L/R/F/LS/SN):	PC ; PC ; PC ; PC
Light (1/2/3):	1 ; 1 ; 1 ; 1
Beaufort Sea State (0-4):	2/3 ; 2 ; 2 ; 2
Visibility (m):	4 miles
Glare (%):	15-20% away from Rock but 0 in the Sound at 1500ft
Notes:	circled boat at 104 to see if soundtrap would pick it up at 12ish.
Daily Total Marine Mammal Count	
Species Observed:	1 dolphin see location pin
Number of Groups:	1
Total Number of Animals:	
Additional Notes:	10 knot tail wind
QA/QC Verification	
QA/QC Initials:	Jubal McCut
Date:	Feb 14, 2026

10:10 circled the boat to at 1,000ft to get air sound of plane making 3 mile per wide turns.
a lot of cloud shadows @ 11am. headed east over Sound to Exuma Cays.

Austin
named
the new
pilot.

knots
17 knots
to 35
knots in
a few
miles at
the same
altitude.

Marine Monitoring Observation Form	
Project Name:	Space X Aerial Survey
Location / Observation Station:	LZ, landing area, Schooner Schooner Cays
Observer(s) (include time of switch if applicable):	Agnessa Lundy
Monitoring Effort	
Start Time:	9:51 am.
End Time:	
Project Activities (In-Water)	
Start Time:	9:51 ; 10:00 ; 10:42 ; 11:03 ; 11:35
End Time:	
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	Only aerial surveys - no marine/TPS due to weather.
Environmental Conditions	
Time:	
Monitoring Conditions (1-10):	4
Weather (S/PC/OC/L/R/F/LS/SN):	PC - throughout
Light (1/2/3):	1
Beaufort Sea State (0-4):	3; but by LZ in South Ex. Sound 1; 2; 1 @ 11:45
Visibility (m):	2 miles
Glare (%):	0
Notes:	Wind conditions variable based on Sound location
Daily Total Marine Mammal Count	
Species Observed:	0 11:35 1 Beaufort; @ 2000ft+ altitude.
Number of Groups:	
Total Number of Animals:	
Additional Notes:	clouds lower than other days;
Is the glare shadowing the white caps? By the way no white caps, but in the rear of the plane white caps. So was it 0 glare when I wrote 0% glare?	
QA/QC Verification	
QA/QC Initials:	Jabulile
Date:	Feb 16 2026

LZ = 24.
10:45am
northern track of
drift up route headed
to northern Exuma
Sound LHA.

76.095 W

11:03am no
glare Beaufort (1)

→ 10am, 6 miles from the
fairing zone marker 2000ft+
→ 10:42 over landing
1500ft+

Marine Monitoring Observation Form

Project Name:		SpaceX Post Landing Aerial Survey			
Location / Observation Station:					
Observer(s) (include time of switch if applicable):		Agnessa Lundy Franchesca Palomino			
Monitoring Effort					
Start Time:		11:07 am			
End Time:		12:42 end.			
Project Activities (In-Water)					
Start Time:		11:07	11:37	12:06	12:36
End Time:					
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):		monitoring only			
Environmental Conditions					
Time:		11:07	11:37	12:06	12:36
Monitoring Conditions (1-10):		10	10	10	10
Weather (S/PC/OC/L/R/F/LS/SN):		S	S	S	S
Light (1/2/3):		1	1	1	1
Beaufort Sea State (0-4):		0	0	0	0
Visibility (m):		~4 miles	~4 miles	? ~2 1/2 - 3 miles	4 miles
Glare (%):		0%	0%	0%	0%
Notes:		Several sailboats along Eleuthera west coast 12:06 cut over fairing LZ to head to Cat Island coast			
Daily Total Marine Mammal Count					
Species Observed:		Ø			
Number of Groups:		Ø			
Total Number of Animals:		Ø			
Additional Notes:		@ 1500ft altitude for the full flight 12:34 over Half Moon Cay headed back to RSD			
QA/QC Verification					
QA/QC Initials:		Duke Little Code			
Date:		Feb 25, 2026			

Marine Monitoring Observation Form

Project Name:

SpaceX Post Landing Aerial Survey

Location / Observation Station:

Western Eleuthera, Schooner Cay, Exuma Cay - Cat Island.

Observer(s) (include time of switch if applicable):

Agnessa Lundy
Jeffrey Webb (ACT)

Monitoring Effort

Start Time:

10:00am

End Time:

11:40am

Project Activities (In-Water)

Start Time:

10am - 10:30

End Time:

11:35am

Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):

Monitoring Aerial & Marine

condition change

Environmental Conditions

Time:

10am; 10:30; 10:45; 11am; 11:25am

Monitoring Conditions (1-10):

10; 10; 10; 10; 10

Weather (S/PC/OC/L/R/F/LS/SN):

PC; PC; OC; PC;

Light (1/2/3):

1; 1; 1; 1; 1

Beaufort Sea State (0-4):

1; 1; 2-3; 3;

Visibility (m):

~3miles; 4.5miles; 5miles; 5miles;

Glare (%):

0% 5% 10% 10%

Notes:

@ 1500ft altitude; 1100ft @ Env. Hdb.; 1500ft;
10:45 1100ft

Daily Total Marine Mammal Count

Species Observed:

Number of Groups:

Total Number of Animals:

Additional Notes:

11:25 approaching Half Moon Cay @ 1100ft

QA/QC Verification

QA/QC Initials:

Jeffrey Webb

Date: Feb 26, 2016

N50068
Lundy
Agnessa
Hester

Marine Monitoring Observation Form

Project Name:	Space X Falcon 9 Landing 2
Location / Observation Station:	Aerial Surveys from RSD
Observer(s) (include time of switch if applicable):	McGilton Deneritte, Kelli Armstrong Bobby "BJ" Kirby (Pilot)
Monitoring Effort	
Start Time:	9:26 am taxiing along RSD runway
End Time:	11:29 am " " " "
Project Activities (In-Water)	
Start Time:	9:25 am over water
End Time:	11:40 am over land
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	terrestrial surveys marine surveys, deploying ROV & hydrophone
Environmental Conditions	
Time:	9:30 am; 9:56 am; 11:29 am
Monitoring Conditions (1-10):	↑ S, PC; 10; 10;
Weather (S/PC/OC/L/R/F/LS/SN):	↓ 10; S, PC; S, PC;
Light (1/2/3):	1; 1; 1
Beaufort Sea State (0-4):	1; 2; 1 1/2
Visibility (m):	unrestricted, 10mi; " ; "
Glare (%):	15%; " ; "
Notes:	
winds	10 kts; 9 kts; 6 kts
Daily Total Marine Mammal Count	
Species Observed:	0
Number of Groups:	
Total Number of Animals:	
Additional Notes:	
9:56 am over boat but not recording sound in landing area over most S MSP point in grid; quite a bit of sea mist ("marine fog") (pinkish in colour) also impacting visibility in some areas	
QA/QC Verification	
QA/QC Initials:	<i>[Signature]</i>
Date:	Tu. 17 February 2026

* flight aware.com for flight track, altitudes, speeds, takeoff, landings, etc.

* went over landing area, along Emma Cays to failing landing area

* note 2 course ships at LHP (& HMC @ 11:27 am)

* note other large vessel offshore at Cat Island

* stream of sargassum observed along tidal channel lines offshore. considered while was at outis

Marine Monitoring Observation Form

Project Name:	SpaceX Falcon 9 Second Landing
Location / Observation Station:	Aerial Surveys
Observer(s) (include time of switch if applicable):	McCallum Dementie, Kelli Armstrong, Pilot Bobby "BJ" Kirby
Monitoring Effort	
Start Time:	9:34 am
End Time:	9:39 11:48 am
Project Activities (In-Water)	
Start Time:	9:39 am
End Time:	11:48 am
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	terrestrial surveys marine surveys; deploying ROV & hydrophone
Environmental Conditions	
Time:	9:41 am; 10:16 am; 11:23 am
Monitoring Conditions (1-10):	9, 10, 9, 9
Weather (S/PC/OC/L/R/F/LS/SN):	S, PC; S, OC; S, PC
Light (1/2/3):	1, 1, 1
Beaufort Sea State (0-4):	1, 1, 1
Visibility (m):	unrestricted 10 mi; 2 mi; 2 mi unrestricted
Glare (%):	15%; 50% 10%
Notes:	
Daily Total Marine Mammal Count	
Species Observed:	
Number of Groups:	
Total Number of Animals:	
Additional Notes:	* sea mist on ESB coast of FL and fog, heading S to Cat Island, east to Gumbo Cays, over landing area (boat) and back to RSD * photo 1 rain showers, 1 on south turn, one along Ex Cays
QA/QC Verification	
QA/QC Initials:	
Date:	We. 18 February 2026

Marine Monitoring Observation Form

Project Name:	SpaceX Bahamas Falcon 9 Landing 2
Location / Observation Station:	Aerial Surveys from RSD/MYER
Observer(s) (include time of switch if applicable):	McCallister Deneritte Kelli Armstrong, Pilot Austin Fields
Monitoring Effort	
Start Time:	9:26 am taxi for takeoff from RSD
End Time:	11:41 am taxi for landing at RSD
Project Activities (In-Water)	
Start Time:	9:35 am;
End Time:	11:38 am
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	terrestrial surveys marine surveys, deploying ROV & hydrophone
Environmental Conditions	
Time:	9:41 am, 10:11 am, 11:18
Monitoring Conditions (1-10):	9; 5; 9
Weather (S/PC/OC/L/R/F/LS/SN):	S, PC; OC; S, PC;
Light (1/2/3):	1; 1; 1;
Beaufort Sea State (0-4):	1; 1; 1;
Visibility (m):	2 mi unrestricted " ; "
Glare (%):	15%; 5%; 0%
Notes:	sea mist forming pink fog over water surface
Daily Total Marine Mammal Count	
Species Observed:	Ø
Number of Groups:	
Total Number of Animals:	
Additional Notes:	
QA/QC Verification	
QA/QC Initials:	<i>McCallister</i>
Date:	Th. 19 February 2026

R/O/Y
V/B/G

Marine Monitoring Observation Form

Project Name:	SpaceX Bahamas Falcon 9 Landing 2
Location / Observation Station:	Aerial Surveys of Exuma Sound
Observer(s) (include time of switch if applicable):	McCallum Derrahite Kelli Armstrong, Pilot Austin Fields
Monitoring Effort	
Start Time:	9:22 am taxiing from PSD
End Time:	9:57 " to "
Project Activities (In-Water)	#
Start Time:	9:31 am
End Time:	11:50 am
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	terrestrial surveys marine surveys, deploying ROV & hydrophone
Environmental Conditions	
Time:	9:42 am ; 10:43 am ; 11:25 am ;
Monitoring Conditions (1-10):	5, 8, 9, 5, 9
Weather (S/PC/OC/L/R/F/LS/SN):	S, PC, OC, L ; S, PC ;
Light (1/2/3):	1 ; 1 ; 1 ;
Beaufort Sea State (0-4):	1 ; 1 ; 1 ;
Visibility (m):	2 mi unrestricted ; 11 ; 11 ;
Glare (%):	15% ; 5% ; 15% but less bright than earlier
Notes:	
Daily Total Marine Mammal Count	
Species Observed:	0
Number of Groups:	
Total Number of Animals:	
Additional Notes:	
QA/QC Verification	
QA/QC Initials:	J. McCallum
Date:	Fr. 20 February 2026

* headed south along ^w coast of Eleuthera to firing landing zone, then north ^{coast} to rocket landing zone, then north ^w coast of Eleuthera towards ^E coast of Exuma Cays, back south towards ^{firing} long island and north ^w coast of Cat Island back to Eleuthera.

Marine Monitoring Observation Form

Project Name:	SpaceX Falcon Landing 2 in Exuma Sound				
Location / Observation Station:	Aerial Surveys from RSD via N306LM				
Observer(s) (include time of switch if applicable):	Kelli Armstrong, Pilot Austin Fields				
Monitoring Effort					
Start Time:	9:38am taxiing from RSD				
End Time:	11:56am " to "				
Project Activities (In-Water)					
Start Time:	9:46am				
End Time:	11:53am				
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	terrestrial surveys marine surveys, deploying ROV & hydrophone				
Environmental Conditions					
Time:	9:52am	10:15am	10:53am	11:26am	11:51am
Monitoring Conditions (1-10):	9	9	9	9	9
Weather (S/PC/OC/L/R/F/LS/SN):	S, PC	S, PC	S, PC	S, PC	S, PC
Light (1/2/3):	1	1	1	1	1
Beaufort Sea State (0-4):	1	1	1	1	1
Visibility (m):	2mi (wr)	2mi wr	2mi wr	2mi wr	2mi wr
Glare (%):	15%	15%	15%	15%	0%
Notes:	(wr) unrescribed	@ 1100 ft	"	"	"
Daily Total Marine Mammal Count					
Species Observed:	0				
Number of Groups:					
Total Number of Animals:					
Additional Notes:					
QA/QC Verification					
QA/QC Initials:	<i>[Signature]</i>				
Date:	21. Feb February 2026				

* maintaining elevation @ 1100ft to avoid interference (minimal) with sinus stock

Marine Monitoring Observation Form

Project Name:

SpaceX Behrman Falcon 9 Landing 2

Location / Observation Station:

Aerial Surveys from NS0068 & Exuma Sound

Observer(s) (include time of switch if applicable):

Kelli Armstrong, Pilot Austin Fields

Monitoring Effort

Start Time:

9:20 am fixing from RSD

End Time:

11:04 am " to "

Project Activities (In-Water)

Start Time:

9:25 am

End Time:

11:01 am

Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):

terrestrial surveys only,
too windy for marine surveys

Environmental Conditions

Time:

9:39 am

10:02 am

10:25 am

10:58 am

Monitoring Conditions (1-10):

8

9

8

9

Weather (S/PC/OC/L/R/F/LS/SN):

S, PC

S, PC

PC

S, PC

Light (1/2/3):

1

1

1

1

Beaufort Sea State (0-4):

1

2

2

1

Visibility (m):

2 mi (wr)

2 mi (wr)

2 mi (wr)

2 mi (wr)

Glare (%):

15%

15%

5%

15%

Notes:

Daily Total Marine Mammal Count

Species Observed:

0

Number of Groups:

Total Number of Animals:

Additional Notes:

QA/QC Verification

QA/QC Initials:

[Signature]

Date:

Tu. 24 February 2016

* lots of turbidity plumes along W coast of Eleuthera

Marine Monitoring Observation Form	
Project Name:	Space X Booster Landing
Location / Observation Station:	Catamaran; Landing Point 5 points
Observer(s) (include time of switch if applicable):	Mark Daniels Gabrielle Collie
Monitoring Effort	
Start Time:	10:15am
End Time:	5:00pm
Project Activities (In-Water)	
Start Time:	10:15 am
End Time:	5:00 pm
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	Hydrophones ROV deployed Himba
Environmental Conditions	
Time:	10:15 am
Monitoring Conditions (1-10):	5
Weather (S/PC/OC/L/R/F/LS/SN):	OC
Light (1/2/3):	1
Beaufort Sea State (0-4):	3
Visibility (m):	~20-40 meters
Glare (%):	15%
Notes:	monitoring effort began @ Low tide
Daily Total Marine Mammal Count	
Species Observed:	~3 spotted dolphins
Number of Groups:	1
Total Number of Animals:	3
Additional Notes:	observed traveling along side boat (starboard) wave riding
QA/QC Verification	
QA/QC Initials:	Blundy
Date:	Feb. 10, 2026

Landing, Point 1, Point 5, Point 3

Marine Monitoring Observation Form	
Project Name:	Space X Booster Landing
Location / Observation Station:	Point 3 / 24° 30' 27" N 76° 25' 28" W
Observer(s) (include time of switch if applicable):	Mark Daniels Gabrielle Collie
Monitoring Effort	
Start Time:	7:52 AM
End Time:	
Project Activities (In-Water)	
Start Time:	2:27 pm
End Time:	3:00 pm
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	Hydrophone & ROV deployed Heribor,
Environmental Conditions	
Time:	2:27 pm
Monitoring Conditions (1-10):	10
Weather (S/PC/OC/L/R/F/LS/SN):	S, PC
Light (1/2/3):	1
Beaufort Sea State (0-4):	0, 1
Visibility (m):	~20 - 40m
Glare (%):	0
Notes:	calm seas
Daily Total Marine Mammal Count	
Species Observed:	Atlantic Spotted Dolphin AK
Number of Groups:	2 (Marine Mammal & Bird)
Total Number of Animals:	4
Additional Notes:	3 dolphins observed (1 Atlantic Spotted Dolphin; the others unknown) The unknown dolphins were Adult & juvenile. 1 Frigatebird
QA/QC Verification	
QA/QC Initials:	Agnessa Lundy
Date:	Feb 11, 2026

Dolphins were curious; swam near vessel slowly.

Marine Monitoring Observation Form	
Project Name:	Space X Booster Landing
Location / Observation Station:	Landing, Points 4, 6 & 2
Observer(s) (include time of switch if applicable):	Gracienne Collier & Mark Daniels
Monitoring Effort	
Start Time:	7:27 am
End Time:	4:00 pm
Project Activities (In-Water)	
Start Time:	7:27 am
End Time:	4:00 pm
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	Hydrophon & ROV deployed, Horiba, soundmeter on vessel to capture plane noise/sounds.
Environmental Conditions	
Time:	7:27 am
Monitoring Conditions (1-10):	10
Weather (S/PC/OC/L/R/F/LS/SN):	(S); (PC)
Light (1/2/3):	1
Beaufort Sea State (0-4):	1
Visibility (m):	~20 meters.
Glare (%):	~15% - 25%
Notes:	
Daily Total Marine Mammal Count	
Species Observed:	No marine Mammals observed
Number of Groups:	2 (fish; plankton)
Total Number of Animals:	1 ocean triggerfish; zooplankton 4 flying fish
Additional Notes:	
QA/QC Verification	
QA/QC Initials:	<i>[Signature]</i>
Date:	Feb 12, 2026

Marine Monitoring Observation Form	
Project Name:	Space X Booster Landing
Location / Observation Station:	Landing Points 5, 1 & 3.
Observer(s) (include time of switch if applicable):	Gabrielle Collie Mark Daniels
Monitoring Effort	
Start Time:	7:27am
End Time:	3:21pm
Project Activities (In-Water)	
Start Time:	7:27am
End Time:	3:21pm
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	Hariba, Hydrophone, & ROV deployed
Environmental Conditions	
Time:	7:27am
Monitoring Conditions (1-10):	5
Weather (S/PC/OC/L/R/F/LS/SN):	S
Light (1/2/3):	1
Beaufort Sea State (0-4):	4
Visibility (m):	~20 miles
Glare (%):	0%
Notes:	vessel drifted further from points much faster than previous days; capt continued to reposition vessel
Daily Total Marine Mammal Count	
Species Observed:	2 Frigate birds
Number of Groups:	1 Bird
Total Number of Animals:	2
Additional Notes:	observed circling an area ~500ft ^{South} stem
QA/QC Verification	
QA/QC Initials:	<i>Alundy</i>
Date:	Feb. 13, 2026

Marine Monitoring Observation Form	
Project Name:	Space X Booster Landing
Location / Observation Station:	Landing, Points 6, 4 & 2
Observer(s) (include time of switch if applicable):	Gabriella Callie & Mark Daniels
Monitoring Effort	
Start Time:	7:14am
End Time:	pm
Project Activities (In-Water)	
Start Time:	7:14am
End Time:	pm
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	Heriba, Hydrophone, Rax deployed
Environmental Conditions	
Time:	7:14 am
Monitoring Conditions (1-10):	5
Weather (S/PC/OC/L/R/F/LS/SN):	S
Light (1/2/3):	1
Beaufort Sea State (0-4):	4
Visibility (m):	~20 meters
Glare (%):	15% 15 - 20%
Notes:	
Daily Total Marine Mammal Count	
Species Observed:	1 Squid 5 Atlantic Pearlsides No marine mammals
Number of Groups:	2
Total Number of Animals:	6
Additional Notes:	Atlantic Pearlsides observed at Points ~150ft deep 2, 4 & 6. Squid at Point 6. ~189ft deep.
QA/QC Verification	
QA/QC Initials:	Mundy
Date:	Feb. 14, 2026

Marine Monitoring Observation Form	
Project Name:	Space X Booster Landing
Location / Observation Station:	N/A
Observer(s) (include time of switch if applicable):	Mark Daniels & Gabrielle Collier
Monitoring Effort	
Start Time:	7:03 am
End Time:	N/A
Project Activities (In-Water)	
Start Time:	N/A
End Time:	N/A
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	
Environmental Conditions	
Time:	N/A
Monitoring Conditions (1-10):	1
Weather (S/PC/OC/L/R/F/LS/SN):	OC (OC) (PC) (S)
Light (1/2/3):	1
Beaufort Sea State (0-4):	74
Visibility (m):	N/A
Glare (%):	N/A
Notes:	OC Confirmation from captain ① 7:03 am that wave activity too severe for monitoring. Rough seas
Daily Total Marine Mammal Count	
Species Observed:	Ø
Number of Groups:	Ø
Total Number of Animals:	Ø
Additional Notes:	Poor monitoring conditions due to weather; unsafe for marine vessel transport.
QA/QC Verification	
QA/QC Initials:	Handy
Date:	Feb 15, 2026

Marine Monitoring Observation Form

Project Name:	Space X Booster Landing
Location / Observation Station:	N/A
Observer(s) (include time of switch if applicable):	Gabrielle Collier Mark Daniels
Monitoring Effort	
Start Time:	7:01 AM
End Time:	N/A
Project Activities (In-Water)	
Start Time:	N/A
End Time:	N/A
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	N/A
Environmental Conditions	
Time:	N/A
Monitoring Conditions (1-10):	1
Weather (S/PC/OC/L/R/F/LS/SN):	(OC) (PC) (S)
Light (1/2/3):	1
Beaufort Sea State (0-4):	74
Visibility (m):	N/A
Glare (%):	N/A
Notes:	confirmation from captain @ 7:01 AM that it is too windy to conduct monitoring efforts today.
Daily Total Marine Mammal Count	
Species Observed:	Ø
Number of Groups:	Ø
Total Number of Animals:	Ø
Additional Notes:	Poor monitoring conditions due to weather, unsafe for vessel transport
QA/QC Verification	
QA/QC Initials:	<i>[Signature]</i>
Date:	Feb. 16, 2026

Marine Monitoring Observation Form				
Project Name:	Space X			
Location / Observation Station:	Fels 17 2026			
Observer(s) (include time of switch if applicable):	Francisco Mark			
Monitoring Effort				
Start Time:	9:10 - 10:00	10:33	11:40	12:45
End Time:	10:00	11:00	12:10	1:15
Project Activities (In-Water)				
Start Time:				
End Time:				
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):				
Environmental Conditions				
Time:	9:10	10:33	11:47	12:45
Monitoring Conditions (1-10):	8	9	9	9
Weather (S/PC/OC/L/R/F/LS/SN):	PC	S	S	S
Light (1/2/3):	1	1	1	1
Beaufort Sea State (0-4):	2	1	1	1
Visibility (m): 70	70			
Glare (%):	25%	20%	10%	5%
Notes:				
Daily Total Marine Mammal Count				
Species Observed:	NA			
Number of Groups:				
Total Number of Animals:				
Additional Notes:				
QA/QC Verification				
QA/QC Initials:	[Signature]			
Date:	Fels 17 2026			

Marine Monitoring Observation Form			
Project Name:	SPARX		
Location / Observation Station:	Feb 18 2020		
Observer(s) (include time of switch if applicable):	Fremduson Adamino Mark Daniels		
Monitoring Effort			
Start Time:	9:30	10:20	11:14
End Time:	10:00	10:35	11:30
Project Activities (In-Water)			
Start Time:			
End Time:			
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	ROV Hydrophone		
Environmental Conditions			
Time:	9:30	10:20	11:14
Monitoring Conditions (1-10):	5		4
Weather (S/PC/OC/L/R/F/LS/SN):	PC	PC	PC
Light (1/2/3):	1	1	1
Beaufort Sea State (0-4):	4	4	4
Visibility (m):			
Glare (%):	25	10	10
Notes:			
Daily Total Marine Mammal Count			
Species Observed:	Anderson Shearwater Masked Booby		
Number of Groups:	1, 1 single birds.		
Total Number of Animals:			
Additional Notes:	8:49 booby 8:24 Anderson		
QA/QC Verification			
QA/QC Initials:	Jalulhasek		
Date:	Feb 18 2020		

Marine Monitoring Observation Form	
Project Name:	Space X
Location / Observation Station:	Feb 19 2026
Observer(s) (include time of switch if applicable):	Francesca Palomino Mark Daniels
Monitoring Effort	
Start Time:	4:47 7:43
End Time:	10:00 8:30
Project Activities (In-Water)	
Start Time:	
End Time:	
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	
Environmental Conditions	
Time:	4:47 7:43
Monitoring Conditions (1-10):	7 8
Weather (S/PC/OC/L/R/F/LS/SN):	PC PC
Light (1/2/3):	1
Beaufort Sea State (0-4):	3 1
Visibility (m):	dark
Glare (%):	50% 0
Notes:	night time.
Daily Total Marine Mammal Count	
Species Observed:	Anderson Shearwater.
Number of Groups:	
Total Number of Animals:	
Additional Notes:	This was the day of the launch. We couldn't home any dove came print in the day. We went out during the evening for the landing which was at night and too dark from spotting.
QA/QC Verification	
QA/QC Initials:	<i>[Signature]</i>
Date:	Feb 19 2026

Marine Monitoring Observation Form				
Project Name:	Shree X			
Location / Observation Station:	Seawards			
Observer(s) (include time of switch if applicable):	Francesca Monk			
Monitoring Effort				
Start Time:	Punching	Points	Points	Point 1
End Time:	9:30	10:33	11:38	12:35
	10:04	10:55	11:55	12:48
Project Activities (In-Water)				
Start Time:				
End Time:				
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	underwater ROV hydrophone deployment			
Environmental Conditions				
Time:	9:30	10:33	11:38	12:35
Monitoring Conditions (1-10):	7	7	6	8
Weather (S/PC/OC/L/R/F/LS/SN):	PC	PC	PC	PC
Light (1/2/3):	1	1	1	1
Beaufort Sea State (0-4):	3	3	3	3
Visibility (m):				
Glare (%):	5	5	10	10
Notes:	8	ste	10	
Daily Total Marine Mammal Count				
Species Observed:	anderson shearwater manta ray			
Number of Groups:				
Total Number of Animals:	1 1			
Additional Notes:				
QA/QC Verification				
QA/QC Initials:	Subtract			
Date:	Feb 20 2024 Feb 21 2024			

Marine Monitoring Observation Form				
Project Name:	Space X			
Location / Observation Station:	Sewards			
Observer(s) (include time of switch if applicable):	Francesca Palomiro			
Monitoring Effort				
Start Time:	9:28	10:26	11:15	12:15
End Time:	10:00	10:40	11:25	12:25
Project Activities (In-Water)				
Start Time:	9:30			
End Time:				
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):				
Environmental Conditions				
Time:	Point 1	Point 4	Point 6	Point 2
Monitoring Conditions (1-10):	7	8	8	8
Weather (S/PC/OC/L/R/F/LS/SN):	PC	PC	PC	PC
Light (1/2/3):	1	1	1	1
Beaufort Sea State (0-4):	3	3	3	3
Visibility (m):				
Glare (%):	5%	8	10	15
Notes:				
Daily Total Marine Mammal Count				
Species Observed:				
Number of Groups:				
Total Number of Animals:				
Additional Notes:				
QA/QC Verification				
QA/QC Initials:	[Signature]			
Date:	Feb 21 2020			

Marine Monitoring Observation Form				
Project Name:		SFBile Y		
Location / Observation Station:		Seawards		
Observer(s) (include time of switch if applicable):		Francisca Pacheco		
Monitoring Effort		landing		
Start Time:		9:25		
End Time:				
Project Activities (In-Water)		landing	Point 2	Point 3
Start Time:		9:20	10:30	11:30
End Time:		9:50	10:30	11:52
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):		ROV Hydrophone		
Environmental Conditions				
Time:		9:25	10:30	11:30
Monitoring Conditions (1-10):		8	8	8
Weather (S/PC/OC/L/R/F/LS/SN):		PC	PC	PC
Light (1/2/3):		1	1	1
Beaufort Sea State (0-4):		3	3	3
Visibility (m):				
Glare (%):		5	10	15
Notes:				
Daily Total Marine Mammal Count				
Species Observed:		Flying fish school of mahi		
Number of Groups:				
Total Number of Animals:				
Additional Notes:				
QA/QC Verification				
QA/QC Initials:		J. Sullivan		
Date:		Feb 22 2024		

Marine Monitoring Observation Form	
Project Name:	Spale X
Location / Observation Station:	N/A
Observer(s) (include time of switch if applicable):	Francesca Pahlmho Mark Daniels
Monitoring Effort	
Start Time:	6:06 am
End Time:	N/A
Project Activities (In-Water)	
Start Time:	N/A
End Time:	N/A
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	
Environmental Conditions	
Time:	N/A
Monitoring Conditions (1-10):	
Weather (S/PC/OC/L/R/F/LS/SN):	PC
Light (1/2/3):	1
Beaufort Sea State (0-4):	4
Visibility (m):	N/A
Glare (%):	N/A
Notes:	Goat confirmed no boat day due to weather.
Daily Total Marine Mammal Count	
Species Observed:	
Number of Groups:	
Total Number of Animals:	
Additional Notes:	No boat day due to weather conditions.
QA/QC Verification	
QA/QC Initials:	
Date:	Feb 23, 2024

Marine Monitoring Observation Form	
Project Name:	SPace X
Location / Observation Station:	
Observer(s) (include time of switch if applicable):	Francesca Palumiro
Monitoring Effort	
Start Time:	6:46 am.
End Time:	N/A
Project Activities (In-Water)	
Start Time:	
End Time:	
Type of Activity (e.g., soft-start, pile installation, dredging, vessel activity, etc.):	
Environmental Conditions	
Time:	N/A
Monitoring Conditions (1-10):	N/A
Weather (S/PC/OC/L/R/F/LS/SN):	S
Light (1/2/3):	1
Beaufort Sea State (0-4):	4
Visibility (m):	N/A
Glare (%):	N/A
Notes:	N/A
Daily Total Marine Mammal Count	
Species Observed:	
Number of Groups:	
Total Number of Animals:	
Additional Notes:	No boat day due to weather.
QA/QC Verification	
QA/QC Initials:	
Date:	February 24, 2016



8.3 APPENDIX C – IN-AIR AND IN-WATER SOUND MEASUREMENT MONITORING REPORT



In-Air and In-Water Sound Measurement Monitoring Report for SpaceX Starlink G10-36 Mission on 19 February 2026 at Exuma Sound, Bahamas



23 March 2026

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Acronyms and Abbreviations

μPa	micropascal
dB	decibel
Hz	Hertz
INJ	auditory injury
kHz	kilohertz
L90	90 th percentile exceedance level
lb	pound(s)
LZeq	equivalent continuous sound level with Z-weighting
LZmax	unweighted time-weighted maximum sound level
LZpeak	unweighted instantaneous maximum peak sound level
m	meter(s)
MSRS	ManTech SRS Technologies, Inc.
NM	nautical mile(s)
NMFS	National Marine Fisheries Service
Pa	Pascal
psf	pounds per square foot
SEL	sound exposure level
SLM	sound level meter
SPL	sound pressure level
ST400HF	Ocean Instruments SoundTrap 400 High Frequency
TTS	temporary threshold shift

1.0 Introduction

On 19 February 2026, SpaceX successfully conducted its second Landing of a Falcon 9 first-stage booster in the Exuma Sound, Bahamas on the autonomous dronship “Just Read the Instructions”. This followed the previous and first international landing on 18 February 2025, which established the region as a strategic recovery zone for Falcon 9 first-stage boosters.

The physical oceanography of the Exuma Sound makes it a biological hotspot and complex acoustic environment. It is a deep-water basin of the ocean, characterized by a dramatic bathymetric profile that drops precipitously from the shallow carbonate banks of the Exuma Cays to depths exceeding 1,500 meters (m) (Shipley et al., 2024). The geometry creates a unique semi-enclosed basin that traps and reflects underwater sound, effectively acting as a natural resonator for low-frequency noise like vessel thrusters, seismic activity, and potentially sonic booms (Shipley et al., 2024). Furthermore, the steep continental slopes provide essential upwelling zones that support a high density of deep-diving organisms, which explains the year-round presence of sensitive species like the Blainville’s beaked whale (Shipley et al., 2024). Table 1-1 is included for general presence and vocalization frequency of marine mammals of the Exuma Sound, Table 1-2 shows classification of hearing groups, and Table 1-3 provides the temporary threshold shift (TTS) and auditory injury (INJ) thresholds for those hearing groups provided by the National Marine Fisheries Service (NMFS) on the 2024 Update to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0).

Post-mission analysis of the February 2025 landing identified two primary areas of concern that necessitated a more rigorous acoustic monitoring protocol for subsequent events.

- 1) **Mechanical Noise Interference:** Preliminary data from the first landing indicated a high level of low frequency “masking” which was largely attributed to the vessel of use at that time, which obscured the target acoustic signature of the descent boom.
- 2) **Biological Impact Concerns:** The Exuma Sound is a vital habitat for deep diving odontocetes and various dolphin species. The intensity of the sonic booms and sustained machinery noise led to concerns from the Bahamian Department for Environmental Planning and Protection regarding behavioral disruption and potential for “Level B” harassment under international marine mammal protection standards.

The primary objective of this second monitoring campaign was to quantify the acoustic transition from air to water with greater precision and isolate the landing boom and landing noise from vessel noise. By deploying an array of Class 1 Sound Level Meters (SLM) in-air and in-water along with a deep water SoundTrap (Ocean Instruments NZ; a self-contained, high-fidelity passive acoustic monitoring device used to detect and record cetacean sounds), this study sought to:

- Establish an acoustic gradient for Falcon 9 in the air-water interaction
- Mitigate self-noise
- Monitor high-frequency and low-frequency bioacoustics

Table 1-1. Marine mammal Species Presence in Exuma Sound, Bahamas

Species	Primary Exuma Habitat	Vocalization Types	Frequency Range	Likelihood of Sighting
Bottlenose Dolphin	Shallow banks and coastal waters	Whistles, burst-pulses, and echolocation clicks	Whistles: 0.2 to 24 kHz Clicks: 0.2 to 150 kHz	High: Resident to the area.
Atlantic Spotted Dolphin	Shallow banks and reef edges	Whistles and high-speed echolocation clicks	Whistles: 1.3 to 29 kHz Clicks: Up to 130+ kHz	High: Very common residents.
Sperm Whale	Deep pelagic waters (Exuma Sound)	Clicks	20 Hz to 24 kHz (often peaking around 15 kHz)	Moderate: They live in the deep trenches year-round.
Humpback Whale	Migratory (passing through deeper waters)	Complex songs, moans, and grunts	20 Hz to 10 kHz	Seasonal / Low: Only present during their winter/spring migration (January - April).
Beaked Whales (e.g., Blainville's)	Deep "twilight zone" (Exuma Sound)	Highly specialized echolocation clicks	20 kHz to 60+ kHz	Low: Though they live in the deep Sound.
West Indian Manatee	Mangrove creeks, marinas, and shallow coastal	Squeaks, chirps, and squeals	2 kHz to 5 kHz (rarely up to 10 kHz)	Very Rare: A few individuals are known to wander through Exuma marinas.

Table 1-2. Marine Mammal Hearing Groups

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 36+ kHz
High-frequency (HF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
Very High-frequency (VHF) cetaceans (true porpoises, Kogia, river dolphins, cephalorhynchid, Lagenorhynchus cruciger & L. australis)	200 Hz to 165 kHz
Sirenians (SI) manatees and dugongs	250 Hz to 90.5 kHz

Table 1-3. TTS/INJ Thresholds per Hearing Classification*

Group	Non-impulsive TTS thresholdSEL (weighted)	Non-impulsive INJ thresholdSEL (weighted)	Impulsive TTS thresholdSEL (weighted)	Impulsive TTS thresholdpeak SPL (unweighted)	Impulsive INJ thresholdSEL (weighted)	Impulsive INJ thresholdpeak SPL (unweighted)
LF	177	197	168	216	183	222
HF	181	201	178	224	193	230
VHF	161	181	144	196	159	202
SI	180	200	171	219	186	225

*SEL thresholds are in dB re 1 $\mu\text{Pa}^2\text{s}$. Peak SPL thresholds are in dB re 1 μPa underwater. Non-impulsive (blue) values pertain to continuous, or longer-duration sounds without a sudden peak. Impulsive (green) values pertain to sounds with a very rapid onset and high peak pressure.

2.0 Methods

2.1 In-Air Sound Level Metering

Acoustic data were collected using an array of three Larson Davis 831c Class 1 SLMs fitted with PCB Piezotronic 377A12 microphones (Figure 2-1). These units were deployed across three geographical regions to capture spatial variation in the sound field following the landing on the autonomous droneship:

- Two units, located at Eastern Nassau and Cape Eleuthera, were placed on land to measure the intensity of the landing boom.
- One unit was deployed at sea to capture localized acoustics from a monitoring vessel approximately 10.7 nautical miles (NM) northeast of the droneship dictated by the edge of the hazard zone.



Figure 2-1. Calibration of Larson Davis 831C Sound Level Meters on Monitoring Vessel

The PCB Piezotronic 377A12 microphones are high-sensitivity $\frac{1}{4}$ " microphones typically used for low-frequency noise during environmental monitoring. Sampling occurred at 48 kilohertz (kHz) to reliably measure any impulse noise less than 24 kHz. Specifications for the in-air microphone are as follows in Table 2-1.

Table 2-1. Specifications for PCB Piezotronic 377A12

Specification	Value
Nominal Microphone Diameter	1/4"
Frequency Response Characteristic	Pressure
Open Circuit Sensitivity	0.25 mV/Pa
Open Circuit Sensitivity (± 3 dB)	-72 dB re 1 V/Pa
Frequency Range (± 2 dB)	4 to 20,000 Hz
Lower Limiting Frequency (-3 dB)	0.5 to 3.0 Hz
Resonant Frequency (90° Phase Shift)	48.9 kHz
Inherent Noise	<60 dB(A) re 20 μ Pa
Dynamic Range (3% Distortion Limit)	182 dB re 20 μ Pa
Max Sound Pressure Level (Peak)	>194 dB re 20 μ Pa
Operating Temperature Range	-40 to +120 °C (-40 to +248 °F)
Temp. Coefficient of Sensitivity	0.007 dB/°C (0.004 dB/°F)
Static Pressure Coefficient	-0.001 dB/kPa
Humidity Coefficient of Sensitivity	± 0.001 dB/%RH
Influence of Axial Vibration	72 dB re 20 μ Pa
Capacitance (Polarized)	4.6 pF
Polarization Voltage	0 V (Prepolarized)
Housing Material	Stainless Alloy
Venting	Rear
Mounting Thread (Preamplifier)	5.7 mm - 60 UNS (0.2244 - 60 UNS)
Mounting Thread (Grid)	6.35 mm - 60 UNS (0.25 - 60 UNS)
Size - Diameter (with grid)	7.0 mm (0.28 in)
Size - Height (with grid)	10.4 mm (0.41 in)
Weight	1.7 g (0.06 oz)

Microphones were fitted with windscreens and environmental protection housing (Larson Davis EPS2116) to mitigate pseudo-noise from wind turbulence. All microphones were calibrated before and after deployment using Larson Davis Cal 200 Precision Acoustic Calibrators 1000 hertz (Hz) at 114 decibels (dB) to ensure data integrity.

2.2 Hydrophone Sound Level Metering

In addition to the atmospheric measurements, underwater sound pressure levels (SPL) were monitored using a vertical hydrophone array. This system was designed to capture depth-dependent acoustic profiles while minimizing mechanical interference from surface motion, line strumming, and current-induced vibrations.

Teledyne Reson TC4013 miniature reference hydrophones were integrated with Larson Davis 831c Class 1 SLMs at each depth along a single vertical line along 3-m, 10-m, and 40-m depths. The line was hand deployed with ¼" double-braided polyester to limit stretching with service loops directly above each sensor to maintain a flexible, non-tensioned segment at each measurement point. To maintain a vertical profile and to keep the hydrophones at the desired depths weights were varied between 5 pounds (lbs) and 15 lbs, dynamically adjusted based on the variability of currents with a ¼" bungee attached to a surface float before the 3-m hydrophone. Specifications for the hydrophones are as follows in Table 2-2.

Table 2-2. Specifications for Teledyne Reson TC4013

Specification	Value
Usable Frequency Range	1 Hz to 170 kHz
Receive Sensitivity	-211 dB re 1 V/μPa
Transmit Sensitivity (at Resonance)	135 dB re 1 μPa/V
Directivity	Omnidirectional (to high frequencies)
Operating Depth Rating	700 m (2,296 ft)
Survival Depth	1,000 m (3,280 ft)
Operating Temperature Range	-2 to +80 °C (28 to 176 °F)
Storage Temperature Range	-40 to +80 °C (-40 to 176 °F)
Encapsulating Material	Special formulated NBR (Nitrile Rubber)
Cable Connection	Integrated Coax cable with BNC termination
Standard Cable Length	6 m (19.7 ft)
Outer Diameter (Max)	10 mm (0.39 in)
Length	63 mm (2.48 in)
Weight (in air)	75 g (2.65 oz)

For the 40-m deployment baseline dB levels were compared with shallower deployments to ensure the ceramic in the sensor remained stable under the increased four atmospheres at depth. Based on manufacturer specifications, sensitivity drift at this depth was found to be negligible and less than 0.5 dB.

Calibration was done with a G.R.A.S 42AA pistophone operating at 114.0 dB then compensating for the in-air to in-water conversion by adding 26.02 dB then adding on the k-value of the coupler (k=5.4) and lastly correcting for atmospheric conditions which, at the time of deployment, was negative 0.3 dB. This led to a calibration of 145.1 dB.

To establish a representative baseline for ambient ocean noise, two primary metrics were utilized: the equivalent continuous sound pressure level (LZeq) and the 90th percentile exceedance level (L90). While the LZeq provides a measure of the total acoustic energy recorded during each 30-minute survey, it is highly sensitive to outliers such as surface weather, biological bursts, and electrical noise. If the L90 and the LZeq differed by 5 dB the survey was deemed to have too much interference and the reading was not used to calculate a baseline. Similarly, if sensor readings from one depth differed by more than 5 dB in comparison to the other depths it was removed as well.

To average dB levels the logarithmic reading was first converted to linear values before averaged and converted back to the decibel logarithmic scale, following the equations below.

$$10^{\frac{L_i}{10}}$$
$$Average_Linear = \frac{1}{n} \sum_{i=1}^n 10^{\frac{L_i}{10}}$$
$$Average_dB = 10 \cdot \log_{10}(Average_Linear)$$

2.3 SoundTrap Deployment for Ecological Assessment

To monitor high frequency marine mammal activity at depth, a self-contained Ocean Instruments SoundTrap 400HF (ST400HF) recorder was deployed at 100 m. This depth was chosen to minimize surface noise interference and to place the sensor closer to foraging layers for deep diving odontocetes common to the Bahamas archipelago.

The ST400HF was configured with a sampling rate of 388 kHz. According to the Nyquist-Shannon Sampling Theorem, the maximum frequency that can be accurately reconstructed is half the sampling rate (194 kHz), which is well within the frequency range of local odontocetes within the region.

This high bandwidth was essential for capturing the full ultrasonic spectrum of odontocetes, whose primary energy resides between 20 kHz and 150 kHz. High gain setting was applied to the internal preamplifier to maximize the signal-to-noise ratio for low amplitude biological vocalizations.

At the 100-m depth, the ST400HF was integrated into a hand-deployed line with between 10 and 15-lb weights to maintain vertical stability and counter-act subsurface currents. The SoundTrap was attached onto an alpine butterfly loop with an additional line to limit transmitting mechanical friction noise directly to the SoundTrap housing.

Unlike the analog to digital-to-digital conversion chain of the Larson Davis 831c SLM, the SoundTrap utilizes a factory defined Full Scale Calibration value. To convert the recorded digital signal into SPLs (dB re 1 micropascal μPa) the following equation was used: $\text{SPL} = 20\log_{10}(\text{Root-mean-square of the digital audio waveform}) + \text{Calibration Value}_{\text{FS}}$, the specific Calibration Value_{FS} given by the factory for this unit was 174.60 dB re 1 μPa .

Before each deployment the calibration was checked using a G.R.A.S. 42AP pistophone with a 1" coupler, operating at 114 dB re 20 μPa and compared to the expected value of 136.6 dB re 20 μPa (140.02 dB re 20 μPa + negative k-value for the coupler). Specifications for the ST400HF are as follows in Table 2-3 and specifications for Larson Davis 831c SLM are in Table 2-4.

Table 2-3. Specifications for ST400HF

Specification	Value
Bandwidth ($\pm 3\text{dB}$)	20 Hz to 150 kHz
Self-Noise (above 2 kHz)	< 37 dB re 1 μPa
Self-Noise (100 Hz - 2 kHz)	Better than sea-state 0
Max Level Before Clipping	173 dB re 1 μPa
Sample Rates Supported	384, 192, 128, 96, 64, and 32 kHz
ADC Resolution	16-bit SAR
Calibration	Factory calibration certificate (single point 250 Hz)
Memory Capacity	Up to 2 TB (4 x 512GB removable SDXC slots)*
Battery Type	2 x Panasonic NCR18650B Lithium Ion (18650 cells)
Battery Life (Continuous)	Up to 14 days
Housing Material	Acetal
Maximum Depth Rating	200 m (656 ft)
Dimensions (Length x Diameter)	235 mm x 64 mm (9.25 in x 2.52 in)
Weight (in air)	650 g (22.9 oz) with 2 batteries loaded
Weight (in water)	50 g (1.76 oz) with 2 batteries loaded

Table 2-4. Specifications for Larson Davis 831c

Specification	Value
Standard Compliance	Class 1 (IEC 61672-1:2013, ANSI S1.4-2014)
Frequency Analysis (w/ 831C-OB3)	Real-time 1/1 and 1/3 octave bands (IEC 61260:2014, ANSI S1.11-2014 Class 1)
Dynamic Range	>120 dB
Frequency Weightings	A, C, and Z
Time Weightings	Slow, Fast, or Impulse
Sample Rate	51,200 Hz
Measurement Metrics	Leq, Lmax, Lmin, Lpeak, Ln (6 values), LDN, LDEN, LCEq – LAeq
Data Storage / Memory	2 GB non-volatile internal (expandable via USB)
Connectivity	Cellular (via gateway), WiFi, Ethernet, USB
Display	LCD Color Interface
Power Supply	4-AA cells (Lithium, NiMH, or Alkaline), USB (5V), or External I/O (10-25 VDC)
Operating Time (Internal Batteries)	>18 hours (1.5 V Lithium) / >8 hours (Alkaline or NiMH)
Operating Temperature	-30 to +60 °C (-22 to +140 °F)
Storage Temperature	-30 to +60 °C (-22 to +140 °F)
Humidity Range	10% to 99% RH (non-condensing)
Dimensions (Instrument Body Only)	22.4 x 7.1 x 4.1 cm (8.8 x 2.8 x 1.6 in)
Length (with Mic & Preamplifier)	29.0 cm (11.35 in)
Weight (Body + Batteries)	490 g (17.3 oz)
Weight (Full with Preamp & Mic)	532 g (18.8 oz)

All .wav files were analyzed using Raven Pro. Initially the entire sound files were opened to see any general patterns related to deployment interference or mechanical, physical or electrical artifacts. Broad unfiltered spectrographs are provided in Appendix A for reference to general trends and for easier reference.

Following data collection, each survey file was visually analyzed in 300-second windows across a frequency band of 20 kHz to 80 kHz. While this high-frequency range effectively captures local marine mammals, it excludes the lower-frequency vocalizations typical of some cosmopolitan large cetaceans (such as *Balaenoptera musculus*, *B. physalus*, *B. borealis*, and *B. acutorostrata*). However, *Megaptera novaeangliae* was the only species from this group expected to be present in the study area; because the upper limits of *M. novaeangliae* vocalizations can extend between 20 kHz and 24 kHz, this bandwidth was deemed sufficient for their detection. Finally, to account for variations in deployment quality, spectrogram contrast and brightness were adjusted to optimize the signal-to-noise ratio and ensure the clearest possible data visualization.

2.4 Application of Methods

The study area for in-water acoustic measurements consisted of six peripheral numbered monitoring stations arranged in a hexagonal pattern around the dronship to capture variation in bioacoustic noise around the landing site. Figure 2-2 shows the location and orientation of monitoring stations (numbered 1-6) around the landing area.

Acoustic data collection was divided into three phases: pre-launch, landing, and post-launch monitoring. During standard monitoring days the landing site was surveyed for 30 minutes followed by 30-minute surveys at three alternating peripheral monitoring stations. To ensure equal spatial coverage monitoring stations were rotated daily between even (#2, #4, #6) and odd (#1, #3, #5). On the last day of the pre-and-post launch monitoring the numbered sites were omitted to spend a greater amount of time monitoring the landing location.

ST400HF was used to monitor bioacoustics for the entirety of the post-launch monitoring and due to the ST400HF not being available for the first three days of monitoring, a combination of the ST400HF and Larson Davis hydrophones were used in the pre-launch and day of launch monitoring.

For the day of launch monitoring, two terrestrial monitoring stations were chosen. These coincided with beaches on the two nearest populated islands. Cape Eleuthera to the northeast and along the eastern shore of Nassau.

To capture the impulsive SPL of the landing in the water, the monitoring vessel SeaWard was positioned at the closest location to the northeast of the droneship; just outside of the hazard zone. On the day of the landing, bioacoustics were collected using the SoundTrap, in-water SPLs were collected with Larson Davis 831c SLMs with Telodyne Resen 4013 hydrophones, and an in-air SPL was collected on the same monitoring vessel to gather in relation to in-water measurements. Figure 2-3 shows the areas where sound measurements were collected on the day of landing in relation to the impulse area.

GPS coordinates for the monitoring stations are as follows:

- Station #1: 24°33'57.51"N 76°27'34.10"
- Station #2: 24°32'57.69"N 76°25'41.84"W
- Station #3: 24°30'59.33"N 76°25'42.65"W
- Station #4: 24°30'00.78"N 76°27'35.72"W
- Station #5: 24°31'00.60"N 76°29'27.99"W
- Station #6: 24°32'58.97"N 76°29'27.18"W
- Droneship: 24°31'59.16"N 76°27'34.93"W

GPS coordinates for the SLM placements on the day of the landing are as follows:

- Monitoring Vessel: 24°41'57.00"N 76°24'25.30"W
- Cape Eleuthera Resort: 24°50'09.21"N 76°20'39.87"W
- Nassau: 25°03'57.05"N 77°18'13.73"W

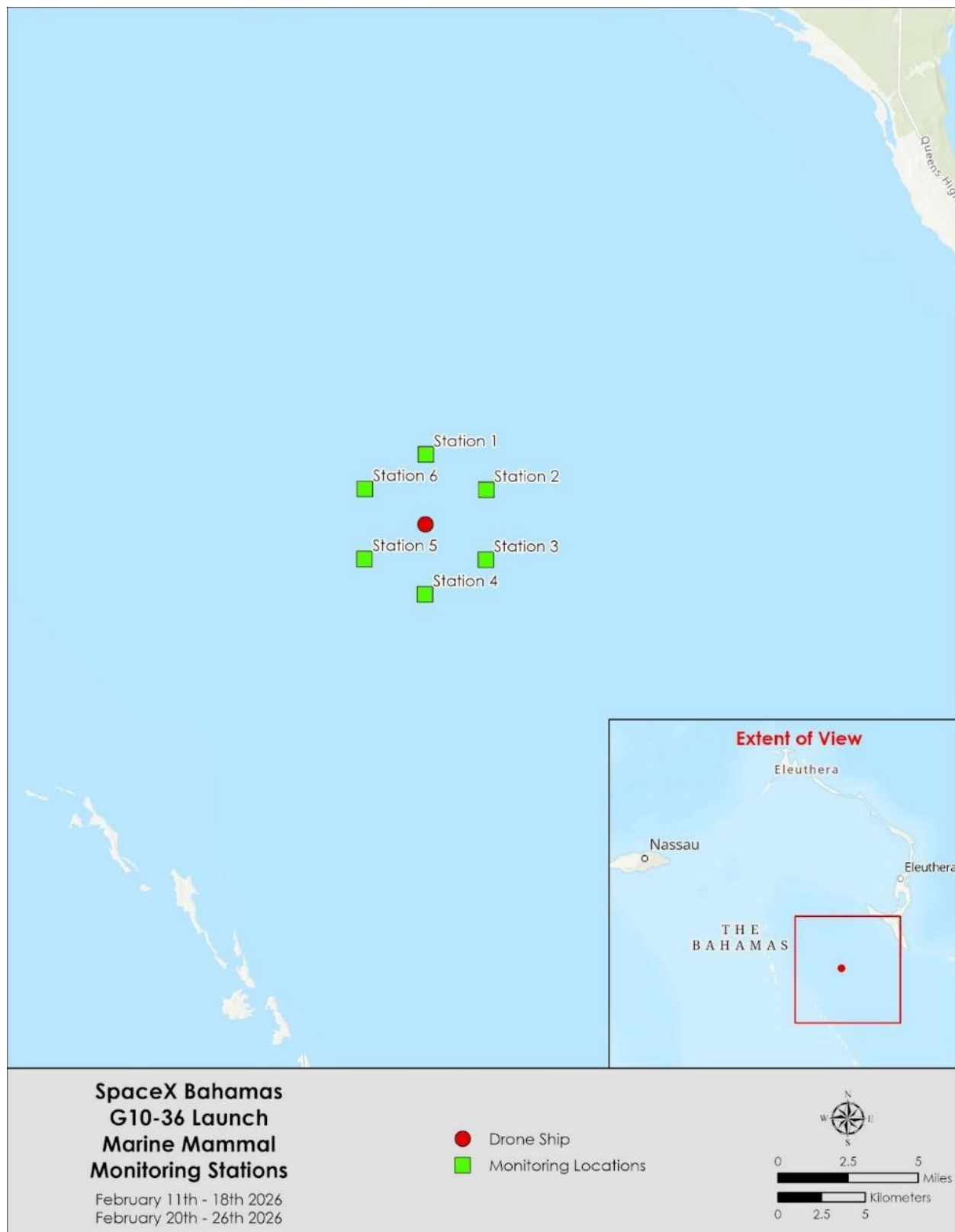


Figure 2-2. Survey Monitoring Stations for pre/post In-Water Monitoring

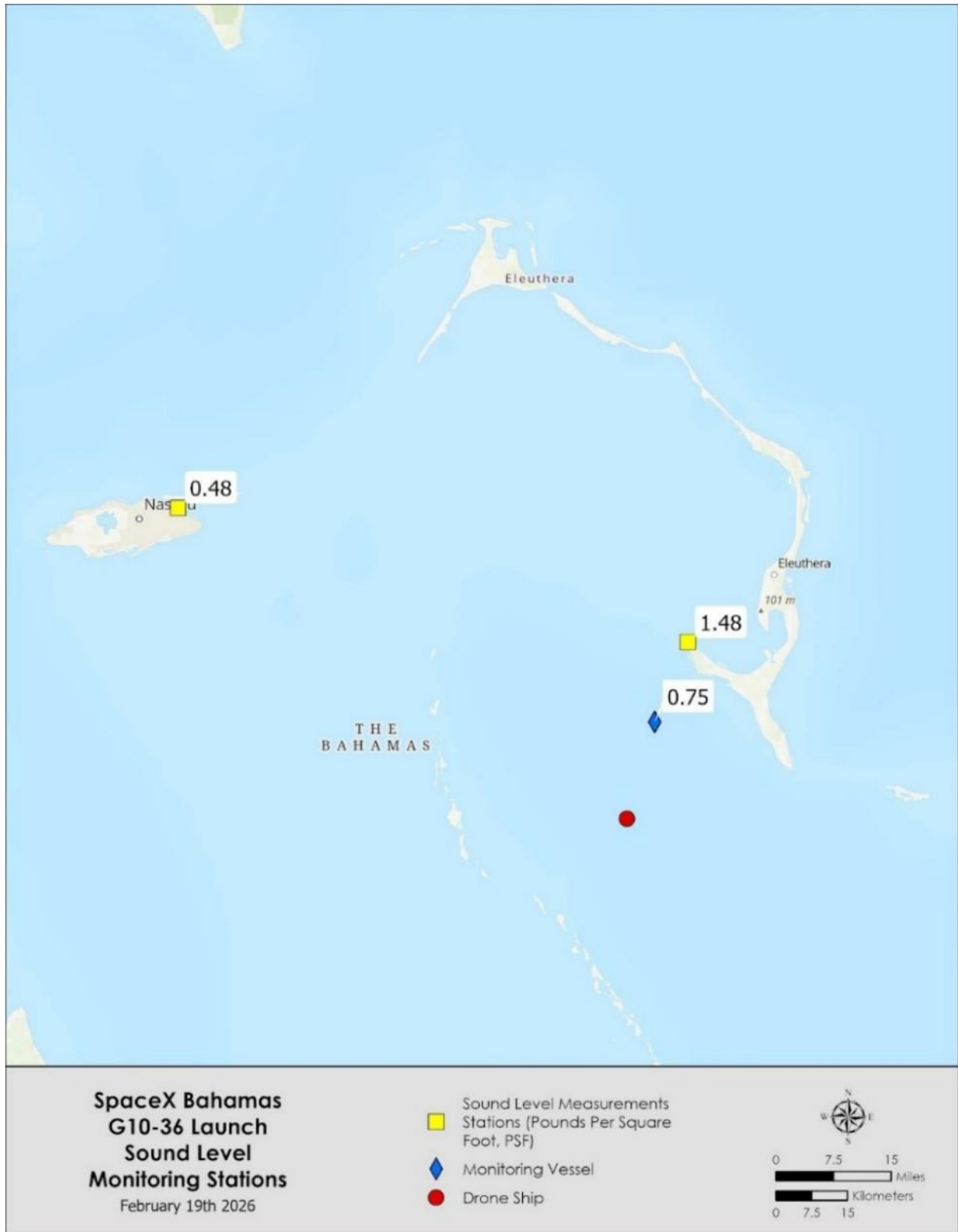


Figure 2-3. Landing Sound Monitoring Stations

3.0 Results

3.1 In-Air Sound Recordings

Figure 3-1 provides in-air acoustic measurements collected for the sonic boom generated during the descent of the Falcon 9 first stage at each of the monitoring stations. The loudest recording was along the Cape Eleuthera shore with a maximum unweighted instantaneous maximum peak sound level (LZpeak) of 131.0 dB re 20 μ Pa and an unweighted time-weighted maximum sound level (LZmax) of 123.7 dB re 20 μ Pa. The next loudest recording was on the Monitoring Vessel SeaWard with a recorded LZpeak of 125.1 dB re 20 μ Pa and a LZmax of 121.5 dB re 20 μ Pa, occurring primarily below 150 Hz. The quietest impulse noise recorded was along the Eastern Nassau shoreline with a comparable LZpeak of 121.2 dB re 20 μ Pa and a LZmax of 115.5 dB re 20 μ Pa. Table 3-1 show all SPLs from the deployed in-air units at the time of the landing. The values indicated on Figure 2-3 show the same measurements converted to pounds per square foot (psf).

Figure 3-1 shows the waveform and spectrograph taken from the SLM on the monitoring vessel during the landing confirmed via the correct landing time.

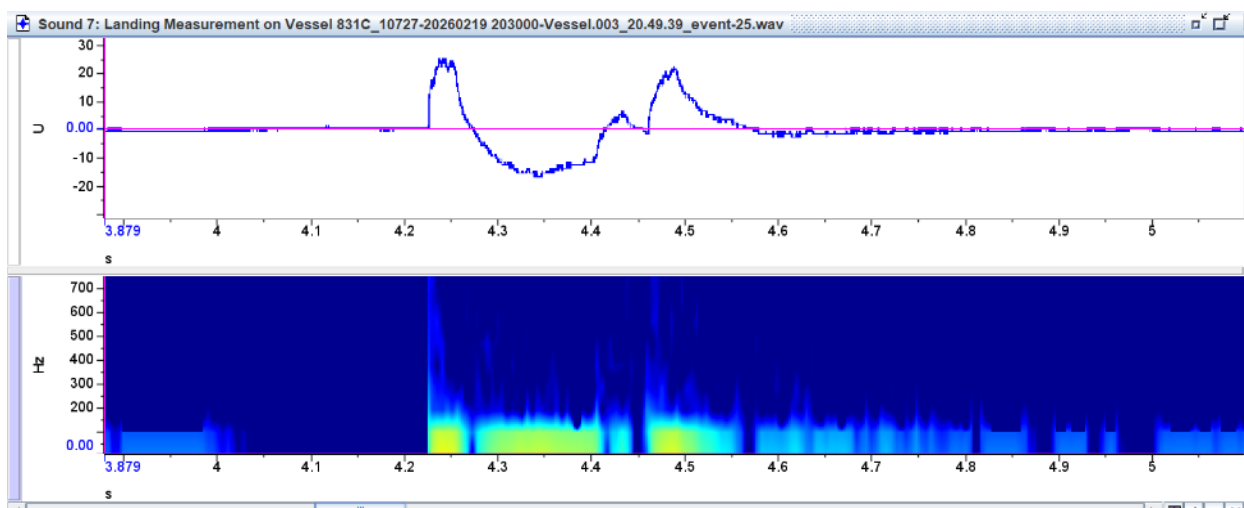


Figure 3-1. Waveform/Spectrograph of Monitoring Vessel SLM in-Air Landing Boom

Table 3-1. In-Air Sound Pressure Levels Measured for the Sonic Boom Generated During Landing of the Falcon 9 First Stage *

Location	Time	LZmax (dB)	LZpeak (dB)	Peak Overpressure (psf)
Nassau	2050:58:00	115.5	121.2	0.48
Cape Eleuthera	2050:16:00	123.7	131	1.48
Hydrophone Vessel	2049:39:00	121.5	125.1	0.75

*Note: Timing was not synced due to SLM being deployed separately

3.2 Underwater Sound Recordings

Ambient noise baselines were determined using the same Larson Davis 831c SLMs utilized for all in-air and underwater peak pressure readings. To ensure data integrity, the L90 metric was applied to isolate the steady-state background noise and filter out transient outliers or

mechanical interference associated with the deployment. Table 3-2 summarizes all LZeq and L90 statistics for the pre-launch and landing data taken with the Larson Davis SLMs. Red values and Yellow values were omitted from ambient calculations as mechanical error or electrical interference was too great. In these instances, the L90 was favored.

Table 3-2. Decibel Levels of in-Water Measurements*

Date	Deployent	3m LZeq	3m L90	10m LZeq	10m L90	40m LZeq	40m L90	Corrected Average LZeq	Corrected Average L90
11	1	134.6	133.4	137.4	129.8	150.2	132.9	136.2	132.3
11	2	132.4	130.9	139.8	139.5	138.1	136.2	137.7	136.8
11	3	134.9	133.9	130.7	129.2	142.1	131.5	133.3	132.8
11	4	135.5	133.8	131.4	129.1	140.1	131.1	133.9	131.8
12	1	137	136.5	136.3	131.8	170.8	135.4	136.7	135
12	2	131	130.7	128.7	127.7	165.3	131.4	130	130.2
12	3	131.4	130.9	128.1	128.2	152.2	129.7	130.1	129.7
12	4	130.7	130.4	128	127.3	189.7	142.3	129.6	129.1
13	1	132.4	131.5	133.8	133.1	132.4	131.5	132.9	132.1
13	2	135.7	134.4	135.8	134	132.4	135.4	134.9	134.6
13	3	135.6	133.7	135.1	132.2	136.7	134.9	135.85	133.7
13	4	134.8	134.4	134.3	134	135.4	134.1	134.9	134.2
14	1	138.5	138	132.3	131.9	131.1	132.1	135.3	134
14	2	138.6	137.5	133	131.7	133.5	132.7	135.8	134.8
14	3	135.2	135.3	133	132.5	131	131.3	133.4	133.4
14	4	136	134.6	132.8	131.2	131.3	130.8	133.8	132.6
17	1	135.9	136	144.9	141.5	140.8	141.2	135.9	136
17	2	132.8	131.1	132.8	131.5	139.4	139	136.2	132.6
17	3	135.8	134.9	134.7	134.1	138.5	137.5	136.6	135.8
17	4	133.6	132.5	133	131.3	139.1	136.5	136.2	134
Corrected averages		135.7	134.3	134.2	132.65	136	134.4	135	133.3

*All values are in dB re 1µPa. Red values represent surveys with overloaded reading. Yellow values represent measurements that were more than 5dB higher than similar sensors on the same deployment line or when the LZeq was >5dB different from the L90.

The average value of the ambient noise taken with the Larson Davis 831c SLMs and hydrophone attachment was found to be 133.3 dB re 1 µPa when the L90 readings were averaged after conversion to linear values, added and converted back to decibel levels. In comparison the average ambient noise using the LZeq values was found to be 135.0 dB re 1 µPa.

During the landing phase, significant low-frequency masking (e.g. strumming and electrical signals) was observed in the 3-m and 10-m measurements (detailed in Section 4.0 Conclusions); therefore, there was no clear detection of a sonic boom at these depths. In contrast, the 40-m sensor recorded substantially less interference, allowing for clear detection of the landing boom. It was noted that a non-project vessel named *Cargo Mail* passed by the monitoring vessel during the landing event, which contributed to the overall ambient noise levels.

Acoustic analysis of this recording identified an LZpeak of 142.64 dB re 1 µPa. A signature “triple boom” waveform was fully realized approximately 0.3 seconds later after the initial impulse. The frequency range of the descent boom captured at 40 m showed most frequencies under 500 Hz with most of the frequency strength under 250 Hz, as expected by the in-air monitoring vessel SLM. Figure 3-2 shows the waveform and spectrograph of the 40-m boom analysis.

Based on the average value of the ambient ocean noise found during pre-launch analysis of 133.3 dB re 1 μ Pa, this resulted in an increase of 9.34 dB re 1 μ Pa at approximately 40 m below the water's surface and 10.7 NM from the droneship.

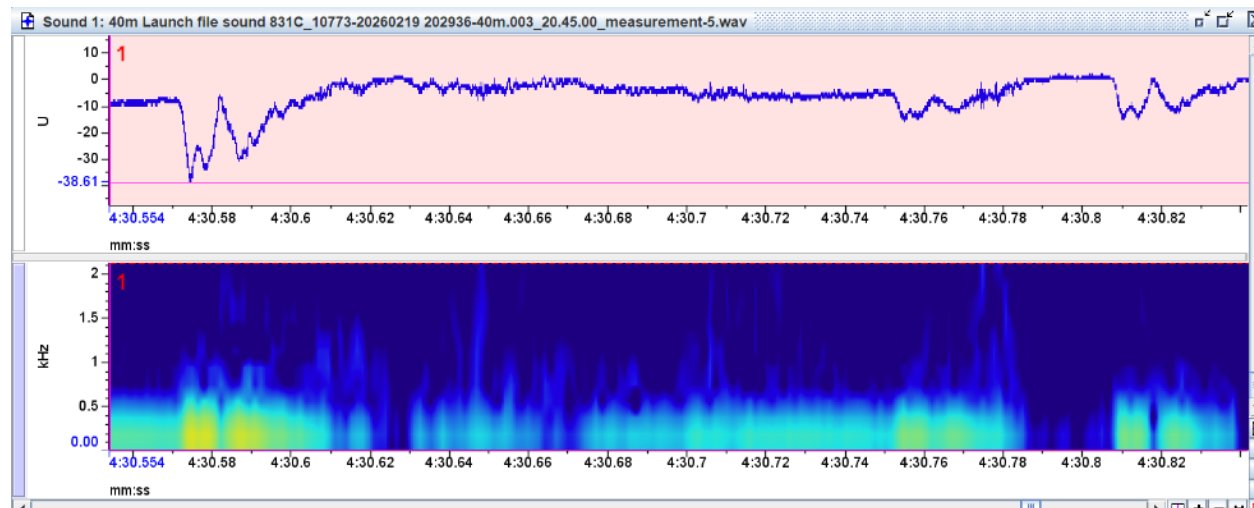


Figure 3-2. Waveform/Spectrograph of Monitoring Vessel SLM Underwater 40 m Depth Recording

3.3 Underwater Ecological Assessment

Analysis of the Larson Davis hydrophone and SoundTrap data revealed a large amount of low frequency noise between 0 and approximately 125 Hz, as demonstrated in Figure 3-3. This low frequency noise is likely due to strumming artifacts caused by shallow wave interaction and current affecting the deployment line. It is possible the low frequency noise could be a limiting factor in the detection of lower frequency vocalizations; however, we do not expect cetacean vocalizations to be in this range. Due to the sampling frequency limitations of the 831c SLMs, it was understood that clicks above 20 kHz could not be visualized reliably.

Atlantic spotted dolphin (*Stenella frontalis*) was detected on the 2nd, 3rd and 4th surveys on 11 February, as well as the 2nd and 3rd survey on 12 February. This was confirmed via visual survey. No other detections were found in any other surveys, audially or visually. A list of the Atlantic spotted dolphin observation times is provided in Table 3-3 and an example spectrograph of the Atlantic spotted dolphin found during survey 4, monitoring station 2 on 11 February shown in Figure 3-4.

Table 3-3. *Stenella frontalis* in Surveys

Date	Start Time (Device)	End Time (Device)	Survey and Spot	Source / Species	Call Type	Freq.	Freq.	Confidence
2/11/2026	18 min 55 sec	21 min 40 sec	2 and 1	<i>Stenella frontalis</i>	Whistles	1.5	20	Probable
2/11/2026	20 min 31 sec	22 min 00 sec	3 and 5	<i>Stenella frontalis</i>	Clicks	1.5	20	Probable
2/11/2026	5 min 18 sec	18 min 50 sec	4 and 3	<i>Stenella frontalis</i>	Clicks and Whistles	1.5	20	Definite
2/12/2026	1 min 30 sec	7 min 40 sec	2 and 4	<i>Stenella frontalis</i>	Clicks and Whistles	1.5	20	Possible
2/12/2026	20 min 35 sec	21 min 25 sec	3 and 6	<i>Stenella frontalis</i>	Clicks and Whistles	1.5	20	Possible



Figure 3-3. Limiting Low Frequency Masking Below 125 Hz

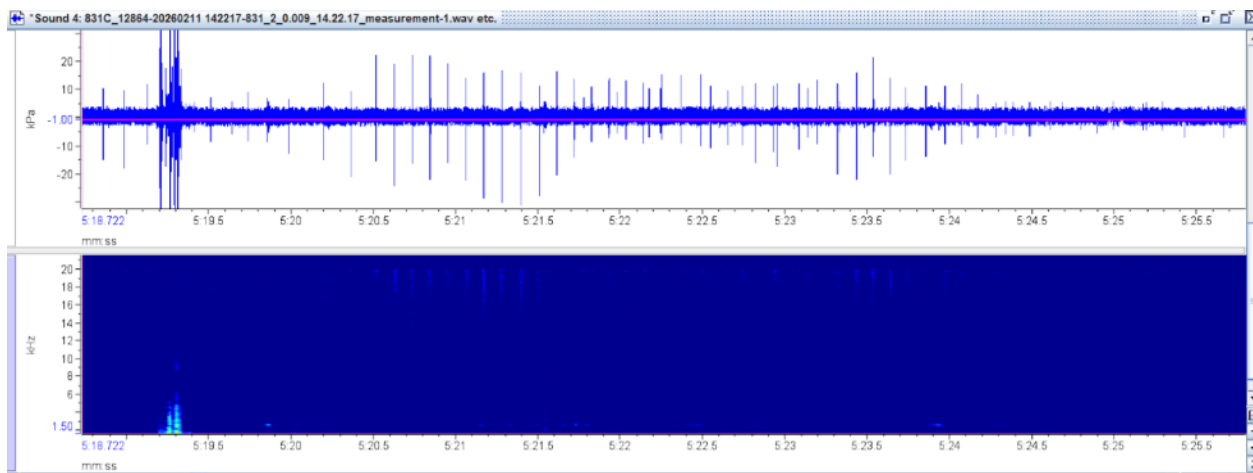


Figure 3-4. Audible Presence of *Stenella frontalis* Spectrograph Visualization

An example of mechanical and electrical interference detected during the surveys is provided in Figure 3-5, where many horizontal broadband frequencies persist over large periods of time. The high frequencies received by the SoundTrap can appear larger in magnitude than clicks and whistles found in local Odontocetes. It is estimated that interference affected less than 25% of recording time.

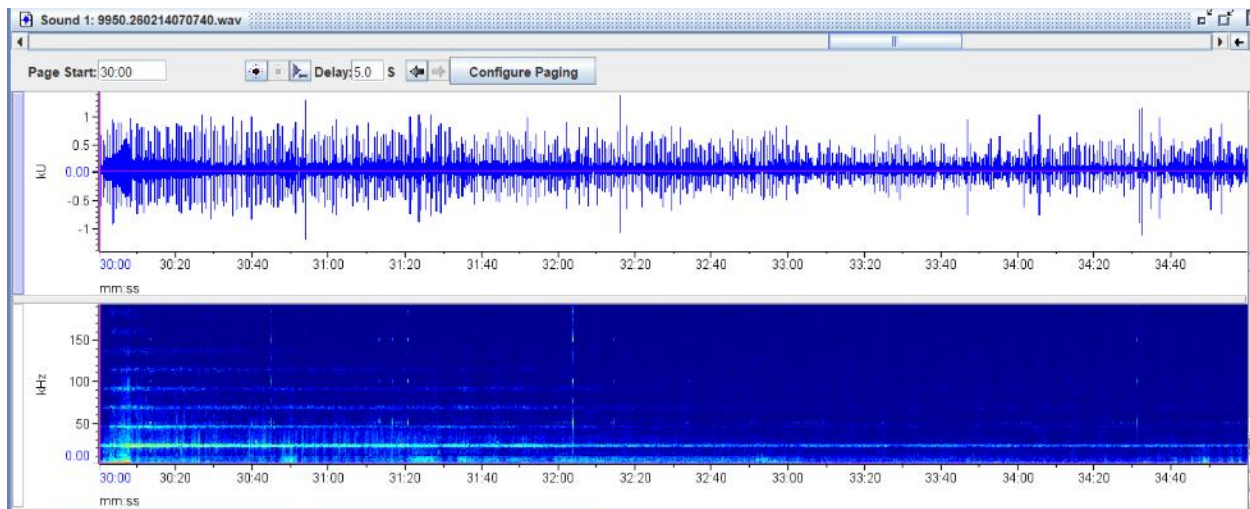


Figure 3-5. Mechanical and/or Electrical Interference

4.0 Conclusions

4.1 In-Air Methods

All SPLs recovered from in-air SLMs appeared to record properly. We also gained valuable insight into recommended trigger level settings for each of the in-air monitoring stations. During the recordings, average in-air ambient noise levels at the monitoring vessel ranged from 100 to 105 dB. These levels were primarily driven by environmental factors, specifically wind and hull-slap from wave surge. However, vessel self-noise was successfully eliminated from the in-air measurements, as the monitoring vessel's engine and generator were powered down during the event. Quieter areas, such as Cape Eleuthera, were closer to 70 dB. Trigger levels and SLM placements will be adjusted in future efforts based on these measurements.

4.2 Underwater Methods and Bioacoustics

To summarize pre-launch and post-launch monitoring, a single instance of *Stenella frontalis* presence was verified on 11 February with a possible detection on 12 February. As such, detections during pre and post launch monitoring were too sparse to reliably determine cetacean presence and perform any statistical analysis or make accurate conclusions about launch impacts to cetacean presence or behavior.

During the previous Bahamas landing for Starlink G10-12, hydrophones detected LZpeaks from the landing boom in-water of 155.1-169.0 dB re 1 μ Pa, with an ambient level of 167.7 dB re 1 μ Pa (BRON Ltd., 2025). In their analysis, they mentioned issues relating to mechanical noise, deployment issues, and recording issues. Our study found similar issues regarding hand deployment and mechanical/electrical noise interference. Our measured ambient noise level of 133.3 dB re 1 μ Pa is higher than the historical baseline of 90–120 dB re 1 μ Pa for waters near shipping lanes (Wenz, 1962); however, this aligns with modern estimates when accounting for the approximately 3.3 dB per decade increase in ocean noise reported by Frisk (2012). The impulsive energy of the landing boom at the 40-m depth was found to be 142.64 dB re 1 μ Pa,

which equates to an increase of 9.34 db re 1 μ Pa. This correlates to a pressure wave increase of ~2.9x the baseline acoustic pressure at the location of the monitoring vessel (BOEM 2022). This decibel level is under known NMFS TTS/INJ thresholds for all the cetacean hearing groups (Table 1-3).

5.0 References

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- Shiple, O. N., Muller-Karger, F. E., Delaney, D., de Silva, C., Dixon, O. F., Giddens, J., ... & Gallagher, A. J. 2024. Community composition and organic carbon flux in twilight zone communities of The Tongue of the Ocean and Exuma Sound, The Bahamas. *Deep Sea Research Part I: Oceanographic Research Papers*, 212, 104373.
- Wenz, G. M. 1962. Acoustic ambient noise in the ocean: Spectra and sources. *The Journal of the Acoustical Society of America*, 34(12), 1936-1956.

Appendices

Appendix A. Waveform and Spectrographs for SoundTrap – Unfiltered

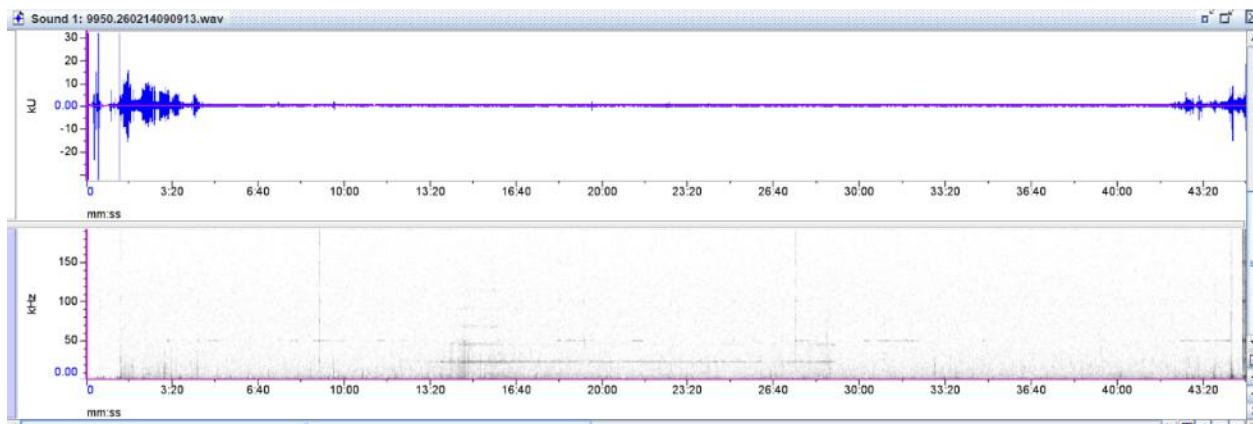


Figure A-1. Survey 1, 14 February



Figure A-2. Survey 2, 14 February



Figure A-3. Survey 3, 14 February

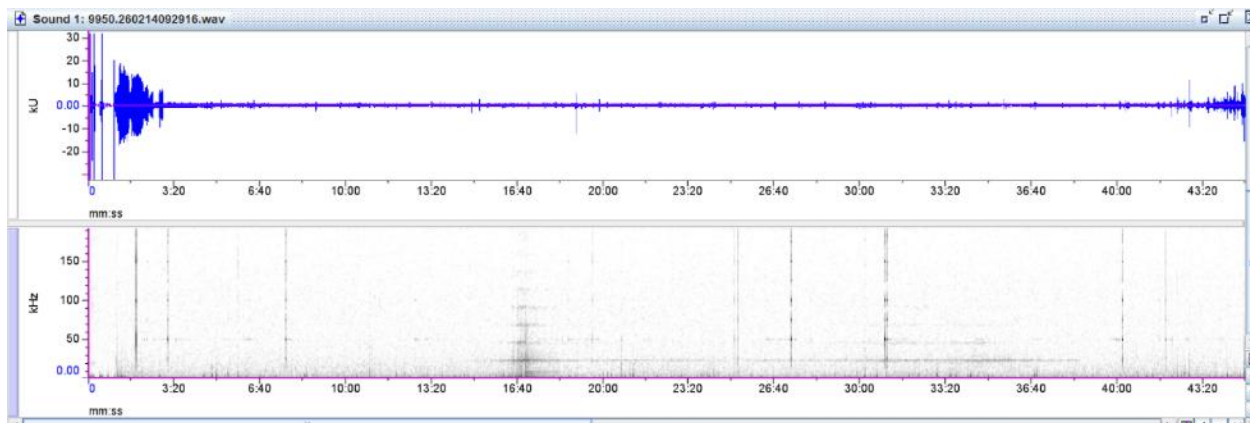


Figure A-4. Survey 4, 14 February

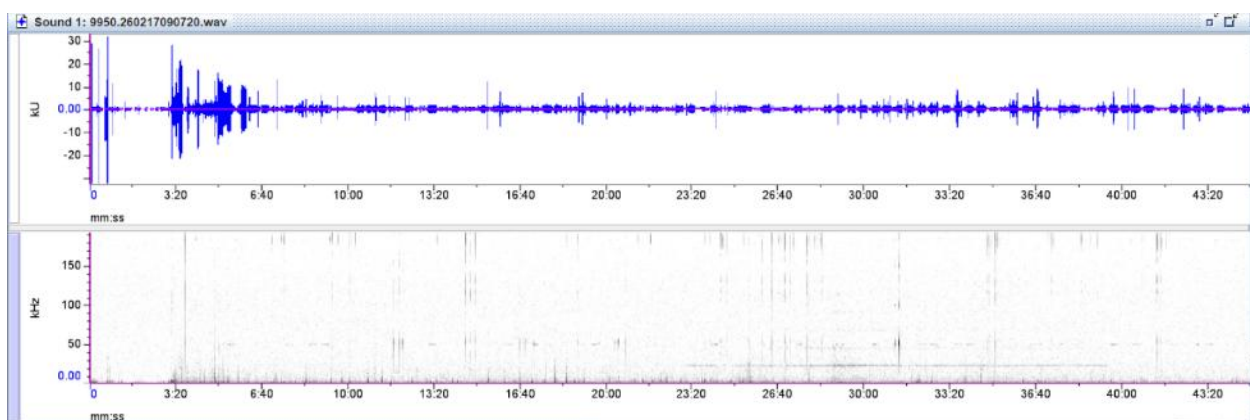


Figure A-5. Survey 1, 17 February

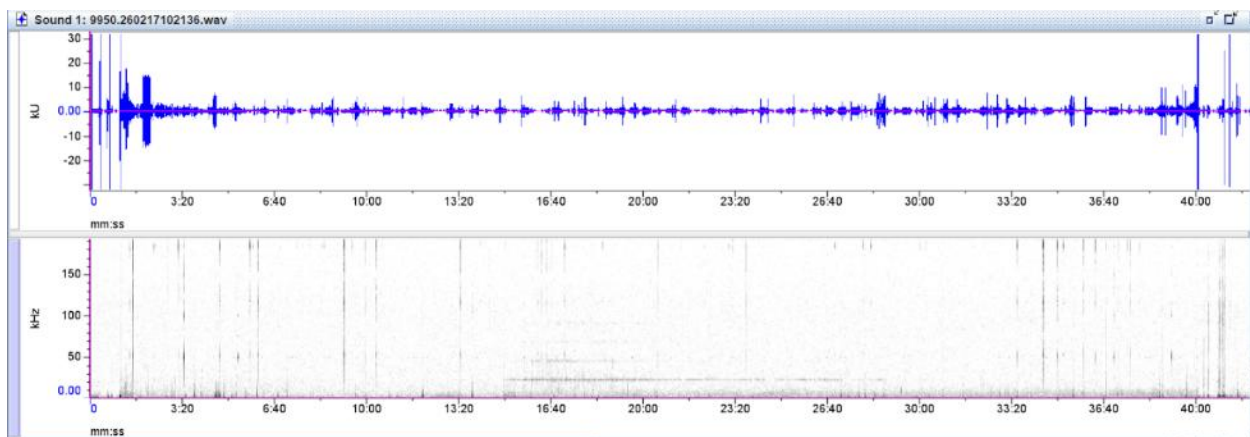


Figure A-6. Survey 2, 17 February



Figure A-7. Survey 3, 17 February

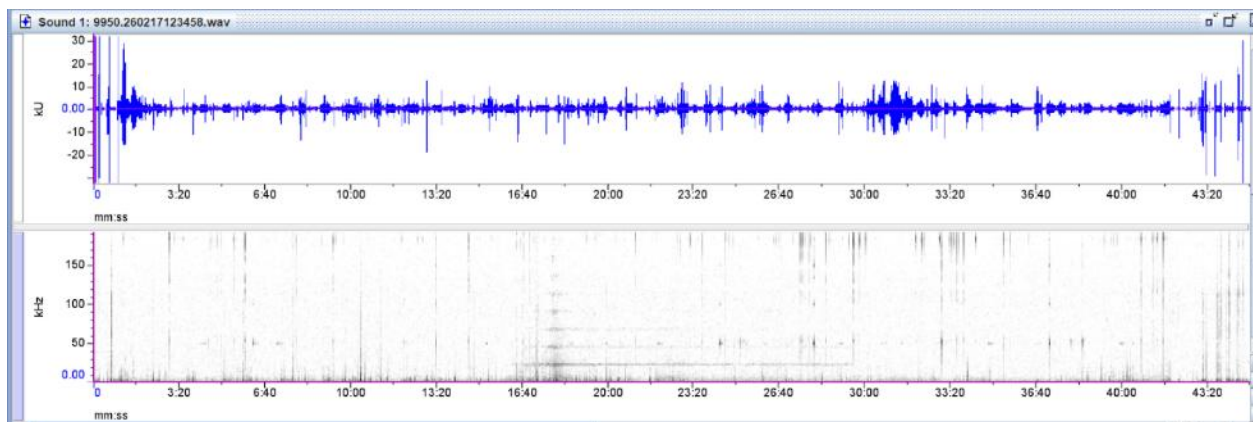


Figure A-8. Survey 4, 17 February

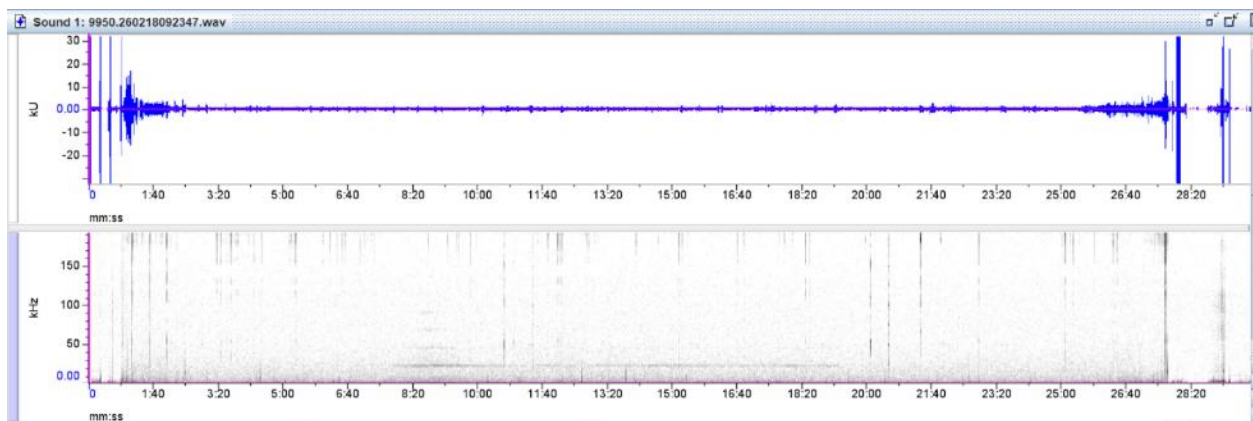


Figure A-9. Survey 1, 18 February

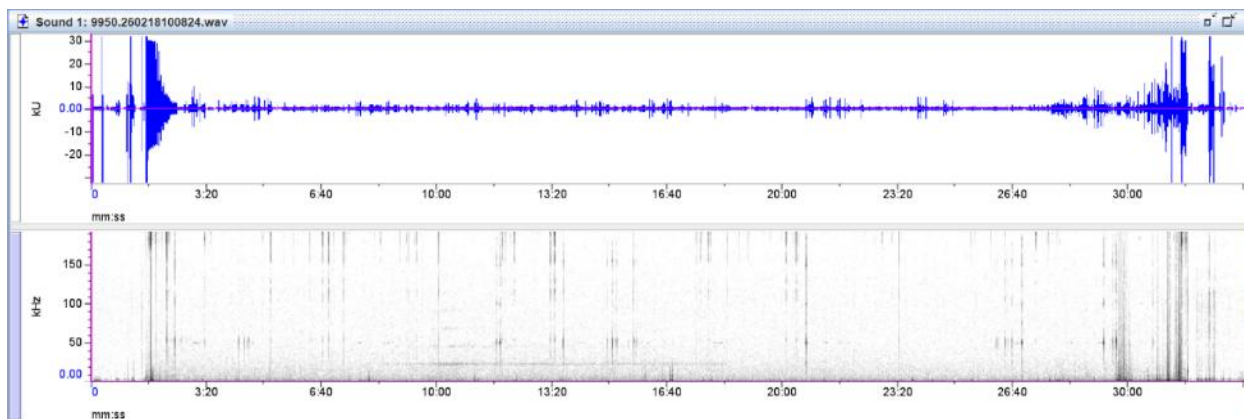


Figure A-10. Survey 2, 18 February

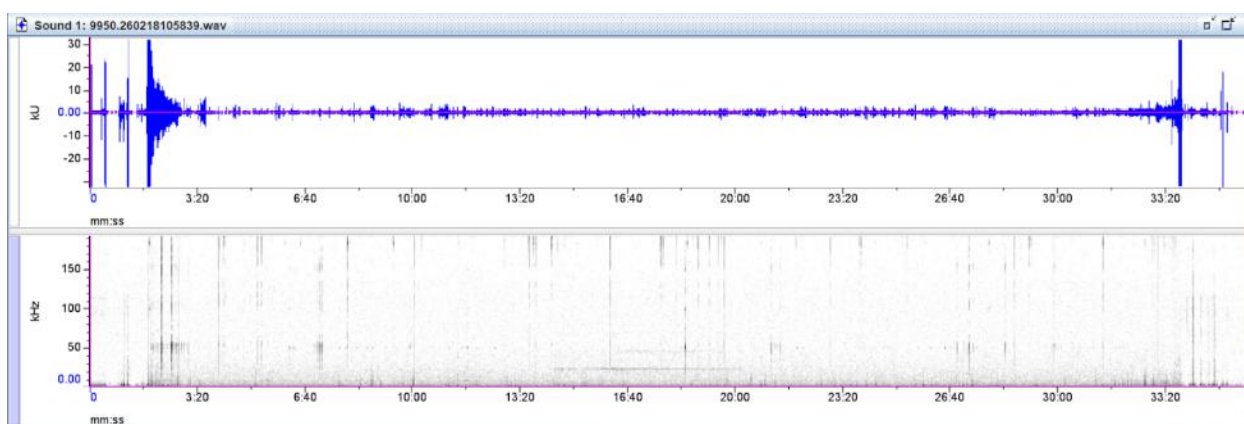


Figure A-11. Survey 3, 18 February

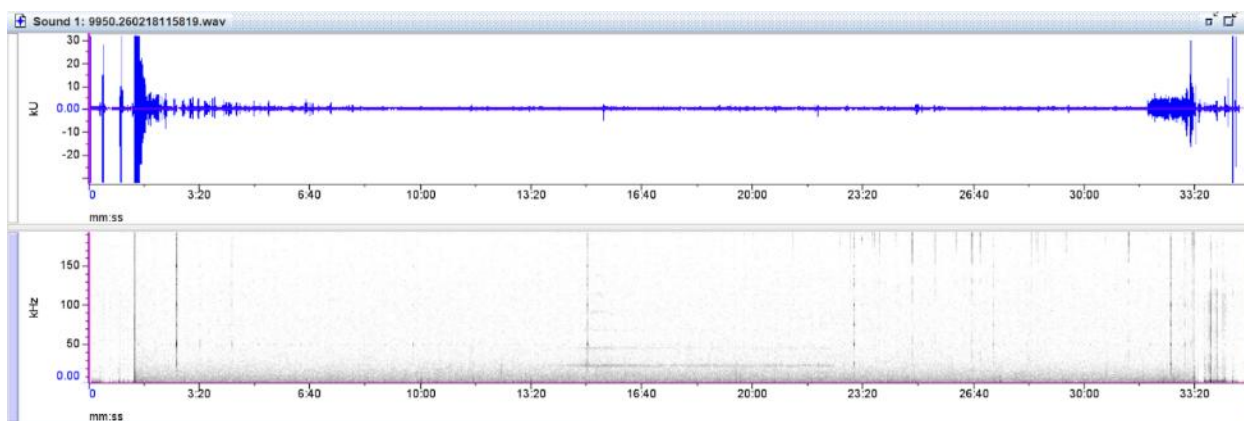


Figure A-12. Survey 4, 18 February

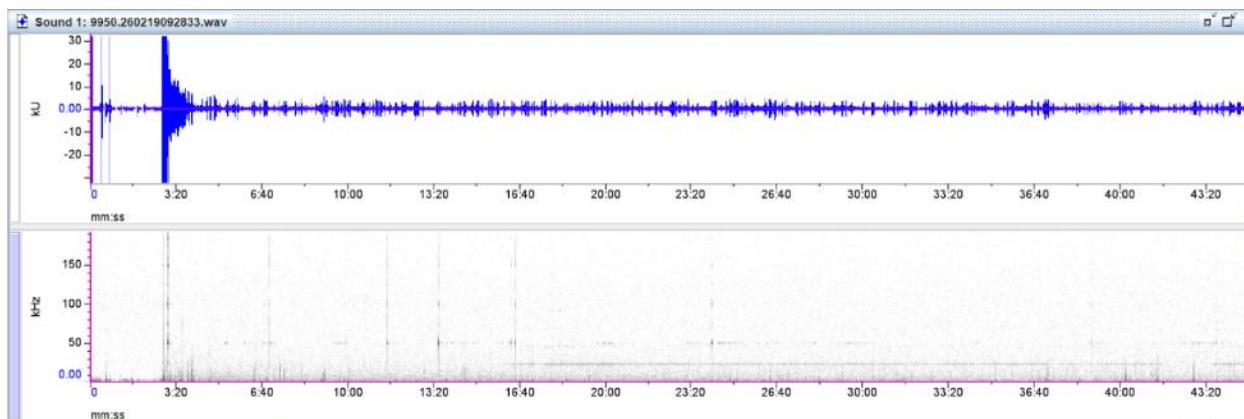


Figure A-13. Survey 1, 19 February

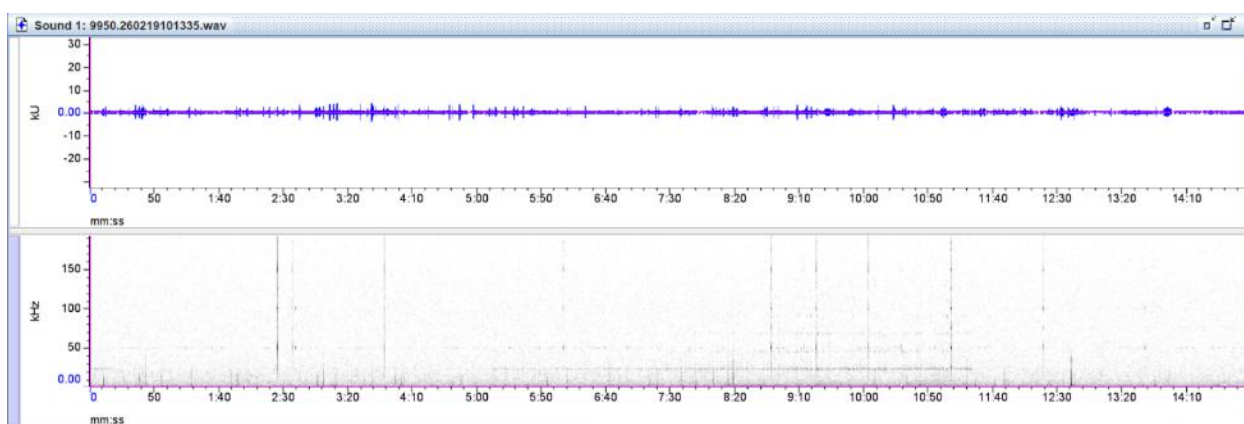


Figure A-14. Survey 1, 19 February cont.

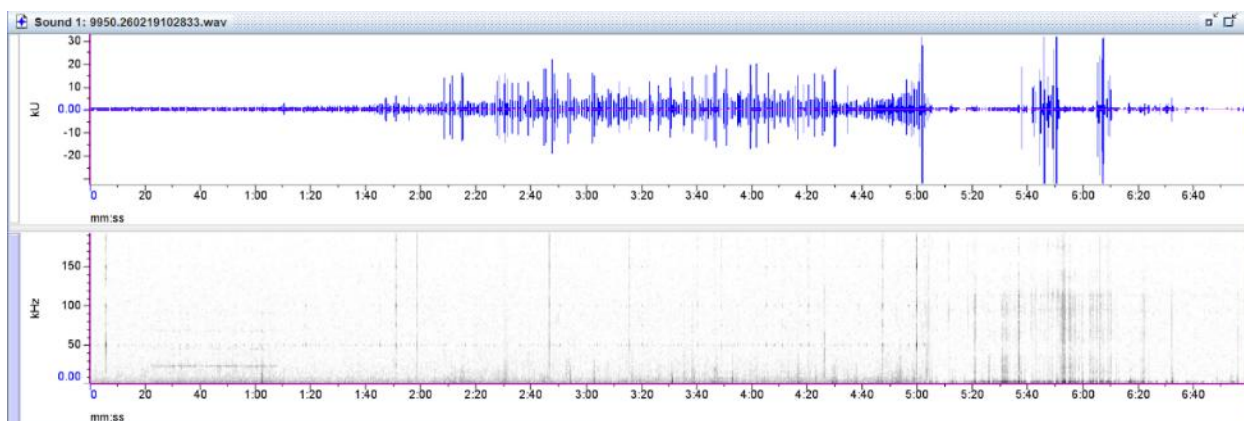


Figure A-15. Survey 1, 19 February cont.

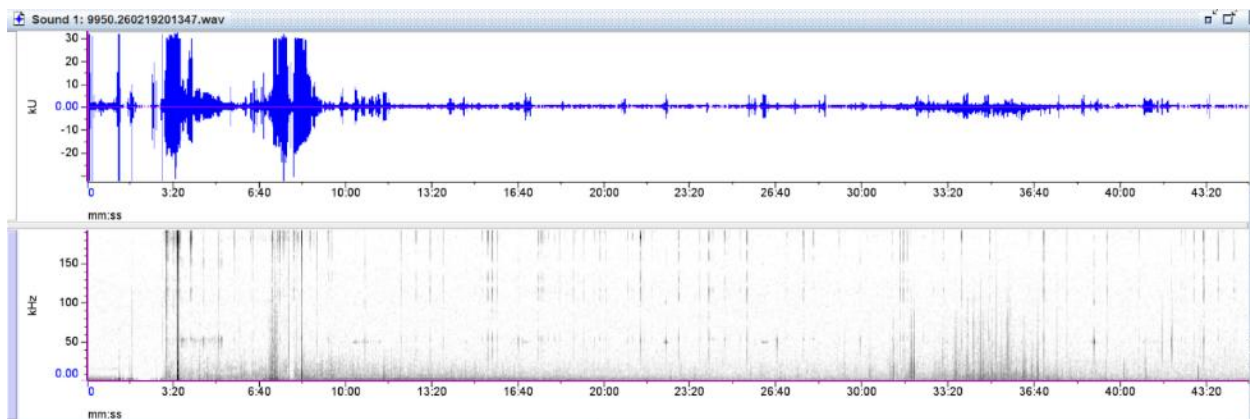


Figure A-16. Droneship Landing, 19 February

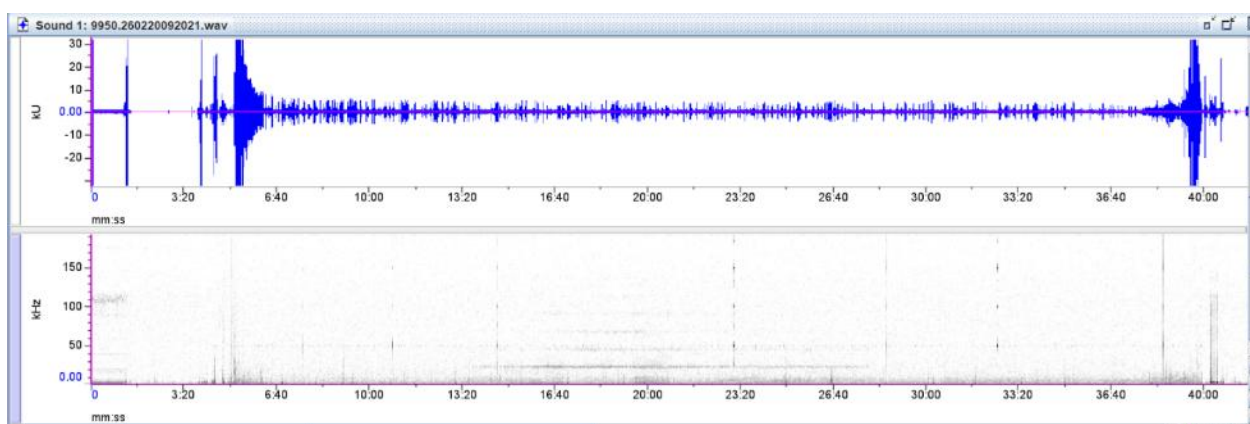


Figure A-17. Survey 1, 20 February

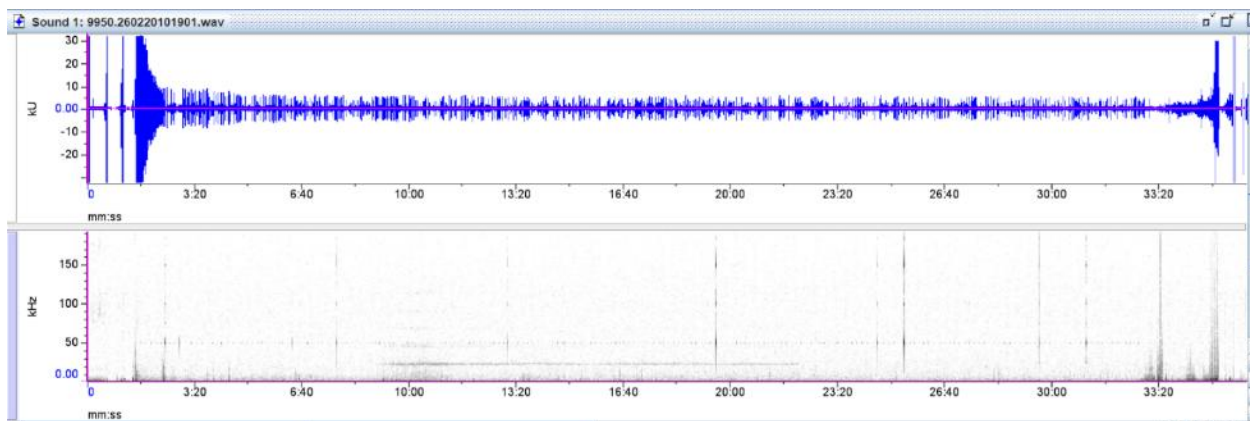


Figure A-18. Survey 2, 20 February

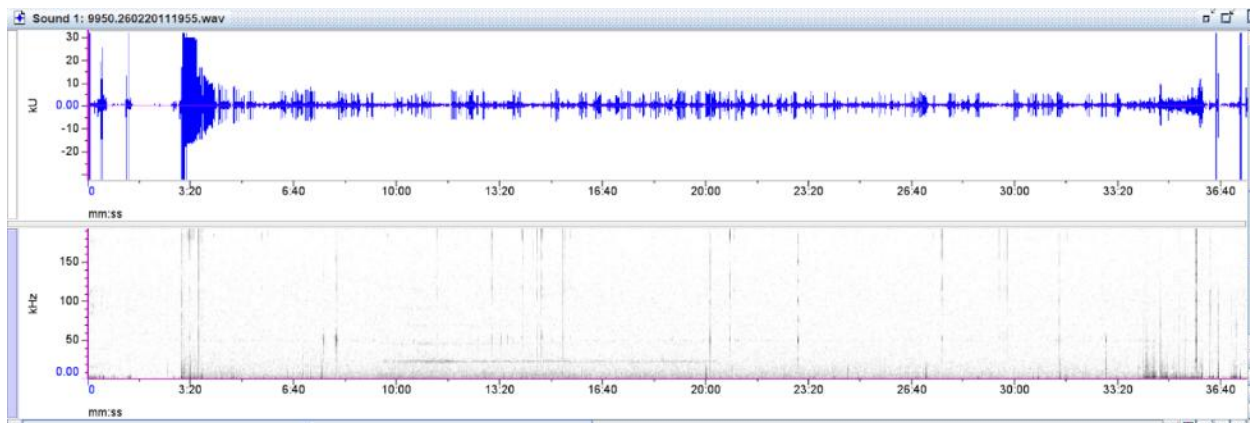


Figure A-19. Survey 3, 20 February

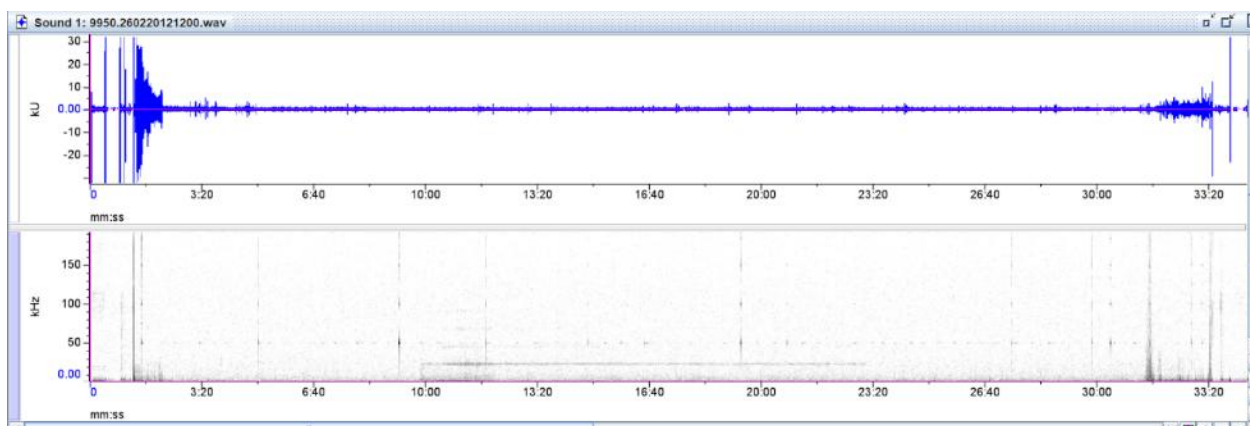


Figure A-20. Survey 4, 20 February

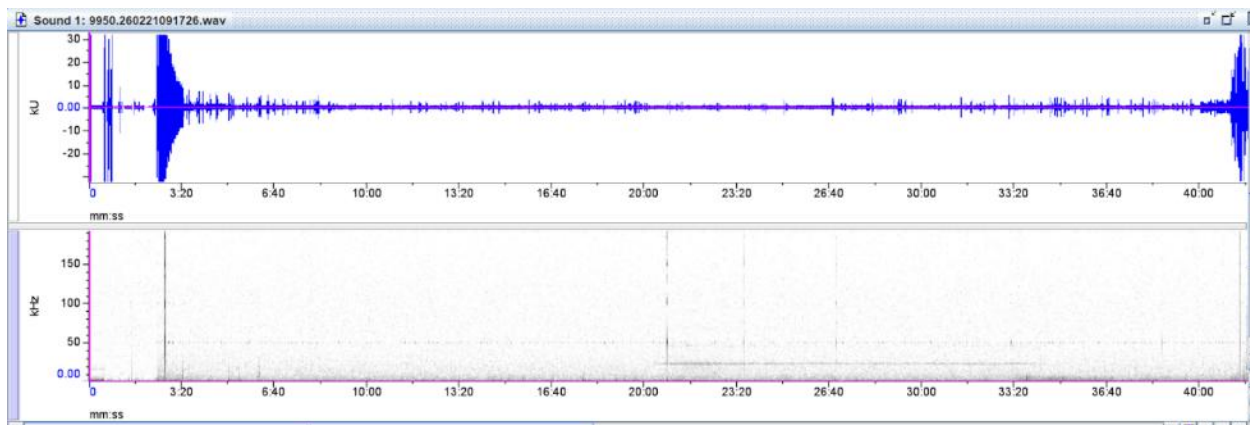


Figure A-21. Survey 1, 21 February



Figure A-22. Survey 2, 21 February

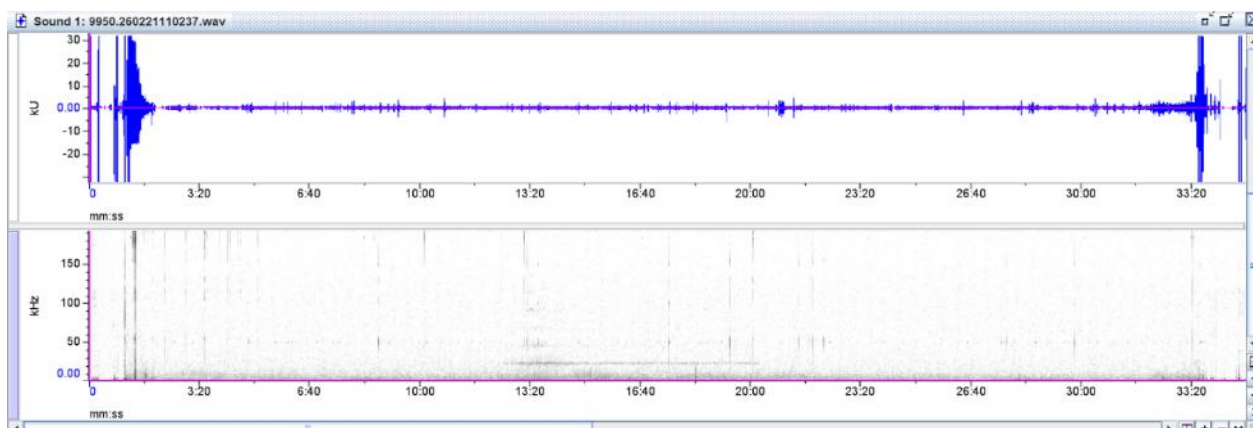


Figure A-23. Survey 3, 21 February

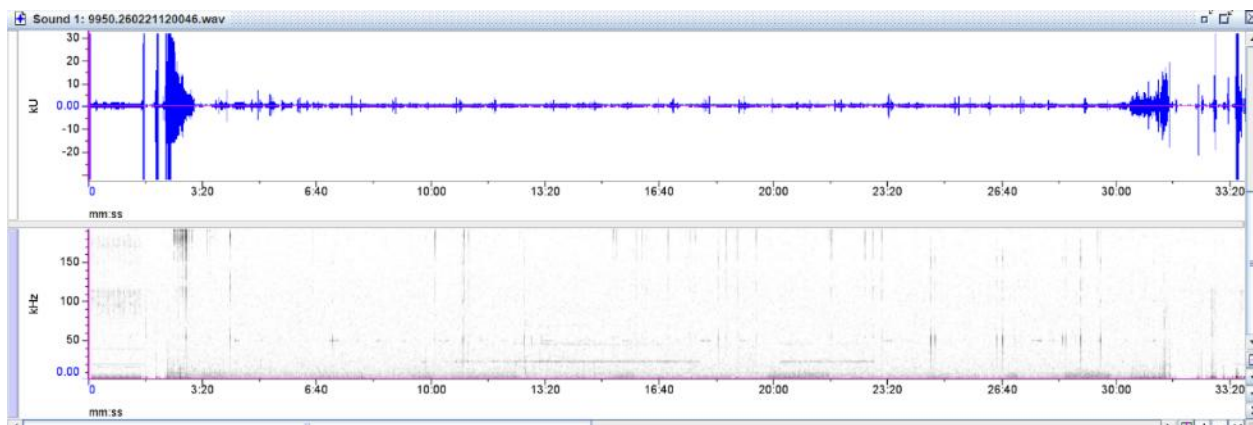


Figure A-24. Survey 4, 21 February

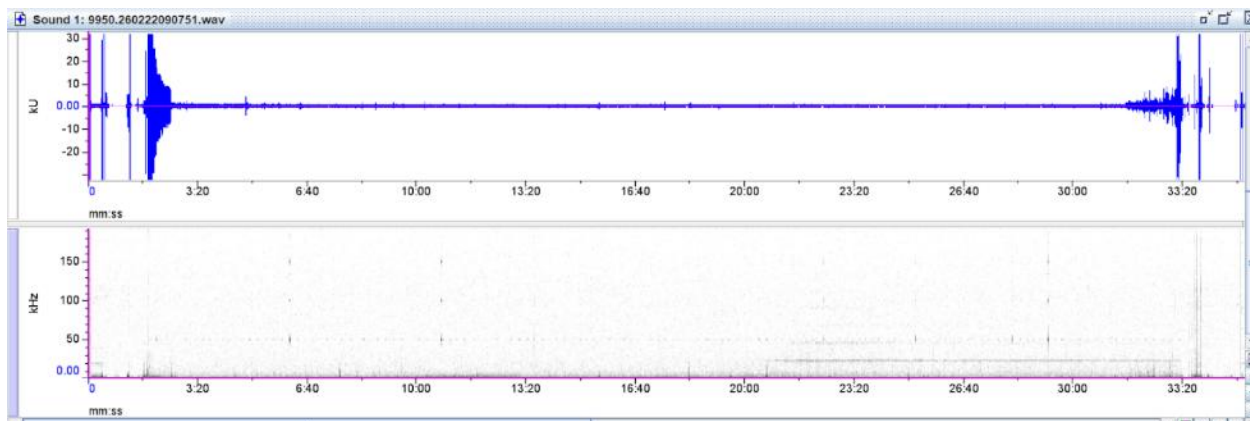


Figure A-25. Survey 1, 22 February

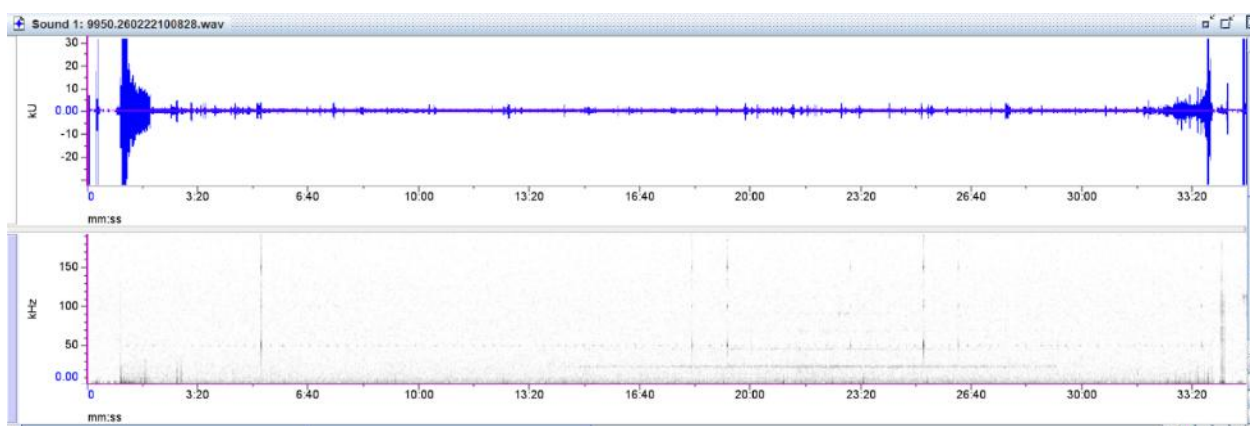


Figure A-26. Survey 2, 22 February

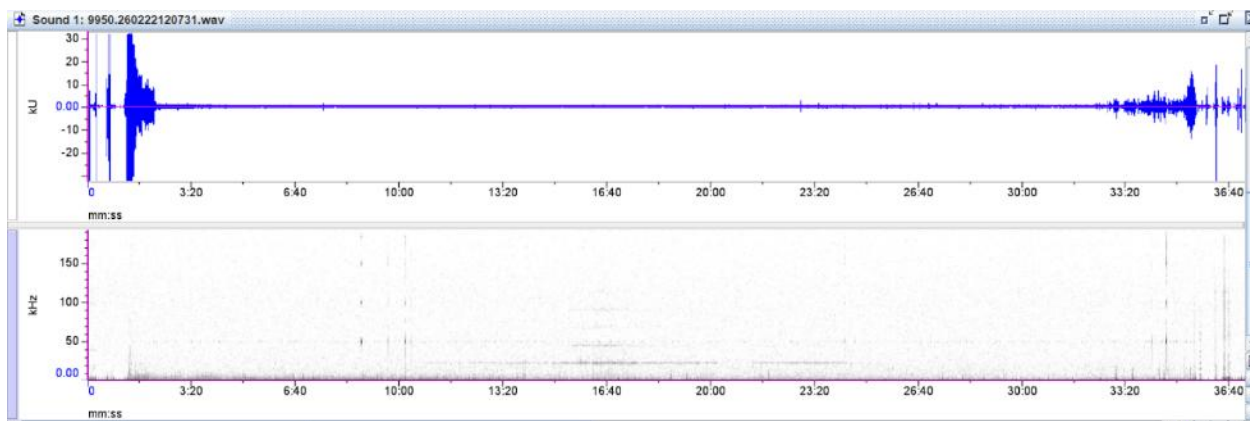


Figure A-27. Survey 4, 22 February

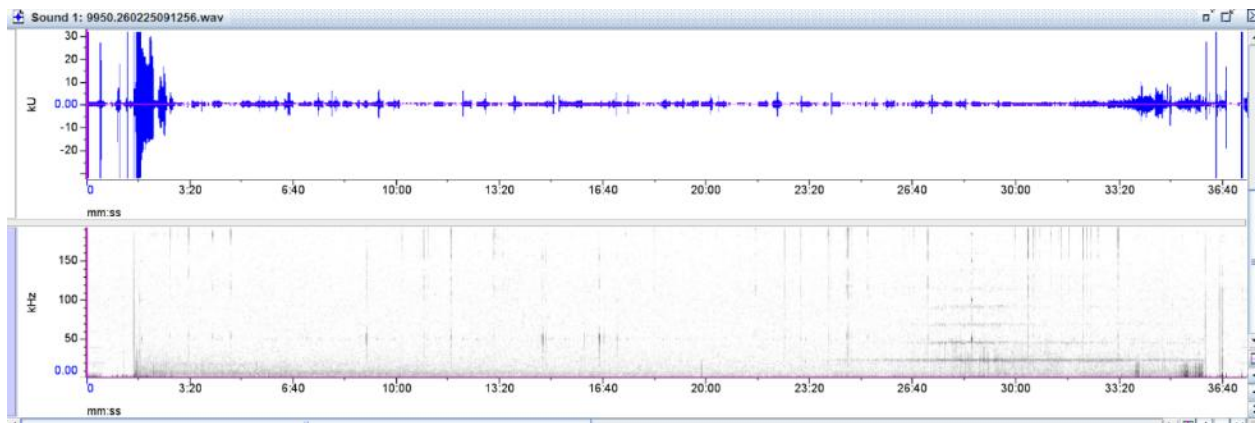


Figure A-28. Survey 1, 25 February

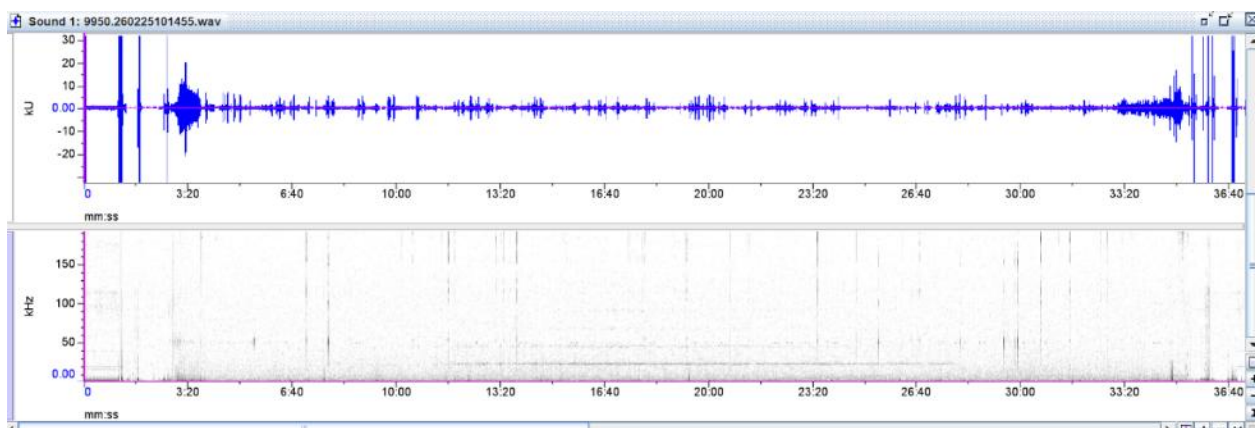


Figure A-29. Survey 2, 25 February

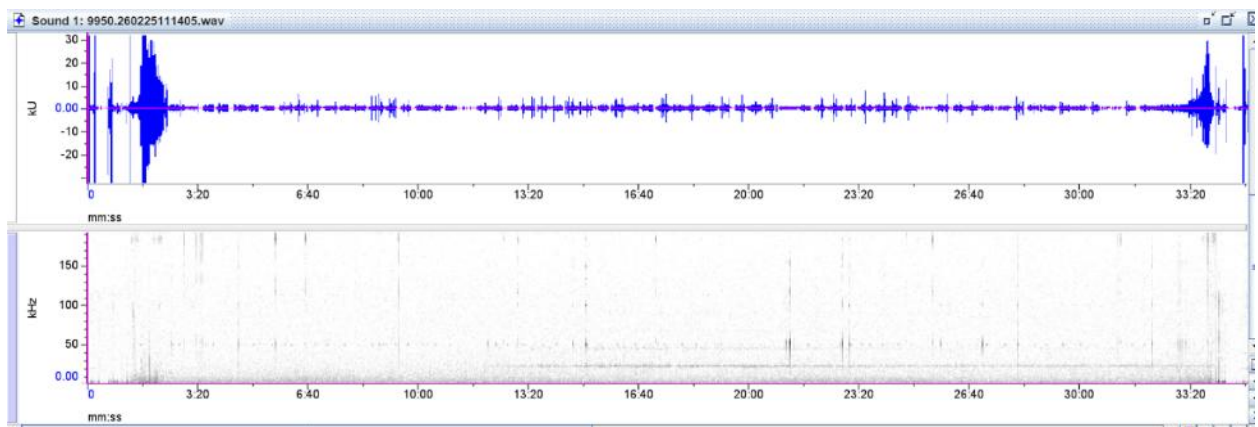


Figure A-30. Survey 3, 25 February

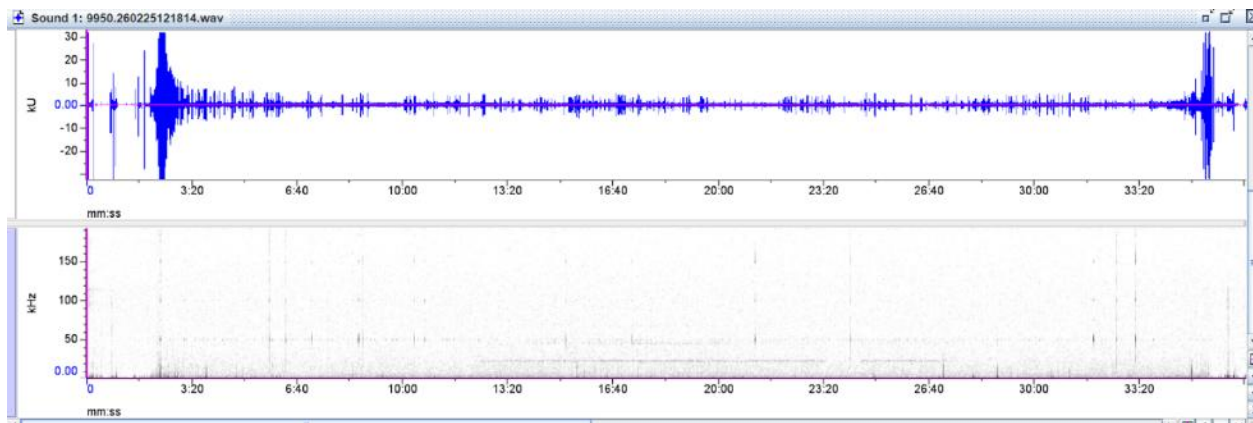


Figure A-31. Survey 4, 25 February



Figure A-32. Survey 1, 26 February

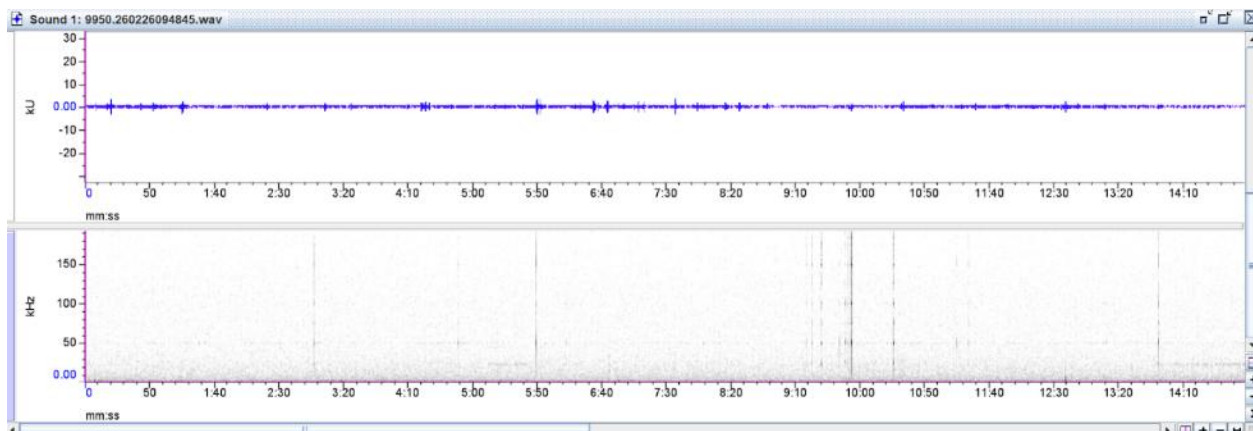


Figure A-33. Survey 1, 26 February cont.

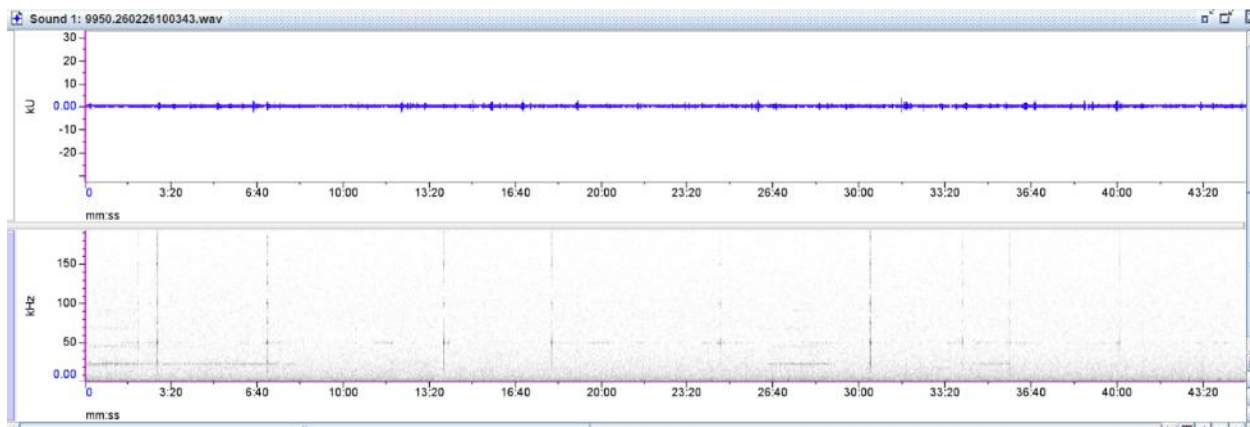


Figure A-34. Survey 1, 26 February cont.

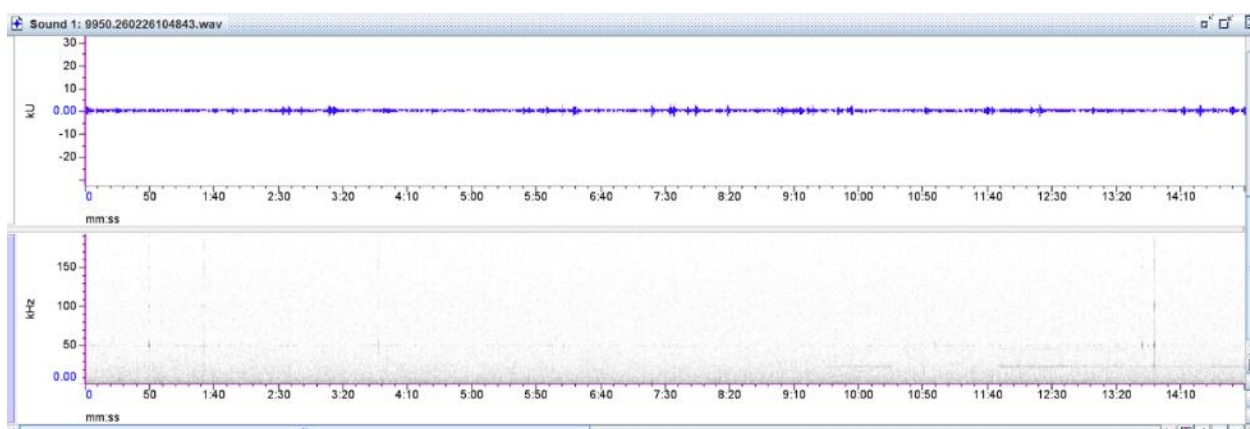


Figure A-35. Survey 1, 26 February cont.



Figure A-36. Survey 1, 26 February cont.



8.1 APPENDIX D – WEATHER, WATER, AND AIR QUALITY DATA (LAUNCH 1 & 2)

8.1.1 Marine

Launch 1

Weather Data

Table 8-1. Climate and Weather measured on February 17th, 2025, around the perimeter of the Minimum Safe Area (MSA) and at the dronship site (Booster).

Sample Point	Booster	MSA 3	MSA 4	MSA 5	MSA 6	MSA 2
Time	9:00	10:24	10:56	11:37	12:16	1:09
Wind Speed (mph)	6.8	2.4	8.5	8.8	8.9	7.3
Temperature (°F)	77.9	78.2	77.2	77.5	78.0	79.0
Wind Direction	W	WNW	WNW	WNW	NW	NW
Humidity (%)	75.7	70.8	78.9	81.4	80.3	77.9
Heat Index (°F)	82/6	81.1	81.1	81.7	85.3	90.3
Dew Point (°F)	70.4	69.2	70.7	71.7	72.4	76.2
Pressure (HPa)	1018.9	1019	1019.1	1018.8	1018.3	1017.7

Table 8-2. Climate and Weather measured on February 18th, 2025, at MS 3, the dronship site (Booster), and the marine monitoring location MSP1.

Sample Point	Booster	MSA 3	MSP 1	Booster
Time	9:55 am	12:51 pm	5:51 pm	8:09 pm
Wind Speed	5.8	1.8	7.6	9.6
Temperature (°F)	77.8	81.4	79.5	76.3
Wind Direction	E	NE	E	NE
Humidity (%)	77.5	70.6	76.6	80.5
Heat Index (%)	81.9	95.9	83.8	78.6
Dew Point (°F)	70.4	73.1	71.7	69.9
Pressure (HPa)	1018.8	1018.3	1017.5	1018.4

Table 8-3. Climate and Weather measured on February 19th, 2025.

Sample Point	Booster	MSA 3	MSA 4	MSA 5	MSA 6	MSA 2
Time	10:32 am	11:00 am	11:19 am	11:36 am	11:54 am	12:13 pm
Wind Speed (mph)	17	14	19.4	18.3	17.2	14.4
Temperature (°F)	77.4	78.8	77.6	77.8	78.6	77.8



Wind Direction	SSE	SSE	SSE	S	S	SSE
Humidity (%)	79.6	75.7	73.8	77.7	73.8	80.3
Heat Index (°F)	85.1	84.2	81.9	82	86.4	88.7
Dew Point (°F)	72.5	70.8	69.2	71.9	70.9	73.5
Pressure (HPa)	1018.2	1017.9	1017.8	1017.7	1017.3	1017

Air Quality

Table 8-4. Air Quality measured on February 17th, 2025, around the perimeter of the MSA and at the dronship site (Booster).

Sample Point	Booster	MSA 3	MSA 4	MSA 5	MSA 6	MSA 2
Time	8:55	10:25	10:58	11:39	12:19	1:10
PM 2.5 (ug/m³)	8.2	3.2	6.5	7.7	4.7	3.9
PM 10 (ug/m³)	13.6	6.7	11.4	14.4	7.6	5.8
HCHO	0.11	0.02	0.01	0.01	0.02	0.01
TVOC	0.54	0.06	0.06	0.03	0.05	0.02
Temperature (°F)	74.8	81.9	82.2	83.7	83.7	91.3
Humidity (%)	84.3	67.7	71.6	69.5	72.4	57.6

Table 8-5. Air Quality measured on February 18th, 2025, at MSA 3, the dronship site (Booster), and the marine monitoring location MSP1.

Sample Point	Booster	MSA 3	MSP 1	MSP 1	MSP 1
Time	9:58 am	12:52 pm	5:56pm	6:17 pm	6:30 pm
PM 2.5 (ug/m³)	5.7	4.0	3.5	7.6	6.6
PM 10 (ug/m³)	8.4	6.9	6.2	12.5	9.7
HCHO	0.01	0.01	0.02	0.01	0.01
TVOC	0.03	0.02	0.08	0.02	0.01
Temperature (° F)	79	95.7	81.5	81.5	75.9
Humidity (%)	74.9	51.4	71.8	73.9	79.8

Table 8-6. Air Quality measured on February 19th, 2025.

Sample Point	Booster	MSA 3	MSA 4	MSA 5	MSA 6	MSA 2
Time	10:31am	11:02am	11:21am	11:38 am	11:55 am	12:14 pm
PM 2.5 (ug/m³)	6.3	5.2	4.1	9.4	3.1	5.8
PM 10 (ug/m³)	10.7	10.1	8.4	19.4	5.5	11.9
HCHO	0.02	0.02	0.01	0.01	0..02	0.01



TVOC	0.06	0.04	0.02	0.02	0.02	0.02
Temperature (° F)	81.9	82.5	83.3	83.3	87.7	87.5
Humidity (%)	70.7	69.6	65.4	69.4	60.5	62.3

Launch 2

Weather Data

Table 8-7. Weather Data – February 10-11, 2026.

Time	1:17 PM	2:13 PM	9:59 AM	11:58 AM	1:15 PM	2:26 PM
Date	10-Feb-26	10-Feb-26	11-Feb-26	11-Feb-26	11-Feb-26	11-Feb-26
Sample Location	Landing	Point 6	Landing	Point 1	Point 5	Point 3
Wind Speed (mph)	3.8	0.9	2.1	0.9	4.8	1.4
Temperature (°F)	74.8	76.3	75.8	80.1	74.8	82.1
Wind Direction	-	-	-	-	-	-
Humidity (%)	61.8	64.2	54.1	49	54.6	50.5
Heat Index (°F)	74.3	76.8	75	79.7	73.9	83.8
Dew Point (°F)	60.2	63.5	58	59.1	58	62.6
Pressure	1026.8	1025.6	1026.4	1024.5	1024.2	1023.1
Barometric Pressure	1026.2	1026	1026.2	1024.8	1024.1	1023.5
Density Altitude	788	945	831	1194	977	1465
Wind Chill (°F)	75.5	76.3	75.6	80.1	74.4	82.4
Wet Bulb	65.1	67.6	63.5	66.4	64.4	69.4
Altitude	-349	-344	-359	-322	-298	-300

Table 8-8. Weather Data – February 12-13, 2026.

Time	9:23 AM	10:28 AM	11:59 AM	1:05 PM	9:08 AM	10:46 AM	11:57 AM	1:13 PM
Date	12-Feb-26	12-Feb-26	12-Feb-26	12-Feb-26	13-Feb-26	13-Feb-26	13-Feb-26	13-Feb-26
Sample Location	Landing	Point 4	Point 6	Point 2	Landing	Point 5	Point 3	Point 1
Wind Speed (mph)	1.1	3.2	2.3	3.9	5.7	4.5	5.1	6.1



Temperature (°F)	77.1	78.2	76.8	75.8	74	80.3	76.7	79.9
Wind Direction	-	-	-	-	-	-	-	-
Humidity (%)	59.4	55.2	60.9	56.2	81.3	61.8	70.9	65.4
Heat Index (°F)	77.5	75.7	77.2	74.8	75.7	83.1	78.3	82.4
Dew Point (°F)	62.3	58.6	62.8	58.9	67.9	66.6	67.4	67.3
Pressure	1023.4	1023.1	1023	1021.3	1021.9	1021.9	1021.3	1021
Barometric Pressure	1023.2	1023.2	1022.4	1021.3	1021.6	1021.8	1021.7	1020.4
Density Altitude	1114	974	1032	1002	941	1405	1181	1477
Wind Chill (°F)	77	78.3	76.8	75.6	73.9	80.2	76.6	79.9
Wet Bulb	67.5	64.4	67.6	64.6	69.6	70.9	70.5	71.1
Altitude	-281	-279	-257	-221	-228	-243	-229	-197

Table 8-9. Weather Data – February 14 & 17, 2026.

Time	8:59 AM	10:11 AM	11:24 AM	12:32 PM	9:02	10:24	11:27	12:41
Date	14-Feb-26	14-Feb-26	14-Feb-26	14-Feb-26	17-Feb-26	17-Feb-26	17-Feb-26	17-Feb-26
Sample Location	Landing	Point 6	Point 4	Point 2	Landing	Point 3	Point 5	Point 1
Wind Speed (mph)	2.7	3.7	1.6	4.8	6.4	7.1	2.8	1.4
Temperature (°F)	75.6	76.7	77.7	80	78.5	77.2	81.1	85.6
Wind Direction	-	-	-	-	ESE	ESE	ESE	ESE
Humidity (%)	69.2	63.6	63.1	60	67.1	69.8	59.8	58.2
Heat Index (°F)	76.3	77	79	81	80.6	84	87.3	89.4
Dew Point (°F)	64.7	63.6	64.5	64.5	66.9	67.8	68.4	68.1
Pressure	1022.8	1023.8	1022.6	1022.7	1021.9	1022.4	1022.1	1021.3



Barometric Pressure	1022.8	1023	1022.6	1022.1	1022	1022.2	1022.2	1021.2
Density Altitude	1011	1094	1177	1321	1273	1462	1776	1675
Wind Chill (°F)	75.4	76.6	77.9	79.7	79.5	81.7	81.7	85.3
Wet Bulb	68.2	67.8	69.8	69.1	70.5	71.8	72.2	73.6
Altitude	-265	-270	-262	-243	-241	-248	-247	-216

Table 8-10. Weather Data – February 18-19, 2026.

Time	9:24	10:20	11:07	12:10	9:38	22:15
Date	18-Feb-26	18-Feb-26	18-Feb-26	18-Feb-26	19-Feb-26	19-Feb-26
Sample Location	Landing	Point 4	Point 6	Point 2	Landing	Landing
Wind Speed (mph)	4.5	6.7	7.5	4	5.4	9.8
Temperature (°F)	75.2	78.4	79.5	78.4	80.3	74.8
Wind Direction	E	E	E	E	N/NE	N/NE
Humidity (%)	68.8	69.1	70.7	67	68.8	73
Heat Index (°F)	75.9	76.8	84.9	79.9	84.4	76.6
Dew Point (°F)	64.4	65.4	71.3	66.1	69.5	66.3
Pressure	1022.8	1023.3	1023.1	1021.9	1021.5	1019.3
Barometric Pressure	1022.6	1023.4	1022.9	1021.9	1021.5	1018.9
Density Altitude	962	1111	1398	1210	1433	1148
Wind Chill (°F)	75.2	76.1	80.4	78.3	80.2	74.8
Wet Bulb	67.8	69.1	71.2	71.2	72.9	69.1
Altitude	-275	-279	-267	-243	-243	-164

Table 8-11. Weather Data – February 20-21, 2026.

Time	9:27	10:25	11:27	12:25	9:23	10:26	11:12	12:12
Date	20-Feb-26	20-Feb-26	20-Feb-26	20-Feb-26	21-Feb-26	21-Feb-26	21-Feb-26	21-Feb-26
Sample Location	Landing	Point 5	Point 3	Point 1	Landing	Point 4	Point 6	Point 2
Wind Speed (mph)	4.5	7	9.8	4.2	6.2	7.3	4.6	10.6



Temperature (°F)	81.5	84.1	79.5	82.9	78.6	78.3	81.6	77.8
Wind Direction	ESE	ESE	ESE	ESE	SE	SE	SE	SE
Humidity (%)	77.3	79	77.7	74.2	72.6	76.9	69	79
Heat Index (°F)	86.5	88	85.1	93.2	81.7	82.6	85.1	80.6
Dew Point (°F)	71.7	75.9	73.2	74.2	69.2	71.1	70	71.2
Pressure	1019.7	1019.9	1019.5	1019	1021.2	1021	1020.9	1020.7
Barometric Pressure	1019.7	1019.9	1019.2	1018.7	1021.1	1021	1020.9	1020.4
Density Altitude	1580	1551	1566	1910	1321	1381	1480	1290
Wind Chill (°F)	81.5	80.1	79.5	83.3	78.6	78.3	81.1	77.8
Wet Bulb	74.7	75	75.7	77.4	72	73.4	73.2	73.2
Altitude	-181	-187	-167	-169	-219	-224	-214	-207

Table 8-12. Weather Data – February 22 & 25, 2026.

Time	9:15	10:18	11:24	12:19	9:14 AM	10:17 AM	11:15 AM	12:21 PM
Date	22-Feb-26	22-Feb-26	22-Feb-26	22-Feb-26	25-Feb-26	25-Feb-26	25-Feb-26	25-Feb-26
Sample Location	Landing	Point 3	Point 5	Point 1	Landing	Point 6	Point 4	Point 2
Climate/Weather Parameters								
Wind Speed (mph)	7.3	7.4	6.1	6.6	6.6	6.7	3.5	5.1
Temperature (°F)	78.4	78.6	87.5	79.8	70.4	72.2	71.5	72.9
Wind Direction	W	W	W	W				
Humidity (%)	66.2	65	55.4	66.2				
Heat Index (°F)	79.9	81.1	85.8	83.1				
Dew Point (°F)	66.6	66.8	66.3	68.3				
Pressure	1020.2	1020.4	1020.5	1019.9				



Barometric Pressure	1020	1020.1	1020.7	1019.9				
Density Altitude	1289	1362	1684	1548				
Wind Chill (°F)	78.3	78.6	82.6	79.8				
Wet Bulb	70.3	70.7	71.8	72.3				
Altitude	-192	-188	-210	-164				

Table 8-13. Weather Data – February 26, 2026.

Time	9:00 AM	11:19 AM
Date	26-Feb-26	26-Feb-26
Sample Location	Landing	Landing
Climate/Weather Parameters		
Wind Speed (mph)	8.7	9.1
Temperature (°F)	75.9	76.8

Air Quality Results

Table 8-14. Air Quality Data – February 10-11, 2026.

Time	12:25 PM	2:07 PM	9:47 AM	11:52 AM	1:13 PM	2:26 PM
Date	10-Feb-26	10-Feb-26	11-Feb-26	11-Feb-26	11-Feb-26	11-Feb-26
Sample Location	Landing	Point 6	Landing	Point 1	Point 5	Point 3
PM2.5 (µg/m³)	3.3	3	9.7	7.4	5.6	5.3
PM10 (µg/m³)	5.6	5.4	16.5	12	9.2	9.8
HCHO (µg/m³)	0.02	0.01	0.01	0.01	0.01	0.01
TVOC (µg/m³)	0.02	0.02	0.01	0.01	0.02	0.01
Temperature (°F)	77.8	77	81.2	87.4	94.4	93
Humidity (%)	59.6	59.4	47.7	44.5	37.6	37.6
AQI	13	14	42	33	29	21
Particle Count	559	607	1501	1119	928	822



Table 8-15. Air Quality Data – February 12-13, 2026.

Time	9:22 AM	10:33 AM	11:57 AM	1:06 PM	9:09 AM	10:45 AM	11:55 AM	1:16 PM
Date	12-Feb-26	12-Feb-26	12-Feb-26	12-Feb-26	13-Feb-26	13-Feb-26	13-Feb-26	13-Feb-26
Sample Location	Landing	Point 4	Point 6	Point 2	Landing	Point 5	Point 3	Point 1
PM2.5 (µg/m³)	3.9	3.9	8.5	5	7.1	4.9	3.8	4.2
PM10 (µg/m³)	6.8	6.8	14.5	8.6	11.9	7.6	5.7	7
HCHO (µg/m³)	0.01	0	0.02	0.01	0.01	0.01	0.02	0.01
TVOC (µg/m³)	0.02	0	0.02	0.01	0.01	0.01	0.02	0.01
Temperature (°F)	81.2	81.2	79.1	78.5	76	79.1	84.2	91.6
Humidity (%)	53.1	53.1	59.7	57.8	71.4	64.6	57	47.5
AQI	16	16	33	23	29	21	15	20
Particle Count	679	679	1298	805	1091	793	608	696

Table 8-16. Air Quality Data – February 14 & 17, 2026.

Time	8:58 AM	10:10 AM	11:26 AM	12:30 PM	8:57 AM	10:24 AM	11:27 AM	12:38 PM
Date	14-Feb-26	14-Feb-26	14-Feb-26	14-Feb-26	17-Feb-26	17-Feb-26	17-Feb-26	17-Feb-26
Sample Location	Landing	Point 6	Point 4	Point 2	Landing	Point 3	Point 5	Point 1
PM2.5 (µg/m³)	7.6	6.4	6.1	5.6	4.3	2.7	3.9	3.5
PM10 (µg/m³)	13.2	9.5	10.7	9	7.4	4.5	6.5	5.9
HCHO (µg/m³)	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TVOC (µg/m³)	0.2	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Temperature (°F)	76.7	78.5	84	80.3	81.5	78.8	88	83.7
Humidity (%)	69	62.2	56.7	62.1	62.7	67.7	51.1	56.6
AQI	32	26	26	23	11	11	15	11
Particle Count	1183	1012	943	915	696	993	665	596



Table 8-17. Air Quality Data – February 18-19, 2026.

Time	9:22 AM	10:16 AM	11:06 AM	12:09 PM	9:37 AM	11:13 PM
Date	18-Feb-26	18-Feb-26	18-Feb-26	18-Feb-26	19-Feb-26	19-Feb-26
Sample Location	Landing	Point 4	Point 6	Point 2	Landing	Landing
PM2.5 (µg/m³)	4.9	4.4	1.6	3.4	3.1	6
PM10 (µg/m³)	8.9	8.4	3.8	5.6	4.5	10.9
HCHO (µg/m³)	0.01	0.02	0.01	0.01	0.01	0.03
TVOC (µg/m³)	0.02	0.02	0.01	0.01	0.01	0.11
Temperature (°F)	75.1	84.9	79.7	82.4	83.9	74.9
Humidity (%)	73.1	56.7	63.6	61.8	64.6	79.6
AQI	71	22	16	15	8	24
Particle Count	752	754	640	626	389	913

Table 8-18. Air Quality Data – February 20-21, 2026.

Time	9:25 AM	10:23 AM	11:25 AM	12:22 PM	9:22 AM	10:24 AM	11:11 AM	12:08 PM
Date	20-Feb-26	20-Feb-26	20-Feb-26	20-Feb-26	21-Feb-26	21-Feb-26	21-Feb-26	21-Feb-26
Sample Location	Landing	Point 5	Point 3	Point 1	Landing	Point 4	Point 6	Point 2
PM2.5 (µg/m³)	7.3	6.9	6.3	6.3	5.3	11.3	5.4	4
PM10 (µg/m³)	12.6	12.7	11.4	10.01	10	18.4	9.9	6.9
HCHO (µg/m³)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TVOC (µg/m³)	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01
Temperature (°F)	87.1	92.9	89.3	89.8	72.9	81.4	85.7	87.5
Humidity (%)	67.4	55.6	60.7	59.6	79.8	73.7	67.6	63
AQI	29	35	33	36	28	47	21	37
Particle Count	1229	1198	1122	984	1123	1743	889	780



Table 8-19. Air Quality Data – February 22 & 25, 2026.

Time	9:07 AM	10:12 AM	11:18 AM	12:18 PM	9:23 AM	10:20 AM	11:21 AM	12:26 PM
Date	22-Feb-26	22-Feb-26	22-Feb-26	22-Feb-26	25-Feb-26	25-Feb-26	25-Feb-26	25-Feb-26
Sample Location	Landing	Point 3	Point 5	Point 1	Landing	Point 6	Point 4	Point 2
PM2.5 (µg/m³)	4.7	5.8	6.3	6.2	1.5	1.8	1.7	1.8
PM10 (µg/m³)	8.2	9.6	11.8	10.8	2.3	2.7	2.9	3.4
HCHO (µg/m³)	0.01	0.01	0.04	0.01	0.01	0.01	0.01	0.01
TVOC (µg/m³)	0.02	0.02	0.61	0.01	0.01	0.01	0.01	0.01
Temperature (°F)	81	91.7	85.7	88.1	78.1	79.3	76	77.4
Humidity (%)	73.9	54.5	65.3	61.2	53.1	46.5	54.6	50.7
AQI	12	21	24	33	6	7	8	9
Particle Count	731	800	1054	979	260	348	304	342

Table 8-20. Air Quality Data – February 26, 2026.

Time	9:10 AM	11:23 AM
Date	26-Feb-26	26-Feb-26
Sample Location	Landing	Landing
PM2.5 (µg/m³)	6.7	6.4
PM10 (µg/m³)	11	11.7
HCHO (µg/m³)	0.01	0.01
TVOC (µg/m³)	0.01	0.01
Temperature (°F)	82.3	81.2
Humidity (%)	67.1	67
AQI	21	25
Particle Count	1085	946



Launch 1 Water Quality

Table 4-1. Water Quality measured on February 17th, 2025, around the perimeter of the MSA and at the droneship site (Booster).

Location	Booster		MSA 3		MSA 4		MSA 5		MSA 6		MSA 2	
Time	9:10	9:12	10:28	10:30	11:00	11:02	11:45	11:47	12:21	12:23	1:42	1:44
Depth (m)	5.25	1.2	6	1.5	6	1.55	5.75	1.45	5.1	1.55	5.05	1.25
Temp (°F)	77.34	77.31	77.29	77.25	77.39	77.41	77.43	77.59	77.58	77.61	77.54	78.08
pH	8.47	8.46	8.45	8.46	8.48	8.46	8.48	8.46	8.43	8.48	8.49	8.5
DO (%)	8.31	7.9	1.31	1.32	9.05	8.48	1.13	1.16	0.94	1.06	1.22	1.07
TDS (g/L)	26.8	26.7	26.4	27.55	26.0	26.0	26.5	26.2	26.4	26.6	26.6	26.5
Sal (ppt)	28.32	28.27	27.82	27.5	27.38	27.36	27.95	27.65	27.95	27.81	28.07	27.75
Turbidity (NTU)	0	0	0	0	0	0	0	0	0	0	0	0

DO=Dissolved Oxygen, TDS=Total Dissolved Solids, Temp = Temperature, Sal = Salinity

The Booster location and MSA 3, 4, & 5 were measured in the morning. MSA 6 & 2 were measured in the afternoon.



Table 4-5. Water Quality measured on February 18th, 2025, at the Booster landing and MSA 3.

Sample Point	Booster		MSA 3	
Time	10:02 am	10:03 am	12:57 pm	12:58 pm
Depth (m)	5.75	1.4	6	1.55
Temperature (°F)	77.14	77.34	78.29	78.72
pH	8.56	8.53	8.54	8.51
Dissolved Oxygen (%)	1.42	0.75	4.84	5.54
TDS (g/L)	26.71	26.3	26.1	25.8
Salinity (ppt)	26.71	27.7	27.48	27.13
Turbidity (NTU)	0	0	0	0

Two sites were assessed on the day of the launch due to time constraints requiring the launch area to be vacated within a designated time window.

Table 4-14. Water Quality measurements taken on February 19th, 2025, around the perimeter of the MSA. MSA2 was measured in the afternoon and all readings were measured in the morning.

Sample Point	Booster		MSA 3		MSA 4		MSA 5		MSA 6		MSA 2	
Time	10:38	10:39	11:01	11:02	11:23	11:24	11:40	11:41	11:57	11:58	12:16	12:17
Depth (m)	2.55	1	4	1	3.3	1.5	6.2	1.5	4.4	1	3	1
Temperature (°F)	77.36	77.36	77.54	77.45	77.49	77.52	77.45	77.52	77.50	77.54	77.54	77.58
pH	8.57	8.56	8.56	8.52	8.56	8.55	8.56	8.56	8.55	8.56	8.57	8.59
Dissolved Oxygen (%)	9.16	8.5	11.96	9.32	9.38	8.62	0.98	15.23	48.3	14.3	5.5	5.87
Total Dissolved Solids (g/L)	26.1	25.0	24.6	24.7	25.4	25.8	26.5	25.2	26.8	26.2	26.2	26.1
Salinity (ppt)	27.5	26.28	26.86	25.89	26.5	27.07	28	28.05	26.3	27.7	27.56	27.52
Turbidity (NTU)	0	0	0	0	0	0	0	0	0	0	0	0

Launch 2

Water Quality Results



Table 8-21. Water quality results February 10, 2026.

Time	12:46 PM	12:49 PM	1:56 PM	1:57 PM
Date	10-Feb-26	10-Feb-26	10-Feb-26	10-Feb-26
Sample Location	Landing	Landing	Point 6	Point 6
Seawater Specific Gravity (σ_t)	24	23.8	25.1	23.6
Depth (m)	14.25	5.8	16.95	5.05
pHmV	-329	-296	-393	-391
Temperature (°C)	24.74	24.74	24.61	24.73
pH	12.5	11.93	13.57	13.55
Conductivity (ms/cm)	53.9	53.5	55.7	53.2
Dissolved Oxygen (mg/L)	3.38	3.44	3.12	3.68
TDS (g/L)	32.3	32.1	33.4	31.9
Salinity (ppt)	35.62	35.32	36.97	35.11
Oxygen Reduction Potential (OPR)	229	-4	-32	-92
Turbidity (NTU)	2.6	1.7	0	0



Table 8-22. Water quality results – February 11, 2026

Time	9:47 AM	10:09 AM	11:48 AM	11:49 AM	1:07 PM	1:08 PM	2:20 PM	2:21 PM
Date	11-Feb-26	11-Feb-26	11-Feb-26	11-Feb-26	11-Feb-26	11-Feb-26	11-Feb-26	11-Feb-26
Sample Location	Landing	Landing	Point 1	Point 1	Point5	Point 5	Point 3	Point 3
Seawater Specific Gravity (σ_t)	23.2	23.2	22.9	23.1	22.8	22.8	22.1	22.1
Depth (m)	3.45	3.55	4.1	3.85	4.4	3.65	4.2	3.95
pHmV	-65	-69	-69	-70	-69	-70	-70	-70
Temperature (°C)	24.79	24.8	24.82	24.84	24.87	24.89	24.82	24.9
pH	8.64	8.7	8.72	8.72	8.7	8.72	8.72	8.73
Conductivity (ms/cm)	52.4	42.4	52	52.4	51.9	51.7	50.6	50.5
Dissolved Oxygen (mg/L)	3.65	3.63	7.84	7.82	7.63	7.39	2.65	2.68
TDS (gL)	31.5	31.5	31.2	31.4	31.1	31	30.4	30.3
Salinity (ppt)	34.53	34.54	34.21	34.47	34.1	34.02	33.17	33.11
Oxygen Reduction Potential (OPR)	189	191	249	245	270	263	265	261
Turbidity (NTU)	0	0	0	0	0	0	0	0



Table 8-23. Water quality results - February 12, 2026.

Time	9:16 AM	9:22 AM	10:31 AM	10:31 AM	12:03 PM	12:05 PM	1:00 PM	1:01 PM
Date	12-Feb-26	12-Feb-26	12-Feb-26	12-Feb-26	12-Feb-26	12-Feb-26	12-Feb-26	12-Feb-26
Sample Location	Landing	Landing	Point 4	Point 4	Point 6	Point 6	Point 2	Point 2
Seawater Specific Gravity (σ_t)	22.8	22.8	22.4	23.1	23.1	23.2	23.3	23.3
Depth (m)	4.4	4.5	4.5	4.05	5.4	3.2	4.3	3.15
pHmV	-71	-72	-70	-72	-68	-71	-75	-73
Temperature ($^{\circ}\text{C}$)	24.78	24.8	24.78	24.81	24.85	24.92	24.9	24.92
pH	8.74	8.75	8.72	8.77	8.68	8.75	8.82	8.77
Conductivity (ms/cm)	51.7	51.8	51.1	52.4	52.3	52.6	52.8	52.8
Dissolved Oxygen (mg/L)	6.78	6.71	8.2	7.9	7.82	7.87	7.75	7.65
TDS (g/L)	31	31.1	30.7	31.4	31.4	31.5	31.7	31.7
Salinity (ppt)	34	34.05	33.55	34.51	34.41	34.63	34.81	34.77
Oxygen Reduction Potential (OPR)	196	197	260	257	277	266	277	276
Turbidity (NTU)	0	0	0	0	0	0	0	0



Table 8-24. Water quality results - February 13, 2026.

Time	9:14 AM	9:15 AM	10:51 AM	10:52 AM	11:51 AM	11:53 AM	1:10 PM	1:11 PM
Date	13-Feb-26	13-Feb-26	13-Feb-26	13-Feb-26	13-Feb-26	13-Feb-26	13-Feb-26	13-Feb-26
Sample Location	Landing	Landing	Point 5	Point 5	Point 3	Point 3	Point 1	Point 1
Seawater Specific Gravity (σ_t)	23.4	23.3	23	22.9	23.6	23.5	23.9	23.9
Depth (m)	5.2	3.1	6	3.25	6.15	3	5.75	3.3
pHmV	-76	-76	-79	-78	-80	-77	-80	-78
Temperature (°C)	24.64	24.78	24.83	24.86	24.93	24.94	24.8	24.9
pH	8.84	8.83	8.88	8.88	8.91	8.86	8.9	8.87
Conductivity (ms/cm)	52.9	52.7	52.2	52.1	53.4	53.2	53.9	53.8
Dissolved Oxygen (mg/L)	7.21	6.97	4.34	4.41	7.6	7.58	3.08	3.22
TDS (g/L)	31.7	31.6	31.3	31.2	32	31.9	32.59	32.3
Salinity (ppt)	31.84	34.76	34.35	34.26	35.22	35.09	35.59	35.58
Oxygen Reduction Potential (OPR)	239	237	261	260	299	296	260	263
Turbidity (NTU)	0	0	0	0	0	0	0	0



Table 8-25. Water quality results - February 14, 2026

Time	9:06 AM	9:07AM	10:16 AM	10:17 AM	11:38 AM	11:33 AM	12:35 PM	12:36 PM	9:28 AM	9:28 AM
Date	14-Feb-26	14-Feb-26	14-Feb-26	14-Feb-26	14-Feb-26	14-Feb-26	14-Feb-26	14-Feb-26	14-Feb-26	14-Feb-26
Sample Location	Landing	Landing	Point 6	Point 6	Point 4	Point 4	Point 2	Point 2	Landing 2__A	Landing 2__B
Seawater Specific Gravity (σt)	22.3	22.2	23.3	23.2	22.9	22.35	22.7	22.6	22.8	22.7
Depth (m)	5.3	2.75	4.9	2.9	3.35	2.35	4.4	1.35	4	2.45
pHmV	-81	-80	-83	-82	-84	-83	-83	-82	-82	-82
Temperature (°C)	24.77	24.87	24.82	24.82	24.93	24.98	24.96	24.98	24.88	24.89
pH	8.92	8.91	8.96	8.94	8.97	8.97	8.95	8.94	8.95	8.94
Conductivity (ms/cm)	50.1	50.1	52.7	50.5	52	51.6	51.6	51.5	51.6	51.7
Dissolved Oxygen (mg/L)	7.69	7.52	7.68	7.32	7.64	7.53	8.76	7.74	4.13	4.23
TDS (gL)	30.5	30.4	31.6	31.5	31.2	31.1	31	30.8	31.1	31
Salinity (ppt)	33.38	33.21	34.72	34.6	34.24	34.12	33.83	33.81	34.1	33.97
Oxygen Reduction Potential (OPR)	265	262	290	289	282	281	283	284	304	302
Turbidity (NTU)	3.1	3.2	0	0	13.7	14.1	0	0	0	0



Table 8-26. Water quality results - February 17, 2026

Time	9:07 AM	9:08 AM	10:32 AM	10:33 AM	11:32 AM	11:33 AM	12:45 PM	12:46 PM
Date	17-Feb-26	17-Feb-26	17-Feb-26	17-Feb-26	17-Feb-26	17-Feb-26	17-Feb-26	17-Feb-26
Sample Location	Landing	Landing	Point 3	Point 3	Point 5	Point 5	Point 1	Point 1
Seawater Specific Gravity (σ_t)	23	23	22.8	22.6	23.5	22.8	22.3	21.9
Depth (m)	3.75	1.45	4.9	1.1	4.5	1.1	4.8	1.7
pHmV	-82	-83	-84	-83	-82	-83		
Temperature (°C)	24.74	24.74	24.74	24.78	24.85	24.95	24.85	24.98
pH	8.95	8.96	8.98	8.95	8.94	8.96	9	8.97
Conductivity (ms/cm)	52.2	52	51.7	51.3	53	51.9	50.9	50.2
Dissolved Oxygen (mg/L)	7.05	6.84	9.47	8.22	7.5	7.79	8.17	7.32
TDS (g/L)	31.3	31.2	31	30.8	31.8	31.2	30.5	30.1
Salinity (ppt)	34.33	34.23	34.01	33.71	34.97	34.17	33.39	32.88
Oxygen Reduction Potential (OPR)	193	203	266	267	279	279	278	278
Turbidity (NTU)	0.1	0	0	0	0	0	2.7	2.9



Table 8-27. Water quality results - February 18, 2026

Time	9:22	9:23	10:10	10:11	11:01	11:02	12:03	12:03
Date	18-Feb-26	18-Feb-26	18-Feb-26	18-Feb-26	18-Feb-26	18-Feb-26	18-Feb-26	18-Feb-26
Sample Location	Landing	Landing	Point 4	Point 4	Point 6	Point 6	Point 2	Point 2
Seawater Specific Gravity (σ_t)	21.9	21.4	20.8	20.7	22.4	22	21.2	20.8
Depth (m)	2.45	0.45	4.65	1.15	4.2	1.95	2.7	1.7
pHmV	-87	-86	-87	-86	-92	-88	-86	-86
Temperature (°C)	24.64	24.69	24.71	24.76	24.77	9.05	24.8	24.82
pH	8.92	8.95	9.03	9.02	9.12	8.34	9.02	9.02
Conductivity (ms/cm)	50.1	49.3	48.3	48	51.1	50.4	48.9	48.2
Dissolved Oxygen (mg/L)	7.59	7.19	2.07	2.21	10.11	30.2	9.29	8.51
TDS (gL)	30	30.1	29.4	29.3	30.6	30.02	29.8	29.4
Salinity (ppt)	32.78	32.2	31.35	31.25	33.5	33.02	31.92	31.44
Oxygen Reduction Potential (OPR)	230	229	296	292	299	296	292	291
Turbidity (NTU)	0	0	0.2	0.9	0.1	8	0	0



Table 8-28. Water quality results - February 19, 2026

Time	9:33	9:34	22:14	22:15
Date	19-Feb-26	19-Feb-26	19-Feb-26	19-Feb-26
Sample Location	Landing	Landing	Landing	Landing
Seawater Specific Gravity (σ_t)	22.1	21.6	20.3	21.1
Depth (m)	5.1	1.05	4.7	1.1
pHmV	-87	-86	-87	-86
Temperature (°C)	24.9	24.93	24.8	24.96
pH	9.03	9.01	9.08	9.07
Conductivity (ms/cm)	50.5	49.7	48.7	47.3
Dissolved Oxygen (mg/L)	4.54	4.77	4.47	4.6
TDS (gL)	30.3	30.3	29.7	28.8
Salinity (ppt)	33.12	32.55	31.73	30.73
Oxygen Reduction Potential (OPR)	192	200	250	251
Turbidity (NTU)	0.7	0.8	0	0



Table 8-29. Water quality results - February 20, 2026

Time	9:21	9:21	10:21	10:22	11:23	11:24	12:17	12:17
Date	20-Feb-26	20-Feb-26	20-Feb-26	20-Feb-26	20-Feb-26	20-Feb-26	20-Feb-26	20-Feb-26
Sample Location	Landing	Landing	Point 5	Point 5	Point 3	Point3	Point 1	Point 1
Seawater Specific Gravity (σ_t)	22.4	22.2	23.5	23.4	21.7	21.3	22.9	22.6
Depth (m)	3.9	1.5	4.65	1.45	4.2	1	4.1	1.4
pHmV	-89	-87	-93	-90	-93	-91	-94	-92
Temperature (°C)	29.9	24.94	24.94	25.07	25.08	25.16	25.16	25.78
pH	9.07	9.15	9.14	9.08	9.14	9.11	9.15	9.11
Conductivity (ms/cm)	51.1	50.7	53.2	53	50	49.2	52.2	51.9
Dissolved Oxygen (mg/L)	7.46	7.18	1.86	1.97	8.9	7.68	8.41	7.78
TDS (g/L)	30.6	30.4	31.9	31.8	30.5	30	31.3	31
Salinity (ppt)	33.51	33.27	35.9	34.95	32.7	32.16	34.33	34
Oxygen Reduction Potential (OPR)	240	241	268	268	254	292	256	257
Turbidity (NTU)	0	0	0	0	0	0	0	0



Table 8-30. Water quality results - February 21, 2026.

Time	9:25	9:26	10:20	10:21	11:07	11:08	12:05	12:06
Date	21-Feb-26	21-Feb-26	21-Feb-26	21-Feb-26	21-Feb-26	21-Feb-26	21-Feb-26	21-Feb-26
Sample Location	Landing	Landing	Point 6	Point 6	Point 4	Point 4	Point 2	Point 2
Seawater Specific Gravity (σ_t)	22.7	22.6	22.5	22.3	22.9	34.1	22.6	22.4
Depth (m)	3.15	1.4	3.6	1.65	4.4	2	4.7	1.65
pHmV	-93	-92	-95	-93	-95	-93	-97	-94
Temperature ($^{\circ}\text{C}$)	24.85	24.85	25	25.02	25.04	25	25.09	25.3
pH	9.13	9.12	9.17	91.4	9.18	9.13	9.21	9.15
Conductivity (ms/cm)	51.7	51.4	51.4	51	52.1	51.8	51.6	51.3
Dissolved Oxygen (mg/L)	8.69	8.06	10.61	8.34	2.11	2.32	3.77	1.31
TDS (g/L)	31	30.8	30.8	30.6	31.2	31.1	30.9	30.8
Salinity (ppt)	33.98	33.78	33.78	33.5	34.28	34.1	33.89	33.72
Oxygen Reduction Potential (OPR)	180	185	258	259	252	256	270	269
Turbidity (NTU)	0	0	0	0	0	0	0	0



Table 8-31. Water quality results - February 22, 2026.

Time	9:10	9:11	10:14	10:15	11:21	11:22	12:13	12:14
Date	22-Feb-26	22-Feb-26	22-Feb-26	22-Feb-26	22-Feb-26	22-Feb-26	22-Feb-26	22-Feb-26
Sample Location	Landing	Landing	Point 3	Point 3	Point 5	Point 5	Point 1	Point1
Seawater Specific Gravity (σt)	27.2	21.8	23.3	23	23	22.8	22.2	21.6
Depth (m)	4.9	1.5	4.7	1.55	4.05	1.75	4.45	1.85
pHmV	-94	-93	-98	-94	-98	-97	-99	-94
Temperature (°C)	24.98	25.03	25.07	25.11	25.19	26.23	25.2	25.28
pH	9.16	9.14	9.23	9.16	9.23	9.2	9.24	9.16
Conductivity (ms/cm)	50.8	50.1	52.8	52.4	52.3	52.1	51	49.8
Dissolved Oxygen (mg/L)	1.55	0.38	9.79	7.61	9	7.37	8.64	7.39
TDS (g/L)	30.5	30	31.7	31.4	31.1	31.3	30.5	30.4
Salinity (ppt)	33.3	32.79	34.79	34.48	34.42	34.28	33.47	32.53
Oxygen Reduction Potential (OPR)	196	202	243	247	236	258	247	253
Turbidity (NTU)	9.3	8.5	0	0	0	0.6	0	0



8.1.2 Terrestrial

Table 8-32. Weather Conditions Recorded in Cat Island terrestrial surveys during 1st launch

Location	Point Count ID	Date	Time	Temp (°F)	Wind (mph)	Humidity (%)	Cloud Cover (%)
Cat Island	CIPC1	2/14/2025	7:15	77.2	4.1	78.4	N/A
Cat Island	CIPC2	2/14/2025	8:17	80.5	1.7	64.5	N/A
Cat Island	CIPC3	2/14/2025	8:43	79.7	7.5	62.2	N/A
Cat Island	CIPC4	2/14/2025	9:16	85.8	1.8	69.2	N/A
Cat Island	CIPC5	2/14/2025	9:49	85.1	4.7	66.3	N/A
Cat Island	CIPC6	2/14/2025	10:15	89.7	3.6	59.6	N/A
Cat Island	CIPC7	2/14/2025	10:41	85.4	2.7	63.9	N/A
Cat Island	CIPC8	2/14/2025	11:09	81.7	3.9	62.5	N/A
Cat Island	CIPC9	2/14/2025	11:37	87.9	1.3	69.9	N/A
Cat Island	CIPC10	2/14/2025	12:05	91.1	5	52.1	N/A
Cat Island	CIPC11	2/14/2025	12:18	87.9	2.8	50.8	N/A
Cat Island	CIPC12	2/14/2025	12:43	86.4	3.8	42.5	N/A
Cat Island	CIPC13	2/15/2025	7:15	77.2	4.1	78.4	N/A
Cat Island	CIPC14	2/15/2025	7:29	76.5	2.5	75.2	N/A
Cat Island	CIPC15	2/15/2025	7:58	75.8	3.6	79.8	N/A
Cat Island	CIPC16	2/15/2025	8:27	79.5	1.9	86.7	N/A
Cat Island	CIPC17	2/15/2025	8:55	79.1	6.8	87.6	N/A
Cat Island	CIPC18	2/15/2025	9:23	83.5	2	70.4	N/A
Cat Island	CIPC19	2/15/2025	9:49	81.6	3.8	59.8	N/A
Cat Island	CIPC20	2/16/2025	10:00	65.5	2.2	62.3	N/A
Cat Island	CIPC21	2/16/2025	8:47	82.2	1	67.4	N/A
Cat Island	CIPC22	2/16/2025	9:16	79.7	1.4	69.8	N/A
Cat Island	CIPC23	2/16/2025	9:39	85.4	1.2	64.5	N/A
Cat Island	CIPC24	2/16/2025	9:51	82.9	6.6	59.4	N/A
Cat Island	CIPC25	2/16/2025	10:25	85.5	6.7	62.1	N/A
Cat Island	CIPC26	2/16/2025	11:13	89.2	0.8	55.8	N/A
Cat Island	CIPC27	2/16/2025	11:38	86.7	1.6	65.1	N/A
Cat Island	CIPC28	2/16/2025	11:51	87.6	4.1	63.2	N/A
Cat Island	CIPC29	2/17/2025	12:44	88.6	2.1	56.2	N/A
Cat Island	CIPC30	2/17/2025	8:17	82	4.5	77.4	N/A
Cat Island	CIPC31	2/17/2025	8:39	80.7	3.9	77.2	N/A
Cat Island	CIPC32	2/17/2025	9:03	84.4	4.2	69.8	N/A
Cat Island	CIPC33	2/17/2025	9:12	82.9	3.7	63.4	N/A



Cat Island	CIPC34	2/17/2025	10:02	82.6	1.8	74.3	N/A
Cat Island	CIPC36	2/17/2025	11:16	81.6	4.4	72.5	N/A
Cat Island	CIPC38	2/17/2025	12:40	86.5	6.6	62.4	N/A
Cat Island	CIPC39	2/17/2025	13:42	87.2	3	61.3	N/A
Cat Island	CIPC40	2/17/2025	14:07	86.4	2.1	66.8	N/A
Cat Island	CIPC41	2/17/2025	14:34	81	3.3	71.9	N/A
Cat Island	CIPC1	2/18/2025	7:27	77.6	6.2	72.2	N/A
Cat Island	CIPC2	2/18/2025	8:00	80.2	2.1	63.1	N/A
Cat Island	CIPC3	2/18/2025	8:29	81.5	5.2	61	N/A
Cat Island	CIPC4	2/18/2025	9:02	82.6	2.6	59.8	N/A
Cat Island	CIPC5	2/18/2025	9:33	84.8	2.8	52.4	N/A
Cat Island	CIPC6	2/18/2025	9:59	90	5.9	50	N/A
Cat Island	CIPC7	2/18/2025	10:25	83.4	4.2	59.6	N/A
Cat Island	CIPC8	2/18/2025	10:53	86.1	2.4	72.8	N/A
Cat Island	CIPC9	2/18/2025	11:22	88	3.1	91.4	N/A
Cat Island	CIPC10	2/18/2025	11:48	86	2.4	83.7	N/A
Cat Island	CIPC11	2/18/2025	12:18	87.9	2.8	50.8	N/A
Cat Island	CIPC12	2/18/2025	12:43	86.4	3.8	42.5	N/A
Post Landing							
Cat Island	CIPC14	2/21/2025	9:31	77.1	5.6	63.6	N/A
Cat Island	CIPC15	2/21/2025	9:04	77	2.1	70.6	N/A
Cat Island	CIPC16	2/21/2025	8:34	77.6	1.4	71.4	N/A
Cat Island	CIPC17	2/21/2025	8:19	74.3	2.2	75.7	N/A
Cat Island	CIPC18	2/21/2025	8:13	75	2.2	78.6	N/A
Cat Island	CIPC19	2/21/2025	7:46	74.3	4.7	76.5	N/A
Cat Island	CIPC20	2/19/2025	12:23	83.2	6.5	86.3	N/A
Cat Island	CIPC21	2/19/2025	12:15	83.6	7.7	66.7	N/A
Cat Island	CIPC22	2/19/2025	11:53	90.9	1.6	57.5	N/A
Cat Island	CIPC23	2/19/2025	11:29	88.2	2.4	56.8	N/A
Cat Island	CIPC24	2/19/2025	10:59	87.3	0.7	55.5	N/A
Cat Island	CIPC25	2/19/2025	10:39	86.2	1.9	59.9	N/A
Cat Island	CIPC26	2/19/2025	10:18	82.3	2.2	68.5	N/A
Cat Island	CIPC27	2/19/2025	9:57	82.6	1	70.1	N/A
Cat Island	CIPC28	2/19/2025	9:31	84.2	0.9	73.6	N/A
Cat Island	CIPC30	2/20/2025	12:15	86.1	1.2	78.2	N/A
Cat Island	CIPC31	2/20/2025	11:30	80.1	7.1	79.9	N/A
Cat Island	CIPC32	2/20/2025	11:18	79.6	8.4	76.6	N/A
Cat Island	CIPC33	2/20/2025	10:21	80.3	6.1	83.5	N/A
Cat Island	CIPC34	2/20/2025	10:08	80.4	4.3	83	N/A



Cat Island	CIPC35	2/20/2025	9:30	78.4	7.6	86	N/A
Cat Island	CIPC36	2/20/2025	9:19	78.9	8.2	85.4	N/A
Cat Island	CIPC38	2/20/2025	8:09	8:14	78.4	6.9	N/A
Cat Island	CIPC39	2/19/2025	8:12	76.9	1.7	86	N/A
Cat Island	CIPC40	2/19/2025	8:34	76.8	5.8	83.6	N/A
Cat Island	CIPC41	2/19/2025	8:52	81.6	1.4	75	N/A

Table 8-33. Weather Conditions Recorded in Cat Island terrestrial surveys during 2nd launch

Date	Plot	Temperature (F)	Wind (mph)	Speed	Humidity (%)
Pre-Landing					
Feb 10 2026	NCPC1	0	0		0
Feb 10 2026	Transect	63.2	3		77.5
Feb 10 2026	NCPC2	70.6	6		67.5
Feb 10 2026	Transect	75.8	6		58.1
Feb 10 2026	NCPC3	72.8	5		60.9
Feb 10 2026	Transect	79.2	10		57.2
Feb 10 2026	NCPC4	81.4	5		47.5
Feb 10 2026	Transect	81.7	9		46.5
Feb 10 2026	NCPC5	88.8	3		40.3
Feb 10 2026	Transect	86.8	7		42.5
Feb 10 2026	NCPC6	82.2	3		46.9
Feb 10 2026	Transect	83.8	3		47.5
Feb 10 2026	NCPC7	90.2	5		46.1
Feb 10 2026	Transect	88.6	2		42
Feb 10 2026	NCPC8	94.2	13		37.1
Feb 10 2026	Transect	88.8	5		42.3
Feb 10 2026	NCPC9	89.2	3		39.6
Feb 10 2026	Transect	81.3	12		48.8
Feb 10 2026	NCPC10	94	7		33.8
Feb 11 2026	Transect	64.4	5		72.4
Feb 11 2026	NCPC11	70.4	3		66.1
Feb 11 2026	Transect	71.6	4		61.3
Feb 11 2026	NCPC12	67.9	6		68.5
Feb 11 2026	Transect	74.5	5		65.2
Feb 11 2026	NCPC13	69.9	8		69.8
Feb 11 2026	Transect	86.2	11		42.3
Feb 11 2026	NCPC14	79.5	9		46.2
Feb 11 2026	Transect	84.8	3		44.1



Feb 11 2026	NCPC15	82.8	7	43.7
Feb 11 2026	Transect	86.7	9	44
Feb 11 2026	NCPC16	80.5	9	47.2
Feb 11 2026	Transect	84.9	10	44.5
Feb 11 2026	NCPC17	85.6	1	45.1
Feb 11 2026	Transect	82.7	4	44.5
Feb 11 2026	NCPC18	82.9	10	45.6
Feb 11 2026	Transect	84.1	8	41.7
Feb 11 2026	NCPC19	82.5	3	41.9
Feb 12 2026	NCPC20	62.1	0	76.2
Feb 12 2026	Transect	71	2.5	73.4
Feb 12 2026	NCPC21	72.9	4.4	66
Feb 12 2026	Transect	72.5	3.2	66.3
Feb 12 2026	NCPC22	73.9	6.4	65.3
Feb 12 2026	Transect	72.8	3.7	64.9
Feb 12 2026	NCPC23	76.4	3.4	65.3
Feb 12 2026	Transect	75.8	5.7	65.3
Feb 12 2026	NCPC24	76.5	5.1	66.9
Feb 12 2026	Transect	72.8	3.7	64.9
Feb 12 2026	NCPC25	73.6	4	77.1
Feb 12 2026	Transect	73.4	3.1	63.5
Feb 12 2026	NCPC26	74.8	3	69.4
Feb 12 2026	Transect	72.9	3.4	69.3
Feb 12 2026	NCPC27	75.3	3.4	69.3
Feb 12 2026	Transect	72.9	3.4	74
Feb 12 2026	NCPC28	73.2	3.1	72.1
Feb 13 2026	Transect	72.1	1.9	69.2
Feb 13 2026	NCPC29	72.1	1.3	67.7
Feb 13 2026	Transect	75.4	2.1	66
Feb 13 2026	NCPC30	73.1	5.5	64.1
Feb 13 2026	Transect	73.9	3.2	66
Feb 13 2026	NCPC31	73.3	3.6	71.4
Feb 13 2026	Transect	76.3	2	65.2
Feb 13 2026	NCPC32	74.1	5.1	65.2
Feb 13 2026	Transect	74.6	3	62.2
Feb 13 2026	NCPC33	74	1.8	66.8
Feb 13 2026	Transect	74.7	4.1	66.7
Feb 13 2026	NCPC34	74.6	2	66.2
Feb 13 2026	Transect	74.7	4.1	66.7



Feb 13 2026	NCPC35	78.3	2.8	67
Feb 13 2026	Transect	75.9	2.5	66.2
Feb 13 2026	NCPC36	77.7	4.6	67
Feb 14 2026	NCPC37	72.7	0	73
Feb 14 2026	Transect	86.1	0	68.8
Feb 14 2026	NCPC38	78.2	0	68.3
Feb 14 2026	Transect	86.1	0	68.8
Feb 14 2026	NCPC39	79.2	1.5	69.1
Feb 14 2026	Transect	86.9	1.6	69.6
Feb 14 2026	NCPC40	85	2.3	66.5
Feb 14 2026	Transect	87.6	0	69
Feb 14 2026	NCPC41	87.4	1.3	60.7
Feb 15 2026	Transect	70.3	0.9	71.1
Feb 15 2026	NCPC42	71.5	1.5	72.9
Feb 15 2026	Transect	75.5	1.1	69.4
Feb 15 2026	NCPC43	74.6	1.2	64.5
Feb 15 2026	Transect	74.4	1.2	64.3
Feb 15 2026	NCPC44	74.4	1.2	64.3
Feb 15 2026	Transect	70.2	1.2	65
Feb 15 2026	NCPC45	77.9	0	69.5
Feb 15 2026	Transect	78.4	1.2	70.8
Feb 15 2026	NCPC46	80.7	0.8	69.8
Feb 17 2026	Transect	70.2	0	63.4
Feb 17 2026	NCPC47	70.5	0	63.6
Feb 17 2026	Transect	74.5	0	67.5
Feb 17 2026	NCPC48	77	0.8	69.7
Feb 17 2026	Transect	79.1	0.6	70.1
Feb 17 2026	NCPC49	77.7	1.1	69.2
Feb 17 2026	Transect	77.7	1.1	69.2
Feb 17 2026	NCPC50	80	0	68.8
Feb 17 2026	Transect	77.7	1.1	69.2
Feb 17 2026	NCPC51	80.6	0.8	67.6
Feb 17 2026	Transect	83.2	1	58.5
Feb 17 2026	NCPC52	80.1	1.2	67.7
Feb 17 2026	Transect	86.3	0.8	67.7
Feb 17 2026	NCPC53	91.3	0	73.9
Feb 17 2026	Transect	96.7	0	51.6
Feb 17 2026	NCPC54	86.2	0	55.7
Feb 17 2026	Transect	90.2	0	60



Feb 17 2026	NCPC55	90	1.6	70.1
Feb 18 2026	Transect	73.9	1.4	79.7
Feb 18 2026	NCPC56	78.2	3.1	74.4
Feb 18 2026	Transect	79.6	2.1	73.2
Feb 18 2026	NCPC57	73.8	1.8	92.8
Feb 18 2026	Transect	79.7	1.1	74.5
Feb 18 2026	NCPC58	76.4	1.7	83.7
Post Landing				
Feb 20 2026	NCPC1	74.7	0	85.8
Feb 20 2026	Transect	75.3	1.4	84.4
Feb 20 2026	NCPC2	74.9	2.2	88.7
Feb 20 2026	Transect	75.8	1.8	88.5
Feb 20 2026	NCPC3	75.8	4.5	86.3
Feb 20 2026	Transect	75.8	3.9	85.2
Feb 20 2026	NCPC4	76.2	2.7	83.4
Feb 20 2026	Transect	79	0	82.9
Feb 20 2026	NCPC5	79.8	2.2	79.4
Feb 20 2026	Transect	79.3	0.8	79.9
Feb 20 2026	NCPC6	78.5	1.9	82
Feb 20 2026	Transect	82.1	0.9	79.9
Feb 20 2026	NCPC7	82.5	1.1	76.3
Feb 20 2026	Transect	82.3	1.2	75.4
Feb 20 2026	NCPC8	81	1.4	59.7
Feb 20 2026	Transect	82.4	0.9	78.3
Feb 20 2026	NCPC9	75.6	1.4	96.6
Feb 21 2026	Transect	75.5	3.7	97
Feb 21 2026	NCPC10	75.3	5.8	98.2
Feb 21 2026	Transect	76.5	4.8	96.5
Feb 21 2026	NCPC11	76.6	4.9	90.9
Feb 21 2026	Transect	78.4	5.6	87.1
Feb 21 2026	NCPC12	77.9	4.6	85
Feb 21 2026	Transect	77.4	6.1	83.2
Feb 21 2026	NCPC13	77.7	6.7	85.5
Feb 21 2026	Transect	79.6	2.9	83.3
Feb 21 2026	NCPC14	80.1	5.2	78.8
Feb 21 2026	Transect	79.1	4.7	81.2
Feb 21 2026	NCPC15	81.4	1.8	77.7
Feb 21 2026	Transect	83.7	0	74.8
Feb 21 2026	NCPC16	82	1.3	74



Feb 21 2026	Transect	81.6	3.6	74.1
Feb 21 2026	NCPC17	80.1	3.4	75.3
Feb 21 2026	Transect	80.5	5.8	76.4
Feb 21 2026	NCPC18	88.9	4.1	62.4
Feb 21 2026	Transect	81.3	4.9	71.9
Feb 21 2026	NCPC19	80.9	4.9	72.2
Feb 22 2026	NCPC20	74.3	0	69.8
Feb 22 2026	Transect	73.4	1.3	76.6
Feb 22 2026	NCPC21	74.6	0	72.5
Feb 22 2026	Transect	82.2	0	81.9
Feb 22 2026	NCPC22	81.2	0	76.9
Feb 22 2026	Transect	75.8	0	83.8
Feb 22 2026	NCPC23	89.6	0	80.4
Feb 22 2026	Transect	87.3	0	75.8
Feb 22 2026	NCPC24	82.1	0	86.1
Feb 22 2026	Transect	85.7	0	76.1
Feb 22 2026	NCPC25	81.3	0.7	78.8
Feb 22 2026	Transect	87.7	0	77.5
Feb 22 2026	NCPC26	85.6	1.1	80
Feb 22 2026	Transect	88.3	1.8	75.3
Feb 22 2026	NCPC27	82	1.5	76.3
Feb 22 2026	Transect	79.9	2.9	77
Feb 22 2026	NCPC28	84.9	2	73.6
Feb 22 2026	Transect	87.1	1.3	75.8
Feb 22 2026	NCPC29	85.5	1.1	76.7
Feb 24 2026	NCPC38	66	6.2	57.2
Feb 24 2026	Transect	70.3	5.9	48.2
Feb 24 2026	NCPC39	70.8	6.7	46
Feb 24 2026	Transect	69.6	4.5	48.1
Feb 24 2026	NCPC40	65.9	2.5	54.9
Feb 24 2026	Transect	72.2	1.9	44.8
Feb 24 2026	NCPC41	69.2	1.1	57.5
Feb 24 2026	Transect	70.5	1.8	44.8
Feb 24 2026	NCPC42	70.9	1	52.7
Feb 24 2026	Transect	72.7	1.5	51.8
Feb 24 2026	NCPC43	72.2	0.9	55
Feb 24 2026	Transect	70.2	3	50
Feb 24 2026	NCPC44	69.1	1.3	68.7
Feb 24 2026	Transect	68.3	8	57.3



Feb 24 2026	NCPC45	71.4	13.3	55.1
Feb 24 2026	Transect	68.5	9	54
Feb 24 2026	NCPC46	69.5	12.3	57.3
Feb 24 2026	Transect	68.7	8	54.2
Feb 24 2026	NCPC47	71.6	5.3	70
Feb 24 2026	Transect	69	9.4	57.8
Feb 24 2026	NCPC48	70	7.4	69.8
Feb 24 2026	Transect	68.4	13.4	54.7
Feb 24 2026	NCPC49	68.1	9.4	66.1
Feb 24 2026	Transect	71.6	1	70.9
Feb 24 2026	NCPC50	73.8	1.2	55
Feb 24 2026	Transect	74.4	1.4	5.3
Feb 24 2026	NCPC51	76.8	1.4	43
Feb 24 2026	Transect	72	0	56
Feb 25 2026	NCPC52	72.6	2.7	59.9
Feb 25 2026	NCPC53	72.1	1.6	58.8
Feb 25 2026	Transect	71.7	4.5	61.6
Feb 25 2026	NCPC54	72	5.6	55.8
Feb 25 2026	Transect	68.9	2.8	60.8
Feb 25 2026	NCPC55	77.2	7.3	61.6
Feb 25 2026	Transect	77.1	4.5	44
Feb 25 2026	NCPC56	70.2	6.7	62
Feb 25 2026	Transect	79.6	0	57.8
Feb 25 2026	NCPC57	72.8	7.2	57.4
Feb 25 2026	Transect	74	0	50.5
Feb 25 2026	NCPC58	75.2	1.7	48.8

Table 8-34. Weather Conditions Recorded in eleuthera terrestrial surveys during 1st landing

Location	Point Count ID	Date	Time	Temp (°F)	Wind (mph)	Humidity (%)	Cloud Cover (%)
Bannerman Town and John Millars	BTJM1	02/14/25	8:19 AM	80.5	1.7	84.0	1-33%
Bannerman Town and John Millars	BTJM2	02/14/25	8:44 AM	82.1	0.6	68.2	1-33%



Bannerman Town and John Millars	BTJM3	02/14/25	9:16 AM	82.3	0.8	67.4	1-33%
Bannerman Town and John Millars	BTJM4	02/14/25	9:37 AM	86.2	0.8	64.2	1-33%
Bannerman Town and John Millars	BTJM5	02/14/25	10:13 AM	86.0	1.0	69.8	1-33%
Bannerman Town and John Millars	BTJM6	02/14/25	10:48 AM	86.5	1.2	62.0	1-33%
Bannerman Town and John Millars	BTJM7	02/14/25	11:10 AM	85.0	2.2	60.9	1-33%
Bannerman Town and John Millars	BTJM8	02/14/25	11:26 AM	87.5	1.0	59.5	1-33%
Bannerman Town and John Millars	BTJM9	02/14/25	12:18 PM	85.0	2.2	60.9	1-33%
Bannerman Town and John Millars	BTJM10	02/14/25	12:38 PM	85.0	1.6	63.0	1-33%
Bannerman Town and John Millars	BTJM11	02/14/25	1:06 PM	87.6	1.9	73.0	1-33%
Bannerman Town and John Millars	BTJM12	02/14/25	1:24 PM	88.5	2.4	63.2	1-33%
Bannerman Town and John Millars	BTJM13	02/14/25	1:43 PM	86.8	2.5	63.0	1-33%
Bannerman Town and John Millars	BTJM14	02/14/25	2:24 PM	86.2	1.9	64.3	1-33%
Bannerman Town and John Millars	BTJM15	02/14/25	2:49 PM	88.8	1.5	57.3	1-33%



Bannerman Town and John Millars	BTJM16	02/14/25	3:16 PM	86.3	1.8	60.9	1-33%
Bannerman Town and John Millars	BTJM17	02/14/25	3:31 PM	87.8	1.7	62.4	1-33%
Bannerman Town and John Millars	BTJM18	02/14/25	3:36 PM	83.5	1.4	64.7	1-33%
Davis Harbour	DH1	02/15/25	7:57 AM	80.2	0.5	71.0	1-33%
Davis Harbour	DH2	02/15/25	8:27 AM	81.9	2.7	68.6	1-33%
Davis Harbour	DH3	02/15/25	11:10 AM	84.3	4.2	62.1	1-33%
Davis Harbour	DH4	02/15/25	11:39 AM	86.0	2.2	58.8	1-33%
Davis Harbour	DH5	02/15/25	11:58 AM	86.1	1.0	55.1	1-33%
Weymss Bight	WB1	02/15/25	1:58 PM	88.2	2.3	52.8	1-33%
Weymss Bight	WB2	02/15/25	2:18 PM	90.2	2.0	55.3	1-33%
Weymss Bight	WB3	02/15/25	2:39 PM	88.9	4.0	60.8	1-33%
Weymss Bight	WB4	02/15/25	2:53 PM	88.8	3.0	55.5	1-33%
Weymss Bight Cemetary	WBC1	02/16/25	11:19 AM	79.1	3.9	67.7	1-33%
Weymss Bight Cemetary	WBC2	02/16/25	8:20 AM	80.3	3.0	66.4	1-33%
Weymss Bight Cemetary	WBC3	02/16/25	8:42 AM	82.4	2.5	63.0	1-33%
Weymss Bight Cemetary	WBC4	02/16/25	9:07 AM	79.8	4.7	67.8	1-33%
Weymss Bight Cemetary	WBC5	02/16/25	9:31 AM	86.7	1.7	57.7	1-33%
Weymss Bight Cemetary	WBC6	02/16/25	10:03 AM	81.1	4.1	64.7	1-33%
Plum Creek	PC1	02/17/25	8:37 AM	82.1	3.3	73.1	1-33%
Plum Creek	PC2	02/17/25	9:01 AM	81.5	3.0	66.4	1-33%
Plum Creek	PC3	02/17/25	9:18 AM	78.3	4.9	79.5	1-33%
Plum Creek	PC4	02/17/25	9:41 AM	79.8	4.7	67.8	34-66%
Plum Creek	PC5	02/17/25	10:08 AM	79.2	2.0	82.8	34-66%



Plum Creek	PC6	02/17/25	10:40 AM	81.6	4.0	71.0	34-66%
Plum Creek	PC7	02/17/25	11:07 AM	81.9	5.5	70.8	1-33%
Plum Creek	PC8	02/17/25	11:48 AM	86.2	6.1	76.2	1-33%
Plum Creek	PC9	02/17/25	12:22 PM	76.2	6.1	73.2	1-33%
Cape Eleuthera	CE1	02/18/25	7:59 AM	78.5	2.3	75.1	1-33%
Cape Eleuthera	CE2	02/18/25	8:22 AM	79.1	1.2	74.9	1-33%
Cape Eleuthera	CE3	02/18/25	8:39 AM	79.3	3.3	75.4	1-33%
Cape Eleuthera	CE4	02/18/25	9:18 AM	81.5	1.3	75.9	1-33%
Cape Eleuthera	CE5	02/18/25	9:38 AM	86.0	2.0	67.5	1-33%
Cape Eleuthera	CE6	02/18/25	10:49 AM	87.5	2.0	58.4	1-33%
Cape Eleuthera	CE7	02/18/25	11:08 AM	84.5	1.1	60.9	1-33%
Cape Eleuthera	CE8	02/18/25	11:29 AM	82.6	3.0	70.1	1-33%
Cape Eleuthera	CE9	02/18/25	12:08 PM	82.6	1.6	69.3	1-33%
Cape Eleuthera	CE10	02/18/25	12:36 PM	85.4	2.2	68.8	1-33%
Cape Eleuthera	CE11	02/18/25	12:44 PM	83.1	2.1	70.9	1-33%
Post Landing							
Plum Creek	PC1	2/19/2025	2:02 PM	81.9	8.1	76.7	
Plum Creek	PC2	2/19/2025	2:20 PM	81.2	8.5	80.6	
Plum Creek	PC3	2/19/2025	2:40 PM	81.3	7.4	84.1	
Plum Creek	PC4	2/19/2025	3:12 PM	84.4	8.0	69.8	
Plum Creek	PC5	2/19/2025	3:43 PM	86.7	4.6	68.2	
Plum Creek	PC6	2/19/2025	4:03 PM	87.4	7.0	68.5	
Plum Creek	PC7	2/19/2025	4:34 PM	85.1	6.9	75.0	
Plum Creek	PC8	2/19/2025	4:56 PM	83.1	7.1	71.7	



Plum Creek	PC9	2/19/2025	5:28 PM	79.9	5.2	76.8	
Davis Harbour	DH1	2/20/2025	7:21 AM	77.4	9.0	86.0	
Davis Harbour	DH2	2/20/2025	7:48 AM	78.3	11.3	86.0	
Davis Harbour	DH3	2/20/2025	8:07 AM	78.5	12.1	84.0	
Davis Harbour	DH4	2/20/2025	8:28 AM	78.7	12.3	83.3	
Davis Harbour	DH5	2/20/2025	8:49 AM	80.0	5.4	76.5	
Wemyss Bight	WB1	2/20/2025	10:05 AM	81.0	7.2	83.6	
Wemyss Bight	WB2	2/20/2025	10:22 AM	78.9	7.5	82.8	
Wemyss Bight	WB3	2/20/2025	11:01 AM	79.7	9.1	86.1	
Wemyss Bight	WB4	2/20/2025	11:20 AM	78.8	8.2	77.4	
Wemyss Bight Cemetery	WBC6	2/20/2025	2:44 PM	84.0	5.4	79.0	
Wemyss Bight Cemetery	WBC5	2/20/2025	3:39 PM	79.7	8.6	82.5	
Wemyss Bight Cemetery	WBC4	2/20/2025	3:55 PM	86.5	2.2	62.0	
Wemyss Bight Cemetery	WBC3	2/20/2025	4:15 PM	84.0	8.9	61.7	
Wemyss Bight Cemetery	WBC2	2/20/2025	4:36 PM	82.6	10.0	68.5	
Wemyss Bight Cemetery	WBC1	2/20/2025	4:56 PM	79.3	6.3	68.8	
John Millars Beach	JB1	2/21/2025	10:37 AM	76.0	11.0	67.7	
John Millars Beach	JB2	2/21/2025	11:03 AM	78.0	8.1	66.7	
John Millars Beach	JB3	2/21/2025	11:38 AM	78.1	4.2	64.6	
John Millars Beach	JB4	2/21/2025	12:07 PM	77.0	4.5	66.2	
John Millars Beach	JB5	2/21/2025	12:31 PM	77.0	7.1	64.6	
John Millars Beach	JB6	2/21/2025	1:06 PM	82.0	5.3	65.6	
John Millars Beach	JB7	2/21/2025	1:36 PM	80.8	2.4	58.2	



John Millars Beach	JB8	2/21/2025	2:25 PM	74.9	6.2	66.1	
John Millars Beach	JB9	2/21/2025	2:45 PM	74.4	10.5	68.0	
John Millars Beach	JB10	2/21/2025	3:03 PM	75.3	2.5	65.9	
John Millars Beach	JB11	2/21/2025	3:25 PM	74.8	5.3	66.7	
John Millars Beach	JB12	2/21/2025	3:44 PM	75.0	1.3	64.5	
John Millars Beach	JB13	2/22/2025	11:15 AM	78.4	9.0	52.4	
John Millars Beach	JB14	2/22/2025	11:48 AM	85.4	7.7	49.6	
John Millars Beach	JB15	2/22/2025	12:13 PM	81.7	9.0	50.0	
John Millars Beach	JB16	2/22/2025	12:36 PM	90.0	1.7	47.2	

Table 8-35. Weather Conditions Recorded in Eleuthera terrestrial surveys during 2nd Landing

Date	Plot	Temperature (F)	Wind (mph)	Speed	Humidity (%)
Pre-Landing					
Feb 10 2026	SEPC1	69.8	3.2		64.7
Feb 10 2026	Transect	76.5	2.3		53.7
Feb 10 2026	SEPC2	73.9	3.3		54.4
Feb 10 2026	Transect	73.6	2.7		58.9
Feb 10 2026	SEPC3	74.8	3.6		56
Feb 10 2026	Transect	74.2	1.6		54.3
Feb 10 2026	SEPC4	76.1	3.5		53.9
Feb 10 2026	Transect	76	5.4		53.9
Feb 10 2026	SEPC5	80.7	5.9		51.5
Feb 10 2026	Transect	77.2	4.7		55.5
Feb 10 2026	SEPC6	76.3	6		55.5
Feb 10 2026	Transect	80.5	3.1		52.4
Feb 10 2026	SEPC7	84.9	0.9		49.3
Feb 10 2026	Transect	80.4	3.3		51.8
Feb 10 2026	SEPC8	84.5	2.7		44.4
Feb 11 2026	SEPC9	67.7	0		71.2



Feb 11 2026	Transect	75.6	0.8	59.4
Feb 11 2026	SEPC10	70.8	0.9	63.8
Feb 11 2026	Transect	77.7	2.1	61.2
Feb 11 2026	SEPC11	76.4	3.5	63
Feb 11 2026	Transect	80.6	1.4	51
Feb 11 2026	SEPC12	79.2	2	52.1
Feb 11 2026	Transect	79.5	7.2	51.8
Feb 11 2026	SEPC13	77.7	8	47.5
Feb 11 2026	SEPC14	84.1	5.3	44.1
Feb 11 2026	Transect	81.4	3.2	43.4
Feb 11 2026	SEPC15	82.1	2.2	50.7
Feb 11 2026	Transect	78.8	1.2	52.1
Feb 12 2026	SEPC16	71.3	1.5	65.7
Feb 12 2026	Transect	73.7	1.9	66.5
Feb 12 2026	SEPC17	76.6	2.4	62.4
Feb 12 2026	Transect	74.5	6	62.8
Feb 12 2026	SEPC18	73.5	2.8	68.6
Feb 12 2026	Transect	75.8	5.2	59.3
Feb 12 2026	SEPC19	82.2	3.1	54.6
Feb 12 2026	Transect	78.5	5.1	57.3
Feb 12 2026	SEPC20	74.9	7.2	59.5
Feb 12 2026	Transect	76.1	8.9	53.1
Feb 12 2026	SEPC21	78.2	8.2	63.3
Feb 12 2026	Transect	80.6	4.8	56.4
Feb 12 2026	SEPC22	82.8	6.8	57.1
Feb 13 2026	SEPC23	71.9	4.2	72
Feb 13 2026	Transect	77.8	5.1	60.1
Feb 13 2026	SEPC24	76.7	7.3	58.2
Feb 13 2026	Transect	79.8	3.9	56.3
Feb 13 2026	SEPC25	80.1	5.8	52.7
Feb 13 2026	Transect	79.5	3.7	55.8
Feb 13 2026	SEPC26	81.6	4.3	48
Feb 13 2026	Transect	78.6	7.4	56.5
Feb 13 2026	SEPC27	77.5	4.9	60.7
Feb 13 2026	Transect	79	6	56.8
Feb 13 2026	SEPC28	79	7.1	50.7
Feb 13 2026	Transect	78.2	5.4	53.4
Feb 13 2026	SEPC29	79.2	5.1	56
Feb 13 2026	Transect	69.5	0.7	79.8



Feb 14 2026	SEPC30	71	0.9	80.1
Feb 14 2026	Transect	73.7	0.9	76.3
Feb 14 2026	SEPC31	77.3	0.7	72.2
Feb 14 2026	Transect	78.3	4.9	64.2
Feb 14 2026	SEPC32	81	3.2	57.9
Feb 14 2026	Transect	85.2	1.2	53.7
Feb 14 2026	SEPC33	80.9	2.9	58.3
Feb 14 2026	Transect	84.1	6.5	52.2
Feb 14 2026	SEPC34	83.3	5.2	53.5
Feb 14 2026	Transect	88.1	2.8	61.7
Feb 14 2026	SEPC35	89	2	48.3
Feb 14 2026	Transect	82.4	3.6	56.7
Feb 14 2026	SEPC36	83.4	3.1	50.2
Feb 15 2026	Transect	73.1	8.7	69.7
Feb 15 2026	SEPC37	75.7	3.6	65.1
Feb 15 2026	SEPC38	75.9	12.1	64.5
Feb 15 2026	Transect	80.1	7.4	59.7
Feb 15 2026	SEPC39	79.1	7.8	53.9
Feb 15 2026	Transect	85.3	3.2	57.3
Feb 15 2026	SEPC40	85.3	2.1	53.8
Feb 15 2026	Transect	88.2	2.1	49
Feb 15 2026	SEPC41	88.3	2.5	48.3
Feb 15 2026	Transect	88.2	3	49.84
Feb 15 2026	SEPC42	85	4.8	48
Feb 15 2026	Transect	90	1.8	47.3
Feb 15 2026	SEPC43	83.8	3.2	51.3
Feb 17 2026	Transect	76.4	1.4	69.1
Feb 17 2026	SEPC44	78.9	0.9	66.1
Feb 17 2026	Transect	79	1.6	63.6
Feb 17 2026	SEPC45	79	2.4	60.4
Feb 17 2026	Transect	81.3	1.3	60.2
Feb 17 2026	SEPC46	84.5	1.6	58.7
Feb 17 2026	Transect	81.1	3.2	60
Feb 17 2026	SEPC47	84.1	2.7	53.8
Feb 17 2026	Transect	81.9	2.3	57.9
Feb 17 2026	SEPC48	82.7	2.9	47.9
Feb 17 2026	Transect	81	1.5	59.4
Feb 17 2026	SEPC49	87.7	1	51.4
Feb 17 2026	Transect	82.3	4.9	55.3



Feb 17 2026	SEPC50	81.9	3.6	56.4
Feb 17 2026	Transect	84.6	1.2	56.9
Feb 18 2026	SEPC51	79.1	4.5	68.2
Feb 18 2026	Transect	80	1.3	58.7
Feb 18 2026	SEPC52	77	4.9	58.5
Feb 18 2026	Transect	83.1	2.8	51.1
Feb 18 2026	SEPC53	84.7	2.4	50.5
Feb 18 2026	Transect	79.9	4.1	51.9
Feb 18 2026	SEPC54	80.2	2.8	54.8
Feb 19 2026	SEPC55	75.2	2.1	71.1
Feb 19 2026	Transect	77.6	0.9	72.1
Feb 19 2026	SEPC56	78.1	1.8	70.9
Feb 19 2026	Transect	79.3	0.9	72.7
Feb 19 2026	SEPC57	82.6	0.9	71.8
Feb 19 2026	Transect	83	6.2	58.5
Feb 19 2026	SEPC58	81	4.6	62.5
Post Landing				
Feb 20 2026	SEPC1	79.3	0	77.5
Feb 20 2026	Transect	78.8	2.7	77.9
Feb 20 2026	SEPC2	83.9	2.9	67.9
Feb 20 2026	Transect	80.1	2.1	72.5
Feb 20 2026	SEPC3	81.2	2.3	72.7
Feb 20 2026	Transect	80.4	1.7	75.9
Feb 20 2026	SEPC4	83.4	0.8	74
Feb 20 2026	Transect	88.7	4.3	57.7
Feb 20 2026	SEPC5	86.7	1.5	62.7
Feb 20 2026	Transect	90	2.3	51.5
Feb 20 2026	SEPC6	82.3	3.4	63.8
Feb 20 2026	Transect	82.5	8	67.8
Feb 20 2026	SEPC7	82.7	1.9	70.6
Feb 20 2026	Transect	81	8.2	78.1
Feb 20 2026	SEPC8	82.9	2.2	67
Feb 21 2026	SEPC9	80.3	4.9	70.8
Feb 21 2026	Transect	79.8	4.7	67
Feb 21 2026	SEPC10	84.1	1.2	66.6
Feb 21 2026	Transect	80.3	7.9	97.9
Feb 21 2026	SEPC11	81.9	2.4	77.9
Feb 21 2026	Transect	78.4	6.5	72.7
Feb 21 2026	SEPC12	78.8	10.5	71.8



Feb 21 2026	Transect	82	9.9	71.3
Feb 21 2026	SEPC13	79.6	10.7	73.9
Feb 22 2026	SEPC14	78.4	5.7	76
Feb 22 2026	Transect	79.1	5.3	73.5
Feb 22 2026	SEPC15	79.3	5.4	73.3
Feb 22 2026	Transect	81	2.9	70.7
Feb 22 2026	SEPC16	78.8	6	71.7
Feb 22 2026	Transect	78.2	5.5	75
Feb 22 2026	SEPC17	77.4	8.9	84.4
Feb 22 2026	Transect	79.7	6.2	75.8
Feb 22 2026	SEPC18	80.5	5.3	70.6
Feb 22 2026	Transect	79.2	7.8	74.8
Feb 22 2026	SEPC19	80.5	7.6	71.2
Feb 22 2026	Transect	79.7	6.7	69.8
Feb 22 2026	SEPC20	80	6.4	70.2
Feb 22 2026	Transect	81.8	7.3	70.2
Feb 22 2026	SEPC21	79.5	4.9	70.1
Feb 22 2026	Transect	78.8	6.5	72.3
Feb 22 2026	SEPC22	81.6	5.2	71.5
Feb 24 2026	SEPC23	64.6	12.3	61.6
Feb 24 2026	Transect	66.5	5.2	52.9
Feb 24 2026	SEPC24	64.9	10.9	55.9
Feb 24 2026	Transect	72.1	1.9	42.7
Feb 24 2026	SEPC25	69.4	9.5	39.4
Feb 24 2026	Transect	67.5	10.7	39.5
Feb 24 2026	SEPC26	67.2	13.3	39.9
Feb 24 2026	Transect	65.4	16.1	43.6
Feb 24 2026	SEPC27	67	12.8	48.5
Feb 24 2026	Transect	69.1	9.5	45
Feb 24 2026	SEPC28	67.4	13.6	48.4
Feb 24 2026	Transect	67.6	7.4	43
Feb 24 2026	SEPC29	69	6.1	42.4
Feb 24 2026	Transect	72.1	4.7	37.8
Feb 24 2026	SEPC30	80.9	2.2	31.5
Feb 24 2026	Transect	81.1	7.8	34.2
Feb 24 2026	SEPC31	81.3	5.1	33.1
Feb 24 2026	Transect	74.7	5.7	38.4
Feb 24 2026	SEPC32	77.4	3.8	35.8
Feb 24 2026	Transect	74.9	3.7	37.9



Feb 24 2026	SEPC33	74.6	2.6	36.9
Feb 24 2026	Transect	72.9	6.7	38.5
Feb 24 2026	SEPC34	81.8	3.2	32.6
Feb 24 2026	Transect	77.3	3.2	37.3
Feb 24 2026	SEPC35	76.5	9.7	37
Feb 24 2026	Transect	75.4	3.7	39.8
Feb 25 2026	SEPC36	78.2	51.2	0.8
Feb 25 2026	Transect	82.5	2	78.2
Feb 25 2026	SEPC37	81.2	0.8	42.9
Feb 25 2026	SEPC38	75	3.9	43.2
Feb 25 2026	Transect	80.7	2	40.4
Feb 25 2026	SEPC39	78	2.3	39.1
Feb 25 2026	Transect	83.1	1	36.7
Feb 25 2026	SEPC40	83	0.9	45.7
Feb 25 2026	Transect	77.9	3.8	42.5
Feb 25 2026	SEPC41	81.1	0.9	41.7
Feb 25 2026	Transect	82.6	8.1	44.2
Feb 25 2026	SEPC42	80	2.4	42.4
Feb 25 2026	Transect	82.3	1.5	40.6
Feb 25 2026	SEPC43	80	4.8	43.6
Feb 25 2026	Transect	80.7	1	42.2
Feb 25 2026	SEPC44	86.3	1	38.2
Feb 25 2026	Transect	79.8	1.4	40.9
Feb 25 2026	SEPC45	78.6	2.4	42.7
Feb 25 2026	Transect	78.9	4.3	42.7
Feb 25 2026	SEPC46	83.3	1	41.2
Feb 25 2026	Transect	81.4	2.6	39.7
Feb 25 2026	SEPC47	78.4	4.6	44.2
Feb 25 2026	Transect	81.8	0.8	43.5
Feb 26 2026	SEPC48	71.8	0	71.5
Feb 26 2026	Transect	72.9	1.4	74.7
Feb 26 2026	SEPC49	74.6	2.3	74.2
Feb 26 2026	Transect	80.5	4.3	61.3
Feb 26 2026	SEPC50	80.8	2.1	60.5
Feb 26 2026	Transect	84.7	2.2	63.3
Feb 26 2026	SEPC51	80.2	2.9	66.1
Feb 26 2026	Transect	80.4	0.7	68.6
Feb 26 2026	SEPC52	82.8	3.6	64.6
Feb 26 2026	Transect	87.7	7.5	54.9



Feb 26 2026	SEPC53	81.2	3.3	88.3
Feb 26 2026	Transect	80.8	1.9	64.7
Feb 26 2026	SEPC54	81.3	1.9	66.8
Feb 26 2026	SEPC55	85.1	3	62.5
Feb 26 2026	Transect	84.1	2.9	73
Feb 26 2026	SEPC56	83.6	2.5	63.4
Feb 26 2026	Transect	81.7	2.4	69.4
Feb 26 2026	SEPC57	80.9	2.2	75.4
Feb 26 2026	Transect	80.2	1.4	72.1
Feb 26 2026	SEPC58	77.6	5	75.2

Table 8-36. Air Quality Recordings in Cat Island terrestrial surveys during the 1st Landing

Date	Point ID	PM1.0	PM2.5	PM10	HCHO	TVOC	APL
Pre-Landing							
2/14/2025	CIPC1	3	16	4	0.038	-	6
2/14/2025	CIPC2	3	17	5	0.013	0.004	6
2/14/2025	CIPC3	3	16	4	0.013	0	6
2/14/2025	CIPC4	3	16	4	0.028	0.063	6
2/14/2025	CIPC5	3	16	4	0.018	0.021	6
2/14/2025	CIPC6	2	15	3	0.019	0.025	6
2/14/2025	CIPC7	2	15	3	0.014	0.008	6
2/14/2025	CIPC8	2	15	2	0.033	0.086	6
2/14/2025	CIPC9	3	17	5	0.023	0.041	6
2/14/2025	CIPC10	3	16	4	0.022	0.034	6
2/14/2025	CIPC11	3	16	4	0.028	0.062	6
2/14/2025	CIPC12	2	15	3	0.016	0.012	6
2/15/2025	CIPC13	3	17	5	0.013	0	6
2/15/2025	CIPC14	3	17	5	0.015	0.008	6
2/15/2025	CIPC15	3	16	4	0.015	0.008	6
2/15/2025	CIPC16	3	16	4	0.016	0.012	6
2/15/2025	CIPC17	2	15	3	0.017	0.016	6
2/15/2025	CIPC18	3	16	4	0.017	0.017	6
2/15/2025	CIPC19	4	18	6	0.014	0.004	6
2/16/2025	CIPC20	6	21	10	0.017	0.016	8
2/16/2025	CIPC21	3	16	4	0.023	0.042	6
2/16/2025	CIPC22	3	16	4	0.014	0.004	6
2/16/2025	CIPC23	3	16	4	0.014	0.004	6
2/16/2025	CIPC24	2	15	3	0.014	0.004	6



2/16/2025	CIPC25	2	15	3	0.016	0.017	6
2/16/2025	CIPC26	2	15	3	0.013	0	6
2/16/2025	CIPC27	2	15	3	0.022	0.037	6
2/16/2025	CIPC28	3	17	5	0.024	0.038	6
2/17/2025	CIPC29	7	22	11	0.013	0	8
2/17/2025	CIPC30	9	24	13	0.013	0	9
2/17/2025	CIPC31	7	22	11	0.014	0.004	8
2/17/2025	CIPC32	5	19	8	0.013	0	7
2/17/2025	CIPC33	3	17	5	0.013	0	6
2/17/2025	CIPC34	3	17	5	0.018	0.021	6
2/17/2025	CIPC35	3	16	4	0.014	0.004	6
2/17/2025	CIPC36	3	16	4	0.013	0	6
2/17/2025	CIPC37	3	17	5	0.013	0	6
2/17/2025	CIPC38	3	16	4	0.013	0	6
2/17/2025	CIPC39	3	17	5	0.013	0	6
2/17/2025	CIPC40	4	19	6	0.015	0	7
2/17/2025	CIPC41	4	18	6	0.015	0.008	7
Post Landing							
2/21/2025	CIPC13	3	16	4	0.015	0.012	6
2/21/2025	CIPC14	3	16	4	0.013	0	6
2/21/2025	CIPC15	3	16	4	0.014	4	6
2/21/2025	CIPC16	3	16	4	0.015	8	6
2/21/2025	CIPC17	3	16	4	0.015	0.008	6
2/21/2025	CIPC18	3	16	4	0.013	0	6
2/21/2025	CIPC19	3	16	4	0.013	0	6
2/19/2025	CIPC20	2	15	3	0.013	0	6
2/19/2025	CIPC21	1	14	2	0.022	0.037	5
2/19/2025	CIPC22	1	14	2	0.014	0.008	5
2/19/2025	CIPC23	1	14	2	0.015	0.008	5
2/19/2025	CIPC24	1	14	2	0.016	0.012	5
2/19/2025	CIPC25	2	15	3	0.023	0.043	6
2/19/2025	CIPC26	1	14	2	0.017	0.016	5
2/19/2025	CIPC27	1	14	2	0.02	0.029	5
2/19/2025	CIPC28	1	14	2	0.014	0.004	5
Equipment issue	CIPC29						
2/20/2025	CIPC30	8	23	12	0.015	0	9
2/20/2025	CIPC31	7	22	11	0.018	0.016	8
2/20/2025	CIPC32	12	28	18	0.013	0	11



2/20/2025	CIPC33	7	22	11	0.015	8	8
2/20/2025	CIPC34	10	26	16	0.013	0	10
2/20/2025	CIPC35	4	18	6	0.013	0	7
2/20/2025	CIPC36	6	20	9	0.013	0	8
2/20/2025	CIPC37	7	22	11	0.013	0	8
2/20/2025	CIPC38	8	23	12	0.013	0	9
2/19/2025	CIPC39	2	15	3	0.014	0.008	6
2/19/2025	CIPC40	2	15	3	0.013	0	6
2/19/2025	CIPC41	1	14	2	0.014	0.004	5

Table 8-37. Air Quality Recordings in Cat Island terrestrial surveys during the 2nd Landing

Date	Point Count	PM 1.0	PM 2.5	PM 10	HCHO	TVOC	AQI
Pre-Landing							
Feb 10 2026	NCPC1	666	3.3	7.6	0.02	0.02	15
Feb 10 2026	NCPC2	456	3	5	0.02	0.06	12
Feb 10 2026	NCPC3	504	2.8	4.8	0.02	0.02	14
Feb 10 2026	NCPC4	585	3.5	6.4	0.01	0.01	15
Feb 10 2026	NCPC5	430	2	4.2	0.01	0.04	7
Feb 10 2026	NCPC6	562	3.3	6	0.01	0.02	14
Feb 10 2026	NCPC7	457	2.8	4.8	0.03	0.14	12
Feb 10 2026	NCPC8	524	2.8	5.1	0.01	0.03	12
Feb 10 2026	NCPC9	352	2.3	3.9	0.01	0.01	10
Feb 10 2026	NCPC10	376	2.3	3.5	0.01	0.01	8
Feb 11 2026	NCPC11	1180	7.7	12.1	0.01	0.01	32
Feb 11 2026	NCPC12	1275	8.2	13.5	0.01	0.02	35



Feb 11 2026	NCPC13	1265	7.5	13.3	0.02	0.02	32
Feb 11 2026	NCPC14	673	4.7	6.5	0.02	0.02	16
Feb 11 2026	NCPC15	949	5.2	9.2	0.01	0.01	20
Feb 11 2026	NCPC16	984	6.2	9.6	0.01	0.05	23
Feb 11 2026	NCPC17	3195	21.2	33.4	0.01	0.04	27
Feb 11 2026	NCPC18	725	4.8	8.4	0.01	0.04	21
Feb 11 2026	NCPC19	746	5.4	9	0.01	0.04	24
Feb 12 2026	NCPC20	1714	23.6	34.7	0.01	0.04	23
Feb 12 2026	NCPC21	553	3.2	5.6	0.01	0.02	14
Feb 12 2026	NCPC22	895	4.8	9	0.01	0.02	20
Feb 12 2026	NCPC23	928	7.4	11.8	0.01	0.03	20
Feb 12 2026	NCPC24	1161	7.9	12.1	0.01	0.02	28
Feb 12 2026	NCPC25	1422	9.3	16	0.01	0.02	22
Feb 12 2026	NCPC26	2313	16.1	28.2	0.01	0.03	52
Feb 12 2026	NCPC27	946	4.9	8.6	0.01	0.01	23
Feb 12 2026	NCPC28	1145	7.4	12.5	0.01	0.02	34
Feb 13 2026	NCPC29	1523	10.2	17.7	0.01	0.01	55
Feb 13 2026	NCPC30	2869	18.6	32.2	0.01	0.02	51
Feb 13 2026	NCPC31	1287	8.2	14.2	0.01	0.03	29
Feb 13 2026	NCPC32	1621	11.3	18.2	0.01	0.01	31



Feb 13 2026	NCPC33	812	3.9	7.9	0.01	0.01	16
Feb 13 2026	NCPC34	1265	6.3	13.1	0.01	0.01	44
Feb 13 2026	NCPC35	1356	8.5	15.8	0.01	0.01	25
Feb 13 2026	NCPC36	1846	9.8	19.1	0.01	0.01	49
Feb 14 2026	NCPC37	2029	12.8	21.6	0.08	0.05	48
Feb 14 2026	NCPC38	1433	10.4	16	0.07	0.35	32
Feb 14 2026	NCPC39	911	6	9.7	0.01	0.05	24
Feb 14 2026	NCPC40	740	5	8.3	0.01	0.02	10
Feb 14 2026	NCPC41	806	5	8.2	0.01	0.01	20
Feb 15 2026	NCPC42	801	4.9	7.4	0.01	0.02	19
Feb 15 2026	NCPC43	788	4.9	8.6	0.02	0.09	20
Feb 15 2026	NCPC44	1271	8.6	13.7	0.01	0.06	42
Feb 15 2026	NCPC45	661	3.5	6	0.02	0.08	14
Feb 15 2026	NCPC46	16	0.02	0.1	0.01	0.06	17
Feb 17 2026	NCPC47	747	4.9	9	0.02	0.09	20
Feb 17 2026	NCPC48	3815	22.6	43.7	0.02	0.09	74
Feb 17 2026	NCPC49	751	5	10.1	0.02	0.09	76
Feb 17 2026	NCPC50	477	3	4.5	0.01	0.02	12
Feb 17 2026	NCPC51	420	2.9	3.5	0.01	0.01	11
Feb 17 2026	NCPC52	490	5.1	6	0.01	0.01	10



Feb 17 2026	NCPC53	490	3.2	5.1	0.01	0.01	11
Feb 17 2026	NCPC54	506	3.3	3.5	0.01	0.02	11
Feb 17 2026	NCPC55	371	0.6	0.4	0.01	0.02	10
Feb 18 2026	NCPC56	500	3	4.8	0.01	0.03	12
Feb 18 2026	NCPC57	658	3.6	6.7	0.01	0.01	15
Feb 18 2026	NCPC58	605	3.4	6.8	0.01	0.01	21
Post Landing							
Feb 20 2026	NCPC1	994	6.3	11.3	0.01	0.05	25
Feb 20 2026	NCPC2	1043	6.4	11.9	0.01	0.05	25
Feb 20 2026	NCPC3	845	5.4	8.8	0.01	0.06	23
Feb 20 2026	NCPC4	978	5.8	10.3	0.01	0.02	24
Feb 20 2026	NCPC5	803	4.9	8.4	0.01	0.04	17
Feb 20 2026	NCPC6	739	4.5	7.1	0.01	0.03	21
Feb 20 2026	NCPC7	1038	5.6	11.7	0.01	0.02	23
Feb 20 2026	NCPC8	795	6	8.5	0.01	0.02	22
Feb 20 2026	NCPC9	1186	8.7	13.7	0.01	0.03	35
Feb 21 2026	NCPC10	1686	12	21.8	0.03	0.14	39
Feb 21 2026	NCPC11	1577	10.5	18.8	0.01	0.08	43
Feb 21 2026	NCPC12	1401	8.3	15.4	0.01	0.05	40
Feb 21 2026	NCPC13	931	5.4	10.1	0.01	0.05	40



Feb 21 2026	NCPC14	1231	7.9	13.9	0.01	0.02	27
Feb 21 2026	NCPC15	2171	14.5	26.1	0.42	1.28	46
Feb 21 2026	NCPC16	1106	6.5	11.3	0.1	0.49	33
Feb 21 2026	NCPC17	996	5.9	10.7	0.03	0.14	26
Feb 21 2026	NCPC18	1292	7.8	14.5	0.01	0.02	29
Feb 21 2026	NCPC19	1589	14	21.1	0.02	0.03	25
Feb 22 2026	NCPC20	819	6.5	10	0.09	0.49	21
Feb 22 2026	NCPC21	1810	8.5	15.1	0.06	0.26	159
Feb 22 2026	NCPC22	1223	0.04	0.08	0.04	0.17	15
Feb 22 2026	NCPC23	1293	8.7	14.8	0.09	0.12	54
Feb 22 2026	NCPC24	648	4.7	8.2	0.02	0.09	16
Feb 22 2026	NCPC25	1198	7.5	13.4	0.01	0.04	28
Feb 22 2026	NCPC26	938	5.9	10.8	0.01	0.05	23
Feb 22 2026	NCPC27	988	5.4	11.8	0.01	0.01	23
Feb 22 2026	NCPC28	1253	6.6	12.1	0.01	0.03	30
Feb 22 2026	NCPC29	1565	9.6	17.2	0.01	0.02	39
Feb 24 2026	NCPC38	469	1.6	4.2	0.01	0.02	12
Feb 24 2026	NCPC39	12	0.1	0.2	0.01	0.02	1
Feb 24 2026	NCPC40	487	3.7	6.7	0.01	0.02	10
Feb 24 2026	NCPC41	613	3.5	5.1	0.01	0.01	16



Feb 24 2026	NCPC42	21.7	8.1	11.2	0.01	0.02	11
Feb 24 2026	NCPC43	1258	8.3	15.1	0.01	0.02	23
Feb 24 2026	NCPC44	1141	4	7.3	0.02	0.02	34
Feb 24 2026	NCPC45	616	6.9	11.6	0.02	0.02	35
Feb 24 2026	NCPC46	1986	13.6	22.4	0.02	0.06	53
Feb 24 2026	NCPC47	642	5.4	8.9	0.01	0.02	16
Feb 24 2026	NCPC48	3620	26.5	46	0.01	0.02	72
Feb 24 2026	NCPC49	4510	30.4	58.2	0.01	0.02	89
Feb 24 2026	NCPC50	1057	6.8	8.9	0.01	0.02	21
Feb 24 2026	NCPC51	912	1.6	2.6	0.02	0.06	19
Feb 25 2026	NCPC52	385	2	3.5	0.01	0.02	9
Feb 25 2026	NCPC53	395	1.8	3.3	0.01	0.02	19
Feb 25 2026	NCPC54	365	2.2	3.3	0.01	0.02	10
Feb 25 2026	NCPC55	349	1.3	4.3	0.01	0.01	5
Feb 25 2026	NCPC56	335	2.9	3.2	0.01	0.01	7
Feb 25 2026	NCPC57	237	2.6	1.8	0.01	0.01	6
Feb 25 2026	NCPC58	288	1.9	3.1	0.01	0.01	4



8.1 APPENDIX E – SOUND MAPPING STUDY



THE HERITAGE PARTNERS
SOUND MAPPING STUDY
SPACEX



Submitted To

DEPARTMENT OF ENVIRONMENTAL PLANNING & PROTECTION
THE MINISTRY OF THE ENVIRONMENT AND NATURAL RESOURCES

Nassau, The Bahamas

Submitted By

THE HERITAGE PARTNERS

Submittal Date

April 17, 2026

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LIST OF ACRONYMS

ADI - Area of Direct Influence
BMOT - Bahamas Ministry of Tourism & Aviation
BRON - Bron Ltd.

CAAB - Civil Aviation Authority of The Bahamas
DEPP - Department of Environmental Planning and Protection
EIA - Environmental Impact Assessment
EMP - Environmental Management Plan
ES - Environmental and Social (as in ES consultants)
GOBH - Government of The Bahamas
ICBEN - International Commission on Biological Effects of Noise
ISO - International Organization for Standardization
ISO/TS 15666:2021 - Acoustics: Assessment of noise annoyance by means of social and socio-acoustic surveys (Technical Specification 15666:2021)
NASA - National Aeronautics and Space Administration
THP - The Heritage Partners
WSPR - Wallops Sonic Boom Perception and Response (NASA field study)

1. **EXECUTIVE SUMMARY**

1.1 **Study Overview**

On 19 February 2026, a SpaceX Falcon 9 rocket completed its second landing on an autonomous droneship in Exuma Sound, The Bahamas, generating one or more sonic booms that were heard across multiple islands. The Heritage Partners (THP) was commissioned by Bron Ltd to carry out a quantitative and qualitative sound-mapping study describing how communities experienced and interpreted the event.

The SpaceX Sound Mapping Survey used a single instrument deployed in two modes: 415 face-to-face interviews in New Providence, Eleuthera, and Cat Island between 19 and 21 February 2026, and a web-based digital survey with 382 responses, drawn predominantly from New Providence and other islands. The instrument followed ISO/TS 15666:2021 and drew on NASA's Wallops Sonic Boom Perception and Response (WSPR) framework, providing international-standard measures of loudness, annoyance, interference, and related dimensions of community noise response. Respondents are grouped as Group A (those who heard or felt the boom, n = 566) and Group B (those who did not, n = 216), a distinction used consistently throughout the report.

1.2 **Key Findings**

1.2.1 **Event awareness and notification**

In the combined study dataset, just over half of respondents (53.2%) had no prior indication that a sonic boom might occur. Awareness was strongest on New Providence (54.1% aware) and dropped to 41.5% in Eleuthera and 37.5% in Cat Island, revealing a clear communication gradient away from Nassau. Government notice reached only 12 people in the face-to-face sample (2.9%). Among those who did know in advance, social media dominated as an information channel (58.0%), followed by news media (31.0%) and word of mouth (27.5%).

The study finds a serious gap between where the boom was loudest and where people were properly informed. Communities in South Eleuthera bore some of the highest acoustic impact yet had some of the lowest levels of prior warning, highlighting weaknesses in how formal and digital notifications reach rural, outer-island residents. Bannerman Town, Wemyss Bight, and Rock Sound all recorded 100% heard rates and some of the lowest advance-awareness levels in the study. That mismatch between who heard the boom most intensely and who received clear notice is a central finding for future notification and engagement protocols.

1.2.2 Acoustic reach and heard rates

Taken together, the responses show that 72.9% of participants heard at least one boom. South Eleuthera recorded the highest heard rate of any zone at 85.2%, consistent with its proximity to the landing site. New Providence's overall heard rate was close to 80%, influenced by the self-selection profile of the online survey. Cat Island, despite being within the broader area of influence, showed much lower heard rates: 29.5% in North Cat Island, 14.8% in South Cat Island, and 5.9% in Central Cat Island. Local topography and the fact that many residents were indoors at the time likely reduced exposure.

Community reports confirm that the boom was heard well outside the original study area. Residents from multiple settlements across Eleuthera and Cat Island, as well as from Grand Bahama, Andros, Exuma, and Long Island, described experiencing the event, indicating that the programme's true area of influence is wider than the footprint used to define current monitoring and engagement.

1.2.3 Perception, physical reactions, and structural impacts

Within Group A, loudness stands out as the dominant dimension: 83% rated the boom as moderately to extremely loud. Eleuthera recorded the highest scores across loudness, annoyance, and interference (Loudness 3.85, Annoyance 3.13, Interference 2.76 on a 1-5 scale), consistent with its position closest to the landing zone. Annoyance responses are sharply split, with 27% selecting the lowest possible score and 34.9% choosing 4 or 5. Around 45% of Group A reported no interference with their activities, indicating that the same physical event was integrated very differently into daily life depending on context and expectations.

Two-thirds of Group A respondents (66.9%) reported some involuntary physical reaction. Being startled or jumping was the most common (about 78% of those with a reaction), followed by heart racing (27%) and anxiety or panic (20%). Prior awareness helped people interpret the sound but did not prevent reactions: of the 80 Group A respondents who knew in advance, 49 still reported a physical reaction, including 12 cases of anxiety or panic. Parents frequently described children being startled or frightened, especially where there had been no notice, and 45.9% of households with pets present reported some impact on animals, ranging from brief disturbance to pets running away for several days.

Reports of structural effects are consistent between survey modes. Among Group A, 22.6% of face-to-face respondents and 21.2% of digital respondents reported some physical impact to their home or surroundings. Typical descriptions include house shaking, window and door vibration, rattling of rafters, and objects moving. A small number of specific issues were noted: one hairline crack, several accounts of an unusual smell outdoors after the event, and an

(unconfirmed) observation from the eastern viewpoint of Nassau of what one respondent presumed to be burning booster debris landing in the water roughly 30-40 feet from shore.

1.2.4 Future acceptability and wider concerns

Survey responses show limited tolerance for future sonic booms under current conditions. Overall, 56.7% of respondents judged the prospect of further booms to be completely or somewhat unacceptable, while only 18.3% viewed them as acceptable. “Completely unacceptable” was the most common single response on every island, and Group A showed stronger opposition than Group B (60.9% vs. 44.9% selecting unacceptable), pointing to a direct link between exposure and resistance.

Opposition is not confined to those who heard the boom. A significant share of Group B respondents, who did not experience the sound directly, nonetheless opposed future landings and raised concerns reaching well beyond acoustics, including effects on marine ecosystems and fisheries, rocket fuel and debris, long-term environmental risk, and questions about how benefits and burdens are being distributed among Bahamian communities.

1.3 Observations and Implications

Five overarching points follow from the data and carry direct implications for programme management. Notification systems are not reliably reaching the communities that are most acoustically exposed, particularly in South Eleuthera, where the gap between acoustic impact and advance awareness was most pronounced. The community impact footprint is wider than the area currently designated for monitoring and engagement, and future scoping should be planned accordingly. Advance notice improves interpretation of the sound but does not remove startle, fear, or other physical reactions, particularly among children and older residents, meaning that notification alone cannot stand in for broader management measures. Community concerns extend beyond noise to environmental risk, marine life, debris, and questions of equity and benefit-sharing that require institutional responses beyond acoustic management. Lastly, schedule changes without re-notification leave prepared residents as uninformed as everyone else, as the shift from 18 to 19 February confirmed.

The main report expands on these findings and sets out recommendations that seek to address community concerns raised as well as gaps identified.

2. **INTRODUCTION**

Space Exploration Technologies Corp (SpaceX) is an American space technology company founded in 2002, that designs, manufactures, and launches reusable rockets and spacecraft, and is the world's dominant space launch provider.

The Bahamas Ministry of Tourism & Aviation (BMOT) announced in early 2025 that an agreement between the Government of The Bahamas (GOBH) and SpaceX had been made, which would allow the SpaceX Falcon 9 rocket (Falcon 9, described as the world's first orbital class reusable two-stage rocket) to land within the territory of The Bahamas.

On Tuesday, 18 February, 2025, Falcon 9 launched 23 Starlink satellites to low-Earth orbit from a space launch complex at Cape Canaveral Space Force Station in Florida, and made a first, historic, landing on an autonomous dronship stationed in Exuma Sound, The Bahamas (the First Landing). A number of residents of and visitors to several islands of The Bahamas reported hearing and feeling one or more sonic booms resulting from the landing.

The First Landing was successful, and the GOBH announced that it had approved 19 additional Falcon 9 landings throughout 2025, subject to regulatory approval, and following the completion of a full environmental impact assessment (EIA) and Environmental Management Plan (EMP), and submission of a post-launch report on the First Landing (the Environmental Documents).

Revised versions of the EIA, EMP, and post-launch report were submitted to the Department of Environmental Planning & Protection (DEPP) by Bron Ltd. (BRON) on 29 August, 2025, 21 January, 2026, and 30 May, 2025, respectively. Together, the Environmental Documents indicate that the initial First Landing exercise resulted in, and subsequent landings are likely to result in, negligible to minor environmental impacts.

SpaceX sought approval from the GOBH of a second Falcon 9 landing in the Exuma Sounds (the Second Landing). As part of this approval process, the GOBH, through DEPP, stipulated that a quantitative and qualitative sound mapping study and a public consultation process were required. A public consultation meeting was conducted on 9 October, 2025.

Approval for the Second Landing was granted by DEPP in February 2026 and the date of the Second Landing was set first for 17 February, 2026, then for 18 February, 2026, and ultimately for Thursday, 19 February, 2026.

On Thursday, 19 February, 2026 at approximately 8:41 p.m., Falcon 9 launched 29 Starlink satellites to low-Earth orbit from Cape Canaveral Space Force Station in Florida, and landed on an autonomous dronship in the Exuma Sounds, The Bahamas (the Landing Site). As with the

First Landing, residents of and visitors to a number of islands of The Bahamas heard and felt one or more sonic booms.

The Heritage Partners (THP) were requested to assist with mapping the public response to the sonic boom(s). Survey teams were deployed in communities across the islands of New Providence, Eleuthera, and Cat Island, and interviewed residents and visitors about their perception of the sound event. A similar digital survey instrument was also distributed over social media and news channels, to collect responses concerning the sound event.

This report documents the sound mapping study conducted by THP and in particular, the design, execution, analysis, and results of the study. The data garnered from this research effort will be used to provide information and guidance to decision makers responsible for assessing noise impacts and mitigation strategies.

3. METHODOLOGY

3.1 Introduction

This study was conducted as part of the regulatory framework established by the Department of Environmental Planning and Protection (DEPP) for the resumed SpaceX Falcon 9 landing programme. This framework reflects the Government of The Bahamas' commitment to evidence based oversight of commercial aerospace activity in Bahamian waters.

THP approached this work on a foundational principle that the social impact of a commercial aerospace event cannot be fully understood through physical measurement alone. What instruments record and what communities experience are related but distinct phenomena, and it is the relationship between them that this study is designed to interrogate.

The methods selected for this study were designed accordingly. They capture how the boom was perceived, and also provide a basis for identifying and weighing potential social impacts within the area of influence of the landing activity. Quantitative survey items distinguish between key outcomes such as heard versus not heard, loudness, annoyance, interference, physical reactions, and future acceptability, and show how these are distributed across islands and zones. This makes it possible to separate widespread, lower-intensity effects from localised, higher-intensity impacts on particular communities, while qualitative open-ended responses explain how residents understand these experiences in terms of disturbance, worry, or benefit, informing which issues are most socially significant and where mitigation or engagement should be focused.

The methodology described in this section was structured to capture the broadest and most representative range of community responses to the Second Landing. The numbers establish how many people were affected, the perception scores establish how intensely they felt it, and the open-ended responses establish what it actually meant to them — together producing a complete account of community experience that no single method could have produced alone.

This study's community perception data and the acoustic sound mapping conducted by BRON are designed to work in parallel, as co-equal and complementary evidence streams. Acoustic sound mapping establishes the objective physical parameters of the event, such as the pressure levels, propagation patterns, and spatial footprint of the sonic boom as recorded by instruments.

Community perception data establishes what those physical parameters meant to the people on the ground, such as how the event was heard, felt, interpreted, and experienced in the context of daily life across a number of distinct island communities. Neither stream is a substitute for the other. Instruments cannot capture fear, confusion, pride, or the difference between a boom that was expected and one that was not. Community perception cannot replace calibrated measurement. Together, they produce a complete picture, and it is that complete picture this study is designed to deliver.

3.2 Primary Study Communities

The three communities initially comprising the study area (the Primary Study Communities) - New Providence, South Eleuthera, and North Cat Island - were identified by BRON as part of the environmental and social impact framework for the landing programme, reflecting their position within the established area of influence of the Falcon 9 descent corridor. THP conducted its research within this defined scope - however, the decision to extend the scope was made given the circumstances enumerated at Section 5.2.5. Each Primary Study Community brings a distinct profile to the study, in terms of proximity to the Landing Site, ambient acoustic environment, population density, and access to information infrastructure (the channels through which residents receive public information, including digital media, radio, government notices, and community networks). It is the contrast between these three communities that makes the findings meaningful.

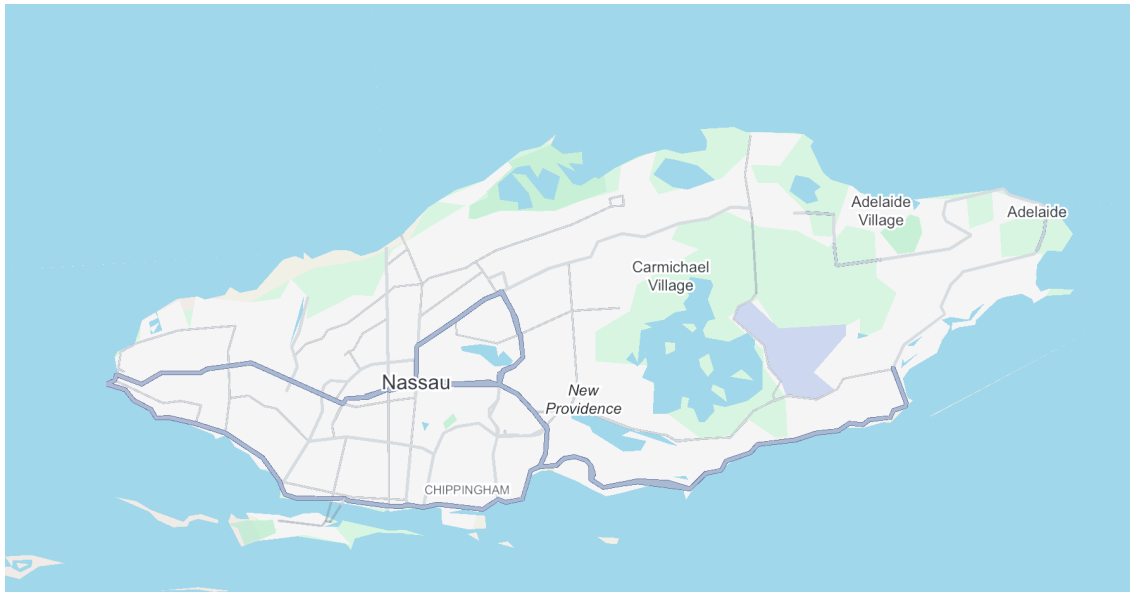


Figure 1: Image of New Providence (Source: Google Earth)



Figure 2: Image of Eleuthera (Source: Google Earth)



Figure 3: Image of Cat Island (Source: Google Earth)

Community	Primary Settlements	Proximity to Landing Site	Study Relevance
New Providence	Nassau & Surrounding communities	Furthest from the landing site	Most populous island and primary centre of institutional, regulatory, and media activity. Highest density of digital information infrastructure.

			Provides the urban baseline against which outer island experiences are compared.
South Eleuthera	Rock Sound, Tarpum Bay & surrounding settlements	Close proximity to Exuma Sound	Outer Island communities closest to the Landing Site, with a quieter acoustic environment and limited public communications networks. The community most likely to experience the event differently from Nassau
North Cat Island	Arthur's Town & surrounding settlements	Within descent corridor	Low-density island community within the Falcon 9 descent corridor. Included to document experience at a representative remote location and to extend geographic coverage beyond the central zones.

Table 1: Primary Study Communities: profile and rationale for inclusion.

3.3. **Desk Review and Secondary Research**

The study commenced with a structured desk review prior to any primary data collection. Project-specific documentation was examined first, including the Environmental Documents and DEPP regulatory conditions. Community and demographic data drawn from the 2022 national census provided the foundation for sample size calculations. The review also encompassed the international research literature on social acoustic methodology and community response to sonic boom events, which directly informed the design of the survey instrument.

3.4. **Survey Administration**

A single survey instrument, the SpaceX Sound Mapping Survey, was prepared to collect subjective community response to the sonic boom generated by the landing event. The instrument was adapted slightly for face-to-face administration while the core structure and question set remained consistent across both modes. The survey was administered post-event, capturing community experience and perception in the days immediately following the 19 February landing. Two modes of administration were used, namely face-to-face interviews and a

digital web-based survey, selected to maximise reach and demographic coverage across the diverse information environments of the three target communities.

3.4.1 Face-to-Face Interviews

Structured face-to-face interviews were conducted by THP field researchers across all three target communities. Interviewers engaged individually with participants, capturing demographic information while maintaining respondent anonymity throughout, in order to encourage candid responses on questions relating to community perception and emotional experience. The questionnaire was designed to be completable in approximately five minutes and was conducted across different days, times, and locations within each community to reduce demographic skew.

3.4.2 Web-Based Survey

A parallel online survey was deployed via JotForm, using an instrument substantively identical in content to the face-to-face version. The web-based mode extended geographic reach and enabled a larger aggregate response volume within the operational timeframe. The survey was distributed through community networks, social media channels, and organisations across New Providence. The survey window remained open for seven days following the event.

3.4.3 Survey Instrument Validation

Every question in this instrument is grounded in a recognised international standard or a peer-reviewed methodological precedent, and it is the standard to which the SpaceX Sound Mapping Survey was designed.

The instrument's measurement framework is grounded in two complementary international references, each performing a distinct validating function.

The primary methodological standard is the International Organization for Standardization Technical Specification 15666:2021 (ISO/TS 15666:2021), titled Acoustics: Assessment of Noise Annoyance by Means of Social and Socio-Acoustic Surveys. Most recently updated in 2021 by an international working group, ISO/TS 15666:2021 specifies the questions to be asked, the response scales to be used, and the reporting requirements for social surveys assessing community noise annoyance. Its adoption as the instrument's governing standard ensures that findings are directly comparable with those of other socio-acoustic studies conducted to international specifications, a prerequisite for any study intended to contribute to a regional or global evidence base.

The standard's scope is formally restricted to noise annoyance assessed at home. In practice, the landing occurred in the evening hours, when the majority of residents across the three study communities would reasonably be expected to be at or near their homes.

The survey also captured respondents across multiple locations, which is methodologically appropriate for a post-event study of this kind. This extension of scope is consistent with the spirit of the standard and is acknowledged accordingly.

The applied aerospace validation for the instrument is provided by NASA's Wallops Sonic Boom Perception and Response (WSPR) study, one of the most rigorously designed social acoustic field studies ever conducted in a commercial aerospace context. The WSPR study operationalised the ICBEN measurement framework, which had been in development since 1993 and is the scientific foundation on which ISO/TS 15666 is built, in a real-world sonic boom community research setting. By designing to both ISO/TS 15666 and the WSPR precedent, the instrument is anchored in the formal international standard and validated by the most directly comparable applied aerospace research programme available. This study is among the first of its kind to apply this dual framework in a Small Island Developing State context.

Dimension	What It Measures
Annoyance	The overall degree to which the acoustic event was found disturbing, bothersome, or unacceptable in the context of the respondent's daily life.
Loudness	The perceived intensity of the sound, independent of the respondent's emotional reaction to it.
Interference	The extent to which the event disrupted activities in progress including conversation, concentration, rest, or other routine tasks.
Startle	The degree of sudden fright or alarm produced by the impulsive onset of the acoustic event.
Vibration	Perception of physical vibration associated with the event, felt through the body, flooring, or furniture.
Rattle	Audible rattling of windows, doors, objects, or structural elements caused by the acoustic energy of the event.

Table 2: Six dimensions of subjective noise response, grounded in ISO/TS 15666:2021 and the WSPR/ICBEN framework.

Instrument Development and Field Revision

The survey instrument was developed against three design criteria: each question had to serve a clearly defined analytical purpose traceable to the study's research objectives; its wording and response format had to be consistent with ISO/TS 15666:2021 or WSPR/ICBEN guidance; and it had to be accessible to a general community respondent without specialist knowledge.

During the initial deployment of the face-to-face mode, THP field researchers identified that the sequencing of certain response options was not flowing naturally in a spoken interview context. Respondents were hesitating in ways that indicated the written format did not translate directly to verbal administration. The instrument was revised accordingly before the remainder of face-to-face fieldwork was conducted. This iterative refinement in the field is standard practice in community social research and reflects THP's commitment to data quality over rigid adherence to a pre-set protocol. The web-based instrument was not revised, ensuring consistency across the online response dataset.

3.4.4 Survey Structure

The original survey instrument comprised 26 questions organised into six thematic sections. The table below provides a structured overview of each section, the topics it addressed, and the question formats employed. The complete instrument, including full question text and all response options, is reproduced in Appendix A.

	Section Theme	Key Topics Covered	No. of Questions	Question Types
1	Demographic Information	Gender, age, island of residence, location at time of event, community type, household composition (children, pets)	7	<i>Multiple choice, binary</i>
2	Event Awareness & Context	Pre-event awareness, information source, number of booms heard or felt, location and activity at time of event	4	<i>Binary, multiple choice</i>
3	Perception of the Sonic Boom	Annoyance, loudness, and interference. Three of the six	3	<i>Likert scale (1-5)</i>

	Section Theme	Key Topics Covered	No. of Questions	Question Types
		ICBEN dimensions, rated on a 1–5 scale		
4	Physical, Emotional & Structural Impacts	Physical impacts to home, personal physical reactions, overall emotional response, impact on children and pets	8	<i>Binary, multiple choice, open-ended</i>
5	Comparative Sound Perception	Open description of the sound in the respondent's own words	1	<i>Open-ended</i>
6	Future Acceptability	Acceptability of future sonic booms, whether prior knowledge affected perception, final open comments	3	<i>Multiple choice, binary, open-ended</i>

Table 3: Survey structure summary. See Appendix A for the full instrument.

3.4.5 Sampling Strategy

Two complementary sampling strategies were applied to select survey participants within each target community. Sample sizes were determined by reference to the adult population recorded in the 2022 national census, using a margin of error of 9% and a population proportion of 70%, a conservative assumption appropriate for a study topic where the distribution of responses cannot be assumed in advance.

3.4.5.1 Geographical Cluster Sampling

Geographical cluster sampling served as the primary approach. Each target community was divided into geographic clusters based on its constituent settlements and neighbourhood areas, with sample sizes allocated proportionally to each cluster's share of the community's total household population. This approach addressed the logistical challenges of a geographically dispersed, multi-island study while ensuring appropriate representation across both larger and smaller communities within each zone.

3.4.5.2 Simple Random Sampling

Simple random sampling was applied as a supplementary method within specific clusters where logistical conditions permitted, providing a probability-based check on the broader cluster sample. Together, these two strategies produced a balanced and operationally realistic approach to data collection, ensuring the final dataset captured a representative range of community perspectives across all three target areas.

3.6 Social Fieldwork

3.6.1 Social Field Work

Fieldwork activities focused on establishing a study area, and conducting structured social surveys.

To focus the analysis on relevant aspects with actionable recommendations, clear boundaries were set, based on the maximum potential interaction between the project and the local communities. This included setting limits on the scope of data collection to avoid excessive or irrelevant information, and ensuring that the study addressed social factors directly connected to the Project's impact. The limits adopted were justified within the study, distinguishing between areas where the Project would have a direct impact from those areas where the effects would be more peripheral. This targeted approach allowed for a more efficient assessment, prioritizing concrete and realistic social proposals.

3.7 Data Analysis

Data analysis was conducted across two streams, quantitative and qualitative, integrated at the interpretive stage to produce the findings presented in this report.

3.7.1 Quantitative Analysis

Quantitative survey data were cleaned, coded, and analysed using standard statistical procedures. Descriptive statistics were calculated for all survey items across the full sample and disaggregated by community zone and demographic group to ensure that variation in responses across communities was captured and meaningfully compared.

3.7.2 Qualitative Analysis

Qualitative data from open-ended survey responses were analysed thematically, with codes developed inductively from the data and refined through iterative review.

3.8 Ethical Considerations

This study was conducted in full accordance with THP's research ethics standards and the accepted principles of ethical social research with human participants. Participation was entirely voluntary and all participants were informed of the study's purpose and their right to withdraw at any time. All survey responses were collected anonymously. Qualitative material is presented in anonymised form throughout this report. Data was stored securely and accessed only by authorised THP research personnel.

THP's approach to research ethics extends beyond procedural compliance. The communities represented in this study are stakeholders in a governance process that directly affects their lives.

3.9 **Limitations and Mitigation Strategies**

The key challenges relevant to this study, and the measures taken to address them, are summarised in the table below.

Examples of data challenges relevant to the Project	Mitigation strategies
Sampling bias Since the samples for convenience sampling are based on access and not equal probability, convenience samples don't result in a statistically balanced selection of the population and can lead to sampling bias (when some members of the population are systematically more likely to be in a sample than others).	The data collection has been diversified by determining an appropriate sample size and by recruiting an appropriate number of participants. The face-to-face interviews were carried out at different days, times, and locations, and preliminary research was conducted to determine which locations would produce best results.
Observer bias Researchers may be subjective in how they choose participants, e.g. by stopping the passersby who appear friendliest, leading to observer bias (when a researcher's expectations, opinions, or prejudices influence what they perceive or record in a study)	Survey enumerators underwent training prior to the commencement of the data collection exercise. This process helps to ensure that data is collected and recorded in the same way and helps to limit bias. Using triangulation to corroborate results also helps to ensure that findings are credible.
False, biased, misleading, or overly narrow interpretation of data	Data was triangulated using a variety of questions, data sources, collection tools and methods, and respondent/stakeholder types.

Examples of data challenges relevant to the Project	Mitigation strategies
Some techniques for analysing quantitative data can introduce bias and misinterpretation, such as using averages that ignore diversity in responses or in context, and thus in experiences.	The logic and reasoning behind the quantitative data presented, particularly the assumptions, have been made explicit in the analysis. Data has been disaggregated by demographics.
Low response to survey Respondents may not feel encouraged to provide answers, leading to nonresponse or a low response rate. Respondents may also not provide accurate responses owing to lack of knowledge, low recall of information, or even boredom.	The survey tool was tested to ensure that it is focused and specific and allowed for “skip” or “n/a” responses when the respondent does not have a solid response. The survey was kept to a response time of under 20 minutes, and completion of the face-to-face survey averaged 5 to 10 minutes. How the data will be used and by whom was made clear in the survey’s introduction. The team amplified the reach of the survey by paying for advertising on social media platforms, which allowed the survey to appear to a wider number of persons in the target population.
Ineffective data collection tools The articulation of questions used to garner data is important to ensuring high-quality data. Questions that are vague, have limited options, or lack relevance, for example, can distort responses and results and limit response rates.	Our team conducted a peer review of survey questions and pilot interview questions and the survey. The face-to-face (F2F) survey was also revised during the field exercise to improve clarity for respondents. Data was also triangulated.
Lack of sufficient data to identify patterns and draw strong conclusions Data collection may improperly represent the population or segments of the population (e.g., stakeholder group, demographic group), as revealed through small sample size and/or low response rate on surveys.	Our team encouraged the generation of larger data sets by supporting increased response rates to survey data collection (this effort involves disseminating online survey through stakeholder groups and sending reminder prompts to stakeholder representatives). The online survey was limited in length and written in plain language to encourage completion. Where response rates were low and/or biased, the team considered whether the data should be presented, and, where necessary, drew attention

Examples of data challenges relevant to the Project	Mitigation strategies
	to the limitations of the data. The team ensured that the dataset included variables on demographic characteristics and stakeholder type so that the diversity of respondents could be assessed.

Table 4: Key Limitations relevant to study

4. ACOUSTICS OVERVIEW

Sonic booms are impulsive noises generated by shock waves created when an object travels through the air at speeds greater than the speed of sound - a speed known as *Mach 1*, which is approximately 750 miles (1,192 kmh) per hour at sea level and 68 °F (20 °C). As the object outruns its own sound waves, the waves compress and merge into a single shock wave that trails behind the object in the shape of a cone, known as a Mach cone.

Sonic booms are often described as sounding like a loud explosion or clap of thunder, and can startle people and animals, cause some physiological concerns, and, in some cases, result in minor damage to structures.

Falcon 9 is a two-stage rocket capable of reaching speeds of nearly 5,000 miles (8,000 kilometres) per hour. Following the launch of the rocket, its stages separate, and the first stage booster begins its controlled descent to Earth. As the booster re-enters the Earth's atmosphere and decelerates through the sound barrier in preparation for landing, it moves faster than the speed of sound - generating a sonic boom (*SpaceX*).

The boom carpet (the strip of ground, or ocean that is exposed to the surface of the boom's Mach cone) follows the direction of travel of the aircraft, rather than radiating uniformly outward. Communities located directly along or near the flight path will therefore experience a boom most intensely, while those situated outside of the boom carpet, even those at comparable distances from impacted communities, may hear little or nothing. This helps to explain the survey data findings of why Cat Island reported significantly lower audibility rates than other more impacted communities, such as Eastern New Providence, though it is at an equivalent distance from the Landing Site (see Table 8 at Section 5.2.4).

Shock waves formed by sonic booms typically reach the ground in a number of ways; these include primary booms - direct, intense shock waves that propagate directly to the ground and

are often experienced as an “N-wave”, characterised by two sudden rises in pressure lasting a few seconds. Interestingly, while most sonic booms are N-waves, and consist of two shocks, the Falcon-9 booster (as well as the SpaceX Starship and possibly other craft) makes a triple sonic boom during its descent, and contain three distinct shocks. (Anderson & Gee, 2024). This characteristic is directly relevant to the survey data, as a number of respondents reported hearing two or more distinct booms, consistent with the multi-shock signature of the Falcon 9 descent (see Section 5.4.1).

Rocket ascent and descent sonic booms are said to differ significantly from sonic booms created by other aircraft, as they are much lower in frequency and are typified as sounding and feeling like an earthquake. “The boom’s dominant energy is at a frequency of less than 1 hertz, below the range of human hearing, meaning that the booms rattle homes rather than bursting eardrums” (Acoustical Society of America, 2025). This characteristic directly explains the structural impact reports collected by this survey (see Section 5.8), in which respondents across multiple islands described windows rattling, walls shaking, pictures falling from walls, and in some cases roof damage – all physical sensations consistent with pressure waves passing through building structures, rather than an audible sound in the conventional sense.

The human response to sonic booms has been studied extensively since the 1960s and 1970s, accelerated by the development of supersonic commercial aviation and programmes such as the Concorde. Research established that the most consistently documented immediate human response to a sonic boom is the startle reflex (an involuntary, whole body response to sudden loud sound that involves measurable physiological changes), and that annoyance, rather than direct physiological harm, is the primary community-level outcome for populations exposed to single or infrequent boom events. Research from this period did not find that single or infrequent events produced lasting physiological changes - although vulnerable populations (young children, the elderly, those with cardiovascular conditions and anxiety disorders or post-traumatic stress) were noted to be more reactive and have longer-lasting distress responses (Rylander, 1974).

5. **SURVEY ANALYSIS AND FINDINGS**

5.1 **Introduction**

This section presents the analysis and findings of the SpaceX Sound Mapping Survey, administered through two complementary modes: face-to-face field interviews (n=415) conducted across New Providence, Eleuthera, and Cat Island, and a web-based digital survey (n=382) distributed primarily through community networks in New Providence. The findings are in the main presented in three parts, digital survey, face-to-face survey (F2F survey) and combined synthesis, to preserve the distinct characteristics of each dataset while producing an integrated account of community experience.

Central to the analytical approach is the distinction between respondents who directly experienced the sonic boom and those who did not. Throughout this section, respondents are classified into two groups: Group A, comprising those who confirmed hearing or feeling the boom, and Group B, comprising those who did not (see further at Section 5.4). Emotional response, future acceptability, and programme-level concerns are reported for both groups, as the contrast between them is itself a finding of governance significance.

Qualitative data from open-ended survey responses is drawn on throughout to give texture and precision to the quantitative findings.

5.2 **Demographics**

5.2.1 **Study Sample**

Digital

The digital survey captured 382 responses, of which 358 (93.7%) were from New Providence, 9 (2.4%) from Grand Bahama, and 8 (2.1%) from Eleuthera. Single respondents also participated from Andros, Cat Island, Exuma, and Long Island (one respondent each, 0.3% apiece), and three respondents (0.8%) did not state their island of residence. This online sample therefore reflects a predominantly New Providence-based, connected population reached through digital channels.

Face-to-Face

The face-to-face sample comprised 415 respondents distributed across New Providence, Eleuthera, and Cat Island through direct field interviews conducted between 19 and 21 February 2026. The demographic profile reflects the geographic and population characteristics of each

study community and the field deployment strategy, which prioritised broad coverage across age groups, settlement types, and household compositions.

797 responses were captured over both datasets.

5.2.2 Gender

Digital

Women accounted for 275 digital respondents (72.0%), while 95 respondents (24.9%) identified as men. A small number selected “prefer not to say” (8 respondents, 2.1%), one respondent identified as non-binary (0.3%), and three respondents (0.8%) did not state their gender. This distribution reflects who encountered and chose to complete the online questionnaire during the survey period.

Gender	Count	% (n=382)
Female	275	72.0%
Male	95	24.9%
Prefer not to say	8	2.1%
Not stated	3	0.8%
Non-binary	1	0.3%

Table 5: Gender distribution, digital survey (n=382).

Face-to-Face

The sample was broadly balanced by gender, with 52.8% female and 47.0% male respondents. One respondent (0.2%) preferred not to state their gender. This near-equal distribution reflects the field team's deliberate strategy of engaging respondents across varied household types and at different times of day.

Gender	Count	% (n=415)
Female	219	52.8%
Male	195	47.0%
Prefer not to say	1	0.2%

Table 6: Gender distribution, face-to-face survey (n=415).

5.2.3 Age

Digital

In the digital survey, the 35 to 44 age group was the largest at 27.5%, followed by 25 to 34 (22.3%) and 45 to 54 (15.7%). The 18 to 24 group, represented 6.5%. This reflects the demographic characteristics of social media engagements in Nassau, where the digital survey was primarily distributed, with middle aged adults more likely to engage with community information channels of this kind.

Face to Face

In the face to face survey the 18-24 age group was the largest cohort at 23.9%, followed by 45-54 (17.1%), 25-34 (16.7%), 55-64 (16.2%), and 35-44 (15.9%). Respondents aged 65 and above represented 9.2%. The broad age distribution, with no single cohort dominating, supports the representativeness of the sample across the study communities.

Age Group	Face-to-Face (n=414)		Digital (n=382)	
	Count	%	Count	%
18-24	99	23.9%	25	6.5%
25-34	69	16.7%	85	22.3%
35-44	66	15.9%	105	27.5%
45-54	71	17.1%	60	15.7%
55-64	67	16.2%	59	15.4%
65 and above	38	9.2%	40	10.5%
Prefer not to say	4	1.0%	8	2.1%

Table 7: Age distribution, face-to-face (n=414) and digital (n=382) surveys.

5.2.4 Island of Residence/Location During the Sound Event and Distance from Landing Site

Zone	Digital (n=378)	% of Digital	Face-to- Face (n=414)	% of F2F	Combined (n=792)	%	Approx. Distance from Landing Site
New Providence (n=565)	358	93.71	207	49.88	565	70.89	
Eastern	144	38.10	54	13.04	198	25.00	79.8mi/ 128.43km
Southern	75	19.84	48	11.59	123	15.53	85.59mi/1 37.74km
Western	69	18.25	39	9.42	108	13.64	91.9mi/ 147.9km
North/Central & Paradise Island	67	17.72	63	15.22	130	16.41	84.98mi/ 136.77k
Eleuthera (n=125)	8	2.12	117	28.26	125	15.78	
North Eleuthera	1	0.26	24	5.70	25	3.16	94mi/ 107.73km
Central Eleuthera	5	1.32	30	7.25	35	4.42	66.94mi/1 07.73km
South Eleuthera	2	0.53	63	15.22	65	8.21	22.41mi/3 6.08km
Cat Island (n=91)	1	0.26	90	21.74	91	11.49	
North Cat Island	1	0.26	43	10.39	44	5.56	41.21mi/6 6.32km
Central Cat Island	0	0.00	17	4.11	17	2.15	48.26mi/7 7.67km
South Cat Island	0	0.00	30	7.25	30	3.79	52.54mi/8 4.56km
Grand Bahama (n=9)	9	2.38	0	0.00	9	1.14	201.96mi/ 325.02km

Zone	Digital (n=378)	% of Digital	Face-to- Face (n=414)	% of F2F	Combined (n=792)	%	Approx. Distance from Landing Site
Andros (n=1)	1	0.26	0	0.00	1	0.13	92.94mi/ 149.58km
Exuma (n=2)	1	0.26	1	0.24	2	0.25	65.90mi/1 06.04km
Long Island (n=1)	1	0.26	0	0.00	1	0.13	90.94mi/ 146.35km

Table 8: Survey respondents by Geographic Zone and Approx Distance from Landing Site

5.2.4.1 By Island

New Providence accounted for 70.89 of all respondents, Eleuthera 15.68%, and Cat Island 11.42%. 9 persons from Grand Bahama completed the digital survey, and are included in the community-level analysis. Two respondents from Exuma (one responding to the digital survey and one person who was in Exuma at the time of the sonic boom but was interviewed in Cat Island during the face-to-face survey exercise), a respondent from Long Island and a respondent from Andros (both Long Island and Andros respondents participated in the digital survey) are included in overall totals but excluded from community-level analysis. There were also 3 respondents (0.8%) who did not state their island and who are therefore excluded from community-level analysis.

The combined 28.23% from Eleuthera, Cat Island, and Grand Bahama makes this dataset the study's primary source of outer island community experience. The responses from Grand Bahama are to be treated with caution, given its distance from the Landing Site and the lesser likelihood of disturbance due to that distance, as well as the small subset of Grand Bahama responses (9, with only 3 Group A (Heard) respondents).

Though the digital survey was predominantly taken by New Providence residents, the participation by respondents from outside of the Primary Study Communities shows that the digital survey achieved some reach across the wider Bahamas, even though it remained strongly New Providence centred.

Digital survey respondents encountered the survey through social media and community networks rather than through targeted distribution.

5.2.4.2 By Geographic Zone and Settlement

Data has also been disaggregated by geographic zone (see Section 5.2.5) and by settlement, for Eleuthera and Cat Island.

New Providence

Over both datasets, New Providence accounted for 565 respondents, drawn from North/Central & Paradise Island (130), Eastern New Providence (198), Southern New Providence (123), Western New Providence (108), and a small number who did not specify their area (3).

Eleuthera

Eleuthera contributed 125 respondents, with 65 being from South Eleuthera (primarily from Rock Sound (13) and Bannerman Town (13), followed by Wemyss Bight (11), Green Castle (9), Waterford (9), Tarpum Bay (5), Deep Creek (2), and John Millar (1)), 35 being from Central Eleuthera (from James Cistern (8), Palmetto Point (6), Governor's Harbour (5), Hatchet Bay (3), Savannah Sound (2), Rainbow Bay (2), and Eleuthera Island Shores (2)), and 25 being from North Eleuthera (drawn from Upper Bogue (8), Gregory Town (7), Lower Bogue (6), Bluff (2), and Spanish Wells (1)).

Cat Island

Cat Island accounted for 91 respondents. In North Cat Island (43 respondents) - the largest settlements were Orange Creek (15) and Arthur's Town (10), followed by McQueens (6), Bennett Harbour (4), Fernandez Bay (2), Pigeon Cay (2), and Shannon's Cove (4). Central Cat Island respondents (18 respondents) were concentrated in Smith's Bay (11), with smaller numbers from Knowles (3), The Cove (2), Stevenson (1), and Tea Bay (1). South Cat Island (30 respondents) was led by New Bight (17) and Old Bight (5), with further respondents from Devil's Point (3), Zonnicle Hill (2), Port Howe (2), and Bain's Town (1).

5.2.4.3 By Approximate Distance from the Landing Site

To better assess proximity and exposure, approximate distances were mapped from the Landing Site in the Exuma Sound to each of the communities from which a survey respondent reported having experienced the sound event. Mapping of the distances was carried out by inputting the Landing Site coordinates into Google Earth and measuring the distance between the Landing Site and all geographic zones and islands named herein. This method of

measurement is undoubtedly imprecise and is in no way meant to serve as anything more than a rough approximation; however, the information helps to illuminate proximity and likely impacts of the sound event.

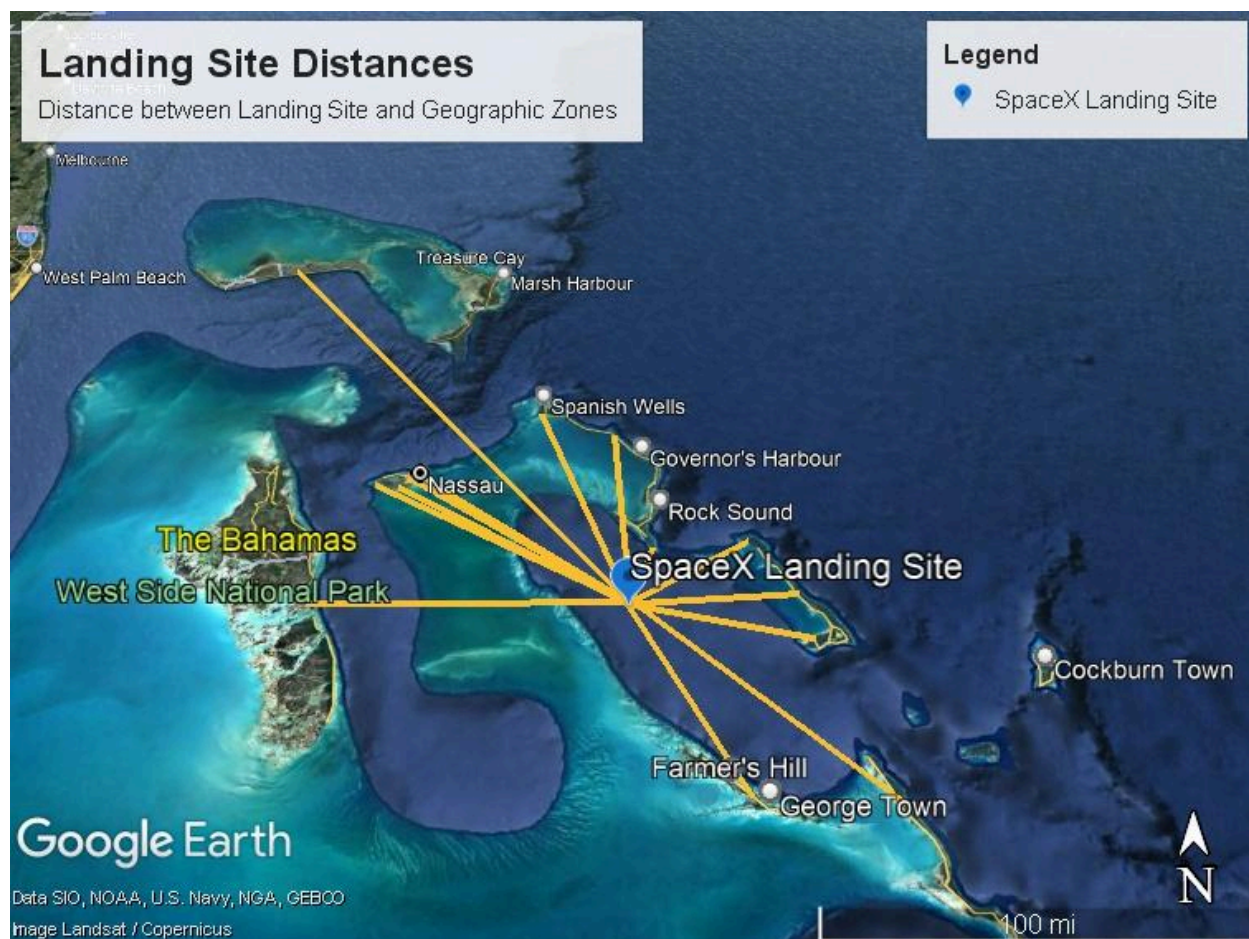


Figure 4: Distance Between Landing Site and Geographic Zones

5.2.5 Geographic Zones

For this report, the primary communities of study (being the islands of New Providence, Eleuthera, and Cat Island) for both the face-to-face and digital surveys have been organised into geographic zones that group settlements and communities by their proximity to the Landing Site, and by their reported intensity and reaction patterns. These zones are not official districts, they are groupings created for this analysis to bring together communities that share similar sound experiences and local conditions (although the islands of Eleuthera and Cat Island are typically divided into North, Central, and South districts, that mirror the Zones found in this

report). Islands that fall outside of the primary study scope have not been zoned in this manner; and are each treated as an individual community where applicable.

The original scope of work/intent was to assess the sound experiences of New Providence, South Eleuthera, and North Cat Island. However, while the survey teams were conducting fieldwork in the islands of Eleuthera and Cat Island, it became quickly apparent that communities outside of the primary zones had experienced the sonic boom. In Eleuthera especially, persons to the very north of the island were reporting that they heard and felt the boom. Similarly, a number of persons from Central and South Cat Island reported impacts. For this reason, the study scope was extended to include the communities of Central Eleuthera, North Eleuthera, Central Cat Island, and South Cat Island, so as to ensure that the impact of the sound event on those islands can be understood as fully as possible.

Geographic Zone and Expected Impact	Key Communities/ Boundaries	Study Area Rationale
New Providence		
Eastern (High Impact)	East Street to East Bay Street, Eastern Road, Yamacraw Hill Road e.g. Paradise Island, Montagu, Winton, Sandilands Village, Kemp Road, Gleniston Gardens, Elizabeth Estates, Yamacraw, Fox Hill, Seabreeze, Nassau East, Nassau Village, etc.)	Eastern side of island, oriented toward south-eastern approach to Landing Site, close to Landing Site.
Southern (High Impact)	Coral Harbour Road, Firetrail Road & South Lake Killarney, Soldier Road to East Street South e.g. Carmichael Village, Golden Gates, Venice Bay, Flamingo Gardens, South Beach Estates, etc.	Southern coast of New Providence, closest New Providence zone to Landing Site; suburban community type.
Western (Low Impact)	Coral Harbour Road to Western Road West & South West Bay e.g. Lyford Cay, Albany, Adelaide Village, Mount Pleasant, Airport Industrial Park, Old Fort Bay, Tropical Gardens,	Western side of island, furthest NP zone from Landing Site; suburban community type.

Geographic Zone and Expected Impact	Key Communities/Boundaries	Study Area Rationale
	Gambier Village, Coral Harbour, etc.	
N/Central & Paradise Island (Mixed Impact)	Paradise Island, West Bay to East Street, Soldier Road West and Ridgeland Park, Firetrail Road, & Northern Lake Killarney e.g., Cable Beach, Prospect Ridge, Skyline Drive, Fort Charlotte, Bain Town & Grants Town, Chippingham, Coconut Grove, Blue Hill Heights, Ridgeland, Garden Hills West, Millennium Gardens, etc.	Northern and central urban core of Nassau and Paradise Island, bordered by the northern coast and contains mixed-use, urban and suburban community types (high percentage of urban communities).
Eleuthera		
Zone 1 South Eleuthera, (High-Impact)	Settlements south of Savannah Sound (eg Tarpum Bay, Rock Sound, Deep Creek, Green Castle, Waterford, Wemyss Bight, Bannerman Town & John Millars Estate)	Nearest to Landing Site, predicted highest acoustic exposure of any study community; predominantly rural community type
Zone 2 Central Eleuthera (Mixed Impact)	Settlements south of Gregory Town (eg. Palmetto Point, James Cistern, Governor's Harbour, Hatchet Bay, Savannah Sound, Eleuthera Island Shores, Rainbow Bay)	Moderate distance from Landing Site.; mixed-use community type
Zone 3 North Eleuthera (Low Impact)	Northernmost settlements,, Gregory Town, Upper Bogue, Lower Bogue, Bluff, Spanish Wells	Furthest Eleuthera Zone from the Landing Site predominantly rural community type
Cat Island		
Zone 4 North Cat Island (High Impact)	New Bight, Smith's Bay, Old Bight, Orange Creek, McQueens	Predicted high acoustic experience; Most remote study community;

Geographic Zone and Expected Impact	Key Communities/ Boundaries	Study Area Rationale
		captures family island experience beyond Eleuthera.
Central Cat Island (Medium to Low Impact)	Smith's Bay, Knowles, The Cove, Stevenson, and Tea Bay	Predicted medium to low acoustic experience; remote study community
South Cat Island (Low Impact)	New Bight, Old Bight, Devil's Point, Zonnicle Hill, Port Howe, Bain's Town	Predicted low acoustic experience; remote study community

Table 9: Geographic Zones and Study Area Rationale

5.2.6 Community Type

Face to Face

Rural communities were the most prevalent at 41.4%, followed by suburban or peri-urban (36.6%), urban (18.6%), and mixed-use or tourism-centred (3.4%). The high rural proportion directly reflects the outer island communities of South Eleuthera and North Cat Island. This community profile connects to two key findings, rural communities tend to have quieter ambient acoustic baselines, amplifying the relative intensity of the sonic boom; and they have lower connectivity to the digital channels through which advance notification was primarily distributed.

Community Type	Count	% (n=413)
Rural	171	41.4%
Suburban / Peri-urban	151	36.6%
Urban	77	18.6%
Mixed-use / Tourism-centred	14	3.4%

Table 10: Community type, face-to-face survey (n=413).

Digital

Digital respondents mostly described their communities as suburban or peri-urban, reflecting the New Providence focus of the online sample. Two thirds of digital respondents (66.0%, 252 of 382) reported living in suburban or peri-urban areas, 19.6% (75 respondents) in urban

communities, and 6.8% (26 respondents) in rural communities. A further 6.8% (26 respondents) described their community as mixed-use or tourism-centred.

Community Type	Count	% (n=382)
Suburban	252	66.0%
Urban	75	19.6%
Rural	26	6.8%
Mixed-use / Tourism-centred	26	6.8%

Table 11: Community type, digital survey (n=382).

5.2.7 Household Composition

The majority of respondents (62.7%) reported no household members under the age of 18. Among the 37.3% with children present, child-specific impacts are documented in Section 5.7.3.

Pet ownership (see Section 5.7.4) was reported by 26.0% of face-to-face respondents and 50.3% of digital respondents. The sample included 34 visitors (8.7%), whose responses provide a perspective from individuals with no long-term stake in how commercial aerospace activity in Bahamian waters is managed - but these individuals did offer perspectives of how communities outside of The Bahamas manage sonic booms, and of visitor/tourist perception of commercial aerospace activity and noise (See Section 5.11).

Household Item	Response	Face-to-Face	%	Digital	%
		Count	%	Count	%
Children under 18 in household		n=413		n=381	
	Yes	154	37.3%	155	40.7%
	No	259	62.7%	226	59.3%
Pets in household		n=411		n=382	

Household Item	Response	Face-to-Face	%	Digital	%
	Yes	107	26.0%	192	50.3%
	No	304	74.0%	190	49.7%
Visitor or resident		n=393		Did not ask	
	Resident	359	91.3%	-	-
	Visitor	34	8.7%	-	-

Table 12: Household composition and visitor/resident status, face-to-face survey and digital.

5.3 Sound Event Awareness and Context

5.3.1 Introduction

This section presents findings on pre-event awareness, information sources, whether the boom was heard, the number of acoustic events perceived, and respondent location at the time of the landing. These findings establish the informational and contextual conditions under which community members experienced the sonic boom and help regulators form conclusions about how this activity should be managed.

Notice of the event was first published to social media on 16 February, 2026, by the Civil Aviation Authority of The Bahamas (CAAB). The notice advised of the intended date of February 18, 2026.

On 17 February 2026, a digital notice (February 18 Notice) advising the public of a sonic boom expected on 18 February 2026 - on what was the scheduled date for the Second Landing - was released across a number of social media platforms, including The Nassau Guardian's social media platforms. The February 18 Notice was also released over television platforms - namely the ZNS Community page announcements (a method of notification that was chosen because older populations, especially those living in rural communities in the Family Islands, are thought to be more likely to utilize it) - and was also reportedly widely disseminated across Whatsapp.

On February 17, 2026 (the date on which the February 18 Notice was published) the Second Landing was postponed to the following day, February 19, 2026. All public notices, media coverage, and community advertisements initially referenced the 18 February window and had

to be revised at short notice when the date moved to 19 February, limiting the time available for the updated information to reach communities.

Following publication of the notices, traditional media houses (Nassau Guardian, Tribune) published articles about the Second Landing and about the sound mapping study conducted in connection with this survey.

5.3.2 Pre-Event Awareness

Across both surveys, 306 of 792 respondents, or 38.6%, were not aware in advance that a sonic boom might occur. New Providence was the only Primary Study Community to achieve majority awareness at 68.3%. Among digital respondents from Grand Bahama (n=9), Andros (n=1), Exuma (n=1), and Long Island (n=1), all respondents were aware of the event in advance. These islands were outside the primary study scope and their respondents encountered the survey through social media.

Island	% Aware Before Event	% Not Aware	n
New Providence	68.3	31.7	562
Eleuthera	44.0%	56.0%	125
Cat Island	38.9%	38.6%	91
Grand Bahama	100%	-	9
Andros	100%	-	1
Exuma	100%	-	1
Long Island	100%	-	1
Total	38.6%	61.50	792

Table 13: Pre-event awareness by island, combined.

5.3.3 Source of Information

Among the 487 respondents across both datasets, who were aware of the event in advance (193 face-to-face, 294 digital, social media was the dominant channel at 64.2%, followed by news media (31.1%), word of mouth (25.1%), and government notice (15.1%). Other sources included WhatsApp groups, Facebook, TV and radio, and in one case direct observation at Cape Eleuthera. Government notice reached 73 respondents, 15.1% of those who were aware. 4 respondents did not specify a source.

Information Source	Count	% of Aware Respondents (n=483)*
Social media	310	64.2%
News media	150	31.1%
Word of mouth	121	25.1%
Government notice	73	15.1%
Other (WhatsApp, TV/radio, aviation)	10	2.1%

Table 14: Source of pre-event information. *Multiple sources permitted; n=200 reflects those who specified a source.

5.3.4 Notification Gap

Across both surveys, the data converges on a single conclusion that the quality of a community's experience of the Second Landing was determined primarily by whether they knew it was coming. The notification system did not reach communities equally. It reached New Providence more effectively than it reached the other Primary Study Communities. It reached digitally connected residents better than it reached rural ones. Formal government notice, the mechanism the regulatory framework requires, had a very low reach rate according to the data.

Notification Finding (Face-to-Face)	Percentage
F2F respondents awareness rate	46.8% (196 of 415)
Digital awareness rate (NP-dominant)	77.0% (294 of 382)
Cat Island awareness rate	38.5% (35 of 91)
South Eleuthera awareness rate	44.0% (55 of 125)
New Providence awareness rate	68.0% (384 of 565)

Notification Finding (Face-to-Face)	Percentage
Government notice reached	9.2% (73 of 797)
Social media as primary awareness channel (of aware)	63.7% (310 of 487)

Table 15: Notification gap summary across both survey modes.

5.3.5 Activity at Time of Event

Activity at Time of Event	Face-to-Face (n=402)	% of F2F	Digital (n=380)	% of Digital	Combined
At home, indoors, household / recreational activities	175	43.5%	210	55.3%	385 49.0%
At home, indoors, sleeping / resting	103	25.6%	112	29.5%	215 27.4%
At home, outdoors	24	6.0%	29	7.6%	53 6.7%
Away from home, outdoors	25	6.2%	15	3.9%	40 5.1%
Away from home, indoors, leisure / recreation	24	6.0%	5	1.3%	29 3.7%
Away from home, indoors, working	23	5.7%	7	1.8%	30 3.8%
Away from home, indoors, household activities	20	5.0%	-	-	20 2.5%
Away from home, driving / travelling	8	2.0%	2	0.5%	10 1.3%

Table 16 - Location of respondents at time of sonic boom, face-to-face (n=402) and digital (n=380) surveys.

5.3.6 Event Awareness and Context, Key Observations

Five findings from this section carry direct weight for how this activity should be managed.

First, 52.8% (219 of 415) of respondents were unaware of the event before it occurred.

Third, 103 respondents (24.8%) were asleep when the event occurred.

Fourth, the landing was originally scheduled for 18 February and postponed to 19 February. Public advertisements, social-media posts, and news items had been built around the 18 February window, and although notices were updated, several respondents reported that they were still expecting the boom on the wrong night. As a result, people who believed themselves to be informed were effectively uninformed when the event actually occurred.

Fifth, and most precisely: Bannerman Town, Wemyss Bight, and Rock Sound, the three southernmost Eleuthera settlements closest to the landing site, had among the lowest pre-event awareness in the study despite being the communities most directly in the acoustic path. The notification gaps documented in this section are addressed directly in the recommendations in Section 7.

5.4 **Boom Audibility**

5.4.1 **Number of Booms Heard**

The most notable element of a sound event is, inarguably, the sound that is produced. Survey respondents across the datasets and within and outside the Primary Study Communities reported hearing between no booms and up to five sonic booms.

Number of Booms Heard	Online Survey (n=382)	%	Face-to-Face Survey (n=415)	%	Combined (n=797)	%
None (Did Not Hear)	26	6.07	190	45.78	216	27.10
Unsure	3	0.79	8	1.93	11	1.38
One	313	82.59	172	41.45	485	60.85
Two to Three	35	9.23	40	9.64	75	9.41
Three +	5	1.32	5	1.20	10	1.25

Table 17: Number of Booms heard per dataset and Combined

216 respondents (27.10%) heard no boom, 11 were unsure about whether or not they heard a boom (1.38%), and 581 respondents (72.89%) heard between one and three + booms. More respondents heard one boom than any other sound (60.85%).

There is a significant disparity between the two datasets. 45.87% of the face-to-face survey respondents reported hearing no boom, compared to only 6.07% of the online survey respondents. This is likely due to the fact that online survey respondents self-selected into the survey, making them more likely to have already been aware of or directly experienced the event.

5.4.2 Audibility (By Island)

Data concerning the rates at which respondents heard (or did not hear) the sound event has been disaggregated at an island level across both datasets.

Island	Group A (Heard)	% Within A	Group B (Not Heard)	% Within B	Unsure	% Unsure
New Providence (n=565)	449	79.33	109	50.46	5	50
Eleuthera (n=125)	94	16.60	31	14.35	-	-
Cat Island (n=91)	17	3.00	69	31.94	5	50
Grand Bahama	3	0.53	6	2.78	-	-
Exuma	1	0.18	1	0.46		
Andros	1	0.18	-	-	-	-
Long Island	1	0.18	-	-	-	-
Total	566	100	216	~100	10	100

Table 18: Heard / did not hear by island by Group A (Heard), Group B (Not Heard)

Unsure

4 respondents over the two datasets (1 of the 8 respondents in the F2F survey, and 2 of the 3 respondents in the online survey) who responded that they were unsure about how many booms they heard are assessed as having experienced the sound event based on their other

responses. Of the relevant digital survey respondents, one was located in the New Providence Eastern zone and one did not select a location. Both responded that they were extremely concerned about the boom and reported being startled by the boom, and both gave the highest response to all Likert scale questions. The F2F survey respondent was located in the New Providence North/Central zone, reported being startled by the boom, and was moderately concerned about the boom.

By Island

New Providence

New Providence had the highest combined Heard rate at almost 80%; this is in large part due to the high hearing rate of the online survey (over 95% hearing rate compared to 57% in the enumerator study). New Providence also dominated the Not Heard category, at 50.46% of Group B. New Providence Eastern had the highest Heard rate at 87.87%, followed by New Providence Southern at 85.37% - this tracks, as both of these communities were in closer proximity to the Landing Site and more exposed to the sound. New Providence Western followed at 76.85%, and last was New Providence North/Central & Paradise Island at 66.92%.

New Providence — Audibility by Zone | Heard vs Not Heard

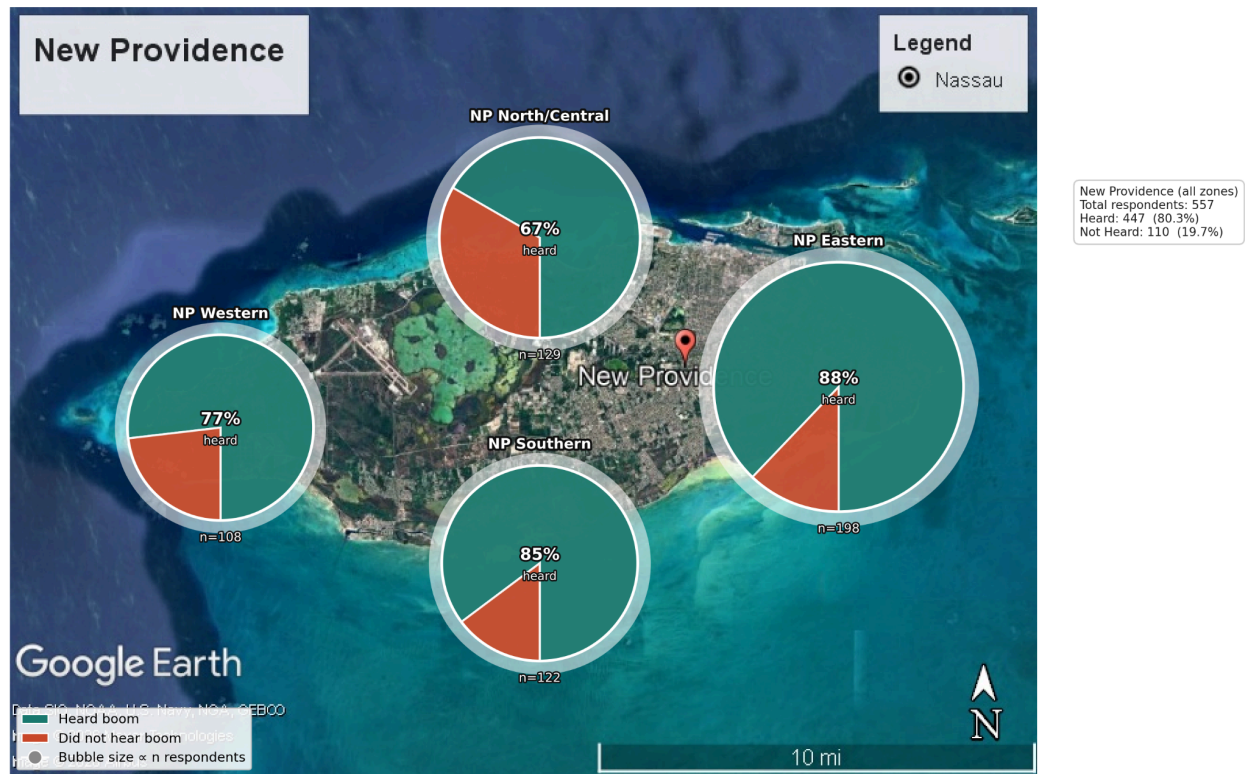


Figure 5: New Providence Rates of Audibility

Eleuthera

Eleuthera's Heard rate of 75% was also high; South Eleuthera in particular had a 89% Heard rate, and had notably high rates of hearing multiple booms.

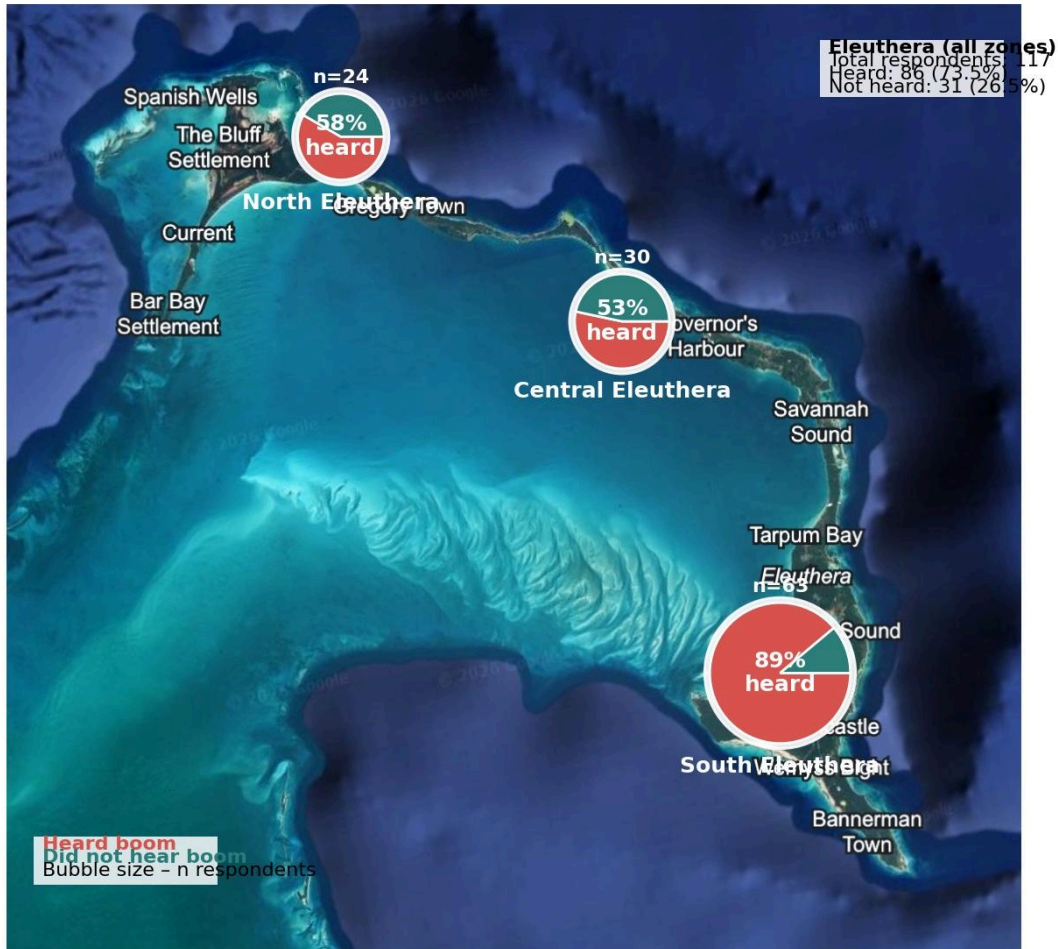


Figure 6: Eleuthera Rates of Audibility

Cat Island

Cat Island — Audibility by Zone | Heard vs Not Heard

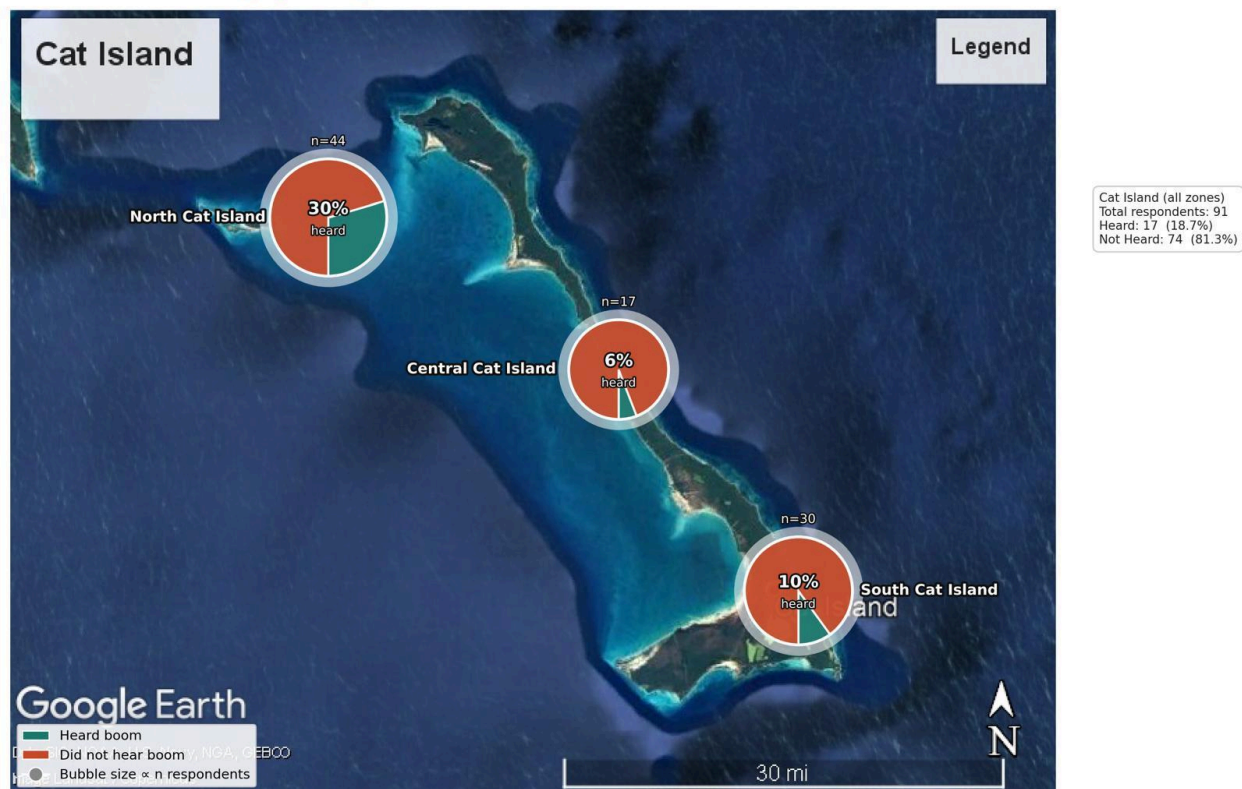


Figure 7: Cat Island Rates of Audibility

The results coming out of Cat Island were striking - despite its proximity to the Landing Site, it had the highest non-hearing rate of all other communities, and accounts for just 3% of Heard responses, but 33% of all Not Heard responses. Even in the primary study area of North Cat Island, the Heard rate was only 29.54%, and in Central Cat Island and South Cat Island it dropped even lower, to 5.88% and 10.00% respectively.

Grand Bahama's Heard Rate was also relatively low at 33%. This is unsurprising, given the large distance between the Landing Site (~200 miles/325 kilometres - see Section 5.2.4).

5.4.3 Geographic Distribution, Audibility by Zone and Settlement

The zone and settlement data reveals a geographic pattern of acoustic exposure that directly mirrors proximity to the Landing Site. The table below shows all zones broken out across New Providence, Eleuthera, and Cat Island, with Group A, Group B, and not-asked figures presented separately.

Location Zone	Group A (Heard)	% A	Group B (Not heard)	% B	Total	% Aware before event
New Providence - Southern	105	85.4%	18	14.6%	123	67.5%
New Providence - Eastern	174	87.9%	19	9.6%	198	69.2%
New Providence - Western	83	76.9%	23	21.3%	108	72.2%
New Providence - N/Central & Paradise Island	86	66.2%	39	30.0%	130	62.3%
South Eleuthera	58	89.2%	7	10.8%	65	40.0%
Central Eleuthera	21	60.0%	14	40.0%	35	48.6%
North Eleuthera	16	61.5%	10	38.5%	25	50.0%
North Cat Island	13	29.5%	28	63.6%	44	38.6%
South Cat Island	4	14.8%	23	76.7%	30	36.7%
Central Cat Island	1	5.9%	13	76.5%	17	41.2%

Table 19: Heard / did not hear by location zone with Group A, Group B, and pre-event awareness. Note: Total includes not-asked respondents, so A+B does not always equal Total.

The pattern is unambiguous. South Eleuthera, the zone closest to the Exuma Sound, had the highest confirmed heard rate at 89.2% and the lowest Group B rate at 10.8%. Cat Island zones had the highest Group B rates (Central Cat Island 92.9%, South Cat Island 76.5% , and North Cat Island 63.6%). Within New Providence, the Eastern zone had the highest heard rate (87.9%) and North/Central the lowest (66.2%), with the highest Group B concentration again in North/Central (30.0%).

The awareness column reveals the inverse relationship. South Eleuthera recorded the highest heard rate (89.2%) but only 40.0% pre-event awareness. New Providence Western recorded the

highest awareness of any zone at 72.2% but a heard rate of only 76.9%. a. Communities that were most exposed acoustically were among the least informed that the event was coming.

The Inverse Relationship Between Exposure and Notification

The communities that heard the boom most clearly were among the least informed it was coming. South Eleuthera: 85.2% heard it, 39.7% knew in advance. New Providence Western: 41.0% heard it, 59.0% knew in advance. This inverse relationship is not incidental. It reflects the structural reality that formal and digital notification channels reach urban, connected communities more effectively than rural, outer island ones, the same communities that bore the greatest acoustic impact of the landing trajectory.

5.4.4 Geographic Zone and Settlement Detail

5.4.4.1 Eleuthera and Cat Island

For Eleuthera and Cat Island, settlement-level data provides the most detailed picture of acoustic exposure in the study. The tables below show Group A and Group B counts for each settlement with four or more respondents, revealing a steep gradient within each island.

Within Eleuthera, the southern settlements closest to the Exuma Sound recorded the highest heard rates in the study. Wemyss Bight, Deep Creek, Eleuthera Island Shores, and Rainbow Bay all recorded 100% heard rates. Bannerman Town and Rock Sound followed closely at 92.3% each. Heard rates declined progressively northward, reaching 50% in Lower Bogue and Bluff, 42.9% in Gregory Town, and 33.3% in Palmetto Point.

Eleuthera Settlement	Group A (Heard)	% A	Group B (Not heard)	% B	Total
Bannerman Town	12	92.3%	1	7.7%	13
Deep Creek	2	100%	0	0.0%	2
John Millar	1	100%	0	0.0%	1
Wemyss Bight	11	100.0%	0	0.0%	11
Rock Sound	12	92.3%	1	7.7%	13
Savannah Sound	1	50.0%	1	50.0%	2
Upper Bogue	7	87.5%	1	12.5%	8

Eleuthera Settlement	Group A (Heard)	% A	Group B (Not heard)	% B	Total
Waterford	7	87.5%	1	12.5%	8
Tarpum Bay	4	80.0%	1	20.0%	5
Green Castle	6	66.7%	3	33.3%	9
Hatchet Bay	3	60.0%	2	40.0%	5
Rainbow Bay	2	100%	0	0.0%	2
Eleuthera Island Shores	2	100%	0	0.0%	2
James Cistern	4	50.0%	4	50.0%	8
Lower Bogue	3	50.0%	3	50.0%	6
Spanish Wells	0	0.0%	0	0.0%	0
Bluff	1	50.0%	1	50.0%	2
Gregory Town	3	42.9%	4	57.1%	7
Governor's Harbour	2	40.0%	3	60.0%	5
Palmetto Point	1	25.0%	3	75.0%	4

Table 20: Heard / did not hear by Eleuthera settlement.

Within Cat Island, the pattern reverses. New Bight had the largest number of respondents (15) but the lowest heard rate at 6.7%, with 14 of 15 respondents not hearing the boom. Orange Creek recorded the highest heard rate on the island at 46.7%, followed by Shannon's Cove (100%, n=1), Arthur's Town (27.3%), Bennett Harbour (25.0%), Old Bight (20.0%), McQueens (16.7%), and Smith's Bay (9.1%). Knowles, Devil's Point, Port Howe, Fernandez Bay, Pigeon Cay, Zonnicle Hill, Bain's Town, Tea Bay, and Stevenson all recorded 0% heard rates.

Cat Island Settlement	Group A (Heard)	% A	Group B (Not heard)	% B	Total
Orange Creek	7	58.3%	5	41.7%	12
Shannon's Cove	1	100%	0	0.0%	1
The Cove	1	33.3%	2	66.7%	3

Cat Island Settlement	Group A (Heard)	% A	Group B (Not heard)	% B	Total
Arthur's Town	3	42.9%	4	57.1%	7
Bennett Harbour	1	25.0%	3	75.0%	4
McQueens	1	20.0%	5	83.3%	6
Stevenson	0	0.0%	1	100.0%	1
Tea Bay	0	0.0%	1	100.0%	1
Old Bight	1	20.0%	4	80.0%	5
Smith's Bay	1	14.3%	6	85.7%	7
New Bight	1	7.1%	13	92.9%	14
Fernandez Bay	0	0.0%	2	100.0%	2
Pigeon Cay	0	0.0%	2	100.0%	2
Knowles	0	0.0%	3	100.0%	3
Zonnicle Hill	0	0.0%	2	100.0%	2
Port Howe	0	0.0%	3	100.0%	3
Bain's Town	0	0.0%	1	100.0%	1
Devil's Point	0	0.0%	3	100.0%	3

Table 21: Heard / did not hear by Cat Island settlement.

The contrast between Orange Creek (53.8% heard) and New Bight (7.1% heard), two settlements on the same island, shows how local factors such as topography, coastal exposure, and whether people were indoors or outdoors at the time shaped the acoustic experience within a single community. Orange Creek faces the Exuma Sound directly, while New Bight sits in a more protected position with less direct exposure to the open sea.

5.4.4.2 New Providence

New Providence contributed 565 respondents (207 face-to-face and 358 digital) and recorded an overall heard rate of 80%. Eastern New Providence recorded the highest heard rate within the island at 87.9% and the second highest very or extremely concerned rate at 28.8%, consistent with its location along the south-eastern approach to the Exuma Sound. The Western zone had the highest future unacceptable rate at 64.8% despite a lower heard rate of 76.9%,

suggesting stronger opposition to future launches in that community independent of direct exposure. North/Central and Paradise Island had the lowest heard rate at 66.2% and the lowest concern rate at 30.1%, reflecting its greater distance from the landing corridor and higher pre-event awareness. Southern New Providence was directly exposed to the sound, and had the second highest New Providence heard rate of 85.42%, and the highest very/extremely concerned rate at 30.1%, consistent with its greater proximity to the Landing Site.

Experience Zone	n	% Heard	Loud 4-5 (% of hearers)	Physical Impacts (%)	Very Extremely Concerned (%)	Future Booms Unacceptable (%)
New Providence - Eastern	198	87.9%	52.3%	20.2%	28.8%	62.1%
New Providence - Southern	123	85.4%	55.2%	12.2%	30.1%	57.7%
New Providence - Western	108	76.9%	44.6%	16.7%	22.2%	64.8%
New Providence - N/Central & Paradise Island	130	66.2%	53.5%	10.8%	23.8%	55.4%

Table 22: Heard / did not hear for New Providence

5.4.5 Acoustic Reach Beyond the Designated Study Zones

The study was designed around three communities, New Providence, South Eleuthera, and North Cat Island. The sonic boom was heard in settlements and zones well beyond those boundaries. This finding has direct implications for how regulators define the area of influence for future landing events.

Within Eleuthera, the boom was heard in North and Central Eleuthera, zones not included in the primary study scope. Of 22 respondents located in North Eleuthera at the time of the event, 13 confirmed hearing the boom (59.1%). Of 27 in Central Eleuthera, 16 confirmed hearing it (59.3%). The specific settlements in North and Central Eleuthera where hearing was confirmed include Upper Bogue, Hatchet Bay, Lower Bogue, James Cistern, Gregory Town, Governor's Harbour, Palmetto Point, and Bluff. The boom was therefore heard across virtually the entire length of Eleuthera, not only in its southern tip.

Within Cat Island, the boom was also heard in South and Central Cat Island, again outside the designated North Cat Island study zone. Four respondents in South Cat Island and one in Central Cat Island confirmed hearing the event, despite those zones sitting further from the Landing Site.

The digital survey also captured responses from Grand Bahama, Andros, Exuma, and Long Island, islands outside the primary study scope that encountered the survey through social media and community networks. Of these, one respondent each from Andros, Exuma, Cat Island and Long Island confirmed hearing the boom, as did three of nine Grand Bahama respondents and all eight Eleuthera digital respondents who described it as a loud low level boom. While the digital survey's self-selection characteristics mean these figures cannot be treated with the same rigour as the face-to-face data, they point to acoustic propagation that may have extended significantly further than the three designated study communities.

Zone / Island	Respondents Who Heard	Total in Zone	% Heard	Study Scope
South Eleuthera	57	68	83.8%	Within scope
Central Eleuthera	16	27	59.3%	Outside primary scope
North Eleuthera	13	22	59.1%	Outside primary scope
North Cat Island	12	43	27.9%	Within scope
South Cat Island	4	30	13.3%	Outside primary scope
Central Cat Island	1	17	5.9%	Outside primary scope
Grand Bahama (digital)*	3	9	33.3%	Outside scope
Andros (digital)*	1	1	100%	Outside scope

Zone / Island	Respondents Who Heard	Total in Zone	% Heard	Study Scope
Long Island (digital)*	1	1	100%	Outside scope
Eleuthera	8	8	100%	Outside scope
Cat Island	1	1	100%	Outside Scope

Table 23: Acoustic reach beyond designated study zones. *Digital survey respondents; self-selected, not probability sample.

5.4.6 The Area of Influence Is Larger Than the Study Scope

The study was scoped to three communities. The acoustic event was not. Respondents from North Eleuthera, Central Eleuthera, South Cat Island, and Central Cat Island all confirmed hearing the boom, but none of these areas were part of the designated study scope. Digital respondents from Grand Bahama, Andros, and Long Island also reported hearing it. Future landing events should be planned on the assumption that the magnitude and geographic distribution of sonic booms may vary considerably (see Section 4), and that the areas of impact may extend well beyond the communities included by the Project as part of any future study scope. This should be taken into account for future notification, monitoring, and community engagement measures related to the Project.

5.5 Perception of Sonic Boom

5.5.1 Dimensional Perception

This section assesses respondents' perceptions of the sonic boom across three dimensions: the degree to which it bothered, disturbed, or annoyed them; their perception of its loudness; and the extent to which it interfered with their activities at the time.

Respondents rated their perceptions of the sonic boom on a five-point Likert scale. For the bothered/disturbed/annoyed and interference questions, 1 indicated 'Not at all' and 5 indicated 'Extremely.' For the perceived loudness question, 1 indicated 'Not loud at all' and 5 indicated 'Extremely loud.' These questions were developed in alignment with ISO/TS 15666:2021.

Note: Perceptions related to vibration, rattling, and startle response were not assessed using the Likert scale. These experiences were instead captured through questions dealing with

physical and personal, and structural impacts (see Sections 5.7 and 5.8). This approach was adopted to improve the clarity and user-friendliness of the survey instrument.

Data is aggregated across both samples individually and combined, as well as by Group A (Heard) and Group B (Not Heard) respondents, allowing for a distinction to be made between the perception of those who actually heard the sound vs those who did not hear the sound and so could not form a perception. As expected, Group B consistently scores near 1.00 across all three questions. Data is also aggregated by island (combined samples).

The face-to-face “Total” scores are consistently lower than digital scores because the face-to-face sample included significantly more “Not Heard” respondents than did the digital sample (particularly from Cat Island), as digital survey takers were more likely to self-select than face-to-face respondents. This also brought down the total scores across both samples.

Two different survey modes, reaching different groups in different locations, produced perception scores that point the same way. Together, they show that people closer to the Landing Site and in quieter environments reported the boom as somewhat louder, more annoying, and more interfering, while respondents in New Providence reported lower but consistent scores on the same measures. The two datasets reinforce each other rather than contradict, and together they give a more complete picture of acoustic experience across the full study area than either could provide alone.

5.5.1.1 Interference

Survey respondents were asked how much the boom interfered with their activities.

Most survey respondents provided that the boom did not interfere with their activities at all - almost 60% of respondents across the samples chose Rating 1 (no interference at all), and approximately 70% chose either Ratings 1 or 2. Among Group A respondents, 45% chose Rating 1, and over 60% chose either Ratings 1 or 2. This suggests that the event disrupted daily activities the least of the three dimensions measured.

INTERFERENCE						
Scale	Group A (Heard)	% of A	Group B (Not Heard)	% of B	Total	%
Digital Survey (n=379)						
1 - Not at all	169	47.21	21	95.45	190	50.00

INTERFERENCE						
Scale	Group A (Heard)	% of A	Group B (Not Heard)	% of B	Total	%
2 - Slightly	63	17.60	1	4.55	64	16.84
3 - Moderately	46	12.85	0	0.00	46	12.11
4 - Very	46	12.85	0	0.00	46	12.11
5 - Extremely	34	9.50	0	0.00	34	8.95
Mean Score	2.20	(weighted mean)	1.05	(weighted mean)	2.13	(weighted mean)
Face-to-Face (n=413)						
1 - Not at all	92	22.28	187	98.42	279	67.55
2 - Slightly	37	8.96	2	1.05	39	9.44
3 - Moderately	26	6.30	1	0.53	27	6.54
4 - Very	27	6.54	0	0.00	27	6.54
5 - Extremely	41	9.93	0	0.00	41	9.93
Mean Score	2.5	(weighted mean)	1.02	(weighted mean)	1.82	(weighted mean)
Combined (n=792)						
1 - Not at all	261	44.92	208	98.11	469	59.14
2 - Slightly	100	17.21	3	1.42	103	12.99
3 - Moderately	72	12.39	1	0.47	73	9.21
4 - Very	73	12.56	0	0.00	73	9.21
5 - Extremely	75	12.91	0	0.00	75	9.46
Mean Score	2.31	(weighted mean)	1.02	(weighted mean)	1.97	(weighted mean)

Table 24: Interference Scores

5.5.1.2 Annoyance

Survey respondents were asked how much the sonic boom bothered, disturbed, or annoyed them.

Responses to this question were more polarized than any others. The most common answer across Group A and Group B was Rating 1 (46.34%), and for Group A, this answer received 27% of responses. However, a combined 25.63% rated their annoyance at 4 or 5 (Very or Extremely), and for Group A this figure was greater at 34.93%. This suggests that a considerable portion of respondents were significantly bothered, and that there was a wide range of experiences; some respondents were completely unbothered by the sound event, while others were very disturbed.

ANNOYANCE						
Scale	Group A (Heard)	%	Group B (Not Heard)	%	Total	%
Digital Survey (n=379)						
1 - Not at all	93	26.05	22	100.00	115	30.34%
2 - Slightly	60	16.81	0	0.00%	60	15.83%
3 - Moderately	82	22.97	0	0.00%	82	21.64%
4 - Very	67	18.77	0	0.00%	67	17.68%
5 - Extremely	55	15.41	0	0.00%	55	14.51%
Mean Score	2.81	(weighted mean)	1	(weighted mean)	2.70	(weighted mean)
Face-to-Face (n=413)						
1 - Not at all	64	15.50%	188	45.52%	252	61.02%
2 - Slightly	32	7.75%	0	0.00%	32	7.75%
3 - Moderately	47	11.38%	1	0.24%	48	11.62%
4 - Very	38	9.20%	0	0.00%	38	9.20%

ANNOYANCE						
Scale	Group A (Heard)	%	Group B (Not Heard)	%	Total	%
5 - Extremely	43	10.41%	0	0.00%	43	10.41%
Mean Score	2.31	(weighted mean)	1.02	(weighted mean)	1.97	(weighted mean)
Combined (n=792)						
1 - Not at all	157	27.02	210	99.53	367	46.34
2 - Slightly	92	15.83	0	0.00	92	11.62
3 - Moderately	129	22.20	1	0.47	130	16.41
4 - Very	105	18.07	0	0.00	105	13.26
5 - Extremely	98	16.87	0	0.00	98	12.37
Mean Score	2.82	(weighted mean)	1.01	(weighted mean)	2.34	(weighted mean)

Table 25: Interference Scores

5.5.13 Loudness

Survey respondents were asked how loud they perceived the boom to be.

This question was the highest-scoring question on average. A majority of respondents perceived the sound event as being moderately to extremely loud - Ratings 3, 4, and 5 account for approximately 60% of combined responses over both samples. For Group A, the impact of the loudness is more pronounced - some 83.16% of respondents perceived the boom as being moderately to extremely loud, and over 54% of respondents across both samples selected between Ratings 4 and 5 (Very to Extremely Loud).

Face-to-face Group A respondents found the event more loud than did digital survey respondents - the mean score of the Group A digital respondents was 3.45 contrasted with the F2F mean score of 3.8.

LOUDNESS						
Scale	Group A (Heard)	%	Group B (Not Heard)	%	Total	%
Digital Survey (n=377)						
1 - Not at all	8	2.25	19	86.36	27	7.16%
2 - Slightly	61	17.18	1	4.55	62	16.45%
3 - Moderately	113	31.83	1	4.55	114	30.24%
4 - Very	109	30.70	1	4.55	110	29.18%
5 - Extremely	64	18.03	0	0.00%	64	16.98%
Mean Score	3.45	(weighted mean)	1.27	(weighted mean)	3.32	(weighted mean)
Face-to-Face (n=412)						
1 - Not at all	5	1.21	193	97.97	198	48.06%
2 - Slightly	22	5.34	2	1.02	24	5.83%
3 - Moderately	53	12.86	1	0.51	54	13.11%
4 - Very	67	16.26	1	0.51	68	16.50%
5 - Extremely	68	16.50	0	0.00	68	16.50%
Mean Score	3.8	(weighted mean)	1.04	(weighted mean)	2.48	(weighted mean)
Combined (n=789)						
1 - Not at all	13	2.28	212	96.80	225	28.52
2 - Slightly	83	14.56	3	1.37	86	10.90
3 - Moderately	166	29.12	2	0.91	168	21.29
4 - Very	176	30.88	2	0.91	178	22.56
5 - Extremely	132	23.16	0	0.00	132	16.73
Mean Score	3.58	(weighted	1.06	(weighted	2.88	(weighted

LOUDNESS						
Scale	Group A (Heard)	%	Group B (Not Heard)	%	Total	%
		mean)		mean)		mean)

Table 26: Loudness

To summarise, respondents perceived the event as fairly loud, but it did not significantly interfere with their activities. Annoyance was the most divided dimension, suggesting that personal sensitivity and awareness varied considerably across the sample.

a. Across Island (Combined)

PERCEPTION OF BOOM BY ISLAND			
Mean Score Scale of 1-5			
Island	Group A (Heard)	Group B (Not Heard)	Total
INTERFERENCE			
New Providence (n=562)	2.24	1.09	2.01
Eleuthera (n=125)	2.76	1.00	2.32
Cat Island (n=91)	2.00	1.00	1.19
Grand Bahama (n=8)	3.67	1.00	2.00
ANNOYANCE			
New Providence (n=562)	2.80	1.10	2.46
Eleuthera (n=125)	3.13	1.00	2.60
Cat Island (n=91)	2.53	1.00	1.29
Grand Bahama (n=8)	3.33	1.00	2.00

PERCEPTION OF BOOM BY ISLAND			
Mean Score Scale of 1-5			
Island	Group A (Heard)	Group B (Not Heard)	Total
LOUDNESS			
New Providence (n=562)	3.53	1.26	3.07
Eleuthera (n=125)	3.85	1.00	3.14
Cat Island (n=91)	3.24	1.00	1.42
Grand Bahama (n=8)	3.00	1.20	1.42

Table 27: Dimensional Perception by island

Group A (Heard)

Grand Bahama was the most affected across two of the three dimensions (Interference at 3.67 and Annoyance at 3.33), but the least affected by Loudness (3.00). These results are surprising, given the large distance between the island of Grand Bahama and the Landing Site, but note that because of the small subset of responses from Grand Bahama (n=8) and its low Heard rate of 33% (from 3 respondents), they should be interpreted with caution.

Eleuthera was the most affected across the three dimensions of the communities within the primary study scope, consistent with its proximity to the Landing Site. Eleuthera respondents found the sound event considerably louder than did the other communities, with a Loudness score of 3.85, a full 0.32 points higher than the next highest island (New Providence, with a mean score of 3.53)

Eleuthera was the most affected across the three dimensions, consistent with its proximity to the Landing Site. Eleuthera respondents found the sound event considerably louder than did the other communities (3.85), a full 0.32 points higher than the next highest island (New Providence, with a mean score of 3.53). Its Interference and Annoyance scores were 2.76 and 3.13 respectively, well above the midpoint.

New Providence follows closely behind Eleuthera, with an Interference score of 2.24, an Annoyance score of 2.80, and a Loudness score of 3.53.

Interestingly, Cat Island, one of the communities in the primary study scope, was the least affected across all three dimensions outside of Loudness (with a score of 3.24 that is higher than Grand Bahama's score of 3.00), notwithstanding its proximity to the Landing Site. Its higher Loudness score suggests that those who did hear the boom found the sound event notable.

Loudness was the highest scoring question for nearly every island (outside of Grand Bahama, which had a higher Interference score (3.67) than any other dimension). Interference was the lowest (again, outside of Grand Bahama with its relatively high Interference score).

Group B (Not Heard)

Group B scores were markedly consistent, with scores clustering tightly at or near 1.00 across all islands and all three questions. The slight exceptions are New Providence (with Interference, Annoyance, and Loudness scores of 1.09, 1.10, and 1.26 respectively), and Grand Bahama (with an interference score of 1.20) - the likely explanation for this is that digital survey respondents for both islands mistakenly gave ratings even though they did not hear the boom.

Otherwise, the Not Heard Group is a reliable control - no boom perceived = no interference, annoyance, or loudness registered.

Combined "All" scores are pulled down wherever the Not Heard group is large — most visibly for Cat Island, where 74 of 91 respondents did not hear the boom, driving all three means close to 1.

5.5.2 Qualitative Sound Perception

Respondents were asked to give a description of the sound, "in their own words". This question was qualitative and open-ended, allowing respondents to speak freely and provide a more rich and subjective understanding of their perception of the sound event.

245 face-to-face and 330 digital survey respondents answered this question.

5.5.2.1 Responses by Sound Theme

Responses have been grouped into thematic categories and may appear in multiple categories if their description matched more than one.

Sound Theme	All Islands	New Providence	Eleuthera	Cat Island	Grand Bahama
Explosion/ Bomb	103	78	22	3	-
Thunder/ Weather	42	22	15	4	1
Gunshot/ Cannon/ Bullet	32	22	8	2	-
Fireworks	22	20	2	-	-
Crash/ Collision	57	50	5	2	-
Very Loud/ Boom	116	84	25	6	-
Emotive	21	19	2	-	
Something Falling	44	37	7	-	-
Distant/ Muffled/ Faint	26	22	2	-	-
Drum	2	2	-	-	-
Multiple Booms	9	4	5	-	-
Did Not Hear	37	18	9	8	1

Table 28: Sound Theme by Island

5.5.2.2 *Representative Sound Descriptions (Selected Verbatim Responses)*

Representative responses have been grouped within themes provided above. Some responses have been lightly edited for clarity.

Theme	Respondent's Own Words	Geographic Zone
Explosion/ Bomb	Like a bomb going off over the horizon but fuller than a bomb.	North Cat Island
	You ever hear dynamite before? Okay.	North Eleuthera
	It sounded like a loud explosion that was some distance away from my home.	New Providence Southern
Thunder/ Weather	Thunderous	New Providence North/Central & Paradise Island
	I thought it was thunder. But I said that can't be no thunder. That don't sound like no thunder.	Central Eleuthera
	Like a roll of thunder really. But the thrust when it landed was like a wave of sound. A crackly sound as it was landing	South Eleuthera
	Like a muffled but distinct single clap of thunder. It sounded awesome. I keep up to date with military aircraft, so it was cool to hear a sonic boom.	New Providence Eastern
Gunshot/ Cannon/ Bullet	Slightly louder than gun shots	North Cat Island
	I thought it was the microwave for real. Sound like gun shots	New Providence Eastern
	Like the cannon at the start of a sailing regatta. Far less bothersome than the high powered fireworks which have greatly increased in frequency	New Providence Eastern
Fireworks	Fireworks at New Years.	South Eleuthera
	Like fireworks in the distance.	New Providence Eastern
Crash/ Collision	It sounded like a massive explosion. My mother-in-law thought that a plane had crashed nearby.	New Providence Western
	Like a car crashing into a wall/ tank blowing	New Providence Eastern

Theme	Respondent's Own Words	Geographic Zone
	up	
	It sound like something hit something, like it was an accident or like something was damaged	North Cat Island
Very Loud/ Boom	There was nothing for a second and then there was a loud BOOM. Similar to hitting a wall that's a little hollow and hearing the sound from it, except obviously much louder.	New Providence Western
	A very loud boom sound	New Providence North/Central & Paradise Island
	Like a loud bang and crackling behind it	South Cat Island
Emotive	Fascinating	Central Eleuthera
	Sound like the whole world collapse	South Eleuthera
	Amazing	New Providence Southern
	It was terrible, horrifying. I disoriented for about 20mins	New Providence North/Central & Paradise Island
	Extremely loud; scary; annoying; poor decision making used	New Providence Western
	Physically and emotionally traumatic!!!	New Providence Southern
Something Falling	Very loud almost like a building falling	New Providence Southern
	It sound like piece of plywood drop. I just hear a big boom. I ain't feel no vibration or nothing	North Eleuthera
	It sounded like a work site that was far away where big rocks are hitting the ground	New Providence Eastern
Distant/ Muffled/ Faint	Not too loud. Pretty faint but loud enough	New Providence North/Central & Paradise Island

Theme	Respondent's Own Words	Geographic Zone
	A low pitch distant short boom	Long Island
	Quieter than I expected	New Providence Western
	Very subtle. Sounded very far away.	South Eleuthera
	It sounded like a faint pop	New Providence Southern
Drum	Just a loud boom almost like a Junkanoo drum.	New Providence Eastern
	Like a big drum being hit	New Providence Southern
Multiple Booms	It was like a loud boom and it went off like 3,4 times, maybe 5. It was a boom first. Then boom kadoom. Then the last one was very loud and shake the house.	South Eleuthera
	First one sounded like a transformer blew; second one sounded like something fell on the roof. Will have to look and see if maybe something did.	New Providence Southern
Other	Like a large bird landing on the roof. Or a person nailing a plywood	Andros
	The Motor Cycles and Illegal Drug Runners in Canals are louder.	Grand Bahama

Table 29: Representative Sound Descriptions by Island

5.6 Concern About The Sonic Boom

Respondents were asked “Overall, how did the sonic boom make you feel?” This question assesses to what degree the sound event caused concern to respondents. It provides additional context for the assessment of startle response, annoyance levels, and the concern for potential impact.

Respondents rated their degree of concern regarding the sonic boom on a five-point Likert scale ranging from “Not Concerned” to “Extremely Concerned”.

Data is aggregated across Group A (Heard) and Group B (Not Heard) respondents, allowing for a distinction to be made between the degree of concern of those who actually heard the sound and those who did not. This section presents only the combined data and does not make a distinction between the two separate samples. Data is also aggregated by island and across all islands.

Island	Overall Feelings	Group A (Heard) & % of A Responses	Group B (Not Heard) & % of Not Heard Responses	Combined & % of Combined Responses
All Islands	Not Concerned	138 (24.25%)	162 (85.71%)	300 (39.6%)
	Somewhat Concerned	134 (23.55%)	5 (2.65%)	139 (18.3%)
	Moderately Concerned	105 (18.45%)	12 (6.35%)	117 (15.4%)
	Very Concerned	110 (19.33%)	5 (2.65%)	115 (15.2%)
	Extremely Concerned	82 (14.41%)	5 (2.65%)	87 (11.5%)
	Mean	2.76	1.34	2.41
New Providence	Not Concerned	109 (24.2%)	85 (78.7%)	194 (34.8%)
	Somewhat Concerned	113 (25.1%)	3 (2.8%)	116 (20.8%)
	Moderately Concerned	87 (19.3%)	12 (11.1%)	99 (17.7%)
	Very Concerned	80 (17.8%)	5 (4.6%)	85 (15.2%)
	Extremely Concerned	61 (13.6%)	3 (2.8%)	64 (11.5%)
	Mean	2.71	1.5	2.48

Island	Overall Feelings	Group A (Heard) & % of A Responses	Group B (Not Heard) & % of Not Heard Responses	Combined & % of Combined Responses
Eleuthera	Not Concerned	22 (23.4%)	30 (96.8%)	52 (41.6%)
	Somewhat Concerned	13 (13.8%)	1 (3.2%)	14 (11.2%)
	Moderately Concerned	16 (17.0%)	-	16 (12.8%)
	Very Concerned	26 (27.7%)	-	26 (20.8%)
	Extremely Concerned	17 (18.1%)	-	17 (13.6%)
	Mean	3.03	1.03	2.54
Cat Island	Not Concerned	4 (23.5%)	42 (95.5%)	42 (75.4%)
	Somewhat Concerned	6 (35.3%)	1 (2.3%)	7 (11.5%)
	Moderately Concerned	2 (11.8%)	-	2 (3.3%)
	Very Concerned	2 (11.8%)	-	2 (3.3%)
	Extremely Concerned	3 (17.6%)	1 (2.3%)	4 (6.6%)
	Mean	2.65	1.11	1.54
Grand Bahama	Not Concerned	-	5 (100%)	5 (62.5%)
	Somewhat Concerned	1 (33.3%)	-	1 (12.5%)
	Moderately Concerned	-	-	-

Island	Overall Feelings	Group A (Heard) & % of A Responses	Group B (Not Heard) & % of Not Heard Responses	Combined & % of Combined Responses
	Very Concerned	2 (66.7%)	-	2 (25.0%)
	Extremely Concerned	-	-	-
	Mean	3.33	1.88	1.00

Table 30: Responses to Concern Question

5.6.1 Overall

'Not Concerned' had the highest rate of response all together (39.6%) and across both Group A and Group B; however, the disparity between Group A and Group B was significant. 24.25% of Group A selected 'Not Concerned' - contrast this with 85.71% of Group B. This 61% percentage gap indicates that those who experienced the boom were significantly more concerned than those who did not.

33.74% of Group A respondents selected 'Very Concerned' or 'Extremely Concerned', compared to only 5.3% of Group B respondents.

5.6.2 By Island

Group A

Outside of Grand Bahama (generally treated as an outlier given its small dataset and low heard rate), Eleuthera had the highest mean score for Group A (3.03, compared to Grand Bahama's 3.33, New Providence's 2.71, and Cat Island's 2.65) This heightened degree of concern is to be expected, owing to Eleuthera's close proximity to the Landing Site.

Group A Respondents from Eleuthera were more likely to have been either 'Very Concerned' or 'Extremely Concerned' (45.8%), compared to respondents from the other primary study areas of New Providence (31.4%) and Cat Island (29.4%). 66.7% of Grand Bahama Group A respondents (2 persons selected 'Very Concerned'.

Of the 3 primary study areas (New Providence, Eleuthera, and Cat Island), Cat Island Group A respondents had the lowest mean score for concern, indicating that even when controlling for

Not Heard responses, Cat Island residents were less impacted by the sound event than the other islands.

Group B

New Providence Group B members were more likely to express concern about the sound event than other islands, despite their not having experienced the sonic boom. 4.6% of Cat Island, 3.2% of Eleuthera, and 0.0% of Grand Bahama Group B members provided an answer other than 'Not Concerned', compared to 21.3% of New Providence Group B members. This suggests that more New Providence Group B members had formed a (negative) opinion about the boom that impacted their responses, outside of their personal experience of the event.

For Group B, selecting "Not Concerned" mainly reflects that they did not hear or feel the sonic boom at all, rather than a positive judgment that they found the event acceptable. Many in this group provided data on something they did not directly experience, which limits how far their emotional responses can be used to assess the impact of the boom itself. By contrast, Group A responses describe how people said the boom made them feel in the moment, particularly where it involved sudden loudness, shaking of the home, or being woken from sleep.

A subset of Group B respondents provided additional comments through open-ended response fields. These comments were limited in number but consistently reflected broader concerns related to the Project, including perceived environmental impacts, potential effects on marine ecosystems, and issues related to transparency and national benefit.

Although these concerns are not directly linked to acoustic experience, they provide context for interpreting survey results by illustrating that community responses to the event may be influenced by pre-existing perceptions and broader awareness of the Project. This is particularly relevant when considering reported levels of concern among individuals who did not hear the sonic boom, suggesting that perception of the event is not solely driven by direct acoustic exposure.

5.6.3 Concern Driven By Exposure

The 61.21 percentage point gap in concern between Group A and Group B is one of the study's most important quantitative findings. These figures show that concern was reported far more frequently by people who directly experienced the boom than by those who did not. They do not show that advance notification would have eliminated concern entirely, and the data also show that many informed respondents remained concerned and opposed to the activity continuing. What the data does show is that the absence of notification was associated with a markedly worse experience for those who heard the boom. These are two separate findings and both

matter, because notification can reduce alarm in the moment but does not address the deeper questions communities are asking about environmental impact, oversight, and the distribution of risk and benefit from commercial aerospace activity in Bahamian waters.

5.7 **Physical and Emotional Impacts**

Where the previous sections established who knew about the event and who heard it, this section documents what it did to people, physically, emotionally, and within their households. The Group A and Group B distinction is applied throughout. Emotional response and household impacts are reported for both groups. Personal physical reactions are drawn from Group A only, as they represent the most direct measure of acoustic impact in the dataset.

Note that this question was designed to capture perceptions relating to startle response in accordance with ISO/TS 15666.

5.7.1 **Personal Physical Reactions**

Physical reactions were reported by 379 of 570 Group A respondents, 66.5% of confirmed direct experiencers. Among those who reacted, being startled or jumping was the dominant response at 334 (88.1%) of reactors, followed by ear discomfort or other reactions at 28 (7.4%), heart racing 98 (27.2%) and anxiety or panic 101 (26.6%). Ear discomfort and other physical reactions, including dizziness, ear pressure, feeling a vibration through the body, and waking suddenly from sleep, were also reported.

Physical Reaction	Count (of 136 Group A reactors)	% of Group A Reactors	% of Group A (n=217)
Startled / jumped (all combinations)	334	88.1%	58.6%
Heart racing (all combinations)	101	26.6%	17.7%
Anxiety / panic (all combinations)	98	25.9%	17.2%
Ear discomfort / other reactions	28	7.4%	4.9%

Table 3: Personal physical reactions, Group A only (n=570; 379 reported a reaction).

5.7.2 Personal Emotional Reactions

The anxiety and panic rate, 37 of 136 reactors (27.2%) and 37 of 217 Group A respondents (17.1%), is the key finding in this section. People who reported anxiety or panic often said the feeling did not stop as soon as the sound ended. Even among people who knew about the planned sonic boom in advance, many still described being badly startled or afraid - 41.5% of respondents who were aware of the boom (216 of 487 aware) reported being startled, compared to 44.4% of unaware respondents (136 of 306 unaware). Knowing helped some residents recognise the sound, but it did not stop them from being jolted awake, feeling their homes shake, or feeling anxiety and panic in the moment. This means that saying “we told people” cannot be treated as enough protection against this kind of reaction.

Several people said they felt nervous, briefly panicked, or “shaken up,” and that they needed time to calm down. Some mentioned their heart racing or having to comfort children or older relatives. This is how they themselves described what the sound did to them at the time.

These examples show, in residents’ own words, how the sound felt to them in the moment and what they were doing when it happened.

Geographic Zone	Activity at time of boom	Description of Impact
South Eleuthera	At home, indoors	Brief panic, thought something had exploded nearby.
South Eleuthera	At home, indoors	House shook; described it as “very scary,” especially with no prior notice.
Central Eleuthera	At home, indoors	House shook, pets startled, said this made them more anxious and was scary.
New Providence Eastern	At home, indoors	Loud and unusual sound, caused concern because they were unaware beforehand.
New Providence North/ Central and Paradise Island	At home, indoors	Described the sound “like a cannon was fired.”
Cat Island	Sleeping	Woke suddenly, reported being scared and needing time to settle afterward.

Geographic Zone	Activity at time of boom	Description of Impact
South Eleuthera	At home with children	Child screaming; parent described fear of bombs.
South Eleuthera household with children	At home with children	Child came out praying, felt something catastrophic was happening.

Table 32: Resident reports of fear, anxiety, and panic (Group A)

The survey data shows that advance notice reduced confusion about the source of the sound but did not consistently prevent startle or physical reactions. Among the 110 Group A respondents who confirmed both hearing the boom and knowing about it in advance, 58 reported a physical reaction. Of those, 49 were startled or jumped, 19 had heart racing, and 15 experienced anxiety or panic, rates only modestly lower than among those who were unaware. 69% of aware Group A respondents still expressed some level of concern across both surveys (69.1% face to face and 69.9% digital. Advance notice helped people frame the event, but it did not remove the acoustic impact.

The survey data shows that advance notice reduced confusion about the source of the sound but did not consistently prevent startle or physical reactions. Across both survey instruments, 380 respondents confirmed both hearing the boom and knowing about it in advance. Of those, 230 (60.5%) reported a physical reaction. Among those who experienced a physical reaction: 201 were startled or jumped (52.9%), 49 experienced heart racing (12.9%), and 57 experienced anxiety or panic (15.0%) — rates meaningfully lower than among those who were unaware, where 69.8% were startled, 25.9% experienced heart racing, and 23.3% experienced anxiety or panic. Nonetheless, 69.9% of aware respondents who heard the boom still expressed some level of concern — 69.4% in the face-to-face survey and 70.1% in the digital survey. Advance notice helped people frame the event, but it did not remove the acoustic impact.

This pattern is particularly notable for children and older residents. In households where the parent or carer had received advance notice, 21 of 31 households with children present still reported some level of impact on those children, ranging from minor to significant. Among Group A respondents aged 65 and above who were aware in advance, four of five still expressed moderate or very high concern, and all three who reported a physical reaction described being startled. Prior notice appears helpful for some, but it does not fully remove the risk of acute disturbance, particularly for children and older people.

5.7.3 Impact on Children

Across both surveys 260 of 766 respondents (33.9%) had children present at the time. Among face-to-face respondents with children present, 73 (60.3%) reported no noticeable impact, 22 (18.2%) reported minor impact, 11 (9.1%) moderate impact, and 15 (12.4%) significant impact. Among digital respondents with children present, 69 (49.6%) reported no noticeable impact, 39 (28.1%) minor impact, 22 (15.8 %) moderate impact, and 9 (6.5%) significant impact. In households where children did hear the boom, parents most often described children being startled, frightened, crying, or briefly interpreting the event as an emergency, particularly where there had been no advance notice.

Impact on Children	Count	% (n=766
Not applicable, no children present	506	66.1%
No noticeable impact	142	18.5%
Minor impact	61	8.0%
Moderate impact	33	4.3%
Significant impact	24	3.1%

Table 33: Impact on children at time of event, combined.

“Screaming, fear of bombs.”

- Uninformed household, child's reaction

“Child came out praying, felt something cataclysmic was happening.”

- Uninformed household

In informed households, the same event produced an entirely different response.

“Startled but excited after learning what it was.”

- Informed household, child's reaction

5.7.4 Impact on Pets

Across both surveys, 287 of 761 respondents (37.7%) had pets present at the time. Among those with pets present, 155 (54.0%) reported no noticeable impact, 50 (17.4%) minor impact, 47 (16.4%) moderate impact, and 35 (12.2%) significant impact. Descriptions included dogs barking for hours, cats running and hiding, chickens fleeing into trees, and in two cases pets

running away entirely, one not returning for two days. One respondent reported their pet had not eaten since the boom.

Impact on Pets	Count	% (n=761)
Not applicable, no pets present	474	62.3%
No noticeable impact	155	20.4%
Minor impact	50	6.6%
Moderate impact	47	6.2%
Significant impact	35	4.6%

Table 34: Impact on pets at time of event, combined (n=761).

5.8 Structural Impacts

Of the 44 Group A respondents who observed physical impacts to their homes or surroundings, only 2 were from Group B. The sections below document the scale and nature of those impacts.

Note that this question was designed to capture perceptions relating to vibration and rattling in accordance with ISO/TS 15666.

5.8.1 Observed Physical Impacts, Group A vs Group B

Physical impacts to homes or surroundings were observed by 49 of 217 face-to-face Group A respondents (22.6%) and 75 of 353 digital Group A respondents (21.2%). The consistency across both survey modes strengthens the reliability of this finding. The lower full-sample figure of 12.8% reflects the inclusion of respondents who did not hear the boom, pulling the overall rate down.

Response	F2F Group A (n=217)	% F2F Group A	F2F Group B (n=179)	% F2F Group B	Digital Group A (n=353)	% Dig Group A	Digital Group B (n=29)	% Dig Group B
	n	%	n	%	n	%	n	%

Response	F2F Group A (n=217)	% F2F Group A	F2F Group B (n=179)	% F2F Group B	Digital Group A (n=353)	% Dig Group A	Digital Group B (n=29)	% Dig Group B
Observed physical impacts	49	22.6%	3	1.7%	75	21.2%	1	3.4%
No physical impacts observed	168	77.4%	175	97.8%	275	77.9%	28	96.6%

Table 35: Structural impacts by exposure group, face-to-face and digital survey.

5.8.2 Nature of Structural Impacts

Among the 44 Group A respondents who reported physical impacts, open-ended descriptions reveal a consistent pattern distributed across all three study communities. Occurrences of vibration and rattling were widespread. House and building shaking was the most prevalent category. Windows, doors, walls, and rafters were widely affected. Two respondents independently described an unusual smell outside following the event. One respondent reported a hairline crack. One respondent at the eastern viewpoint of Nassau observed what was presumed by that respondent to be burning booster debris falling into the water approximately 30 - 40 feet in front of them.

Impact Category	Respondent Descriptions (verbatim)
House / building shaking	'House shook'; 'Whole house shook'; 'Building shook'; 'I felt the ground shake beneath me and I saw my glass of water shake'; 'Felt like rumblings, curtains were shaking and I thought the house was coming down'
Windows and glass	'Windows rattled'; 'The windows rattled'; 'Windows vibrated'; 'Glass shook'; 'Glass shatter and break'; 'Vibrating of glass doors'; 'House, windows and sliding doors shook!!'
Doors	'Front door vibrated sounded like a slam'; 'The front door noticeably vibrated and sounded as if it was going to blow open'; 'The doors slammed shut'; 'The door shook'; 'I felt the door rattle almost like someone was knocking'

Impact Category	Respondent Descriptions (verbatim)
Walls and roof	'Walls rattled'; 'Walls and roof vibrated'; 'The rafters shook'; 'Everything rattled'
Hairline crack	One respondent reported a hairline crack. Single report, causation unconfirmed, documented for future monitoring.
Unusual smells	Two independent respondents described an unusual smell outside after the event.
Booster debris	One respondent at the eastern viewpoint of Nassau observed burning booster debris fall into the water approximately 30-40 feet in front of them during the recovery. The debris was on fire and extinguished by the water within seconds..
Wildlife disturbance	'It upset all the dogs in the neighborhood. They all started barking.' Neighbourhood-wide animal disturbance noted by multiple respondents.

Table 36: Structural and environmental impacts with respondent descriptions, face-to-face survey Group A.

5.8.3 High-Level Attention

During the landing, three environmental observations appear independently in both the face-to-face and digital survey datasets. First, multiple respondents in both surveys reported an unusual smell outside following the event. Second, one respondent in James Cistern, Eleuthera, reported that a brush fire occurred in the area coinciding with the sonic boom event. Third, one respondent at the eastern viewpoint of Nassau reported observing burning booster debris fall into the water approximately 30 to 40 feet in front of them. In their words: “It was on fire at the time and the water put it out a few seconds later.” These observations fall outside the acoustic scope of this study. In line with standard practice for environmental and social impact assessments, they are documented here in full and referred to the relevant regulatory and environmental authorities for assessment and follow-up.

5.9 Experience Patterns of Primary Study Communities

The experience patterns of the Primary Study Communities (New Providence, South Eleuthera, and North Cat Island) as well as neighbouring communities, have been assessed to provide a summary level picture of how persons across those communities experienced the sound event.

Proximity to the Landing Site, coastal exposure, and local topography all shaped whether residents heard the sound, how loud it seemed, and whether it caused structural disturbance.

5.9.1 Geographic Zone Level Experience Patterns

For respondents across the dataset, community-level data reveals a clear pattern across communities in how the sound event was experienced.

5.9.1.1 Eleuthera and Cat Island

Geographic Zone	Key Communities/Boundaries	Typical Experience Profile
South Eleuthera (High-Impact)	Bannerman Town, Rock Sound, Wemyss Bight, Waterford, Palmetto Point, Tarpum Bay	Very high rates of hearing the boom; frequent reports of house shaking, wall and roof vibration, and objects moving; descriptions such as 'bomb', 'dynamite', 'cannon', or 'car crash'; strong startle and anxiety reactions, especially where there was no advance notice.
Central Eleuthera (Mixed)	James Cistern, Governor's Harbour, Hatchet Bay, Savannah Sound, Eleuthera Island Shores, Rainbow Bay	Mixed pattern of hearing and non-detection. Some residents report a loud but brief boom and minor rattling, others hear only distant thunder or nothing at all. Experiences range from curiosity among those informed to confusion and moderate concern among those who were not.
North Eleuthera (Low-Detection)	Green Castle, Upper Bogue, Gregory Town, Lower Bogue	Lower subjective detection, with many respondents reporting no clear boom or interpreting sounds as weather or distant activity. A small number report secondary effects such as cable and internet disruption despite low perceived loudness.
Cat Island (Mixed to Low Detection)	New Bight, Smith's Bay, Old Bight, Orange Creek, McQueens	Many residents did not hear the boom, particularly indoors or while sleeping. Among those who did, descriptions range from faint rumble to loud boom, and these communities show both the largest information gaps and the strongest governance concerns about rocket fuel, debris, and environmental impacts, even where acoustic impact was limited.

Table 37: Geographic Experience Zones.

South Eleuthera (High Intensity)

Settlements in southern Eleuthera, closest to the Exuma landing zone and facing open ocean to the east, reported the highest concentration of loud, startling booms with structural impacts. Many respondents described the sound as a bomb, dynamite, or cannon, with houses shaking, walls rattling, roofs vibrating, and objects falling. Startle reactions, heart racing, and acute anxiety were common among those who were uninformed. Several residents explicitly compared the event to wartime sounds or feared missile strikes.

Awareness in this zone was patchy, many residents either were not informed in advance or learned about it too late to prepare. Those who were aware still expressed concern about cumulative effects and long-term environmental impacts on fishing grounds and marine ecosystems.

“The house shook. I thought something exploded nearby. It was very scary, especially with no knowledge about the launch.”

- Female, Tarpum Bay

“Thunderous, like a cannon. The roof of the loft started to shake. I was convinced it was thunder, but it didn't sound right.”

- Female, Eleuthera Island Shores

Central Eleuthera (Moderate Intensity)

Central Eleuthera settlements reported more variable experiences. Some residents, particularly those outdoors or in elevated locations, heard a clear boom and described it as loud but not alarming. Others, especially those indoors or engaged in other activities, either did not hear it or interpreted it as distant thunder. Structural impacts were less frequent than in the south but still present, window rattling, brief vibrations, and objects shifting were reported in Governor's Harbour and James Cistern.

Awareness levels in this zone were moderate, with many residents learning about the event through news media or word of mouth. Emotional responses ranged from curiosity and excitement among those who were informed and chose to watch, to confusion and concern among those who were surprised.

"The house shook and the cats were startled, which made me more anxious. I didn't know what it was until you came and asked me. That was scary."

- Female, James Cistern

"Went on the roof to watch. Short boom. Completely acceptable."

- Male, James Cistern

North Eleuthera (Low-Detection)

In northern Eleuthera, the event was often either not heard at all or perceived as faint and ambiguous. Distance from the landing zone, inland locations, and ambient noise all contributed to reduced audibility. Several respondents in Gregory Town and Upper Bogue reported hearing nothing, or hearing something they dismissed as weather or distant machinery.

However, two respondents reported significant secondary effects, cable and internet outages immediately after the boom, which they attributed to vibration. One described the cable going up and down and remaining unstable for hours afterward. These reports suggest that even where the boom was not subjectively loud, secondary infrastructure effects may have occurred.

"The cable went out. It was up and down. You couldn't watch anything either before or after that. It's still not working as of 9:30 this morning. Why are you only now asking questions about it? For the longest time we've been hearing it and you weren't considering us."

- Female, Gregory Town

Cat Island (North and Other Geographic Zones)

Cat Island settlements, the most geographically remote communities in the study, showed the widest variation in experience. Many residents did not hear the boom at all, particularly those indoors, sleeping, or in sheltered locations. Among those who did hear it, descriptions ranged from a faint rumble to a loud boom, depending on location and time of observation. Awareness in Cat Island was the lowest of any study area, at 38.5%, reflecting the island's limited digital connectivity and reliance on word of mouth and intermittent radio.

Concerns about SpaceX's operations and the government's agreement were prominent in Cat Island, even among those who did not hear the boom. Respondents repeatedly raised questions about rocket fuel pollution, debris falling into fishing grounds, long-term effects on marine life, and the lack of visible benefit to Cat Island communities.

"I don't know how all that rocket fuel they use goes into the air. Something came down last year and we don't want it. It will pollute the environment and the fish."

- Male, McQueens

"I don't want to hear no booming. I would think it's a bomb."

- Female, Smith's Bay

5.9.1.1 Eleuthera and Cat Island Zone Summary Metrics

The table below shows the main sound and attitude measures for each experience zone in Eleuthera and Cat Island, putting numbers to the settlement patterns described above.

Experience Zone	n	% Heard	Loud 4-5 (% of hearers)	Physical Impacts (%)	Very / Extremely Concerned (%)	Future Booms Unacceptable (%)
South Eleuthera (high-impact)	58	89.8%	70.5%	24.6%	40.4%	52.6%
Central Eleuthera (mixed)	24	58.3%	85.7%	20.8%	16.7%	25.0%
North Eleuthera (low-detection)	30	70.8%	82.4%	40.0%	40.0%	60.0%
North, Central and South Cat Island	91	18.9%	35.3%	0.0%	8.6%	54.3%

Table 38: Key metrics by settlement experience zone, face-to-face survey.

These four zones confirm that settlement-level experience is shaped by proximity, exposure, local context, and the reach and quality of advance notification. The southern Eleuthera zone, closest to the landing site and least sheltered, bore the highest acoustic and structural impact. Central Eleuthera experienced moderate and variable effects. Northern Eleuthera and Cat Island showed lower detection rates but were the least informed the event was coming, and expressed the strongest concerns about the environmental impact of the landing and booster recovery. Communities that heard nothing still asked legitimate questions about safety, environment, and transparency. Communities that heard everything asked why landings were taking place at all in The Bahamas. Both sets of questions require institutional responses that go beyond acoustic mitigation alone.

5.9.1.2 New Providence

Eastern New Providence

Eastern New Providence recorded the highest heard rate at 70.4% and the highest very or extremely concerned rate at 35.2%, consistent with its location along the south-eastern approach to the Exuma Sound and relative proximity to the Landing Site at 79.8mi/128.43km.

Western New Providence

Western New Providence had the highest future unacceptable rate at 64.1% despite a lower heard rate of 48.7%, suggesting stronger opposition to future launches in that community.

North/Central New Providence and Paradise Island

North/Central New Providence and Paradise Island had the lowest heard rate at 41.3% and the lowest concern rate at 11.1%, reflecting its greater distance from the landing corridor and higher pre-event awareness.

Southern New Providence

Southern New Providence had the highest heard rate after Eastern New Providence at 64.6%, not surprising given its proximity to the Landing Site.

5.9.1.2.1 New Providence Zone Summary Metrics

Experience Zone	n	% Heard	Loud 4-5 (% of hearers)	Physical Impacts (%)	Very Extremely Concerned (%)	Future Booms Unacceptable (%)
New Providence - Eastern	54	70.4 %	70.3%	7.4%	35.2%	63.0%
New Providence - Southern	48	64.6 %	61.3%	8.3%	27.1%	56.2%
New Providence - Western	39	48.7 %	52.6%	7.7%	10.3%	64.1%

New Providence - N/Central & Paradise Island	63	41.3 %	50.0%	4.8%	11.1%	60.3%
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Table 39: New Providence zone summary metrics

5.10 Future Acceptability

Respondents were asked to assess their level of acceptance of occasional future sonic booms, using a five-point scale ranging from “Completely Unacceptable” to “Completely Acceptable”. This question was designed to evaluate public perception of the sound event and gauge the likelihood of community resistance to future SpaceX landings in the region. Understanding the attitudes of both those who directly experienced the event and those who did not provides a more complete picture of community sentiment. This, in turn, can inform the positions of policymakers and regulators when making decisions regarding the frequency and conditions under which future approvals may be granted.

ACCEPTABILITY						
Scale	Group (Heard)	A %	Group B (Not Heard)	%	Total	%
Digital Survey (n=377)						
Completely unacceptable	133	35.28	3	0.79	136	36.07
Somewhat unacceptable	86	22.81	2	0.53	88	23.34
Neutral	70	18.57	11	2.92	81	21.49
Somewhat acceptable	39	10.34	1	0.27	40	10.61
Completely acceptable	27	7.16	5	1.33	32	8.49
Face-to-Face (n=410)						
Completely unacceptable	86	20.97	56	13.66	142	34.63

ACCEPTABILITY						
Scale	Group A (Heard)	%	Group B (Not Heard)	%	Total	%
Somewhat unacceptable	48	11.71	32	7.804	80	19.51
Neutral	52	12.68	64	15.61	116	28.29
Somewhat acceptable	20	4.88	19	4.63	39	9.51
Completely acceptable	19	4.63	14	3.42	33	8.05
Combined (n=787)						
Completely unacceptable	219	27.83	59	7.49	278	35.32
Somewhat unacceptable	134	17.03	34	4.32	168	21.35
Neutral	122	15.50	75	9.53	197	25.03
Somewhat acceptable	59	7.50	20	2.54	79	10.04
Completely acceptable	46	5.84	19	2.41	65	8.25

Table 40: Acceptability of Future Booms by Heard/Not Heard

5.10.1 General

A slight majority of combined survey respondents (446 or 56.67%) found the prospect of additional sonic booms to be either Completely Unacceptable or Somewhat Unacceptable. By comparison, less than 20% (18.29%) of combined respondents found the prospect to be either Somewhat Acceptable or Completely Acceptable. 25.03% of combined respondents had neutral sentiments about the prospect.

Digital survey respondents, who had a greater pre-event awareness than face-to-face respondents (see Section 5.3.2) were only slightly more likely than face-to-face respondents to find the prospect of additional sonic booms Completely Unacceptable (36.07% vs 34.63%

respectively). Their increased awareness about the event did not substantially impact their overall feelings about the prospect of future sound events.

5.10.2 Audibility

Group A respondents were more likely to find the prospect of future booms to be either Completely Unacceptable or Somewhat Unacceptable than Group B respondents (60.86% of total Group A respondents vs 44.92% of total Group B respondents). This was expected, as Group A respondents actually experienced the boom and its effects, unlike Group B.

Conversely, Group A and Group B respondents were almost identically likely to find the prospect of future booms either Somewhat Acceptable or Completely Acceptable - 18.10% vs 18.84% respectively, suggesting that hearing the boom shifted people toward opposition rather than acceptance.

36.23% of Group B respondents had neutral feelings about the prospect of future booms, compared to 21.03% of Group A respondents. This suggests that direct exposure to the boom drove stronger negative sentiment.

5.10.3 By Island (Combined)

Island of Residence	Completely Unacceptable	Somewhat unacceptable	Neutral	Completely Acceptable	Somewhat Acceptable
New Providence (n=560)	196 (35%)	142 (25.4%)	121 (21.6%)	60 (10.7%)	41 (7.3%)
Eleuthera (n=121)	44 (36.4%)	17 (14.0%)	41 (33.9%)	8 (6.6%)	11 (9.1%)
Cat Island (n=90)	33 (36.7%)	5 (5.6%)	33 (36.7%)	10 (11.1%)	9 (10.0%)
Grand Bahama (n=9)	3 (33.3%)	2 (22.2%)	1 (11.1%)	1 (11.1%)	2 (22.1%)

Table 41: Acceptability of Future Booms by Island (Combined)

Completely Unacceptable was the top response across every island, ranging from 33.3% to 36.7%. New Providence was the most negative island overall, with 60.4% of responses being

either Completely Unacceptable or Somewhat Unacceptable, followed by Grand Bahama at 55.5%, Eleuthera at 50.4%, and Cat Island at 42.3%.

The small subset of Grand Bahama residents who responded to the online survey were most likely to find the prospect of future booms either Somewhat or Completely Acceptable (33.3%), followed by Cat Island at 21.1%, Eleuthera at 20.2%, and New Providence at 18% - meaning that in addition to being the most negative island overall, New Providence was also the least positive island overall.

Eleuthera and Cat Island showed higher neutrality than the other islands at (~34% and ~37% respectively) - New Providence showed relatively low levels of neutrality at 22%.

5.11 General Concerns

At the conclusion of the survey, respondents were asked: “Do you have any other observations, thoughts, comments, or concerns? This qualitative, open-ended question served as a “catch-all”, allowing respondents to share their thoughts with us about the sound event but also about the project, their experiences during the First Landing, other similar projects, and gave them an opportunity to voice their thoughts, offer suggestions and advice, and in many cases simply to vent their frustrations. These candid responses help to uncover unexpected insights and generate a more complete representation of the study sample.

The survey did not ask respondents whether they support or oppose the SpaceX booster reentry in Bahamian waters in principle. Emotional response and concern items were framed in terms of how the sonic boom made them feel and what, if anything, they were worried about, rather than as a referendum on the activity itself. The environmental and governance concerns documented in the qualitative data were raised voluntarily in open-ended responses, not in answer to questions about the activity itself. They represent community voices that chose to speak, not responses shaped by survey design.

Across both datasets, 245 face-to-face and 330 digital survey respondents answered this question.

5.11.1 Points of Interest

Environmental concern is a dominant theme, with marine life, ocean/reef impact, rocket debris, and water quality the most frequently cited sub-topics.

Information-seeking and curiosity is nearly as prevalent — respondents across both surveys consistently asked why The Bahamas was selected as a landing site, what are the long-term implications of the landings, and how does the science work. This reflects a significant information gap.

New Providence respondents were notably more oppositional than respondents from the Family Islands, and more focused on government accountability. Family Island respondents were more enthusiastic about the prospect of future landings, even in communities where they were more impacted by the sound event.

Respondents frequently expressed concern for members of vulnerable groups, like children and the elderly.

5.11.2 Responses by Theme

Responses have been grouped into thematic categories and may appear in multiple categories if their description matched more than one.

Theme	All Islands	New Providence	Eleuthera	Cat Island
Environmental Concern	135	87	28	15
Curiosity/ Information Seeking	13	90	31	12
Government & Accountability	86	54	21	7
Prior Awareness/ Communication	66	44	17	5
Impact on Vulnerable Groups	55	31	17	6
Opposition/ Rejection	39	31	6	-
Support/Acceptance	41	24	11	5
Fear/ Psychological Impact	32	16	15	-
Economic Benefit/ Fairness	27	2	10	3
Date/ Timing Communications	32	4	6	5
Tourism Concerns	7	18	3	1

Table 42: Overall Comments Theme by Island

5.11.3 Representative Sound Descriptions (Selected Verbatim Responses)

Representative responses have been grouped within themes provided above. Some responses have been lightly edited for clarity.

Theme	Respondent's Own Words	Island
Environmental Concern	What if they miss their landing spot? Is this even healthy? Why our water and not other water? Even	Eleuthera

Theme	Respondent's Own Words	Island
	though we have shallow waters I feel like something like this could cause a tsunami. That's crazy. And why are we the test dummies?	
	My concern is about the fisheries. Will it be killing our fishes.	Cat Island
	Concerns: we don't know the impact it has on the environment, people or building structures. It's a gamble we taking for a few dollars. How does it affect the sea life? And why Exuma where so many land and sea parks.	New Providence
	What harm or effects would this have on our marine life? Any place in the world you do this sort of tests you will have to compensate the country, greed is killing our politicians so I am lobbying for lower rates on our Starlink bills and money for our organic Bahamian.	Andros
Curiosity/ Information Seeking	I would like to know what it is about and why it occurred.	Cat Island
	I don't really know about it like that. I have to do some research. I don't really know what it is to have an opinion on it.	Eleuthera
	I want to know what's the effect of constant sonic booms. I would like more information and transparency on it.	New Providence
Government & Accountability	Annoyed with government for bringing it to the Bahamas. To what extent would it impact our fishing? I don't like strange things in the country.	Cat Island
	It wasn't too bad for me but I'm thinking about the kids and the elderly. I was thinking about Leon Moss [Elon Musk] and wondering why he had to come here and do that. I even vex at the prime minister and wondering why he do that. The first one [First Landing] everyone was talking about it and then it just went quiet. The second one [Second Landing] really scared everyone. We don't know where these things gonna land. These manmade and everything	Eleuthera

Theme	Respondent's Own Words	Island
	could happen. How do they know this stuff is going to land where they say it's going to?	
	Whoever was the cause need to have some kind of disciplinary action. Why are we booming. God forbid there's a war we wouldn't be able to differentiate. Also, what's the effect on our environment. Sound pollution - animals are sensitive.	New Providence
	Government will do what they want to do.	Eleuthera
Prior Awareness/ Communications	Because I was informed, I was less shocked. I heard the humming of the rocket after first boom, I had notice so it was expected.	Eleuthera
	The world is advancing. Make an advisory so that residents are aware of the boom	Cat Island
Impact on Vulnerable Groups	Concerned for elderly individuals, infants and persons with heart problems.	Eleuthera
	As previously mentioned my concerns relate to how it may affect those who depend on marine life and species of the ocean. Additionally I also have concern for the family islands which may have individuals who are disabled or have special needs which the loud sound and vibrations may negatively effect, which I think is another concern we should be mindful of moving forward.	New Providence
Opposition/ Rejection	This should not be happening in The Bahamas. Money should never be able to sway the leaders of our country like this. Will we continue to be used in the future by these big corporations?? The Bahamas has enough environmental issues as it stands and our biodiversity hasn't even been explored fully. There is still no baseline ecological data on how environmental conditions/impacts influence some ecosystems in The Bahamas and the government is allowing stuff like this to happen?? It is a shame.	New Providence
	I hate sonic booms. They are unnatural. Go away.	New Providence

Theme	Respondent's Own Words	Island
	What if someone had a heart attack and it gone down. Totally against it.	Eleuthera
Support/ Acceptance	I wouldn't care for it every two weeks out whatever. But once they make a report over the airwaves so the Bahamian people could accept it then it's okay. I'm not a person who stands in the way of progress. I love to see progress. As long as it isn't affecting the people of the Bahamas to hurt the people then I say go for it. It's progress.	Eleuthera
	Feels the added revenue would help the economy.	Eleuthera
	Keep up the good work and don't let the corruption of The Bahamas slow you down...Especially in the Silly Season of Elections. Go SpaceX and may God Bless Elon Musk	Grand Bahama
	For internet stability they could boom as much as they want to boom.	Cat Island
	Very acceptable if I get monetised. Only concern is, is it harmful to our environment and our waters? The radiation may affect the waters. If I can't go in the water, that's a problem. I also heard that's why people on the islands sometimes have the rarest and most concerning forms of cancer.	New Providence
Fear/ Psychological Impact	It was scary, because I didn't know about it. We ran outside. I found out what it was in my neighborhood chat group. We are feeling much better.	New Providence
	Has multiple young children who were frightened, dog was agitated and generally family was scared from what happened. Wishes she was more informed and wonders how it will affect the environment and community if to continue more frequently.	Eleuthera
Economic Benefit/ Fairness	1. Legalities: what were the permits acquired to land in Bahamian waters 2. Compensation: How were the residents of Eleuthera, Cat Island, and Exuma (and the	Eleuthera

Theme	Respondent's Own Words	Island
	Bahamian residents in general) consulted and compensated 3. Environmental concerns: What is the consensus on the impact on marine life in Exuma sound, especially marine mammals. What is different from the last landing that resulted in beaked whale stranding and death? What were the changes made to have a different impact? 4. Impact assessment	
	This ain't benefiting us and if he [Elon Musk] wanna do something for us he should pay off our debt. If he paying for air space he better be paying for that. What this doing for future generations of The Bahamas?	Cat Island
Date/ Timing Communications	I saw the notice saying it would be on Wednesday and I didn't hear anything so I figured it was too far away. But when it happened last night I thought a car or gas tank exploded. I didn't know the date had changed.	New Providence
	It only sound like a piece of plywood fall. I work on a construction site and I'm used to loud noises. It wouldn't really phase me. I just would like to be in the know next time so I wouldn't be freaking myself out.	Eleuthera
	I appreciated the advance notice so knew what caused the noise and vibrations and could alert my adult disabled daughter who is easily startled. I saw the video of the landing and am deeply concerned that the burning fuel and sonic boom nearer to the site are harmful to our fragile and pristine environment	New Providence
Tourism Concerns	Concern mostly over impact on nature and wild/sea life. Concern if there is one accident.... repercussions. After tourism, we have little else. NOTHING is worth risking our product.	New Providence
	We mentioned to the other visitors about the notice and some of them didn't know what a sonic boom is.	Cat Island

Theme	Respondent's Own Words	Island
	We tried to listen but we heard nothing. I know the bahamian gov seems to be ok with this. But if I was a Bahamian I would want to get advice on safety and securities and environmental solutions. I am not sure their track record on space debris is perfect. I don't think SpaceX can predict exactly where it will land. My worry is what are Elon Musk and SpaceX giving to the government of The Bahamas.	
	We used to have the supersonic jet from London to New York go across our home in Boston and it always would surprise me but I always knew what it was because it was on a schedule. So it was noticeable. As a visitor I would be neutral. If I was a resident I wouldn't like it too much.	Eleuthera
Other	I grew up in Montana and there was an air base there. We used to hear sonic booms all the time. My daughter lives in Georgia at a base and we hear sonic booms all the time. The first time I heard [a sonic boom] was when I was about 5. My grandpa was in WWI. This was in the 1950s and he was just white as a sheet. I'm sure he was thinking if we were at war because he had never heard it before. For me it wouldn't be a major problem. But I understand how it may be a problem for a nice quiet island.	Eleuthera
	I saw the explosion last year [reference to 2025 SpaceX Starship explosion], it came from here and came straight over. You could see the pieces just breaking apart. Over here we had the whales who were impacted. A whale came up during February or March . And the whale head came up by itself. And a whale came up with the baby. They were dead.	Eleuthera

Table 43: Representative Sound Descriptions by Island

6. INTERPRETATION OF FINDINGS

This section synthesizes and provides an interpretation of the findings of this study.

In interpreting these findings, it is important to note the following regarding the data collected for this study: (1) that the data was collected as soon as possible after the sound event (approximately 81% of combined surveys were administered on either February 19 or 20, and the collection period ended on February 22) and so only immediate impacts, and not sustained or long-term impacts, were captured, (2) that the data was self-reported and subjective, and so reflects individual perception rather than objectively measured experiences, (3) that the data does not capture evidence of any impacts that persist beyond the immediate event.

The survey instrument was designed to capture perceived effects, which are meaningful as community impact indicators and provide an evidence base for community experience, but which cannot provide an assessment of sustained or long-term clinical, social or environmental impacts. Its findings should therefore be interpreted accordingly. Where the data points toward potential sustained impacts, these are identified as areas warranting further investigation.

6.1 Event Awareness and Notification

Across both surveys, 38.6% of respondents were not aware in advance that a sonic boom might occur. Awareness differed across geographic zones - while a majority of New Providence respondents (68.3%) were aware of the boom, awareness of communities in Eleuthera and Cat Island was lower - at 44.0% and 38.9% respectively. Digital survey respondents had a much higher rate of awareness (77.0%) than that of F2F respondents (46.8%). Event awareness was further complicated by the fact that the date of the Second Landing was pushed back by one day, on the date that the Second Landing was scheduled to take place (see Section 5.3.1).

A majority of persons - 64.2% - received notice of the Second Landing by way of social media. More traditional forms of notice were less successful in their reach - 31% of respondents provided that they received notice by way of news media, 25% by word of mouth, and only 15.1% by government notice. In all cases, digital respondents were more informed than F2F respondents.

The survey findings highlight a significant information gap, which especially disadvantaged more vulnerable and more exposed communities (the more populous and developed New Providence had greater levels of awareness compared to the rural communities of Eleuthera and Cat Island. South Eleuthera in particular reported greater exposure and bore greater acoustic impacts from the sound event than other communities). Government notice was notably ineffective in its reach, while more modern media channels had much greater success rates; however, this trend

toward digital media is more likely to disadvantage vulnerable populations who are less digitally connected, such as older persons and persons without reliable access to internet and other utilities.

The awareness gap is not a finding about the event itself — it is a finding about communication and governance, rather than of the impacts of the sonic boom. The data supports a conclusion that the absence of adequate prior notice amplified the community's immediate distress response in a way that was foreseeable and preventable.

6.2 Audibility and Geographic Distribution

This study confirms that the boom was perceived across the archipelago, with over 70% of respondents reporting that they heard one or more booms. Audibility of the sound event varied across Geographic Zones. South Eleuthera, a community very close to the Landing Site, recorded the highest audibility rate across Zones, and New Providence Eastern and Southern zones also recorded high audibility rates, despite their greater distance from the Landing Site. In contrast, Cat Island recorded dramatically lower audibility rates, despite its comparable proximity to the Landing Site.

Respondents from communities outside the initial study scope (in particular Grand Bahama and Long Island) and well outside of the spacecraft's presumed Mach cone geometry, reported hearing the sonic boom(s). Though these samples are small, they indicate that the sound event was experienced by communities outside of the Project's initial contemplation.

Audibility rates simply reflect the acoustic physics of the event and do not indicate harm or other long-term impacts. Communities with low heard rates, however, were not protected from impact by policy, notification efforts, or other mitigation measures - they were simply outside of the acoustic footprint of the sonic boom. Future landings with different conditions (flight trajectories, atmospheric conditions, etc) could produce materially different exposure patterns and impact different communities, and the Project should make efforts to account for this in their planning exercises and while plotting flight trajectories.

6.3 Perception

The survey captures several dimensions of perceived impacts of the sound event. These include interference, annoyance, and loudness, as well as physical and emotional impacts on respondents, children, and pets, structural impacts and impacts to property, and degree of concern caused by the sound event.

6.3.1 Interference/Annoyance/Loudness

Among combined respondents who heard the boom, the mean perceived loudness was 3.58, above the scale midpoint, indicating that the boom was broadly experienced as significantly loud. Perceived loudness varied by community, with South Eleuthera having a mean loudness score of 3.85, while Cat Island had a score of 3.24. Mean annoyance was 2.82 and mean interference was 2.31.

Perceived loudness, annoyance, and interference are meaningful indicators of community impact and should be taken seriously in planning future events. However, these are distinct from evidence of lasting physiological or psychological injury, and should not be interpreted as such.

6.3.2 Physical and Emotional Impacts

66.5% of respondents who heard the boom reported experiencing at least one physical reaction. Of these, “being startled/jumped” was the most common reaction, reported by 88.1% of respondents who heard the boom. Nearly half of startled respondents (44.9%) reported being Very or Extremely concerned. The startle response, which is well-documented in the acoustic literature as the primary immediate human response to booms, is evident throughout the open-text responses, with many respondents describing being awakened from sleep, running outside, or fearing a nearby explosion, act of war, or structural collapse. Likewise, a number of respondents reported experiencing one or more physical reactions - these included heart racing, ear discomfort, and anxiety/panic. This is consistent with established research on sonic boom human effects and reflects the acute, transient nature of the startle response, rather than evidence of sustained psychological harm.

Survey findings also indicate that children and pets were impacted by the sound event. Of households with children present, 54.6% of respondents reported no noticeable impact, while 21.9% of respondents reported either moderate or significant impacts. Of households with animals in them, 54.0% reported no noticeable impact, while 28.6% reported either moderate or significant impacts.

Two in three persons who heard the boom experienced a measurable physical reaction, which is a striking finding in its own right. Children and animals were also impacted, and while a majority of respondents reported no noticeable impact, when impacts were noticed, they necessitated a degree of concern.

These responses do not indicate evidence of sustained physical or psychological harm at a population level. The physical reactions documented are involuntary responses to sudden, intense acoustic stimuli, and can be expected to resolve without lasting consequence for the

majority of those affected. However, it should be noted that this survey, which was administered within days of the event, was designed to capture immediate reactions only, and was not structured to detect whether any acute responses recorded - in particular those physiological responses - persisted in the days and weeks following the sound event. Longer-term consequences of those responses are outside the scope of what this data can establish.

6.3.3 Structural Impacts

21.75% of survey respondents across both datasets reported that they noticed physical impacts to their homes or surroundings - these impacts primarily included vibration and rattling, as well as more significant impacts including hairline cracks dislodged roof shingles, and pictures falling from walls. In addition, there were also reports of seemingly coincidental fires and smells of burning (that have not been corroborated outside of this study).

These reports are consistent with the characteristics of the Falcon 9 boom(s) resulting in pressure waves that interact with building structures. These findings constitute perceived impact and in some cases may warrant further documentation. However, this survey was not designed to conduct structural assessments, and self-reported observations cannot be treated as evidence of sustained structural damage without independent inspection. This gap represents an area where follow-up investigation - especially in more exposed communities - should be considered.

6.4 Community Concern and Future Acceptability

A significant number of respondents (39.6%) reported that they were 'not concerned' about the sonic boom - 24.25% of Group A respondents reported non-concern, compared to 85.71% of Group B respondents. However, Group A respondents were much more likely to report being 'very concerned' or 'extremely concerned' about the boom, compared to only 5.3% of Group B respondents. This indicates that exposure to the boom increased likelihood of concern about the sonic boom - an expected finding.

The open-text analysis reveals that the dominant themes driving concern included: environmental and marine impact, information seeking, government accountability and transparency, and prior awareness and communication.

A slight majority of combined survey respondents (56.67%) found the prospect of additional sonic booms to be either Completely Unacceptable or Somewhat Unacceptable, and survey respondents who heard the boom were more likely to find the prospect of future booms to be completely or somewhat unacceptable than respondents who didn't, suggesting that exposure to the boom negatively impacted tolerance of such sound events.

Taken together, the concern data and future acceptability data indicates a community that was startled and in many cases uninformed, but not necessarily a community that had, at the date of the survey exercise, experienced measurable sustained harm. The prominence of environmental concern and information-seeking suggests that the most significant sustained impact of the event may be reputational and relational: a reduction in public trust in the government's management of the SpaceX partnership that, if unaddressed, could crystallize into more durable social opposition.

6.5 Conclusion of Interpretation of Findings

These findings provide that the Second Landing resulted in a significant and widespread sound event that was perceived across a number of Bahamian islands and that generated an immediate community response characterised primarily by startle, concern, and an acute demand for information. Findings align with established literature on sonic boom human effects, and the survey does not provide evidence of sustained physiological, psychological, or structural harm at a community level. It does, however, point to a significant communication gap, a demand for transparency around community concerns, and the early indicators of a trust deficit between affected communities and the institutions responsible for managing this partnership.

7. **RECOMMENDATIONS**

7.1 **Acoustic Footprint and Area of Influence**

The designated study scope covered New Providence, South Eleuthera, and North Cat Island. The sonic boom was, however, heard across virtually the entire length of Eleuthera, in South and Central Cat Island, and by respondents in Grand Bahama, Andros, Exuma, and Long Island. The regulatory framework should reflect the actual acoustic footprint of the activity, but also recognize that that footprint is not fixed, so potential variability of boom distribution should be anticipated and planned for.

Future landings in the Exuma Sound region with different flight trajectories, descent angles, or atmospheric conditions on the night could produce materially different exposure patterns, directing significant acoustic energy toward communities that experienced little or none in February 2026, or conversely sparing communities that were significantly affected this time. Regulators should use the findings of this study - most notably the evidence of potential variability of acoustic outcomes - alongside the acoustic sound-mapping and monitoring data collected concurrently with this survey, to help define the acoustic area of influence for future landing events and update that definition over time as additional monitoring and community data become available. The possibility of variability in acoustic outcomes should be explicitly incorporated into community engagement and notification planning, and all communities within a plausible exposure radius should be formally included in notification, consultation, and monitoring requirements for future landings, regardless of whether they fell within the original study scope, so that no affected community sits outside the evidence base or mitigation measures. Future sound-mapping and associated social research should be scoped to match the projected acoustic area of influence rather than a predetermined geographic boundary, in line with impact-assessment guidance that impact zones are defined by where effects are actually experienced.

7.1.1 **Evidence**

This recommendation is supported by face-to-face data showing the boom was heard in North Eleuthera (59.1% heard rate), Central Eleuthera (59.3%), South Cat Island (13.3%), and Central Cat Island (5.9%), none of which were within the original study scope. Digital respondents from Grand Bahama, Andros, Exuma, and Long Island also reported hearing the boom. This approach mirrors standard EIA practice whereby zones of influence are defined by observed effects rather than initial study boundaries.

7.2 **Environmental Monitoring and Community Observation**

The survey data identified a small number of environmental observations reported by respondents that fall outside the acoustic scope of this study. These included reports of an unusual smell and a coincidental brush fire following the event, which was subsequently confirmed through follow-up by the field team.

While these observations may not be directly attributable to the sonic boom, they highlight how community members may associate concurrent environmental events with the landing. This reinforces the importance of clear communication regarding the nature and expected effects of the activity to support accurate public understanding.

Consideration should be given to establishing a community environmental observation mechanism for any future landing events. Community members are often among the first to observe environmental anomalies; providing a structured reporting mechanism to capture and review such observations in real time, such as a dedicated incident reporting line or online portal, monitored by the relevant environmental authorities and investigated where appropriate, would only strengthen the Project team's environmental monitoring efforts. Reports submitted through this mechanism should be formally logged, screened by the relevant authorities, and where appropriate investigated, communicated back to the originating community, and summarised in public monitoring reports, to support transparency and trust in the regulatory oversight of the Project, improve information flow between stakeholders and the public, and help address potential misconceptions.

7.2.1 Evidence

Survey responses included reports from some community members of perceived debris or material entering the water during the event. While these observations were not substantiated by field monitoring data, they highlight the importance of clear communication regarding the nature of landing operations and expected outcomes.

7.3 Community Engagement and Public Education Campaign

The survey data highlighted a distinct gap between the information that was communicated and the information that reached communities at high risk of exposure to the sound event. 38.4% of combined respondents were not aware that the sonic boom was going to occur - that number rose significantly in communities outside of New Providence, which captured less digitally connected community members. Respondents' reactions to the sonic boom were shaped not only by the physical intensity of the sound, but also by uncertainty about what was happening. Those who were unaware of the impending boom reported meaningfully higher concern than those who were not, and the uncertainty contributed to high levels of fear, anxiety, and reports that repeated booms would be "completely unacceptable", especially in communities that felt

they had not been adequately informed in advance. This confirms that advance notice acts as a direct buffer against distress.

Based on the observed relationship between awareness and reduced concern, a structured, multi-channel community engagement programme would materially reduce alarm, build trust, and ensure that those most affected by the event are the best informed about it.

The project could host settlement/neighbourhood-level community briefings in the weeks before the launch, to provide clear event details, and allow structured time for questions. A layered alert system - across high-level government advisory platforms and alert systems (such as via SMS or email broadcast) as well as across community-level systems like Whatsapp broadcast and social media, should be implemented. The environmental impact of the Landing was a major theme of concern, across all islands, and the concerns go beyond mere opposition.

Any future launch and landing activities associated with The Bahamas should be accompanied by a short, accessible public education campaign that addresses and responds to environmental and other concerns in accessible ways. The campaign should include a video and supporting materials that explain, in clear, non-technical language, what a sonic boom is, how the launch and landing process works, what the landing area and pads are designed to do, and what residents can realistically expect to hear and feel. Visual explanations of the landing sequence and landing pad design, combined with simple animations, can help demystify the process and reduce the tendency to interpret the boom as an uncontrolled explosion or accident. Producing post-launch summary videos, and livestreaming of the launch across Bahamian media platforms could also be deployed as components of the campaign. This would help build trust, demonstrate accountability, demystify the boom, and build positive familiarity.

The campaign should be produced in partnership with relevant government agencies and local media, and distributed across multiple channels (national television, radio, social media, WhatsApp groups, schools, churches, clinics and local government offices), with specific tailoring for family islands that are directly under the sonic boom footprint. The goal is not to persuade residents to support the activity uncritically, but to ensure that they have accurate, timely information so that any future booms are understood as planned events rather than emergencies. This kind of transparent, proactive risk communication is a practical, low-cost way to reduce distress, build trust, and demonstrate respect for communities that are being asked to live with the effects of sonic booms.

7.3.1 Evidence

Survey respondents raised a number of concerns (see Section 5.11) that confirm information and awareness gaps highlighted in the survey data. The community engagement programme builds on a comment provided by a male resident of Bannerman Town, South Eleuthera, one of the most exposed and impacted communities, who gave the following suggestions: (1) We have local governments in our communities. Come to the settlement and have a briefing. Give the time and date. Say who will be there. (2) Have an emergency team [in impacted communities] right [before the Landing]. (3) Make an alert minutes before [the Landing]. (4) Update people about the marine and ecological impacts. (5) Put a video out letting people see... what's going on.

8. CONCLUSION

The findings of the Sound Mapping Study confirm that the sonic boom generated by the Falcon 9 booster recovery was widely perceived across the Bahamas archipelago. The event produced measurable acute community responses - including startle reactions, heart racing, anxiety, and in some cases ear discomfort - across a wide geographic area. Concern levels were elevated, particularly among those who were unaware of the event in advance, those who heard the boom at close range, and those in communities located directly along the acoustic footprint of the boom.

The data presented aligns with existing literature, and indicates that the majority of reactions and impacts documented were short term in nature, and does not suggest evidence of sustained physical or psychological harm at a population level - but note that this survey instrument was designed to capture immediate perception and reaction data, and further study would be required for an assessment of any potential long-term impacts.

The survey data further demonstrates that prior awareness is associated with meaningfully lower levels of concern. Awareness did not, however, eliminate physical reactions or concern entirely. This finding supports the conclusion that effective communication and stakeholder engagement are important factors in mitigating perceived impacts and maintaining public confidence in the Project.

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APPENDICES

Appendix A

Digital Community Survey Questionnaire (February 19–26, 2026)

This online questionnaire asked residents about their experiences of the SpaceX sonic boom(s) and related community impacts in The Bahamas.

Section 1. Background information

Submission Date

- (Recorded automatically as the date of online submission.)

Island of Residence

- New Providence
- Grand Bahama
- Eleuthera
- Andros
- Other (please specify): _

Approximately how many sonic booms did you hear or feel?

- None
- One
- Two–three
- More than three
- Unsure

Your location at the time you heard the sonic boom

- New Providence – Eastern
- New Providence – Western
- New Providence – Southern
- New Providence – North/Central & Paradise Island
- Fresh Creek, Andros
- Other (please specify): _

Gender

- Female

-
- ☐ Male
 - ☐ Prefer not to say

Age

- ☐ 18–24
- ☐ 25–34
- ☐ 35–44
- ☐ 45–54
- ☐ 55–64
- ☐ 65+

How would you describe your community?

- ☐ Urban (high population density; concentrated housing, businesses, traffic, and built infrastructure)
- ☐ Suburban / Peri-urban (primarily residential; moderate population density; mix of housing types with nearby services and commercial areas)
- ☐ Rural (low population density; dispersed housing; agricultural, coastal, or natural landscapes dominate)
- ☐ Mixed-use / Tourism-centered (blend of residential, commercial, and tourism activities such as resorts, marinas, or attractions)

Are any members of your household under the age of 18?

- ☐ Yes
- ☐ No

Are there pets living in your household?

- ☐ Yes
- ☐ No

Section 2. Awareness and description of the event

Before the event, were you aware that a sonic boom might occur?

- ☐ Yes
- ☐ No

If yes, what was your source of information? *(select all that apply)*

- ☐ Government notice

-
- News media
 - Social media
 - Word of mouth
 - Neighborhood WhatsApp group
 - SpaceX news
 - Other (please specify): _

Do you have any other observations, thoughts, comments, or concerns?

- Open-ended response: _

If pets were impacted, please describe the impact.

- Open-ended response: _

If children were impacted, please describe the impact.

- Open-ended response: _

Did knowing or not knowing about the sonic boom beforehand impact your perception of it?

- Yes
- No
- Please explain: _

In your own words, how would you describe the sound?

- Open-ended response: _

When the sonic boom occurred, where were you located?

- At home, indoors – Sleeping/resting
- At home, indoors – Household activities
- At home, outdoors
- Away from home, indoors – Working
- Away from home, indoors – Leisure activities / recreation
- Away from home, outdoors
- Driving / travelling
- Other (please specify): _

Section 3. Immediate impacts

How much did the sonic boom interfere with your activities at the time?

- ☐ 1 – Not at all
- ☐ 2 – Slightly
- ☐ 3 – Moderately
- ☐ 4 – Very much
- ☐ 5 – Extremely

How much did the sonic boom bother, disturb, or annoy you?

- ☐ 1 – Not at all
- ☐ 2 – Slightly
- ☐ 3 – Moderately
- ☐ 4 – Very much
- ☐ 5 – Extremely

How loud did you perceive the sonic boom to be?

- ☐ 1 – Not loud
- ☐ 2 – Slightly loud
- ☐ 3 – Moderately loud
- ☐ 4 – Very loud
- ☐ 5 – Extremely loud

Did you observe any physical impacts to your home or surroundings?

- ☐ Yes
- ☐ No

If you did observe physical impacts to your home or surroundings, please specify:

- ☐ Open-ended response: _

Section 4. Personal physical and emotional reactions

Did you experience any personal physical reactions? (Select all that apply)

- ☐ None
- ☐ Startled / jumped
- ☐ Heart racing
- ☐ Anxiety / panic
- ☐ Ear discomfort

-
- Headache
 - Other (please specify): _

Overall, how did the sonic boom make you feel?

- Not concerned
- Slightly concerned
- Moderately concerned
- Very concerned
- Extremely concerned
- Neutral

Section 5. Children and pets

If you have children, how were they impacted?

- Not applicable – I do not have children
- Not applicable – No children were present
- They were not impacted
- They were frightened / hid / moved closer to adults
- They were curious or excited
- Other (please describe): _

If you have pets, how were they impacted?

- Not applicable – I do not have pets
- Not applicable – No pets were present
- No noticeable impact
- Barking or other vocalising
- Hiding, shaking, pacing, or jumping
- Other (please describe): _

If sonic booms were to occur occasionally in the future, how acceptable would this be to you?

- Completely acceptable
- Somewhat acceptable
- Neutral
- Somewhat unacceptable
- Completely unacceptable

Appendix B

Face-to-Face (Enumerator-Administered) Community Survey Questionnaire This questionnaire was administered in person by trained enumerators.

Section 1.

Your location at the time of the sonic boom

- ☐ New Providence – Eastern
- ☐ New Providence – Western
- ☐ New Providence – Southern
- ☐ Central Eleuthera
- ☐ South Eleuthera
- ☐ Other (please specify): _

Island of residence / location at time of landing

- ☐ New Providence
- ☐ Eleuthera (Central / North / South)
- ☐ Other (please specify): _

Gender

- ☐ Female
- ☐ Male
- ☐ Prefer not to say

In your own words, how would you describe the sound?

- ☐ Open-ended response: _

Age

- ☐ 18–24
- ☐ 25–34
- ☐ 35–44
- ☐ 45–54
- ☐ 55–64
- ☐ 65+

Settlement (Eleuthera and Cat Island only)

- Open-ended settlement name (e.g., James Cistern, Palmetto Point, Governor's Harbour, Tarpum Bay).

How would you describe your community?

- Urban (high population density; concentrated housing, businesses, traffic, and built infrastructure)
- Suburban / Peri-urban (primarily residential; moderate population density; mix of housing types with nearby services and commercial areas)
- Rural (low population density; dispersed housing; agricultural, coastal, or natural landscapes dominate)
- Mixed-use / Tourism-centered (blend of residential, commercial, and tourism activities such as resorts, marinas, or attractions)

Are any members of your household/place of residence under the age of 18?

- Yes
- No

Were there pets living in your household/place of residence at the time of landing?

- Yes
- No

Before the event, were you aware that a sonic boom might occur?

- Yes
- No

If yes, what was your source of information?

- News media
- Social media
- Word of mouth
- Other (please specify): _

Visitor / resident

- Visitor
- Resident

Section 2. Experience of the sonic boom

Approximately how many sonic booms did you hear or feel?

- ☐ None
- ☐ One
- ☐ Two–three
- ☐ More than three
- ☐ Unsure

Did you hear a loud sound or feel vibrations and rattling on Thursday evening at around 8:45 pm?

- ☐ Yes
- ☐ No

If knowing/not knowing about the sonic boom DID impact your perception, how so?

- ☐ Open-ended response: _

When the sonic boom occurred, where were you located?

- ☐ At home, indoors – Sleeping/resting
- ☐ At home, indoors – Household / recreational activities
- ☐ At home, outdoors
- ☐ Away from home, indoors – Working
- ☐ Away from home, outdoors
- ☐ Driving / travelling
- ☐ Other (please specify): _

How much did the sonic boom interfere with your activities at the time?

- ☐ 1 – Not at all
- ☐ 2 – Slightly
- ☐ 3 – Moderately
- ☐ 4 – Very much
- ☐ 5 – Extremely

How much did the sonic boom bother, disturb, or annoy you?

- ☐ 1 – Not at all
- ☐ 2 – Slightly

-
- 3 – Moderately
 - 4 – Very much
 - 5 – Extremely

How loud did you perceive the sonic boom to be?

- 1 – Not loud
- 2 – Slightly loud
- 3 – Moderately loud
- 4 – Very loud
- 5 – Extremely loud

Did you observe any physical impacts to your home or surroundings?

- Yes
- No

If you did observe physical impacts to your home or surroundings, please specify:

- Open-ended response: _

Section 3. Physical and emotional reactions

Did you experience any personal physical reactions? (Select all that apply)

- None
- Startled / jumped
- Heart racing
- Anxiety / panic
- Ear discomfort
- Headache
- Other (please specify): _

Overall, how did the sonic boom make you feel?

- Not concerned
- Slightly concerned
- Moderately concerned
- Very concerned
- Extremely concerned
- Neutral

Section 4. Children and pets

If children were with you at the time of the launch, how were they impacted?

- ☐ Not applicable – No children present
- ☐ They were not impacted
- ☐ They were startled or frightened
- ☐ They were curious or excited
- ☐ Other (please describe): _

If children were impacted, please describe the impact.

- ☐ Open-ended response: _

If pets were with you at the time of the sonic boom, how were they impacted?

- ☐ Not applicable – No pets present
- ☐ No noticeable impact
- ☐ Barking or other vocalising
- ☐ Hiding, shaking, or other visible distress
- ☐ Other (please describe): _

If pets were impacted, please describe the impact.

- ☐ Open-ended response: _

Section 5. Future acceptability and comments

If sonic booms were to occur occasionally in the future, how acceptable would this be to you?

- ☐ Completely acceptable
- ☐ Somewhat acceptable
- ☐ Neutral
- ☐ Somewhat unacceptable
- ☐ Completely unacceptable

Did knowing/not knowing about the sonic boom beforehand impact your perception of it?

- ☐ Yes
- ☐ No

-
- Please explain: __

Do you have any other observations, thoughts, comments, or concerns?

- Open-ended response: __



8.2 APPENDIX F – PHOTO LOG

8.2.1 Marine Photos



Figure 8-1. Prelaunch – Plankton

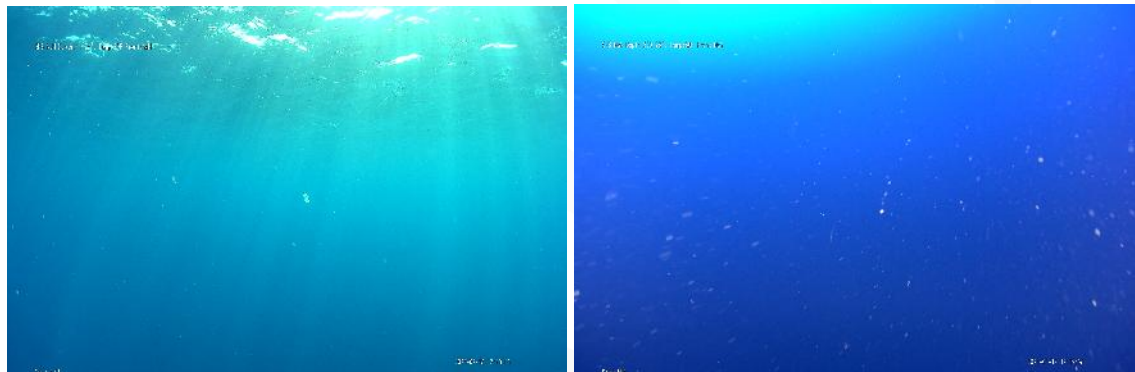


Figure 8-2. Prelaunch - Jellyfish species mixed with plankton

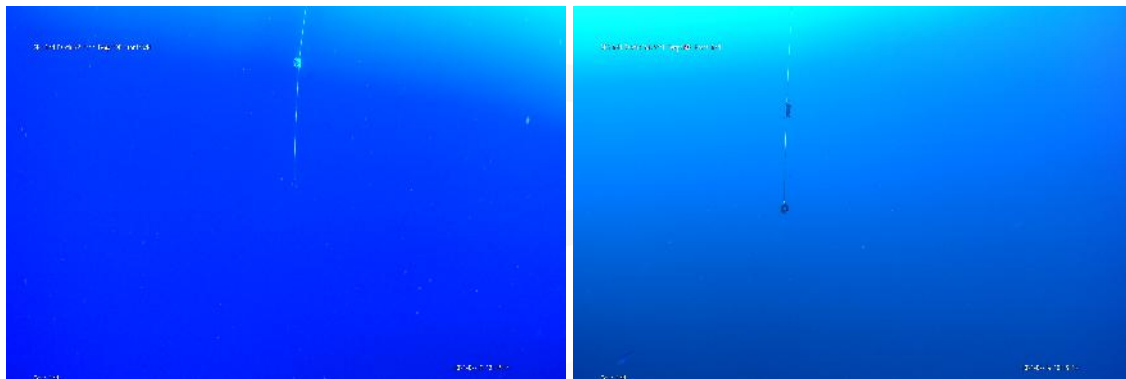


Figure 8-3. Prelaunch - Hydrophone setup at varying depths

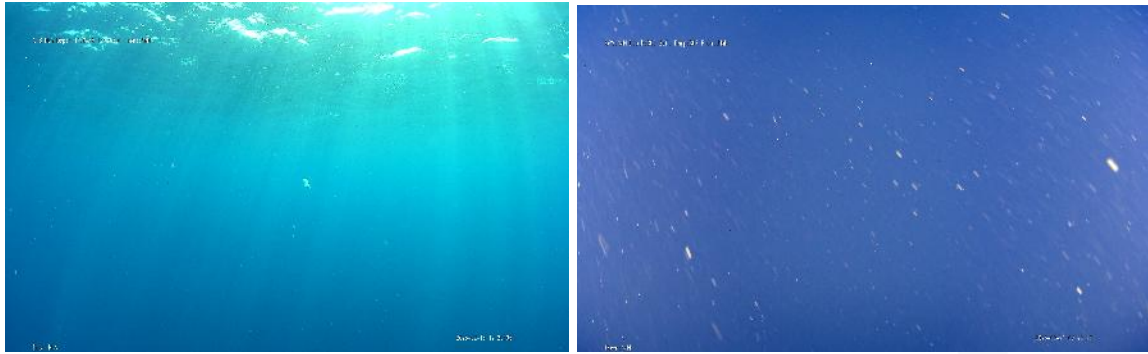


Figure 8-4. Post Launch – Jellyfish and plankton

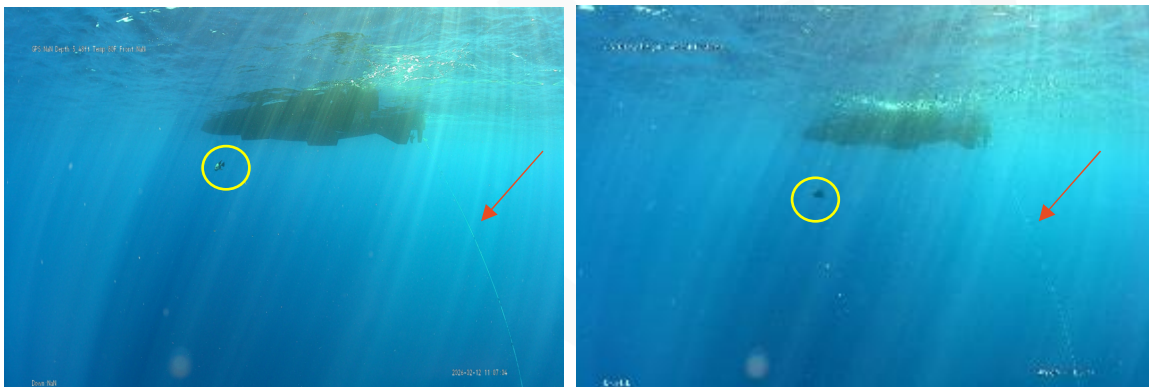


Figure 8-5. Post Launch – Triggerfish circled in yellow. Red arrow shows hydrophone array setup.



Figure 8-6. Post Launch – Mahi Mahi school



Figure 8-7. Post Launch Jellyfish, silversides and hydrophone set up

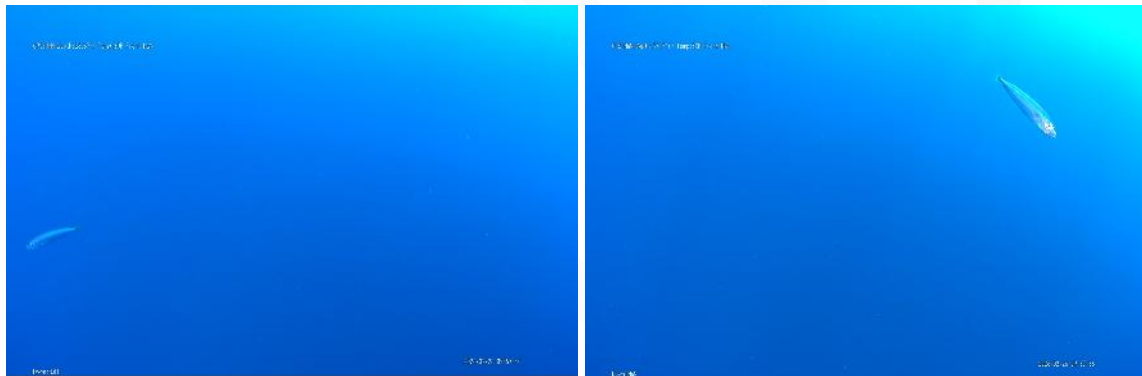


Figure 8-8. Post Launch - Silversides



Figure 8-9. Seaweed in wind blown convergence zones (l) and plastic debris (r).



Figure 8-10. Observed surface neuston slick (l), Falcon 9 booster on droneship (r).



Figure 8-11. Civil Aviation Officer observing sound trap deployment (l), SpaceX support crew (r).



Figure 8-12. Droneship and support vessels at booster landing location.



Figure 8-13. Hydrophone deployment



Figure 8-14. Brown Booby circling monitoring vessel



Figure 8-15. RBDF support vessel Madeira



Figure 8-16. Plankton and gelatinous organisms collected during surface dip sample.



Figure 8-17. Caribbean Reef Squid after jumping onto vessel



Figure 8-18. Marine data collection on the morning of launch day.



Figure 8-19. ROV calibration pre deployment



Figure 8-20. Hydrophone and sound trap deployment



Figure 8-21. Ocean triggerfish recorded by ROV near to monitoring vessel.



Figure 8-22. Marine mammal spotting (l), in air acoustic monitoring setup (r).



Figure 8-23. Seaweed and marine debris observed during post launch surveys



Figure 8-24. Frigate bird flying over monitoring vessel (l), Horiba deployed for water quality measurements (r).

8.2.2 Terrestrial Photos



Figure 8-25. A La'Sagra's Fly catcher perched on a branch within the coppice.



Figure 8-26. An osprey looking out over the coastline.



Figure 8-27. Yellow-throated Warbler eating Gum elemi berries.



Figure 8-28. Bahama Woodstar



Figure 8-29. Tri-colored Heron observed lurking in the mangrove wetlands.



Figure 8-30. American coots in a pond near to Bannerman town



Figure 8-31. A flock of Smooth billed Anis near in Cape Eleuthera.



Figure 8-32. Bananaquit



Figure 8-33. Ovenbird



Figure 8-34. Greater Antillean Bullfinch



Figure 8-35. Yellow-crowned Night Heron



Figure 8-36. Royal Terns



Figure 8-37. Immature Great black backed Gull



Figure 8-38. Killdeer



Figure 8-39. Wilson's Plover



Figure 8-40. Western Spindalis



Figure 8-41. Cuban Pewee



Figure 8-42. Ruddy Turnstone



Figure 8-43. Thick billed Vireo (l), Bahama Mockingbird (r)



Figure 8-44. Bird Nests seen in various vegetation throughout the survey area



Figure 8-45. Cuban Whiptail (l), Ghost Crab (r)



Figure 8-46. Grey Catbird



Figure 8-47. Wilson's Plover(l) and Short-Billed Dowitchers (r)



Figure 8-48. Female Black-faced Grassquit



Figure 8-49.- American Oystercatcher



8.2.3 Aerial Survey Flight Paths

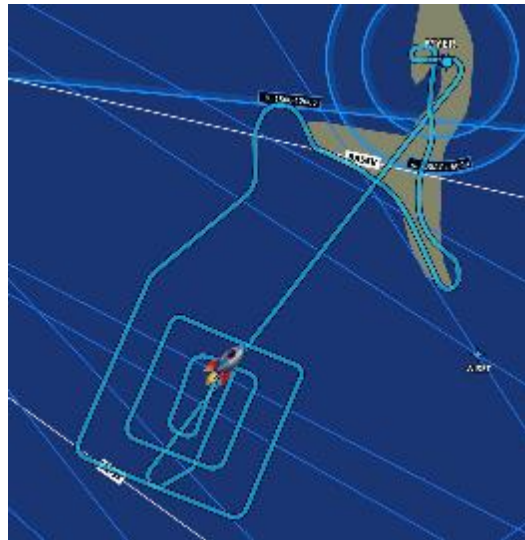


Figure 8-50. February 10, 2026 Aerial Survey Flight Path along South Eleuthera and over MSA.



Figure 8-51. February 11, 2026 Aerial Survey Flight Path along South Eleuthera, over MSA, and along northern Exuma Cays.



Figure 8-52. February 12, 2026 Aerial Survey Flight Path along Cat Island and Half Moon Cay coastlines, and over MSA.



Figure 8-53. February 13, 2026 Aerial Flight Path over South Eleuthera, northern Exuma Sound perimeter, and along northern Exuma Cays.

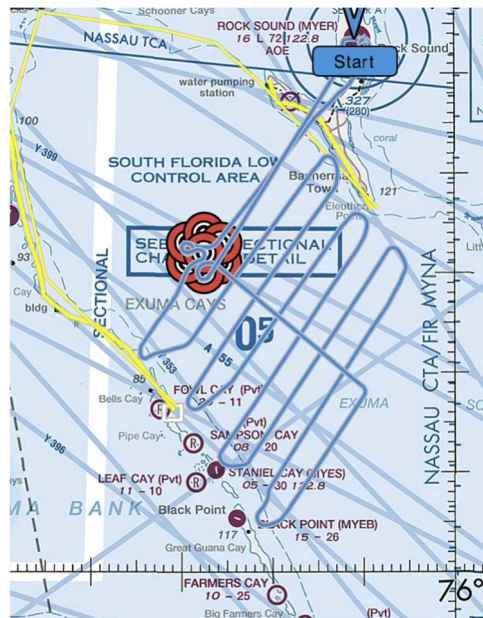


Figure 8-54. February 14, 2026 Aerial Flight Path over MSA, and across the Exuma Sound in a southern direction towards the fairing landing location within the Exuma Sound.



Figure 8-55. February 16, 2026 Aerial Flight Path over MSA and south of the MSA to the fairing landing location within the Exuma Sound.



Figure 8-56. February 17, 2026 Aerial Flight Path over MSA and along the northern Exuma Cays headed south, and over the fairing landing location.

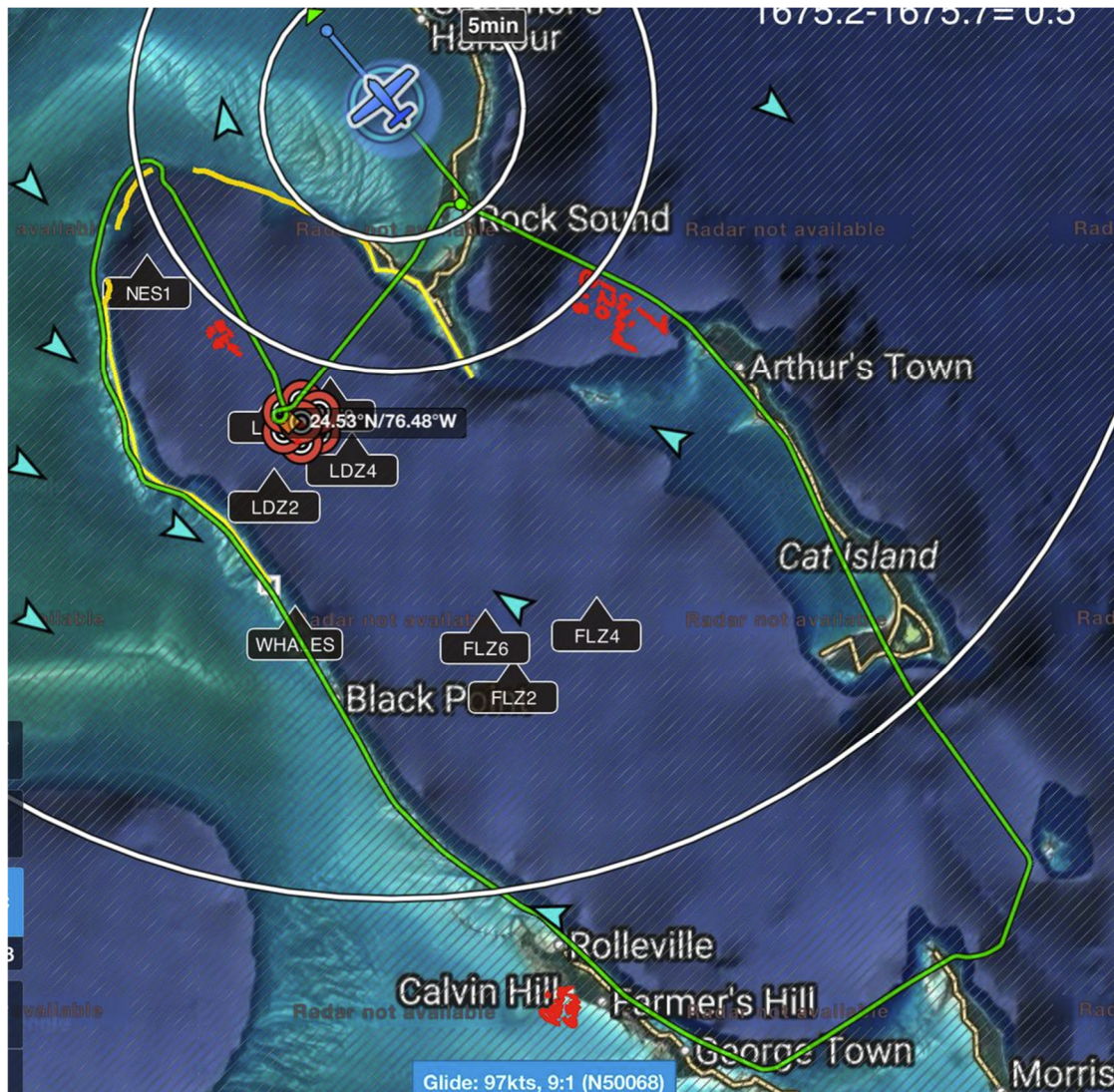


Figure 8-57. February 18, 2026 Aerial Flight Path over MSA, along Exuma Cays, Great Exuma, Southern Exuma Sound, and over Cat Island.