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PROTECTED SPECIES MITIGATION AND MONITORING REPORT

Marine Geophysical 2D Seismic Survey, Cape Fear (Cruise ID No. MGL2306)

Cape Fear Survey, RV *Marcus G Langseth* (Callsign: WDC6698)
09 May 2023 – 03 June 2023

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Report Author

Name	Draft Submission Date
Cassandra Frey	15 June 2023

Report Reviewer

Name	Date of Review
Cara Sands	10 July 2023
Katherine Gideon	31 July 2023

Final Report Approval

Name	Stephanie Milne
Title	Team Leader – Senior Environmental Manager
Signature	
Date	September 15, 2023

Prepared by:

RPS

Stephanie Milne
Team Leader – Senior Environmental Manager

575 N. Dairy Ashford
Suite 700
Houston, Texas 77079

T +1 281 589 7257
E stephanie.milne@rpsgroup.com

Prepared for:

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National Marine Fisheries Service
Office of Protected Resources

1315 East-West Hwy, Silver Spring, MD
20910-3282

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Acronyms and Abbreviations

ADCP – Acoustic Doppler Current Profiler
BiOp – Biological Opinion
BOEM – Bureau of Ocean Energy Management
BSS – Beaufort Sea State
BZ – Buffer Zones
DAQ – Data acquisition
dB - decibels
DSLR – Digital Single Lens Reflex
EA – Environmental Assessment
EPU – Electronic Processing Unit
ESA – Endangered Species Act
EEZ – Economic Exclusion Zone
EZ – Exclusion Zone
GPS – Global Positioning System
HF – High Frequency
HZ – Hertz
IHA – Incidental Harassment Authorization
ITS – Incidental Take Statement
LDEO – Lamont-Doherty Earth Observatory
LF – Low Frequency
MBES – Multibeam Echosounder
MGL – RV Marcus G. Langseth
MMPA – Marine Mammal Protection Act
NMFS – National Marine Fisheries Service
NRP – Navigation Reference Point
NSF – National Science Foundation
PI – Principal Investigator
PTS – Permanent threshold shift
PSO – Protected Species Observer
RME – PAM sound card manufacturer company name (not an acronym)
RMS – Root mean square
RPS – PSO Provider company name (not an acronym)
RV – Research vessel
SBP – Sub-bottom Profiler
TOAD – Time of Arrival Distance
TTS – Temporary Threshold Shift
TVG – Transverse Gradiometer
US – United States
UTC – Coordinated Universal Time
VSA – Vessel Strike Avoidance

1 EXECUTIVE SUMMARY

The R/V *Marcus G. Langseth* (MGL), which is owned and operated by Columbia University's Lamont-Doherty Earth Observatory (LDEO), conducted a high-energy 2D seismic survey in the Northwest Atlantic Ocean off the coast of North Carolina from 09 May to 03 June 2023 (referred to herein as "survey"). The operational activities were conducted in support of research proposed by Principal Investigators (PIs) Drs. H. Daigle (University of Texas at Austin), A. Becel and C. Grall (L-DEO) and funded by the National Science Foundation (NSF).

The purpose of the survey was to collect low energy 2D seismic reflection data to study geological processes at the Cape Fear submarine slide complex, where submarine landslides are a common seafloor feature and have been associated with tsunamis in the past.

This report was prepared to meet the reporting requirements for the survey required under the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA). On 12 October 2022, NSF applied to the US National Marine Fisheries Service (NMFS) for an Incidental Harassment Authorization (IHA) that would allow for the potential harassment of small numbers of protected marine mammals incidental during the seismic survey. On 05 May 2023, NMFS issued the signed Biological Opinion (BiOp) and IHA for the survey.

Mitigation measures were implemented to minimize potential impacts to marine mammals and protected species. These measures included, but were not limited to, the use of NMFS approved Protected Species Observers (PSOs) for visual and acoustic monitoring, the designation of buffer zones (BZ) and exclusion zones (EZ) (where the presence of a protected species would require a mitigation action), and the implementation of ramp-up procedures, mitigation actions (including delayed operations and shutdowns), and vessel strike avoidance (VSA) maneuvers. Continuous protected species observation coverage during the survey was provided by RPS, the PSO provider contracted for the survey. PSOs monitored and reported on the presence and behavior of protected species and directed the implementation of the mitigation measures, as described in the regulatory documents issued for the survey.

A team of five PSOs, one of which was designated as the Lead, were present on board *MGL* throughout the survey to conduct visual and acoustic monitoring. Throughout the survey, PSOs conducted visual monitoring for a total of 372 hours and 40 minutes and acoustic monitoring for a total of 518 hours and 50 minutes. Visual and acoustic monitoring were conducted simultaneously for a total of 327 hours and 15 minutes. The acoustic survey source was active for a total of 497 hours and 44 minutes.

There was a total of three visual detections of protected species during the survey. Visual detections included two detections of dolphins (one sighting of bottlenose dolphins and one sighting of unidentified dolphins, and one detection of an unidentified sea turtle.

There was a total of one acoustic detection of protected species during the survey. The acoustic detection was of unidentified dolphins.

Protected species detections resulted in the implementation of one mitigation action during the survey, consisting of one shutdown for an unidentified sea turtle for a total of 16 minutes. There were no VSA maneuvers implemented for, in which would have required the vessel to reduce speed and/or alter course.

NMFS issued an IHA, authorizing 5909 Level B takes for 26 species of marine mammals, including four species that are listed as endangered. There were 31 Level A takes authorized for one species group of marine mammals. For this report, the definition of Level A and Level B are the same as found in the MMPA and the NMFS issued BiOp regarding what constitutes a take. There were 1302 Level B takes issued for four ESA-listed sea turtle species and no specific number of takes issued for ESA-listed seabird species for this survey.

During the survey program, two unidentified dolphins and one unidentified sea turtle, were observed within the predicted 160 decibel radius (where there is a potential for a behavioral response and temporary threshold shift (TTS)) while the acoustic source was active, constituting potential Level B takes. There were no protected species observed within the predicted radius at which there is a potential for auditory injury (based upon each species hearing range and how that overlaps with the frequencies produced by the sound source), constituting potential Level A takes/exposures.

2 INTRODUCTION

The following report details protected species monitoring and mitigation as well as seismic survey operations undertaken as part of the high-energy 2D marine geophysical survey on board the R/V *Marcus G. Langseth* (*MGL*) in the Northwest Atlantic Ocean, off the coast of North Carolina from 09 May to 03 June 2023.

This document serves to meet the reporting requirements dictated in the IHA issued to NSF by NMFS on 05 May 2023. The IHA authorized takes of specific protected species incidental to the survey. NMFS has stated that seismic source received sound levels equal to or greater than 160 dB re 1 µPa root mean square (rms) (160 dB) could potentially disturb marine mammals, temporarily disrupting behavior, such that they could be considered non-lethal 'takes' (Level B harassment). In July 2016, NMFS released new technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing, which established new thresholds for permanent threshold shift (PTS) onset, Level A harassment (auditory injury), for marine mammal species. Predicted distances to Level A harassment vary based on species specific hearing groups – low frequency cetaceans, mid frequency cetaceans, high frequency (HF) cetaceans, phocid pinnipeds, otariid pinnipeds, sea otters, and sea turtles – and how each group's hearing range overlaps with the frequencies produced by the sound source.

NMFS requires that measures such as buffer zones (BZs), exclusion zones (EZs), delayed operations, ramp-ups, and shutdowns be implemented to mitigate for potentially adverse effects of the acoustic source sounds on protected species. The BZs and EZs were established from any element on the acoustic source array as areas, where the presence of a protected species would require the implementation of a mitigation action (see Section 6). For marine mammals, the occurrence of an individual detected approaching, entering, or within their designated EZ would require the implementation of a shutdown of the seismic source. NMFS specified a 500 meter EZ for most marine mammals as it encompasses all zones within which auditory injury (Level A harassment) could occur on the basis of instantaneous exposure, provides additional protection from the potential for more severe behavioral reactions for marine mammals at relatively close range to the acoustic source, provides a consistent area for PSOs to conduct effective observational effort, and is a distance within which detection probabilities are reasonably high for most species under typical conditions.

In accordance with the IHA, the PSO team conducted an onboard environmental management briefing with the vessel personnel prior to the start of source operations. The lead PSO covered the mitigation and monitoring protocols, communication procedures, roles and responsibilities of the monitoring team and any additional operational procedures for this survey.

The IHA is attached as Appendix A.

2.1 Project Overview and Location

The research activities involved a 2D high-energy seismic survey. The research activities took place within the Northwest Atlantic Ocean, off the coast of North Carolina, in water depths of approximately 300 to 5200 meters (Figure 1).

The purpose of the research was to collect 2D seismic reflection data to understand the Cape Fear sub-marine landslide and provide new constraints for examining the associated tsunami hazards. The survey will provide further understanding of how slope failures operated through time and the manner in which past sub-marine landslides might affect succeeding events. Also, a regional grid of seismic data with companion multi-beam echosounder and sub-bottom profiler data were needed to place the existing and new observations within a regional stratigraphic framework.

All operations for the survey were conducted solely by *MGL*. The vessel is 72 meters (236.2 feet) in length and has a beam of 17 meters (55.8 feet) and a maximum draft of 5.9 meters (19.4 feet). The vessel's cruising speed was approximately 10 knots, during transits and varied between three and five knots during the seismic survey.

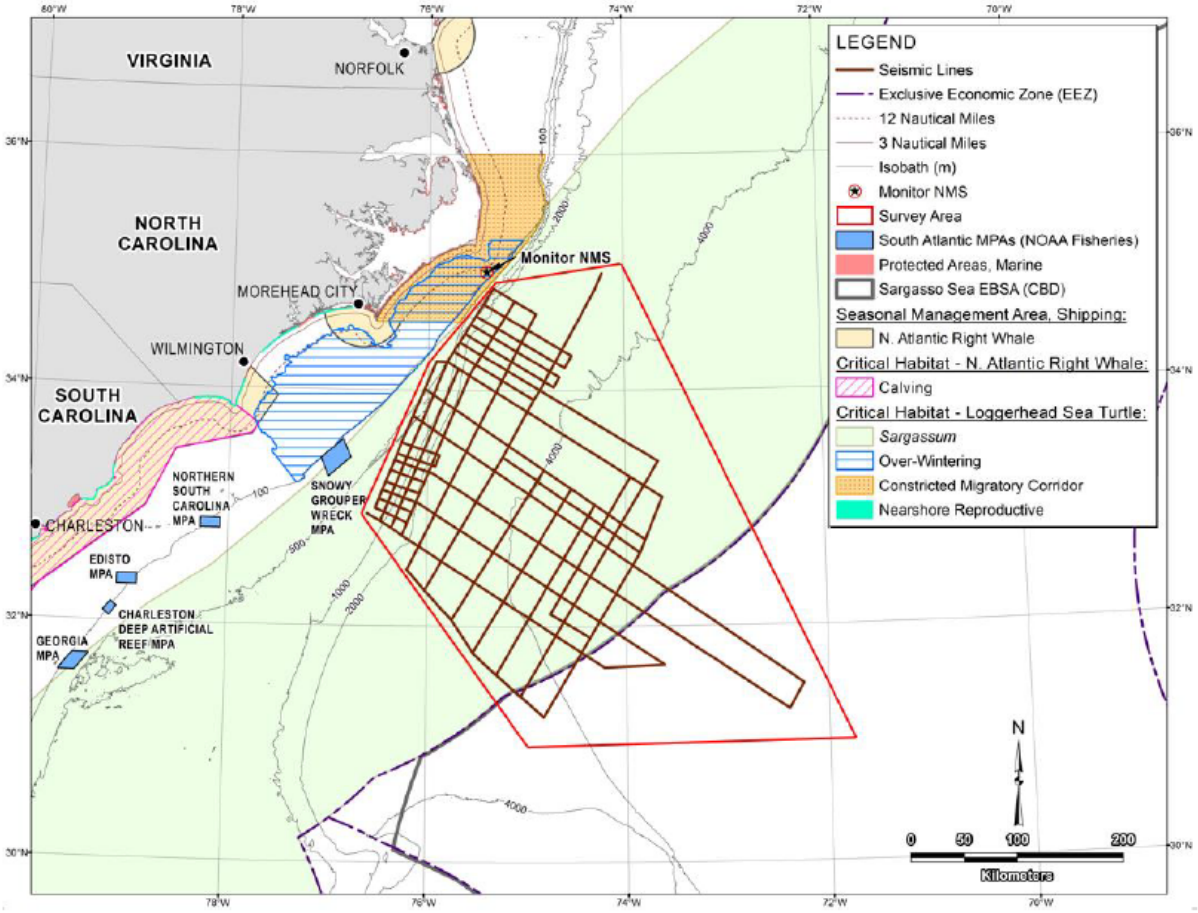

Figure 1: Location and survey points of the 2D seismic survey.

Seismic Operations were conducted between 11 May and 02 June 2023. There was a total of 59 survey line sequences acquired during the operational period.

2.1.1 Energy Source and Receiving Systems

The energy source utilized during the survey consisted of two towed acoustic source sub-arrays towed aft of the vessel, each with nine source elements, for a total of 18 source elements, a total volume of 3300 cubic inches. The source array utilized Bolt 1500LL and Bolt 1900LLX elements ranging in size from 40 to 360 cubic inches. The operating pressure was 2000 pounds per square inch and the dominant frequency components ranged from two to 188 Hertz (Hz). The shot point interval was 25 meters (10.6 seconds) dependent on vessel speed which ranged from 3 to 5.5 knots during acquisition. During acquisition, the source elements emitted a brief (approximately 0.1 second) pulse of sound. The source elements were towed at a depth of six meters. The center of the source was 304 meters from the Navigation Reference Point (NRP), which was located 29 meters from the stern of the vessel. This positioned the elements on the array 275 meters from the stern of the vessel.

The receiving system for the seismic survey consisted of one 6000-meter hydrophone streamer with 552 channels, which received the returning acoustic signals and transferred the data to the onboard processing system

Additional sound sources used in support of research efforts included a Kongsberg EM 122 multi-beam echosounder (MBES), Knudsen Chirp 3260 sub-bottom profiler (SBP), and a Teledyne RDI 75 kHz Ocean Surveyor acoustic doppler current profiler (ADCP). The hull mounted MBES operated at frequencies between 10.5 and 13 (usually 12) kilohertz. Each ping consisted of eight (in water depths

greater than 1000 meters) or four (in water depths less than 1000 meters) successive fan-shaped transmissions. The transmitting beam width was one or two degrees fore-aft and 150 degrees perpendicular to the ship's line of travel. The maximum source level was 242 dB re: 1 µPa (root mean square [rms]). The hull-mounted SBP beam was transmitted as a 27-degree cone, which was directed downward by a 3.5 kilohertz transducer. The nominal power output was 10 kilowatts; however, the actual maximum radiated power was three kilowatts or 222 dB re: 1 µPa m (rms). The ping duration was 64 seconds, and the interval was one second. The hull-mounted ADCP operated at a frequency of 75 kilohertz and a maximum source level of 224 dB re: 1 µPa m (rms) over a conically shaped 30-degree beam. The MBES and SBP operated simultaneously to provide information about near seafloor sedimentary features and to map the topography of the ocean floor. The ADCP was used to measure water current velocities.

3 MITIGATION AND MONITORING METHODS

The PSO monitoring program on the *MGL* was established to meet the standards set forth in the IHA and BiOp requirements. Survey mitigation measures were designed to minimize potential impacts of the MGL's seismic activities on marine mammals and other protected species of interest. The following monitoring protocols were implemented to meet these objectives.

- Visual observations were conducted to provide real-time sighting data, allowing for the implementation of mitigation procedures as necessary.
- A passive acoustic monitoring (PAM) system was operated 24 hours a day during seismic source operations to augment visual observations and provide additional marine mammal detection data.
- Effects of marine species exposed to sound levels constituting a defined take were observed and documented. The nature of the probable consequences was discussed when possible.

In addition to the mitigation objectives outlined in the project permit documents, PSOs collected and analyzed necessary data mandated by the IHA.

3.1 Mitigation Methodology

Mitigation actions were implemented for visual and acoustic detections of protected species, including marine mammals, as outlined in the IHA and BiOp. These actions included the establishment of buffer zones (BZs) and exclusion zones (EZs), and the implementation of delayed operations and shutdowns (where the seismic source was fully silenced) for protected species detected approaching, entering, or within their designated BZ and EZ (Table 1).

Before the acoustic source could be activated from silence, two visual PSOs and one PAM (Passive Acoustic Monitor) operator conducted a 30-minute clearance period of the BZs and EZs. In the event of a detection of protected species within their designated zones (Table 2) or as outlined in Table 1, a delay of source activation operations would be implemented. Source operations would not be cleared to begin until the protected species were observed exiting their designated zones. If the protected species were not observed exiting their designated zones (i.e., if they dove/submerged within the zone and were not re-sighted), operations would not be cleared to begin until a specific time following the final detection of the animals. For detections of small odontocetes and pinnipeds, this time was 15 minutes following last sighting. For detections of sea turtles or ESA listed sea birds, operations could resume without a ramp-up 15 minutes following the last sighting. For detections of mysticetes and other large odontocetes (including sperm whales or beaked whales), this time was 30 minutes following last sighting.

Table 1: Specific detections of protected species and their required mitigation actions.

Detection of:	Mitigation Action Required
A large whale (defined as a sperm whale or any mysticete species) with a calf (defined as an animal less than two-thirds the body size of an adult and observed in close association with an adult) observed at 1500 meters from the vessel.	Delayed operation of inactive source and shutdown of active source.
An aggregation of six or more large whales observed at 1500 meters from the vessel.	Delayed operation of inactive source and shutdown of active source.
Any North Atlantic right whale observed at any distance from the vessel.	Delayed operation of inactive source and shutdown of active source.
Any marine mammal species not authorized for take observed approaching, entering, or within the 160-decibel radius.	Delayed operation of inactive source and shutdown of active source.
Any marine mammal species for which the total authorized takes has been met observed approaching, entering, or within the 160-decibel radius.	Delayed operation of inactive source and shutdown of active source.
Any sea turtle species detected approaching, entering, or within their designated exclusion zones, and any ESA-listed sea bird species detected diving and/or foraging within their designated exclusion zones.	Delayed operation of inactive source and shutdown of active source.
Any dolphin species with a shut-down exemption detected approaching, entering, or within their designated exclusion zones.	None.

Table 2: Separation distances, buffer and exclusion zones sizes for each species / species group expected to occur in the survey area.

Species/Species Groups	Separation Distance (meters)	Buffer Zones (meters)	Exclusion Zones (meters)	Delay Duration (minutes)
Large whale/calf, 6+ large whales	100	1500	1500	30
Beaked whales, dwarf, and pygmy sperm whales	100	1500	1500	30
North Atlantic right whales	500	Any distance	Any distance	30
Mysticetes and large odontocetes	100	1000	500	30
All other small dolphins and porpoises	50	1000	500[1]	15
Pinnipeds	50	200	100	15
Sea turtles	100	175 dB radius	150	15
ESA listed sea birds	none	none	150	15

1 Except exempt species per the NMFS IHA

Once the acoustic source was active, the BZ from any element on the acoustic source arrays were established as areas in which the presence of a protected species would initiate an alert to the seismic operators that the animal was detected, and that the implementation of a mitigation action may soon be required. PSOs and PAM operators would keep in frequent contact with each other and the seismic team, relaying information on the location and movement of the protected species, and the implementation of any needed mitigation actions.

The EZs from any active source element were established as areas in which the detection of a protected species would require a shutdown of the seismic source, depending on the species present. For marine mammals, the detection of one approaching, entering, or within their designated zone would require a shutdown of the source. For sea turtles, the detection of one approaching within their designated zone would require a shutdown of the source. For protected sea birds, the detection of one foraging or diving within their designated zone would require a shutdown of the source.

Upon the implementation of a shutdown for a detection of protected species, a ramp-up was required to resume source activity once the protected species were confirmed to have exited their respective exclusion zones. If the protected species could not be confirmed to have exited their respective exclusion zones (i.e., if they submerged/dove within the zone and were not re-sighted), clearance for ramp-up would not be given until a specific time following the last sighting of the individuals within the zones. For detections of small odontocetes or pinnipeds, this time was 15 minutes following last sighting. For detections of mysticetes and other large odontocetes (including sperm whales or beaked whales) this time was 30 minutes following last sighting. For detections of sea turtles or ESA listed sea birds source activity could resume without a ramp-up 15 minutes following the last sighting.

The IHA also outlined additional mitigation actions for specific protected species while the acoustic source was active as outlined in Table 1.

Specific acoustic source operation procedures outlined in the IHA that were relevant to this specific survey included:

1. Ramp-ups could not be less than 20 minutes and were required to begin with the smallest volume element and continue in stages by doubling the number of active elements, with each stage approximately the same duration. The time between ramp-up completion and start of data acquisition had to be minimized.
2. Testing of individual elements or strings required a 30-minute clearance search period but no ramp-up. Testing of more than one element or string required both a 30-minute clearance search period and a ramp-up to the maximum volume being tested.
3. Brief periods (less than 30 minutes) of operational silence for reasons other than a protected species shut-down did not require a ramp-up to resume full volume source operations provided that: (1) PSOs maintained constant visual observation, and (2) no detections of protected species occurred within the applicable exclusion zone during that silent period. For any brief period of silence at night or in periods of poor visibility (e.g., BSS of four or greater), a ramp-up was required, but if constant observation was maintained, a pre-start clearance watch was not required. For any longer shutdown, both a pre-start clearance watch by a visual PSO and PAM operator and a ramp-up were required.

Table 3 describes the predicted 160 decibel radius (Level B harassment zone for marine mammals) and the predicted 175 decibel radius (Level B harassment zone for sea turtles) where the predicted distance for the source was used.

Table 3: Predicted 160 and 175 decibel zones* implemented during the survey.

Source	Volume (in^3)	Water Depth (m)	160 dB radius (m) – Level B harassment zone for marine mammals	175 dB radius (m) – Level B harassment zone for sea turtles
18 elements	3300	> 1000	2886	609
18 elements	3300	100-1000	4329	909
*Distances are from any single element on the array				

3.2 Visual Monitoring Survey Methodology

There were five experienced PSOs on board the *MGL* during the seismic survey to conduct monitoring for protected species, record and report detections, and request mitigation actions in accordance with the IHA and BiOp. The PSOs on board were NMFS approved and held certifications from a recognized Bureau of Ocean Energy Management (BOEM) PSO course. The PSOs that were onboard the *MGL* are listed in Appendix B. Visual monitoring was primarily carried out from an observation tower (Figure 2) located 18.9 meters above the surface of the water, which allowed a 360-degree viewpoint around the vessel and acoustic source.

Figure 2: Protected Species Observer stern view of observation tower with mounted big-eye binoculars.

The PSO tower was equipped with Fujinon 7x50 and Steiner Marine 7x50 binoculars, as well as two mounted 25x150 Big-eye binoculars for visual monitoring. A D-300-2MS Night Optics USA, Inc. monocular and two Butler Creek PVS-7-night vision devices were also available for visual monitoring during reduced/restricted lighting conditions if needed. Inside the tarpaulin tent the PSOs were provided a laptop, a telephone for communication with the PAM station, bridge, and main lab, and a monitor that displayed pertinent information about the vessel including position; speed; heading; water depth; sea temperature, wind speed and direction, and air temperature. The monitor also displayed source activity information including survey line number, total number of active elements and volume. Environmental conditions along with vessel and acoustic source activity were recorded at least once an hour, and every time there was a change in one or more of the above variables. Most visual monitoring was held from the tower; however, during severe weather or when the ships exhaust was blowing on the tower, monitoring would be conducted from the bridge (approximately 12.8 meters above sea level) or the catwalk (approximately 12.3 meters above sea level). Visual monitoring methods were implemented in accordance with the survey requirements outlined in the IHA. A minimum of two PSOs were required to be on duty and always conducting monitoring during daylight hours, from when the vessel departed port to when the vessel returned to port. Visual monitoring during the transits between ports and survey area were conducted for VSA and to gather baseline data on the presence and abundance of protected species in the areas during periods of acoustic source silence. Scheduled watches were a maximum of four hours followed by at least one hour of scheduled break time.

Visual observations were conducted around the entire area of the vessel and acoustic source, divided between the two PSOs on watch. The smaller monitoring area for each observer increased the probability of protected species being sighted. PSOs searched for blows, fins, splashes or disturbances of the sea surface, large flocks of feeding sea birds, and other sighting cues indicating the possible presence of a protected species. Upon the visual detection of a protected species, PSOs would identify the animals' range to the vessel and acoustic source. Range estimations were made using reticle binoculars, the naked eye, and by relating the animal(s) to an object at a known distance, such as the acoustic source arrays and streamer head float. PSOs would also identify to species, if possible, upon initial detection to ensure that the proper mitigation measures were implemented, should any be required.

As required by the IHA (section 5(d)(iii)), PSOs recorded the following information for each protected species detection:

I. Date, time of first and last sighting, observers on duty during the detection, location of the observers, vessel information (e.g., position, speed, heading), water depth, and acoustic source activity (e.g., volume and number of active elements).

II. Species, detection cue, group size (including number of adults, juveniles, and calves), visual description (e.g., overall size, shape of the head, position and shape of the dorsal fin, shape of the flukes, height, and direction of the blow), observed behaviors (e.g., porpoising, logging,

diving, etc.), and the initial and final pace, heading, bearing, and direction of travel in relation to both the vessel and the source (e.g., towards, away, parallel, perpendicular, etc.).

III. Initial, closest, and final distance to the vessel and the source, time when entering and exiting the exclusion zones, type of mitigation action implemented, total time of the mitigation action, description of other vessels in the area, and any avoidance maneuvers conducted.

During or immediately after each sighting event, the PSOs recorded the detection details per the requirements of the IHA in a detection datasheet. Each sighting event was linked to an entry on an effort datasheet where specific environmental conditions (e.g., Beaufort Sea state, wind force, swell height, visibility, and glare) and vessel activity were logged.

Species identifications were made whenever the distance from the observer, length of the sighting, and visual observation conditions allowed. Whenever possible during detections, photographs were taken with Canon EOS 80D cameras that had 300-millimeter lenses. Marine mammal identification manuals (*Whales, Dolphins, and Other Marine Mammal of the World; Guide to Marine Mammals of the world; Readers Digest Whales, Dolphins, and Porpoises; Seabirds of the world; Sibley Guide to Birds*) were consulted, and photos were examined to confirm identifications were consulted, and photos were examined to confirm identifications.

3.3 Passive Acoustic Monitoring Methodology

Passive Acoustic Monitoring (PAM) was used to augment visual monitoring efforts in the detection, identification, and locating of marine mammals. PAM is important during periods of time when visual monitoring was not effective (periods of darkness or low visibility). Acoustic monitoring was conducted continuously during all seismic operations and to the maximum extent possible during periods of acoustic source silence. When the acoustic source was activated from any period of silence, acoustic monitoring was conducted for at least 30 minutes prior to the activation of the source for the pre-clearance survey. PAM shifts were a maximum of four hours in duration followed by at least one hour of scheduled break time.

In accordance with the NMFS issued IHA and ITS, in the event of an issue with PAM equipment, acoustic source activity could continue for 30 minutes without acoustic monitoring while the PAM operator diagnosed the issue. If the diagnosis indicated that the PAM system needed maintenance, operations could continue for an additional five hours without acoustic monitoring, during daylight hours only, provided that: (1) the sea state was less than or equal to a BSS 4; (2) with the exception of delphinids, no marine mammals were acoustically detected in the applicable exclusion zones in the previous two hours; (3) active acoustic source operations without acoustic monitoring did not exceed a cumulative total of five hours within any 24 hour period; and (4) NMFS was notified via email as soon as practicable of the time and location in which operations occurred without an active PAM system.

The PAM system was located in the main science lab which allowed ample space, quick communication with the PSOs and seismic technicians, and access to the vessel's instrumentation screens. Information about the vessel (e.g., position, heading, and speed), water depth, source activity (e.g., line number, total source volume, number of active elements), and the PAM system (e.g., cable deployments/retrievals, changes to the system, background noise score, hydrophone depth) were recorded at least once an hour, and whenever any of the parameters changed.

Acoustic monitoring for marine mammals was conducted aurally, utilizing Sennheiser headphones, and visually with the PAMGuard software program. Low frequency (LF) to mid-frequency delphinid whistles, clicks, and burst pulses, as well as sperm whale clicks and baleen whale vocalizations, could be visualized in PAMGuard's spectrogram modules. Sperm whale, beaked whale, Kogia species, and delphinid clicks could also be visualized in LF and HF click detector modules. Settings adjustments to amplitude range, amplitude triggers, and spectral content filters, among others, could be made in PAMGuard's spectrogram and click detector modules to maximize the distinction between cetacean vocalizations and ambient signal. The map module within PAMGuard could be utilized to attempt localizing the position and range of vocalizing marine mammals. Sound recordings could be made using the HF and LF sound recording modules when potential marine mammal vocalizations were detected, or when the operator noted unknown or unusual sound sources.

As required by the IHA (section 5(d)(iv)), PAM operators recorded the following information during acoustic detections of protected species:

I. An acoustic encounter identification number, and whether the detection was linked with a visual sighting;
II. Date and time when first and last heard;
III. Types and nature of sounds heard (e.g., clicks, whistles, creaks, burst pulses, continuous, sporadic, strength of signal);
IV. Any additional information recorded such as water depth of the hydrophone array, bearing of the animal to the vessel (if determinable), species or taxonomic group (if determinable), spectrogram screenshot, and any other notable information.

3.3.1 Passive Acoustic Monitoring Parameters

A PAM system designed to detect most species of marine mammals was installed on board the *MGL*. The system was developed by Seiche Measurements Limited and consisted of the following main components: a 255 meter hydrophone cable (configured as a separate 230 meter steel-reinforced tow cable and detachable 25 meter hydrophone array); a 100 meter deck cable; a rack-mounted electronic processing unit (EPU) that incorporated a buffer unit, RME Fireface 800 unit and computer; two desktop monitors; a keyboard and mouse; acoustic analysis software package; and headphones for aural monitoring. A complete spare system of all components was also present on board in the event that any of the main system components became damaged or inoperable. The diagram in Figure 3 is a simplified depiction of the PAM system installed on the *MGL*, and further PAM system specifications can be found in Appendix D.

The hydrophone cable contained six hydrophone elements and a depth gauge molded into a 25-meter section of the cable. The six-element linear hydrophone array allowed the system to sample a large range of marine mammal vocalization frequencies. The hydrophone pair closest to the end by the depth gauge were used for low frequencies between 10 hertz and 24 hertz, the middle hydrophone pair was used for mid frequencies between 200 hertz and 200 kilohertz, and the forward hydrophone pair closest to the connector to the tow cable was used for high frequencies between two kilohertz and 200 kilohertz.

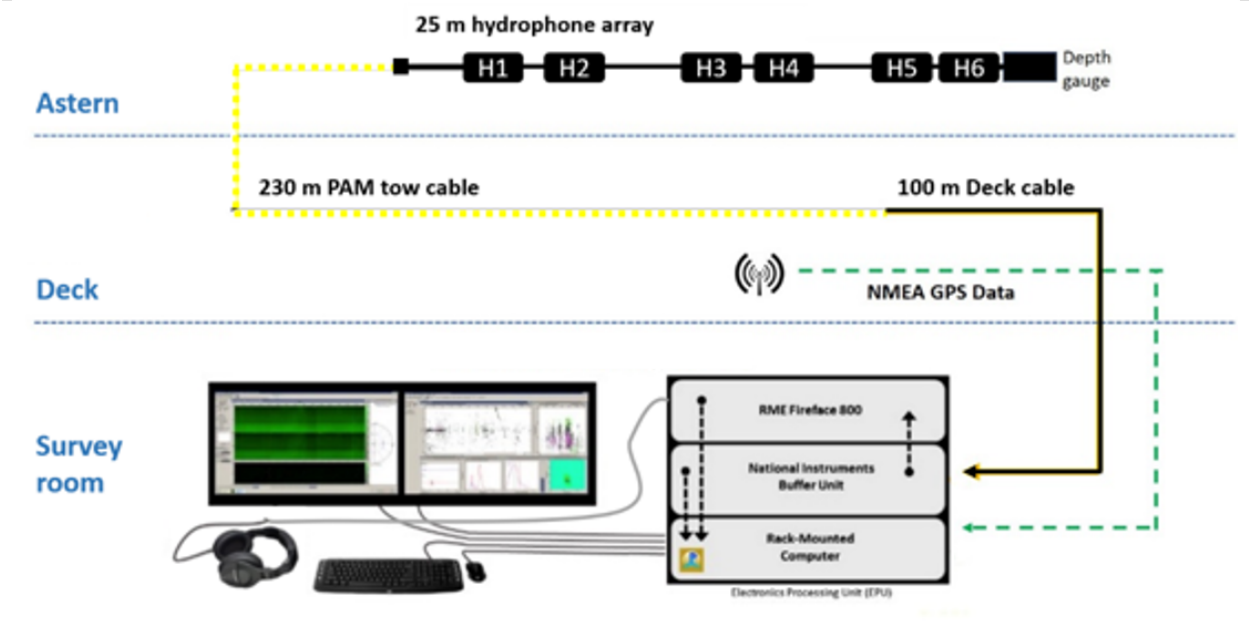

Figure 3: Simplified pathway of data through the PAM system onboard the *MGL*

The deck cable interfaced between the hydrophone cable deployed astern of the vessel and the electronics processing unit (EPU) located in the main science lab. The rack-mounted EPU was set up with the two pre-installed, wall-mounted monitors supplied by the *Langseth*, a keyboard, a mouse, and headphones. The EPU contained a buffer unit with Universal Serial Base (USB) output, an RME Fireface

800 ADC unit with firewire output, and a rack-mounted computer. A Global Positioning System (GPS) feed of GNGGA strings was supplied from the ship's Seapath navigation system and routed to the computer, reading data every five seconds. Data from the hydrophone cable's depth transducer was routed through the buffer unit to the computer, via USB connection. PAMGuard *Beta* version 1.15.11 was the software version utilized for the survey until 22 May 2022, at which time version 1.15.17 was installed and utilized for the remainder of the survey.

Raw feed from the two high frequency hydrophone elements was digitized in the buffer unit using an analogue-digital National Instruments data acquisition (DAQ) soundcard at a sampling rate of 500 kilohertz. The output was filtered for HF content and visualized using the PAMGuard software, which used the difference between the time that a signal arrived at each of the two hydrophones to calculate and display the bearing to the source of the signal. A scrolling bearing/time module displayed the filtered data in real time, allowing for the detection and directional mapping of click trains. Additional components of the HF click detector system in PAMGuard included: an amplitude/time display that registered click intensity data in real time, as well as click waveform, click spectrum, and Wigner plot displays, providing the PAM operator immediate review of individual click characteristics in the identification process.

Raw feed from the two low frequency and two mid frequency hydrophone elements was routed from the buffer unit to the RME Fireface 800 unit, where it was digitized at a sampling rate of 48 kilohertz. The relatively low frequency (LF) output was further processed within PAMGuard by applying Engine Noise Fast Fourier Transform (FFT) filters, including click suppression and spectral noise removal filters (e.g., median filter, average subtraction, Gaussian kernel smoothing and thresholding). Filtered LF content was visualized in two spectrograms, one displaying a channel feed at frequency ranges of zero to 24 kilohertz, and another displaying a channel feed at a frequency range of zero to three kilohertz. LF click detector modules allowed for review of individual click characteristics as well as the detection and tracking of click trains.

A map module on the LF system interfaced with GPS data provided by the vessel to display the vessel location and could be used to determine range and bearing estimates based on clicks tracked in the click detector module. PAMGuard contained a function for calculating the range to vocalizing marine mammals based upon the least squares fit test. This method is most effective with animals that are relatively stationary in comparison to the moving vessel, such as sperm whales. The mathematical function estimated the range to vocalizing marine mammals by calculating the most likely crossing of a series of bearing lines generated from tracked clicks or whistles and plotted on a map display. The bearings of detected whistles and moans were calculated using a Time-of-Arrival-Distance (TOAD) method (where the signal time delay between the arrival of a signal on each hydrophone was compared), and presented on a radar display, along with amplitude information for the detected signal as a proxy for range.

Additional modules displayed on the LF monitor included a LF sound recorder and clip generator. The clip generator module within PAMGuard could be used to generate short sound clips in response to either an automatic detection or the operator manually selecting a portion of the spectrogram display. This module was useful in the event that the whistle-and-moan detector falsely triggered and identified a non-biological sound (i.e., echosounder) or if it missed detecting tonal signatures that the operator determined to be vocalizations.

3.3.2 Hydrophone Deployment

The hydrophone cable was deployed from a hydraulic winch on the port stern of the vessel's aft deck where the acoustic source arrays were deployed. Two deck cables, a main and a spare, were installed along the deck-head running from the winch to the main science lab. A Chinese finger attached to the tow cable approximately 125 meters ahead of the connector to the hydrophone array was secured to the port side boom via lifting rope. This reduced the tension on the cable remaining on the winch and served as a method to pull the cable further to port and away from the source arrays. This deployment method placed the trailing end of the hydrophone cable approximately 125 meters from the port stern of the vessel (Figure 4). One piece of chain of seven kilograms was attached and secured to the tow cable to increase tow depth and to decrease the chance of entanglement with the source arrays' umbilicals. The tow depth of the hydrophones varied between 12.7 and 23 meters and averaged 15.3 meters throughout the seismic survey.

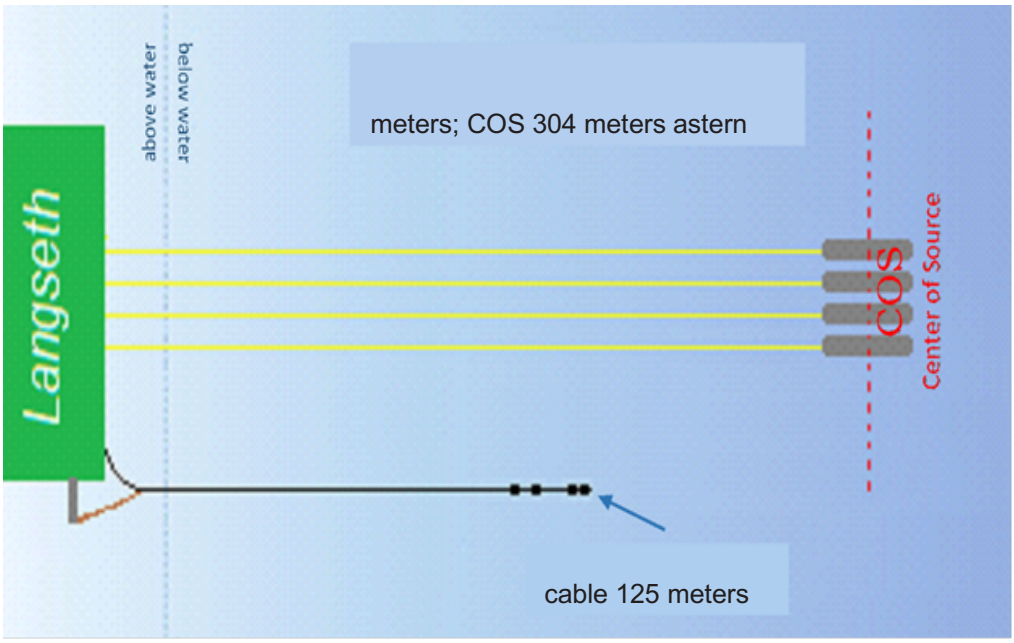

Figure 4. Location of the PAM cable in relation to the seismic gear during the survey.

4 MONITORING EFFORT SUMMARY

4.1 Survey Operations Summary

4.1.1 General Survey Parameters

The Cape Fear seismic survey began on 09 May 2023, when the *MGL* departed port in Norfolk, Virginia. Seismic data acquisition operations were conducted between 11 May and 02 June. The survey concluded on 03 June 2023, when the vessel arrived back at port in Morehead, North Carolina (Table 4).

Table 4: Survey parameters.

Survey Parameter	Date	Time (UTC)	Location
Mobilization	09 May 2023	17:15	Norfolk, Virginia
First seismic source activity	11 May 2023	09:03	Survey area
Start of acquisition	11 May 2023	09:59	Survey area
End of acquisition	02 June 2023	14:00	Survey area
Transit to Morehead	02 June 2023	23:37	Survey area
Arrive in Morehead	03 June 2023	13:00	Morehead, North Carolina

During the seismic survey, data was acquired continuously according to the survey plan, with source operations only suspended when there were mechanical or technical issues.

Table 5: Suspension of source operations during the survey.

Date	Time Source Silenced	Date	Time Source Re-activated	Reason for Interruption to Acquisition
19 May 2023	19:59	20 May 2023	12:26	Stop acquisition for mechanical issues
26 May 2023	16:10	27 May 2023	02:16	Stop acquisition for mechanical issues

4.1.2 MBES, SBP, and ADCP Operations

The multi-beam echosounder (MBES), sub-bottom profiler (SBP), and the Acoustic Doppler current profiler (ADCP) systems were active throughout the survey for a total of 1753 hours 28 minutes. The SBP was active for the first time on 09 May 2023 at 20:18 UTC. The ADCP was active for the first time on 09 May at 21:30 UTC. The MBES was active for the first time on 09 May at 21:30 UTC. All the sound sources were active during transit and throughout the survey. The ADCP, SBP, and MBES were all disabled on 03 June at 07:18 UTC. All three sound sources were disabled and re-enabled multiple times throughout the survey, mainly for technical issues.

4.1.3 Acoustic Source Operations

The acoustic source was active for a total of 497 hours and 44 minutes throughout the survey. This total included: two hours and 58 minutes of ramp-up, 425 hours and 44 minutes of operations on a survey line at full volume, 55 hours and 33 minutes at reduced volume on a survey line, 11 hours and 17 minutes of operations not on a survey line at full volume, two hours and six minutes at reduced volume not on a survey line and six minutes of source testing.

Table 6 summarizes the acoustic source operations over the course of the seismic survey.

The acoustic source was ramped up eight times during the survey to commence data acquisition. seven ramp-ups were cleared by visual and acoustic monitoring while one was cleared solely by acoustic monitoring for a brief technical silence at night (less than 30 minutes). Four ramp-ups occurred at night and four ramp-ups occurred during the day. The duration of all ramp-ups was between 21 and 23 minutes.

There was one occasion of source testing. It consisted of a multi-source test at the end of a survey line.

Table 6: Total acoustic source operations during the survey.

Source Tests	1	00:06
Ramp-up	8	02:58
Day-time ramp-ups	4	01:29
Night-time ramp-ups	4	01:29
Full (3300 in^3)/Reduced Volume on a Survey Line		425:44/55:33
Full (3300 in^3)/Reduced Volume not on a Survey Line		11:17/02:06

The geospatial data for source operations are provided as a shapefile attachment to this report.

The monitoring effort, source operations and protected species detections for this survey are provided as an excel dataset in Appendix C and the basic data summary form found in Appendix D.

4.1.4 Interactions with Other Vessels

In addition to visually monitoring for protected species, PSOs also observed and documented interactions with other marine vessel traffic. Such interactions included but were not limited to another vessel or another vessels' towed gear/equipment interacting with the *MGL's* towed gear/equipment, and the *MGL* having to deviate from planned survey operations (i.e., diverge from the survey line, increase/decrease speed) because of another vessel.

There were no instances where the *MGL* had such an interaction with another vessel during the survey.

4.2 Visual Monitoring Survey Summary

Visual monitoring was conducted by two PSOs during all daylight hours, beginning 30 minutes before sunrise and ending 30 minutes after sunset each day, initiating when the vessel left dock at the beginning of the program and terminating upon the vessels return to dock at the end of the program (Table 7). During transit, observations were undertaken by two PSOs for VSA and visual monitoring during times with no source operations was conducted to collect baseline data about protected species abundance in the survey areas.

Table 7: Initiation and termination of visual monitoring during the survey.

Initiation for the survey	09 May 2023	17:15
Termination for the survey	03 June 2023	13:00

Visual monitoring on the *MGL* was conducted over a period of 26 days for a total of 372 hours and 40 minutes. Of the overall total visual monitoring effort, 84% (313 hours and 25 minutes) was undertaken while the acoustic source was active, and 16% (59 hours and 15 minutes) was undertaken while the acoustic source was silent. Visual monitoring while the acoustic source was silent was mainly conducted during the transits. Table 8 details visual monitoring with acoustic source operations on the *MGL* throughout the seismic survey.

Table 8: Total visual monitoring effort during the survey.

Visual Monitoring Effort	Duration (hh:mm)	% of Overall Effort
Total monitoring while acoustic source active	313:25	84
Total monitoring while acoustic source silent	59:15	16
Total monitoring effort	372:40	-

4.3 Acoustic Monitoring Survey Summary

Acoustic monitoring was conducted continuously throughout acoustic source operations and to the maximum extent possible while the acoustic source was silent (Table 9). Periods without source activity or acoustic monitoring occurred when the PAM hydrophone cable was secured on board the vessel during transits, during deployment and recovery of the seismic gear, and during times when operations were suspended due to rough weather and sea conditions or gear maintenance.

Table 9: Initiation and termination of acoustic monitoring watches during survey.

Acoustic Monitoring	Date	Time (UTC)
Initiation for the survey	11 May 2023	04:50
Termination for the survey	02 June 2023	15:25

Acoustic monitoring was conducted on 23 days for a total of 518 hours and 50 minutes. Of the overall total acoustic monitoring effort, 96% (497 hours and 44 minutes) was undertaken while the acoustic source was active, and 4% (21 hours and six minutes) was undertaken while the acoustic source was silent. Acoustic monitoring while the acoustic source was silent was mainly conducted during the brief periods of time between recovery/deployment of the seismic gear and recovery/deployment of the PAM cable. Table 10 details acoustic monitoring with acoustic source operations.

Table 10: Total Passive Acoustic Monitoring (PAM) effort during the survey.

Acoustic Monitoring Effort	Duration (hh:mm)	% of Overall Effort
Total monitoring while the acoustic source was active	497:44	96
Total monitoring while the acoustic source was silent	21:06	04
Total acoustic monitoring	**518:50**	

4.4 Simultaneous Visual and Acoustic Monitoring Summary

Simultaneous visual and acoustic monitoring was conducted to the maximum extent possible for a total of 327 hours and 15 minutes. Of the overall simultaneous monitoring effort, 96% (313 hours and 25 minutes) was conducted while the acoustic source was active (Table 11). Additional visual monitoring conducted during transit periods was not accompanied by acoustic monitoring as the increased vessel speed would causes the hydrophone cable to migrate to the water surface, out of the ideal tow position, where increased background noise would impair acoustic detection capabilities.

Table 11: Simultaneous visual and acoustic monitoring effort during the survey.

Simultaneous Visual and Acoustic Monitoring	Duration (hh:mm)	% of Overall Downtime
Source Active	313:25	96
Source Silent	13:50	04
Overall Total	**327:15**	

4.5 Environmental Conditions

Environmental conditions can have an impact on the probability of detecting protected species. The environmental conditions present during visual observations undertaken during the survey program were generally considered to be 'excellent.'

Visibility was classified as 'excellent' if it extended greater than 10 kilometers and 'very good' if it was between seven and 10 kilometers. 73% and 12% of monitoring effort on the *MGL* was undertaken at 'excellent' and 'very good' visibility levels, respectively (Table 12). The entire predicted harassment zone radii, BZs, and EZs were not visible on multiple occasions, mainly due to precipitation and reduced lighting before sunrise and after sunset and during night-time visual monitoring. During these times, it is possible that protected species were not detected within these zones.

Table 12: Visibility during the survey (in kilometers).

Total	<0.05	0.05-0.1	0.1-0.3	0.3-0.5	0.5-1	1-2	2-5	5-7	7-10	>10
Duration (hh:mm)	00:00	00:53	02:13	04:50	04:24	11:19	06:29	25:09	44:58	272:25

Reduced visibility was mainly attributed to periods of heavy rain, the brief periods of reduced lighting before sunrise and after sunset, and any time visual monitoring was required for a nighttime ramp-up. Precipitation was recorded during visual monitoring on the *MGL* for a total of 53 hours 31 minutes. Most of the precipitation recorded was light rain (50%) or haze (28%) (Table 13).

Table 13: Precipitation during the survey.

Total	None	Heavy Rain	Moderate Rain	Light Rain	Heavy Fog	Moderate Fog	Thin Fog	Haze	Sleet	Snow
Duration (hh:mm)	319:09	03:56	03:54	26:37	00:00	01:08	03:05	14:51	00:00	00:00

The Beaufort Sea State recorded during visual monitoring ranged from level one to level seven. Most visual observations on the *MGL* were undertaken in conditions where the BSS was level three (37%) or level four (25%), which were considered 'good' conditions for the detection of protected species (Table 14).

Table 14: Beaufort Sea State during the survey.

Total	B0	B1	B2	B3	B4	B5	B6	B7	B8	B9
Duration (hh:mm)	00:00	01:45	62:46	139:08	93:17	42:46	20:58	12:00	00:00	00:00

Wind speeds recorded visual monitoring ranged between one and 34 knots. Most of the visual monitoring on the *MGL* occurred during recorded wind speeds less than 10 knots (25%) and from 10 to 15 knots (27%) (Table 15).

Table 15: Wind speed during the survey.

Total	<10	10-15	16-20	21-25	26-30	>31
Duration (hh:mm)	94:09	102:24	89:31	52:24	26:42	7:30

Swell heights during visual observations were generally low, with swells of less than two meters recorded for the majority of visual observations (84%) (Table 16).

Table 16: Swell height during the survey.

Total	<2m	2-4m	>4m
Duration (hh:mm)	313:15	59:25	0:00

Visual monitoring was conducted primarily when no glare (32%) was present (Table 17). During times of moderate to severe glare, it is possible that the detection of protected species was hindered.

Table 17: Glare during the survey.

Total	None	Mild	Moderate	Severe
Duration (hh:mm)	120:14	72:03	83:19	97:04

5 MONITORING AND DETECTION RESULTS

5.1 Visual Detections

Visual monitoring efforts during the survey program resulted in a total of three visual detections events of protected species totaling six individuals (summarized in Appendix E). This total included two detections of dolphins and one detection of a sea turtle.

Table 18 lists the total number of detections and total number of animals recorded for each protected species observed during the survey. Photographs taken of visual detections can be found in Appendix F.

Maps of the detections of the protected species are shown in Figure 5.

Table 18: Number of visual detection records collected for each protected species during the survey.

Species	Total Number of Detection Records	Total Number of Animals
Dolphins		
Bottlenose dolphins	1	3
Unidentified dolphin	1	2
Sea turtles		
Unidentified sea turtle	1	1
Total	**3**	**6**

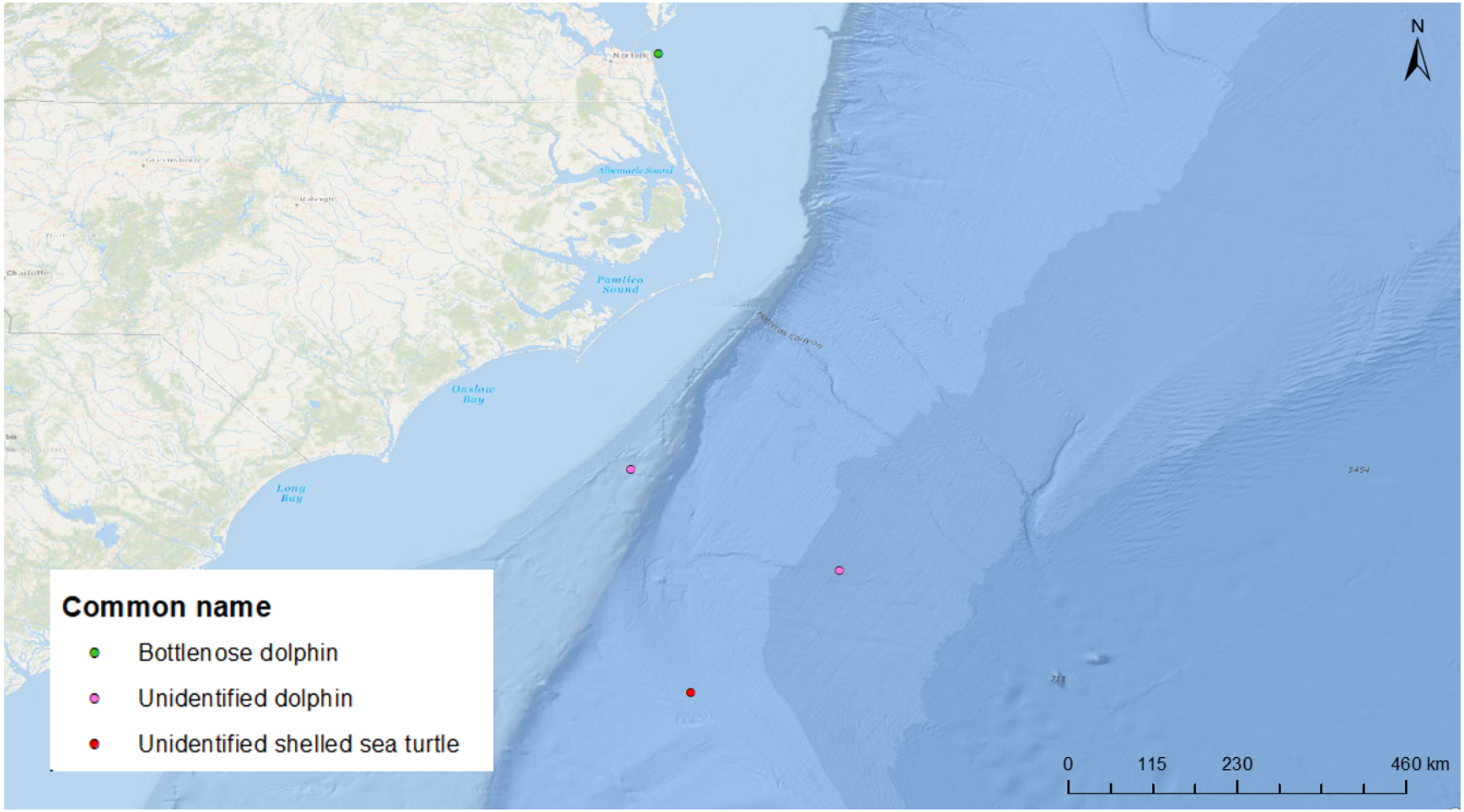

Figure 5: All protected species detections observed by common name during the survey.

Of the three visual detections, two detections occurred while the acoustic source was deployed and active and one detection occurred while the vessel was in transit to the survey area. The acoustic source was not deployed during this detection, therefore there is no mean closest observed approach to the source. Table 19 lists the number of each species detected during each different source activity described above as well as the species average closest approach to the source during those times. The closest distance to the source was not recorded while the source was not deployed for the remaining one detection of the three. Detections occurred in water depths ranging between 542 and 2797 meters.

Table 19: Average closest approach of protected species to the acoustic source during the survey.

Species Detected	Regulated Source Active		Regulated Source Inactive	
	Number of detections	Mean closest observed approach to source (meters)	Number of detections	Mean closest observed approach to source (meters)
Bottlenose Dolphin	-	-	1	-
Unidentified dolphin	1	106	-	-
Unidentified sea turtle	1	160	-	-

In general, dolphins detected during the survey program were mainly observed porpoising and swimming below the surface while traveling at sedate or moderate paces away from or in the opposite direction as the vessel. The sea turtle detected during the survey program was mainly observed swimming below the surface and diving while traveling at a sedate pace in the opposite direction as the vessel.

5.1.1 Other Wildlife

Observations of other wildlife included 16 species of birds, two species of fish and one species of invertebrates. A complete list of birds and other marine wildlife observed and identified, in addition to the approximate number of individuals observed and the number of days on which they were observed, can be found in Appendix G. No adverse impacts to any other wildlife species as a result of research activities were observed.

5.2 Acoustic Detections

There was one acoustic detection of protected species during the survey program, which consisted of unidentifiable dolphins. The detection included one individual and occurred in water depths between 4412 meters. This detection occurred during hours of darkness with no ongoing visual monitoring. This detection occurred while the seismic source was active at full volume. The single acoustic detection consisted of high frequency click trains. This detection was unable to be tracked due to a short duration.

6 MITIGATION ACTION SUMMARY

There was one mitigation action implemented, a shutdown of the active source due to an unidentified sea turtle observed swimming below the surface and approaching its EZ at 160 meters. At the time of the detection, the source was at full volume on a survey line. The individual was initially observed swimming below the surface at a sedate pace, parallel and in the opposite direction as the vessel, 50 meters from the starboard beam and 335 meters from the active acoustic source. As the individual was observed entering the 150-meter exclusion zone, a shutdown of the active source was requested and immediately implemented. The closest distance to the active source was 160 meters, whilst the closest distance to the silent source was 150 meters. The sea turtle was not observed leaving the EZ, thus clearance was given to resume source activity 16 minutes after the mitigation shutdown. In this instance, source activities were able to resume full volume after the given clearance period without a ramp-up, per the BiOp.

6.1 Vessel Strike Avoidance (VSA) Maneuvers

There were no VSA measures implemented for protected species during the survey.

6.2 Protected Species Known to Have Been Exposed to 160 Decibels or Greater of Received Sound Levels

Numerous protected species are known to occur within the survey area, including 10 species listed as endangered or threatened under the ESA. These species included four marine mammals; blue whale, fin whale, sei whale and sperm whale, four marine reptiles; green sea turtle, Kemp's Ridley sea turtle, leatherback sea turtle and loggerhead sea turtle. NSF came to a "no effect" determination for seabirds due to their unlikely presence; however, PSOs monitored for two ESA-listed sea birds, Bermuda petrel and roseate tern, in the unlikely event they were encountered in the survey area.

NMFS granted an IHA, which included an ITS, for the marine seismic survey authorizing a total of 7211 individuals from 26 species or species groups, including nine species of whales and 17 delphinid species. four species of sea turtles. Four species of whales are listed as endangered or threatened. One species group, consisting of Kogia species, was authorized for Level A harassment takes (exposure to sound pressure levels where there is a potential for auditory injury based upon each species hearing range). All individuals were authorized for Level B harassment takes (exposure to sound pressure levels equal to or greater than 160 dB re: 1 µPa rms) where there is a potential for behavioral changes), including 419 takes for endangered/threatened species.

During acoustic source operations, two marine mammals, correlating to two unidentified dolphins, were observed within the predicted 160 decibel radius (where there is a potential for a behavioral response) while the acoustic source was active, constituting potential Level B takes. In addition, one unidentified sea turtle was observed within the predicted 160 decibel radius. There were no protected species observed within the predicted radius at which there is a potential for auditory injury (based upon each species hearing range and how that overlaps with the frequencies produced by the sound source), constituting potential Level A takes/exposures.

The number of potential takes may be an underestimation and, therefore, may be a minimum estimate of the actual number of protected species potentially exposed to received sound levels within the predicted Level A and Level B harassment zones. It is possible that the estimated numbers of animals recorded were underestimates due to some individuals not being visually sighted or having moved away before they were observed (Table 20).

Table 20: Number of authorized and potential Level A and B harassment takes / exposures during the survey.

Species	IHA Authorized Level B Takes/ Exposures	Total Potential Takes/ Exposures During Seismic operations
Humpback whale	2	-
Fin whale	4	-
Sei whale	8	-
Minke whale	10	-
Blue whale	1	-
Sperm whale	406	-
Kogia spp.	678	-
Cuvier's beaked whale	396	-
Mesoplodont beaked whales whale	420	-
Pilot whale	385	-
Rough-toothed dolphin	82	-
Bottlenose dolphin	1477	-
Atlantic white-sided dolphin	14	-
Pantropical spotted dolphin	114	-
Atlantic spotted dolphin	1237	-
Spinner dolphin	41	-
Clymene dolphin	79	-
Striped dolphin	45	-
Fraser's dolphin	163	-
Risso's dolphin	189	-
Common dolphin	56	-
Melon-headed whale	83	-
Pygmy killer whale	6	-
False killer whale	6	-
Killer whale	4	-
Harbor porpoise	3	-
Green sea turtle	251	-
Kemp's Ridley sea turtle	2	-
Leatherback sea turtle	2	-
Loggerhead sea turtle	1047	-
Unidentified dolphin	-	2
Unidentified sea turtle	-	1

Table 21 describes the behavior of all animals, including unidentified species, which were visually observed within the predicted Level B harassment zones. There were no highly distinctive behavioral reactions observed in relation to the vessel or acoustic source during the seismic survey.

Table 21: Behavior of species visually observed to be exposed to sound pressure levels of 160 dB or greater during the survey.

Species	Detection No.	No. Of Animals	CPA Active Source (meters)	Source Volume (in^3) at CPA	Initial Behavior	Initial Direction in Relation to Vessel	Subsequent and Final Behaviors	Final Direction in Relation to Vessel
Unidentifiable shelled sea turtle	VD02	1	150	3300	Swimming below surface	Parallel in opposite direction as vessel	Diving	Parallel in opposite direction as vessel

Species	Detection No.	No. Of Animals	CPA Active Source (meters)	Source Volume (in^3) at CPA	Initial Behavior	Initial Direction in Relation to Vessel	Subsequent and Final Behaviors	Final Direction in Relation to Vessel
Unidentified dolphin	VD03	2	106	2914	Porpoising	parallel in opposite direction as vessel	Swimming below surface	away from vessel

6.3 Implementation and Effectiveness of the Biological Opinion and IHA

To minimize the potential impacts to marine mammals during the seismic survey, LDEO and PSOs were prepared to implement mitigation measures whenever these protected species were detected approaching, entering, or within their designated exclusion zones as outlined in the IHA and BiOp. There was one mitigation action implemented for protected species consisting of a shut-down of the sound source for an unidentified sea turtle. The confirmation of the implementation of each term and condition of the project permit documents are described in this report.

If an injured or dead protected species was discovered, the incident was to be reported to the NMFS Office of Protected Resources (OPR), NMFS, and the NMFS Southeast Regional Stranding Coordinator as soon as possible. The report would include a detailed description of the incident (time, date, location, species identification, description of the animal, condition of the animal/carcass, observed behaviors if the animal was alive, and general circumstances under which the animal was discovered), including pictures when possible. There were no sightings of dead or injured protected species during the seismic survey.

To prevent the occurrence of the vessel striking a marine mammal during transits, PSOs and vessel crew members maintained a vigilant watch for marine mammals, and the vessel was prepared to slow down, stop, or alter course as appropriate to avoid striking a protected species. The vessel speed had to be reduced to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans were observed near the vessel. The vessel had to maintain the minimum separation distances as described in Table 2. If a marine mammal was sighted during transits, the vessel was to act as necessary to avoid violating the relevant separation distances (e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal left the area). If marine mammals were sighted within the relevant separation distances, the vessel was required to reduce speed, shift the engines to neutral, and not engage the engines until the animals were clear of the area. If a whale entered the separation zone while the vessel was stationary, the vessel would not engage the engines until the whale has exited the zone. These requirements did not apply in any case where compliance would create an imminent and serious threat to a person or vessel, or if the vessel was restricted in maneuverability due to towed equipment. There were no instances during the survey where avoidance maneuvers were required to be implemented for protected species detections.

In the event of a ship strike of a marine mammal, the incident was to be reported to NMFS, OPR, and to the Southeast Regional Stranding Coordinator, as soon as feasible. The report would include a detailed description of the incident (date, time, location, species identification, description of the animal(s) involved, vessel speed leading up to the incident, vessel's course/heading and what operations were being conducted, status of all sound sources in use, description of avoidance measures taken if any, environmental conditions, description of the animals behavior preceding and following the strike, and estimated fate of the animal), including pictures when possible. There were no instances of the vessel striking a protected species during the survey.

PSOs likely did not detect all animals present; however, it is highly unlikely that the actual number of animals present during survey operations reached anywhere near the fully authorized levels for all species. The combination of conservative predicted mitigation zones combined with conservative take estimation by NMFS (*i.e.,* the precautionary approach), appears for most species to have resulted in an overestimation of take and of overall impact on marine species from the activity. The monitoring and mitigation measures required by the IHAs appear to have been an effective means to protect the marine species encountered during survey operations.

Appendix A: Incidental Harassment Authorization

Appendix B: Protected Species Observers Onboard the *MGL*

Appendix C: Complete Survey Raw Datasheets (Provided in Attached File in Excel Format)

Appendix D: Basic Data Summary Form

Appendix E: Summary of Visual Detections of Protected Species During the Survey

Appendix F: Photographs of Visual Detections During the Survey

Appendix G: Photographs of Acoustic Detections During the Survey

Appendix H: Birds and Other Wildlife Observed During the Survey

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, Maryland 20910

INCIDENTAL HARASSMENT AUTHORIZATION

The Lamont-Doherty Earth Observatory of Columbia University (L-DEO) is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1371(a)(5)(D)) to incidentally harass marine mammals, under the following conditions:

1. This incidental harassment authorization (IHA) is valid for one year from the date of issuance.

2. This IHA is valid only for geophysical survey activity in the Cape Fear submarine slide complex, off North Carolina in the Northwest Atlantic Ocean, as specified in L-DEO's IHA application.

3. General Conditions

   (a) A copy of this IHA must be in the possession of L-DEO, the vessel operator, the lead protected species observer (PSO), and any other relevant designees of L-DEO operating under the authority of this IHA.

   (b) The species and/or stocks authorized for taking are listed in Table 1. Authorized take, by Level A and Level B harassment only, is limited to the species and numbers listed in Table 1.

   (c) The taking by serious injury or death of any of the species listed in Table 1 or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA. Any taking exceeding the authorized amounts listed in Table 1 is prohibited and may result in the modification, suspension, or revocation of this IHA.

   (d) During use of the airgun array, if any marine mammal species that are not listed in Table 1 appear within or enter the Level B harassment zone (Table 3) the airgun array must be shut down.

   (e) L-DEO must ensure that relevant vessel personnel and the PSO team participate in a joint onboard briefing led by the vessel operator and lead PSO to ensure that responsibilities, communication procedures, marine mammal monitoring protocols, operational procedures, and IHA requirements are clearly understood.

   (f) L-DEO must notify the NMFS Southeast Regional Office (SERO) of the start and end date of seismic operations in the survey area via email (nmfs.ser.research.notification@noaa.gov).

4. Mitigation Requirements

The holder of this Authorization is required to implement the following mitigation measures:

a. No use of airguns is allowed from November 1 through April 30 for North Atlantic right whale migration. We request L-DEO submit daily observations to SERO (kara.shervanick@noaa.gov) during any non-airgun activities that are conducted between November 1 and April 30.

b. L-DEO must use independent, dedicated, trained visual and acoustic PSOs, meaning that the PSOs must be employed by a third-party observer provider, must not have tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant vessel crew with regard to the presence of marine mammals and mitigation requirements (including brief alerts regarding maritime hazards), and must have successfully completed an approved PSO training course appropriate for their designated task (visual or acoustic). Individual PSOs may perform acoustic and visual PSO duties (though not at the same time).

c. At least one visual and two acoustic PSOs must have a minimum of 90 days at-sea experience working in those roles, respectively, during a deep penetration seismic survey, with no more than 18 months elapsed since the conclusion of the at-sea experience.

d. Visual Observation

i. During survey operations (e.g., any day on which use of the airgun array is planned to occur, and whenever the airgun array is in the water, whether activated or not), a minimum of two visual PSOs must be on duty and conducting visual observations at all times during daylight hours (i.e., from 30 minutes prior to sunrise through 30 minutes following sunset) and 30 minutes prior to and during ramp-up of the airgun array.

ii. Visual monitoring of the shutdown and buffer zones must begin no less than 30 minutes prior to ramp-up, and must continue until one hour after use of the acoustic source ceases or until 30 minutes past sunset.

iii. Visual PSOs must coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts, and must conduct visual observations using binoculars and the naked eye while free from distractions and in a consistent, systematic, and diligent manner. Estimated harassment zones are provided in Table 2 and 3 for reference.

iv. Visual PSOs must immediately communicate all observations to the acoustic PSO(s) on duty, including any determination by the PSO regarding species identification, distance, and bearing and the degree of confidence in the determination.

v. During good conditions (e.g., daylight hours; Beaufort sea state (BSS) 3 or less), visual PSOs must conduct observations when the airgun array is not

operating for comparison of sighting rates and behavior with and without use of the airgun array and between acquisition periods, to the maximum extent practicable.

vi. Visual PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least one hour between watches and may conduct a maximum of 12 hours of observation per 24-hour period. Combined observational duties (visual and acoustic but not at same time) may not exceed 12 hours per 24-hour period for any individual PSO.

e. Acoustic Monitoring

i. The source vessel must use a towed passive acoustic monitoring system (PAM) which must be monitored by, at a minimum, one on-duty acoustic PSO beginning at least 30 minutes prior to ramp-up and at all times during use of the airgun array.

ii. When both visual and acoustic PSOs are on duty, all detections must be immediately communicated to the remainder of the on-duty PSO team for potential verification of visual observations by the acoustic PSO or of acoustic detections by visual PSOs.

iii. Acoustic PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least one hour between watches and may conduct a maximum of 12 hours of observation per 24-hour period. Combined observational duties may not exceed 12 hours per 24-hour period for any individual PSO.

iv. Survey activity may continue for 30 minutes when the PAM system malfunctions or is damaged, while the PAM operator diagnoses the issue. If the diagnosis indicates that the PAM system must be repaired to solve the problem, operations may continue for an additional five hours without acoustic monitoring during daylight hours only under the following conditions:

1. Sea state is less than or equal to BSS 4;

2. With the exception of delphinids, no marine mammals detected solely by PAM in the applicable shutdown zone in the previous two hours;

3. NMFS is notified via email as soon as practicable with the time and location in which operations began occurring without an active PAM system; and

4. Operations with an active acoustic source, but without an operating PAM system, do not exceed a cumulative total of five hours in any 24-hour period.

f. Shutdown zones and buffer zones

i. Except as provided in 4(f)(ii) and 4(f)(iii), the PSOs must establish and monitor a 500-m shutdown zone and additional 500-m buffer zone (total 1000 m). The 1000-m zone must serve to focus observational effort but not limit such effort; observations of marine mammals beyond this distance shall also be recorded as described in 5(d) below and/or trigger shutdown as described in 4(g)(iv) below, as appropriate. The shutdown zone encompasses the area at and below the sea surface out to a radius of 500 m from the edges of the airgun array (rather than being based on the center of the array or around the vessel itself) (0–500 m). The buffer zone encompasses the area at and below the sea surface from the edge of the shutdown zone, out to a radius of 1000 meters from the edges of the airgun array (500–1000 m). During use of the acoustic source, occurrence of marine mammals within the buffer zone (but outside the shutdown zone) must be communicated to the operator to prepare for the potential shutdown of the acoustic source. PSOs must monitor the shutdown zone and buffer zone for a minimum of 30 minutes prior to ramp-up (i.e., pre-start clearance).

ii. An extended 1500 m shutdown zone must be established for all beaked whales, dwarf and pygmy sperm whales, a large whale with a calf, and groups of six or more large whales. No buffer zone is required.

iii. The acoustic source must be shut down upon detection (visual or acoustic) of a North Atlantic right whale at any distance.

g. Pre-start clearance and Ramp-up

i. A ramp-up procedure must be followed at all times as part of the activation of the airgun array, except as described under 4(e)(iv).

ii. Ramp-up must not be initiated if any marine mammal is within the shutdown or buffer zone. If a marine mammal is observed within the shutdown zone or the buffer zone during the 30 minute pre-start clearance period, ramp-up may not begin until the animal(s) has been observed exiting the zone or until an additional time period has elapsed with no further sightings (15 minutes for small odontocetes, and 30 minutes for mysticetes and all other odontocetes).

iii. Ramp-up must begin by activating a single airgun of the smallest volume in the array and must continue in stages by doubling the number of active elements at the commencement of each stage, with each stage of approximately the same duration. Duration must not be less than 20 minutes. The operator must provide information to the PSO documenting that appropriate procedures were followed.

iv. PSOs must monitor the shutdown and buffer zones during ramp-up, and ramp-up must cease and the source must be shut down upon visual observation or acoustic detection of a marine mammal within the shutdown zone. Once ramp-up has begun, observations of marine mammals within the buffer zone do not require shutdown, but such observation must be communicated to the operator to prepare for the potential shutdown.

v. Where operational planning cannot reasonably avoid such circumstances ramp-up may occur at times of poor visibility, including nighttime, if appropriate acoustic monitoring has occurred with no detections in the 30 minutes prior to beginning ramp-up. Acoustic source activation may only occur at times of poor visibility where operational planning cannot reasonably avoid such circumstances.

vi. If the acoustic source is shut down for brief periods (i.e., less than 30 minutes) for reasons other than that described for shutdown (e.g., mechanical difficulty), it may be activated again without ramp-up if PSOs have maintained constant visual and/or acoustic observation and no visual or acoustic detections of marine mammals have occurred within the applicable shutdown zone. For any longer shutdown, pre-start clearance observation and ramp-up are required. For any shutdown at night or in periods of poor visibility (e.g., BSS 4 or greater), ramp-up is required, but if the shutdown period was brief and constant observation was maintained, pre-start clearance watch is not required.

vii. Testing of the acoustic source involving all elements requires ramp-up. Testing limited to individual source elements or strings does not require ramp-up but does require pre-start clearance watch.

h. Shutdown requirements

i. Any PSO on duty has the authority to delay the start of survey operations or to call for shutdown of the airgun array.

ii. The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that shutdown commands are conveyed swiftly while allowing PSOs to maintain watch.

iii. When the airgun array is active (i.e., anytime one or more airguns is active, including during ramp-up) and (1) a marine mammal (excluding delphinids of the species described in 4(h)(iv)) appears within or enters the shutdown zone and/or (2) a marine mammal is detected acoustically and localized within the shutdown zone, the airgun array must be shut down. When shutdown is called for by a PSO, the airgun array must be immediately deactivated. Any dispute regarding a PSO shutdown must be resolved after deactivation.

iv. The shutdown requirement described in 4(h)(iii) shall be waived for small dolphins of the following genera: *Delphinus, Lagenodelphis, Stenella, Steno, and Tursiops.*

1. If a dolphin of these genera is visually and/or acoustically detected and localized within the shutdown zone, no shutdown is required unless the acoustic PSO or a visual PSO confirms the individual to be of a species other than those listed above, in which case a shutdown is required.

2. If there is uncertainty regarding identification, visual PSOs may use best professional judgement in making the decision to call for a shutdown.

v. Upon implementation of shutdown, the source may be reactivated after the marine mammal(s) has been observed exiting the applicable shutdown zone (*i.e.*, animal is not required to fully exit the buffer zone where applicable) or following a clearance period (15 minutes for small odontocetes, and 30 minutes for mysticetes and all other odontocetes) with no further observation of the marine mammal(s).

vi. Shutdown of the array is required upon observation of a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized number of takes has been met, approaching or observed within any harassment zone.

i. Vessel strike avoidance

i. Vessel operators and crew must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any marine mammals. A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the vessel (distances stated below). Visual observers monitoring the vessel strike avoidance zone may be third-party observers (i.e., PSOs) or crew members, but crew members responsible for these duties must be provided sufficient training to 1) distinguish marine mammals from other phenomena and 2) broadly to identify a marine mammal to taxonomic group (i.e., as a right whale, other large whale, or other marine mammal).

ii. All survey vessels, regardless of size, must observe a 10-kn speed restriction in specific areas designated by NMFS for the protection of North Atlantic right whales from vessel strikes. These include all Seasonal Management Areas (SMA) established under 50 CFR 224.105 (when in effect), any dynamic management areas (DMA) (when in effect), and Slow Zones. See *www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-ship-strikes-north-atlantic-right-whales* for specific detail regarding these areas.

iii. Vessel speeds must be reduced to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near a vessel.

iv. The vessel must maintain a minimum separation distance of 500 m from North Atlantic right whales. If a whale is observed but cannot be confirmed as a species other than a right whale, the vessel operator must assume that it is a right whale and take appropriate action.

v. The vessel must maintain a minimum separation distance of 100 m from sperm whales and all other baleen whales.

vi. The vessel must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all other marine mammals, with an understanding that at times this may not be possible (e.g., for animals that approach the vessel).

vii. When marine mammals are sighted while a vessel is underway, the vessel must take action as necessary to avoid violating the relevant separation distance (e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If marine mammals are sighted within the relevant separation distance, the vessel must reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. This does not apply to any vessel towing gear or any vessel that is navigationally constrained.

viii. These requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply.

5. Monitoring Requirements

Monitoring must be conducted in accordance with the following requirements:

a. The operator must provide PSOs with bigeye reticle binoculars (e.g., 25 x 150; 2.7 view angle; individual ocular focus; height control) of appropriate quality solely for PSO use. These must be pedestal-mounted on the deck at the most appropriate vantage point that provides for optimal sea surface observation, PSO safety, and safe operation of the vessel.

b. The operator must work with the selected third-party observer provider to ensure PSOs have all equipment (including backup equipment) needed to adequately perform necessary tasks, including accurate determination of distance and bearing to observed marine mammals. Such equipment, at a minimum, must include:

i. PAM must include a system that has been verified and tested by an experienced acoustic PSO that will be using it during the trip for which monitoring is required.

ii. Reticle binoculars (e.g., 7 x 50) of appropriate quality (at least one per PSO, plus backups).

iii. Global Positioning Unit (GPS) (plus backup).

iv. Digital single-lens reflex cameras of appropriate quality that capture photographs and video (plus backup).

v. Compass (plus backup)

vi. Radios for communication among vessel crew and PSOs (at least one per PSO, plus backups).

vii. Any other tools necessary to adequately perform necessary PSO tasks.

c. Protected Species Observers (PSOs, Visual and Acoustic) Qualifications

i. PSOs must have successfully completed an acceptable PSO training course appropriate for their designated task (visual or acoustic). Acoustic PSOs are required to complete specialized training for operating PAM systems and are encouraged to have familiarity with the vessel with which they will be working.

ii. NMFS must review and approve PSO resumes.

iii. NMFS shall have one week to approve PSOs from the time that the necessary information is submitted, after which PSOs meeting the minimum requirements shall automatically be considered approved.

iv. One visual PSO with experience as shown in 4(c) shall be designated as the lead for the PSO team. The lead must coordinate duty schedules and roles for the PSO team and serve as primary point of contact for the vessel operator. (Note that the responsibility of coordinating duty schedules and roles may instead be assigned to a shore-based, third-party monitoring coordinator.) To the maximum extent practicable, the lead PSO must devise the duty schedule such that experienced PSOs are on duty with those PSOs with appropriate training but who have not yet gained relevant experience.

v. PSOs must successfully complete relevant training, including completion of all required coursework and passing (80 percent or greater) a written and/or oral examination developed for the training program.

vi. PSOs must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or equivalent in the biological sciences, and at least one undergraduate course in math or statistics.

vii. The educational requirements may be waived if the PSO has acquired the relevant skills through alternate experience. Requests for such a waiver must be submitted to NMFS and must include written justification. Requests must be granted or denied (with justification) by NMFS within one week of receipt of submitted information. Alternate experience that may be considered includes, but is not limited to (1) secondary education and/or experience comparable to PSO duties; (2) previous work experience conducting academic, commercial, or government-sponsored marine mammal surveys; or (3) previous work experience as a PSO; the PSO should demonstrate good standing and consistently good performance of PSO duties.

d. Data Collection

i. PSOs must use standardized data collection forms, whether hard copy or electronic. PSOs must record detailed information about any implementation of mitigation requirements, including the distance of animals to the acoustic source and description of specific actions that ensued, the behavior of the animal(s), any observed changes in behavior before and after implementation of mitigation, and if shutdown was implemented, the length of time before any subsequent ramp-up of the acoustic source. If required mitigation was not implemented, PSOs should record a description of the circumstances.

ii. At a minimum, the following information must be recorded:

1. Vessel name and call sign;

2. PSO names and affiliations;

3. Date and participants of PSO briefings (as discussed in General Requirement);

4. Dates of departure and return to port with port name;

5. Dates and times (Greenwich Mean Time) of survey effort and times corresponding with PSO effort;

6. Vessel location (latitude/longitude) when survey effort began and ended and vessel location at beginning and end of visual PSO duty shifts;

7. Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any line change;

8. Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions changed significantly), including BSS and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon;

9. Factors that may have contributed to impaired observations during each PSO shift change or as needed as environmental conditions changed (e.g., vessel traffic, equipment malfunctions); and

10. Survey activity information, such as acoustic source power output while in operation, number and volume of airguns operating in the array, tow depth of the array, and any other notes of significance (i.e., pre-start clearance, ramp-up, shutdown, testing, shooting, ramp-up completion, end of operations, streamers, etc.).

iii. Upon visual observation of any marine mammals, the following information must be recorded:

1. Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);

2. PSO who sighted the animal;

3. Time of sighting;

4. Vessel location at time of sighting;

5. Water depth;

6. Direction of vessel's travel (compass direction);

7. Direction of animal's travel relative to the vessel;

8. Pace of the animal;

9. Estimated distance to the animal and its heading relative to vessel at initial sighting;

10. Identification of the animal (e.g., genus/species, lowest possible taxonomic level, or unidentified) and the composition of the group if there is a mix of species;

11. Estimated number of animals (high/low/best);

12. Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.);

13. Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics);

14. Detailed behavior observations (e.g., number of blows/breaths, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior);

15. Animal's closest point of approach (CPA) and/or closest distance from any element of the acoustic source;

16. Platform activity at time of sighting (e.g., deploying, recovering, testing, shooting, data acquisition, other); and

17. Description of any actions implemented in response to the sighting (e.g., delays, shutdown, ramp-up) and time and location of the action.

iv. If a marine mammal is detected while using the PAM system, the following information must be recorded:

1. An acoustic encounter identification number, and whether the detection was linked with a visual sighting;

2. Date and time when first and last heard;

3. Types and nature of sounds heard (e.g., clicks, whistles, creaks, burst pulses, continuous, sporadic, strength of signal);

4. Any additional information recorded such as water depth of the hydrophone array, bearing of the animal to the vessel (if determinable), species or taxonomic group (if determinable), spectrogram screenshot, and any other notable information.

6. Reporting

(a) L-DEO must submit a draft comprehensive report to NMFS on all activities and monitoring results within 90 days of the completion of the survey or expiration of the IHA, whichever comes sooner. A final report must be submitted within 30 days following resolution of any comments on the draft report. The draft report must include the following:

(i) Summary of all activities conducted and sightings of marine mammals near the activities;

(ii) Summary of all data required to be collected (see condition 5(d));

(iii) Full documentation of methods, results, and interpretation pertaining to all monitoring;

(iv) Summary of dates and locations of survey operations (including (1) the number of days on which the airgun array was active and (2) the percentage of time and total time the array was active during daylight vs. nighttime hours (including dawn and dusk)) and all marine mammal sightings (dates, times, locations, activities, associated survey activities);

(v) Geo-referenced time-stamped vessel tracklines for all time periods during which airguns were operating. Tracklines should include points recording any change in airgun status (e.g., when the airguns began operating, when they were turned off, or when they changed from full array to single gun or vice versa);

(vi) GIS files in ESRI shapefile format and UTC date and time, latitude in decimal degrees, and longitude in decimal degrees. All coordinates must be referenced to the WGS84 geographic coordinate system; and

(vii) Raw observational data.

(b) Reporting Injured or Dead Marine Mammals

(i) Discovery of Injured or Dead Marine Mammal – In the event that personnel involved in the survey activities covered by the authorization discover an injured or dead marine mammal, L-DEO must report the incident to the Office of Protected Resources (OPR) (301-427-8401), NMFS and the NMFS Southeast Regional Stranding Coordinator (305-361-4586) as soon as feasible. The report must include the following information:

1. Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);

2. Species identification (if known) or description of the animal(s) involved;

3. Condition of the animal(s) (including carcass condition if the animal is dead);

4. Observed behaviors of the animal(s), if alive;

5. If available, photographs or video footage of the animal(s); and

6. General circumstances under which the animal was discovered.

(ii) Vessel Strike – In the event of a ship strike of a marine mammal by any vessel involved in the activities covered by the authorization, L-DEO must report the incident to OPR, NMFS and to the Southeast Regional Stranding Coordinator as soon as feasible. The report must include the following information:

1. Time, date, and location (latitude/longitude) of the incident;

2. Species identification (if known) or description of the animal(s) involved;

3. Vessel's speed during and leading up to the incident;

4. Vessel's course/heading and what operations were being conducted (if applicable);

5. Status of all sound sources in use;

6. Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;

7. Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;

8. Estimated size and length of animal that was struck;

9. Description of the behavior of the marine mammal immediately preceding and following the strike;

10. If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;

11. Estimated fate of the animal (e.g., dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and

12. To the extent practicable, photographs or video footage of the animal(s).

(c) Reporting Species of Concern

(i) If a North Atlantic right whale is observed at any time by PSOs or personnel on any project vessels, during surveys or during vessel transit, L-DEO must immediately report sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System: 877-WHALE-HELP (877-942-5343). North Atlantic right whale sightings in any location must

also be reported to the U.S. Coast Guard via channel 16 and through the WhaleAlert app (http://www.whalealert.org/).

7. Actions to minimize additional harm to live-stranded (or milling) marine mammals – In the event of a live stranding (or near-shore atypical milling) event within 50 km of the survey operations, where the NMFS stranding network is engaged in herding or other interventions to return animals to the water, the Director of OPR, NMFS (or designee) will advise L-DEO of the need to implement shutdown procedures for all active acoustic sources operating within 50 km of the stranding. Shutdown procedures for live stranding or milling marine mammals include the following:

   (a) If at any time, the marine mammal(s) die or are euthanized, or if herding/intervention efforts are stopped, the Director of OPR, NMFS (or designee) will advise L-DEO that the shutdown around the animals' location is no longer needed.

   (b) Otherwise, shutdown procedures will remain in effect until the Director of OPR, NMFS (or designee) determines and advises L-DEO that all live animals involved have left the area (either of their own volition or following an intervention).

   (c) If further observations of the marine mammals indicate the potential for restranding, additional coordination with L-DEO will be required to determine what measures are necessary to minimize that likelihood (e.g., extending the shutdown or moving operations farther away) and to implement those measures as appropriate.

   (d) Additional information requests – If NMFS determines that the circumstances of any marine mammal stranding found in the vicinity of the activity suggest investigation of the association with survey activities is warranted, and an investigation into the stranding is being pursued, NMFS will submit a written request to L-DEO indicating that the following initial available information must be provided as soon as possible, but no later than 7 business days after the request for information.

      (i) Status of all sound source use in the 48 hours preceding the estimated time of stranding and within 50 km of the discovery/notification of the stranding by NMFS; and

      (ii) If available, description of the behavior of any marine mammal(s) observed preceding (i.e., within 48 hours and 50 km) and immediately after the discovery of the stranding.

   In the event that the investigation is still inconclusive, the investigation of the association of the survey activities is still warranted, and the investigation is still being pursued, NMFS may provide additional information requests, in writing,

regarding the nature and location of survey operations prior to the time period above.

8. This Authorization may be modified, suspended or revoked if the holder fails to abide by the conditions prescribed herein (including, but not limited to, failure to comply with monitoring or reporting requirements), or if NMFS determines: (1) the authorized taking is likely to have or is having more than a negligible impact on the species or stocks of affected marine mammals, or (2) the prescribed measures are likely not or are not effecting the least practicable adverse impact on the affected species or stocks and their habitat.

9. Renewals

On a case-by-case basis, NMFS may issue a one-time, one-year Renewal IHA following notice to the public providing an additional 15 days for public comments when (1) up to another year of identical, or nearly identical, activities are planned or (2) the specified activities would not be completed by the time this IHA expires and a Renewal would allow for completion of the activities, provided all of the following conditions are met:

(a) A request for renewal is received no later than 60 days prior to the needed Renewal IHA effective date (the Renewal IHA expiration date cannot extend beyond one year from expiration of this IHA).

(b) The request for renewal must include the following:

(i) An explanation that the activities to be conducted under the requested Renewal IHA are identical to the activities analyzed for this IHA, are a subset of the activities, or include changes so minor that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take).

(ii) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.

(c) Upon review of the request for Renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings made in support of this IHA remain valid.

Kimberly Damon-Randall, Date

Director, Office of Protected Resources,

National Marine Fisheries Service.

Table 1. Authorized take numbers, by species

Species	Authorized Take	
	Level B	Level A
Humpback whale	2	0
Fin whale	4	0
Sei whale	8	0
Minke whale	10	0
Blue whale	1	0
Sperm whale	406	0
Kogia spp.	678	31
Cuvier's beaked whale	396	0
Mesoplodont Beaked whales	420	0
Pilot whales	385	0
Rough-toothed dolphin	82	0
Bottlenose dolphin	1,477	0
Atlantic white-sided dolphin	14	0
Pantropical spotted dolphin	114	0
Atlantic spotted dolphin	1,237	0
Spinner dolphin	41	0
Clymene dolphin	79	0
Striped dolphin	45	0
Fraser’s dolphin	163	0
Risso’s dolphin	189	0
Common dolphin	56	0
Melon-headed whale	83	0
Pygmy killer whale	6	0
False killer whale	6	0
Killer whale	4	0
Harbor porpoise	3	0

Table 2. Modeled Radial Distances (m) to Isopleths Corresponding to Level A Harassment Thresholds.

Airgun Configuration	Threshold	Level A harassment zone (m)		
		LF Cetaceans	MF Cetaceans	HF Cetaceans
18 airgun array (3300 in^3)	SELcum	101.9	0	0.5
	Peak	23.3	11.2	116.9

Table 3. Modeled Radial Distances (m) to Isopleths Corresponding to Level B Harassment Threshold.

Airgun Configuration	Water Depth (m)	Level B harassment zone (m)
18 airgun array (3300 in^3)	>1000m	2,886
	100-1000m	4,329

RPS PSOs onboard the *MGL*	
Name	**Initials**
Cassandra Frey	CF
Daniela Durazo	DD
Kristal Muhammad	KM
Jo-Ann Sookar	JS
Shelby Tobin	ST

Protected Species Recording Form – Project Data – INPUT

Project Number	Regulatory Reference Number	Country	Client	Seismic Contractor	Vessel Name	Survey Type
221339	MGL2306	USA	LDEO	LDEO	*Marcus G Langseth*	2D If "other" specify

Reporting period start date	Reporting period end date	Source Vessel(s) (List)	Type of Source	Number of Airguns	Source Volume (cu. in.)	Tow Depth of Airgun array (metres)
2023-05-09	2023-06-03		airguns	18	3300	6
			If “other” specify			

Frequency (Hz)	Intensity (dB re. 1µPa or bar metres)	Shot point interval (seconds or metres; for your vessel)	Method of Soft Start	Visual monitoring equipment used Place an 'X' in the cell to the left of each of the following that apply	
2-188	259	25	increase number of guns	x	hand-held binoculars
				x	big eyes
				x	naked eye
					infrared camera
	Unit:	**Unit:**		x	hand-held NVD w/thermal
	dB re 1µPa	metres			

Magnification of optical equipment (e.g. “8x”)	**Visual Monitoring Locations**	**Height of eye off water surface by location (metres)**	**How was distance of animals estimated?** Place an 'X' in the cell to the left of each of the following that apply	
7x50; 25x150	Tower	18.9	**x**	by eye
	Bridge	12.8		with laser rangefinder
	Bridge wings	12.3		with rangefinder stick / calipers
	Helideck	13.7	**x**	with reticle binoculars
			x	by relating to object at known distance
				other

Names of PSOs (initials, name) JD, John Doe	**Training of MMOs** Place an 'X' in the cell to the left of each of the following that apply		**Was PAM used?**
Cassandra Frey		JNCC approved MMO induction course for UK waters	yes
Jo-Ann Sookar	x	PSO training course for the Gulf of Mexico	
Daniela Durazo		MMO training course for Irish Waters	
Kristal Mohammed		other	
Shelby Tobin		none	

Names of PAM Operators	PAM system manufacturer	Version(s) of Pamguard utilized	Date initiated use of Pamguard version	Number of hydrophone elements
Cassandra Frey	Seiche	**1.15.17**	2023-05-11	6
Jo-Ann Sookar				
Daniela Durazo				
Kristal Mohammed				
Shelby Tobin				

Operations – INPUT

Date	Time visual pre-clearance search began	Time visual pre-clearance search ended	Duration of visual search	Time acoustic pre-clearance search began	Time acoustic pre-clearance search ended	Duration of acoustic search	Was it day or night in the period prior to source activation ?	Any reason protected species may not have been detected?
2023-05-11	08:33	09:03	00:30	08:33	09:03	00:30	night	no
2023-05-12								no
2023-05-12								no
2023-05-12								no
2023-05-13								no
2023-05-13								no
2023-05-13								no
2023-05-13								no
2023-05-13								no
2023-05-13								no
2023-05-13								no
2023-05-13								no
2023-05-13								no
2023-05-13								no
2023-05-13								no
2023-05-13								no
2023-05-13	20:02	20:32	00:30	20:02	20:32	00:30	day	no
2023-05-13								no
2023-05-13								no
2023-05-13								no
2023-05-13								no
2023-05-14								no
2023-05-14								no

2023-05-14								no
2023-05-14								no
2023-05-14								no
2023-05-14								no
2023-05-15								no
2023-05-15								no
2023-05-15								no
2023-05-15								no
2023-05-15								no
2023-05-15								no
2023-05-15								no
2023-05-15								no
2023-05-15								no
2023-05-15								no
2023-05-15								no
2023-05-15								no
2023-05-15								no
2023-05-15								no
2023-05-15								no
2023-05-16								no
2023-05-16							night	no
2023-05-16								no
2023-05-16							day	no
2023-05-17								no
2023-05-17								no
2023-05-17								no
2023-05-17								no
2023-05-17								no
2023-05-17								no
2023-05-18								no
2023-05-18								no
2023-05-18								no
2023-05-18								no
2023-05-19								no
2023-05-19								no
2023-05-19								no

2023-05-19								no
2023-05-19								no
2023-05-19								no
2023-05-19								no
2023-05-19								no
2023-05-19								no
2023-05-20	11:56	12:26	00:30	11:56	12:26	00:30	day	no
2023-05-20								no
2023-05-20								no
2023-05-21								no
2023-05-21								no
2023-05-21	05:46	06:16	00:30	05:46	06:16	00:30	night	no
2023-05-21								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-22								no
2023-05-23								no
2023-05-23								no
2023-05-23								no
2023-05-23								no
2023-05-23								no
2023-05-23								no
2023-05-23								no

2023-05-23								no
2023-05-23								no
2023-05-23								no
2023-05-24								no
2023-05-24								no
2023-05-24								no
2023-05-24								no
2023-05-24								no
2023-05-24								no
2023-05-24	22:44	23:14	00:30	22:44	23:14	00:30	day	no
2023-05-25								no
2023-05-25								no
2023-05-25								no
2023-05-25								no
2023-05-25								no
2023-05-25								no
2023-05-26								no
2023-05-26								no
2023-05-26								no
2023-05-27	01:46	02:16	00:30	01:46	02:16	00:30	night	low vis d/t
2023-05-27	15:08	15:38	00:30	15:08	15:38	00:30	day	no
2023-05-28								no
2023-05-29								no
2023-05-29								no
2023-05-29								no
2023-05-29								no
2023-05-29								no
2023-05-29								no
2023-05-29								no
2023-05-29								no
2023-05-30								no
2023-05-30								no
2023-05-30								no
2023-05-30								no
2023-05-30								no
2023-05-30								no

2023-05-31								no
2023-05-31								no
2023-06-01								no
2023-06-01								no
2023-06-01								no
2023-06-02								no
2023-06-02								no
2023-06-02								no
2023-06-02								no

Reason for source activity s=survey line t=test x=test followed immediately by survey	Line and/or sequence number (Optional)	Time soft start / ramp up began	Time airguns reached full volume	Duration of soft start / ramp up	#of active elements	Volume
s	MGL2306001P001	09:03	09:25	00:22	18	3300
s					18	3300
s	MGL2306002P02		07:17		18	3300
s	MGL2306003P03		21:25		18	3300
s					18	3300
s			02:45		9	1650
s			04:30		18	3300
s			05:00		17	2940
s			05:06		9	1650
s			06:47		18	3300
s			08:58		17	3080
s			09:00		9	1650
s			12:10		18	3300
s			17:10		17	2940
s			17:21		9	1650
s	MGL2306004P03a	20:32	20:55	00:23	18	3300
s			20:56		9	1650
s			20:58		18	3300
s			22:26		9	1650
s			22:34		18	3300
s	MGL2306004P03a				18	3300
s	MGL2306005P04		04:02		18	3300

s	MGL2306006P05		07:35		18	3300
s			15:12		17	2940
s			15:15		9	1650
s			16:39		18	3300
s					18	3300
s			01:22		9	1650
s			02:33		11	2370
s			02:34		9	1650
s			02:38		10	2010
s			02:39		11	2370
s			02:40		9	1650
s	MGL2306007P06		03:03		9	1650
s			04:34		18	3300
s			04:37		17	3120
s			04:43		9	1650
s			06:59		18	3300
s	MGL2306008P07		07:31		18	3300
s					18	3300
s	MGL2306009P08	07:00	07:23	00:23	18	3300
s	MGL2306010P09		12:35		18	3300
s			14:14		18	3300
s					18	3300
s	MGL2306011P10		06:05		18	3300
s	MGL2306012P11		11:03		18	3300
s			14:29		17	3120
s			14:51		9	1650
s			16:48		18	3300
s					18	3300
s	MGL2306013P12		04:48		18	3300
s	MGL2306014P13		07:40		18	3300
s			22:56		17	3120
s					17	3120
s	MGL2306015P014		00:55		17	3120
s	MGL2306016P15		06:54		17	3120

s			07:22		16	2900
s			07:28		9	1650
s	MGL2306017P16		09:43		9	1650
s	MGL2306018P17		11:16		9	1650
s	MGL2306019P17a		11:33		9	1650
t			19:53		18	3300
s	MGL2306020P14R	12:26	12:49	00:23	18	3300
s			20:10		9	1650
s			21:36		18	3300
s	MGL2306020P14R				18	3300
s	MGL2306021P14S		00:53		18	3300
s	MGL2306022P17b	06:16	06:38	00:22	18	3300
s	MGL2306023P20		22:17		18	3300
s					18	3300
s	MGL2306024P21		00:01		18	3300
s			00:13		17	3120
s			00:20		17	3080
s			00:23		17	3260
s			00:26		17	3080
s			00:37		9	1650
s			00:38		17	3120
s			00:45		9	1650
s	MGL2306025P22		01:57		9	1650
s			02:44		18	3300
s	MGL2306026P23		06:47		18	3300
s	MGL2306027P24		08:07		18	3300
s	MGL2306028P25		12:49		9	1650
s			14:57		9	1650
s	MGL2306029P26		14:58		18	3300
s	MGL2306030P27		19:34		18	3300
s	MGL2306031P28		21:18		18	3300
s					18	3300
s	MGL2306032P29		01:09		18	3300
s	MGL2306033P30		02:24		18	3300
s	MGL2306034P31		07:07		18	3300
s	MGL2306035P32		08:26		18	3300
s	MGL2306036P33		12:08		18	3300
s	MGL2306037P34		13:43		18	3300

s	MGL2306038P35		17:54		18	3300
s	MGL2306039P36		19:32		18	3300
s	MGL2306040P37		20:57		18	3300
s					18	3300
s	MGL2306041P20a		06:00		18	3300
s	MGL2306042P19		07:19		18	3300
s	MGL2306043P14b		10:11		18	3300
s	MGL2306044P37a		11:45		18	3300
s	MGL2306045P20b		20:10		18	3300
s	MGL2306046P18	23:14	23:36	00:22	18	3300
s					18	3300
s	MGL2306047P39		00:59		18	3300
s			08:00		17	2940
s			13:06		9	1650
s	MGL2306048P40		14:31		9	1650
s			15:08		18	3300
s					18	3300
s			13:31		9	1650
s			13:33		18	3300
s	MGL2306049P41	02:16	02:38	00:22	18	3300
s	MGL2306050P42	15:38	15:59	00:21	18	3300
s	MGL2306050P42				18	3300
s					18	3300
s	MGL2306051P43		06:44		18	3300
s			06:58		9	1650
s			07:13		18	3300
s			07:15		9	1650
s			09:28		18	3300
s	MGL2306052P44		13:51		18	3300
s					18	3300
s	MGL2306053P45		14:53		9	1650
s			16:38		18	3300
s	MGL2306054P46		19:16		18	3300
s			20:08		9	1650
s			21:17		18	3300

s					18	3300
s	MGL2306055P47		23:21		18	3300
s					18	3300
s	MGL2306056P48		13:25		18	3300
s	MGL2306057P49		18:34		18	3300
s					18	3300
s	MGL2306058P50		00:53		18	3300
s	MGL2306059P51		02:51		18	3300
s			12:52		17	2940

Type of testing	Time testing began	Time testing ended	Duration of test activity	Time survey line began	Time survey line ended	Duration of survey activity	Duration of pre-survey / pre-testing activity
				09:59			00:34
					07:17	21:18	
				07:26	21:25	13:59	00:09
				21:37			00:12
					02:45	05:08	
				02:45	04:30	01:45	00:00
				04:30	05:00	00:30	00:00
				05:00	05:06	00:06	00:00
				05:06	06:47	01:41	00:00
				06:47	08:58	02:11	00:00
				08:58	09:00	00:02	00:00
				09:00	12:10	03:10	00:00
				12:10	17:10	05:00	00:00
				17:10	17:21	00:11	00:00
				17:21	17:52	00:31	00:00
				21:12	22:26	01:14	00:14
				22:26	22:34	00:08	00:00
				22:34		01:26	00:00
					04:02	04:02	
				04:08	07:35	03:27	00:06

				07:46	15:12	07:26	00:11
				15:12	15:15	00:03	00:00
				15:15	16:39	01:24	00:00
				16:39			00:00
					01:22	08:43	
				01:22	02:33	01:11	00:00
				02:33	02:34	00:01	00:00
				02:34	02:38	00:04	00:00
				02:38	02:39	00:01	00:00
				02:39	02:40	00:01	00:00
				02:40	03:03	00:23	00:00
				03:18	04:34	01:16	00:15
				04:34	04:37	00:03	00:00
				04:37	04:43	00:06	00:00
				04:43	06:59	02:16	00:00
				06:59	07:31	00:32	00:00
				07:44			00:13
					05:02	21:18	
				07:24	12:35	05:11	00:01
				12:49	13:58	01:09	00:14
				14:14			00:00
					06:05	15:51	
				06:19	11:03	04:44	00:14
				11:13	14:29	03:16	00:10
				14:29	14:51	00:22	00:00
				14:51	16:48	01:57	00:00
				16:48			00:00
					04:48	12:00	
				04:57	07:40	02:43	00:09
				07:52	22:56	15:04	00:12
				22:56			00:00
					00:55	01:59	
				01:03	06:54	05:51	00:08
				07:09	07:22	00:13	00:15

				07:22	07:28	00:06	00:00
				07:28	09:43	02:15	00:00
				09:57	11:16	01:19	00:14
				11:32	11:33	00:01	00:16
				11:38	19:53	08:15	00:05
multi-source test	19:53	19:59	00:06				00:00
				12:54	20:10	07:16	00:05
				20:10	21:36	01:26	00:00
				21:36		02:24	00:00
					00:53	00:53	
				01:01	02:05	01:04	00:08
				07:00	22:17	15:17	00:22
				22:24			00:07
					00:01	01:37	
				00:05	00:13	00:08	00:04
				00:13	00:20	00:07	00:00
				00:20	00:23	00:03	00:00
				00:23	00:26	00:03	00:00
				00:26	00:37	00:11	00:00
				00:37	00:38	00:01	00:00
				00:38	00:45	00:07	00:00
				00:45	01:57	01:12	00:00
				02:05	02:44	00:39	00:08
				02:44	06:47	04:03	00:00
				06:55	08:07	01:12	00:08
				08:21	12:49	04:28	00:14
				13:09	14:57	01:48	00:20
				15:13	19:34	04:21	00:15
				19:42	21:18	01:36	00:08
				21:25			00:07
					01:09	03:44	
				01:16	02:24	01:08	00:07
				02:33	07:07	04:34	00:09
				07:29	08:26	00:57	00:22
				08:34	12:08	03:34	00:08
				12:16	13:43	01:27	00:08
				13:52	17:54	04:02	00:09

				18:00	19:32	01:32	00:06
				19:40	20:57	01:17	00:08
				21:04			00:07
					06:00	08:56	
				06:09	07:19	01:10	00:09
				07:34	10:11	02:37	00:15
				10:23	11:45	01:22	00:12
				11:55	20:10	08:15	00:10
				20:18	22:36	02:18	00:08
				23:37			00:01
					00:59	01:22	
				01:15	08:00	06:45	00:16
				08:00	13:06	05:06	00:00
				13:06	14:31	01:25	00:00
				14:45	15:08	00:23	00:14
				15:08			00:00
					13:31	22:23	
				13:31	13:33	00:02	00:00
				13:33	16:10	02:37	00:00
				02:43	13:53	11:10	00:05
				16:14		07:46	00:15
				00:00	24:00	24:00	
				00:00	06:44	06:44	00:00
				06:53	06:58	00:05	00:09
				06:58	07:13	00:15	00:00
				07:13	07:15	00:02	00:00
				07:15	09:28	02:13	00:00
				09:28	13:51	04:23	00:00
				14:05			00:14
					14:52	24:47	
				15:01	16:38	01:37	00:08
				16:38	19:16	02:38	00:00
				19:22	20:08	00:46	00:06
				20:08	21:17	01:09	00:00
				21:17			00:00

					23:21	26:04	
				23:30			00:09
					13:25	13:55	
				13:32	18:34	05:02	00:07
				18:42			00:08
					00:53	06:11	
				01:05	02:51	01:46	00:12
				03:01	12:52	09:51	00:10
				12:52	14:00	01:08	00:00

Time source activity ended	Duration of post-survey / post-testing activity	Time mitigation gun enabled / source output reduced	Time mitigation gun disabled / end of reduced output	Duration of mitigation activity / reduced output	Was any mitigation action required?	Time mitigation was called for HH:MM	Time mitigation occurred HH:MM
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
17:52	00:00				no		
20:56	00:01				no		
20:58	00:02				no		
					no		
					no		
					no		
					no		
					no		

					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
06:43	01:41				no		
					no		
13:58	00:00				yes	0.581944	0.581944
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		

					no		
					no		
					no		
					no		
					no		
19:59	00:00				no		
					no		
					no		
					no		
					no		
03:12	01:07				no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
14:58	00:01				no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		

					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
22:36	00:00				no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
16:10	00:00				no		
13:53	00:00				no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
14:53	00:01				no		
					no		
					no		
					no		
					no		
					no		

					no		
					no		
					no		
					no		
					no		
					no		
					no		
					no		
14:00	00:00				no		

Comments
Array 2 disabled d/t autofire on S2G8
Source element S1G1 failure
Array 1 disabled for recovery
Source element S2G9 disabled d/t autofire
Array 1 disabled for recovery
Source element S2G1 autofire
Array 2 disabled for recovery; line aborted d/t array maintenance
Disable Array to troubleshoot hydrophone card
Array 1 disabled d/t airleak and recovery
continues on next report
continued from previous report

S2G1 autofire, reduce volume
Array 2 disabled for recovery
Disable array 2 d/t missfires
enable guns 2-1 and 2-2 to test
disable guns 2-1 and 2-2 to swap sensor
enable gun 2-1
enable gun 2-2
disable guns 2-1 and 2-2 to recover array 2
Resume FV
Disable gun Gun 2-4 after misfire
Disable array 2 for recovery
Resume FV
Compressors failed - sources disabled
no pre-watch required per IHA for brief technical shut-down
VD#02 Unidentified shelled sea turtle
Resume FV; no ramp-up required
S2G4 disabled
Arraay 2 disabled for recovery
Array 2 deployed and Resume FV
Gun 2-4 failed

Gun S1G8 disable, but autofiring
Array 1 disabled
Sequence aborted d/t numbering error
Source testing before recovery for array and streamer maintenance
Disabled string 1 due to airleak
continues on next report
continued from previous report
No fire on 1-4
Troubleshooting guns 1-4
Disabled array 1
reenabled array 1to troubleshoot
Disabled array 1
enable array 1 to resume FV
Disable array 1 for maintenance
Enable array 1 to resume FV

Guns silent
S2G2 disabled after multiple failure
Array 2 disabled for recovery
Array 2 back in position and enabled
For 10 shots (SP 131652-131661) array 2 failed to fire
Sources disabled at EOL
Sources disabled at EOL
continues on next report
Array 1 disabled to adjust separation
Array 1 back online
Array 2 disabled to adjust separation
Array 2 back online
Array 1 disabled for recovery to address suspected leak
String 1 deployed & enabled
Array 1 disabled for repair on depth rope
String 1 Deployed and enabled

S2G1 disabled after multiple timing errors; end of project

Monitoring Effort – INPUT

Date	Type (visual, acoustic, or both VS day or night)	Number PSOs on Visual Watch	Location of visual monitoring	If acoustic, location of monitoring	PAM Operator Initials	PSO Initials
2023-05-09	visual only (day)	2	tower			CF, KM
2023-05-09	visual only (day)	2	tower			KM, CF
2023-05-09	visual only (day)	2	tower			ST, DD
2023-05-09	visual only (day)	2	tower			ST, JS
2023-05-09	visual only (day)	2	tower			DD, KM
2023-05-09	visual only (day)	2	tower			ST, JS
2023-05-09	visual only (day)	2	tower			DD, JS
2023-05-10	visual only (day)	2	tower			DD,JS
2023-05-10	visual only (day)	2	tower			DD, JS
2023-05-10	visual only (day)	2	tower			DD, JS
2023-05-10	visual only (day)	2	tower			DD, JS
2023-05-10	visual only (day)	2	tower			DD, JS
2023-05-10	visual only (day)	2	tower			JS, KM
2023-05-10	visual only (day)	2	tower			JS, KM
2023-05-10	visual only (day)	2	tower			JS, KM
2023-05-10	visual only (day)	2	tower			JS, KM
2023-05-10	visual only (day)	2	tower			JS, KM
2023-05-10	visual only (day)	2	tower			JS, KM
2023-05-10	visual only (day)	2	tower			JS, KM
2023-05-10	visual only (day)	2	tower			JS, KM
2023-05-10	visual only (day)	2	tower			JS, ST
2023-05-10	visual only (day)	2	tower			DD, JS
2023-05-10	visual only (day)	2	tower			KS, DD
2023-05-10	visual only (day)	2	tower			CF, DD
2023-05-10	visual only (day)	2	tower			KS, CF
2023-05-10	visual only (day)	2	tower			DD, KM
2023-05-10	visual only (day)	2	tower			CF, DD
2023-05-10	visual only (day)	2	tower			CF, ST
2023-05-10	visual only (day)	2	tower			DD, ST
2023-05-10	visual only (day)	2	tower			CF, ST
2023-05-10	visual only (day)	2	tower			CF, ST
2023-05-10	visual only (day)	2	tower			KM, CF
2023-05-10	visual only (day)	2	tower			ST, KM
2023-05-10	visual only (day)	2	tower			ST, KM
2023-05-10	visual only (day)	2	tower			ST,KM
2023-05-10	visual only (day)	2	tower			DD, ST
2023-05-10	visual only (day)	2	tower			DD, JS
2023-05-10	visual only (day)	2	bridge wings			DD, JS
2023-05-10	visual only (day)	2	bridge wings			DD, JS
2023-05-10	visual only (day)	2	tower			DD, JS

2023-05-10	visual only (day)	2	tower			CF, JS
2023-05-10	visual only (day)	2	tower			CF, JS
2023-05-11	visual only (day)	2	tower			CF, JS
2023-05-11	visual only (day)	2	tower			CF, JS
2023-05-11	visual only (day)	2	tower			CF, JS
2023-05-11	visual only (day)	2	tower			CF, JS
2023-05-11	PAM only (night)			vessel	JS	
2023-05-11	PAM only (night)			vessel	JS	
2023-05-11	visual and PAM (night)	1	bridge	vessel	JS	CF
2023-05-11	visual and PAM (night)	1	bridge	vessel	JS	CF
2023-05-11	PAM only (night)			vessel	JS	
2023-05-11	PAM only (night)			vessel	JS	
2023-05-11	PAM only (night)			vessel	KM	
2023-05-11	visual and PAM (night)	1	bridge	vessel	KM	CF
2023-05-11	visual and PAM (night)	1	bridge	vessel	KM	CF
2023-05-11	visual and PAM (night)	1	bridge	vessel	KM	CF
2023-05-11	PAM only (night)			vessel	KM	
2023-05-11	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-11	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-11	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-11	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-11	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-11	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-11	visual and PAM (day)	2	tower	vessel	DD	ST, JS
2023-05-11	visual and PAM (day)	2	tower	vessel	ST	JS, DD
2023-05-11	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-05-11	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-05-11	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-11	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-11	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-11	visual and PAM (day)	2	tower	vessel	KM	CF, ST
2023-05-11	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-05-11	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-11	visual and PAM (day)	2	tower	vessel	DD	KM,CF
2023-05-11	visual and PAM (day)	2	tower	vessel	DD	KM, ST
2023-05-11	visual and PAM (day)	2	tower	vessel	DD	KM, ST
2023-05-11	visual and PAM (day)	2	tower	vessel	CF	KM,ST
2023-05-11	visual and PAM (day)	2	tower	vessel	CF	KM,ST
2023-05-11	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-05-11	visual and PAM (day)	2	tower	vessel	KM	JS, DD
2023-05-11	visual and PAM (day)	2	tower	vessel	KM	JS, DD
2023-05-11	visual and PAM (day)	2	tower	vessel	ST	JS, DD
2023-05-11	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-11	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-11	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-12	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-12	visual and PAM (day)	2	tower	vessel	ST	CF, JS

2023-05-12	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-12	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-12	PAM only (night)			vessel	ST	
2023-05-12	PAM only (night)			vessel	CF	
2023-05-12	PAM only (night)			vessel	JS	
2023-05-12	PAM only (night)			vessel	CF	
2023-05-12	PAM only (night)			vessel	JS	
2023-05-12	PAM only (night)			vessel	JS	
2023-05-12	PAM only (night)			vessel	JS	
2023-05-12	PAM only (night)			vessel	JS	
2023-05-12	PAM only (night)			vessel	KM	
2023-05-12	PAM only (night)			vessel	KM	
2023-05-12	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-12	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-12	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-12	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-12	visual and PAM (day)	2	bridge wings	vessel	DD	KM,JS
2023-05-12	visual and PAM (day)	2	bridge wings	vessel	DD	KM,JS
2023-05-12	visual and PAM (day)	2	bridge wings	vessel	DD	KM,JS
2023-05-12	visual and PAM (day)	2	bridge wings	vessel	DD	JS, ST
2023-05-12	visual and PAM (day)	2	bridge wings	vessel	ST	DD, JS
2023-05-12	visual and PAM (day)	2	bridge wings	vessel	ST	DD, KM
2023-05-12	visual and PAM (day)	2	bridge wings	vessel	ST	CF, DD
2023-05-12	visual and PAM (day)	2	tower	vessel	ST	KM, CF
2023-05-12	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-12	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-12	visual and PAM (day)	2	tower	vessel	KM	CF, ST
2023-05-12	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-05-12	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-12	visual and PAM (day)	2	tower	vessel	DD	KM,CF
2023-05-12	visual and PAM (day)	2	tower	vessel	DD	KM, ST
2023-05-12	visual and PAM (day)	2	tower	vessel	CF	KM,ST
2023-05-12	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-05-12	visual and PAM (day)	2	tower	vessel	KM	DD,JS
2023-05-12	visual and PAM (day)	2	tower	vessel	ST	DD,JS
2023-05-12	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-12	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-12	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-13	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-13	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-13	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-13	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-13	PAM only (night)			vessel	ST	
2023-05-13	PAM only (night)			vessel	CF	
2023-05-13	PAM only (night)			vessel	JS	
2023-05-13	PAM only (night)			vessel	CF	
2023-05-13	PAM only (night)			vessel	JS	

2023-05-13	PAM only (night)			vessel	JS	
2023-05-13	PAM only (night)			vessel	JS	
2023-05-13	PAM only (night)			vessel	JS	
2023-05-13	PAM only (night)			vessel	KM	
2023-05-13	PAM only (night)			vessel	KM	
2023-05-13	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-13	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-13	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-13	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-13	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-13	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-13	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-13	visual and PAM (day)	2	tower	vessel	DD	JS, ST
2023-05-13	visual and PAM (day)	2	tower	vessel	ST	JS, DD
2023-05-13	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-05-13	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-05-13	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-13	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-13	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-13	visual and PAM (day)	2	tower	vessel	KM	ST, CF
2023-05-13	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-05-13	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-13	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-13	visual and PAM (day)	2	tower	vessel	DD	KM,CF
2023-05-13	visual and PAM (day)	2	tower	vessel	DD	KM, ST
2023-05-13	visual and PAM (day)	2	tower	vessel	CF	KM, ST
2023-05-13	visual and PAM (day)	2	tower	vessel	CF	DD,ST
2023-05-13	visual and PAM (day)	2	tower	vessel	KM	DD,JS
2023-05-13	visual and PAM (day)	2	tower	vessel	ST	DD,JS
2023-05-13	visual and PAM (day)	2	tower	vessel	ST	JS, CF
2023-05-13	visual and PAM (day)	2	tower	vessel	ST	JS, CF
2023-05-13	visual and PAM (day)	2	tower	vessel	ST	JS, CF
2023-05-14	visual and PAM (day)	2	tower	vessel	ST	JS, CF
2023-05-14	visual and PAM (day)	2	tower	vessel	ST	JS, CF
2023-05-14	visual and PAM (day)	2	tower	vessel	ST	JS, CF
2023-05-14	visual and PAM (day)	2	tower	vessel	ST	JS, CF

2023-05-14	PAM only (night)			vessel	ST	
2023-05-14	PAM only (night)			vessel	CF	
2023-05-14	PAM only (night)			vessel	JS	
2023-05-14	PAM only (night)			vessel	CF	
2023-05-14	PAM only (night)			vessel	JS	
2023-05-14	PAM only (night)			vessel	JS	
2023-05-14	PAM only (night)			vessel	JS	
2023-05-14	PAM only (night)			vessel	JS	
2023-05-14	PAM only (night)			vessel	KM	
2023-05-14	PAM only (night)			vessel	KM	
2023-05-14	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-14	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-14	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-14	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-14	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-14	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-14	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-14	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-14	visual and PAM (day)	2	tower	vessel	ST	DD,JS
2023-05-14	visual and PAM (day)	2	tower	vessel	ST	KM, DD
2023-05-14	visual and PAM (day)	2	tower	vessel	ST	DD,CF
2023-05-14	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-14	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-14	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-14	visual and PAM (day)	2	tower	vessel	KM	CF, ST
2023-05-14	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-05-14	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-14	visual and PAM (day)	2	tower	vessel	DD	KM,CF
2023-05-14	visual and PAM (day)	2	tower	vessel	DD	KM, ST
2023-05-14	visual and PAM (day)	2	tower	vessel	CF	KM,ST
2023-05-14	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-05-14	visual and PAM (day)	2	tower	vessel	KM	JS, DD
2023-05-14	visual and PAM (day)	2	tower	vessel	ST	JS, DD
2023-05-14	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-14	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-14	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-15	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-15	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-15	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-15	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-15	PAM only (night)			vessel	ST	
2023-05-15	PAM only (night)			vessel	CF	

2023-05-15	PAM only (night)			vessel	JS	
2023-05-15	PAM only (night)			vessel	CF	
2023-05-15	PAM only (night)			vessel	JS	
2023-05-15	PAM only (night)			vessel	JS	
2023-05-15	PAM only (night)			vessel	JS	
2023-05-15	PAM only (night)			vessel	KM	
2023-05-15	PAM only (night)			vessel	KM	
2023-05-15	visual and PAM (day)	2	tower	vessel		
2023-05-15	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-15	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-15	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-15	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-15	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-15	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-15	visual and PAM (day)	2	tower	vessel	DD	JS, ST
2023-05-15	visual and PAM (day)	2	tower	vessel	ST	JS, DD
2023-05-15	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-05-15	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-05-15	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-15	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-15	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-15	visual and PAM (day)	2	tower	vessel	KM	CF, ST
2023-05-15	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-05-15	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-15	visual and PAM (day)	2	tower	vessel	DD	KM,CF
2023-05-15	visual and PAM (day)	2	tower	vessel	DD	ST, KM
2023-05-15	visual and PAM (day)	2	tower	vessel	CF	ST, KM
2023-05-15	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-05-15	visual and PAM (day)	2	tower	vessel	KM	DD, JS
2023-05-15	visual and PAM (day)	2	tower	vessel	ST	DD. JS
2023-05-15	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-15	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-15	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-16	PAM only (night)			vessel	ST	
2023-05-16	PAM only (night)			vessel	CF	

2023-05-16	PAM only (night)			vessel	JS	
2023-05-16	PAM only (night)			vessel	CF	
2023-05-16	PAM only (night)			vessel	JS	
2023-05-16	PAM only (night)			vessel	JS	
2023-05-16	PAM only (night)			vessel	JS	
2023-05-16	PAM only (night)			vessel	JS	
2023-05-16	PAM only (night)			vessel	KM	
2023-05-16	PAM only (night)			vessel	KM	
2023-05-16	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-16	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-16	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-16	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-16	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-16	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-16	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-16	visual and PAM (day)	2	tower	vessel	DD	JS, ST
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-16	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-16	visual and PAM (day)	2	tower	vessel	KM	CF, ST
2023-05-16	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-05-16	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-16	visual and PAM (day)	2	tower	vessel	DD	CF, KM
2023-05-16	visual and PAM (day)	2	tower	vessel	DD	ST, KM
2023-05-16	visual and PAM (day)	2	tower	vessel	CF	ST, KM
2023-05-16	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-05-16	visual and PAM (day)	2	tower	vessel	KM	DD,JS
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	DD,JS
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-16	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-17	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-17	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-17	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-17	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-17	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-17	PAM only (night)			vessel	ST	
2023-05-17	PAM only (night)			vessel	CF	
2023-05-17	PAM only (night)			vessel	JS	
2023-05-17	PAM only (night)			vessel	CF	
2023-05-17	PAM only (night)			vessel	JS	
2023-05-17	PAM only (night)			vessel	JS	

2023-05-17	PAM only (night)			vessel	JS	
2023-05-17	PAM only (night)			vessel	JS	
2023-05-17	PAM only (night)			vessel	KM	
2023-05-17	PAM only (night)			vessel	KM	
2023-05-17	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-17	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-17	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-17	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-17	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-17	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-17	visual and PAM (day)	2	tower	vessel	DD	JS, ST
2023-05-17	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-05-17	visual and PAM (day)	2	bridge	vessel	ST	KM,DD
2023-05-17	visual and PAM (day)	2	bridge	vessel	ST	KM,DD
2023-05-17	visual and PAM (day)	2	bridge	vessel	ST	CF, DD
2023-05-17	visual and PAM (day)	2	bridge	vessel	ST	KM,CF
2023-05-17	visual and PAM (day)	2	bridge	vessel	ST	KM,CF
2023-05-17	visual and PAM (day)	2	bridge	vessel	ST	KM,CF
2023-05-17	visual and PAM (day)	2	bridge	vessel	ST	DD, KM
2023-05-17	visual and PAM (day)	2	bridge	vessel	KM	CF, DD
2023-05-17	visual and PAM (day)	2	bridge	vessel	KM	CF, ST
2023-05-17	visual and PAM (day)	2	bridge	vessel	KM	DD, ST
2023-05-17	visual and PAM (day)	2	bridge	vessel	DD	CF, ST
2023-05-17	visual and PAM (day)	2	bridge	vessel	DD	KM,CF
2023-05-17	visual and PAM (day)	2	bridge	vessel	DD	KM, ST
2023-05-17	visual and PAM (day)	2	bridge	vessel	CF	KM,ST
2023-05-17	visual and PAM (day)	2	bridge	vessel	CF	DD, ST
2023-05-17	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-05-17	visual and PAM (day)	2	tower	vessel	KM	DD, JS
2023-05-17	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-05-17	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-17	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-18	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-18	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-18	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-18	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-18	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-18	PAM only (night)			vessel	ST	
2023-05-18	PAM only (night)			vessel	CF	
2023-05-18	PAM only (night)			vessel	JS	
2023-05-18	PAM only (night)			vessel	CF	
2023-05-18	PAM only (night)			vessel	JS	
2023-05-18	PAM only (night)			vessel	JS	
2023-05-18	PAM only (night)			vessel	JS	
2023-05-18	PAM only (night)			vessel	JS	
2023-05-18	PAM only (night)			vessel	JS	
2023-05-18	visual and PAM (day)	2	bridge	vessel	DD	JS, KM

2023-05-18	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-18	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-18	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-18	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-18	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-18	visual and PAM (day)	2	bridge	vessel	DD	JS, ST
2023-05-18	visual and PAM (day)	2	bridge	vessel	ST	DD, JS
2023-05-18	visual and PAM (day)	2	bridge	vessel	ST	KM,DD
2023-05-18	visual and PAM (day)	2	bridge	vessel	ST	CF, DD
2023-05-18	visual and PAM (day)	2	bridge	vessel	ST	KM,CF
2023-05-18	visual and PAM (day)	2	bridge	vessel	ST	DD, KM
2023-05-18	visual and PAM (day)	2	bridge	vessel	KM	CF, DD
2023-05-18	visual and PAM (day)	2	bridge	vessel	KM	CF, ST
2023-05-18	visual and PAM (day)	2	bridge	vessel	KM	DD, ST
2023-05-18	visual and PAM (day)	2	bridge	vessel	DD	CF, ST
2023-05-18	visual and PAM (day)	2	bridge	vessel	DD	KM,CF
2023-05-18	visual and PAM (day)	2	bridge	vessel	DD	KM, ST
2023-05-18	visual and PAM (day)	2	bridge	vessel	CF	KM, ST
2023-05-18	visual and PAM (day)	2	bridge	vessel	CF	DD, ST
2023-05-18	visual and PAM (day)	2	bridge	vessel	KM	DD, JS
2023-05-18	visual and PAM (day)	2	bridge	vessel	ST	DD, JS
2023-05-18	visual and PAM (day)	2	bridge	vessel	ST	DD, JS
2023-05-18	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-19	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-19	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-19	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-19	PAM only (night)			vessel	ST	
2023-05-19	PAM only (night)			vessel	CF	
2023-05-19	PAM only (night)			vessel	JS	
2023-05-19	PAM only (night)			vessel	CF	
2023-05-19	PAM only (night)			vessel	JS	
2023-05-19	PAM only (night)			vessel	JS	
2023-05-19	PAM only (night)			vessel	JS	
2023-05-19	PAM only (night)			vessel	JS	
2023-05-19	PAM only (night)			vessel	KM	
2023-05-19	PAM only (night)			vessel	KM	
2023-05-19	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-19	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-19	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-19	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-19	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-19	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-19	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-19	visual and PAM (day)	2	bridge	vessel	DD	JS, ST
2023-05-19	visual and PAM (day)	2	bridge	vessel	ST	DD, JS
2023-05-19	visual and PAM (day)	2	bridge	vessel	ST	KM,DD
2023-05-19	visual and PAM (day)	2	bridge	vessel	ST	CF, DD

2023-05-19	visual and PAM (day)	2	bridge	vessel	ST	KM,CF
2023-05-19	visual and PAM (day)	2	bridge	vessel	ST	DD, KM
2023-05-19	visual and PAM (day)	2	bridge	vessel	KM	CF, DD
2023-05-19	visual and PAM (day)	2	bridge	vessel	KM	ST, CF
2023-05-19	visual and PAM (day)	2	bridge	vessel	KM	DD, ST
2023-05-19	visual and PAM (day)	2	bridge	vessel	DD	CF, ST
2023-05-19	visual and PAM (day)	2	bridge	vessel	DD	CF, ST
2023-05-19	visual and PAM (day)	2	bridge	vessel	DD	CF, ST
2023-05-19	visual and PAM (day)	2	bridge	vessel	DD	KM,CF
2023-05-19	visual and PAM (day)	2	bridge	vessel	DD	KM, ST
2023-05-19	visual and PAM (day)	2	bridge	vessel	CF	KM,ST
2023-05-19	visual and PAM (day)	2	bridge	vessel	CF	KM,ST
2023-05-19	visual and PAM (day)	2	bridge	vessel	CF	DD, ST
2023-05-19	visual and PAM (day)	2	bridge	vessel	KM	DD,JS
2023-05-19	visual only (day)	2	bridge			DD,JS
2023-05-19	visual only (day)	2	bridge			DD,JS
2023-05-19	visual only (day)	2	bridge			CF, JS
2023-05-20	visual only (day)	2	bridge			CF, JS
2023-05-20	visual only (day)	2	bridge			CF, JS
2023-05-20	visual only (day)	2	bridge			CF, JS
2023-05-20	visual only (day)	2	bridge			CF, JS
2023-05-20	visual only (day)	2	bridge			CF, JS
2023-05-20	visual only (day)	2	bridge			CF, JS
2023-05-20	visual only (day)	2	bridge			KM,JS
2023-05-20	visual only (day)	2	bridge			KM,JS
2023-05-20	visual only (day)	2	bridge			KM,JS
2023-05-20	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-20	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-20	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-20	visual and PAM (day)	2	bridge	vessel	DD	JS, ST
2023-05-20	visual and PAM (day)	2	bridge	vessel	ST	JS, DD
2023-05-20	visual and PAM (day)	2	bridge	vessel	ST	KM,DD
2023-05-20	visual and PAM (day)	2	bridge	vessel	ST	KM,DD
2023-05-20	visual and PAM (day)	2	bridge	vessel	ST	CF, DD
2023-05-20	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-05-20	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-20	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-20	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-20	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-20	visual and PAM (day)	2	bridge	vessel	KM	CF, DD
2023-05-20	visual and PAM (day)	2	bridge	vessel	KM	CF, ST
2023-05-20	visual and PAM (day)	2	bridge	vessel	KM	DD, ST
2023-05-20	visual and PAM (day)	2	bridge	vessel	DD	CF, ST
2023-05-20	visual and PAM (day)	2	bridge	vessel	DD	KM,CF
2023-05-20	visual and PAM (day)	2	bridge	vessel	DD	KM, ST

2023-05-20	visual and PAM (day)	2	bridge	vessel	CF	KM, ST
2023-05-20	visual and PAM (day)	2	bridge	vessel	CF	DD, ST
2023-05-20	visual and PAM (day)	2	bridge	vessel	KM	DD,JS
2023-05-20	visual and PAM (day)	2	bridge	vessel	ST	DD, JS
2023-05-20	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-21	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-21	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-21	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-21	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-21	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-21	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-21	PAM only (night)			vessel	ST	
2023-05-21	PAM only (night)			vessel	CF	
2023-05-21	PAM only (night)			vessel	JS	
2023-05-21	PAM only (night)			vessel	CF	
2023-05-21	PAM only (night)			vessel	CF	
2023-05-21	PAM only (night)			vessel	JS	
2023-05-21	PAM only (night)			vessel	JS	
2023-05-21	visual and PAM (night)	1	bridge	vessel	JS	KM
2023-05-21	visual and PAM (night)	1	bridge	vessel	JS	KM
2023-05-21	PAM only (night)			vessel	JS	
2023-05-21	PAM only (night)			vessel	JS	
2023-05-21	PAM only (night)			vessel	KM	
2023-05-21	PAM only (night)			vessel	KM	
2023-05-21	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-21	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-21	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-21	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-21	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-21	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-21	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-21	visual and PAM (day)	2	tower	vessel	DD	JS, ST
2023-05-21	visual and PAM (day)	2	tower	vessel	ST	JS, DD
2023-05-21	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-05-21	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-05-21	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-21	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-21	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-21	visual and PAM (day)	2	tower	vessel	KM	CF, ST
2023-05-21	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-05-21	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-21	visual and PAM (day)	2	tower	vessel	DD	KM,CF
2023-05-21	visual and PAM (day)	2	tower	vessel	DD	KM, ST
2023-05-21	visual and PAM (day)	2	tower	vessel	CF	KM, ST
2023-05-21	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-05-21	visual and PAM (day)	2	tower	vessel	KM	DD,JS

2023-05-21	visual and PAM (day)	2	tower	vessel	ST	DD,JS
2023-05-21	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-22	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-22	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-22	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-22	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-22	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-22	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-22	PAM only (night)			vessel	ST	
2023-05-22	PAM only (night)			vessel	CF	
2023-05-22	PAM only (night)			vessel	JS	
2023-05-22	PAM only (night)			vessel	CF	
2023-05-22	PAM only (night)			vessel	JS	
2023-05-22	PAM only (night)			vessel	JS	
2023-05-22	PAM only (night)			vessel	JS	
2023-05-22	PAM only (night)			vessel	JS	
2023-05-22	PAM only (night)			vessel	KM	
2023-05-22	PAM only (night)			vessel	KM	
2023-05-22	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-22	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-22	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-22	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-22	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-22	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-22	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-22	visual and PAM (day)	2	tower	vessel	DD	JS, ST
2023-05-22	visual and PAM (day)	2	tower	vessel	ST	DD, ST
2023-05-22	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-05-22	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-05-22	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-22	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-22	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-22	visual and PAM (day)	2	tower	vessel	KM	CF, ST
2023-05-22	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-05-22	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-22	visual and PAM (day)	2	tower	vessel	DD	KM,CF
2023-05-22	visual and PAM (day)	2	tower	vessel	DD	KM,ST
2023-05-22	visual and PAM (day)	2	tower	vessel	CF	KM, ST
2023-05-22	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-05-22	visual and PAM (day)	2	tower	vessel	KM	DD, JS

2023-05-22	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-05-22	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-23	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-23	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-23	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-23	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-23	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-23	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-23	PAM only (night)			vessel	ST	
2023-05-23	PAM only (night)			vessel	CF	
2023-05-23	PAM only (night)			vessel	JS	
2023-05-23	PAM only (night)			vessel	CF	
2023-05-23	PAM only (night)			vessel	JS	
2023-05-23	PAM only (night)			vessel	JS	
2023-05-23	PAM only (night)			vessel	JS	
2023-05-23	PAM only (night)			vessel	JS	
2023-05-23	PAM only (night)			vessel	KM	
2023-05-23	PAM only (night)			vessel	KM	
2023-05-23	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-23	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-23	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-23	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-23	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-23	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-23	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-23	visual and PAM (day)	2	tower	vessel	DD	JS, ST
2023-05-23	visual and PAM (day)	2	tower	vessel	ST	JS, DD
2023-05-23	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-05-23	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-05-23	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-23	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-23	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-23	visual and PAM (day)	2	tower	vessel	KM	CF, ST
2023-05-23	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-05-23	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-23	visual and PAM (day)	2	tower	vessel	DD	KM,CF
2023-05-23	visual and PAM (day)	2	tower	vessel	DD	KM, ST
2023-05-23	visual and PAM (day)	2	tower	vessel	CF	KM, ST
2023-05-23	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-05-23	visual and PAM (day)	2	tower	vessel	KM	DD,JS
2023-05-23	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-05-23	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-24	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-24	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-24	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-24	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-24	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-24	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-24	PAM only (night)			vessel	ST	

2023-05-24	PAM only (night)			vessel	CF	
2023-05-24	PAM only (night)			vessel	JS	
2023-05-24	PAM only (night)			vessel	CF	
2023-05-24	PAM only (night)			vessel	JS	
2023-05-24	PAM only (night)			vessel	JS	
2023-05-24	PAM only (night)			vessel	JS	
2023-05-24	PAM only (night)			vessel	JS	
2023-05-24	PAM only (night)			vessel	KM	
2023-05-24	PAM only (night)			vessel	KM	
2023-05-24	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	DD	ST, JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	ST	DD, JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	ST	KM,DD
2023-05-24	visual and PAM (day)	2	bridge	vessel	ST	CF, DD
2023-05-24	visual and PAM (day)	2	bridge	vessel	ST	KM,CF
2023-05-24	visual and PAM (day)	2	bridge	vessel	ST	DD, KM
2023-05-24	visual and PAM (day)	2	bridge	vessel	KM	CF, DD
2023-05-24	visual and PAM (day)	2	bridge	vessel	KM	CF, ST
2023-05-24	visual and PAM (day)	2	bridge	vessel	KM	DD, ST
2023-05-24	visual and PAM (day)	2	bridge	vessel	DD	CF, ST
2023-05-24	visual and PAM (day)	2	bridge	vessel	DD	KM,CF
2023-05-24	visual and PAM (day)	2	bridge	vessel	DD	KM, ST
2023-05-24	visual and PAM (day)	2	bridge	vessel	CF	KM,ST
2023-05-24	visual and PAM (day)	2	bridge	vessel	DD	KM, ST
2023-05-24	visual and PAM (day)	2	bridge	vessel	KM	DD,JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	ST	DD,JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	ST	DD,JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	ST	DD, JS
2023-05-24	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-25	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-25	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-25	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-25	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-25	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-25	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-25	PAM only (night)			vessel	ST	
2023-05-25	PAM only (night)			vessel	CF	
2023-05-25	PAM only (night)			vessel	JS	
2023-05-25	PAM only (night)			vessel	CF	
2023-05-25	PAM only (night)			vessel	JS	
2023-05-25	PAM only (night)			vessel	JS	
2023-05-25	PAM only (night)			vessel	JS	

2023-05-25	PAM only (night)			vessel	JS	
2023-05-25	PAM only (night)			vessel	KM	
2023-05-25	PAM only (night)			vessel	KM	
2023-05-25	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-25	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-25	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-25	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-25	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-25	visual and PAM (day)	2	bridge	vessel	DD	KM,JS
2023-05-26	visual and PAM (day)	2	tower	vessel	DD	KM,JS
2023-05-26	visual and PAM (day)	2	tower	vessel	DD	JS, ST
2023-05-25	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-05-25	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-05-25	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-05-25	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-25	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-25	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-25	visual and PAM (day)	2	tower	vessel	KM	CF, ST
2023-05-25	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-05-25	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-25	visual and PAM (day)	2	tower	vessel	DD	KM,CF
2023-05-25	visual and PAM (day)	2	tower	vessel	DD	KM, ST
2023-05-25	visual and PAM (day)	2	tower	vessel	CF	KM, ST
2023-05-25	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-05-25	visual and PAM (day)	2	bridge	vessel	CF	DD, ST
2023-05-25	visual and PAM (day)	2	bridge	vessel	KM	DD,JS
2023-05-25	visual and PAM (day)	2	bridge	vessel	ST	DD,JS
2023-05-25	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-26	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-26	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-26	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-26	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-26	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-26	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-26	PAM only (night)			vessel	ST	
2023-05-26	PAM only (night)			vessel	CF	
2023-05-26	PAM only (night)			vessel	JS	
2023-05-26	PAM only (night)			vessel	CF	
2023-05-26	PAM only (night)			vessel	JS	
2023-05-26	PAM only (night)			vessel	JS	
2023-05-26	PAM only (night)			vessel	JS	
2023-05-26	PAM only (night)			vessel	JS	
2023-05-26	PAM only (night)			vessel	KM	
2023-05-26	PAM only (night)			vessel	KM	
2023-05-26	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-26	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-26	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-26	visual and PAM (day)	2	bridge	vessel	DD	JS, KM

2023-05-26	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-26	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-26	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-26	visual and PAM (day)	2	bridge	vessel	DD	JS, ST
2023-05-26	visual and PAM (day)	2	bridge	vessel	ST	DD, JS
2023-05-26	visual and PAM (day)	2	bridge	vessel	ST	KM,DD
2023-05-26	visual and PAM (day)	2	bridge	vessel	ST	CF, DD
2023-05-26	visual and PAM (day)	2	bridge	vessel	ST	KM,CF
2023-05-26	visual and PAM (day)	2	bridge	vessel	ST	DD, KM
2023-05-26	visual and PAM (day)	2	bridge	vessel	KM	CF, DD
2023-05-26	visual and PAM (day)	2	bridge	vessel	KM	CF, ST
2023-05-26	visual and PAM (day)	2	bridge	vessel	KM	CF, ST
2023-05-26	visual and PAM (day)	2	bridge	vessel	KM	DD, ST
2023-05-26	visual only (day)	2	bridge			DD, ST
2023-05-26	visual only (day)	2	bridge			CF, ST
2023-05-26	visual only (day)	2	bridge			KM,CF
2023-05-26	visual only (day)	2	bridge			KM, ST
2023-05-26	visual only (day)	2	bridge			KM, ST
2023-05-26	visual only (day)	2	bridge			DD, ST
2023-05-26	visual only (day)	2	bridge			DD, JS
2023-05-26	visual only (day)	2	bridge			DD, JS
2023-05-26	visual only (day)	2	bridge			DD, JS
2023-05-26	visual only (day)	2	bridge			JS,CF
2023-05-27	visual only (day)	2	bridge			JS, CF
2023-05-27	PAM only (night)			vessel	ST	
2023-05-27	PAM only (night)			vessel	CF	
2023-05-27	visual and PAM (night)	1	bridge	vessel	JS	CF
2023-05-27	visual and PAM (night)	1	bridge	vessel	JS	CF
2023-05-27	PAM only (night)			vessel	JS	
2023-05-27	PAM only (night)			vessel	CF	
2023-05-27	PAM only (night)			vessel	JS	
2023-05-27	PAM only (night)			vessel	JS	
2023-05-27	PAM only (night)			vessel	JS	
2023-05-27	PAM only (night)			vessel	JS	
2023-05-27	PAM only (night)			vessel	KM	
2023-05-27	PAM only (night)			vessel	KM	
2023-05-27	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-27	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-27	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-27	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-27	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-27	visual and PAM (day)	2	bridge	vessel	DD	JS, KM

2023-05-27	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-27	visual and PAM (day)	2	bridge	vessel	DD	JS, ST
2023-05-27	visual and PAM (day)	2	bridge	vessel	ST	DD, JS
2023-05-27	visual and PAM (day)	2	bridge	vessel	ST	KM, DD
2023-05-27	visual and PAM (day)	2	bridge	vessel	ST	CF, DD
2023-05-27	visual and PAM (day)	2	bridge	vessel	ST	KM,CF
2023-05-27	visual and PAM (day)	2	bridge	vessel	ST	KM,CF
2023-05-27	visual and PAM (day)	2	bridge	vessel	ST	DD, KM
2023-05-27	visual and PAM (day)	2	bridge	vessel	KM	CF, DD
2023-05-27	visual and PAM (day)	2	bridge	vessel	KM	CF, DD
2023-05-27	visual and PAM (day)	2	bridge	vessel	KM	CF, ST
2023-05-27	visual and PAM (day)	2	bridge	vessel	KM	DD, ST
2023-05-27	visual and PAM (day)	2	bridge	vessel	DD	CF, ST
2023-05-27	visual and PAM (day)	2	bridge	vessel	DD	KM,CF
2023-05-27	visual and PAM (day)	2	bridge	vessel	DD	KM, ST
2023-05-27	visual and PAM (day)	2	bridge	vessel	CF	KM,ST
2023-05-27	visual and PAM (day)	2	bridge	vessel	CF	DD, ST
2023-05-27	visual and PAM (day)	2	bridge	vessel	KM	DD, JS
2023-05-27	visual and PAM (day)	2	bridge	vessel	ST	DD, JS
2023-05-27	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-27	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-28	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-28	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-28	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-28	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-28	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-05-28	PAM only (night)			vessel	ST	
2023-05-28	PAM only (night)			vessel	CF	
2023-05-28	PAM only (night)			vessel	JS	
2023-05-28	PAM only (night)			vessel	CF	
2023-05-28	PAM only (night)			vessel	JS	
2023-05-28	PAM only (night)			vessel	JS	
2023-05-28	PAM only (night)			vessel	JS	
2023-05-28	PAM only (night)			vessel	JS	
2023-05-28	PAM only (night)			vessel	KM	
2023-05-28	PAM only (night)			vessel	KM	
2023-05-28	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-28	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-28	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-28	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-28	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-28	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-28	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-28	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-28	visual and PAM (day)	2	tower	vessel	DD	JS, ST
2023-05-28	visual and PAM (day)	2	tower	vessel	ST	JS, DD
2023-05-28	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-05-28	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-05-28	visual and PAM (day)	2	tower	vessel	ST	KM,CF

2023-05-28	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-28	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-28	visual and PAM (day)	2	tower	vessel	KM	CF, ST
2023-05-28	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-05-28	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-28	visual and PAM (day)	2	tower	vessel	DD	KM,CF
2023-05-28	visual and PAM (day)	2	tower	vessel	DD	ST, KM
2023-05-28	visual and PAM (day)	2	tower	vessel	CF	KM,ST
2023-05-28	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-05-28	visual and PAM (day)	2	tower	vessel	KM	JS, DD
2023-05-28	visual and PAM (day)	2	tower	vessel	ST	JS, DD
2023-05-28	visual and PAM (day)	2	tower	vessel	ST	JS, CF
2023-05-29	visual and PAM (day)	2	tower	vessel	ST	JS, CF
2023-05-29	visual and PAM (day)	2	tower	vessel	ST	JS, CF
2023-05-29	visual and PAM (day)	2	tower	vessel	ST	JS, CF
2023-05-29	visual and PAM (day)	2	tower	vessel	ST	JS, CF
2023-05-29	visual and PAM (day)	2	tower	vessel	ST	JS, CF
2023-05-29	visual and PAM (day)	2	tower	vessel	ST	JS, CF
2023-05-29	PAM only (night)			vessel	ST	JS, CF
2023-05-29	PAM only (night)			vessel	CF	
2023-05-29	PAM only (night)			vessel	JS	
2023-05-29	PAM only (night)			vessel	CF	
2023-05-29	PAM only (night)			vessel	JS	
2023-05-29	PAM only (night)			vessel	JS	
2023-05-29	PAM only (night)			vessel	JS	
2023-05-29	PAM only (night)			vessel	JS	
2023-05-29	PAM only (night)			vessel	KM	
2023-05-29	PAM only (night)			vessel	KM	
2023-05-29	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-29	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-29	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-29	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-29	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-29	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-29	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-29	visual and PAM (day)	2	tower	vessel	DD	JS, ST
2023-05-29	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-05-29	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-05-29	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-05-29	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-29	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-29	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-29	visual and PAM (day)	2	tower	vessel	KM	CF, ST
2023-05-29	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-05-29	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-29	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-29	visual and PAM (day)	2	tower	vessel	DD	KM,CF

2023-05-29	visual and PAM (day)	2	tower	vessel	DD	KM, ST
2023-05-29	visual and PAM (day)	2	tower	vessel	CF	KM, ST
2023-05-29	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-05-29	visual and PAM (day)	2	tower	vessel	KM	DD, JS
2023-05-29	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-05-29	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-30	PAM only (night)			vessel	ST	
2023-05-30	PAM only (night)			vessel	CF	
2023-05-30	PAM only (night)			vessel	JS	
2023-05-30	PAM only (night)			vessel	CF	
2023-05-30	PAM only (night)			vessel	JS	
2023-05-30	PAM only (night)			vessel	JS	
2023-05-30	PAM only (night)			vessel	JS	
2023-05-30	PAM only (night)			vessel	JS	
2023-05-30	PAM only (night)			vessel	KM	
2023-05-30	PAM only (night)			vessel	KM	
2023-05-30	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-30	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-30	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-30	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-30	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-30	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-30	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-30	visual and PAM (day)	2	tower	vessel	DD	JS, ST
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	KM, CF
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-30	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-30	visual and PAM (day)	2	tower	vessel	KM	CF, ST
2023-05-30	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-05-30	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-05-30	visual and PAM (day)	2	tower	vessel	DD	KM,CF
2023-05-30	visual and PAM (day)	2	tower	vessel	DD	KM, ST
2023-05-30	visual and PAM (day)	2	tower	vessel	CF	KM,ST
2023-05-30	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-05-30	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-31	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-31	visual and PAM (day)	2	tower	vessel	ST	CF, JS

2023-05-31	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-31	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-31	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-31	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-05-31	PAM only (night)			vessel	ST	
2023-05-31	PAM only (night)			vessel	CF	
2023-05-31	PAM only (night)			vessel	JS	
2023-05-31	PAM only (night)			vessel	CF	
2023-05-31	PAM only (night)			vessel	JS	
2023-05-31	PAM only (night)			vessel	JS	
2023-05-31	PAM only (night)			vessel	JS	
2023-05-31	PAM only (night)			vessel	JS	
2023-05-31	PAM only (night)			vessel	KM	
2023-05-31	PAM only (night)			vessel	KM	
2023-05-31	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-31	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-31	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-31	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-31	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-31	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-31	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-05-31	visual and PAM (day)	2	bridge	vessel	DD	JS, KM
2023-05-31	visual and PAM (day)	2	bridge	vessel	DD	ST, JS
2023-05-31	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-05-31	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-05-31	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-05-31	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-31	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-31	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-31	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-05-31	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-05-31	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-05-31	visual and PAM (day)	2	bridge	vessel	KM	CF, DD
2023-05-31	visual and PAM (day)	2	bridge	vessel	KM	CF, ST
2023-05-31	visual and PAM (day)	2	bridge	vessel	KM	DD, ST
2023-05-31	visual and PAM (day)	2	bridge	vessel	DD	CF, ST
2023-05-31	visual and PAM (day)	2	bridge	vessel	DD	KM,CF
2023-05-31	visual and PAM (day)	2	bridge	vessel	DD	KM, ST
2023-05-31	visual and PAM (day)	2	bridge	vessel	CF	KM, ST
2023-05-31	visual and PAM (day)	2	bridge	vessel	CF	DD, ST
2023-05-31	visual and PAM (day)	2	bridge	vessel	KM	DD, JS
2023-05-31	visual and PAM (day)	2	bridge	vessel	ST	DD, JS
2023-05-31	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	ST	CF, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	ST	CF, JS

2023-06-01	PAM only (night)			vessel	ST	
2023-06-01	PAM only (night)			vessel	CF	
2023-06-01	PAM only (night)			vessel	JS	
2023-06-01	PAM only (night)			vessel	CF	
2023-06-01	PAM only (night)			vessel	JS	
2023-06-01	PAM only (night)			vessel	JS	
2023-06-01	PAM only (night)			vessel	JS	
2023-06-01	PAM only (night)			vessel	JS	
2023-06-01	PAM only (night)			vessel	KM	
2023-06-01	PAM only (night)			vessel	KM	
2023-06-01	visual and PAM (day)	2	bridge	vessel	DD	KM, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	DD	KM, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	DD	KM, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	DD	KM, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	DD	KM, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	DD	KM, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	DD	KM, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	DD	ST, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	ST	DD, JS
2023-06-01	visual and PAM (day)	2	bridge	vessel	ST	KM,DD
2023-06-01	visual and PAM (day)	2	bridge	vessel	ST	CF, DD
2023-06-01	visual and PAM (day)	2	bridge	vessel	ST	KM,CF
2023-06-01	visual and PAM (day)	2	bridge	vessel	ST	DD, KM
2023-06-01	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-06-01	visual and PAM (day)	2	tower	vessel	KM	CF, DD
2023-06-01	visual and PAM (day)	2	tower	vessel	KM	CF, ST
2023-06-01	visual and PAM (day)	2	tower	vessel	KM	DD, ST
2023-06-01	visual and PAM (day)	2	tower	vessel	DD	CF, ST
2023-06-01	visual and PAM (day)	2	tower	vessel	DD	KM,CF
2023-06-01	visual and PAM (day)	2	tower	vessel	DD	ST, KM
2023-06-01	visual and PAM (day)	2	tower	vessel	CF	ST,KM
2023-06-01	visual and PAM (day)	2	tower	vessel	CF	DD, ST
2023-06-01	visual and PAM (day)	2	tower	vessel	KM	DD,JS
2023-06-01	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-06-01	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	CF, JS
2023-06-02	PAM only (night)			vessel	ST	
2023-06-02	PAM only (night)			vessel	CF	
2023-06-02	PAM only (night)			vessel	JS	
2023-06-02	PAM only (night)			vessel	CF	
2023-06-02	PAM only (night)			vessel	JS	
2023-06-02	PAM only (night)			vessel	JS	
2023-06-02	PAM only (night)			vessel	JS	

2023-06-02	PAM only (night)			vessel	JS	
2023-06-02	PAM only (night)			vessel	KM	
2023-06-02	PAM only (night)			vessel	KM	
2023-06-02	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-06-02	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-06-02	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-06-02	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-06-02	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-06-02	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-06-02	visual and PAM (day)	2	tower	vessel	DD	JS, KM
2023-06-02	visual and PAM (day)	2	tower	vessel	DD	JS, ST
2023-06-02	visual and PAM (day)	2	tower	vessel	DD	JS, ST
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	DD, JS
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	KM,DD
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	KM,CF
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	DD, KM
2023-06-02	visual and PAM (day)	2	tower	vessel	ST	CF, DD
2023-06-02	visual only (day)	2	tower			CF, DD
2023-06-02	visual only (day)	2	tower			CF, ST
2023-06-02	visual only (day)	2	tower			DD, ST
2023-06-02	visual only (day)	2	tower			CF, ST
2023-06-02	visual only (day)	2	tower			CF, ST
2023-06-02	visual only (day)	2	tower			CF, ST
2023-06-02	visual only (day)	2	tower			KM,CF
2023-06-02	visual only (day)	2	tower			KM, ST
2023-06-02	visual only (day)	2	tower			KM, ST
2023-06-02	visual only (day)	2	tower			DD, ST
2023-06-02	visual only (day)	2	tower			JS, DD
2023-06-02	visual only (day)	2	tower			JS, DD
2023-06-02	visual only (day)	2	tower			CF, JS
2023-06-03	visual only (day)	2	tower			CF, JS
2023-06-03	visual only (day)	2	tower			CF, JS
2023-06-03	visual only (day)	2	tower			CF, JS
2023-06-03	visual only (day)	2	tower			CF, JS
2023-06-03	visual only (day)	2	tower			CF, JS
2023-06-03	visual only (day)	2	tower			CF, JS
2023-06-03	visual only (day)	2	tower			CF, JS
2023-06-03	visual only (day)	2	tower			KM,JS
2023-06-03	visual only (day)	2	tower			KM,JS
2023-06-03	visual only (day)	2	tower			KM,JS
2023-06-03	visual only (day)	2	tower			KM,JS
2023-06-03	visual only (day)	2	tower			KM,JS
2023-06-03	visual only (day)	2	tower			KM,JS
2023-06-03	visual only (day)	2	tower			KM,JS

2023-06-03	visual only (day)	2	tower			JS, ST
2023-06-03	visual only (day)	2	tower			DD, JS
2023-06-03	visual only (day)	2	tower			KM,DD

Vessel Activity	Start of observations				
	Time	Latitude	Longitude	Vessel Heading in degrees	Vessel Speed in Knots
Transit	17:15	36.85261°N	076.29956°W	37.0°	1.1
Transit	18:00	36.93067°N	076.33883°W	5.1°	10.4
Transit	19:00	36.99200°N	076.17967°W	109.0°	10.3
Transit	20:00	36.93957°N	075.99313°W	104.0°	11.0
Transit	21:00	36.82667°N	075.80555°W	121.0°	10.0
Transit	22:00	36.72723°N	075.62935°W	123.0°	10.3
Transit	23:00	36.57343°N	075.52237°W	153.0°	10.8
Transit	00:00	36.42503°N	075.43832°W	154.0°	10.8
Transit	00:05	36.39557°N	075.42400°W	154.0°	10.8
Transit	00:10	36.38408°N	075.41772°W	154.0°	10.8
Transit	00:15	36.37002°N	075.40996°W	154.0°	10.7
Transit	00:20	36.36100°N	075.40517°W	153.0°	10.8
Deploying equipment	09:30	35.31658°N	074.05673°W	149.0°	2.5
Deploying equipment	09:35	35.31245°N	074.05198°W	144.0°	2.5
Deploying equipment	09:40	35.31207°N	074.05160°W	143.0°	2.5
Deploying equipment	09:45	35.31190°N	074.05137°W	141.0°	2.5
Deploying equipment	09:50	35.30606°N	074.04411°W	143.0°	2.5
Deploying equipment	09:55	35.30342°N	074.04085°W	143.0°	2.4
Deploying equipment	10:00	35.30140°N	074.03880°W	142.0°	2.5
Deploying equipment	10:14	35.29797°N	074.03493°W	140.0°	2.7
Deploying equipment	11:00	35.28084°N	074.01417°W	134.0°	3.8
Deploying equipment	11:30	35.26050°N	073.98700°W	138.0°	3.9
Deploying equipment	12:00	35.24064°N	073.96191°W	138.0°	3.4
Deploying equipment	13:00	35.20280°N	073.91739°W	190.0°	4.0
Deploying equipment	13:30	35.17846°N	073.89936°W	190.0°	4.0
Deploying equipment	14:30	35.13528°N	073.92327°W	213.0°	4.0
Deploying equipment	15:00	35.11384°N	073.93662°W	213.0°	2.2
Deploying equipment	16:00	35.08048°N	073.93983°W	223.0°	1.8
Standby (define in commer	16:30	35.07050°N	073.95567°W	230.0°	1.7
Standby (define in commer	17:00	35.06106°N	073.97141°W	226.0°	2.0
Deploying equipment	17:31	35.04431°N	073.98997°W	215.0°	4.2
Deploying equipment	18:00	35.02634°N	074.00484°W	213.0°	4.1
Deploying equipment	18:30	35.00517°N	074.02217°W	211.0°	4.5
Deploying equipment	19:00	34.97917°N	074.04300°W	211.0°	4.5
Deploying equipment	20:00	34.93968°N	074.07345°W	210.0°	3.9
Deploying equipment	20:30	34.91850°N	074.08837°W	211.0°	4.0
Deploying equipment	21:30	34.87793°N	074.09187°W	130.0°	3.8
Deploying equipment	22:00	34.88074°N	074.05509°W	56.0°	4.4
Deploying equipment	23:00	34.95968°N	074.04380°W	2.0°	4.5
Deploying equipment	23:30	34.99980°N	074.04455°W	358.7°	4.6

Deploying equipment	23:49	35.02142°N	074.04949°W	358.7°	4.6
Deploying equipment	23:54	35.02713°N	074.06073°W	283.9°	3.0
Deploying equipment	00:00	35.02487°N	074.05741°W	296.7°	3.3
Deploying equipment	00:04	35.02713°N	074.06073°W	283.9°	3.3
Deploying equipment	00:09	35.02899°N	074.06507°W	267.0°	3.0
Deploying equipment	00:14	35.02966°N	074.06819°W	247.3°	2.2
Deploying equipment	04:50	34.98200°N	074.23108°W	214.2°	2.5
Deploying equipment	05:00	34.97333°N	074.23582°W	220.0°	2.2
Deploying equipment	05:55	34.93936°N	074.25345°W	214.0°	3.3
Standby (define in commer	06:00	34.93512°N	074.25573°W	213.0°	3.0
Standby (define in commer	06:25	34.91567°N	074.26484°W	169.0°	4.0
Standby (define in commer	07:00	34.91129°N	074.22673°W	31.0°	4.3
Standby (define in commer	08:00	34.97326°N	074.18665°W	26.0°	4.4
Standby (define in commer	08:32	35.00902°N	074.16637°W	352.0°	4.7
Standby (define in commer	09:00	35.02950°N	074.18925°W	289.0°	3.1
Data acquisition	09:03	35.02541°N	074.19257°W	253.0°	3.1
Data acquisition	09:25	35.01659°N	074.21259°W	213.0°	3.3
Data acquisition	09:30	35.01198°N	074.21545°W	212.0°	3.9
Data acquisition	09:35	35.00750°N	074.21787°W	215.0°	3.5
Data acquisition	09:40	35.00244°N	074.22058°W	220.0°	3.0
Data acquisition	09:50	34.99320°N	074.22538°W	218.0°	2.4
Data acquisition	09:57	34.98614°N	074.22904°W	214.0°	4.1
Data acquisition	09:59	34.98420°N	074.23002°W	213.0°	4.3
Data acquisition	11:00	34.92926°N	074.25852°W	216.0°	4.0
Data acquisition	11:30	34.89355°N	074.27738°W	217.0°	4.1
Data acquisition	12:00	34.86793°N	074.29073°W	214.0°	4.4
Data acquisition	13:00	34.79539°N	074.33689°W	218.0°	5.1
Data acquisition	13:30	34.76474°N	074.35782°W	217.0°	4.3
Data acquisition	14:30	34.68780°N	074.40967°W	214.0°	5.1
Data acquisition	15:00	34.65310°N	074.43293°W	214.0°	5.0
Data acquisition	16:00	34.57825°N	074.48331°W	212.0°	4.8
Data acquisition	16:30	34.54498°N	074.50542°W	212.0°	4.6
Data acquisition	17:00	34.50969°N	074.52919°W	212.6°	5.1
Data acquisition	18:00	34.44375°N	074.57362°W	208.0°	4.7
Data acquisition	18:30	34.40584°N	074.59876°W	209.0°	4.5
Data acquisition	19:00	34.36999°N	074.62262°W	208.0°	4.3
Data acquisition	19:30	34.32869°N	074.65027°W	208.0°	4.8
Data acquisition	20:00	34.29373°N	074.67347°W	208.0°	4.8
Data acquisition	20:30	34.26717°N	074.69119°W	209.0°	4.2
Data acquisition	21:30	34.19280°N	074.74063°W	208.0°	4.1
Data acquisition	22:00	34.16003°N	074.76253°W	207.0°	5.1
Data acquisition	22:30	34.12190°N	074.78754°W	205.0°	4.1
Data acquisition	23:30	34.05177°N	074.83410°W	203.0°	4.4
Data acquisition	23:50	34.02851°N	074.84946°W	203.7°	4.5
Data acquisition	23:55	34.01963°N	074.85520°W	203.4°	4.6
Data acquisition	00:00	34.01568°N	074.85783°W	204.0°	4.4
Data acquisition	00:05	34.00971°N	074.86180°W	205.0°	4.5

Data acquisition	00:10	34.00510°N	074.86500°W	204.0°	4.9
Data acquisition	00:15	33.99723°N	074.87025°W	203.0°	4.8
Data acquisition	00:20	33.99279°N	074.87323°W	204.0°	4.8
Data acquisition	01:00	33.94147°N	074.90683°W	205.2°	5.2
Data acquisition	02:00	33.87347°N	074.95183°W	203.0°	5.0
Data acquisition	03:00	33.80150°N	074.99927°W	199.0°	5.1
Data acquisition	04:00	33.72762°N	075.04750°W	194.7°	4.3
Data acquisition	05:00	33.66520°N	075.08860°W	200.0°	4.3
Data acquisition	06:00	33.61715°N	075.12005°W	199.0°	4.0
Data acquisition	07:00	33.54168°N	075.16900°W	189.0°	4.4
Data acquisition	08:00	33.48380°N	075.10398°W	132.0°	5.0
Data acquisition	09:00	33.44946°N	075.04401°W	134.0°	4.3
Data acquisition	09:30	33.42955°N	075.00951°W	135.0°	4.6
Data acquisition	09:35	33.42162°N	074.99567°W	134.0°	4.7
Data acquisition	09:40	33.41738°N	074.98825°W	134.0°	4.9
Data acquisition	09:45	33.41482°N	074.98382°W	133.0°	4.9
Data acquisition	09:50	33.41188°N	074.97865°W	134.0°	4.8
Data acquisition	09:55	33.40632°N	074.96898°W	134.0°	4.9
Data acquisition	10:02	33.40310°N	074.96308°W	134.0°	4.8
Data acquisition	11:00	33.35961°N	074.88925°W	130.0°	5.3
Data acquisition	11:30	33.33323°N	074.84172°W	127.0°	5.4
Data acquisition	12:00	33.31016°N	074.80138°W	126.0°	4.8
Data acquisition	13:00	33.26517°N	074.72328°W	120.0°	4.9
Data acquisition	13:30	33.24265°N	074.68175°W	116.0°	4.9
Data acquisition	14:30	33.19514°N	074.60219°W	115.0°	4.8
Data acquisition	15:00	33.17396°N	074.56552°W	112.8°	4.8
Data acquisition	16:00	33.12603°N	074.48288°W	112.0°	4.7
Data acquisition	16:30	33.10380°N	074.44470°W	113.0°	5.0
Data acquisition	17:00	33.07835°N	074.40105°W	123.1°	4.9
Data acquisition	18:00	33.03221°N	074.32165°W	125.0°	4.9
Data acquisition	18:30	33.00818°N	074.28062°W	123.0°	4.9
Data acquisition	19:30	32.95882°N	074.19602°W	122.0°	5.0
Data acquisition	20:30	32.91431°N	074.11987°W	121.0°	3.9
Data acquisition	21:30	32.86063°N	074.04798°W	185.0°	5.1
Data acquisition	22:30	32.78690°N	074.09567°W	213.0°	5.0
Data acquisition	23:30	32.71548°N	074.14678°W	217.6°	5.0
Data acquisition	23:50	32.69315°N	074.16212°W	218.0°	5.2
Data acquisition	23:55	32.68665°N	074.16675°W	217.0°	4.9
Data acquisition	00:00	32.67907°N	074.17215°W	218.9°	4.8
Data acquisition	00:05	32.67357°N	074.17617°W	218.7°	4.9
Data acquisition	00:10	32.66848°N	074.17965°W	217.9°	4.8
Data acquisition	00:15	32.66243°N	074.18387°W	217.8°	4.9
Data acquisition	00:20	32.65832°N	074.18677°W	217.3°	4.9
Data acquisition	01:00	32.60979°N	074.22096°W	216.7°	4.9
Data acquisition	02:00	32.54065°N	074.26985°W	217.0°	5.0
Data acquisition	03:00	32.47336°N	074.31715°W	220.2°	3.3
Data acquisition	04:00	32.42823°N	074.34885°W	223.0°	3.0

Data acquisition	05:00	32.36902°N	074.39073°W	217.0°	4.8
Data acquisition	06:00	32.32570°N	074.42100°W	220.0°	3.0
Data acquisition	07:00	32.27655°N	074.45553°W	216.0°	4.8
Data acquisition	08:00	32.20558°N	074.50527°W	213.0°	4.8
Data acquisition	09:00	32.14930°N	074.54456°W	212.0°	4.5
Data acquisition	09:30	32.12512°N	074.56121°W	212.0°	2.7
Data acquisition	09:35	32.11840°N	074.56592°W	210.0°	2.7
Data acquisition	09:40	32.11491°N	074.56835°W	209.0°	2.9
Data acquisition	09:45	32.11373°N	074.56917°W	210.0°	2.8
Data acquisition	09:50	32.10715°N	074.57378°W	209.0°	2.8
Data acquisition	09:55	32.10612°N	074.57450°W	208.0°	2.6
Data acquisition	10:00	32.10259°N	074.57695°W	209.0°	2.5
Data acquisition	11:00	32.06695°N	074.60185°W	207.0°	2.5
Data acquisition	11:30	32.04682°N	074.61592°W	203.0°	2.7
Data acquisition	12:00	32.02938°N	074.62807°W	200.0°	2.4
Data acquisition	13:00	31.97012°N	074.66919°W	203.5°	4.6
Data acquisition	13:30	31.94059°N	074.69112°W	202.0°	4.5
Data acquisition	14:30	31.87174°N	074.73806°W	198.0°	4.4
Data acquisition	15:00	31.84359°N	074.75709°W	198.7°	4.1
Data acquisition	16:00	31.78412°N	074.79824°W	198.0°	4.0
Data acquisition	16:30	31.75197°N	074.82055°W	195.0°	4.1
Data acquisition	17:00	31.72131°N	074.84161°W	197.8°	4.6
Mechanical/technical shut	17:52	31.68297°N	074.86802°W	194.0°	2.3
Mechanical/technical shut	18:00	31.68031°N	074.87015°W	192.0°	2.3
Mechanical/technical shut	18:30	31.66044°N	074.86837°W	138.0°	3.1
Mechanical/technical shut	19:30	31.70797°N	074.78913°W	59.0°	5.3
Data acquisition	20:32	31.78993°N	074.77372°W	305.0°	5.6
Data acquisition	21:30	31.77820°N	074.81502°W	164.0°	4.1
Data acquisition	22:30	31.71953°N	074.84289°W	198.0°	3.0
Data acquisition	23:30	31.68071°N	074.86947°W	200.0°	2.9
Data acquisition	23:48	31.66438°N	074.88080°W	202.5°	4.0
Data acquisition	23:53	31.66038°N	074.88355°W	202.2°	4.3
Data acquisition	00:00	31.65360°N	074.88822°W	203.0°	4.1
Data acquisition	00:03	31.65056°N	074.89030°W	203.7°	4.1
Data acquisition	00:08	31.64586°N	074.89364°W	203.9°	4.3
Data acquisition	00:13	31.64010°N	074.89761°W	203.9°	4.4

Data acquisition	00:18	31.64010°N	074.89761°W	203.9°	4.4
Data acquisition	01:00	31.59344°N	074.92965°W	205.6°	4.3
Data acquisition	02:00	31.53380°N	074.97063°W	209.0°	4.1
Data acquisition	03:00	31.46692°N	075.01673°W	210.0°	4.3
Data acquisition	04:00	31.41775°N	075.06647°W	263.0°	4.1
Data acquisition	05:00	31.46074°N	075.13237°W	297.0°	4.9
Data acquisition	06:00	31.51728°N	075.20782°W	295.0°	4.4
Data acquisition	07:00	31.56438°N	075.27057°W	295.0°	4.5
Data acquisition	08:00	31.63227°N	075.27113°W	23.0°	4.8
Data acquisition	09:00	31.69649°N	075.22775°W	21.8°	4.9
Data acquisition	09:30	31.72996°N	075.20532°W	36.0°	4.9
Data acquisition	09:35	31.74413°N	075.19570°W	40.0°	5.0
Data acquisition	09:40	31.74972°N	075.19190°W	40.0°	5.1
Data acquisition	09:45	31.75897°N	075.18563°W	39.0°	5.0
Data acquisition	09:50	31.76167°N	075.18378°W	38.0°	4.9
Data acquisition	09:55	31.76480°N	075.18163°W	37.0°	4.8
Data acquisition	10:05	31.77450°N	075.17495°W	37.0°	4.8
Data acquisition	11:00	31.84023°N	075.12974°W	51.0°	5.0
Data acquisition	11:30	31.87820°N	075.10425°W	50.0°	5.1
Data acquisition	12:00	31.91332°N	075.08034°W	47.0°	5.2
Data acquisition	13:00	31.98366°N	075.03262°W	47.1°	5.1
Data acquisition	13:30	32.01957°N	075.00810°W	45.2°	5.0
Data acquisition	14:30	32.09491°N	074.95653°W	43.0°	5.1
Data acquisition	15:00	32.12747°N	074.93436°W	40.8°	5.1
Data acquisition	16:00	32.19361°N	074.88907°W	40.0°	4.4
Data acquisition	16:30	32.22703°N	074.86609°W	37.0°	4.4
Data acquisition	17:00	32.26274°N	074.84150°W	33.5°	5.1
Data acquisition	18:00	32.33425°N	074.79232°W	31.3°	5.1
Data acquisition	18:30	32.37120°N	074.76687°W	28.0°	5.0
Data acquisition	19:30	32.45189°N	074.71087°W	27.1°	5.0
Data acquisition	20:30	32.51558°N	074.66718°W	27.0°	4.9
Data acquisition	21:30	32.58676°N	074.61791°W	31.0°	5.0
Data acquisition	22:30	32.65768°N	074.56867°W	31.0°	5.0
Data acquisition	23:30	32.73025°N	074.51837°W	36.0°	4.9
Data acquisition	23:49	32.75163°N	074.50347°W	35.0°	4.9
Data acquisition	23:54	32.75842°N	074.49878°W	33.3°	4.9
Data acquisition	00:00	32.76570°N	074.49362°W	32.0°	5.0
Data acquisition	00:04	32.77200°N	074.48923°W	32.0°	4.9
Data acquisition	00:09	32.77640°N	074.48620°W	31.0°	5.0
Data acquisition	00:14	32.78198°N	074.48228°W	30.0°	5.1
Data acquisition	00:19	32.78753°N	074.47843°W	29.0°	4.8
Data acquisition	01:00	32.83537°N	074.44529°W	30.5°	4.4

Data acquisition	02:00	32.88364°N	074.41149°W	25.9°	2.4
Data acquisition	03:00	32.92148°N	074.38928°W	2.0°	2.5
Data acquisition	04:00	32.95562°N	074.42705°W	314.0°	3.5
Data acquisition	05:00	32.98963°N	074.48473°W	314.0°	3.3
Data acquisition	06:00	33.01687°N	074.53125°W	309.0°	2.8
Data acquisition	07:00	33.04350°N	074.57720°W	306.0°	3.3
Data acquisition	08:00	33.02966°N	074.64522°W	215.0°	4.4
Data acquisition	09:00	32.97208°N	074.68680°W	210.0°	4.8
Data acquisition	09:22	32.94767°N	074.70447°W	208.0°	4.8
Data acquisition	09:30	32.94207°N	074.70827°W	208.0°	5.0
Data acquisition	09:32	32.93595°N	074.71267°W	208.0°	5.0
Data acquisition	09:37	32.93133°N	074.71600°W	208.0°	5.0
Data acquisition	09:42	32.92537°N	074.72032°W	208.0°	4.9
Data acquisition	09:47	32.91482°N	074.72792°W	208.0°	4.9
Data acquisition	09:52	32.91125°N	074.73047°W	208.0°	4.9
Data acquisition	10:38	32.85858°N	074.76855°W	205.0°	5.0
Data acquisition	11:00	32.83344°N	074.78667°W	209.0°	5.0
Data acquisition	11:30	32.79680°N	074.81300°W	207.0°	5.0
Data acquisition	12:00	32.76316°N	074.83725°W	210.0°	5.1
Data acquisition	13:00	32.68991°N	074.88973°W	209.0°	5.1
Data acquisition	13:30	32.65537°N	074.91452°W	206.0°	5.0
Data acquisition	14:30	32.58319°N	074.96598°W	207.0°	5.2
Data acquisition	15:00	32.55008°N	074.98975°W	209.5°	5.1
Data acquisition	16:00	32.48167°N	075.03855°W	207.0°	4.9
Data acquisition	16:30	32.45117°N	075.06032°W	205.0°	4.3
Data acquisition	17:00	32.41739°N	075.08435°W	202.5°	4.1
Data acquisition	18:00	32.35777°N	075.12684°W	195.0°	3.9
Data acquisition	18:30	32.32575°N	075.14960°W	193.0°	3.9
Data acquisition	19:30	32.26825°N	075.19041°W	190.0°	3.5
Data acquisition	20:30	32.21745°N	075.22609°W	189.0°	3.6
Data acquisition	21:30	32.17027°N	075.25961°W	185.0°	3.9
Data acquisition	22:30	32.12330°N	075.29276°W	190.0°	3.9
Data acquisition	23:30	32.06752°N	075.33215°W	192.2°	3.7
Data acquisition	23:52	32.05111°N	075.34366°W	194.3°	3.4
Data acquisition	23:57	32.04730°N	075.34635°W	193.0°	3.7
Data acquisition	00:00	32.04488°N	075.34802°W	194.1°	4.2
Data acquisition	00:07	32.03803°N	075.35287°W	197.0°	4.1
Data acquisition	00:12	32.03343°N	075.35613°W	195.0°	4.0
Data acquisition	00:17	32.02928°N	075.35905°W	195.0°	4.3
Data acquisition	00:22	32.02504°N	075.36201°W	195.9°	4.5
Data acquisition	01:00	31.98875°N	075.38748°W	199.4°	3.7

Data acquisition	02:00	31.93037°N	075.42883°W	211.0°	4.0
Data acquisition	03:00	31.86652°N	075.47358°W	217.0°	4.1
Data acquisition	04:00	31.81119°N	075.51216°W	219.0°	4.3
Data acquisition	05:00	31.74042°N	075.56183°W	220.0°	4.0
Data acquisition	06:00	31.68463°N	075.53213°W	108.0°	5.4
Data acquisition	07:00	31.73697°N	075.50720°W	319.0°	2.5
Data acquisition	08:00	31.79732°N	075.55295°W	321.0°	3.1
Data acquisition	09:00	31.84667°N	075.59091°W	323.0°	3.4
Data acquisition	09:35	31.87837°N	075.61501°W	324.0°	4.2
Data acquisition	09:40	31.88403°N	075.61938°W	326.0°	4.1
Data acquisition	09:45	31.88660°N	075.62134°W	325.0°	4.1
Data acquisition	09:50	31.88970°N	075.62375°W	325.0°	3.6
Data acquisition	09:55	31.89692°N	075.62926°W	325.0°	3.9
Data acquisition	10:05	31.90261°N	075.63380°W	327.0°	4.0
Data acquisition	10:50	31.94909°N	075.66952°W	330.0°	4.0
Data acquisition	11:00	31.95711°N	075.67566°W	330.0°	4.2
Data acquisition	11:30	31.99055°N	075.70140°W	333.0°	4.5
Data acquisition	12:00	32.02822°N	075.73030°W	334.0°	4.4
Data acquisition	13:00	32.08010°N	075.73058°W	29.9°	3.7
Data acquisition	13:30	32.10582°N	075.71206°W	29.3°	3.9
Other (see notes)	13:58	32.13217°N	075.69328°W	31.0°	4.4
Data acquisition	14:14	32.14816°N	075.68182°W	35.4°	3.1
Data acquisition	14:30	32.16244°N	075.67157°W	37.7°	4.3
Data acquisition	15:00	32.19592°N	075.64743°W	39.9°	4.4
Data acquisition	16:00	32.25519°N	075.60475°W	44.0°	4.4
Data acquisition	16:30	32.28543°N	075.58278°W	45.0°	4.1
Data acquisition	17:00	32.32415°N	075.55509°W	49.3°	4.5
Data acquisition	18:00	32.37933°N	075.51527°W	34.0°	4.3
Data acquisition	18:30	32.41147°N	075.49193°W	47.0°	4.5
Data acquisition	19:30	32.47906°N	075.44265°W	49.4°	4.8
Data acquisition	20:30	32.54492°N	075.39518°W	49.0°	4.9
Data acquisition	21:30	32.62193°N	075.33925°W	43.0°	5.0
Data acquisition	22:30	32.69011°N	075.28964°W	41.0°	5.1
Data acquisition	23:30	32.76101°N	075.23784°W	36.9°	5.2
Data acquisition	23:54	32.78730°N	075.21862°W	36.0°	5.2
Data acquisition	00:00	32.79445°N	075.21340°W	35.0°	5.1
Data acquisition	00:04	32.79925°N	075.20975°W	34.0°	5.1
Data acquisition	00:09	32.80581°N	075.20481°W	34.0°	5.2
Data acquisition	00:14	32.81115°N	075.20112°W	33.0°	5.0
Data acquisition	00:19	32.81728°N	075.19665°W	33.0°	5.1
Data acquisition	00:24	32.82295°N	075.19250°W	32.5°	4.7
Data acquisition	01:00	32.86817°N	075.15960°W	31.1°	4.8
Data acquisition	02:00	32.93721°N	075.10887°W	27.3°	4.4
Data acquisition	03:00	33.00682°N	075.05742°W	27.0°	4.8
Data acquisition	04:00	33.07826°N	075.00521°W	27.8°	4.9
Data acquisition	05:00	33.15510°N	074.94865°W	26.0°	4.9

Data acquisition	06:00	33.21965°N	074.90303°W	0.0°	4.1
Data acquisition	07:00	33.26868°N	074.96010°W	293.0°	4.2
Data acquisition	08:00	33.30946°N	075.03218°W	293.4°	4.4
Data acquisition	09:00	33.34665°N	075.09592°W	294.8°	4.5
Data acquisition	09:30	33.36215°N	075.12449°W	292.0°	3.5
Data acquisition	09:35	33.36912°N	075.13698°W	292.0°	4.0
Data acquisition	09:40	33.37065°N	075.13953°W	292.0°	4.0
Data acquisition	09:45	33.37355°N	075.14467°W	290.0°	4.1
Data acquisition	09:50	33.37637°N	075.14955°W	289.0°	3.8
Data acquisition	09:59	33.38292°N	075.16132°W	292.0°	3.8
Data acquisition	11:00	33.41899°N	075.22895°W	271.0°	3.9
Data acquisition	11:30	33.40227°N	075.26186°W	217.0°	4.2
Data acquisition	12:00	33.37128°N	075.28320°W	219.0°	4.5
Data acquisition	12:37	33.33345°N	075.30971°W	216.0°	3.8
Data acquisition	13:00	33.31206°N	075.32486°W	214.0°	4.5
Data acquisition	13:30	33.28162°N	075.34627°W	214.7°	4.6
Data acquisition	14:09	33.23869°N	075.37611°W	219.0°	4.3
Data acquisition	14:25	33.22178°N	075.38803°W	217.2°	4.3
Data acquisition	14:30	33.21901°N	075.39011°W	214.0°	4.3
Data acquisition	15:00	33.19064°N	075.40983°W	213.5°	3.6
Data acquisition	16:00	33.15321°N	075.43601°W	218.0°	3.3
Data acquisition	16:30	33.13018°N	075.45206°W	218.0°	2.7
Data acquisition	17:00	33.10616°N	075.46892°W	214.0°	3.5
Data acquisition	18:00	33.04473°N	075.51174°W	212.0°	4.5
Data acquisition	18:30	33.01431°N	075.53290°W	214.0°	4.4
Data acquisition	19:30	32.95002°N	075.57766°W	214.6°	4.6
Data acquisition	20:30	32.88932°N	075.61985°W	215.0°	3.9
Data acquisition	21:00	32.85543°N	075.64334°W	213.0°	4.6
Data acquisition	21:30	32.82432°N	075.66503°W	211.0°	6.2
Data acquisition	22:30	32.75855°N	075.71054°W	206.0°	4.9
Data acquisition	23:30	32.69137°N	075.75682°W	208.1°	4.7
Data acquisition	23:55	32.66427°N	075.77562°W	209.0°	4.8
Data acquisition	00:00	32.65868°N	075.77950°W	208.0°	5.0
Data acquisition	00:05	32.65315°N	075.78327°W	209.0°	4.7
Data acquisition	00:10	32.64635°N	075.78795°W	209.0°	5.0
Data acquisition	00:15	32.64165°N	075.79122°W	208.0°	4.8
Data acquisition	00:20	32.63562°N	075.79537°W	209.0°	4.5
Data acquisition	00:25	32.63010°N	075.79915°W	210.0°	4.7
Data acquisition	01:00	32.58545°N	075.83003°W	206.9°	4.9
Data acquisition	02:00	32.51615°N	075.87757°W	211.0°	4.9
Data acquisition	03:00	32.44018°N	075.92993°W	220.0°	5.1
Data acquisition	04:00	32.37167°N	075.97658°W	223.0°	4.8
Data acquisition	05:00	32.32247°N	076.04220°W	315.0°	3.7
Data acquisition	06:00	32.37643°N	076.09787°W	323.0°	5.0
Data acquisition	07:00	32.43963°N	076.16175°W	321.0°	4.9
Data acquisition	08:00	32.51954°N	076.17564°W	33.9°	4.9
Data acquisition	09:00	32.57931°N	076.14072°W	37.9°	4.8
Data acquisition	09:34	32.62830°N	076.11220°W	38.7°	5.0

Data acquisition	09:39	32.63215°N	076.10988°W	40.6°	5.0
Data acquisition	09:44	32.63630°N	076.10747°W	38.7°	4.6
Data acquisition	09:49	32.64175°N	076.10418°W	39.4°	5.0
Data acquisition	09:54	32.64693°N	076.10128°W	39.4°	5.1
Data acquisition	10:04	32.65715°N	076.09518°W	37.0°	4.8
Data acquisition	11:00	32.72387°N	076.05606°W	38.2°	4.9
Data acquisition	11:30	32.75899°N	076.03546°W	39.0°	4.9
Data acquisition	12:00	32.79494°N	076.01442°W	45.8°	5.0
Data acquisition	13:00	32.86313°N	075.97401°W	39.1°	4.5
Data acquisition	13:30	32.89795°N	075.95373°W	43.4°	4.8
Data acquisition	14:30	32.96723°N	075.91268°W	40.0°	5.2
Data acquisition	15:00	33.00626°N	075.88960°W	38.5°	4.8
Data acquisition	16:00	33.06889°N	075.85248°W	36.0°	4.7
Data acquisition	16:30	33.10293°N	075.83242°W	41.0°	3.6
Data acquisition	17:00	33.13887°N	075.81098°W	35.9°	4.2
Data acquisition	18:00	33.20787°N	075.77003°W	36.1°	4.3
Data acquisition	18:30	33.24232°N	075.74954°W	36.2°	4.8
Data acquisition	19:30	33.31594°N	075.70572°W	40.9°	5.2
Data acquisition	20:30	33.38411°N	075.66499°W	42.3°	5.0
Data acquisition	21:30	33.45920°N	075.62008°W	41.0°	4.6
Data acquisition	22:30	33.53020°N	075.57759°W	46.2°	4.7
Data acquisition	23:20	33.58176°N	075.54649°W	42.5°	4.4
Data acquisition	23:30	33.59313°N	075.53983°W	46.8°	4.3
Data acquisition	00:00	33.62912°N	075.51812°W	47.0°	4.4
Data acquisition	00:18	33.64963°N	075.50575°W	46.0°	4.5
Data acquisition	00:23	33.65613°N	075.50180°W	45.5°	4.7
Data acquisition	00:28	33.66219°N	075.49842°W	56.0°	4.1
Data acquisition	01:00	33.69790°N	075.49400°W	327.2°	4.9
Data acquisition	02:00	33.74413°N	075.57285°W	299.0°	4.6
Data acquisition	03:00	33.79017°N	075.65298°W	292.0°	4.6
Data acquisition	04:00	33.83502°N	075.73157°W	280.0°	5.2
Data acquisition	05:00	33.88162°N	075.81268°W	277.0°	3.6
Data acquisition	06:00	33.92107°N	075.88188°W	271.0°	3.2
Data acquisition	07:00	33.98915°N	075.92965°W	37.8°	7.8
Data acquisition	08:00	34.08536°N	075.88237°W	31.0°	4.8
Data acquisition	09:00	34.15822°N	075.84643°W	36.1°	6.3
Data acquisition	09:30	34.22465°N	075.80773°W	92.4°	6.6
Data acquisition	09:35	34.22749°N	075.79239°W	127.5°	5.2
Data acquisition	09:40	34.22663°N	075.78690°W	136.8°	4.5
Data acquisition	09:45	34.22650°N	075.78627°W	135.0°	4.9
Data acquisition	09:50	34.22488°N	075.78157°W	150.0°	4.8
Data acquisition	09:55	34.22227°N	075.77645°W	150.0°	2.8
Data acquisition	10:00	34.21953°N	075.77082°W	153.9°	3.3
Data acquisition	11:00	34.19143°N	075.71606°W	149.0°	3.8
Data acquisition	11:30	34.17274°N	075.70077°W	188.0°	1.9
Data acquisition	12:00	34.15861°N	075.70451°W	203.2°	2.4
Data acquisition	13:00	34.12127°N	075.72319°W	200.6°	2.3

Data acquisition	13:30	34.10348°N	075.73195°W	200.5°	3.2
Data acquisition	14:30	34.06827°N	075.74944°W	198.0°	2.5
Data acquisition	15:00	34.05349°N	075.75677°W	201.6°	5.0
Data acquisition	16:00	34.02085°N	075.77302°W	201.0°	2.2
Data acquisition	16:30	34.00517°N	075.78077°W	199.0°	2.5
Data acquisition	17:00	33.98747°N	075.78961°W	201.0°	3.4
Data acquisition	17:12	33.97885°N	075.79383°W	200.6°	2.3
Data acquisition	17:42	33.96332°N	075.80153°W	209.4°	2.0
Data acquisition	18:00	33.95454°N	075.80588°W	204.0°	2.0
Data acquisition	18:30	33.93758°N	075.81425°W	204.0°	2.7
Data acquisition	19:30	33.90360°N	075.83112°W	203.5°	2.0
Retrieving equipment	19:58	33.88777°N	075.83621°W	179.2°	2.3
Retrieving equipment	20:30	33.88503°N	075.80089°W	94.0°	5.9
Retrieving equipment	21:30	33.90848°N	075.70883°W	105.0°	4.7
Retrieving equipment	21:37	33.91086°N	075.69623°W	104.0°	4.9
Retrieving equipment	22:30	33.91738°N	075.64346°W	119.0°	2.5
Retrieving equipment	23:30	33.92586°N	075.58901°W	120.1°	3.0
Standby (define in commer	00:00	33.92823°N	075.56233°W	120.0°	2.7
Standby (define in commer	00:05	33.92821°N	075.55547°W	120.3°	2.7
Standby (define in commer	00:10	33.92833°N	075.55220°W	120.7°	2.6
Standby (define in commer	00:15	33.92832°N	075.54699°W	119.8°	3.0
Standby (define in commer	00:20	33.92815°N	075.59195°W	120.0°	3.2
Standby (define in commer	00:25	33.92786°N	075.53718°W	120.0°	3.2
Deploying equipment	09:30	33.73918°N	075.23258°W	261.0°	4.6
Deploying equipment	09:35	33.73832°N	075.23687°W	262.0°	4.9
Deploying equipment	09:40	33.73658°N	075.24577°W	262.0°	4.2
Deploying equipment	09:44	33.73597°N	075.24912°W	262.0°	4.6
Deploying equipment	09:50	33.73382°N	075.26015°W	264.0°	4.4
Deploying equipment	09:57	33.73220°N	075.26878°W	264.0°	3.0
Standby (define in commer	11:00	33.71971°N	075.33881°W	249.0°	3.4
Standby (define in commer	11:30	33.71273°N	075.36988°W	250.0°	3.4
Standby (define in commer	12:00	33.70545°N	075.40776°W	246.5°	3.7
Data acquisition	12:27	33.69740°N	075.44921°W	248.0°	4.0
Data acquisition	13:00	33.69603°N	075.48869°W	284.1°	4.4
Data acquisition	13:08	33.70219°N	075.49950°W	281.2°	3.8
Data acquisition	13:30	33.71758°N	075.52656°W	282.0°	4.2
Data acquisition	14:30	33.75961°N	075.59945°W	272.0°	4.2
Data acquisition	15:00	33.77514°N	075.62645°W	273.5°	4.2
Data acquisition	15:13	33.78401°N	075.64192°W	274.5°	3.5
Data acquisition	15:28	33.79459°N	075.66017°W	271.2°	3.9
Data acquisition	16:00	33.80909°N	075.68549°W	270.0°	3.9
Data acquisition	16:30	33.82559°N	075.71437°W	269.0°	3.2
Data acquisition	17:00	33.84167°N	075.74238°W	266.5°	3.3
Data acquisition	18:00	33.87012°N	075.79215°W	259.8°	3.2
Data acquisition	18:30	33.88596°N	075.81996°W	256.0°	3.0

Data acquisition	19:30	33.91319°N	075.86752°W	242.5°	3.0
Data acquisition	20:30	33.93028°N	075.89779°W	242.0°	3.2
Data acquisition	21:30	33.94407°N	075.92155°W	233.5°	1.7
Data acquisition	22:30	33.95661°N	075.94317°W	226.0°	1.3
Data acquisition	23:30	33.96773°N	075.96279°W	227.0°	1.1
Data acquisition	00:00	33.97203°N	075.96998°W	222.6°	0.7
Data acquisition	00:05	33.97315°N	075.97190°W	222.5°	1.0
Data acquisition	00:10	33.97372°N	075.97283°W	222.5°	1.0
Data acquisition	00:15	33.97452°N	075.97417°W	222.7°	1.0
Data acquisition	00:20	33.97523°N	075.97530°W	222.8°	0.7
Data acquisition	00:25	33.97597°N	075.97638°W	222.5°	5.0
Data acquisition	00:30	33.97681°N	075.97760°W	222.2°	1.1
Data acquisition	01:00	33.98192°N	075.98475°W	222.7°	0.7
Data acquisition	02:00	33.99468°N	076.00080°W	222.3°	1.1
Data acquisition	03:00	33.99600°N	076.00553°W	212.2°	1.5
Line change	03:12	33.99612°N	076.00761°W	211.9°	1.4
Line change	04:00	33.99136°N	075.99252°W	185.8°	0.7
Line change	05:00	33.97808°N	075.93430°W	166.0°	1.0
Line change	05:45	33.96985°N	075.87460°W	161.7°	1.2
Data acquisition	06:16	33.96121°N	075.83881°W	172.0°	1.4
Data acquisition	06:38	33.95097°N	075.81677°W	188.0°	1.6
Data acquisition	07:00	33.94212°N	075.81268°W	203.8°	0.7
Data acquisition	08:00	33.92115°N	075.82312°W	206.5°	1.0
Data acquisition	09:00	33.90375°N	075.83175°W	206.5°	1.2
Data acquisition	09:30	33.89194°N	075.83761°W	205.0°	1.7
Data acquisition	09:35	33.89055°N	075.83830°W	205.3°	1.7
Data acquisition	09:40	33.88948°N	075.83882°W	205.4°	1.4
Data acquisition	09:45	33.88777°N	075.83966°W	205.8°	1.9
Data acquisition	09:50	33.88673°N	075.84017°W	207.2°	1.6
Data acquisition	09:55	33.88399°N	075.84152°W	207.5°	1.3
Data acquisition	09:58	33.88251°N	075.84227°W	207.4°	1.5
Data acquisition	11:00	33.85964°N	075.85367°W	207.0°	1.5
Data acquisition	11:30	33.84935°N	075.85882°W	207.0°	1.8
Data acquisition	12:00	33.83918°N	075.86403°W	208.6°	1.4
Data acquisition	13:00	33.81819°N	075.87421°W	208.2°	1.3
Data acquisition	13:30	33.80657°N	075.88009°W	208.0°	1.1
Data acquisition	14:30	33.78056°N	075.89294°W	212.0°	2.1
Data acquisition	15:00	33.76793°N	075.89919°W	212.1°	1.7
Data acquisition	16:00	33.74124°N	075.91240°W	212.0°	1.7
Data acquisition	16:30	33.72671°N	075.91961°W	213.0°	1.8
Data acquisition	17:00	33.71425°N	075.92574°W	213.7°	1.7
Data acquisition	18:00	33.68185°N	075.94181°W	213.0°	2.4
Data acquisition	18:30	33.66462°N	075.95036°W	212.0°	2.1
Data acquisition	19:30	33.62335°N	075.97070°W	210.0°	2.5
Data acquisition	20:30	33.58292°N	075.99046°W	220.0°	3.0
Data acquisition	21:30	33.53042°N	076.01655°W	213.0°	3.5

Data acquisition	22:30	33.48628°N	076.01683°W	155.3°	3.9
Data acquisition	23:30	33.45947°N	075.92650°W	128.0°	4.7
Data acquisition	00:00	33.44120°N	075.88999°W	175.0°	4.6
Data acquisition	00:05	33.43627°N	075.88828°W	186.3°	4.6
Data acquisition	00:10	33.43142°N	075.88793°W	196.4°	4.5
Data acquisition	00:15	33.42665°N	075.88878°W	206.9°	4.6
Data acquisition	00:20	33.42243°N	075.89055°W	213.0°	4.4
Data acquisition	00:25	33.41831°N	075.89249°W	211.2°	4.4
Data acquisition	00:30	33.41313°N	075.89504°W	212.6°	4.5
Data acquisition	01:00	33.38897°N	075.90642°W	211.2°	3.4
Data acquisition	02:00	33.35950°N	075.93393°W	258.5°	3.5
Data acquisition	03:00	33.37581°N	076.01134°W	289.3°	5.3
Data acquisition	04:00	33.40035°N	076.09495°W	270.5°	5.1
Data acquisition	05:00	33.42375°N	076.18093°W	268.0°	4.9
Data acquisition	06:00	33.44288°N	076.25172°W	267.6°	5.1
Data acquisition	07:00	33.44663°N	076.31000°W	216.0°	4.5
Data acquisition	08:00	33.41252°N	076.32457°W	181.0°	4.9
Data acquisition	09:00	33.39184°N	076.29248°W	143.1°	4.7
Data acquisition	09:30	33.38298°N	076.26207°W	141.8°	5.0
Data acquisition	09:35	33.37780°N	076.24393°W	139.5°	5.0
Data acquisition	09:40	33.37707°N	076.24135°W	138.1°	5.0
Data acquisition	09:45	33.37562°N	076.23653°W	136.5°	4.9
Data acquisition	09:50	33.37360°N	076.22930°W	135.8°	5.0
Data acquisition	09:55	33.37143°N	076.22182°W	133.2°	4.9
Data acquisition	10:00	33.37000°N	076.21685°W	132.3°	5.0
Data acquisition	11:00	33.34763°N	076.13979°W	128.0°	4.2
Data acquisition	11:30	33.33482°N	076.09435°W	127.0°	4.9
Data acquisition	12:00	33.32424°N	076.05779°W	125.1°	5.0
Data acquisition	13:00	33.29378°N	075.99795°W	173.9°	3.5
Data acquisition	13:30	33.27622°N	076.00298°W	197.3°	3.3
Data acquisition	14:30	33.23968°N	076.02219°W	197.0°	3.5
Data acquisition	15:00	33.22600°N	076.04010°W	242.0°	3.4
Data acquisition	16:00	33.24361°N	076.11413°W	270.0°	3.8
Data acquisition	16:30	33.25552°N	076.15426°W	268.0°	5.0
Data acquisition	17:00	33.26472°N	076.18494°W	254.2°	5.0
Data acquisition	18:00	33.28504°N	076.25310°W	266.0°	4.8
Data acquisition	18:30	33.29481°N	076.28662°W	273.0°	4.2
Data acquisition	19:30	33.31432°N	076.36244°W	245.0°	3.5
Data acquisition	20:30	33.27441°N	076.39574°W	201.0°	4.9
Data acquisition	21:30	33.22028°N	076.39615°W	127.4°	4.3

Data acquisition	22:30	33.19547°N	076.31573°W	134.0°	4.8
Data acquisition	23:30	33.16867°N	076.22913°W	127.0°	4.8
Data acquisition	00:00	33.15450°N	076.18324°W	123.6°	5.0
Data acquisition	00:05	33.15235°N	076.17647°W	122.2°	4.9
Data acquisition	00:10	33.14981°N	076.16813°W	123.9°	4.8
Data acquisition	00:15	33.14723°N	076.15987°W	122.3°	4.7
Data acquisition	00:20	33.14510°N	076.15291°W	122.0°	5.1
Data acquisition	00:25	33.14285°N	076.14555°W	120.6°	4.8
Data acquisition	00:30	33.14052°N	076.13804°W	122.8°	4.8
Data acquisition	01:00	33.12379°N	076.09358°W	152.3°	4.6
Data acquisition	02:00	33.07330°N	076.10338°W	205.0°	4.4
Data acquisition	03:00	33.06112°N	076.15672°W	273.9°	4.5
Data acquisition	04:00	33.08185°N	076.22575°W	270.7°	5.0
Data acquisition	05:00	33.10695°N	076.30952°W	269.1°	5.0
Data acquisition	06:00	33.12827°N	076.38058°W	259.5°	5.1
Data acquisition	07:00	33.14398°N	076.44322°W	255.3°	4.5
Data acquisition	08:00	33.09673°N	076.47996°W	210.8°	4.5
Data acquisition	09:00	33.05914°N	076.43430°W	130.5°	4.2
Data acquisition	09:30	33.04190°N	076.38430°W	131.9°	4.7
Data acquisition	09:35	33.04056°N	076.38044°W	131.0°	4.4
Data acquisition	09:40	33.03787°N	076.37260°W	130.0°	4.9
Data acquisition	09:45	33.03643°N	076.36832°W	130.7°	4.8
Data acquisition	09:50	33.03310°N	076.35841°W	130.0°	4.7
Data acquisition	09:55	33.03163°N	076.35412°W	128.9°	5.0
Data acquisition	10:00	33.02906°N	076.34695°W	127.0°	4.3
Data acquisition	11:00	32.99907°N	076.25960°W	124.0°	4.9
Data acquisition	11:30	32.98295°N	076.21185°W	120.4°	5.1
Data acquisition	12:00	32.96863°N	076.17418°W	144.5°	4.6
Data acquisition	13:00	32.91570°N	076.18224°W	203.1°	2.9
Data acquisition	13:30	32.89100°N	076.19652°W	220.1°	4.7
Data acquisition	14:30	32.90067°N	076.26852°W	281.0°	4.6
Data acquisition	15:00	32.91231°N	076.29926°W	178.1°	3.7
Data acquisition	16:00	32.94356°N	076.38161°W	273.0°	4.1
Data acquisition	16:30	32.96051°N	076.42694°W	286.0°	5.0
Data acquisition	17:00	32.97283°N	076.45920°W	288.7°	5.0
Data acquisition	18:00	32.99287°N	076.52882°W	239.5°	4.4
Data acquisition	18:30	32.98031°N	076.55307°W	227.0°	2.6
Data acquisition	19:30	32.95048°N	076.57933°W	187.4°	4.4
Data acquisition	20:30	32.91039°N	076.51760°W	130.0°	4.3
Data acquisition	21:30	32.94643°N	076.44442°W	21.6°	5.1
Data acquisition	22:30	33.04018°N	076.39837°W	26.7°	4.2
Data acquisition	23:30	33.10257°N	076.36759°W	26.8°	3.9
Data acquisition	00:00	33.14038°N	076.34907°W	25.4°	4.4
Data acquisition	00:05	33.14815°N	076.34523°W	25.7°	4.2
Data acquisition	00:10	33.15480°N	076.34200°W	29.1°	4.0
Data acquisition	00:15	33.16114°N	076.33883°W	24.9°	4.1
Data acquisition	00:20	33.16868°N	076.33510°W	26.8°	4.3
Data acquisition	00:25	33.17418°N	076.33235°W	26.7°	4.2
Data acquisition	00:30	33.17847°N	076.32946°W	26.9°	4.1

Data acquisition	01:00	33.22434°N	076.30782°W	26.9°	3.8
Data acquisition	02:00	33.29632°N	076.27223°W	25.1°	4.8
Data acquisition	03:00	33.37097°N	076.23528°W	28.5°	3.2
Data acquisition	04:00	33.45098°N	076.19562°W	30.7°	3.7
Data acquisition	05:00	33.53377°N	076.15453°W	24.0°	4.0
Data acquisition	06:00	33.61885°N	076.12048°W	338.0°	4.1
Data acquisition	07:00	33.70203°N	076.16642°W	326.7°	5.0
Data acquisition	08:00	33.80683°N	076.13715°W	13.0°	4.3
Data acquisition	09:00	33.89325°N	076.09366°W	14.4°	4.6
Data acquisition	09:30	33.95526°N	076.06265°W	17.2°	6.7
Data acquisition	09:35	33.96097°N	076.05985°W	18.8°	5.8
Data acquisition	09:40	33.96836°N	076.05608°W	14.5°	3.4
Data acquisition	09:45	33.97846°N	076.05105°W	14.5°	3.3
Data acquisition	09:50	33.97873°N	076.05092°W	13.1°	3.7
Data acquisition	09:55	34.00559°N	076.03711°W	14.9°	2.6
Data acquisition	10:00	34.00572°N	076.03703°W	13.8°	2.5
Data acquisition	10:30	34.02668°N	075.99427°W	103.0°	4.7
Data acquisition	11:00	34.00257°N	075.95707°W	175.0°	5.5
Data acquisition	11:30	33.96849°N	075.94968°W	191.0°	5.3
Data acquisition	12:00	33.94436°N	075.95240°W	205.2°	5.1
Data acquisition	13:00	33.89293°N	075.97751°W	217.2°	5.0
Data acquisition	13:30	33.86745°N	075.99010°W	124.3°	5.1
Data acquisition	14:30	33.81550°N	076.01579°W	209.0°	5.0
Data acquisition	15:00	33.78756°N	076.02964°W	206.4°	5.2
Data acquisition	16:00	33.73322°N	076.05640°W	205.0°	5.1
Data acquisition	16:30	33.70650°N	076.06966°W	206.0°	5.1
Data acquisition	17:00	33.68180°N	076.08180°W	205.5°	5.1
Data acquisition	18:00	33.62993°N	076.10730°W	207.0°	5.1
Data acquisition	18:30	33.60594°N	076.11857°W	209.0°	4.9
Data acquisition	19:30	33.55862°N	076.14234°W	211.6°	5.1
Data acquisition	20:30	33.51475°N	076.12300°W	125.0°	5.0
Data acquisition	21:30	33.48620°N	076.02200°W	113.6°	5.1
Data acquisition	22:30	33.46035°N	075.92913°W	95.0°	4.7
Line change	22:36	33.46169°N	075.91662°W	67.0°	4.8
Data acquisition	23:14	33.51170°N	075.88335°W	19.4°	5.3
Data acquisition	23:30	33.53550°N	075.87376°W	15..4	5.1
Data acquisition	00:00	33.56807°N	075.90245°W	292.6°	5.1
Data acquisition	00:05	33.57028°N	075.90877°W	294.3°	5.1
Data acquisition	00:10	33.57353°N	075.91788°W	293.5°	5.0
Data acquisition	00:15	33.57645°N	075.92592°W	291.8°	5.2
Data acquisition	00:20	33.57813°N	075.93063°W	292.0°	4.9
Data acquisition	00:25	33.58007°N	075.93572°W	292.4°	5.2
Data acquisition	00:30	33.58235°N	075.94213°W	282.8°	5.2
Data acquisition	01:00	33.58313°N	075.98325°W	223.9°	5.6
Data acquisition	02:00	33.53297°N	076.01517°W	207.4°	5.4
Data acquisition	03:00	33.47802°N	076.04237°W	205.3°	5.1
Data acquisition	04:00	33.42589°N	076.06860°W	205.6°	5.1
Data acquisition	05:00	33.34885°N	076.10720°W	205.3°	5.0
Data acquisition	06:00	33.30763°N	076.12765°W	201.7°	4.9

Data acquisition	07:00	33.25403°N	076.15433°W	201.4°	4.9
Data acquisition	08:00	33.18000°N	076.19162°W	195.1°	5.6
Data acquisition	09:00	33.12151°N	076.22022°W	204.2°	5.1
Data acquisition	09:30	33.08640°N	076.23747°W	201.9°	4.8
Data acquisition	09:35	33.08374°N	076.23879°W	202.1°	5.0
Data acquisition	09:40	33.08092°N	076.24023°W	201.9°	5.1
Data acquisition	09:45	33.07656°N	076.24238°W	200.5°	4.9
Data acquisition	09:50	33.06620°N	076.24755°W	196.9°	5.1
Data acquisition	09:55	33.06108°N	076.25006°W	196.9°	5.1
Data acquisition	09:59	33.05845°N	076.25134°W	197.3°	5.2
Data acquisition	11:00	33.00759°N	076.27657°W	205.0°	5.1
Data acquisition	11:30	32.97662°N	076.29179°W	209.0°	5.0
Data acquisition	12:00	32.95057°N	076.30482°W	211.5°	4.8
Data acquisition	13:00	32.88949°N	076.33492°W	208.3°	4.9
Data acquisition	13:30	32.86914°N	076.34495°W	210.4°	3.5
Data acquisition	14:30	32.82958°N	076.35392°W	161.0°	3.4
Data acquisition	15:00	32.81136°N	076.32885°W	132.5°	3.8
Data acquisition	16:00	32.76674°N	076.25575°W	123.0°	4.0
Data acquisition	16:30	32.74425°N	076.21423°W	118.0°	4.5
Data acquisition	17:00	32.72054°N	076.16986°W	121.0°	4.8
Data acquisition	18:00	32.67819°N	076.09089°W	120.6°	4.8
Data acquisition	18:30	32.65587°N	076.04953°W	117.0°	4.6
Data acquisition	19:30	32.61172°N	075.96758°W	115.0°	4.5
Data acquisition	20:30	32.56568°N	075.88224°W	114.0°	4.4
Data acquisition	20:50	32.55302°N	075.85901°W	112.0°	3.7
Data acquisition	21:30	32.51992°N	075.79790°W	112.0°	3.8
Data acquisition	22:30	32.47550°N	075.71596°W	112.0°	3.6
Data acquisition	23:30	32.42992°N	075.63200°W	115.5°	3.3
Data acquisition	00:00	32.40662°N	075.58935°W	107.6°	3.0
Data acquisition	00:05	32.40168°N	075.58037°W	111.0°	3.1
Data acquisition	00:10	32.39855°N	075.57430°W	115.4°	3.3
Data acquisition	00:15	32.39445°N	075.56682°W	116.9°	3.0
Data acquisition	00:20	32.38942°N	075.55772°W	109.8°	3.3
Data acquisition	00:25	32.38623°N	075.55175°W	114.6°	3.5
Data acquisition	00:30	32.38214°N	075.54441°W	111.8°	2.8
Data acquisition	01:00	32.36035°N	075.50438°W	122.8°	2.9
Data acquisition	02:00	32.31365°N	075.41870°W	121.1°	3.1
Data acquisition	03:00	32.26565°N	075.33103°W	120.6°	4.0
Data acquisition	04:00	32.21093°N	075.23135°W	122.0°	4.4
Data acquisition	05:00	32.15812°N	075.13582°W	120.4°	4.3
Data acquisition	06:00	32.10663°N	075.04252°W	113.0°	3.8
Data acquisition	07:00	32.06562°N	074.96800°W	112.5°	3.9
Data acquisition	08:00	32.01800°N	074.88250°W	109.2°	3.6
Data acquisition	09:00	31.97346°N	074.80194°W	119.7°	4.1
Data acquisition	09:30	31.94820°N	074.75578°W	119.4°	4.2
Data acquisition	09:35	31.94387°N	074.74898°W	123.2°	4.5
Data acquisition	09:40	31.94008°N	074.74232°W	121.0°	4.4
Data acquisition	09:45	31.93637°N	074.73553°W	122.5°	4.8

Data acquisition	09:50	31.93258°N	074.72885°W	122.0°	4.7
Data acquisition	09:55	31.92898°N	074.72238°W	120.0°	4.5
Data acquisition	10:00	31.92672°N	074.71825°W	121.6°	4.8
Data acquisition	11:00	31.88442°N	074.64251°W	119.0°	4.8
Data acquisition	11:30	31.85953°N	074.59792°W	121.0°	4.7
Data acquisition	12:00	31.83848°N	074.56036°W	123.8°	5.0
Data acquisition	13:00	31.79220°N	074.47773°W	120.4°	4.9
Data acquisition	13:30	31.76978°N	074.43774°W	120.7°	4.9
Data acquisition	14:30	31.72472°N	074.35754°W	121.0°	5.0
Data acquisition	15:00	31.70213°N	074.31742°W	120.5°	5.1
Data acquisition	16:00	31.65489°N	074.23359°W	123.0°	5.1
Retrieving equipment	16:11	31.64546°N	074.21700°W	123.4°	4.7
Retrieving equipment	16:30	31.63322°N	074.19784°W	122.0°	3.7
Retrieving equipment	16:53	31.61797°N	074.17449°W	122.0°	3.5
Retrieving equipment	17:20	31.60369°N	074.15438°W	123.4°	2.1
Retrieving equipment	18:00	31.58563°N	074.13868°W	117.5°	1.2
Standby (define in comments)	18:30	31.58124°N	074.13500°W	117.0°	1.1
Deploying equipment	19:30	31.54965°N	074.11740°W	225.1°	4.2
Deploying equipment	20:30	31.53816°N	074.19980°W	269.0°	4.4
Deploying equipment	21:30	31.52923°N	074.29298°W	269.5°	4.5
Deploying equipment	22:30	31.53816°N	074.19980°W	269.0°	4.6
Deploying equipment	23:00	31.51624°N	074.40202°W	272.0°	1.6
Deploying equipment	23:30	31.51255°N	074.43695°W	275.6°	4.2
Deploying equipment	00:00	31.51197°N	074.48381°W	274.5°	4.4
Deploying equipment	00:31	31.51412°N	074.52793°W	277.3°	4.0
Deploying equipment	01:00	31.52049°N	074.57348°W	318.7°	4.0
Deploying equipment	01:45	31.56158°N	074.59730°W	5.6°	5.0
Data acquisition	02:16	31.60200°N	074.60100°W	355.5°	4.0
Data acquisition	02:38	31.62400°N	074.58900°W	57.0°	4.0
Data acquisition	03:00	31.62950°N	074.55872°W	83.9°	4.2
Data acquisition	04:00	31.63760°N	074.47624°W	90.6°	5.3
Data acquisition	05:00	31.64100°N	074.38300°W	99.5°	4.3
Data acquisition	06:00	31.64513°N	074.29218°W	87.9°	4.9
Data acquisition	07:00	31.64902°N	074.19960°W	89.7°	5.0
Data acquisition	08:00	31.65235°N	074.11498°W	90.1°	4.8
Data acquisition	09:00	31.65622°N	074.01694°W	93.5°	4.9
Data acquisition	09:30	31.65788°N	073.97210°W	92.5°	5.1
Data acquisition	09:35	31.65822°N	073.96363°W	91.7°	5.0
Data acquisition	09:40	31.65855°N	073.95495°W	89.4°	4.9
Data acquisition	09:45	31.65917°N	073.93967°W	91.9°	4.8
Data acquisition	09:50	31.65927°N	073.93633°W	91.1°	5.3
Data acquisition	09:55	31.65993°N	073.93150°W	92.7°	5.1

Data acquisition	10:00	31.65972°N	073.92562°W	92.2°	5.1
Data acquisition	11:00	31.66289°N	073.84107°W	92.0°	5.1
Data acquisition	11:30	31.66466°N	073.79201°W	89.0°	4.9
Data acquisition	12:00	31.66627°N	073.74766°W	90.5°	5.1
Data acquisition	13:00	31.66985°N	073.65091°W	93.1°	4.3
Data acquisition	13:30	31.67194°N	073.59814°W	90.3°	4.7
Line change	13:53	31.67408°N	073.54968°W	87.4°	4.2
Line change	14:30	31.67568°N	073.51262°W	89.0°	3.9
Line change	15:00	31.65646°N	073.49247°W	198.5°	3.4
Data acquisition	15:38	31.62916°N	073.52850°W	263.2°	4.4
Data acquisition	16:00	31.63336°N	073.56017°W	305.0°	5.2
Data acquisition	16:30	31.65181°N	073.58940°W	301.0°	4.9
Data acquisition	17:00	31.67060°N	073.62339°W	304.7°	5.0
Data acquisition	18:00	31.71246°N	073.69667°W	303.1°	5.1
Data acquisition	18:30	31.73192°N	073.73077°W	303.0°	4.8
Data acquisition	19:30	31.77214°N	073.80138°W	308.3°	5.0
Data acquisition	20:30	31.81051°N	073.86896°W	306.0°	4.8
Data acquisition	21:30	31.84978°N	073.93830°W	309.3°	4.8
Data acquisition	22:30	31.88700°N	074.00403°W	309.3°	4.8
Data acquisition	23:30	31.92761°N	074.07576°W	308.1°	5.0
Data acquisition	23:55	31.94490°N	074.10648°W	309.2°	5.0
Data acquisition	00:00	31.94758°N	074.11115°W	308.5°	5.0
Data acquisition	00:05	31.95135°N	074.11780°W	310.2°	4.8
Data acquisition	00:10	31.95488°N	074.12417°W	308.7°	5.0
Data acquisition	00:15	31.95810°N	074.12992°W	310.3°	5.0
Data acquisition	00:20	31.96162°N	074.13610°W	309.6°	4.9
Data acquisition	00:25	31.96557°N	074.14313°W	311.2°	4.9
Data acquisition	01:00	31.99146°N	074.18925°W	308.8°	5.1
Data acquisition	02:00	32.02983°N	074.25793°W	306.4°	5.0
Data acquisition	03:00	32.07030°N	074.32952°W	303.5°	5.0
Data acquisition	04:00	32.11390°N	074.40752°W	303.5°	4.8
Data acquisition	05:00	32.15513°N	074.48112°W	310.8°	4.9
Data acquisition	06:00	32.19015°N	074.54380°W	305.6°	4.9
Data acquisition	07:00	32.22648°N	074.60903°W	299.8°	5.0
Data acquisition	08:00	32.26098°N	074.67111°W	299.7°	4.9
Data acquisition	09:00	32.28989°N	074.72302°W	297.7°	5.0
Data acquisition	09:30	32.30969°N	074.75847°W	294.9°	5.0
Data acquisition	09:35	32.31293°N	074.76435°W	296.9°	4.9
Data acquisition	09:40	32.31612°N	074.77012°W	295.7°	5.0
Data acquisition	09:45	32.31832°N	074.77408°W	296.8°	4.7
Data acquisition	09:50	32.32022°N	074.77742°W	297.0°	5.0
Data acquisition	09:55	32.32278°N	074.78210°W	296.9°	5.1
Data acquisition	10:00	32.32502°N	074.78610°W	298.0°	5.1
Data acquisition	10:30	32.34105°N	074.81515°W	297.3°	4.9
Data acquisition	11:00	32.35455°N	074.83964°W	296.0°	5.1
Data acquisition	11:30	32.37205°N	074.87150°W	293.0°	5.2
Data acquisition	12:00	32.38672°N	074.89783°W	291.1°	4.8
Data acquisition	13:00	32.42094°N	074.95974°W	290.1°	5.0
Data acquisition	13:30	32.43603°N	074.98713°W	287.0°	5.0

Data acquisition	14:30	32.46687°N	075.04334°W	282.0°	4.9
Data acquisition	15:00	32.48115°N	075.06891°W	277.3°	5.0
Data acquisition	16:00	32.51266°N	075.12657°W	295.2°	4.7
Data acquisition	16:30	32.53310°N	075.16371°W	293.0°	5.0
Data acquisition	17:00	32.55092°N	075.19610°W	295.1°	5.1
Data acquisition	18:00	32.59642°N	075.27943°W	298.9°	4.8
Data acquisition	18:30	32.61768°N	075.31815°W	297.0°	4.9
Data acquisition	19:30	32.66175°N	075.39901°W	301.4°	5.0
Data acquisition	20:30	32.70287°N	075.47476°W	304.0°	4.9
Data acquisition	21:30	32.74573°N	075.55323°W	306.0°	4.9
Data acquisition	22:30	32.78192°N	075.62021°W	308.0°	5.1
Data acquisition	23:30	32.81173°N	075.67528°W	322.2°	5.1
Data acquisition	00:00	32.82517°N	075.69979°W	317.1°	5.0
Data acquisition	00:05	32.82710°N	075.70343°W	320.0°	4.9
Data acquisition	00:10	32.82950°N	075.70788°W	317.7°	4.8
Data acquisition	00:15	32.83105°N	075.71078°W	319.0°	4.9
Data acquisition	00:20	32.83323°N	075.71482°W	322.6°	4.8
Data acquisition	00:25	32.83498°N	075.71800°W	316.5°	4.8
Data acquisition	00:30	32.83705°N	075.72182°W	317.2°	5.1
Data acquisition	01:00	32.85100°N	075.74767°W	318.9°	4.9
Data acquisition	02:00	32.87795°N	075.79750°W	310.0°	4.9
Data acquisition	03:00	32.90827°N	075.85390°W	308.2°	4.9
Data acquisition	04:00	32.94220°N	075.91700°W	305.5°	5.0
Data acquisition	05:00	32.98400°N	075.99480°W	297.6°	4.9
Data acquisition	06:00	33.01982°N	076.06157°W	290.7°	5.0
Data acquisition	07:00	33.07620°N	076.10203°W	12.2°	4.2
Data acquisition	08:00	33.15704°N	076.06158°W	17.7°	4.0
Data acquisition	09:00	33.21522°N	076.02946°W	348.7°	2.9
Data acquisition	09:30	33.25856°N	076.01138°W	22.1°	4.0
Data acquisition	09:35	33.26337°N	076.00891°W	17.1°	4.1
Data acquisition	09:40	33.26955°N	076.00580°W	16.7°	4.1
Data acquisition	09:45	33.27709°N	076.00208°W	16.7°	3.9
Data acquisition	09:50	33.27917°N	076.00106°W	18.0°	4.0
Data acquisition	09:55	33.28300°N	075.99915°W	18.2°	4.0
Data acquisition	10:00	33.28984°N	075.99579°W	18.3°	4.0
Data acquisition	11:00	33.37111°N	075.95470°W	19.8°	3.9
Data acquisition	11:30	33.41120°N	075.93528°W	23.0°	3.8
Data acquisition	12:00	33.45115°N	075.91528°W	20.7°	3.7
Data acquisition	13:00	33.52659°N	075.87772°W	21.2°	3.9
Data acquisition	13:30	33.56687°N	075.85752°W	21.6°	3.9
Data acquisition	14:30	33.57158°N	075.78158°W	139.0°	4.4
Data acquisition	15:00	33.55287°N	075.74853°W	135.2°	4.8
Data acquisition	16:00	33.50493°N	075.66276°W	126.0°	4.4
Data acquisition	16:30	33.48354°N	075.62420°W	121.6°	4.6
Data acquisition	17:00	33.46157°N	075.58514°W	131.0°	4.7
Data acquisition	17:55	33.42156°N	075.51383°W	138.9°	4.8
Data acquisition	18:00	33.41857°N	075.50857°W	136.6°	4.9

Data acquisition	18:30	33.39896°N	075.47361°W	134.0°	5.0
Data acquisition	19:30	33.35796°N	075.40075°W	128.0°	5.1
Data acquisition	20:30	33.30717°N	075.32323°W	120.0°	5.0
Data acquisition	21:30	33.26895°N	075.24307°W	118.0°	5.0
Data acquisition	22:30	33.22321°N	075.16210°W	114.0°	4.7
Data acquisition	23:30	33.18204°N	075.08958°W	124.1°	5.1
Data acquisition	00:00	33.15768°N	075.04662°W	125.0°	5.0
Data acquisition	00:05	33.15354°N	075.03950°W	125.0°	4.8
Data acquisition	00:10	33.14995°N	075.03322°W	124.8°	4.9
Data acquisition	00:15	33.14655°N	075.02718°W	124.9°	4.9
Data acquisition	00:20	33.14270°N	075.02037°W	125.2°	5.0
Data acquisition	00:25	33.13953°N	075.01487°W	125.3°	5.1
Data acquisition	00:30	33.13596°N	075.00848°W	124.2°	5.0
Data acquisition	01:00	33.11598°N	074.97369°W	122.3°	5.0
Data acquisition	02:00	33.07423°N	074.90018°W	128.2°	5.0
Data acquisition	03:00	33.03478°N	074.83092°W	128.6°	5.0
Data acquisition	04:00	32.98530°N	074.74480°W	126.6°	4.9
Data acquisition	05:00	32.93482°N	074.65702°W	123.8°	4.8
Data acquisition	06:00	32.89218°N	074.58290°W	120.9°	4.9
Data acquisition	07:00	32.85292°N	074.51450°W	119.0°	4.9
Data acquisition	08:00	32.80834°N	074.43755°W	117.2°	4.8
Data acquisition	09:00	32.75983°N	074.35346°W	116.8°	5.0
Data acquisition	09:30	32.73987°N	074.31932°W	114.6°	5.1
Data acquisition	09:35	32.73749°N	074.31515°W	115.8°	5.0
Data acquisition	09:40	32.73377°N	074.30877°W	116.4°	5.0
Data acquisition	09:45	32.73029°N	074.30277°W	115.8°	5.1
Data acquisition	09:50	32.72621°N	074.29568°W	117.9°	5.2
Data acquisition	09:55	32.72366°N	074.29131°W	118.8°	5.0
Data acquisition	10:00	32.72252°N	074.28934°W	118.5°	5.0
Data acquisition	11:00	32.68272°N	074.22107°W	118.7°	5.1
Data acquisition	11:30	32.66239°N	074.18561°W	121.0°	4.4
Data acquisition	12:00	32.64403°N	074.15401°W	124.3°	4.5
Data acquisition	13:00	32.60323°N	074.08402°W	130.1°	4.5
Data acquisition	13:30	32.58258°N	074.04870°W	130.5°	4.5
Data acquisition	14:30	32.53484°N	073.96689°W	130.0°	4.0
Data acquisition	15:00	32.50762°N	073.94425°W	204.9°	4.6
Data acquisition	16:00	32.45902°N	073.97550°W	240.0°	4.3
Data acquisition	16:30	32.43758°N	073.99049°W	241.0°	3.9
Data acquisition	17:00	32.41613°N	074.00553°W	243.1°	4.0
Data acquisition	18:00	32.35784°N	074.04642°W	236.1°	5.0
Data acquisition	18:30	32.32630°N	074.06853°W	233.0°	5.0
Data acquisition	19:30	32.28592°N	074.12186°W	297.4°	4.5
Data acquisition	20:30	32.31194°N	074.16925°W	303.0°	3.7
Data acquisition	21:30	32.33479°N	074.21015°W	301.2°	4.4
Data acquisition	22:30	32.36170°N	074.25753°W	298.5°	4.4
Data acquisition	23:30	32.38852°N	074.30515°W	293.0°	5.1
Data acquisition	00:00	32.40440°N	074.33335°W	292.6°	5.0
Data acquisition	00:05	32.40728°N	074.33844°W	292.5°	5.1

Data acquisition	00:10	32.41020°N	074.34365°W	291.0°	5.1
Data acquisition	00:15	32.41240°N	074.34753°W	290.6°	5.0
Data acquisition	00:20	32.41477°N	074.35212°W	290.3°	5.1
Data acquisition	00:25	32.41755°N	074.35664°W	289.9°	5.0
Data acquisition	00:30	32.41988°N	074.36082°W	288.6°	5.0
Data acquisition	01:00	32.43703°N	074.39121°W	287.0°	5.1
Data acquisition	02:00	32.46154°N	074.43560°W	287.0°	5.1
Data acquisition	03:00	32.49385°N	074.49293°W	294.3°	5.0
Data acquisition	04:00	32.53061°N	074.55847°W	301.3°	4.9
Data acquisition	05:00	32.57693°N	074.64145°W	307.4°	4.9
Data acquisition	06:00	32.61060°N	074.70189°W	313.8°	4.8
Data acquisition	07:00	32.65595°N	074.78347°W	317.0°	5.0
Data acquisition	08:00	32.70047°N	074.86336°W	317.1°	5.0
Data acquisition	09:00	32.74600°N	074.94590°W	316.0°	4.8
Data acquisition	09:30	32.77139°N	074.99141°W	314.0°	4.9
Data acquisition	09:35	32.77290°N	074.99417°W	314.0°	4.9
Data acquisition	09:40	32.77507°N	074.99805°W	313.7°	5.0
Data acquisition	09:45	32.77746°N	075.00246°W	315.4°	5.0
Data acquisition	09:50	32.78385°N	075.01402°W	315.1°	4.9
Data acquisition	09:55	32.78865°N	075.02264°W	314.2°	5.0
Data acquisition	10:00	32.79156°N	075.02794°W	314.5°	5.0
Data acquisition	10:30	32.81527°N	075.07095°W	312.0°	4.8
Data acquisition	11:00	32.83623°N	075.10885°W	312.0°	5.1
Data acquisition	11:30	32.85692°N	075.14679°W	312.0°	5.0
Data acquisition	12:00	32.88028°N	075.18951°W	312.7°	5.0
Data acquisition	13:00	32.92283°N	075.26656°W	310.4°	5.0
Data acquisition	13:30	32.94749°N	075.31173°W	315.6°	5.0
Data acquisition	14:00	32.96833°N	075.34981°W	323.2°	5.4
Data acquisition	14:09	32.97350°N	075.35907°W	328.7°	4.7
Data acquisition	14:23	32.97997°N	075.37091°W	330.0°	5.0
Data acquisition	14:30	32.98479°N	075.37972°W	329.0°	4.9
Data acquisition	15:00	32.99847°N	075.40494°W	328.6°	5.2
Data acquisition	15:30	33.01455°N	075.43403°W	330.0°	5.2
Data acquisition	16:00	33.02813°N	075.45895°W	337.0°	5.0
Data acquisition	16:30	33.04027°N	075.48072°W	300.0°	3.3
Data acquisition	17:00	33.05378°N	075.50592°W	330.8°	3.6
Data acquisition	18:00	33.08848°N	075.56960°W	324.3°	5.0
Data acquisition	18:30	33.10726°N	075.60408°W	317.0°	5.2
Data acquisition	19:30	33.14766°N	075.67846°W	308.0°	5.1
Data acquisition	20:30	33.18842°N	075.75370°W	303.0°	4.9
Data acquisition	21:30	33.23367°N	075.83728°W	296.0°	4.9
Data acquisition	22:30	33.27609°N	075.91603°W	288.0°	4.9
Data acquisition	23:30	33.31595°N	075.98016°W	0.6°	5.1
Data acquisition	00:00	33.35080°N	075.96425°W	17.7°	4.6
Data acquisition	00:05	33.35728°N	075.96102°W	15.5°	4.8
Data acquisition	00:10	33.36768°N	075.95587°W	15.3°	5.1
Data acquisition	00:15	33.36962°N	075.95492°W	15.7°	5.0
Data acquisition	00:20	33.37667°N	075.95145°W	16.4°	4.8
Data acquisition	00:25	33.38130°N	075.94922°W	17.6°	4.5

Data acquisition	00:30	33.38827°N	075.94580°W	18.2°	4.9
Data acquisition	01:00	33.42649°N	075.92699°W	28.5°	4.3
Data acquisition	02:00	33.50375°N	075.88862°W	24.0°	3.9
Data acquisition	03:00	33.57175°N	075.85495°W	20.0°	3.5
Data acquisition	04:00	33.64710°N	075.81781°W	16.7°	2.5
Data acquisition	05:00	33.72348°N	075.78018°W	13.0°	3.4
Data acquisition	06:00	33.81012°N	075.73758°W	13.0°	3.1
Data acquisition	07:00	33.87580°N	075.70513°W	14.9°	3.1
Data acquisition	08:00	33.94786°N	075.66966°W	13.9°	3.5
Data acquisition	09:00	34.02282°N	075.63231°W	10.3°	3.1
Data acquisition	09:30	34.07045°N	075.60889°W	9.2°	3.4
Data acquisition	09:35	34.07512°N	075.60648°W	8.4°	3.4
Data acquisition	09:40	34.07975°N	075.60430°W	11.0°	3.4
Data acquisition	09:45	34.08365°N	075.60232°W	11.5°	3.2
Data acquisition	09:50	34.09113°N	075.59855°W	7.8°	3.1
Data acquisition	09:55	34.09476°N	075.59676°W	8.8°	3.3
Data acquisition	10:00	34.10370°N	075.59227°W	9.1°	3.2
Data acquisition	11:00	34.17599°N	075.54438°W	15.0°	2.4
Data acquisition	11:30	34.20478°N	075.51780°W	20.6°	3.2
Data acquisition	12:00	34.25237°N	075.48945°W	22.5°	3.1
Data acquisition	13:00	34.33403°N	075.43036°W	22.1°	3.1
Data acquisition	13:30	34.36882°N	075.41971°W	308.4°	4.7
Data acquisition	14:30	34.39576°N	075.46575°W	256.0°	4.4
Data acquisition	14:45	34.40195°N	075.47832°W	254.0°	4.5
Data acquisition	15:00	34.40550°N	075.48525°W	250.0°	4.5
Data acquisition	16:00	34.42296°N	075.52089°W	253.0°	5.3
Data acquisition	16:30	34.43242°N	075.54066°W	259.0°	5.2
Data acquisition	17:00	34.44086°N	075.55769°W	262.2°	4.9
Data acquisition	18:00	34.45868°N	075.59442°W	265.5°	4.9
Data acquisition	18:30	34.46763°N	075.62406°W	249.0°	5.0
Data acquisition	19:30	34.44729°N	075.65110°W	229.3°	5.1
Data acquisition	20:30	34.40488°N	075.68306°W	224.0°	5.1
Data acquisition	21:30	34.36183°N	075.71553°W	222.3°	4.8
Data acquisition	22:30	34.32057°N	075.74648°W	219.0°	5.1
Data acquisition	23:30	34.28471°N	075.77340°W	217.1°	5.0
Data acquisition	00:00	34.26510°N	075.78810°W	218.7°	4.9
Data acquisition	00:05	34.26179°N	075.79060°W	217.2°	5.0
Data acquisition	00:10	34.25910°N	075.79255°W	219.6°	5.0
Data acquisition	00:15	34.25612°N	075.79490°W	218.8°	4.9
Data acquisition	00:20	34.25335°N	075.79692°W	219.7°	5.0
Data acquisition	00:25	34.25056°N	075.79899°W	220.0°	5.1
Data acquisition	00:30	34.24783°N	075.80108°W	223.6°	4.9
Data acquisition	00:35	34.24522°N	075.80359°W	228.2°	4.9
Data acquisition	01:00	34.23846°N	075.81713°W	246.0°	5.0
Data acquisition	02:00	34.24065°N	075.86512°W	254.0°	5.0
Data acquisition	03:00	34.23809°N	075.91573°W	232.6°	5.1
Data acquisition	04:00	34.20924°N	075.93406°W	221.2°	5.0
Data acquisition	05:00	34.17375°N	075.95210°W	217.9°	5.0
Data acquisition	06:00	34.13928°N	075.96960°W	213.2°	5.0

Data acquisition	07:00	34.10905°N	075.98503°W	209.4°	5.0
Data acquisition	08:00	34.06848°N	076.00560°W	202.6°	4.9
Data acquisition	09:00	34.02917°N	076.02533°W	202.3°	5.0
Data acquisition	09:30	34.00516°N	076.03766°W	200.8°	5.0
Data acquisition	09:35	34.00182°N	076.03936°W	199.6°	5.0
Data acquisition	09:40	33.99677°N	076.04191°W	201.1°	5.0
Data acquisition	09:45	33.99303°N	076.04383°W	200.1°	5.0
Data acquisition	09:50	33.99001°N	076.04532°W	198.9°	5.0
Data acquisition	09:55	33.98841°N	076.04616°W	200.6°	5.0
Data acquisition	10:00	33.98689°N	076.04693°W	199.9°	4.9
Data acquisition	11:00	33.94325°N	076.06931°W	203.0°	5.0
Data acquisition	11:17	33.92683°N	076.07737°W	202.0°	5.0
Data acquisition	11:30	33.91341°N	076.08435°W	199.0°	5.1
Data acquisition	12:00	33.88924°N	076.09648°W	199.6°	5.0
Data acquisition	12:50	33.84018°N	076.12116°W	199.0°	5.0
Data acquisition	13:00	33.83245°N	076.12513°W	199.7°	5.0
Data acquisition	13:30	33.80136°N	076.14068°W	200.8°	5.0
Standby (define in commer	14:00	33.76683°N	076.15769°W	201.6°	4.7
Retrieving equipment	14:25	33.75531°N	076.16789°W	220.3°	3.4
Retrieving equipment	14:30	33.75211°N	076.17219°W	220.0°	3.4
Retrieving equipment	15:00	33.74022°N	076.18891°W	220.0°	3.5
Retrieving equipment	15:25	33.72926°N	076.20307°W	220.0°	3.2
Retrieving equipment	16:00	33.71715°N	076.21818°W	220.0°	3.1
Retrieving equipment	16:30	33.71093°N	076.22550°W	220.0°	2.6
Retrieving equipment	17:00	33.70643°N	076.23089°W	220.6°	1.7
Retrieving equipment	17:32	33.70494°N	076.23431°W	220.1°	2.1
Retrieving equipment	17:46	33.70347°N	076.23652°W	220.2°	2.3
Retrieving equipment	18:00	33.69832°N	076.24246°W	220..5	4.0
Retrieving equipment	18:30	33.68385°N	076.25837°W	220.0°	4.0
Retrieving equipment	19:30	33.66632°N	076.28215°W	225.9°	1.7
Retrieving equipment	20:30	33.65588°N	076.30101°W	210.0°	1.5
Retrieving equipment	21:30	33.65168°N	076.30697°W	203.0°	1.6
Retrieving equipment	22:30	33.63975°N	076.31448°W	212.9°	2.8
Transit	23:30	33.63042°N	076.32555°W	219.1°	2.1
Transit	00:00	33.63570°N	076.35713°W	270.1°	6.3
Transit	00:05	33.63751°N	076.36785°W	269.0°	6.2
Transit	00:10	33.63874°N	076.37530°W	269.2°	6.4
Transit	00:15	33.64012°N	076.38476°W	270.5°	6.6
Transit	00:20	33.64107°N	076.39140°W	270.2°	6.4
Transit	00:25	33.64252°N	076.40066°W	270.6°	6.4
Transit	00:30	33.64377°N	076.40913°W	270.7°	6.3
Transit	09:30	34.48155°N	076.63068°W	351.0°	5.8
Transit	09:35	34.48487°N	076.63157°W	350.8°	5.7
Transit	09:40	34.49047°N	076.63302°W	351.3°	5.8
Transit	09:45	34.50188°N	076.63595°W	350.5°	5.9
Transit	09:50	34.50650°N	076.63710°W	351.2°	6.0
Transit	09:55	34.51305°N	076.63868°W	350.6°	6.0
Transit	10:00	34.52027°N	076.64045°W	351.0°	2.3

Transit	11:00	34.55066°N	076.65319°W	347.0°	2.4
Transit	11:30	34.60033°N	076.66956°W	331.0°	8.1
Transit	12:00	34.67560°N	076.66903°W	11.9°	10.5

			End of obse			
GIS Latitude	GIS Longitude	Water depth (metres)	Time	Latitude	Longitude	Vessel Heading in degrees
36.85261	-76.29956	8	18:00	36.93067°N	076.33883°W	5.1°
36.93067	-76.33883		19:00	36.99200°N	076.17967°W	109.0°
36.99200	-76.17967		20:00	36.93957°N	075.99313°W	104.0°
36.93957	-75.99313	20	21:00	36.82667°N	075.80555°W	121.0°
36.82667	-75.80555	22	22:00	36.72723°N	075.62935°W	123.0°
36.72723	-75.62935	22	23:00	36.57343°N	075.52237°W	153.0°
36.57343	-75.52237	24	24:00	36.42503°N	075.43832°W	154.0°
36.42503	-75.43832	24	00:05	36.39557°N	075.42400°W	154.0°
36.39557	-75.42400	22	00:10	36.38408°N	075.41772°W	154.0°
36.38408	-75.41772	25	00:15	36.37002°N	075.40996°W	154.0°
36.37002	-75.40996	25	00:20	36.36100°N	075.40517°W	153.0°
36.36100	-75.40517	28	00:27	36.34086°N	075.39404°W	154.0°
35.31658	-74.05673	3137	09:35	35.31245°N	074.05198°W	144.0°
35.31245	-74.05198	3137	09:40	35.31207°N	074.05160°W	143.0°
35.31207	-74.05160	3137	09:45	35.31190°N	074.05137°W	141.0°
35.31190	-74.05137	3137	09:50	35.30606°N	074.04411°W	143.0°
35.30606	-74.04411	3153	09:55	35.30342°N	074.04085°W	143.0°
35.30342	-74.04085	3159	10:00	35.30140°N	074.03880°W	142.0°
35.30140	-74.03880	3157	10:14	35.29797°N	074.03493°W	140.0°
35.29797	-74.03493	3179	11:00	35.28084°N	074.01417°W	134.0°
35.28084	-74.01417	3222	11:30	35.26050°N	073.98700°W	138.0°
35.26050	-73.98700	3260	12:00	35.24064°N	073.96191°W	138.0°
35.24064	-73.96191	3290	13:00	35.20280°N	073.91739°W	190.0°
35.20280	-73.91739	3362	13:30	35.17846°N	073.89936°W	190.0°
35.17846	-73.89936	3361	14:30	35.13528°N	073.92327°W	213.0°
35.13528	-73.92327	3384	15:00	35.11384°N	073.93662°W	213.0°
35.11384	-73.93662	3429	16:00	35.08048°N	073.93983°W	223.0°
35.08048	-73.93983	3432	16:30	35.07050°N	073.95567°W	230.0°
35.07050	-73.95567	3411	17:00	35.06106°N	073.97141°W	226.0°
35.06106	-73.97141	3300	17:31	35.04431°N	073.98997°W	215.0°
35.04431	-73.98997	3311	18:00	35.02634°N	074.00484°W	213.0°
35.02634	-74.00484	3385	18:30	35.00517°N	074.02217°W	211.0°
35.00517	-74.02217	3350	19:00	34.97917°N	074.04300°W	211.0°
34.97917	-74.04300	3363	20:00	34.93968°N	074.07345°W	210.0°
34.93968	-74.07345	3294	20:30	34.91850°N	074.08837°W	211.0°
34.91850	-74.08837	3319	21:30	34.87793°N	074.09187°W	130.0°
34.87793	-74.09187	3389	22:00	34.88074°N	074.05509°W	145.0°
34.88074	-74.05509	3379	23:00	34.95968°N	074.04380°W	2.0°
34.95968	-74.04380	3298	23:30	34.99980°N	074.04455°W	358.7°
34.99980	-74.04455	3356	23:49	35.02142°N	074.04949°W	358.7°

35.02142	-74.04949	3371	23:54	35.02713°N	074.06073°W	283.9°
35.02713	-74.06073	3318	24:00	35.02487°N	074.05741°W	296.7°
35.02487	-74.05741	3329	00:04	35.02713°N	074.06073°W	283.9°
35.02713	-74.06073	3318	00:09	35.02899°N	074.06507°W	267.0°
35.02899	-74.06507	3319	00:14	35.02966°N	074.06819°W	247.3°
35.02966	-74.06819	3321	00:19	35.02938°N	074.07255°W	252.6°
34.98200	-74.23108	3235	05:00	34.97333°N	074.23582°W	220.0°
34.97333	-74.23582	3306	05:55	34.93936°N	074.25345°W	214.0°
34.93936	-74.25345	3303	06:00	34.93512°N	074.25573°W	213.0°
34.93512	-74.25573	3324	06:25	34.91567°N	074.26484°W	169.0°
34.91567	-74.26484	3270	07:00	34.91129°N	074.22673°W	31.0°
34.91129	-74.22673	3359	08:00	34.97326°N	074.18665°W	26.0°
34.97326	-74.18665	3283	08:32	35.00902°N	074.16637°W	352.0°
35.00902	-74.16637	3223	09:00	35.02950°N	074.18925°W	289.0°
35.02950	-74.18925	3184	09:03	35.02541°N	074.19257°W	253.0°
35.02541	-74.19257	3200	09:25	35.01659°N	074.21259°W	213.0°
35.01659	-74.21259	3201	09:30	35.01198°N	074.21545°W	212.0°
35.01198	-74.21545	3227	09:35	35.00750°N	074.21787°W	215.0°
35.00750	-74.21787	3284	09:40	35.00244°N	074.22058°W	220.0°
35.00244	-74.22058	3285	09:50	34.99320°N	074.22538°W	218.0°
34.99320	-74.22538	3312	09:57	34.98614°N	074.22904°W	214.0°
34.98614	-74.22904	3315	09:59	34.98420°N	074.23002°W	213.0°
34.98420	-74.23002	3340	11:00	34.92926°N	074.25852°W	216.0°
34.92926	-74.25852	3208	11:30	34.89355°N	074.27738°W	217.0°
34.89355	-74.27738	3263	12:00	34.86793°N	074.29073°W	214.0°
34.86793	-74.29073	3310	13:00	34.79539°N	074.33689°W	218.0°
34.79539	-74.33689	3303	13:30	34.76474°N	074.35782°W	217.0°
34.76474	-74.35782	3353	14:30	34.68780°N	074.40967°W	214.0°
34.68780	-74.40967	3369	15:00	34.65310°N	074.43293°W	214.0°
34.65310	-74.43293	3377	16:00	34.57825°N	074.48331°W	212.0°
34.57825	-74.48331	3364	16:30	34.54498°N	074.50542°W	212.0°
34.54498	-74.50542	3380	17:00	34.50969°N	074.52919°W	212.6°
34.50969	-74.52919	3391	18:00	34.44375°N	074.57362°W	208.0°
34.44375	-74.57362	3468	18:30	34.40584°N	074.59876°W	209.0°
34.40584	-74.59876	3513	19:00	34.36999°N	074.62262°W	208.0°
34.36999	-74.62262	3616	19:30	34.32869°N	074.65027°W	208.0°
34.32869	-74.65027	3527	20:00	34.29373°N	074.67347°W	208.0°
34.29373	-74.67347	3506	20:30	34.26717°N	074.69119°W	209.0°
34.26717	-74.69119	3498	21:30	34.19280°N	074.74063°W	208.0°
34.19280	-74.74063	3504	22:00	34.16003°N	074.76253°W	207.0°
34.16003	-74.76253	3553	22:30	34.12190°N	074.78754°W	205.0°
34.12190	-74.78754	3561	23:30	34.05177°N	074.83410°W	203.0°
34.05177	-74.83410	3633	23:50	34.02851°N	074.84946°W	203.7°
34.02851	-74.84946	3638	23:55	34.01963°N	074.85520°W	203.4°
34.01963	-74.85520	3629	24:00	34.01568°N	074.85783°W	204.0°
34.01568	-74.85783	3621	00:05	34.00971°N	074.86180°W	205.0°
34.00971	-74.86180	3625	00:10	34.00510°N	074.86500°W	204.0°

34.00510	-74.86500	3629	00:15	33.99723°N	074.87025°W	203.0°
33.99723	-74.87025	3618	00:20	33.99279°N	074.87323°W	204.0°
33.99279	-74.87323	3618	01:00	33.94147°N	074.90683°W	205.2°
33.94147	-74.90683	3580	02:00	33.87347°N	074.95183°W	203.0°
33.87347	-74.95183	3536	03:00	33.80150°N	074.99927°W	199.0°
33.80150	-74.99927	3511	04:00	33.72762°N	075.04750°W	194.7°
33.72762	-75.04750	3528	05:00	33.66520°N	075.08860°W	200.0°
33.66520	-75.08860	3538	06:00	33.61715°N	075.12005°W	199.0°
33.61715	-75.12005	3536	07:00	33.54168°N	075.16900°W	189.0°
33.54168	-75.16900	3555	08:00	33.48380°N	075.10398°W	132.0°
33.48380	-75.10398	3648	09:00	33.44946°N	075.04401°W	134.0°
33.44946	-75.04401	3717	09:30	33.42955°N	075.00951°W	135.0°
33.42955	-75.00951	3763	09:35	33.42162°N	074.99567°W	134.0°
33.42162	-74.99567	3780	09:40	33.41738°N	074.98825°W	134.0°
33.41738	-74.98825	3779	09:45	33.41482°N	074.98382°W	133.0°
33.41482	-74.98382	3782	09:50	33.41188°N	074.97865°W	134.0°
33.41188	-74.97865	3795	09:55	33.40632°N	074.96898°W	134.0°
33.40632	-74.96898	3792	10:02	33.40310°N	074.96308°W	134.0°
33.40310	-74.96308	3811	11:00	33.35961°N	074.88925°W	130.0°
33.35961	-74.88925	3913	11:30	33.33323°N	074.84172°W	127.0°
33.33323	-74.84172	3985	12:00	33.31016°N	074.80138°W	126.0°
33.31016	-74.80138	4036	13:00	33.26517°N	074.72328°W	120.0°
33.26517	-74.72328	4138	13:30	33.24265°N	074.68175°W	116.0°
33.24265	-74.68175	4192	14:30	33.19514°N	074.60219°W	115.0°
33.19514	-74.60219	4285	15:00	33.17396°N	074.56552°W	112.8°
33.17396	-74.56552	4331	16:00	33.12603°N	074.48288°W	112.0°
33.12603	-74.48288	4440	16:30	33.10380°N	074.44470°W	113.0°
33.10380	-74.44470	4474	17:00	33.07835°N	074.40105°W	123.1°
33.07835	-74.40105	4528	18:00	33.03221°N	074.32165°W	125.0°
33.03221	-74.32165	4609	18:30	33.00818°N	074.28062°W	123.0°
33.00818	-74.28062	4619	19:30	32.95882°N	074.19602°W	122.0°
32.95882	-74.19602	4650	20:30	32.91431°N	074.11987°W	121.0°
32.91431	-74.11987	4726	21:30	32.86063°N	074.04798°W	185.0°
32.86063	-74.04798	4776	22:30	32.78690°N	074.09567°W	213.0°
32.78690	-74.09567	4838	23:30	32.71548°N	074.14678°W	217.6°
32.71548	-74.14678	4797	23:50	32.69315°N	074.16212°W	218.0°
32.69315	-74.16212	4797	23:55	32.68665°N	074.16675°W	217.0°
32.68665	-74.16675	4801	24:00	32.67907°N	074.17215°W	217.0°
32.67907	-74.17215	4803	00:05	32.67357°N	074.17617°W	217.0°
32.67357	-74.17617	4801	00:10	32.66848°N	074.17965°W	217.0°
32.66848	-74.17965	4801	00:15	32.66243°N	074.18387°W	217.0°
32.66243	-74.18387	4801	00:20	32.65832°N	074.18677°W	217.0°
32.65832	-74.18677	4801	01:00	32.60979°N	074.22096°W	216.7°
32.60979	-74.22096	4773	02:00	32.54065°N	074.26985°W	217.0°
32.54065	-74.26985	4726	03:00	32.47336°N	074.31715°W	220.2°
32.47336	-74.31715	4727	04:00	32.42823°N	074.34885°W	223.0°
32.42823	-74.34885	4684	05:00	32.36902°N	074.39073°W	217.0°

32.36902	-74.39073	4654	06:00	32.32570°N	074.42100°W	220.0°
32.32570	-74.42100	4649	07:00	32.27655°N	074.45553°W	216.0°
32.27655	-74.45553	4637	08:00	32.20558°N	074.50527°W	213.0°
32.20558	-74.50527	4628	09:00	32.14930°N	074.54456°W	212.0°
32.14930	-74.54456	4618	09:30	32.12512°N	074.56121°W	212.0°
32.12512	-74.56121	4624	09:35	32.11840°N	074.56592°W	210.0°
32.11840	-74.56592	4635	09:40	32.11491°N	074.56835°W	209.0°
32.11491	-74.56835	4630	09:45	32.11373°N	074.56917°W	210.0°
32.11373	-74.56917	4637	09:50	32.10715°N	074.57378°W	209.0°
32.10715	-74.57378	4635	09:55	32.10612°N	074.57450°W	208.0°
32.10612	-74.57450	4641	10:00	32.10259°N	074.57695°W	209.0°
32.10259	-74.57695	4636	11:00	32.06695°N	074.60185°W	207.0°
32.06695	-74.60185	4620	11:30	32.04682°N	074.61592°W	203.0°
32.04682	-74.61592	4603	12:00	32.02938°N	074.62807°W	200.0°
32.02938	-74.62807	4571	13:00	31.97012°N	074.66919°W	203.5°
31.97012	-74.66919	4470	13:30	31.94059°N	074.69112°W	202.0°
31.94059	-74.69112	4415	14:30	31.87174°N	074.73806°W	198.0°
31.87174	-74.73806	4299	15:00	31.84359°N	074.75709°W	198.7°
31.84359	-74.75709	4232	16:00	31.78412°N	074.79824°W	198.0°
31.78412	-74.79824	4107	16:30	31.75197°N	074.82055°W	195.0°
31.75197	-74.82055	4030	17:00	31.72131°N	074.84161°W	197.8°
31.72131	-74.84161	3977	17:52	31.68297°N	074.86802°W	194.0°
31.68297	-74.86802	3833	18:00	31.68031°N	074.87015°W	192.0°
31.68031	-74.87015	3820	18:30	31.66044°N	074.86837°W	138.0°
31.66044	-74.86837	3785	19:30	31.70797°N	074.78913°W	59.0°
31.70797	-74.78913	4044	20:32	31.78993°N	074.77372°W	305.0°
31.78993	-74.77372	4150	21:30	31.77820°N	074.81502°W	164.0°
31.77820	-74.81502	4062	22:30	31.71953°N	074.84289°W	198.0°
31.71953	-74.84289	3975	23:30	31.68071°N	074.86947°W	200.0°
31.68071	-74.86947	3828	23:48	31.66438°N	074.88080°W	202.5°
31.66438	-74.88080	3762	23:53	31.66038°N	074.88355°W	202.2°
31.66038	-74.88355	3750	24:00	31.65360°N	074.88822°W	203.0°
31.65360	-74.88822	3727	0:03	31.65360°N	074.88822°W	203.0°
31.65056	-74.89030	3720	00:08	31.65056°N	074.89030°W	203.7°
31.64586	-74.89364	3690	00:13	31.64586°N	074.89364°W	203.9°
31.64010	-74.89761	3665	00:18	31.64010°N	074.89761°W	203.9°

31.64010	-74.89761	3629	01:00	31.59344°N	074.92965°W	205.6°
31.59344	-74.92965	3503	02:00	31.53380°N	074.97063°W	209.0°
31.53380	-74.97063	3287	03:00	31.46692°N	075.01673°W	210.0°
31.46692	-75.01673	3170	04:00	31.41775°N	075.06647°W	263.0°
31.41775	-75.06647	3013	05:00	31.46074°N	075.13237°W	297.0°
31.46074	-75.13237	2996	06:00	31.51728°N	075.20782°W	295.0°
31.51728	-75.20782	3097	07:00	31.56438°N	075.27057°W	295.0°
31.56438	-75.27057	3047	08:00	31.63227°N	075.27113°W	23.0°
31.63227	-75.27113	3005	09:00	31.69649°N	075.22775°W	21.8°
31.69649	-75.22775	3012	09:30	31.72996°N	075.20532°W	36.0°
31.72996	-75.20532	3115	09:35	31.74413°N	075.19570°W	40.0°
31.74413	-75.19570	3149	09:40	31.74972°N	075.19190°W	40.0°
31.74972	-75.19190	3139	09:45	31.75897°N	075.18563°W	39.0°
31.75897	-75.18563	3154	09:50	31.76167°N	075.18378°W	38.0°
31.76167	-75.18378	3163	09:55	31.76480°N	075.18163°W	37.0°
31.76480	-75.18163	3174	10:05	31.77450°N	075.17495°W	37.0°
31.77450	-75.17495	3174	11:00	31.84023°N	075.12974°W	51.0°
31.84023	-75.12974	3410	11:30	31.87820°N	075.10425°W	50.0°
31.87820	-75.10425	3522	12:00	31.91332°N	075.08034°W	47.0°
31.91332	-75.08034	3575	13:00	31.98366°N	075.03262°W	47.1°
31.98366	-75.03262	3871	13:30	32.01957°N	075.00810°W	45.2°
32.01957	-75.00810	3955	14:30	32.09491°N	074.95653°W	43.0°
32.09491	-74.95653	4142	15:00	32.12747°N	074.93436°W	40.8°
32.12747	-74.93436	4203	16:00	32.19361°N	074.88907°W	40.0°
32.19361	-74.88907	4314	16:30	32.22703°N	074.86609°W	37.0°
32.22703	-74.86609	4358	17:00	32.26274°N	074.84150°W	33.5°
32.26274	-74.84150	4398	18:00	32.33425°N	074.79232°W	31.3°
32.33425	-74.79232	4429	18:30	32.37120°N	074.76687°W	28.0°
32.37120	-74.76687	4429	19:30	32.45189°N	074.71087°W	27.1°
32.45189	-74.71087	4448	20:30	32.51558°N	074.66718°W	27.0°
32.51558	-74.66718	4503	21:30	32.58676°N	074.61791°W	31.0°
32.58676	-74.61791	4553	22:30	32.65768°N	074.56867°W	31.0°
32.65768	-74.56867	4562	23:30	32.73025°N	074.51837°W	36.0°
32.73025	-74.51837	4611	23:49	32.75163°N	074.50347°W	35.0°
32.75163	-74.50347	4634	23:54	32.75842°N	074.49878°W	33.3°
32.75842	-74.49878	4632	24:00	32.76570°N	074.49362°W	32.0°
32.76570	-74.49362	4630	00:04	32.77200°N	074.48923°W	32.0°
32.77200	-74.48923	4633	00:09	32.77640°N	074.48620°W	31.0°
32.77640	-74.48620	4627	00:14	32.78198°N	074.48228°W	30.0°
32.78198	-74.48228	4625	00:19	32.78753°N	074.47843°W	29.0°
32.78753	-74.47843	4624	01:00	32.83537°N	074.44529°W	30.5°
32.83537	-74.44529	4637	02:00	32.88364°N	4d24.6893mW	25.9°

32.88364	-74.41149	4632	03:00	32.92148°N	074.38928°W	2.0°
32.92148	-74.38928	4638	04:00	32.95562°N	074.42705°W	314.0°
32.95562	-74.42705	4592	05:00	32.98963°N	074.48473°W	314.0°
32.98963	-74.48473	4547	06:00	33.01687°N	074.53125°W	309.0°
33.01687	-74.53125	4481	07:00	33.04350°N	074.57720°W	306.0°
33.04350	-74.57720	4412	08:00	33.02966°N	074.64522°W	215.0°
33.02966	-74.64522	4374	09:00	32.97208°N	074.68680°W	210.0°
32.97208	-74.68680	4367	09:22	32.94767°N	074.70447°W	208.0°
32.94767	-74.70447	4382	09:30	32.94207°N	074.70827°W	208.0°
32.94207	-74.70827	4387	09:32	32.93595°N	074.71267°W	208.0°
32.93595	-74.71267	4395	09:37	32.93133°N	074.71600°W	208.0°
32.93133	-74.71600	4391	09:42	32.92537°N	074.72032°W	208.0°
32.92537	-74.72032	4388	09:47	32.91482°N	074.72792°W	208.0°
32.91482	-74.72792	4392	09:52	32.91125°N	074.73047°W	208.0°
32.91125	-74.73047	4401	10:38	32.85858°N	074.76855°W	205.0°
32.85858	-74.76855	4405	11:00	32.83344°N	074.78667°W	209.0°
32.83344	-74.78667	4409	11:30	32.79680°N	074.81300°W	207.0°
32.79680	-74.81300	4386	12:00	32.76316°N	074.83725°W	210.0°
32.76316	-74.83725	4367	13:00	32.68991°N	074.88973°W	209.0°
32.68991	-74.88973	4307	13:30	32.65537°N	074.91452°W	206.0°
32.65537	-74.91452	4301	14:30	32.58319°N	074.96598°W	207.0°
32.58319	-74.96598	4222	15:00	32.55008°N	074.98975°W	209.5°
32.55008	-74.98975	4228	16:00	32.48167°N	075.03855°W	207.0°
32.48167	-75.03855	4188	16:30	32.45117°N	075.06032°W	205.0°
32.45117	-75.06032	4177	17:00	32.41739°N	075.08435°W	202.5°
32.41739	-75.08435	4159	18:00	32.35777°N	075.12684°W	195.0°
32.35777	-75.12684	4093	18:30	32.32575°N	075.14960°W	193.0°
32.32575	-75.14960	4055	19:30	32.26825°N	075.19041°W	190.0°
32.26825	-75.19041	3971	20:30	32.21745°N	075.22609°W	189.0°
32.21745	-75.22609	3886	21:30	32.17027°N	075.25961°W	185.0°
32.17027	-75.25961	3784	22:30	32.12330°N	075.29276°W	190.0°
32.12330	-75.29276	3667	23:30	32.06752°N	075.33215°W	192.2°
32.06752	-75.33215	3420	23:52	32.05111°N	075.34366°W	194.3°
32.05111	-75.34366	3340	23:57	32.04730°N	075.34635°W	193.0°
32.04730	-75.34635	3328	00:00	32.04488°N	075.34802°W	194.1°
32.04488	-75.34802	3325	00:07	32.03803°N	075.35287°W	197.0°
32.03803	-75.35287	3306	00:12	32.03343°N	075.35613°W	195.0°
32.03343	-75.35613	3288	00:17	32.02928°N	075.35905°W	195.0°
32.02928	-75.35905	3284	00:22	32.02504°N	075.36201°W	195.9°
32.02504	-75.36201	3269	01:00	31.98875°N	075.38748°W	199.4°
31.98875	-75.38748	2143	02:00	31.93037°N	075.42883°W	211.0°

31.93037	-75.42883	2941	03:00	31.86652°N	075.47358°W	217.0°
31.86652	-75.47358	2763	04:00	31.81119°N	075.51216°W	219.0°
31.81119	-75.51216	2779	05:00	31.74042°N	075.56183°W	220.0°
31.74042	-75.56183	2894	06:00	31.68463°N	075.53213°W	108.0°
31.68463	-75.53213	3021	07:00	31.73697°N	075.50720°W	319.0°
31.73697	-75.50720	2918	08:00	31.79732°N	075.55295°W	321.0°
31.79732	-75.55295	2781	09:00	31.84667°N	075.59091°W	323.0°
31.84667	-75.59091	2696	09:35	31.87837°N	075.61501°W	324.0°
31.87837	-75.61501	2641	09:40	31.88403°N	075.61938°W	326.0°
31.88403	-75.61938	2652	09:45	31.88660°N	075.62134°W	325.0°
31.88660	-75.62134	2668	09:50	31.88970°N	075.62375°W	325.0°
31.88970	-75.62375	2705	09:55	31.89692°N	075.62926°W	325.0°
31.89692	-75.62926	2735	10:05	31.90261°N	075.63380°W	327.0°
31.90261	-75.63380	2766	10:50	31.94909°N	075.66952°W	330.0°
31.94909	-75.66952	2721	11:00	31.95711°N	075.67566°W	330.0°
31.95711	-75.67566	2705	11:30	31.99055°N	075.70140°W	333.0°
31.99055	-75.70140	2666	12:00	32.02822°N	075.73030°W	334.0°
32.02822	-75.73030	2632	13:00	32.08010°N	075.73058°W	29.9°
32.08010	-75.73058	2635	13:30	32.10582°N	075.71206°W	29.3°
32.10582	-75.71206	2704	13:58	32.13217°N	075.69328°W	31.0°
32.13217	-75.69328	2797	14:14	32.14816°N	075.68182°W	35.4°
32.14816	-75.68182	2854	14:30	32.16244°N	075.67157°W	37.7°
32.16244	-75.67157	2927	15:00	32.19592°N	075.64743°W	39.9°
32.19592	-75.64743	3056	16:00	32.25519°N	075.60475°W	44.0°
32.25519	-75.60475	3279	16:30	32.28543°N	075.58278°W	45.0°
32.28543	-75.58278	3337	17:00	32.32415°N	075.55509°W	49.3°
32.32415	-75.55509	3429	18:00	32.37933°N	075.51527°W	34.0°
32.37933	-75.51527	3470	18:30	32.41147°N	075.49193°W	47.0°
32.41147	-75.49193	3475	19:30	32.47906°N	075.44265°W	49.4°
32.47906	-75.44265	3569	20:30	32.54492°N	075.39518°W	49.0°
32.54492	-75.39518	3700	21:30	32.62193°N	075.33925°W	43.0°
32.62193	-75.33925	3791	22:30	32.69011°N	075.28964°W	41.0°
32.69011	-75.28964	3834	23:30	32.76101°N	075.23784°W	36.9°
32.76101	-75.23784	3905	23:54	32.78730°N	075.21862°W	36.0°
32.78730	-75.21862	3901	00:00	32.79445°N	075.21340°W	35.0°
32.79445	-75.21340	3905	00:04	32.79925°N	075.20975°W	34.0°
32.79925	-75.20975	3906	00:09	32.80581°N	075.20481°W	34.0°
32.80581	-75.20481	3913	00:14	32.81115°N	075.20112°W	33.0°
32.81115	-75.20112	3914	00:19	32.81728°N	075.19665°W	33.0°
32.81728	-75.19665	3913	00:24	32.82295°N	075.19250°W	32.5°
32.82295	-75.19250	3939	01:00	32.86817°N	075.15960°W	31.1°
32.86817	-75.15960	3990	02:00	32.93721°N	075.10887°W	27.3°
32.93721	-75.10887	4069	03:00	33.00682°N	075.05742°W	27.0°
33.00682	-75.05742	4049	04:00	33.07826°N	075.00521°W	27.8°
33.07826	-75.00521	4014	05:00	33.15510°N	074.94865°W	26.0°
33.15510	-74.94865	3967	06:00	33.21965°N	074.90303°W	0.0°

33.21965	-74.90303	3965	07:00	33.26868°N	074.96010°W	293.0°
33.26868	-74.96010	3874	08:00	33.30946°N	075.03218°W	293.4°
33.30946	-75.03218	3790	09:00	33.34665°N	075.09592°W	294.8°
33.34665	-75.09592	3711	09:30	33.36215°N	075.12449°W	292.0°
33.36215	-75.12449	3679	09:35	33.36912°N	075.13698°W	292.0°
33.36912	-75.13698	3682	09:40	33.37065°N	075.13953°W	292.0°
33.37065	-75.13953	3656	09:45	33.37355°N	075.14467°W	290.0°
33.37355	-75.14467	3664	09:50	33.37637°N	075.14955°W	289.0°
33.37637	-75.14955	3662	09:59	33.38292°N	075.16132°W	292.0°
33.38292	-75.16132	3636	11:00	33.41899°N	075.22895°W	271.0°
33.41899	-75.22895	3561	11:30	33.40227°N	075.26186°W	217.0°
33.40227	-75.26186	3529	12:00	33.37128°N	075.28320°W	219.0°
33.37128	-75.28320	3549	12:37	33.33345°N	075.30971°W	216.0°
33.33345	-75.30971	3555	13:00	33.31206°N	075.32486°W	214.0°
33.31206	-75.32486	3547	13:30	33.28162°N	075.34627°W	214.7°
33.28162	-75.34627	3596	14:09	33.23869°N	075.37611°W	219.0°
33.23869	-75.37611	3549	14:25	33.22178°N	075.38803°W	217.2°
33.22178	-75.38803	3557	14:30	33.21901°N	075.39011°W	214.0°
33.21901	-75.39011	3555	15:00	33.19064°N	075.40983°W	213.5°
33.19064	-75.40983	3572	16:00	33.15321°N	075.43601°W	218.0°
33.15321	-75.43601	3685	16:30	33.13018°N	075.45206°W	218.0°
33.13018	-75.45206	3638	17:00	33.10616°N	075.46892°W	214.0°
33.10616	-75.46892	3628	18:00	33.04473°N	075.51174°W	212.0°
33.04473	-75.51174	3555	18:30	33.01431°N	075.53290°W	214.0°
33.01431	-75.53290	3503	19:30	32.95002°N	075.57766°W	214.6°
32.95002	-75.57766	3373	20:30	32.88932°N	075.61985°W	215.0°
32.88932	-75.61985	3339	21:00	32.85543°N	075.64334°W	213.0°
32.85543	-75.64334	3310	21:30	32.82432°N	075.66503°W	211.0°
32.82432	-75.66503	3284	22:30	32.75855°N	075.71054°W	206.0°
32.75855	-75.71054	3273	23:30	32.69137°N	075.75682°W	208.1°
32.69137	-75.75682	3154	23:55	32.66427°N	075.77562°W	209.0°
32.66427	-75.77562	3104	00:00	32.65868°N	075.77950°W	208.0°
32.65868	-75.77950	3095	00:05	32.65315°N	075.78327°W	209.0°
32.65315	-75.78327	3092	00:10	32.64635°N	075.78795°W	209.0°
32.64635	-75.78795	3081	00:15	32.64165°N	075.79122°W	208.0°
32.64165	-75.79122	3076	00:20	32.63562°N	075.79537°W	209.0°
32.63562	-75.79537	3059	00:25	32.63010°N	075.79915°W	210.0°
32.63010	-75.79915	3047	01:00	32.58545°N	075.83003°W	206.9°
32.58545	-75.83003	2955	02:00	32.51615°N	075.87757°W	211.0°
32.51615	-75.87757	2797	03:00	32.44018°N	075.92993°W	220.0°
32.44018	-75.92993	2616	04:00	32.37167°N	075.97658°W	223.0°
32.37167	-75.97658	2486	05:00	32.32247°N	076.04220°W	315.0°
32.32247	-76.04220	2350	06:00	32.37643°N	076.09787°W	323.0°
32.37643	-76.09787	2291	07:00	32.43963°N	076.16175°W	321.0°
32.43963	-76.16175	2229	08:00	32.51954°N	076.17564°W	33.0°
32.51954	-76.17564	2188	09:00	32.57931°N	076.14072°W	37.9°
32.57931	-76.14072	2189	09:34	32.62830°N	076.11220°W	38.7°
32.62830	-76.11220	2197	09:39	32.63215°N	076.10988°W	40.6°

32.63215	-76.10988	2196	09:44	32.63630°N	076.10747°W	38.7°
32.63630	-76.10747	2201	09:49	32.64175°N	076.10418°W	39.4°
32.64175	-76.10418	2204	09:54	32.64693°N	076.10128°W	39.4°
32.64693	-76.10128	2207	10:04	32.65715°N	076.09518°W	37.0°
32.65715	-76.09518	2215	11:00	32.72387°N	076.05606°W	38.2°
32.72387	-76.05606	2340	11:30	32.75899°N	076.03546°W	35.4°
32.75899	-76.03546	2421	12:00	32.79494°N	076.01442°W	45.8°
32.79494	-76.01442	2516	13:00	32.86313°N	075.97401°W	39.1°
32.86313	-75.97401	2630	13:30	32.89795°N	075.95373°W	43.4°
32.89795	-75.95373	2666	14:30	32.96723°N	075.91268°W	40.0°
32.96723	-75.91268	2713	15:00	33.00626°N	075.88960°W	38.5°
33.00626	-75.88960	2869	16:00	33.06889°N	075.85248°W	36.0°
33.06889	-75.85248	2949	16:30	33.10293°N	075.83242°W	41.0°
33.10293	-75.83242	2985	17:00	33.13887°N	075.81098°W	35.9°
33.13887	-75.81098	3022	18:00	33.20787°N	075.77003°W	36.1°
33.20787	-75.77003	3071	18:30	33.24232°N	075.74954°W	36.2°
33.24232	-75.74954	3103	19:30	33.31594°N	075.70572°W	40.9°
33.31594	-75.70572	3197	20:30	33.38411°N	075.66499°W	42.3°
33.38411	-75.66499	3208	21:30	33.45920°N	075.62008°W	41.0°
33.45920	-75.62008	3187	22:30	33.53020°N	075.57759°W	46.2°
33.53020	-75.57759	3157	23:20	33.58176°N	075.54649°W	42.5°
33.58176	-75.54649	3147	23:30	33.59313°N	075.53983°W	46.8°
33.59313	-75.53983	3144	00:00	33.62912°N	075.51812°W	47.0°
33.62912	-75.51812	3157	00:18	33.64963°N	075.50575°W	46.0°
33.64963	-75.50575	3153	00:23	33.65613°N	075.50180°W	45.5°
33.65613	-75.50180	3157	00:28	33.66219°N	075.49842°W	56.0°
33.66219	-75.49842	3154	01:00	33.69790°N	075.49400°W	327.2°
33.69790	-75.49400	3132	02:00	33.74413°N	075.57285°W	299.0°
33.74413	-75.57285	3091	03:00	33.79017°N	075.65298°W	292.0°
33.79017	-75.65298	2980	04:00	33.83502°N	075.73157°W	280.0°
33.83502	-75.73157	2109	05:00	33.88162°N	075.81268°W	277.0°
33.88162	-75.81268	1333	06:00	33.92107°N	075.88188°W	271.0°
33.92107	-75.88188	849	07:00	33.98915°N	075.92965°W	37.8°
33.98915	-75.92965	586	08:00	34.08536°N	075.88237°W	31.0°
34.08536	-75.88237	560	09:00	34.15822°N	075.84643°W	36.1°
34.15822	-75.84643	534	09:30	34.22465°N	075.80773°W	92.4°
34.22465	-75.80773	511	09:35	34.22749°N	075.79239°W	127.5°
34.22749	-75.79239	530	09:40	34.22663°N	075.78690°W	136.8°
34.22663	-75.78690	542	09:45	34.22650°N	075.78627°W	135.0°
34.22650	-75.78627	555	09:50	34.22488°N	075.78157°W	150.0°
34.22488	-75.78157	559	09:55	34.22227°N	075.77645°W	150.0°
34.22227	-75.77645	605	10:00	34.21953°N	075.77082°W	153.9°
34.21953	-75.77082	651	11:00	34.19143°N	075.71606°W	149.0°
34.19143	-75.71606	1230	11:30	34.17274°N	075.70077°W	188.0°
34.17274	-75.70077	1371	12:00	34.15861°N	075.70451°W	203.2°
34.15861	-75.70451	1374	13:00	34.12127°N	075.72319°W	200.6°
34.12127	-75.72319	1300	13:30	34.10348°N	075.73195°W	200.5°

34.10348	-75.73195	1267	14:30	34.06827°N	075.74944°W	198.0°
34.06827	-75.74944	1221	15:00	34.05349°N	075.75677°W	201.6°
34.05349	-75.75677	1208	16:00	34.02085°N	075.77302°W	201.0°
34.02085	-75.77302	1182	16:30	34.00517°N	075.78077°W	199.0°
34.00517	-75.78077	1179	17:00	33.98747°N	075.78961°W	201.0°
33.98747	-75.78961	1159	17:12	33.97885°N	075.79383°W	200.6°
33.97885	-75.79383	1142	17:42	33.96332°N	075.80153°W	209.4°
33.96332	-75.80153	1143	18:00	33.95454°N	075.80588°W	204.0°
33.95454	-75.80588	1115	18:30	33.93758°N	075.81425°W	204.0°
33.93758	-75.81425	1113	19:30	33.90360°N	075.83112°W	203.5°
33.90360	-75.83112	1092	19:58	33.88777°N	075.83621°W	179.2°
33.88777	-75.83621	1113	20:30	33.88503°N	075.80089°W	94.0°
33.88503	-75.80089	1387	21:30	33.90848°N	075.70883°W	105.0°
33.90848	-75.70883	2062	21:37	33.91086°N	075.69623°W	104.0°
33.91086	-75.69623	2276	22:30	33.91738°N	075.64346°W	119.0°
33.91738	-75.64346	2982	23:30	33.92586°N	075.58901°W	120.1°
33.92586	-75.58901	2978	24:00	33.92823°N	075.56233°W	120.0°
33.92823	-75.56233	2986	00:05	33.92821°N	075.55547°W	120.3°
33.92821	-75.55547	2985	00:10	33.92833°N	075.55220°W	120.7°
33.92833	-75.55220	2984	00:15	33.92832°N	075.54699°W	119.8°
33.92832	-75.54699	2989	00:20	33.92815°N	075.59195°W	120.0°
33.92815	-75.59195	2992	00:25	33.92786°N	075.53718°W	120.0°
33.92786	-75.53718	2987	00:30	33.92763°N	075.53285°W	118.8°
33.73918	-75.23258	3301	09:35	33.73832°N	075.23687°W	262.0°
33.73832	-75.23687	3308	09:40	33.73658°N	075.24577°W	262.0°
33.73658	-75.24577	3304	09:44	33.73597°N	075.24912°W	262.0°
33.73597	-75.24912	3315	09:50	33.73382°N	075.26015°W	264.0°
33.73382	-75.26015	3299	09:57	33.73220°N	075.26878°W	264.0°
33.73220	-75.26878	3293	11:00	33.71971°N	075.33881°W	249.0°
33.71971	-75.33881	3238	11:30	33.71273°N	075.36988°W	250.0°
33.71273	-75.36988	3213	12:00	33.70545°N	075.40776°W	246.5°
33.70545	-75.40776	3184	12:27	33.69740°N	075.44921°W	248.0°
33.69740	-75.44921	3159	13:00	33.69603°N	075.48869°W	284.1°
33.69603	-75.48869	3131	13:08	33.70219°N	075.49950°W	281.2°
33.70219	-75.49950	3121	13:30	33.71758°N	075.52656°W	282.0°
33.71758	-75.52656	3096	14:30	33.75961°N	075.59945°W	272.0°
33.75961	-75.59945	3070	15:00	33.77514°N	075.62645°W	273.5°
33.77514	-75.62645	3044	15:13	33.78401°N	075.64192°W	274.5°
33.78401	-75.64192	3033	15:28	33.79459°N	075.66017°W	271.2°
33.79459	-75.66017	2971	16:00	33.80909°N	075.68549°W	270.0°
33.80909	-75.68549	2944	16:30	33.82559°N	075.71437°W	269.0°
33.82559	-75.71437	2643	17:00	33.84167°N	075.74238°W	266.5°
33.84167	-75.74238	2075	18:00	33.87012°N	075.79215°W	259.8°
33.87012	-75.79215	1509	18:30	33.88596°N	075.81996°W	256.0°
33.88596	-75.81996	1255	19:30	33.91319°N	075.86752°W	242.5°

33.91319	-75.86752	1353	20:30	33.93028°N	075.89779°W	242.0°
33.93028	-75.89779	708	21:30	33.94407°N	075.92155°W	233.5°
33.94407	-75.92155	637	22:30	33.95661°N	075.94317°W	226.0°
33.95661	-75.94317	604	23:30	33.96773°N	075.96279°W	227.0°
33.96773	-75.96279	577	00:00	33.97203°N	075.96998°W	222.6°
33.97203	-75.96998	568	0:05	33.97315°N	075.97190°W	222.5°
33.97315	-75.97190	563	00:10	33.97372°N	075.97283°W	222.5°
33.97372	-75.97283	563	00:15	33.97452°N	075.97417°W	222.7°
33.97452	-75.97417	561	00:20	33.97523°N	075.97530°W	222.8°
33.97523	-75.97530	560	00:25	33.97597°N	075.97638°W	222.5°
33.97597	-75.97638	558	00:30	33.97681°N	075.97760°W	222.2°
33.97681	-75.97760	556	01:00	33.98192°N	075.98475°W	222.7°
33.98192	-75.98475	546	02:00	33.99468°N	076.00080°W	222.3°
33.99468	-76.00080	521	03:00	33.99600°N	076.00553°W	212.2°
33.99600	-76.00553	514	03:12	33.99612°N	076.00761°W	211.9°
33.99612	-76.00761	512	04:00	33.99136°N	075.99252°W	185.8°
33.99136	-75.99252	531	05:00	33.97808°N	075.93430°W	166.0°
33.97808	-75.93430	596	05:45	33.96985°N	075.87460°W	161.7°
33.96985	-75.87460	707	06:16	33.96121°N	075.83881°W	172.0°
33.96121	-75.83881	881	06:38	33.95097°N	075.81677°W	188.0°
33.95097	-75.81677	1024	07:00	33.94212°N	075.81268°W	203.8°
33.94212	-75.81268	1090	08:00	33.92115°N	075.82312°W	206.5°
33.92115	-75.82312	1112	09:00	33.90375°N	075.83175°W	206.5°
33.90375	-75.83175	1090	09:30	33.89194°N	075.83761°W	205.0°
33.89194	-75.83761	1086	09:35	33.89055°N	075.83830°W	205.3°
33.89055	-75.83830	1077	09:40	33.88948°N	075.83882°W	205.4°
33.88948	-75.83882	1086	09:45	33.88777°N	075.83966°W	205.8°
33.88777	-75.83966	1082	09:50	33.88673°N	075.84017°W	207.2°
33.88673	-75.84017	1081	09:55	33.88399°N	075.84152°W	207.5°
33.88399	-75.84152	1079	09:58	33.88251°N	075.84227°W	207.4°
33.88251	-75.84227	1088	11:00	33.85964°N	075.85367°W	207.0°
33.85964	-75.85367	1079	11:30	33.84935°N	075.85882°W	207.0°
33.84935	-75.85882	1077	12:00	33.83918°N	075.86403°W	208.6°
33.83918	-75.86403	1116	13:00	33.81819°N	075.87421°W	208.2°
33.81819	-75.87421	1154	13:30	33.80657°N	075.88009°W	208.0°
33.80657	-75.88009	1164	14:30	33.78056°N	075.89294°W	212.0°
33.78056	-75.89294	1187	15:00	33.76793°N	075.89919°W	212.1°
33.76793	-75.89919	1198	16:00	33.74124°N	075.91240°W	212.0°
33.74124	-75.91240	1223	16:30	33.72671°N	075.91961°W	213.0°
33.72671	-75.91961	1225	17:00	33.71425°N	075.92574°W	213.7°
33.71425	-75.92574	1228	18:00	33.68185°N	075.94181°W	213.0°
33.68185	-75.94181	1243	18:30	33.66462°N	075.95036°W	212.0°
33.66462	-75.95036	1250	19:30	33.62335°N	075.97070°W	210.0°
33.62335	-75.97070	1283	20:30	33.58292°N	075.99046°W	220.0°
33.58292	-75.99046	1304	21:30	33.53042°N	076.01655°W	213.0°
33.53042	-76.01655	1322	22:30	33.48628°N	076.01683°W	155.3°

33.48628	-76.01683	1486	23:30	33.45947°N	075.92650°W	128.0°
33.45947	-75.92650	2545	00:00	33.44120°N	075.88999°W	175.0°
33.44120	-75.88999	2769	00:05	33.43627°N	075.88828°W	186.3°
33.43627	-75.88828	2772	00:10	33.43142°N	075.88793°W	196.4°
33.43142	-75.88793	2774	00:15	33.42665°N	075.88878°W	206.9°
33.42665	-75.88878	2766	00:20	33.42243°N	075.89055°W	213.0°
33.42243	-75.89055	2766	00:25	33.41831°N	075.89249°W	211.2°
33.41831	-75.89249	2767	00:30	33.41313°N	075.89504°W	212.6°
33.41313	-75.89504	2767	01:00	33.38897°N	075.90642°W	211.2°
33.38897	-75.90642	2742	02:00	33.35950°N	075.93393°W	258.5°
33.35950	-75.93393	2642	03:00	33.37581°N	076.01134°W	289.3°
33.37581	-76.01134	1988	04:00	33.40035°N	076.09495°W	270.5°
33.40035	-76.09495	1241	05:00	33.42375°N	076.18093°W	268.0°
33.42375	-76.18093	799	06:00	33.44288°N	076.25172°W	267.6°
33.44288	-76.25172	690	07:00	33.44663°N	076.31000°W	216.0°
33.44663	-76.31000	645	08:00	33.41252°N	076.32457°W	181.0°
33.41252	-76.32457	658	09:00	33.39184°N	076.29248°W	143.1°
33.39184	-76.29248	693	09:30	33.38298°N	076.26207°W	141.8°
33.38298	-76.26207	721	09:35	33.37780°N	076.24393°W	139.5°
33.37780	-76.24393	748	09:40	33.37707°N	076.24135°W	138.1°
33.37707	-76.24135	752	09:45	33.37562°N	076.23653°W	136.5°
33.37562	-76.23653	762	09:50	33.37360°N	076.22930°W	135.8°
33.37360	-76.22930	774	09:55	33.37143°N	076.22182°W	133.2°
33.37143	-76.22182	788	10:00	33.37000°N	076.21685°W	132.3°
33.37000	-76.21685	797	11:00	33.34763°N	076.13979°W	128.0°
33.34763	-76.13979	1143	11:30	33.33482°N	076.09435°W	127.0°
33.33482	-76.09435	1461	12:00	33.32424°N	076.05779°W	125.1°
33.32424	-76.05779	1773	13:00	33.29378°N	075.99795°W	173.9°
33.29378	-75.99795	2305	13:30	33.27622°N	076.00298°W	197.3°
33.27622	-76.00298	2301	14:30	33.23968°N	076.02219°W	197.0°
33.23968	-76.02219	2235	15:00	33.22600°N	076.04010°W	242.0°
33.22600	-76.04010	2151	16:00	33.24361°N	076.11413°W	270.0°
33.24361	-76.11413	1603	16:30	33.25552°N	076.15426°W	268.0°
33.25552	-76.15426	1306	17:00	33.26472°N	076.18494°W	254.2°
33.26472	-76.18494	1115	18:00	33.28504°N	076.25310°W	266.0°
33.28504	-76.25310	831	18:30	33.29481°N	076.28662°W	273.0°
33.29481	-76.28662	771	19:30	33.31432°N	076.36244°W	245.0°
33.31432	-76.36244	692	20:30	33.27441°N	076.39574°W	201.0°
33.27441	-76.39574	691	21:30	33.22028°N	076.39615°W	127.4°
33.22028	-76.39615	725	22:30	33.19547°N	076.31573°W	134.0°

33.19547	-76.31573	831	23:30	33.16867°N	076.22913°W	127.0°
33.16867	-76.22913	1130	00:00	33.15450°N	076.18324°W	123.6°
33.15450	-76.18324	1404	00:05	33.15235°N	076.17647°W	122.2°
33.15235	-76.17647	1447	00:10	33.14981°N	076.16813°W	123.9°
33.14981	-76.16813	1498	00:15	33.14723°N	076.15987°W	122.3°
33.14723	-76.15987	1552	00:20	33.14510°N	076.15291°W	122.0°
33.14510	-76.15291	1599	00:25	33.14285°N	076.14555°W	120.6°
33.14285	-76.14555	1719	00:30	33.14052°N	076.13804°W	122.8°
33.14052	-76.13804	1714	01:00	33.12379°N	076.09358°W	152.3°
33.12379	-76.09358	2016	02:00	33.07330°N	076.10338°W	205.0°
33.07330	-76.10338	2022	03:00	33.06112°N	076.15672°W	273.9°
33.06112	-76.15672	1740	04:00	33.08185°N	076.22575°W	270.7°
33.08185	-76.22575	1364	05:00	33.10695°N	076.30952°W	269.1°
33.10695	-76.30952	973	06:00	33.12827°N	076.38058°W	259.5°
33.12827	-76.38058	805	07:00	33.14398°N	076.44322°W	255.3°
33.14398	-76.44322	737	08:00	33.09673°N	076.47996°W	210.8°
33.09673	-76.47996	739	09:00	33.05914°N	076.43430°W	130.5°
33.05914	-76.43430	808	09:30	33.04190°N	076.38430°W	131.9°
33.04190	-76.38430	888	09:35	33.04056°N	076.38044°W	131.0°
33.04056	-76.38044	895	09:40	33.03787°N	076.37260°W	130.0°
33.03787	-76.37260	913	09:45	33.03643°N	076.36832°W	130.7°
33.03643	-76.36832	923	09:50	33.03310°N	076.35841°W	130.0°
33.03310	-76.35841	949	09:55	33.03163°N	076.35412°W	128.9°
33.03163	-76.35412	960	10:00	33.02906°N	076.34695°W	127.0°
33.02906	-76.34695	985	11:00	32.99907°N	076.25960°W	124.0°
32.99907	-76.25960	1427	11:30	32.98295°N	076.21185°W	120.4°
32.98295	-76.21185	1658	12:00	32.96863°N	076.17418°W	144.5°
32.96863	-76.17418	1803	13:00	32.91570°N	076.18224°W	203.1°
32.91570	-76.18224	1824	13:30	32.89100°N	076.19652°W	220.1°
32.89100	-76.19652	1805	14:30	32.90067°N	076.26852°W	281.0°
32.90067	-76.26852	1601	15:00	32.91231°N	076.29926°W	178.1°
32.91231	-76.29926	1465	16:00	32.94356°N	076.38161°W	273.0°
32.94356	-76.38161	1047	16:30	32.96051°N	076.42694°W	286.0°
32.96051	-76.42694	913	17:00	32.97283°N	076.45920°W	288.7°
32.97283	-76.45920	832	18:00	32.99287°N	076.52882°W	239.5°
32.99287	-76.52882	771	18:30	32.98031°N	076.55307°W	227.0°
32.98031	-76.55307	758	19:30	32.95048°N	076.57933°W	187.4°
32.95048	-76.57933	757	20:30	32.91039°N	076.51760°W	130.0°
32.91039	-76.51760	844	21:30	32.94643°N	076.44442°W	21.6°
32.94643	-76.44442	898	22:30	33.04018°N	076.39837°W	26.7°
33.04018	-76.39837	865	23:30	33.10257°N	076.36759°W	26.8°
33.10257	-76.36759	844	00:00	33.14038°N	076.34907°W	25.4°
33.14038	-76.34907	832	00:05	33.14815°N	076.34523°W	25.7°
33.14815	-76.34523	829	00:10	33.15480°N	076.34200°W	29.1°
33.15480	-76.34200	827	00:15	33.16114°N	076.33883°W	24.9°
33.16114	-76.33883	816	00:20	33.16868°N	076.33510°W	26.8°
33.16868	-76.33510	824	00:25	33.17418°N	076.33235°W	26.7°
33.17418	-76.33235	822	00:30	33.17847°N	076.32946°W	26.9°
33.17847	-76.32946	820	01:00	33.22434°N	076.30782°W	26.9°

33.22434	-76.30782	808	02:00	33.29632°N	076.27223°W	25.1°
33.29632	-76.27223	788	03:00	33.37097°N	076.23528°W	28.5°
33.37097	-76.23528	767	04:00	33.45098°N	076.19562°W	30.7°
33.45098	-76.19562	744	05:00	33.53377°N	076.15453°W	24.0°
33.53377	-76.15453	723	06:00	33.61885°N	076.12048°W	338.0°
33.61885	-76.12048	688	07:00	33.70203°N	076.16642°W	326.7°
33.70203	-76.16642	594	08:00	33.80683°N	076.13715°W	13.0°
33.80683	-76.13715	544	09:00	33.89325°N	076.09366°W	14.4°
33.89325	-76.09366	515	09:30	33.95526°N	076.06265°W	17.2°
33.95526	-76.06265	483	09:35	33.96097°N	076.05985°W	18.8°
33.96097	-76.05985	531	09:40	33.96836°N	076.05608°W	14.5°
33.96836	-76.05608	489	09:45	33.97846°N	076.05105°W	14.5°
33.97846	-76.05105	490	09:50	33.97873°N	076.05092°W	13.1°
33.97873	-76.05092	482	09:55	34.00559°N	076.03711°W	14.9°
34.00559	-76.03711	490	10:00	34.00572°N	076.03703°W	13.8°
34.00572	-76.03703	469	10:30	34.02668°N	075.99427°W	103.0°
34.02668	-75.99427	492	11:00	34.00257°N	075.95707°W	175.0°
34.00257	-75.95707	550	11:30	33.96849°N	075.94968°W	191.0°
33.96849	-75.94968	590	12:00	33.94436°N	075.95240°W	205.2°
33.94436	-75.95240	603	13:00	33.89293°N	075.97751°W	217.2°
33.89293	-75.97751	616	13:30	33.86745°N	075.99010°W	124.3°
33.86745	-75.99010	623	14:30	33.81550°N	076.01579°W	209.0°
33.81550	-76.01579	640	15:00	33.78756°N	076.02964°W	206.4°
33.78756	-76.02964	647	16:00	33.73322°N	076.05640°W	205.0°
33.73322	-76.05640	660	16:30	33.70650°N	076.06966°W	206.0°
33.70650	-76.06966	670	17:00	33.68180°N	076.08180°W	205.5°
33.68180	-76.08180	676	18:00	33.62993°N	076.10730°W	207.0°
33.62993	-76.10730	690	18:30	33.60594°N	076.11857°W	209.0°
33.60594	-76.11857	701	19:30	33.55862°N	076.14234°W	211.6°
33.55862	-76.14234	713	20:30	33.51475°N	076.12300°W	125.0°
33.51475	-76.12300	807	21:30	33.48620°N	076.02200°W	113.6°
33.48620	-76.02200	1446	22:30	33.46035°N	075.92913°W	95.0°
33.46035	-75.92913	2490	22:36	33.46169°N	075.91662°W	67.0°
33.46169	-75.91662	2592	23:14	33.51170°N	075.88335°W	19.4°
33.51170	-75.88335	2694	23:30	33.53550°N	075.87376°W	15..4
33.53550	-75.87376	2699	00:00	33.56807°N	075.90245°W	292.6°
33.56807	-75.90245	2262	00:05	33.57028°N	075.90877°W	294.3°
33.57028	-75.90877	2172	00:10	33.57353°N	075.91788°W	293.5°
33.57353	-75.91788	2055	00:15	33.57645°N	075.92592°W	291.8°
33.57645	-75.92592	1937	00:20	33.57813°N	075.93063°W	292.0°
33.57813	-75.93063	1869	00:25	33.58007°N	075.93572°W	292.4°
33.58007	-75.93572	1791	00:30	33.58235°N	075.94213°W	282.8°
33.58235	-75.94213	1705	01:00	33.58313°N	075.98325°W	223.9°
33.58313	-75.98325	1350	02:00	33.53297°N	075.01517°W	207.4°
33.53297	-76.01517	1323	03:00	33.47802°N	076.04237°W	205.3°
33.47802	-76.04237	1330	04:00	33.42589°N	076.06860°W	205.6°
33.42589	-76.06860	1331	05:00	33.34885°N	076.10720°W	205.3°
33.34885	-76.10720	1323	06:00	33.30763°N	076.12765°W	201.7°
33.30763	-76.12765	1315	07:00	33.25403°N	076.15433°W	201.4°

33.25403	-76.15433	1306	08:00	33.18000°N	076.19162°W	195.1°
33.18000	-76.19162	1290	09:00	33.12151°N	076.22022°W	204.2°
33.12151	-76.22022	1292	09:30	33.08640°N	076.23747°W	201.9°
33.08640	-76.23747	1299	09:35	33.08374°N	076.23879°W	202.1°
33.08374	-76.23879	1300	09:40	33.08092°N	076.24023°W	201.9°
33.08092	-76.24023	1306	09:45	33.07656°N	076.24238°W	200.5°
33.07656	-76.24238	1304	09:50	33.06620°N	076.24755°W	196.9°
33.06620	-76.24755	1329	09:55	33.06108°N	076.25006°W	196.9°
33.06108	-76.25006	1318	09:59	33.05845°N	076.25134°W	197.3°
33.05845	-76.25134	1322	11:00	33.00759°N	076.27657°W	205.0°
33.00759	-76.27657	1299	11:30	32.97662°N	076.29179°W	209.0°
32.97662	-76.29179	1315	12:00	32.95057°N	076.30482°W	211.5°
32.95057	-76.30482	1330	13:00	32.88949°N	076.33492°W	208.3°
32.88949	-76.33492	1378	13:30	32.86914°N	076.34495°W	210.4°
32.86914	-76.34495	1391	14:30	32.82958°N	076.35392°W	161.0°
32.82958	-76.35392	1460	15:00	32.81136°N	076.32885°W	132.5°
32.81136	-76.32885	1619	16:00	32.76674°N	076.25575°W	123.0°
32.76674	-76.25575	1863	16:30	32.74425°N	076.21423°W	118.0°
32.74425	-76.21423	1935	17:00	32.72054°N	076.16986°W	121.0°
32.72054	-76.16986	2031	18:00	32.67819°N	076.09089°W	120.6°
32.67819	-76.09089	2222	18:30	32.65587°N	076.04953°W	117.0°
32.65587	-76.04953	2339	19:30	32.61172°N	075.96758°W	115.0°
32.61172	-75.96758	2578	20:30	32.56568°N	075.88224°W	114.0°
32.56568	-75.88224	2820	20:50	32.55302°N	075.85901°W	112.0°
32.55302	-75.85901	2872	21:30	32.51992°N	075.79790°W	112.0°
32.51992	-75.79790	3013	22:30	32.47550°N	075.71596°W	112.0°
32.47550	-75.71596	3193	23:30	32.42992°N	075.63200°W	115.5°
32.42992	-75.63200	3336	00:00	32.40662°N	075.58935°W	107.6°
32.40662	-75.58935	3364	00:05	32.40168°N	075.58037°W	111.0°
32.40168	-75.58037	3368	00:10	32.39855°N	075.57430°W	115.4°
32.39855	-75.57430	3369	00:15	32.39445°N	075.56682°W	116.9°
32.39445	-75.56682	3372	00:20	32.38942°N	075.55772°W	109.8°
32.38942	-75.55772	3380	00:25	32.38623°N	075.55175°W	114.6°
32.38623	-75.55175	3394	00:30	32.38214°N	075.54441°W	111.8°
32.38214	-75.54441	3408	01:00	32.36035°N	075.50438°W	122.8°
32.36035	-75.50438	3449	02:00	32.31365°N	075.41870°W	121.1°
32.31365	-75.41870	3602	03:00	32.26565°N	075.33103°W	120.6°
32.26565	-75.33103	3755	04:00	32.21093°N	075.23135°W	122.0°
32.21093	-75.23135	3872	05:00	32.15812°N	075.13582°W	120.4°
32.15812	-75.13582	3951	06:00	32.10663°N	075.04252°W	113.0°
32.10663	-75.04252	4026	07:00	32.06562°N	074.96800°W	112.5°
32.06562	-74.96800	4087	08:00	32.01800°N	074.88250°W	109.2°
32.01800	-74.88250	4180	09:00	31.97346°N	074.80194°W	119.7°
31.97346	-74.80194	4262	09:30	31.94820°N	074.75578°W	119.4°
31.94820	-74.75578	4317	09:35	31.94387°N	074.74898°W	123.2°
31.94387	-74.74898	4329	09:40	31.94008°N	074.74232°W	121.0°
31.94008	-74.74232	4332	09:45	31.93637°N	074.73553°W	122.5°
31.93637	-74.73553	4338	09:50	31.93258°N	074.72885°W	122.0°

31.93258	-74.72885	4348	09:55	31.92898°N	074.72238°W	120.0°
31.92898	-74.72238	4362	10:00	31.92672°N	074.71825°W	121.6°
31.92672	-74.71825	4369	11:00	31.88442°N	074.64251°W	119.0°
31.88442	-74.64251	4467	11:30	31.85953°N	074.59792°W	121.0°
31.85953	-74.59792	4555	12:00	31.83848°N	074.56036°W	123.8°
31.83848	-74.56036	4586	13:00	31.79220°N	074.47773°W	120.4°
31.79220	-74.47773	4754	13:30	31.76978°N	074.43774°W	120.7°
31.76978	-74.43774	4799	14:30	31.72472°N	074.35754°W	121.0°
31.72472	-74.35754	4908	15:00	31.70213°N	074.31742°W	120.5°
31.70213	-74.31742	4951	16:00	31.65489°N	074.23359°W	123.0°
31.65489	-74.23359	4996	16:11	31.64546°N	074.21700°W	123.4°
31.64546	-74.21700	4985	16:30	31.63322°N	074.19784°W	122.0°
31.63322	-74.19784	4996	16:53	31.61797°N	074.17449°W	122.0°
31.61797	-74.17449	5006	17:20	31.60369°N	074.15438°W	123.4°
31.60369	-74.15438	5035	18:00	31.58563°N	074.13868°W	117.5°
31.58563	-74.13868	5025	18:30	31.58124°N	074.13500°W	117.0°
31.58124	-74.13500	5030	19:30	31.54965°N	074.11740°W	225.1°
31.54965	-74.11740	5040	20:30	31.53816°N	074.19980°W	269.0°
31.53816	-74.19980	5026	21:30	31.52923°N	074.29298°W	269.5°
31.52923	-74.29298	4896	22:30	31.53816°N	074.19980°W	269.0°
31.53816	-74.19980	5026	23:00	31.51624°N	074.40202°W	272.0°
31.51624	-74.40202	4625	23:30	31.51255°N	074.43695°W	275.6°
31.51255	-74.43695	4522	00:00	31.51197°N	074.48381°W	274.5°
31.51197	-74.48381	4431	00:30	31.51412°N	074.52793°W	277.3°
31.51412	-74.52793	4350	01:00	31.52049°N	074.57348°W	318.7°
31.52049	-74.57348	4289	01:45	31.56158°N	074.59730°W	5.6°
31.56158	-74.59730	4284	02:16	31.60200°N	074.60100°W	355.5°
31.60200	-74.60100	4380	02:38	31.62400°N	074.58900°W	57.0°
31.62400	-74.58900	4400	03:00	31.62950°N	074.55872°W	83.9°
31.62950	-74.55872	4432	04:00	31.63760°N	074.47624°W	90.6°
31.63760	-74.47624	4626	05:00	31.64100°N	074.38300°W	99.5°
31.64100	-74.38300	4790	06:00	31.64513°N	074.29218°W	87.9°
31.64513	-74.29218	4964	07:00	31.64902°N	074.19960°W	89.7°
31.64902	-74.19960	4996	08:00	31.65235°N	074.11498°W	90.1°
31.65235	-74.11498	5030	09:00	31.65622°N	074.01694°W	93.5°
31.65622	-74.01694	5063	09:30	31.65788°N	073.97210°W	92.5°
31.65788	-73.97210	5076	09:35	31.65822°N	073.96363°W	91.7°
31.65822	-73.96363	5090	09:40	31.65855°N	073.95495°W	89.4°
31.65855	-73.95495	5092	09:45	31.65917°N	073.93967°W	91.9°
31.65917	-73.93967	5089	09:50	31.65927°N	073.93633°W	91.1°
31.65927	-73.93633	5093	09:55	31.65993°N	073.93150°W	92.7°
31.65993	-73.93150	5093	10:00	31.65972°N	073.92562°W	92.2°

31.65972	-73.92562	5094	11:00	31.66289°N	073.84107°W	92.0°
31.66289	-73.84107	5123	11:30	31.66466°N	073.79201°W	89.0°
31.66466	-73.79201	5128	12:00	31.66627°N	073.74766°W	90.5°
31.66627	-73.74766	5143	13:00	31.66985°N	073.65091°W	93.1°
31.66985	-73.65091	5161	13:30	31.67194°N	073.59814°W	90.3°
31.67194	-73.59814	5173	13:53	31.67408°N	073.54968°W	87.4°
31.67408	-73.54968	5196	14:30	31.67568°N	073.51262°W	89.0°
31.67568	-73.51262	5197	15:00	31.65646°N	073.49247°W	198.5°
31.65646	-73.49247	5189	15:38	31.62916°N	073.52850°W	263.2°
31.62916	-73.52850	5198	16:00	31.63336°N	073.56017°W	305.0°
31.63336	-73.56017	5186	16:30	31.65181°N	073.58940°W	301.0°
31.65181	-73.58940	5175	17:00	31.67060°N	073.62339°W	304.7°
31.67060	-73.62339	5177	18:00	31.71246°N	073.69667°W	303.1°
31.71246	-73.69667	5143	18:30	31.73192°N	073.73077°W	303.0°
31.73192	-73.73077	5122	19:30	31.77214°N	073.80138°W	308.3°
31.77214	-73.80138	5104	20:30	31.81051°N	073.86896°W	306.0°
31.81051	-73.86896	5067	21:30	31.84978°N	073.93830°W	309.3°
31.84978	-73.93830	5052	22:30	31.88700°N	074.00403°W	309.3°
31.88700	-74.00403	5027	23:30	31.92761°N	074.07576°W	308.1°
31.92761	-74.07576	4961	23:55	31.94490°N	074.10648°W	309.2°
31.94490	-74.10648	4947	00:00	31.94758°N	074.11115°W	308.5°
31.94758	-74.11115	4962	0:05	31.95135°N	074.11780°W	310.2°
31.95135	-74.11780	4941	00:10	31.95488°N	074.12417°W	308.7°
31.95488	-74.12417	4951	00:15	31.95810°N	074.12992°W	310.3°
31.95810	-74.12992	4922	00:20	31.96162°N	074.13610°W	309.6°
31.96162	-74.13610	4922	00:25	31.96557°N	074.14313°W	311.2°
31.96557	-74.14313	4914	01:00	31.99146°N	074.18925°W	308.8°
31.99146	-74.18925	4887	02:00	32.02983°N	074.25793°W	306.4°
32.02983	-74.25793	4828	03:00	32.07030°N	074.32952°W	303.5°
32.07030	-74.32952	4781	04:00	32.11390°N	074.40752°W	303.5°
32.11390	-74.40752	4724	05:00	32.15513°N	074.48112°W	310.8°
32.15513	-74.48112	4651	06:00	32.19015°N	074.54380°W	305.6°
32.19015	-74.54380	4599	07:00	32.22648°N	074.60903°W	299.8°
32.22648	-74.60903	4562	08:00	32.26098°N	074.67111°W	299.7°
32.26098	-74.67111	4519	09:00	32.28989°N	074.72302°W	297.7°
32.28989	-74.72302	4477	09:30	32.30969°N	074.75847°W	294.9°
32.30969	-74.75847	4470	09:35	32.31293°N	074.76435°W	296.9°
32.31293	-74.76435	4453	09:40	32.31612°N	074.77012°W	295.7°
32.31612	-74.77012	4450	09:45	32.31832°N	074.77408°W	296.8°
32.31832	-74.77408	4443	09:50	32.32022°N	074.77742°W	297.0°
32.32022	-74.77742	4437	09:55	32.32278°N	074.78210°W	296.9°
32.32278	-74.78210	4427	10:00	32.32502°N	074.78610°W	298.0°
32.32502	-74.78610	4419	10:30	32.34105°N	074.81515°W	297.3°
32.34105	-74.81515	4409	11:00	32.35455°N	074.83964°W	296.0°
32.35455	-74.83964	4372	11:30	32.37205°N	074.87150°W	293.0°
32.37205	-74.87150	4348	12:00	32.38672°N	074.89783°W	291.1°
32.38672	-74.89783	4328	13:00	32.42094°N	074.95974°W	290.1°
32.42094	-74.95974	4278	13:30	32.43603°N	074.98713°W	287.0°
32.43603	-74.98713	4254	14:30	32.46687°N	075.04334°W	282.0°

32.46687	-75.04334	4181	15:00	32.48115°N	075.06891°W	277.3°
32.48115	-75.06891	4154	16:00	32.51266°N	075.12657°W	295.2°
32.51266	-75.12657	4064	16:30	32.53310°N	075.16371°W	293.0°
32.53310	-75.16371	4019	17:00	32.55092°N	075.19610°W	295.1°
32.55092	-75.19610	3990	18:00	32.59642°N	075.27943°W	298.9°
32.59642	-75.27943	3881	18:30	32.61768°N	075.31815°W	297.0°
32.61768	-75.31815	3809	19:30	32.66175°N	075.39901°W	301.4°
32.66175	-75.39901	3700	20:30	32.70287°N	075.47476°W	304.0°
32.70287	-75.47476	3559	21:30	32.74573°N	075.55323°W	306.0°
32.74573	-75.55323	3441	22:30	32.78192°N	075.62021°W	308.0°
32.78192	-75.62021	3348	23:30	32.81173°N	075.67528°W	322.2°
32.81173	-75.67528	3281	00:00	32.82517°N	075.69979°W	317.1°
32.82517	-75.69979	3257	00:05	32.82710°N	075.70343°W	320.0°
32.82710	-75.70343	3252	00:10	32.82950°N	075.70788°W	317.7°
32.82950	-75.70788	3250	00:15	32.83105°N	075.71078°W	319.0°
32.83105	-75.71078	3251	00:20	32.83323°N	075.71482°W	322.6°
32.83323	-75.71482	3250	00:25	32.83498°N	075.71800°W	316.5°
32.83498	-75.71800	3252	00:30	32.83705°N	075.72182°W	317.2°
32.83705	-75.72182	3257	01:00	32.85100°N	075.74767°W	318.9°
32.85100	-75.74767	3231	02:00	32.87795°N	075.79750°W	310.0°
32.87795	-75.79750	3066	03:00	32.90827°N	075.85390°W	308.2°
32.90827	-75.85390	2949	04:00	32.94220°N	075.91700°W	305.5°
32.94220	-75.91700	2788	05:00	32.98400°N	075.99480°W	297.6°
32.98400	-75.99480	2621	06:00	33.01982°N	076.06157°W	290.7°
33.01982	-76.06157	2263	07:00	33.07620°N	076.10203°W	12.2°
33.07620	-76.10203	2046	08:00	33.15704°N	076.06158°W	17.7°
33.15704	-76.06158	2142	09:00	33.21522°N	076.02946°W	348.7°
33.21522	-76.02946	2235	09:30	33.25856°N	076.01138°W	22.1°
33.25856	-76.01138	2284	09:35	33.26337°N	076.00891°W	17.1°
33.26337	-76.00891	2292	09:40	33.26955°N	076.00580°W	16.7°
33.26955	-76.00580	2304	09:45	33.27709°N	076.00208°W	16.7°
33.27709	-76.00208	2314	09:50	33.27917°N	076.00106°W	18.0°
33.27917	-76.00106	2319	09:55	33.28300°N	075.99915°W	18.2°
33.28300	-75.99915	2323	10:00	33.28984°N	075.99579°W	18.3°
33.28984	-75.99579	2335	11:00	33.37111°N	075.95470°W	19.8°
33.37111	-75.95470	2498	11:30	33.41120°N	075.93528°W	23.0°
33.41120	-75.93528	2565	12:00	33.45115°N	075.91528°W	20.7°
33.45115	-75.91528	2645	13:00	33.52659°N	075.87772°W	21.2°
33.52659	-75.87772	2715	13:30	33.56687°N	075.85752°W	21.6°
33.56687	-75.85752	2714	14:30	33.57158°N	075.78158°W	139.0°
33.57158	-75.78158	2934	15:00	33.55287°N	075.74853°W	135.2°
33.55287	-75.74853	2990	16:00	33.50493°N	075.66276°W	126.0°
33.50493	-75.66276	3154	16:30	33.48354°N	075.62420°W	121.6°
33.48354	-75.62420	3175	17:00	33.46157°N	075.58514°W	131.0°
33.46157	-75.58514	3191	17:55	33.42156°N	075.51383°W	138.9°
33.42156	-75.51383	3292	18:00	33.41857°N	075.50857°W	136.6°
33.41857	-75.50857	3300	18:30	33.39896°N	075.47361°W	134.0°

33.39896	-75.47361	3378	19:30	33.35796°N	075.40075°W	128.0°
33.35796	-75.40075	3460	20:30	33.30717°N	075.32323°W	120.0°
33.30717	-75.32323	3567	21:30	33.26895°N	075.24307°W	118.0°
33.26895	-75.24307	3663	22:30	33.22321°N	075.16210°W	114.0°
33.22321	-75.16210	3766	23:30	33.18204°N	075.08958°W	124.1°
33.18204	-75.08958	3836	24:00	33.15768°N	075.04662°W	125.0°
33.15768	-75.04662	3895	00:05	33.15354°N	075.03950°W	125.0°
33.15354	-75.03950	2894	00:10	33.14995°N	075.03322°W	124.8°
33.14995	-75.03322	3919	00:15	33.14655°N	075.02718°W	124.9°
33.14655	-75.02718	3905	00:20	33.14270°N	075.02037°W	125.2°
33.14270	-75.02037	3931	00:25	33.13953°N	075.01487°W	125.3°
33.13953	-75.01487	3934	00:30	33.13596°N	075.00848°W	124.2°
33.13596	-75.00848	3944	01:00	33.11598°N	074.97369°W	122.3°
33.11598	-74.97369	3981	02:00	33.07423°N	074.90018°W	128.2°
33.07423	-74.90018	4085	03:00	33.03478°N	074.83092°W	128.6°
33.03478	-74.83092	4208	04:00	32.98530°N	074.74480°W	126.6°
32.98530	-74.74480	4316	05:00	32.93482°N	074.65702°W	123.8°
32.93482	-74.65702	4436	06:00	32.89218°N	074.58290°W	120.9°
32.89218	-74.58290	4522	07:00	32.85292°N	074.51450°W	119.0°
32.85292	-74.51450	4605	08:00	32.80834°N	074.43755°W	117.2°
32.80834	-74.43755	4645	09:00	32.75983°N	074.35346°W	116.8°
32.75983	-74.35346	4698	09:30	32.73987°N	074.31932°W	114.6°
32.73987	-74.31932	4714	09:35	32.73749°N	074.31515°W	115.8°
32.73749	-74.31515	4715	09:40	32.73377°N	074.30877°W	116.4°
32.73377	-74.30877	4720	09:45	32.73029°N	074.30277°W	115.8°
32.73029	-74.30277	4722	09:50	32.72621°N	074.29568°W	117.9°
32.72621	-74.29568	4727	09:55	32.72366°N	074.29131°W	118.8°
32.72366	-74.29131	4731	10:00	32.72252°N	074.28934°W	118.5°
32.72252	-74.28934	4731	11:00	32.68272°N	074.22107°W	118.7°
32.68272	-74.22107	4728	11:30	32.66239°N	074.18561°W	121.0°
32.66239	-74.18561	4802	12:00	32.64403°N	074.15401°W	124.3°
32.64403	-74.15401	4824	13:00	32.60323°N	074.08402°W	130.1°
32.60323	-74.08402	4856	13:30	32.58258°N	074.04870°W	130.5°
32.58258	-74.04870	4882	14:30	32.53484°N	073.96689°W	130.0°
32.53484	-73.96689	4934	15:00	32.50762°N	073.94425°W	204.9°
32.50762	-73.94425	4949	16:00	32.45902°N	073.97550°W	240.0°
32.45902	-73.97550	4961	16:30	32.43758°N	073.99049°W	241.0°
32.43758	-73.99049	4933	17:00	32.41613°N	074.00553°W	243.1°
32.41613	-74.00553	4925	18:00	32.35784°N	074.04642°W	236.1°
32.35784	-74.04642	4914	18:30	32.32630°N	074.06853°W	233.0°
32.32630	-74.06853	4910	19:30	32.28592°N	074.12186°W	297.4°
32.28592	-74.12186	4896	20:30	32.31194°N	074.16925°W	303.0°
32.31194	-74.16925	4833	21:30	32.33479°N	074.21015°W	301.2°
32.33479	-74.21015	4790	22:30	32.36170°N	074.25753°W	298.5°
32.36170	-74.25753	4743	23:30	32.38852°N	074.30515°W	293.0°
32.38852	-74.30515	4695	24:00	32.40440°N	074.33335°W	292.6°
32.40440	-74.33335	4672	00:05	32.40728°N	074.33844°W	292.5°
32.40728	-74.33844	4667	00:10	32.41020°N	074.34365°W	291.0°

32.41020	-74.34365	4684	00:15	32.41240°N	074.34753°W	290.6°
32.41240	-74.34753	4673	00:20	32.41477°N	074.35212°W	290.3°
32.41477	-74.35212	4672	00:25	32.41755°N	074.35664°W	289.9°
32.41755	-74.35664	4668	00:30	32.41988°N	074.36082°W	288.6°
32.41988	-74.36082	4669	01:00	32.43703°N	074.39121°W	287.0°
32.43703	-74.39121	4657	02:00	32.46154°N	074.43560°W	287.0°
32.46154	-74.43560	4664	03:00	32.49385°N	074.49293°W	294.3°
32.49385	-74.49293	4650	04:00	32.53061°N	074.55847°W	301.3°
32.53061	-74.55847	4624	05:00	32.57693°N	074.64145°W	307.4°
32.57693	-74.64145	4556	06:00	32.61060°N	074.70189°W	313.8°
32.61060	-74.70189	4504	07:00	32.65595°N	074.78347°W	317.0°
32.65595	-74.78347	4425	08:00	32.70047°N	074.86336°W	317.1°
32.70047	-74.86336	4357	09:00	32.74600°N	074.94590°W	316.0°
32.74600	-74.94590	4274	09:30	32.77139°N	074.99141°W	314.0°
32.77139	-74.99141	4220	09:35	32.77290°N	074.99417°W	314.0°
32.77290	-74.99417	4213	09:40	32.77507°N	074.99805°W	313.7°
32.77507	-74.99805	4213	09:45	32.77746°N	075.00246°W	315.4°
32.77746	-75.00246	4209	09:50	32.78385°N	075.01402°W	315.1°
32.78385	-75.01402	4193	09:55	32.78865°N	075.02264°W	314.2°
32.78865	-75.02264	4182	10:00	32.79156°N	075.02794°W	314.5°
32.79156	-75.02794	4175	10:30	32.81527°N	075.07095°W	312.0°
32.81527	-75.07095	4115	11:00	32.83623°N	075.10885°W	312.0°
32.83623	-75.10885	4069	11:30	32.85692°N	075.14679°W	312.0°
32.85692	-75.14679	4006	12:00	32.88028°N	075.18951°W	312.7°
32.88028	-75.18951	3953	13:00	32.92283°N	075.26656°W	310.4°
32.92283	-75.26656	3853	13:30	32.94749°N	075.31173°W	315.6°
32.94749	-75.31173	3800	14:00	32.96833°N	075.34981°W	323.2°
32.96833	-75.34981	3763	14:09	32.97350°N	075.35907°W	328.7°
32.97350	-75.35907	3758	14:23	32.97997°N	075.37091°W	330.0°
32.97997	-75.37091	3758	14:30	32.98479°N	075.37972°W	329.0°
32.98479	-75.37972	3736	15:00	32.99847°N	075.40494°W	328.6°
32.99847	-75.40494	3691	15:30	33.01455°N	075.43403°W	330.0°
33.01455	-75.43403	3650	16:00	33.02813°N	075.45895°W	337.0°
33.02813	-75.45895	3612	16:30	33.04027°N	075.48072°W	300.0°
33.04027	-75.48072	3591	17:00	33.05378°N	075.50592°W	330.8°
33.05378	-75.50592	3572	18:00	33.08848°N	075.56960°W	324.3°
33.08848	-75.56960	3480	18:30	33.10726°N	075.60408°W	317.0°
33.10726	-75.60408	3410	19:30	33.14766°N	075.67846°W	308.0°
33.14766	-75.67846	3252	20:30	33.18842°N	075.75370°W	303.0°
33.18842	-75.75370	3108	21:30	33.23367°N	075.83728°W	296.0°
33.23367	-75.83728	2963	22:30	33.27609°N	075.91603°W	288.0°
33.27609	-75.91603	2762	23:30	33.31595°N	075.98016°W	0.6°
33.31595	-75.98016	2397	00:00	33.35080°N	075.96425°W	17.7°
33.35080	-75.96425	2452	00:05	33.35728°N	075.96102°W	15.5°
33.35728	-75.96102	2467	00:10	33.36768°N	075.95587°W	15.3°
33.36768	-75.95587	2491	00:15	33.36962°N	075.95492°W	15.7°
33.36962	-75.95492	2495	00:20	33.37667°N	075.95145°W	16.4°
33.37667	-75.95145	2500	00:25	33.38130°N	075.94922°W	17.6°
33.38130	-75.94922	2516	00:30	33.38827°N	075.94580°W	18.2°

33.38827	-75.94580	2528	01:00	33.42649°N	075.92699°W	28.5°
33.42649	-75.92699	2595	02:00	33.50375°N	075.88862°W	24.0°
33.50375	-75.88862	2696	03:00	33.57175°N	075.85495°W	20.0°
33.57175	-75.85495	2716	04:00	33.64710°N	075.81781°W	16.7°
33.64710	-75.81781	2751	05:00	33.72348°N	075.78018°W	13.0°
33.72348	-75.78018	2781	06:00	33.81012°N	075.73758°W	13.0°
33.81012	-75.73758	2555	07:00	33.87580°N	075.70513°W	14.9°
33.87580	-75.70513	2390	08:00	33.94786°N	075.66966°W	13.9°
33.94786	-75.66966	2513	09:00	34.02282°N	075.63231°W	10.3°
34.02282	-75.63231	2712	09:30	34.07045°N	075.60889°W	9.2°
34.07045	-75.60889	2836	09:35	34.07512°N	075.60648°W	8.4°
34.07512	-75.60648	2835	09:40	34.07975°N	075.60430°W	11.0°
34.07975	-75.60430	2845	09:45	34.08365°N	075.60232°W	11.5°
34.08365	-75.60232	2853	09:50	34.09113°N	075.59855°W	7.8°
34.09113	-75.59855	2845	09:55	34.09476°N	075.59676°W	8.8°
34.09476	-75.59676	2839	10:00	34.10370°N	075.59227°W	9.1°
34.10370	-75.59227	2822	11:00	34.17599°N	075.54438°W	15.0°
34.17599	-75.54438	2810	11:30	34.20478°N	075.51780°W	20.6°
34.20478	-75.51780	2789	12:00	34.25237°N	075.48945°W	22.5°
34.25237	-75.48945	2802	13:00	34.33403°N	075.43036°W	22.1°
34.33403	-75.43036	2841	13:30	34.36882°N	075.41971°W	308.4°
34.36882	-75.41971	2815	14:30	34.39576°N	075.46575°W	256.0°
34.39576	-75.46575	2718	14:45	34.40195°N	075.47832°W	254.0°
34.40195	-75.47832	2656	15:00	34.40550°N	075.48525°W	250.0°
34.40550	-75.48525	2650	16:00	34.42296°N	075.52089°W	253.0°
34.42296	-75.52089	2635	16:30	34.43242°N	075.54066°W	259.0°
34.43242	-75.54066	2553	17:00	34.44086°N	075.55769°W	262.2°
34.44086	-75.55769	2430	18:00	34.45868°N	075.59442°W	265.5°
34.45868	-75.59442	1773	18:30	34.46763°N	075.62406°W	249.0°
34.46763	-75.62406	1414	19:30	34.44729°N	075.65110°W	229.3°
34.44729	-75.65110	1223	20:30	34.40488°N	075.68306°W	224.0°
34.40488	-75.68306	1053	21:30	34.36183°N	075.71553°W	222.3°
34.36183	-75.71553	756	22:30	34.32057°N	075.74648°W	219.0°
34.32057	-75.74648	547	23:30	34.28471°N	075.77340°W	217.1°
34.28471	-75.77340	513	00:00	34.26510°N	075.78810°W	218.7°
34.26510	-75.78810	510	00:05	34.26179°N	075.79060°W	217.2°
34.26179	-75.79060	505	00:10	34.25910°N	075.79255°W	219.6°
34.25910	-75.79255	512	00:15	34.25612°N	075.79490°W	218.8°
34.25612	-75.79490	520	00:20	34.25335°N	075.79692°W	219.7°
34.25335	-75.79692	518	00:25	34.25056°N	075.79899°W	220.0°
34.25056	-75.79899	517	00:30	34.24783°N	075.80108°W	223.6°
34.24783	-75.80108	504	00:35	34.24522°N	075.80359°W	228.2°
34.24522	-75.80359	503	01:00	34.23846°N	075.81713°W	246.0°
34.23846	-75.81713	490	02:00	34.24065°N	075.86512°W	254.0°
34.24065	-75.86512	434	03:00	34.23809°N	075.91573°W	232.6°
34.23809	-75.91573	341	04:00	34.20924°N	075.93406°W	221.2°
34.20924	-75.93406	354	05:00	34.17375°N	075.95210°W	217.9°
34.17375	-75.95210	378	06:00	34.13928°N	075.96960°W	213.2°
34.13928	-75.96960	398	07:00	34.10905°N	075.98503°W	209.4°

34.10905	-75.98503	417	08:00	34.06848°N	076.00560°W	202.6°
34.06848	-76.00560	437	09:00	34.02917°N	076.02533°W	202.3°
34.02917	-76.02533	457	09:30	34.00516°N	076.03766°W	200.8°
34.00516	-76.03766	466	09:35	34.00182°N	076.03936°W	199.6°
34.00182	-76.03936	468	09:40	33.99677°N	076.04191°W	201.1°
33.99677	-76.04191	469	09:45	33.99303°N	076.04383°W	200.1°
33.99303	-76.04383	472	09:50	33.99001°N	076.04532°W	198.9°
33.99001	-76.04532	474	09:55	33.98841°N	076.04616°W	200.6°
33.98841	-76.04616	473	10:00	33.98689°N	076.04693°W	199.9°
33.98689	-76.04693	474	11:00	33.94325°N	076.06931°W	203.0°
33.94325	-76.06931	492	11:17	33.92683°N	076.07737°W	202.0°
33.92683	-76.07737	499	11:30	33.91341°N	076.08435°W	199.0°
33.91341	-76.08435	505	12:00	33.88924°N	076.09648°W	199.6°
33.88924	-76.09648	512	12:50	33.84018°N	076.12116°W	199.0°
33.84018	-76.12116	530	13:00	33.83245°N	076.12513°W	199.7°
33.83245	-76.12513	532	13:30	33.80136°N	076.14068°W	200.8°
33.80136	-76.14068	543	14:00	33.76683°N	076.15769°W	201.6°
33.76683	-76.15769	554	14:25	33.75531°N	076.16789°W	220.3°
33.75531	-76.16789	553	14:30	33.75211°N	076.17219°W	220.0°
33.75211	-76.17219	551	15:00	33.74022°N	076.18891°W	220.0°
33.74022	-76.18891	547	15:25	33.72926°N	076.20307°W	220.0°
33.72926	-76.20307	542	16:00	33.71715°N	076.21818°W	220.0°
33.71715	-76.21818	542	16:30	33.71093°N	076.22550°W	220.0°
33.71093	-76.22550	537	17:00	33.70643°N	076.23089°W	220.6°
33.70643	-76.23089	537	17:32	33.70494°N	076.23431°W	220.1°
33.70494	-76.23431	537	17:46	33.70347°N	076.23652°W	220.2°
33.70347	-76.23652	535	18:00	33.69832°N	076.24246°W	220..5
33.69832	-76.24246	536	18:30	33.68385°N	076.25837°W	220.0°
33.68385	-76.25837	532	19:30	33.66632°N	076.28215°W	225.9°
33.66632	-76.28215	527	20:30	33.65588°N	076.30101°W	210.0°
33.65588	-76.30101	518	21:30	33.65168°N	076.30697°W	203.0°
33.65168	-76.30697	516	22:30	33.63975°N	076.31448°W	212.9°
33.63975	-76.31448	519	23:30	33.63042°N	076.32555°W	219.1°
33.63042	-76.32555	518	00:00	33.63570°N	076.35713°W	270.1°
33.63570	-76.35713	480	00:05	33.63751°N	076.36785°W	269.0°
33.63751	-76.36785	472	00:10	33.63874°N	076.37530°W	269.2°
33.63874	-76.37530	466	00:15	33.64012°N	076.38476°W	270.5°
33.64012	-76.38476	459	00:20	33.64107°N	076.39140°W	270.2°
33.64107	-76.39140	451	00:25	33.64252°N	076.40066°W	270.6°
33.64252	-76.40066	441	00:30	33.64377°N	076.40913°W	270.7°
33.64377	-76.40913	434	00:35	33.64980°N	076.41733°W	350.0°
34.48155	-76.63068	15	09:35	34.48487°N	076.63157°W	350.8°
34.48487	-76.63157	14	09:40	34.49047°N	076.63302°W	351.3°
34.49047	-76.63302	13	09:45	34.50188°N	076.63595°W	350.5°
34.50188	-76.63595	14	09:50	34.50650°N	076.63710°W	351.2°
34.50650	-76.63710	13	09:55	34.51305°N	076.63868°W	350.6°
34.51305	-76.63868	12	10:00	34.52027°N	076.64045°W	351.0°
34.52027	-76.64045	12	11:00	34.55066°N	076.65319°W	347.0°

34.55066	-76.65319	12	11:30	34.60033°N	076.66956°W	331.0°
34.60033	-76.66956		12:00	34.67560°N	076.66903°W	11.9°
34.67560	-76.66903		13:00	34.71833°N	076.69563°W	154.0°

rvations				Duration of visual only (day) observation	Duration of source activity during visual only (day) observation	Duration of visual only (night) observation	Duration of source activity during visual only (night) observation
Vessel Speed in Knots	GIS Latitude	GIS Longitude	Water depth (metres)				
10.4	36.93067	-076.33883		00:45	00:00		
10.3	36.99200	-076.17967		01:00	00:00		
11.0	36.93957	-075.99313	20	01:00	00:00		
10.0	36.82667	-075.80555	22	01:00	00:00		
10.3	36.72723	-075.62935	22	01:00	00:00		
10.8	36.57343	-075.52237	24	01:00	00:00		
10.8	36.42503	-075.43832	24	01:00	00:00		
10.8	36.39557	-075.42400	22	00:05	00:00		
10.8	36.38408	-075.41772	25	00:05	00:00		
10.7	36.37002	-075.40996	25	00:05	00:00		
10.8	36.36100	-075.40517	28	00:05	00:00		
10.8	36.34086	-075.39404	29	00:07	00:00		
2.5	35.31245	-074.05198	3137	00:05	00:00		
2.5	35.31207	-074.05160	3137	00:05	00:00		
2.5	35.31190	-074.05137	3137	00:05	00:00		
2.5	35.30606	-074.04411	3153	00:05	00:00		
2.4	35.30342	-074.04085	3159	00:05	00:00		
2.5	35.30140	-074.03880	3157	00:05	00:00		
2.7	35.29797	-074.03493	3179	00:14	00:00		
3.8	35.28084	-074.01417	3222	00:46	00:00		
3.9	35.26050	-073.98700	3260	00:30	00:00		
3.4	35.24064	-073.96191	3290	00:30	00:00		
4.0	35.20280	-073.91739	3362	01:00	00:00		
4.0	35.17846	-073.89936	3361	00:30	00:00		
4.0	35.13528	-073.92327	3384	01:00	00:00		
2.2	35.11384	-073.93662	3429	00:30	00:00		
1.8	35.08048	-073.93983	3432	01:00	00:00		
1.7	35.07050	-073.95567	3411	00:30	00:00		
2.0	35.06106	-073.97141	3300	00:30	00:00		
4.2	35.04431	-073.98997	3311	00:31	00:00		
4.1	35.02634	-074.00484	3385	00:29	00:00		
4.5	35.00517	-074.02217	3350	00:30	00:00		
4.5	34.97917	-074.04300	3363	00:30	00:00		
3.9	34.93968	-074.07345	3294	01:00	00:00		
4.0	34.91850	-074.08837	3319	00:30	00:00		
3.8	34.87793	-074.09187	3389	01:00	00:00		
4.4	34.88074	-074.05509	3309	00:30	00:00		
4.5	34.95968	-074.04380	3298	01:00	00:00		
4.6	34.99980	-074.04455	3356	00:30	00:00		
4.6	35.02142	-074.04949	3371	00:19	00:00		

3.0	35.02713	-074.06073	3318	00:05	00:00		
3.3	35.02487	-074.05741	3329	00:06	00:00		
3.3	35.02713	-074.06073	3318	00:04	00:00		
3.0	35.02899	-074.06507	3319	00:05	00:00		
3.2	35.02966	-074.06819	3321	00:05	00:00		
2.4	35.02938	-074.07255	3318	00:05	00:00		
2.2	34.97333	-074.23582	3306				
3.3	34.93936	-074.25345	3303				
3.0	34.93512	-074.25573	3324				
4.0	34.91567	-074.26484	3270				
4.3	34.91129	-074.22673	3359				
4.4	34.97326	-074.18665	3283				
4.7	35.00902	-074.16637	3223				
3.1	35.02950	-074.18925	3184				
3.1	35.02541	-074.19257	3200				
3.3	35.01659	-074.21259	3201				
3.9	35.01198	-074.21545	3227				
3.5	35.00750	-074.21787	3284				
3.0	35.00244	-074.22058	3285				
2.4	34.99320	-074.22538	3312				
4.1	34.98614	-074.22904	3315				
4.3	34.98420	-074.23002	3340				
4.0	34.92926	-074.25852	3208				
4.1	34.89355	-074.27738	3263				
4.4	34.86793	-074.29073	3310				
5.1	34.79539	-074.33689	3303				
4.3	34.76474	-074.35782	3353				
5.1	34.68780	-074.40967	3369				
5.0	34.65310	-074.43293	3377				
4.8	34.57825	-074.48331	3364				
4.6	34.54498	-074.50542	3380				
5.1	34.50969	-074.52919	3391				
4.7	34.44375	-074.57362	3468				
4.5	34.40584	-074.59876	3513				
4.3	34.36999	-074.62262	3616				
4.8	34.32869	-074.65027	3527				
4.8	34.29373	-074.67347	3506				
4.2	34.26717	-074.69119	3498				
4.1	34.19280	-074.74063	3504				
5.1	34.16003	-074.76253	3553				
4.1	34.12190	-074.78754	3561				
4.4	34.05177	-074.83410	3633				
4.5	34.02851	-074.84946	3638				
4.6	34.01963	-074.85520	3629				
4.4	34.01568	-074.85783	3621				
4.5	34.00971	-074.86180	3625				
4.9	34.00510	-074.86500	3629				

4.8	33.99723	-074.87025	3618				
4.8	33.99279	-074.87323	3618				
5.2	33.94147	-074.90683	3580				
5.0	33.87347	-074.95183	3536				
5.1	33.80150	-074.99927	3511				
4.3	33.72762	-075.04750	3528				
4.3	33.66520	-075.08860	3538				
4.0	33.61715	-075.12005	3536				
4.4	33.54168	-075.16900	3555				
5.0	33.48380	-075.10398	3648				
4.3	33.44946	-075.04401	3717				
4.6	33.42955	-075.00951	3763				
4.7	33.42162	-074.99567	3780				
4.9	33.41738	-074.98825	3779				
4.9	33.41482	-074.98382	3782				
4.8	33.41188	-074.97865	3795				
4.9	33.40632	-074.96898	3792				
4.8	33.40310	-074.96308	3811				
5.3	33.35961	-074.88925	3913				
5.4	33.33323	-074.84172	3985				
4.8	33.31016	-074.80138	4036				
4.9	33.26517	-074.72328	4138				
4.9	33.24265	-074.68175	4192				
4.8	33.19514	-074.60219	4285				
4.8	33.17396	-074.56552	4331				
4.7	33.12603	-074.48288	4440				
5.0	33.10380	-074.44470	4474				
4.9	33.07835	-074.40105	4528				
4.9	33.03221	-074.32165	4609				
4.9	33.00818	-074.28062	4619				
5.0	32.95882	-074.19602	4650				
3.9	32.91431	-074.11987	4726				
5.1	32.86063	-074.04798	4776				
5.0	32.78690	-074.09567	4838				
5.0	32.71548	-074.14678	4797				
5.2	32.69315	-074.16212	4797				
4.9	32.68665	-074.16675	4801				
4.8	32.67907	-074.17215	4803				
4.9	32.67357	-074.17617	4801				
4.8	32.66848	-074.17965	4801				
4.9	32.66243	-074.18387	4801				
4.9	32.65832	-074.18677	4801				
4.9	32.60979	-074.22096	4773				
5.0	32.54065	-074.26985	4726				
3.3	32.47336	-074.31715	4727				
3.0	32.42823	-074.34885	4684				
4.8	32.36902	-074.39073	4654				

3.0	32.32570	-074.42100	4649				
4.8	32.27655	-074.45553	4637				
4.8	32.20558	-074.50527	4628				
4.5	32.14930	-074.54456	4618				
2.7	32.12512	-074.56121	4624				
2.7	32.11840	-074.56592	4635				
2.9	32.11491	-074.56835	4630				
2.8	32.11373	-074.56917	4637				
2.8	32.10715	-074.57378	4635				
2.6	32.10612	-074.57450	4641				
2.5	32.10259	-074.57695	4636				
2.5	32.06695	-074.60185	4620				
2.7	32.04682	-074.61592	4603				
2.4	32.02938	-074.62807	4571				
4.6	31.97012	-074.66919	4470				
4.5	31.94059	-074.69112	4415				
4.4	31.87174	-074.73806	4299				
4.1	31.84359	-074.75709	4232				
4.0	31.78412	-074.79824	4107				
4.1	31.75197	-074.82055	4030				
4.6	31.72131	-074.84161	3977				
2.3	31.68297	-074.86802					
2.3	31.68031	-074.87015	3820				
3.1	31.66044	-074.86837	3785				
5.3	31.70797	-074.78913	4044				
5.6	31.78993	-074.77372	4150				
4.1	31.77820	-074.81502	4062				
3.0	31.71953	-074.84289	3975				
2.9	31.68071	-074.86947	3828				
4.0	31.66438	-074.88080	3762				
4.3	31.66038	-074.88355	3750				
4.1	31.65360	-074.88822	3727				
4.1	31.65360	-74.88822	3720				
4.1	31.65056	-74.89030	3690				
4.3	31.64586	-74.89364	3665				
4.4	31.64010	-74.89761	3629				

4.3	31.59344	-74.92965	3503				
4.1	31.53380	-74.97063	3287				
4.3	31.46692	-75.01673	3170				
4.1	31.41775	-75.06647	3013				
4.9	31.46074	-75.13237	2996				
4.4	31.51728	-75.20782	3097				
4.5	31.56438	-75.27057	3047				
4.8	31.63227	-75.27113	3005				
4.9	31.69649	-75.22775	3012				
4.9	31.72996	-75.20532	3115				
5.0	31.74413	-75.19570	3149				
5.1	31.74972	-75.19190	3139				
5.0	31.75897	-75.18563	3154				
4.9	31.76167	-75.18378	3163				
4.8	31.76480	-75.18163	3174				
4.8	31.77450	-75.17495	3174				
5.0	31.84023	-75.12974	3410				
5.1	31.87820	-75.10425	3522				
5.2	31.91332	-75.08034	3575				
5.1	31.98366	-75.03262	3871				
5.0	32.01957	-75.00810	3955				
5.1	32.09491	-74.95653	4142				
5.1	32.12747	-74.93436	4203				
4.4	32.19361	-74.88907	4314				
4.4	32.22703	-74.86609	4358				
5.1	32.26274	-74.84150	4398				
5.1	32.33425	-74.79232	4429				
5.0	32.37120	-74.76687	4429				
5.0	32.45189	-74.71087	4448				
4.9	32.51558	-74.66718	4503				
5.0	32.58676	-74.61791	4553				
5.0	32.65768	-74.56867	4562				
4.9	32.73025	-74.51837	4611				
4.9	32.75163	-74.50347	4634				
4.9	32.75842	-74.49878	4632				
5.0	32.76570	-74.49362	4630				
4.9	32.77200	-74.48923	4633				
5.0	32.77640	-74.48620	4627				
5.1	32.78198	-74.48228	4625				
4.8	32.78753	-74.47843	4624				
4.4	32.83537	-74.44529	4637				
2.4	32.88364	-74.41149	4632				

2.5	32.92148	-74.38928	4638				
3.5	32.95562	-74.42705	4592				
3.3	32.98963	-74.48473	4547				
2.8	33.01687	-74.53125	4481				
3.3	33.04350	-74.57720	4412				
4.4	33.02966	-74.64522	4374				
4.8	32.97208	-74.68680	4367				
4.8	32.94767	-74.70447	4382				
5.0	32.94207	-74.70827	4387				
5.0	32.93595	-74.71267	4395				
5.0	32.93133	-74.71600	4391				
4.9	32.92537	-74.72032	4388				
4.9	32.91482	-74.72792	4392				
4.9	32.91125	-74.73047	4401				
5.0	32.85858	-74.76855	4405				
5.0	32.83344	-74.78667	4409				
5.0	32.79680	-74.81300	4386				
5.1	32.76316	-74.83725	4367				
5.1	32.68991	-74.88973	4307				
5.0	32.65537	-74.91452	4301				
5.2	32.58319	-74.96598	4222				
5.1	32.55008	-74.98975	4228				
4.9	32.48167	-75.03855	4188				
4.3	32.45117	-75.06032	4177				
4.1	32.41739	-75.08435	4159				
3.9	32.35777	-75.12684	4093				
3.9	32.32575	-75.14960	4055				
3.5	32.26825	-75.19041	3971				
3.6	32.21745	-75.22609	3886				
3.9	32.17027	-75.25961	3784				
3.9	32.12330	-75.29276	3667				
3.7	32.06752	-75.33215	3420				
3.4	32.05111	-75.34366	3340				
3.7	32.04730	-75.34635	3328				
4.2	32.04488	-75.34802	3325				
4.1	32.03803	-75.35287	3306				
4.0	32.03343	-75.35613	3288				
4.3	32.02928	-75.35905	3284				
4.5	32.02504	-75.36201	3269				
3.7	31.98875	-75.38748	2143				
4.0	31.93037	-75.42883	2941				

4.1	31.86652	-75.47358	2763				
4.3	31.81119	-75.51216	2779				
4.0	31.74042	-75.56183	2894				
5.4	31.68463	-75.53213	3021				
2.5	31.73697	-75.50720	2918				
3.1	31.79732	-75.55295	2781				
3.4	31.84667	-75.59091	2696				
4.2	31.87837	-75.61501	2641				
4.1	31.88403	-75.61938	2652				
4.1	31.88660	-75.62134	2668				
3.6	31.88970	-75.62375	2705				
3.9	31.89692	-75.62926	2735				
4.0	31.90261	-75.63380	2766				
4.0	31.94909	-75.66952	2721				
4.2	31.95711	-75.67566	2705				
4.5	31.99055	-75.70140	2666				
4.4	32.02822	-75.73030	2362				
3.7	32.08010	-75.73058	2635				
3.9	32.10582	-75.71206	2704				
4.4	32.13217	-75.69328	2797				
3.1	32.14816	-75.68182	2854				
4.3	32.16244	-75.67157	2927				
4.4	32.19592	-75.64743	3056				
4.4	32.25519	-75.60475	3279				
4.1	32.28543	-75.58278	3337				
4.5	32.32415	-75.55509	3429				
4.3	32.37933	-75.51527	3470				
4.5	32.41147	-75.49193	3475				
4.8	32.47906	-75.44265	3569				
4.9	32.54492	-75.39518	3700				
5.0	32.62193	-75.33925	3791				
5.1	32.69011	-75.28964	3834				
5.2	32.76101	-75.23784	3905				
5.2	32.78730	-75.21862	3901				
5.1	32.79445	-75.21340	3905				
5.1	32.79925	-75.20975	3906				
5.2	32.80581	-75.20481	3913				
5.0	32.81115	-75.20112	3914				
5.1	32.81728	-75.19665	3913				
4.7	32.82295	-75.19250	3939				
4.8	32.86817	-75.15960	3990				
4.4	32.93721	-75.10887	4069				
4.8	33.00682	-75.05742	4049				
4.9	33.07826	-75.00521	4014				
4.9	33.15510	-74.94865	3967				
4.1	33.21965	-74.90303	3965				

4.2	33.26868	-74.96010	3874				
4.4	33.30946	-75.03218	3790				
4.5	33.34665	-75.09592	3711				
3.5	33.36215	-75.12449	3679				
4.0	33.36912	-75.13698	3682				
4.0	33.37065	-75.13953	3656				
4.1	33.37355	-75.14467	3664				
3.8	33.37637	-75.14955	3662				
3.8	33.38292	-75.16132	3636				
3.9	33.41899	-75.22895	3561				
4.2	33.40227	-75.26186	3529				
4.5	33.37128	-75.28320	3549				
3.8	33.33345	-75.30971	3555				
4.5	33.31206	-75.32486	3547				
4.6	33.28162	-75.34627	3596				
4.3	33.23869	-75.37611	3549				
4.3	33.22178	-75.38803	3557				
4.3	33.21901	-75.39011	3555				
3.6	33.19064	-75.40983	3572				
3.3	33.15321	-75.43601	3685				
2.7	33.13018	-75.45206	3638				
3.5	33.10616	-75.46892	3628				
4.5	33.04473	-75.51174	3555				
4.4	33.01431	-75.53290	3503				
4.6	32.95002	-75.57766	3373				
3.9	32.88932	-75.61985	3339				
4.6	32.85543	-75.64334	3310				
6.2	32.82432	-75.66503	3284				
4.9	32.75855	-75.71054	3273				
4.7	32.69137	-75.75682	3154				
4.8	32.66427	-75.77562	3104				
5.0	32.65868	-75.77950	3095				
4.7	32.65315	-75.78327	3092				
5.0	32.64635	-75.78795	3081				
4.8	32.64165	-75.79122	3077				
4.5	32.63562	-75.79537	3059				
4.7	32.63010	-75.79915	3047				
4.9	32.58545	-75.83003	2955				
4.9	32.51615	-75.87757	2797				
5.1	32.44018	-75.92993	2616				
4.8	32.37167	-75.97658	2486				
3.7	32.32247	-76.04220	2350				
5.0	32.37643	-76.09787	2291				
4.9	32.43963	-76.16175	2229				
4.9	32.51954	-76.17564	2188				
4.8	32.57931	-76.14072	2189				
5.0	32.62830	-76.11220	2197				
5.0	32.63215	-76.10988	2196				

4.6	32.63630	-76.10747	2201				
5.0	32.64175	-76.10418	2204				
5.1	32.64693	-76.10128	2207				
4.8	32.65715	-76.09518	2215				
4.9	32.72387	-76.05606	2340				
4.9	32.75899	-76.03546	2421				
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Duration of PAM only (day) monitoring	Duration of source activity during PAM only (day) monitoring	Duration of PAM only (night) observation	Duration of source activity during PAM only (night) observations	Duration of visual and PAM (day) monitoring	Duration of source activity during visual and PAM (day) monitoring	Duration of visual and PAM (night) monitoring	Duration of source activity during visual and PAM (night) monitoring

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For acoustic, hydrophone depth (m)	Noise Score	Wind Speed (knots)	Wind Direction	Beaufort Scale	Swell (metres)	Visibility (km)	Cloud Coverage (%)
		4.6	NE	1	<2	>10	80
		16	NE	1	<2	>10	80
		21	N	2	<2	>10	95
		15	NE	3	<2	>10	95
		25	NE	5	2-4	>10	95
		29	NE	4	2-4	>10	95
		24	NE	4	<2	7-10	95
		21	NE	4	<2	2-5	75
		18	NE	4	<2	1-2	75
		20	NE	4	<2	0.5-1	75
		20	NE	4	<2	0.3-0.5	75
		20	NE	4	<2	0.1-0.3	75
		21	NE	3	<2	2-5	75
		25	NE	3	<2	5-7	80
		22	NE	3	<2	7-10	80
		21	NE	3	<2	>10	80
		22	NE	3	<2	>10	75
		23	NE	3	<2	>10	70
		21	NE	3	<2	>10	70
		24	NE	3	<2	>10	60
		26	NE	4	<2	>10	80
		24	NE	4	<2	>10	100
		28	NE	5	<2	>10	100
		27	NE	5	<2	>10	90
		28	NE	5	<2	>10	80
		23	NE	5	<2	>10	80
		23.9	NE	5	<2	>10	70
		17	NE	5	<2	>10	50
		19	NE	5	<2	>10	30
		17.3	NE	5	<2	>10	30
		20.1	NE	5	<2	>10	20
		20	NE	5	<2	>10	20
		21	NE	5	<2	>10	10
		20	NE	5	<2	>10	10
		18	E	5	<2	>10	10
		18	NE	4	<2	>10	10
		18	NE	4	<2	>10	10
		29	NE	5	<2	>10	10
		16	NE	4	<2	>10	10
		17.8	NE	3	<2	>10	10

		17.6	NE	3	<2	7-10	10
		17.4	NE	3	<2	5-7	10
		16	NE	2	<2	2-5	10
		15.3	NE	2	<2	1-2	10
		14.7	NE	2	<2	0.5-1	10
		12.6	NE	2	<2	0.3-0.5	10
22	4						
22	4						
22	4	11	E	3	<2	0.3-0.5	10
18	4	10	SE	3	<2	0.3-0.5	10
17	4						
20	4						
18	4						
17	3	5	SE	3	<2	0.3-0.5	10
17	3	5	SE	3	<2	0.3-0.5	10
15	3	8	SE	3	<2	0.3-0.5	5
15	3						
15	3	4	SE	3	<2	0.3-0.5	7
15	3	10	SE	3	<2	0.5-1	8
15	3	9	SE	3	<2	2-5	9
15	3	12	SE	3	<2	5-7	10
15	3	9	SE	3	<2	7-10	11
17	3	8	E	3	<2	>10	12
16	3	8	SE	3	<2	>10	20
16	3	7	E	3	<2	>10	5
16	3	8	SE	3	<2	>10	5
16	3	6	SE	3	<2	>10	5
16	3	5	SE	3	<2	>10	5
16	3	6	SE	3	<2	>10	5
16	3	9	SE	3	<2	>10	5
16	3	10	SE	3	<2	>10	5
16	3	4	SE	3	<2	>10	5
16	3	8.6	ESE	2	<2	>10	20
16	3	6	SE	2	<2	>10	20
16	3	7	SE	2	<2	>10	20
16	3	8	SE	2	<2	>10	25
16.8	4	10	SE	2	<2	>10	25
16.7	4	12	SE	2	<2	>10	30
17.1	4	8	E	2	<2	>10	40
17.1	4	8	SE	2	<2	>10	10
17.1	4	13	SE	3	<2	>10	10
16.8	4	11	SE	3	<2	>10	20
16.4	4	19	E	3	<2	>10	20
16.5	4	10.2	ESE	3	<2	7-10	20
16.7	4	9.7	SE	3	<2	5-7	30
16.7	4	10.5	SE	3	<2	2-5	30
16.6	4	13	ESE	3	<2	1-2	30

17.1	4	13.7	SE	3	<2	0.5-1	30
17.1	4	12.9	SE	3	<2	0.3-0.5	30
14.8	4						
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13.6	3						
13.6	3						
14.9	3						
14.3	3						
14.6	4	7.1	SE	3	<2	0.3-0.5	20
14.6	4	7.4	SE	3	<2	0.5-1	20
14.6	4	7.5	SE	3	<2	1-2	20
14.6	4	7.7	SE	3	<2	2-5	20
14.6	4	8	SE	3	<2	5-7	10
14.6	4	7.9	SE	3	<2	7-10	10
14.6	4	7.5	SE	3	<2	>10	10
14.9	3	6	SE	3	<2	>10	10
15.2	3	8	SE	3	<2	>10	5
14.6	3	7	SE	3	<2	>10	5
14.9	3	6	SE	3	<2	>10	5
15.2	3	6.1	SSE	2	<2	>10	5
15.2	3	5	SE	2	<2	>10	5
15.2	3	6.9	SE	2	<2	>10	5
14.9	4	6.4	S	2	<2	>10	5
14.9	3	3.5	S	2	<2	>10	5
14.6	3	4.7	ESE	2	<2	>10	5
14.3	4	6	SE	2	<2	>10	5
14.6	4	2.4	E	2	<2	>10	5
14.6	3	2.4	E	2	<2	>10	5
14.3	3	2	SE	2	<2	>10	5
14.3	3	2	E	2	<2	>10	5
14	3	6	SE	3	<2	>10	5
14.1	3	4.4	ESE	2	<2	>10	5
14.3	3	5.4	SE	2	<2	7-10	10
14.4	3	6.2	SE	2	<2	5-7	10
14.6	3	8	SE	2	<2	2-5	10
14.6	3	9.5	E	2	<2	1-2	10
14.7	3	10.6	SE	2	<2	0.5-1	10
14.3	3	8.7	SE	2	<2	0.3-0.5	10
14.4	3						
14.3	3						
14.3	3						
16.4	2						
18.9	2						

13.6	3						
18.6	4						
13.6	4						
13.1	4						
13.3	4						
17.1	3	9	SE	2	<2	0.3-0.5	80
17.1	3	10	SE	2	<2	0.5-1	80
17.1	3	11.9	SE	2	<2	1-2	80
17.1	3	9.9	SE	2	<2	2-5	80
17.1	3	9.6	E	2	<2	5-7	70
17.1	3	10	E	2	<2	7-10	70
17.1	3	9.8	E	2	<2	>10	70
17.4	3	8.2	E	3	<2	>10	70
16.8	3	12.5	E	3	<2	>10	40
16.8	3	12.7	SE	3	<2	>10	40
16.7	3	16.7	ESE	3	<2	>10	40
13	3	13	E	3	<2	>10	40
13.2	2	19	E	4	<2	>10	40
12.7	3	19.9	ESE	4	<2	>10	50
12.4	3	18.5	SE	4	<2	>10	60
12.7	3	19.8	E	4	<2	>10	60
12.7	3	18.4	E	4	<2	>10	60
17.4	3	16	ESE	4	<2	>10	70
17.4	2	15.4	SE	4	<2	>10	70
17.4	2	14	SE	4	<2	>10	70
15.2	3	14	SE	4	<2	>10	70
15.2	3	11	SE	3	<2	>10	70
13.6	2	10.2	SE	3	<2	>10	50
14	3	15.3	SE	3	<2	>10	30
13.1	3	14.1	SE	3	<2	>10	30
13.8	3	13.2	SE	3	<2	7-10	30
12.7	3	13.1	SE	3	<2	5-7	30
16.7	3	13.4	SE	3	<2	2-5	30
16.4	3	13.1	SE	3	<2	1-2	40
17.1	3	12.3	SE	3	<2	0.5-1	40
16.4	3	13.5	SE	3	<2	0.3-0.5	40

14.4	3						
13.6	3						
12.7	3						
13.3	3						
13.6	3						
13.3	3						
13.3	3						
13.3	3						
16.8	3						
16.4	4						
16.8	4	7.4	W	3	<2	0.1-0.3	40
16.8	4	8	W	3	<2	0.3-0.5	40
16.8	4	7.4	W	3	<2	1-2	20
16.8	4	7.5	SW	3	<2	2-5	20
16.8	4	8	SW	3	<2	5-7	20
16.1	3	9	SW	3	<2	7-10	10
16.8	4	9	SW	3	<2	>10	10
15.5	3	11	W	3	<2	>10	5
15.8	3	10	W	3	<2	>10	5
15	3	9	W	3	<2	>10	5
15.5	3	10	W	3	<2	>10	5
15.5	3	9.8	NW	3	<2	>10	5
15.8	3	6.4	W	3	<2	>10	5
15.5	3	6	WNW	2	<2	>10	5
18.6	3	2.3	W	2	<2	>10	10
17.7	3	5.3	SW	2	<2	>10	10
15.5	3	6.7	SW	2	<2	>10	10
14.6	3	8	SW	2	<2	>10	10
14.9	3	6.4	SW	2	<2	>10	10
15.3	3	8.6	SW	2	<2	>10	10
14.3	3	8.7	SW	2	<2	>10	20
14.3	3	10.1	SW	2	<2	>10	20
14.3	3	10	SW	2	<2	>10	15
13.6	3	13.6	SW	3	<2	>10	20
13.9	3	13	SW	3	<2	7-10	20
13.3	3	12.5	WSW	3	<2	5-7	20
14.1	3	11.4	SW	3	<2	2-5	20
14.3	3	13	SW	3	<2	1-2	20
14.2	3	11.8	SW	3	<2	0.5-1	20
13.8	3	12.2	SW	3	<2	0.3-0.5	20
13	3						
16.4	3						

16.1	3						
15.5	3						
15.2	4						
19	4						
19.2	4						
20.5	3						
13.6	3						
13.5	3						
13.2	3	13.1	E	3	<2	0.1-0.3	100
13.3	3	12.8	E	3	<2	0.3-0.5	100
13.3	3	12.6	E	3	<2	0.5-1	95
13.3	3	11.5	E	3	<2	1-2	90
13.3	3	10.9	E	3	<2	2-5	80
13.3	3	11.2	E	3	<2	5-7	75
13.3	3	12	E	3	<2	7-10	70
13.3	3	15	NE	3	<2	>10	70
14	3	13	E	3	<2	>10	70
14	3	15	E	3	<2	>10	85
13.6	3	14	E	3	<2	>10	85
13	3	17.6	E	3	<2	>10	90
13.3	3	20.1	E	3	<2	>10	90
13.7	3	23.6	E	4	<2	>10	95
12.4	3	23.6	ENE	4	<2	7-10	95
13.3	2	18.8	NE	4	<2	7-10	95
12.7	2	21.9	E	4	<2	7-10	95
12.7	2	21.6	E	5	<2	7-10	45
12.7	3	19	E	5	<2	7-10	45
12.7	3	20	E	5	<2	>10	35
13.3	3	21	E	5	<2	>10	35
13	3	21.6	E	4	<2	>10	35
12.1	3	18	E	4	<2	>10	35
13.6	3	18.7	E	4	<2	>10	35
13.3	3	15.6	E	4	<2	>10	50
13.4	3	14.6	E	4	<2	7-10	60
13.6	3	19.6	NE	4	<2	5-7	60
13	3	16.9	E	4	<2	2-5	60
13.4	3	17	NE	4	<2	1-2	60
13.2	3	15.2	NE	4	<2	0.5-1	60
13.1	3	17	E	4	<2	0.3-0.5	60
13.1	3						
13.3	3						

13.3	3						
13	3						
13	3						
14	3						
14.3	3						
20.5	3						
14.6	3						
13.6	3						
13.6	3	9.1	SE	3	<2	1-2	60
13.6	3	11	E	3	<2	2-5	60
13.6	3	10	E	3	<2	5-7	55
13.6	3	9.6	SE	3	<2	7-10	40
13.6	3	8.2	SE	3	<2	>10	40
13.6	4	8.9	SE	3	<2	>10	40
13.6	4	5.8	SE	3	<2	>10	75
14.6	4	5.2	SE	3	<2	>10	75
14	4	5.5	SE	2	<2	>10	75
14.3	4	6	SE	2	<2	>10	30
14.4	4	7.4	SE	2	<2	>10	40
14.6	3	6.5	SE	2	<2	>10	40
13.9	3	5.7	SE	2	<2	>10	50
13.6	3	5.5	S	2	<2	>10	50
13.3	3	5.6	S	2	<2	>10	50
13.2	3	4.8	SSE	2	<2	>10	50
13.3	3	6	S	2	<2	>10	50
13.6	3	6.5	S	2	<2	>10	50
14	3	7.8	S	2	<2	>10	65
14	4	8.1	S	2	<2	>10	65
14	3	8.6	S	2	<2	>10	65
13.6	3	9.1	SW	2	<2	>10	65
14	3	10.2	S	3	<2	>10	65
13.3	3	14.5	SW	3	<2	>10	45
14	3	14.5	S	3	<2	>10	50
13.7	3	14.2	SSW	3	<2	>10	60
13.2	3	15.6	SW	3	<2	7-10	60
13.3	3	15	SW	3	<2	5-7	60
13.3	3	17	S	3	<2	2-5	60
14	3	15.2	S	3	<2	1-2	60
13.6	3	17.7	S	3	<2	0.5-1	60
13.7	3	16.2	S	3	<2	0.3-0.5	60
13.5	3						
15.2	3						
15.2	3						
14.3	3						
13.6	3						
13.3	3						

9.9	3						
11	4						
9.9	3						
11.5	3						
11.5	3	23.5	SW	4	<2	0.5-1	80
11.5	3	24.8	SW	4	<2	1-2	80
11.5	3	24	SW	4	<2	2-5	75
11.5	3	24.5	SW	4	<2	5-7	75
11.5	3	23.8	SW	4	<2	7-10	70
11.5	3	22	SW	4	<2	>10	70
11.2	3	23	SW	4	<2	>10	75
14.3	3	20.9	SW	5	<2	>10	70
14	3	20	SW	5	<2	>10	75
14	3	21	SW	5	<2	1-2	100
15.8	3	20.7	SW	5	<2	1-2	100
14.6	3	24.8	SW	5	<2	5-7	95
14.9	3	24.9	SW	5	2-4	1-2	100
14.9	3	20.9	SW	5	<2	5-7	90
14.3	3	23.7	SW	5	<2	5-7	80
14.3	3	20.6	SW	5	<2	5-7	80
17.4	3	27.5	SW	5	<2	5-7	85
17.4	3	24.2	SW	5	<2	5-7	85
15.4	3	20.5	SW	5	<2	5-7	90
15.8	4	14.8	W	5	<2	5-7	90
14.6	4	11.7	W	5	<2	7-10	85
13.6	4	13.4	W	5	<2	7-10	85
15.2	3	12	NW	4	<2	7-10	70
14.3	3	9.3	NW	3	<2	7-10	70
14.3	3	6.7	NW	3	<2	>10	70
15.2	3	7.1	W	3	<2	>10	70
14.3	3	4.3	W	3	<2	>10	70
14.2	3	4.3	W	3	<2	7-10	70
14.5	3	4	W	3	<2	5-7	70
14.3	3	4	W	3	<2	2-5	70
14.3	3	3.2	W	3	<2	1-2	70
14.4	3	3	W	3	<2	0.5-1	70
14.7	3	2	SW	3	<2	0.3-0.5	70
14.5	3						
14.3	3						
14.9	3						
17.4	3						
17.1	3						
14.7	3						
16	3						
15.8	4						
16.4	4						
16.4	4						
16.8	4	32.4	E	5	2-4	0.5-1	80

16.8	4	32	E	5	2-4	1-2	80
16.8	4	30.7	E	5	2-4	2-5	80
16.8	4	30.5	E	5	2-4	5-7	80
16.8	4	30.5	E	5	2-4	7-10	85
17.4	4	29.7	E	5	2-4	>10	85
17.4	4	36.8	E	5	2-4	>10	90
18.6	3	35.4	E	5	2-4	>10	90
17.4	3	32.6	E	5	2-4	7-10	100
17.7	3	28.8	E	6	2-4	7-10	100
17.4	3	33	E	6	2-4	7-10	100
18.3	3	33	E	6	2-4	7-10	100
22	3	33.7	E	6	2-4	5-7	100
17.1	2	28.2	E	6	2-4	5-7	100
16.3	2	29.3	E	6	2-4	5-7	100
18.3	3	26.9	E	6	2-4	5-7	100
15.5	2	28	E	6	2-4	5-7	100
16.8	2	25.3	E	6	2-4	5-7	100
16.1	3	29.3	E	6	2-4	5-7	100
18.3	3	28.3	E	6	2-4	5-7	100
17.3	3	28	E	6	2-4	5-7	100
14.9	3	28.4	E	6	2-4	5-7	100
14.9	3	30	E	6	2-4	2-5	100
15.5	3	32.9	E	6	2-4	2-5	100
16.8	3	24.6	E	6	2-4	1-2	100
16.8	3	27.8	E	6	2-4	0.5-1	100
16.8	3	31.2	E	6	2-4	0.3-0.5	100
16.8	3						
16.8	3						
15.2	3						
14.3	4						
16.9	4						
17.7	4						
15.5	4						
18	4						
17.5	4						
22.1	4						
19.6	4	29	E	6	2-4	0.3-0.5	100
19.6	4	32.1	E	6	2-4	1-2	100
19.6	4	33	E	6	2-4	2-5	100
19.6	4	29.7	E	6	2-4	5-7	100
19.6	4	31.2	E	6	2-4	7-10	100
10.9	4	29.5	E	6	2-4	>10	100
10.5	1	29.4	E	6	2-4	>10	100
9.3	1	29.6	E	6	2-4	7-10	100
9.6	2	35.8	SE	6	2-4	7-10	100
9.2	2	16.2	SE	6	2-4	7-10	100
9.3	3	25.8	E	6	2-4	7-10	100

8.7	2	22.4	E	6	2-4	7-10	100
9.3	3	29	SE	6	2-4	7-10	100
9.5	3	28	SE	6	2-4	7-10	100
10.2	3	14	SE	6	2-4	5-7	100
10.5	3	18.3	E	6	2-4	5-7	100
11.5	3	20.9	E	5	<2	5-7	100
11.5	3	22.9	E	5	<2	0.5-1	100
12	3	22.4	SE	5	<2	1-2	100
13	3	20.4	SE	5	<2	1-2	100
12.7	3	9.1	SW	5	<2	1-2	100
13	3	2.7	SE	5	<2	2-5	100
13.5	3	2.3	SE	5	<2	7-10	90
15.5	2	5.5	E	4	<2	7-10	90
15.8	3	12	E	4	<2	7-10	90
15.8	3	11	E	4	<2	7-10	90
		9.6	SE	3	<2	7-10	90
		11.7	S	3	<2	>10	90
		11.5	SE	3	<2	7-10	90
		11.6	SSE	3	<2	5-7	90
		11.2	SE	3	<2	2-5	90
		11.4	S	3	<2	1-2	90
		15.9	SE	3	<2	0.5-1	90
		11.5	SE	3	<2	0.3-0.5	90
		26	S	4	<2	0.5-1	80
		23.5	S	4	<2	1-2	80
		25	S	5	<2	2-5	75
16.8	3	22.1	S	5	<2	5-7	70
16.8	3	20	S	5	<2	7-10	70
16.1	3	23.7	S	5	<2	>10	70
14.6	3	29.1	S	5	<2	>10	75
15.2	3	28.6	S	5	<2	>10	75
14.6	3	23.9	S	5	<2	>10	75
14.3	3	23.3	S	5	<2	>10	75
14.9	3	23	S	5	<2	>10	80
14.9	3	22	S	5	<2	>10	80
14.3	3	18.2	S	5	<2	>10	80
14.3	3	12.4	W	4	<2	>10	80
15.2	3	10	W	3	<2	>10	90
15.2	3	12	W	3	<2	>10	90
15.2	3	13.4	W	3	<2	>10	90
15.8	3	14.7	W	3	<2	>10	70
16.1	4	15.2	W	3	<2	>10	70
16.3	4	17.4	W	4	<2	>10	80
15.8	4	9.5	W	4	<2	>10	80
16.1	4	11	W	3	<2	>10	70

16.1	3	13.5	W	3	<2	>10	70
16.1	3	12.5	W	3	<2	>10	70
16.1	3	12.9	W	3	<2	>10	50
16.2	3	12.6	W	3	<2	>10	50
16.1	3	9.8	SW	3	<2	>10	50
15.8	3	7.4	SW	3	<2	7-10	40
15.5	3	9.9	SW	3	<2	5-7	40
15.5	3	8.5	SW	3	<2	2-5	40
15.7	3	9.1	SW	3	<2	1-2	40
15.8	3	10	SW	3	<2	0.5-1	40
15.8	3	9.9	SW	3	<2	0.3-0.5	40
16.4	3						
16.3	3						
15.5	3						
15.8	3						
16.1	3						
15.8	3						
15.5	3						
14.9	3	10.4	SW	3	<2	0.1-0.3	80
15.2	3	10.7	SW	3	<2	0.1-0.3	80
15.2	3						
14.9	3						
15.2	3						
15.5	3						
14.9	4	12.7	W	3	<2	0.3-0.5	90
14.9	4	11.3	W	3	<2	0.5-1	90
14.9	4	11.5	W	3	<2	1-2	85
14.9	4	9.9	W	3	<2	2-5	80
14.9	4	10	W	3	<2	5-7	80
14.9	4	11	W	3	<2	7-10	80
14.9	4	11.5	W	3	<2	>10	80
15.2	3	13.8	NW	3	<2	7-10	90
14.9	3	11.9	NW	3	<2	>10	60
15.2	3	12	NW	3	<2	>10	50
14.6	3	9	NW	3	<2	>10	75
14.9	3	8.1	NW	3	<2	>10	75
14.9	3	7.1	NW	3	<2	>10	75
14.9	3	7	NNW	3	<2	>10	85
15.2	3	5.2	N	2	<2	>10	85
14.9	4	3	NW	2	<2	>10	85
15.2	3	2.2	E	2	<2	>10	90
14.1	3	8.4	W	2	<2	>10	90
15.2	4	8.6	W	2	<2	>10	75
14.9	3	11.1	NW	3	<2	>10	95
14.9	3	13.8	N	3	<2	>10	95
15.5	3	12.7	N	3	<2	>10	95

16.4	3	16.2	N	3	<2	>10	95
15.5	3	18.2	N	3	<2	>10	90
15.5	3	18.1	N	3	<2	7-10	90
15.4	3	21.4	N	3	<2	5-7	90
15.5	3	21	N	3	<2	2-5	90
15.6	3	19.4	N	3	<2	1-2	90
15.5	3	18.3	N	3	<2	0.5-1	90
15.3	3	17.7	N	3	<2	0.3-0.5	90
21.7	3						
22	3						
22	3						
16.8	3						
16.4	3						
18.9	3						
18.3	3						
16.8	3						
16.4	3						
14.3	3						
14.1	3	18.9	NE	4	<2	0.3-0.5	30
13	3	18.8	NE	4	<2	0.5-1	30
13	3	23	NE	4	<2	1-2	30
13	3	22.9	NE	4	<2	2-5	35
13	3	20.8	NE	4	<2	5-7	35
13	3	19.8	NE	4	<2	7-10	35
14.4	3	18.7	NE	4	<2	>10	40
13.6	3	22.2	NE	4	<2	>10	60
13.6	3	20.4	NE	4	<2	>10	70
14	3	23.9	NE	4	<2	>10	80
18	3	22.1	NE	4	<2	>10	90
19.2	3	18.6	NE	4	<2	>10	90
19.2	3	21	NE	4	<2	>10	90
16.4	3	18.7	NE	4	<2	>10	90
17.7	4	23.2	NE	4	<2	>10	85
16.4	4	21.1	NE	4	<2	>10	85
15.5	3	22.1	NE	4	<2	>10	80
15.2	4	19.3	NE	4	<2	>10	75
17.1	3	20.1	NE	4	<2	>10	75
16.8	3	19.2	NE	4	<2	>10	75
14.3	3	22.4	E	4	<2	>10	75
14.3	3	22.5	NE	4	<2	>10	75

13	3	23.8	NE	5	<2	>10	75
13.6	3	25.6	NE	5	<2	>10	75
13.4	3	25.3	NE	5	<2	7-10	80
13.5	3	22	NE	5	<2	5-7	80
13.6	3	22.1	NE	5	<2	2-5	80
13.6	3	22.2	NE	5	<2	1-2	80
13.3	3	21.6	NE	5	<2	0.5-1	80
13.1	3	20.4	NE	5	<2	0.3-0.5	80
14.1	3						
14.6	3						
18.3	3						
18.3	3						
15.5	3						
14.6	3						
16.1	3						
15.9	3						
15.2	3						
14	3						
14.4	2	22.4	NE	4	<2	0.5-1	90
14.4	2	24	NE	4	<2	1-2	95
14.4	2	21.1	NE	4	<2	2-5	80
14.4	2	25.6	NE	4	<2	5-7	80
14.4	2	25.5	NE	4	<2	7-10	80
14.4	2	23.1	NE	4	<2	>10	70
13	2	22.5	NE	4	<2	>10	70
13	2	22.9	NE	4	<2	>10	60
14	3	22.8	NE	4	<2	>10	40
14.3	3	21.4	E	4	<2	>10	40
14.3	3	17.8	NE	4	<2	>10	50
15.8	3	17.1	NE	4	<2	>10	40
15.5	3	19.4	NE	4	<2	>10	40
16.1	3	23.9	NE	4	<2	>10	40
15.2	4	23.8	NE	4	<2	>10	60
15.5	4	21.6	NE	4	<2	>10	80
16.1	4	17.9	E	4	<2	>10	90
16.1	3	16.1	NE	4	<2	>10	90
14.9	2	18.4	NE	4	<2	>10	90
14	3	17	NE	4	<2	>10	90
13.6	3	23.5	NE	4	<2	>10	90
16.1	3	20.9	NE	4	<2	>10	80
16.4	3	21.1	NE	4	<2	>10	40
18.9	3	16.3	NE	4	<2	>10	80
18.4	3	17.5	NE	4	<2	7-10	80
18.3	3	23.3	NE	4	<2	5-7	80
18.4	3	20.9	NE	4	<2	2-5	80
18.5	3	24.8	NE	4	<2	1-2	80
18.6	3	23.4	NE	4	<2	0.5-1	80
18.4	3	20.3	NE	4	<2	0.3-0.5	80
17.9	3						

18	3						
16.1	3						
16.8	3						
15.8	3						
15.5	3						
15.7	3						
16.1	3						
14.6	3						
14.9	3						
17.1	1	29.9	N	7	2-4	0.3-0.5	100
17.1	1	31.2	N	7	2-4	0.5-1	100
20.1	1	28.5	N	7	2-4	1-2	100
20.1	1	30.4	N	7	2-4	2-5	100
18.3	1	29	N	7	2-4	5-7	100
18.3	1	24.5	N	7	2-4	7-10	100
18.3	1	29.9	N	7	2-4	7-10	100
13	1	18.9	N	7	2-4	7-10	100
13.6	2	32.3	N	7	2-4	7-10	100
11.5	3	32.1	N	7	2-4	7-10	100
14.3	3	28.1	N	7	2-4	7-10	100
14.3	3	25.2	N	7	2-4	7-10	100
14.3	3	27.5	N	7	2-4	7-10	100
13.6	3	25.2	N	7	2-4	7-10	100
15.2	3	27.9	N	7	2-4	7-10	100
14.6	3	29	N	7	2-4	7-10	100
13.6	3	25.3	N	7	2-4	7-10	100
14	3	27	N	7	2-4	7-10	100
15.2	3	25	N	7	2-4	1-2	100
13	3	29.5	N	7	2-4	1-2	100
13.3	3	29.8	N	7	2-4	1-2	100
12	3	29.7	N	7	2-4	1-2	100
11.8	3	19	N	6	2-4	7-10	90
12.7	3	26.7	N	6	2-4	7-10	90
12.7	3	21.2	N	6	2-4	7-10	90
14.9	3	24.9	N	6	2-4	7-10	90
16.8	3	20.2	N	5	2-4	7-10	90
16.7	3	22.9	NE	5	<2	7-10	100
16.6	3	23.2	N	5	<2	5-7	100
16.8	3	22.4	N	5	<2	2-5	100
16.8	3	21.1	N	5	<2	1-2	100
16.7	3	22.8	NE	5	<2	0.5-1	100
16.6	3	22.4	N	5	<2	0.3-0.5	100
14.1	3						
13.3	3						
14	3						
14	3						
13.6	3						
13.6	4						
14.3	3						

14	3						
13.3	3						
13.2	3						
13.6	3	13.4	E	3	<2	0.3-0.5	95
13.6	3	15.2	E	3	<2	0.5-1	95
13.6	3	12.3	E	3	<2	1-2	90
13.6	3	16.8	E	3	<2	2-5	90
13.6	3	15.7	E	3	<2	5-7	90
13.6	3	14.8	E	3	<2	7-10	85
13.6	3	16	E	3	<2	>10	85
12.7	3	14.8	E	3	<2	>10	90
14	3	12.4	E	3	<2	>10	90
13.6	3	12.4	E	3	<2	>10	90
13.3	3	13.1	E	3	<2	>10	90
16.8	3	17.2	E	3	<2	>10	90
15.8	3	25.6	E	4	<2	>10	90
15.2	3	21.1	E	4	<2	>10	90
14.1	3	16.5	E	4	<2	>10	100
15.3	3	15.4	E	3	<2	>10	100
13	3	15.2	E	3	<2	>10	100
13.6	3	16.6	E	3	<2	>10	100
14	3	17.2	E	3	<2	>10	100
14.6	3	19.8	E	3	<2	>10	100
15.3	3	18.2	E	4	<2	>10	100
14.6	3	18.7	E	4	<2	>10	100
16.4	3	20.7	E	4	<2	>10	90
20.2	3	20.7	E	4	<2	>10	100
21.4	3	21.3	E	4	<2	>10	100
20.3	3	21.9	E	4	<2	7-10	100
20.3	3	20.6	E	4	<2	5-7	100
20.2	3	21.1	E	4	<2	2-5	100
20.1	3	23.3	E	4	<2	1-2	100
19.8	3	21.4	E	4	<2	0.5-1	100
19.6	3	22.5	E	4	<2	0.3-0.5	100
18.9	3						
17.7	3						
18.6	3						
12.7	3						
12.4	3						
15.6	3						
15.8	3						
14.6	3						
16.1	4						
16.4	4						
15.2	3	17.2	E	4	<2	0.3-0.5	95
15.2	3	16.4	E	4	<2	0.5-1	95
13.6	3	16.9	E	4	<2	1-2	90
13.6	3	16.4	E	4	<2	2-5	90

13.6	3	17	E	4	<2	5-7	85
13.6	3	16.3	E	4	<2	7-10	85
14.6	3	16	E	4	<2	>10	80
14.3	3	14.7	E	3	<2	>10	80
14.3	3	15.2	E	3	<2	>10	80
12.7	3	15.9	E	3	<2	>10	80
14.3	3	16.1	E	4	<2	>10	80
14.2	3	16.6	E	4	<2	>10	80
13	3	16.5	E	4	<2	>10	80
12.7	3	16.6	E	4	<2	>10	80
13.3	3	15.5	E	4	<2	>10	70
14	3	15	E	4	<2	>10	70
17.1	3	14.8	E	4	<2	>10	80
		14.2	E	3	<2	>10	80
		14.6	E	3	<2	>10	80
		12.6	E	3	<2	>10	60
		12	E	3	<2	>10	60
		14.9	E	3	<2	>10	40
		13.9	E	3	<2	>10	50
		14.2	E	3	<2	>10	80
		13.9	E	3	<2	>10	70
		8.2	E	4	2-4	1-2	100
		19.4	E	4	2-4	0.1-0.3	100
		27.4	E	4	<2	0.1-0.3	100
18.3	3						
17.4	3						
16.4	3	23.4	E	4	<2	0.05-0.1	100
18	3	24.1	E	4	<2	0.05-0.1	100
18	3						
16.8	3						
16.1	3						
15.5	3						
15.8	3						
15.5	3						
15.2	3						
16.4	3						
16.4	3	17.3	SE	4	<2	0.3-0.5	80
16.4	3	17.3	SE	4	<2	0.5-1	80
16.4	3	16.8	E	4	<2	1-2	80
15.5	3	16.6	SE	4	2-4	2-5	80
15.5	3	16	SE	4	2-4	5-7	80
15.5	3	16	E	4	2-4	7-10	80

15.2	3	23.1	E	4	2-4	>10	60
16.1	2	15.8	E	4	2-4	>10	25
15.5	2	15.6	E	4	2-4	>10	25
15.5	3	16.1	SE	4	2-4	>10	25
16.1	3	16.1	SE	4	2-4	>10	30
15.8	3	14.5	SE	4	2-4	>10	30
20.8	3	13.6	SE	4	2-4	>10	30
20.8	3	12	SE	4	2-4	>10	30
20.7	3	11.2	SE	3	2-4	>10	30
20.7	3	11.2	SE	3	2-4	>10	30
15.2	3	12	SE	3	2-4	>10	30
15.5	3	9.1	SE	3	2-4	>10	40
15.8	3	12.3	SE	3	2-4	>10	40
15.8	4	11.8	SE	3	2-4	>10	40
17.7	4	10.3	SE	3	2-4	>10	70
16.1	3	13.5	SE	3	2-4	>10	70
15.8	3	13.1	SE	3	2-4	>10	20
15.5	3	9.9	S	4	2-4	>10	15
16.1	3	10.3	SE	4	2-4	>10	15
15.5	3	9.7	SE	4	2-4	>10	15
15.5	3	11.7	SE	4	2-4	7-10	15
16.1	3	11.6	SE	4	<2	5-7	20
16.3	3	11.7	SE	4	<2	2-5	20
16.7	3	12.2	SE	4	<2	1-2	20
16.1	3	11.3	SE	4	<2	0.5-1	20
16.3	3	12	SE	4	<2	0.3-0.5	20
15.2	3						
15.5	3						
15.5	3						
15.2	3						
16.1	3						
16.1	3						
15.5	3						
15.2	3						
15.5	3						
15.4	3						
14.9	3	8.6	S	3	<2	0.3-0.5	70
14.9	3	9.2	SE	3	<2	0.5-1	60
14.9	3	7.5	SE	3	<2	1-2	55
14.9	3	5	S	3	<2	2-5	40
14.9	3	4.3	S	3	<2	5-7	40
14.9	3	4.9	S	3	<2	7-10	30
15.5	3	5.3	S	3	<2	>10	20
15.5	3	7.1	SW	3	<2	>10	20
15.2	3	11.8	S	3	<2	>10	20
14.6	3	13.1	SW	3	2-4	>10	20
14.6	3	14.7	SW	3	2-4	>10	20
14.5	3	16.1	SW	3	2-4	>10	30
14.6	3	17.1	SW	3	2-4	>10	25

14.3	3	20.1	SW	4	2-4	>10	25
14.3	3	18.7	SW	4	2-4	>10	25
14.3	3	18.6	SW	4	2-4	>10	15
14.6	4	20.1	SW	4	<2	>10	15
14.3	4	18.1	SW	4	<2	>10	20
14.6	4	19.5	SW	4	<2	>10	20
14.6	3	20.4	SW	4	<2	>10	20
14	3	18.6	SW	4	<2	>10	20
14.3	3	18.7	SW	4	<2	>10	30
13.3	3	17.3	SW	4	<2	>10	30
13.6	3	17.1	SW	4	<2	>10	30
13.3	3	19	S	4	<2	>10	40
13	3	15.6	SW	4	<2	7-10	40
13.1	3	17.4	SW	4	<2	5-7	40
13	3	17.1	SW	4	<2	2-5	40
13	3	15.6	SW	4	<2	1-2	40
13.4	3	19	SW	4	<2	0.5-1	40
13.6	3	13.2	SW	4	<2	0.3-0.5	40
13.8	3						
13.6	3						
13	3						
14	3						
13.6	3						
13.6	3						
12.7	3						
16.8	4						
18.9	4						
16.4	3						
16.8	3	18	SW	3	<2	1-2	70
16.8	3	16	SW	3	<2	2-5	60
16.8	3	17.7	SW	3	<2	2-5	60
16.8	3	14.1	SW	3	<2	5-7	60
16.8	3	13.9	SW	3	<2	7-10	50
16.8	3	15.1	SW	3	<2	>10	40
16.8	3	13.7	SW	3	<2	>10	50
17.4	3	12.9	SW	3	<2	>10	80
17.4	3	12.2	SW	3	<2	>10	60
18.3	3	11.8	SW	3	<2	>10	60
18.1	3	14.2	SW	3	<2	>10	40
17.4	3	15.7	SW	3	<2	>10	40
16.3	3	11.4	SW	3	<2	>10	40
15.5	3	11.1	SW	3	<2	>10	40
16.8	3	9.5	S	3	<2	>10	40
15.2	3	11.6	SW	3	<2	>10	60
14.6	4	9.1	S	3	<2	>10	70
14.6	4	12.1	SW	3	<2	>10	80
14.3	3	12.8	S	3	<2	>10	80

14.6	4	13.3	S	3	<2	>10	70
14.3	3	15.3	S	3	<2	>10	60
14.9	3	13.7	S	3	<2	>10	30
14.9	3	14.3	S	3	<2	>10	50
14.3	4	16.5	S	3	<2	>10	50
14	3	11.6	S	3	<2	>10	50
13.6	3	11	S	3	<2	7-10	50
14.3	3	7.6	S	3	<2	5-7	50
14.2	3	7.2	S	3	<2	2-5	50
14.3	3	8.8	S	3	<2	1-2	50
14.5	3	8.3	S	3	<2	0.5-1	50
14.3	3	8.3	S	3	<2	0.3-0.5	50
14.2	3						
14.2	3						
14.3	3						
14.3	3						
14	3						
14.5	3						
14.3	3						
14.9	3						
14	3						
14.3	3						
14.3	4	8.2	NE	3	<2	0.3-0.5	70
14.3	4	6.9	NE	3	<2	0.5-1	70
14.3	4	6.2	NE	3	<2	1-2	70
14.3	4	5.9	NE	3	<2	2-5	65
14.3	4	5.6	NE	3	<2	5-7	65
14.3	4	5.1	NE	3	<2	7-10	65
14.3	4	5.3	NE	3	<2	>10	65
14.3	4	5.1	NE	3	<2	>10	60
14.3	3	3.7	N	2	<2	>10	30
13.6	3	2.1	N	2	<2	>10	25
13.6	3	6.5	NNE	2	<2	>10	15
13.6	3	4.6	N	2	<2	>10	15
13.6	3	6.6	NE	2	<2	>10	15
14	3	5	N	2	<2	>10	25
15.5	3	3.3	NE	2	<2	>10	20
15.8	3	1.1	E	2	<2	>10	20
16.1	3	4	NW	2	<2	>10	15
13	3	5.2	NW	2	<2	>10	15
13.6	3	8.7	N	2	<2	>10	30
14.3	4	14	N	2	<2	>10	70
17.1	3	11.5	N	2	<2	>10	30
14.3	3	11.9	N	2	<2	>10	30
14.6	3	13.9	N	2	<2	>10	30
13.6	3	9.9	NNW	2	<2	>10	40
13.6	3	11.6	N	2	<2	7-10	40
13.9	3	11	N	2	<2	5-7	40

14.4	3	12	N	2	<2	2-5	40
14.9	3	11.6	N	2	<2	1-2	40
13.9	3	11.9	NW	2	<2	0.5-1	40
14.3	3	11.7	N	2	<2	0.3-0.5	40
14.6	3						
14.3	3						
14.6	3						
14.3	3						
14.3	3						
14.6	3						
14.3	3						
13.6	3						
14	3						
13.6	3						
13.6	3	11.2	NW	3	<2	0.3-0.5	25
13.6	3	11.3	NW	3	<2	0.5-1	25
13.6	3	11.4	NW	3	<2	1-2	20
13.6	3	12.8	NW	3	<2	2-5	20
13.6	3	12.3	NW	3	<2	5-7	15
13.6	3	13.4	NW	3	<2	7-10	10
13.6	3	13.8	NW	3	<2	>10	10
14	3	8.8	NW	3	<2	>10	10
13.6	3	8.9	NW	3	<2	>10	10
14.3	3	7.5	W	3	<2	>10	20
14	3	6.4	W	3	<2	>10	20
14.3	3	10.4	NW	3	<2	>10	35
14.3	3	15	N	3	<2	>10	80
13.6	3	14.7	N	3	<2	5-7	80
13.6	3	16.5	N	3	<2	0.5-1	100
17.2	3	17.9	N	3	<2	7-10	100
14.6	3	13.4	N	3	<2	7-10	100
14.6	3	9.2	N	3	<2	7-10	100
15.2	3	18.1	NW	3	<2	7-10	100
14.6	3	20.6	NW	3	<2	7-10	100
14.3	3	17.7	NW	3	<2	7-10	100
14.3	3	19.8	NW	3	<2	7-10	90
15.5	3	18.9	NW	3	<2	7-10	90
15.2	3	18.6	NW	3	<2	7-10	90
14.9	3	17	NW	3	<2	7-10	95
15.2	3	17.4	NW	4	<2	7-10	100
16.1	3	22.7	N	4	<2	>10	80
16.8	3	22.5	N	4	<2	>10	80
15.2	3	22.5	N	4	<2	>10	80
14.3	3	19.5	N	4	<2	7-10	80
15.2	3	18.1	N	4	<2	5-7	80
15.5	3	16.5	N	4	<2	2-5	80
15.5	3	17.2	N	4	<2	1-2	80
14.6	3	16.6	N	4	<2	0.5-1	80
14.3	3	14.9	N	4	<2	0.3-0.5	80

14.6	3						
14.9	3						
16.8	3						
16.8	3						
19.6	3						
18.9	3						
20.5	3						
20.2	3						
21.1	3						
19.1	3						
19.1	3	14.4	N	3	<2	0.3-0.5	90
19.1	3	14.7	N	3	<2	0.5-1	85
19.1	3	13.3	N	3	<2	1-2	85
19.1	3	14.7	N	3	<2	2-5	80
19.1	3	12.6	N	3	<2	5-7	80
19.1	3	13	N	3	<2	7-10	80
19.1	3	14.2	N	3	<2	>10	75
20.5	3	15	N	3	<2	>10	70
21.1	3	16.2	N	3	<2	>10	70
23	3	16	N	3	<2	>10	70
20.8	3	14.9	N	3	<2	>10	90
18	3	19.2	N	3	<2	>10	90
15.8	3	19.4	N	3	<2	>10	90
15.8	3	21.7	N	3	<2	>10	80
15.5	3	21	N	4	<2	>10	75
14.6	3	22.4	N	4	<2	>10	80
15.5	3	20.8	N	5	<2	>10	90
15.3	3	20.4	N	5	<2	>10	90
15.8	3	19.1	N	5	<2	>10	90
14.9	4	17.9	N	5	<2	>10	95
14.6	3	20.4	N	5	<2	>10	95
13.3	3	19.5	N	5	<2	>10	100
14	3	21.7	N	4	<2	>10	90
14.6	3	17.8	N	4	<2	>10	100
15.5	3	18	N	4	<2	>10	100
14.3	3	16.9	N	4	<2	>10	100
14.5	3	17.4	N	4	<2	7-10	100
14.6	3	18.6	N	4	<2	5-7	100
14.3	3	18.2	N	4	<2	2-5	100
14	3	21.6	N	4	<2	1-2	100
15.1	3	10.4	N	4	<2	0.5-1	100
15	3	17.8	N	4	<2	0.3-0.5	100
15.3	3						
15.5	3						
15.2	3						
14.3	3						
13.6	3						
13.6	3						
13	3						

14.3	3						
13.3	3						
13.6	3						
14.3	3	13.8	N	3	<2	0.3-0.5	100
14.3	3	16.1	N	3	<2	0.5-1	100
14.3	3	14.6	N	3	<2	1-2	95
14.3	3	14.4	N	3	<2	2-5	90
14.3	3	15.9	N	3	<2	5-7	90
14.3	3	16.4	N	3	<2	7-10	90
14.3	3	16.7	N	3	<2	>10	90
14	3	17.5	N	3	<2	>10	90
14	3	9.2	SE	3	<2	5-7	80
13.6	3	10.5	E	3	<2	5-7	80
13	3	5.9	E	3	<2	5-7	80
13	3	10	NE	3	<2	5-7	95
13.3	3	8	NE	3	<2	2-5	100
13.6	3	4.2	N	3	<2	5-7	100
13.6	3	12.6	NE	3	<2	5-7	100
13.5	3	8.9	NE	3	<2	5-7	90
17.7	3	10	NE	3	<2	5-7	90
17.2	3	9.8	NE	3	<2	5-7	90
		7.7	NE	3	<2	5-7	90
		9.3	NE	2	<2	5-7	90
		12.8	NE	2	<2	5-7	90
		8.8	N	2	<2	5-7	90
		7.3	SE	3	<2	1-2	100
		4.7	SE	3	<2	2-5	95
		4.9	SE	3	<2	2-5	95
		2.5	E	2	<2	5-7	85
		12.5	NE	2	<2	7-10	85
		7.9	NE	2	<2	>10	95
		3.1	N	2	<2	>10	95
		11.5	E	2	<2	>10	80
		14.7	E	2	<2	>10	100
		10	NE	2	<2	>10	100
		13.2	NE	2	<2	7-10	100
		12.6	NE	2	<2	5-7	100
		11.9	NE	2	<2	2-5	100
		9.8	NE	2	<2	1-2	100
		13.4	NE	2	<2	0.5-1	100
		13.4	NE	2	<2	0.3-0.5	100
		12.4	NE	2	<2	0.3-0.5	100
		16.3	NE	2	<2	0.5-1	100
		13.3	NE	2	<2	1-2	100
		12.5	NE	2	<2	2-5	95
		13.5	NE	2	<2	5-7	95
		13.5	NE	2	<2	7-10	95
		12.5	NE	2	<2	>10	95

		12.2	NE	2	<2	7-10	100
		12.1	NE	2	<2	7-10	100
		7.8	NE	2	<2	7-10	100

Glare	Precipitation	In another coutries Territorial Seas? (put country in comments)	Comments
moderate	clear		PSO SOW
moderate	clear		
mild	clear		VD#01 Common bottlenose dolphin
mild	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW
none	clear		PSO SOW; vesssel deploying streamer
none	clear		
none	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		Tail buoy deployed 10:06
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
severe	clear		
moderate	clear		
moderate	clear		Recovering streamer for troubleshooting
moderate	clear		
moderate	clear		Tail buoy back on board
mild	clear		
moderate	clear		Redeploying tail bouy
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
none	clear		

none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW
			4:06 to 4:29 PAM deployment; PAM SOW; Deployment of arrays
none	clear		PSO SOW for nighttime rampup
none	clear		PSO EOW 6:25; Ramp up delayed d/t technichal issues
			6:36 arrays deployed
none	clear		PSO SOW for nighttime rampup
none	clear		
none	clear		Rampup; PSO EOW
moderate	clear		PSO SOW
moderate	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		SOL 9:59
severe	clear		
severe	clear		11:35 Maggie deployed
severe	clear		
severe	clear		
severe	clear		
severe	clear		
mild	clear		
mild	clear		
mild	clear		
moderate	clear		
severe	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
severe	clear		
severe	clear		
moderate	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		

none	clear		
none	clear		PSO EOW
			EOL 7:17; SOL at 7:26
none	clear		PSO SOW
none	clear		
mild	clear		
mild	clear		
moderate	clear		
moderate	clear		
moderate	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
severe	clear		
severe	clear		
severe	clear		EOL 21:25
severe	clear		SOL 21:37
severe	clear		
mild	clear		
mild	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW
			2:45 diable array 2 volume now at 1650 in3 (9 guns); recovery of array 2
			4:15 redeploying array 2; second array back online, 4:30 FV

			5:00 diabled one gun, volume reduced to 2940 in3 (17 guns); 5:06 disable one array volume reduced to 1650 in3 (9 guns), 5:14 recovering array 1
			6:26 Deploying array 1, 6:47 back at FV
			8:58 diable one gun, reduced volume 3080in3 (17 guns)
			9:00 String 2 disabled, volume reduced to 1650 in3 (9 guns), 9:12 recovering string 2
none	clear		PSO SOW
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
moderate	clear		
moderate	clear		11:46 deploy array 2
moderate	clear		12:10 Resume FV
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		17:10 Reduce volume 2940in3 (17 guns); 17:21 Reduce volume 1650in3 (array 2 Disable, 9 guns); Recoving array 2 for maintenance
moderate	clear		EOL 17:52; line aborted d/t array maintenance
moderate	clear		
moderate	clear		
moderate	clear		19:49 deploying array 2
moderate	clear		Ramp-up 20:32, FV 20:55; 20:56 Reduced volume, disable array, 1650in3 (9 guns); 20:59 resume FV; 21:12 SOL
severe	clear		22:26 disable array 1 d/t airleak, reduced volume 1650in3 (9 guns)
severe	clear		22:32 Recovering array 1; 23:19 redeploy array 1
mild	clear		23:34 Resume FV
none	clear		
none	clear		End of reporting period
none	clear		Begin Week 2 reporting period
none	clear		
none	clear		
none	clear		PSO EOW

			4:02 EOL; 4:08 SOL
			7:36 EOL; 7:46 SOL
mild	clear		PSO SOW
mild	clear		
moderate	clear		
moderate	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
moderate	clear		
moderate	clear		15:18 array 2 disabled, reduce volume 1650in3 9 guns; 15:30 recovering array 2 for maintenance
moderate	clear		16:18 redeploying array 2
moderate	clear		16:39 resume FV
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
severe	clear		
severe	clear		
severe	clear		
moderate	clear		
mild	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW
			01:22 Array 2 disabled, reduced volume 1650in3 (9 guns); 01:31 recovering array 2 for maintenance

			2:33 RV 2010in3 then 2370in3; 2:34 RV 1650in3; 2:38 Reduce Volume 2010in3, 2:39 volume change 2370in3 then 1650in3, 2:42 recovering array 2
			3:04 EOL intenal shooting, 3:18 SOL
			4:33 Array 2 deployed, 4:36 FV; 4:38 disable one gun Reduce Volume 3120in3, 4:44 Array 2 disabled reduce volume 1650in3 (9 guns)
			6:42 Deploying array 2, 6:58 finsh deploying array 2
			7:00 FV; AD#01 Unidentified dolphin; 7:33 EOL
			7:44 SOL
none	moderate rain		
none	moderate rain		PSO SOW
none	light rain		
none	light rain		
none	light rain		
none	light rain		
none	light rain		
none	light rain		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	haze		haze on horizon
none	haze		
none	haze		
mild	haze		
mild	haze		
moderate	clear		
moderate	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
mild	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW

			5:02 EOL
			6:44 shutdown of guns due to compressor failure,
			7:01 ramp up; 7:23 ramp up complete; 7:24 SOL
mild	clear		PSO SOW
mild	clear		
mild	clear		
moderate	clear		
moderate	clear		
moderate	clear		
mild	clear		
severe	clear		
severe	clear		
severe	clear		EOL 12:35, SOL 12:50
severe	clear		
severe	clear		
severe	clear		ShutDown for VD#02_Unindentified sea turtle
severe	clear		Resume FV
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		SOW
moderate	clear		
moderate	clear		
severe	clear		
severe	clear		
severe	clear		
mild	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW

			6:05 EOL, 6:19 SOL
none	clear		PSO SOW
none	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		EOL 11:03, 11:13 SOL
mild	clear		
severe	clear		
mild	heavy rain		
mild	heavy rain		
mild	light rain		
none	heavy rain		
mild	light rain		
mild	clear		Reduced volume 14:29, 14:52 gun 2 disabled
mild	clear		
none	clear		
none	clear		Full volume at 16:48
mild	clear		
mild	clear		
mild	clear		
mild	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		PSO EOW
			4:48 EOL; 4:57 SOL
			7:40 EOL; 7:52 SOL
none	clear		PSO SOW

mild	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	light rain		
none	light rain		
none	light rain		
none	haze		
none	haze		
none	haze		
none	haze		
none	haze		
none	haze		
none	haze		
none	haze		22:56 Reduce volume to 3120 in3 (17 guns)
none	light rain		
none	light rain		
none	light rain		
none	light rain		
none	light rain		PSO EOW
			Less than 1000 m, 6:55 EOL
			SOL 7:09, disable on gun, volume 2900 in3 (17 guns), 7:28 disable array 1, new volume 1650 in3 (9 guns)
none	clear		PSO SOW
none	clear		
none	clear		EOL 9:43
none	clear		
none	clear		
none	clear		SOL 9:57
none	clear		
none	thin fog		EOL 11:17
none	thin fog		SOL 11:38
none	light rain		
none	light rain		

none	light rain		
none	light rain		
none	light rain		
none	light rain		
none	light rain		
none	light rain		
none	heavy rain		
none	light rain		
none	light rain		
none	light rain		
none	clear		EOL 19:53
none	clear		Guns off ; Recovering gear
none	clear		
none	clear		
none	clear		21:37 PAM EOW pam cable recovered 21:49
none	clear		
none	clear		
none	clear		00:00 Tail buoy on board; troubleshooting AIS on tail buoy and array maintenance
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW, PAM on standby
none	light rain		PSO SOW, start PAM deployment 9:27
none	light rain		PAM deployed 9:39
mild	clear		
mild	clear		PAM SOW 0944
moderate	clear		Guns deployed 10:39
moderate	clear		10:14 Prewatch complete, deployment still underway
mild	clear		
mild	clear		
mild	clear		
mild	clear		12:27 Start of ramp up, 12:49 FV, 12:54 SOL
mild	clear		
mild	clear		moved back to tower
mild	clear		
mild	clear		
mild	light rain		
mild	clear		
none	light rain		moved back to bridge d/t exhaust
severe	clear		
moderate	clear		
moderate	clear		
severe	clear		
severe	clear		

severe	clear		20:10 UTC reduced Volume 1650in3 (9 guns), disabled array 1 to recover for maintenance
severe	clear		
severe	clear		21:36 Resume full volume
severe	clear		
severe	clear		
moderate	clear		Begin Week 3 reporting period
mild	clear		
mild	clear		
none	clear		
none	clear		
none	clear		PSO EOW
			00:53 EOL; 00:59 SOL
			2:07 EOL
			Source silent
none	clear		PSO SOW; Prewatch started 5:45; prewatch 6:15 complete
none	clear		6:16 Start soft start; 6:38 FV; PSO EOW
			7:00 SOL
none	clear		PSO SOW
mild	clear		
mild	clear		
mild	clear		
mild	clear		
mild	light rain		
mild	light rain		
moderate	light rain		
severe	clear		
mild	clear		
none	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		
none	clear		
none	light rain		
none	light rain		EOL 22:17; 22:24 SOL

none	clear		
none	clear		
none	clear		00:01 EOL
none	clear		00:05 SOL
none	clear		00:13 Reduce volume to 3120in3 (17 guns;no fire on gun 1-4)
none	clear		00:20 Reduce volume to 3080in3 (17 guns; troubleshooting); 00:23 volume change 3260in3 (17 guns)
none	clear		00:26 volume change 3080in3
none	clear		PSO EOW
			00:37 disable array 1, 1650in3 (9 guns); 00:38 volume change 3120in3 (17 guns);00:45 disable array 1, volume change 1650in3 (9 guns), 00:48 recover array 1
			01:57 EOL
			02:05 SOL; 2:31 deploying array 1; 02:41 array 1 deployed; 02:43 back to FV 3300in3
			6:47 EOL; 6:55 SOL
			8:07 EOL; 8:21 SOL
none	clear		PSO SOW
none	clear		
none	clear		
mild	clear		
mild	clear		
moderate	clear		
mild	clear		
mild	clear		
mild	clear		
mild	clear		12:49 EOL , Disable array 1 1650 in3 (9 guns)
mild	clear		13:09 SOL
mild	clear		
none	clear		14:57 EOL; 14:58 Array 1 enabled, resume FV
mild	clear		
mild	clear		
mild	clear		
moderate	clear		
moderate	clear		
severe	clear		
moderate	clear		19:34 EOL ; 19:42 SOL
moderate	clear		21:18 EOL; 21:25 SOL
severe	clear		

severe	clear		
mild	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW
			01:09 EOL; SOL 01:16
			02:24 EOL; 02:33 SOL
			07:07 EOL; 07:29 SOL
			08:26 EOL; 08:34 SOL
none	clear		PSO SOW
none	clear		
mild	clear		
mild	clear		
moderate	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		12:08 EOL; 12:16 SOL
severe	clear		
severe	clear		13:43 EOL; 13:52 SOL
moderate	clear		
severe	clear		
moderate	clear		
none	clear		
mild	clear		17:54 EOL
mild	clear		18:00 SOL
mild	clear		
mild	clear		19:32 EOL; 19:40 SOL
none	clear		20:58 EOL; 21:04 SOL
none	clear		
none	clear		
mild	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW

			06:00 EOL; 06:09 SOL
			07:19 EOL; 07:34 SOL
none	moderate rain		
none	moderate rain		
none	moderate rain		
none	moderate rain		
none	moderate rain		
none	moderate rain		
none	moderate rain		10:12 EOL; 10:23 SOL
none	light rain		
none	light rain		
none	light rain		11:45 EOL; 11:55 SOL
none	light rain		
none	light rain		
none	light rain		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		20:11 EOL; 20:18 SOL
none	clear		
none	clear		
none	clear		
none	clear		22:36 EOL
none	clear		23:14 RAMP UP
none	clear		23:36 end ramp up fv, 23:37 SOL
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW
			01:00 EOL; 01:15 SOL

			Disabled 1 gun (S2G2) - 2940 in3 (17 guns)
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
mild	clear		
mild	clear		
mild	clear		
none	clear		
none	clear		
none	clear		13:06 Disable string 2 volume 1650in3 (9 guns)
none	clear		
none	clear		14:31 EOL; 14:45 SOL
none	clear		15:08 Resume FV
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	moderate rain		
none	moderate rain		
none	light rain		
none	light rain		
none	light rain		
none	light rain		
none	light rain		
none	light rain		
none	light rain		PSO EOW
none	clear		PSO SOW
none	clear		
none	clear		
none	clear		

mild	clear		
mild	clear		
severe	clear		
mild	clear		
mild	clear		
mild	clear		
moderate	clear		
moderate	clear		13:31 reduce volume 1650 in3 (9 guns) for gun failure; 13:33 Resume FV
moderate	clear		
severe	clear		
severe	clear		16:10 EOL
severe	clear		16:11 Source silent; Recovering Maggie and seismic gear for maintenacne, 16:18 recovering array 2
moderate	clear		
moderate	clear		Recovering PAM cable, 17:05 PAM On board
moderate	clear		
moderate	clear		
moderate	clear		All gears onboard.
mild	clear		19:37 begin redeployment
none	clear		
none	clear		
none	clear		
none	heavy rain		
none	moderate rain		
none	heavy rain		00:22 deploying PAM, 00:28 PAM deployed, 00:30 PSO EOW
			PAM SOW
			01:00 Deploying arrays
none	heavy rain		PSO SOW prewatch night time ramp up,
none	heavy rain		02:16 Start ramp up, 02:38 end ramp up; PSO EOW
			02:43 SOL
			03:19 Deploying maggie, 03:24 maggie deployed
none	clear		PSO SOW
none	clear		
none	clear		
mild	clear		
mild	clear		
moderate	clear		

severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		13:53 EOL, Guns silent
severe	clear		
severe	clear		
severe	clear		15:38 Start of ramp-up
severe	clear		16:00 FV; 16:14 UTC
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
severe	clear		
severe	clear		
severe	clear		
mild	clear		
mild	clear		End of reporting period
none	clear		Begin Week 4 reporting period
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW
none	clear		PSO SOW
none	clear		
none	clear		
mild	clear		
mild	clear		
moderate	clear		
moderate	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		

severe	clear		
severe	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
mild	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW
			06:44 EOL; 06:53 SOL; 06:58 disable array one, 1650in3 (9 guns)
			07:13 FV; 07:15 array 2 disabled 1650in3 (9 guns)
			PSO SOW
none	clear		
mild	clear		
mild	clear		
moderate	clear		
moderate	clear		
moderate	clear		
moderate	clear		
mild	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		13:51 EOL,14:05 SOL
severe	clear		
moderate	clear		
moderate	clear		
moderate	clear		
mild	clear		
none	light rain		
none	light rain		

moderate	clear		
moderate	clear		
severe	clear		
moderate	clear		
moderate	clear		
severe	clear		
mild	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW
none	clear		PSO SOW
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
mild	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		14:52 EOL; 14:54 RV 1650in3 (9 guns)
moderate	clear		15:01 SOL; Retrieve array for maintenance
moderate	clear		
moderate	clear		16:38 Back to FV
moderate	clear		
moderate	clear		
moderate	clear		19:16 EOL, 19:22 SOL
moderate	clear		20:08 Array 1 disabled 1650in3 (9guns); 20:28 array 1 on board
moderate	clear		21:07 Deploying array 1; 21:17 back to FV
severe	clear		
severe	clear		
mild	clear		
none	clear		
none	clear		

none	clear		
none	clear		
none	clear		
none	clear		PSO EOW
none	clear		PSO SOW
none	clear		
mild	clear		
mild	clear		
moderate	clear		
moderate	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
severe	clear		
mild	clear		
none	moderate rain		
none	light rain		
none	light rain		
none	clear		
none	clear		
none	clear		
none	clear		
mild	clear		
mild	clear		
none	clear		
none	clear		
none	clear		
mild	clear		
mild	clear		EOL 23:21
moderate	clear		SOL 23:30
mild	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW

none	clear		PSO SOW
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
severe	clear		
moderate	clear		
moderate	clear		
mild	clear		13:25 EOL
mild	clear		13:32 SOL
mild	clear		
mild	clear		
mild	clear		
mild	clear		
none	clear		
moderate	clear		
moderate	clear		
mild	clear		EOL 18:34, SOL 18:42
mild	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW; 00:54 EOL
			01:05 SOL
			02:51 EOL
			03:01 SOL

none	clear		PSO SOW
none	clear		
none	clear		
none	clear		
mild	clear		
mild	clear		
mild	clear		
none	clear		
none	moderate fog		
none	moderate fog		
none	light rain		
none	heavy rain		12:52 Volume at 2914 in3 (17 guns)
none	light rain		
none	light rain		
none	moderate fog		14:00 Source disabled, end of survey; ON standy by for recovery of seismic gear
mild	thin fog		Recovering arrays
mild	thin fog		
mild	thin fog		
mild	thin fog		PAM EOW, 11:37 PAM Cable on board
mild	thin fog		
mild	haze		
mild	haze		
none	heavy rain		
mild	haze		
mild	light rain		
mild	clear		
mild	clear		
mild	light rain		
mild	clear		
mild	clear		
none	clear		recovery of all gear complete
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		
none	clear		PSO EOW
none	light rain		PSO SOW
none	light rain		
none	light rain		
none	haze		
none	haze		
none	haze		
none	haze		

none	haze		Sonars turned off, no depth data
none	haze		pilot on board
none	haze		On dock

Visual Sightings

Date	Visual detection number	Acoustic detection number if detection was correlated	Time at first detection (HH:MM)	Time at last detection (HH:MM)	Visual observer(s)
2023-09-05	1		20:10	20:13	Jo-Ann Sookar
2023-05-16	2		13:57	13:59	Cassandra Frey, Kristal Mohammed
2023-06-02	3		13:30	13:32	Cassandra Frey, Kristal Mohammad

Detection was first made	Detection Cue - Visual Detections
visually by observer keeping a continuous watch	Dorsal Fin
visually by observer keeping a continuous watch	Body
visually by observer keeping a continuous watch	Dorsal Fin

visually by observer keeping a cont	Blow
incidentally by visual observer or sc	Dorsal Fin
acoustically by PAM	Body
both visually and acoustically befor	Splash
	Breach
	Other Wildlife Nearby
	Other (describe in comments)

Vessel Activity	Latitude	Longitude	GIS Latitude	GIS Longitude
Transit	36.91245°N	075.93338°W	36.91245	-75.93338
Data acquisition	32.13217°N	075.69328°W	32.13217	-75.69328
Data acquisition	33.80092°N	076.14084°W	33.80092	-76.14084

Data acquisition
Line change
Testing
Mechanical/technical power down
Mechanical/technical shut down
Milling/stopped
Weather patterns
Deploying equipment
Retrieving equipment
Transit
Docked
At anchor
Bunkering
Standby (define in comments)
Other (see notes)

Compass heading of vessel (degrees)	Water depth (meters)	Common name	Scientific name
125	22	Common bottlenose dolphin	*Tursiops truncatus*
31	2797	Unidentifiable Shelled Sea Turtle	*n/a*
201	542	Unidentifiable Dolphin	*n/a*

Family	Certainty of identification	Number of Adults			Number of Juvenile	
		High Estimate	Low Estimate	Best Estimate	High Estimate	Low Estimate
Delphinidae	definite	2	2	2	1	1
Cheloniidae	definite	1	1	1		
Delphinidae	definite	3	2	2		

s			Select behaviours observed during th behaviours were not observed. If mor behaviour th	
Best Estimate	Total number of animals	Visual Description (include features such as overall size; shape of head; colour and pattern; size, shape, and position of dorsal fin; height, direction, shape of blow, sex/age if determinable, etc.)	Behaviour 1	Behaviour 2
1	3	grey fusiform body, centrally located falcate dorsal fin, short stubby beak	Surfacing	Swimming below surface
	1	dark colored carapace, large fore flippers	Swimming below surface	Diving
	2	Grey falcate dorsal, fin 2-3 meters ody	Porpoising	Swimming below surface

Blowing
Bow riding
Breaching / Jumping / Acrobatic b
Dead / Injured
Diving
Diving with flukes / Fluking
Fast travel
Feeding
Hauling out
Mating
Milling
Porpoising
Resting at surface / Logging
Spy hopping
Stationary
Surfacing
Swimming
Swimming below surface
Tail or pectoral fin slapping
Other(Describe in Detection Desc
Undetermined

he detection event. You do not need to complete all six columns if six different e than six behaviours were observed, select the five behaviours after the initial at were observed most often or by the most animals.					
Behaviour 3	Behaviour 4	Behaviour 5	Behaviour 6	If any bow-riding behavior observed, record total duration during detection (HH:MM)	Bearing to animal(s) at first detection (degrees)
Fast travel					330
					55
					200

›ehaviour

:ription)

Initial Detection Information						
Range of animals to **vessel** at first detection (meters)	Range of animals to **source** at first detection (meters)	Method of Distance Determination	Initial heading of animal(s) (degrees)	Animal(s) Pace at Initial Detection	Direction of travel (relative to **vessel**) at Initial Detection	Location/ direction of travel (relative to the **Exclusion Zone**) at Initial Detection
200		Eyeball estimate	150	moderate	towards vessel	
50	335	Eyeball estimate	180	sedate	parallel in opposite direction as vessel	Approaching
270	106	Eyeball estimate	180	sedate	parallel in opposite direction as vessel	Within

Eyeball estimate
Reticule
Laser range finder
Range stick

towards vessel
away from vesse
parallel in same
parallel in oppos
crossing ahead of vessel
crossing astern of vessel
variable
milling
stationary
other
unknown

Outside
Approaching
Entering
Within

Final Detection Information						
Bearing to animal(s) at last detection (degrees)	Range of animals to **vessel** at last detection (meters)	Range of animals to **source** at last detection (meters)	Method of Distance Determination	Final heading of animal(s) (degrees)	Animal(s) Pace at Final Detection	Direction of travel (relative to **vessel**) at Final Detection
350	100		Eyeball estimate	70	moderate	crossing ahead of vessel
155	85	150	Eyeball estimate	180	sedate	parallel in opposite direction as vessel
210	350	122	Eyeball estimate	220	moderate	away from vessel

stationary
other
unknown

Location/ direction of travel (relative to the **Exclusion Zone**) at Final Detection	Source activity at initial detection	Source activity at final detection
	Source not deployed	Source not deployed
Approaching	Full volume	Source silent
Within	Reduced volume	Reduced volume

Source not deployed	Source not deployed
Source silent	Source silent
Single element	Single element
Soft start/ramp-up	Soft start/ramp-up
Reduced volume	Reduced volume
Full volume	Full volume

Mitigation Zone (Exclusion or Buffer)				
Applicable mitigation zone (meters)	Did the animal enter the mitigation zone during the detection event?	Number of animals during the detection event observed inside the mitigation zone	Was the source active when the animals entered the mitigation zone?	Closest distance of animals to **active source** (metres)
150	yes	1	no	160
500	yes	3	yes	106

yes
no

yes
no

Active source only		**Silent Source Only**		**To Vessel**
Power level of source (cu inches)	Time at closest approach to **active source** (hh:mm)	Closest distance of animals to **silent source** (metres)	Time at closest approach to **silent source** (hh:mm)	Closest distance of animals to **vessel** (metres)
				100
3300	13:58	150	13:59	50
2914	13:30			270

Source mitigation action required	Mitigation Downtime (HH:MM)
none	
shutdown of source	0:16
none	

none
delay to initiation of source
shutdown of source
delay to initiation of source followed by shutdown of source
powerdown of source
delay to initiation of source followed by powerdown of source
powerdown of source followed by shutdown of source
voluntary turtle pause

Total duration of silence between mitigation shutdown and soft start (HH:MM)	Were any of the animals considered to be a "take"; if yes what level	Number of animals considered to be a Level A "take"	Number of animals considered to be a Level B "take"	Applicable separation distance (meters)
	no			50
	yes B		1	N/A
	yes B		2	50

Vessel Strike Avoidance			
Closest distance to the vessel (meters)	Time the animals entered the separation distance (hh:mm)	Were avoidance maneuvers conducted? (If yes, start with “Yes”, then select all applicable actions)	Time avoidance maneuvers conducted (if applicable) (hh:mm)
100		No, no animals entered the separation distance	
106		No, no animals entered the separation distance	

No, no animals entered the separation distance

No, not required because the vessel was towing equipment

Yes

speed reduction

alter course

maintain speed

shift in to neutral

kept course

No, requested but not executed for safety reasons (see comments)

No, requested and not executed (see comments)

No, detection to brief to execute (see comments)

No, VSA not required for voluntary approach of this species

Description of other vessels in the nearby vicinity (if any)	Visual Detection Narrative (be as detailed as possible - include all information relevant to the detection, especially any changes in relation to source activity and distances from the source and EZ - times, distances, behaviours, locations, headings, mitigation actions, etc.)
none	At 20:10 UTC, three common bottlenose dolphins, two adults and one juvenile, were observed surfacing approximately 200 meters from the vessel at a bearing of 330 degrees on the portside. Individuals were seen approaching the vessel with a heading of 150 degrees and swimming just beneath the surface at a moderate pace. At 20:13 UTC, the dolphins were last seen crossing ahead of the bow with a heading of 70 degrees, 100 meters from the vessel and along a bearing of 350 degrees. This was the closest approach to the vessel. At the time of the detection, the vessel was in transit to the prospect area and all seismic gear was onboard.
none	At 13:57 UTC, the body of one unidentifiable shelled sea turtle was detected along a bearing of 55 degrees, 50 meters from the starboard beam and 335 meters from the active acoustic source while on a survey line. The turtle was sedately swimming below the surface of the water, heading parallel and in the opposite direction as the vessel. As the turtle continued on the same heading, past the stern of the vessel, it approached its Shut-Down Zone at 13:58 UTC. At this time, a mitigation action consisting of a shut-down of the acoustic source was immediately requested and implemented. This was the turtle's closest approach to the active source at 160 meters. The sea turtle was last detected within seconds of the mitigation action at 13:59 UTC along a bearing of 150 degrees, 85 meters from the starboard stern and 150 meters from the now silent acoustic source. This turtle is considered to be a potential Level B take. The source resumed full volume at 14:14 UTC.
none	At 13:30 UTC, two unidentified dolphins were detected along a bearing of 200 degrees, 270 meters from the port stern and 106 meters from the active acoustic source, while on a survey line. The dolphins were sedately porpoising parallel and in the opposite direction as the vessel. Due to low lighting and choppy seas, as wells as the animals not surfacing, no identification was able to be made. In addition, there was no mitigation action requested per the IHA for shut-down exemption species. The pod was last detected at 13:32 UTC along a bearing of 210 degrees, 350 degrees from the port stern and 122 meters from the active source. Dolphins changed heading to 220 degrees, away from the vessel and swam with a moderate pace, below the surface of the water. These dolphins are considered to be potential Level B takes.

none
survey vessel
fishing vessel
ferry
tug
freighter
construction/barge
tanker
scout vessel
other (see comments)

Photographs (list file names)	Other notes or comments
N/A	In transit
VD#02_Unidentifiable shelled sea turtle_20230516 (1-4)	Level B take
N/A	

Protected Species Recording Form – Acoustic Detection – INPUT

Date	Visual detection number if detection was correlated	Acoustic detection number	Time at first detection (HH:MM)	Time at last detection (HH:MM)	Acoustic observer(s)
2023-05-15		1	07:05	07:05	Jo-Ann Sookar

Detection was first made	Detection Cue - Acoustic Detection
acoustically by PAM	Visually by Operator on a Click Detector

Vessel Activity	Latitude	Longitude	GIS Latitude	GIS Longitude
Data acquisition	33.04578°N	074.58052°W	33.04578	-074.58052

Compass heading of vessel (degrees)	Water depth (metres)	Common name	Scientific name	Family
306	4412	Unidentifiable Dolphin	*n/a*	Delphinidae

Certainty of identification	Number of Animals			Acoustic Description (include features of detection, such as type(s) and nature of vocalizations, registered amplitudes, etc)
	High Estimate	Low Estimate	Best Estimate	
definite	1	1	1	Click amplitudes ranging between 120 db to 140.20 db, clicks generated on spectrogram between 21.58 kHz and 24 kHz

Acoustic Noise Score	Acoustic Detections: Select from the drop-down list the methods/modules on which vocalizations were detected during the event. You do not need to complete all six columns.						
	1	2	3	4	5	6	Bearing to animal(s) at first detection (degrees)
3	Visual detection of clicks and/or pulsed sounds on a spectrogram						90

Initial Detection Information			**Final Detection Information**		
Range of animals to **hydrophones** at first detection (meters)	Range of animals to **source** at first detection (meters)	Method of Distance Determination	Bearing to animal(s) at last detection (degrees)	Range of animals to **hydrophones** at last detection (meters)	Range of animals to **source** at last detection (meters)
			45		

			Mitigation
Method of Distance Determination	Source activity at initial detection	Source activity at final detection	Applicable mitigation zone (meters)
	Full volume	Full volume	500

Zone (Exclusion or Buffer)		**Active source only**			**Silent Source Only**	
Did the animal enter the mitigation zone during the detection event?	Was the source active when the animals entered the mitigation zone?	Closest distance of animals to **active source** (metres)	Power level of source (cu inches)	Time at closest approach to **active source** (hh:mm)	Closest distance of animals to **silent source** (metres)	Time at closest approach to **silent source** (hh:mm)
no			3300			

Source mitigation action required	Mitigation Downtime (HH:MM)	Total duration of silence between marine mammal mitigation shutdown and soft start (HH:MM)
none	00:00	

Acoustic Detection Narrative (be as detailed as possible - include all information relevant to the detection, especially any changes in relation to source activity and distances from the source and EZ - times, distances, bearings, tow depth of the hydrophone cable, mitigation actions, etc.)	Screengrabs and recordings (list file names)
At 7:05 UTC, clicks from at least one unidentified dolphin were observed on the high frequency click detector at a bearing of 90 degrees with an amplitude of 120 decibels. The vessel was at full volume while on a survey line. The hydrophone cable was towing at a depth of 20.5 meters. At the same time, clicks could be seen on the low frequency spectrogram and ranged between 21.58 and 24 kHz. The dolphin clicks were last detected at 7:05 UTC, at a bearing of 45 degrees and with a peak amplitude of 140.20 decibels. The delphinid was not aurally detected and clicks could not be tracked due to the brief nature of the detection. No mitigation actions were required and this animal was not considered to be a potential take.	AD#01_Spectrogram and HF Click Detector_20230515_070518; AD#01_Spectrogram and HF Click Detector_20230515_070545

Other notes or comments

Protected Species Recording Form – Wildlife Summary – BIRDS – INPUT

Date	Time	Common name	Taxonimic identification to lowest level possible	Approximate number of individuals observed
2023-05-09		American Crow	*Corvus brachyrhynchos*	2
2023-05-09		Brown Pelican	*Pelecanus occidentaalis*	4
2023-05-09		Double crested cormorant	*Phalacrocorax auritus*	2
2023-05-09		Great Black-backed Gull	*Larus marinus*	1
2023-05-13		Common tern	*Sterna hiryundo*	1
2023-05-15		Tropic bird	*Phaethon lepturus*	1
2023-05-15		Ovenbird	*Seiurus Aurocapillus*	1
2023-05-15		Brown booby	*Sula leucogaster*	1
2023-05-16		Tropic bird	*Phaethon lepturus*	1
2023-05-16		Ovenbird	*Seiurus Aurocapillus*	1
2023-05-17		Brown booby	*Sula leucogaster*	2
2023-05-18		Brown booby	*Sula leucogaster*	1
2023-05-18		Black-capped petral	*Pterodroma hasitata*	15
2023-05-18		Cattle egret	*Bubulcus ibis*	1
2023-05-19		Black-capped petral	*Pterodroma hasitata*	10
2023-05-19		Cattle egret	*Bubulcus ibis*	1
2023-05-19		Tropic bird	*Phaethon lepturus*	1
2023-05-21	22:50	Herring gull	*Larus argentatus*	1
2023-05-22	11:50	Brown booby	*Sula leucogaster*	1
2023-05-24	12:45	Black Bellied Storm Petrel	*Fregetta Tropica*	2
2023-05-24	13:11	Parasitic jager	*Stercorarius parasiticus*	1
2023-05-25	23:55	Cory's shearwater	*Calonectris diomedea*	10
28-05-23	*19:20*	Cattle Egret	*Bubulcus ibis*	4
29-05-23	*12:33*	Laughing Gull	*Larus atricilla*	1
29-05-23	*12:50*	Cattle Egret	*Bubulcus ibis*	1
30-05-23	*12:54*	Tropic bird	*Phaeton lepturus*	1
2023-02-06	*22;20*	Barn swallow	*Hirundo rustica*	1

Birds

Latitude	Longitude

Description

Protected Species Recording Form – Wildlife Summary – FISH – INPUT

Lat/Long and Desription not required unless monitoring and mitigation apply for this species

Date	Time	Common name	Taxonimic identification to lowest level possible	Approximate number of individuals observed
2023-05-11		Flying fish		150
2023-05-12		Flying fish		90
2023-05-13		Flying fish		45
2023-05-16		Flying Fish		185
2023-05-17		Flying Fish		35
2023-05-21		Flying fish		300
2023-05-22		Flying fish		150
2023-05-23		Flying fish		35
2023-05-24		Flying fish		75
2023-05-28		*Flying Fish*	Exocoetidae	45
2023-05-29		*Flying Fish*	Exocoetidae	125
2023-05-30		*Flying Fish*	Exocoetidae	50
2023-05-30	*11:15*	*Atlantic tripletail*	Lobotes surinamensis	4

Fish

Latitude	Longitude

Description

Protected Species Recording Form – Wildlife Summary – MARINE INVERTE

				Marine
Date	Time	Common name	Taxonimic identification to lowest level possible	Approximate number of individuals observed
2023-05-29		*Portuguese man o' war*	Physalia physalis	330
2023-05-30		*Portuguese man o' war*	Physalia physalis	75

:BRATES – INPUT

Invertebrates	
Latitude	Longitude

Description

Reticle Binocular Calibrati

Week #	Date	Observer Name	Reticle Binocular Estimated Distance (m)	True Distance from Radar (m)	Sea State (Beaufort)
1	45058	CF	302	304	2
1	45059	ST	360	358	3
1	45058	DD	280	304	2
1	45059	KM	295	304	2
1	45059	JS	302	304	3
2	5/15/2023	CF	7500	7400	3
2	5/20/2023	JS	295	311	3
2	5/20/2023	KM	305	311	3
2	5/20/2023	DD	329	311	3
2	5/20/2023	ST	295	304	3
2	5/20/2023	CF	305	311	3
3	45069	CF	3000	3334	4
3	45071	JS	302	304	3
3	45071	KM	302	304	3
3	45067	DD	7500	9000	3
3	45071	ST	305	304	4
4	6/1/2023	CF	302	304	3
4	6/1/2023	JS	302	304	3
4	5/31/2023	KM	288	304	4
4	6/2/2023	DD	280	304	2
4	5/31/2023	ST	329	304	4
4	6/2/2023	CF	5664	5278	3

ion Tables

Wind Force (knots)	Swell (m)	Comments
1.7	<2	center of source
11.2	<2	head floart
1.1	<2	center of source
10	<2	center of source
10	<2	center of source
17	<2	Big Eyes to cargo vessel
12	<2	Center of source
11	<2	Center of source
12	<2	center of source
13	<2	center of source
10	<2	center of source
18.3	<2	sailboat
13.6	<2	source
13.7	<2	source
7	<2	Big eyes
14	<2	Source
9.9	<2	
8.7	<2	
17	<2	
10.7	<2	
19	<2	
9.8	<2	Using Big Eyes

Protected Species Recording Form – Additional Project Data – INPU

Vessels on Project

Vessel #1	
Name:	R/V Marcus G Langseth
Size	72m
Type:	Reseach vessel
Max speed capabilities:	10 knts
Port of Origin:	New York, NY
Call signs:	WDC6698

V
Name:
Size
Type:
Max speed capabilities:
Port of Origin:
Call signs:

Vessel #2	
Name:	
Size	
Type:	
Max speed capabilities:	
Port of Origin:	
Call signs:	

V
Name:
Size
Type:
Max speed capabilities:
Port of Origin:
Call signs:

Port Names

<Vessel Name>	
Date	**Port**
5/9/2023	NOAA Marine Ops center, Norfolk, Virgina

PSO Briefings

KOM #1	
Date:	45051
Participants:	Cassandra Frey
	Jo-Ann Sookar
	Daniela Durazo
	Kristal Mohammed
	Shelby Tobin
	Cara Sands
	Katie Gideon

Date:
Participants:

PSO Affiliations

PSO	Affilia
Cassandra Frey	RF
Jo-Ann Sookar	RF
Daniela Durazo	RF
Kristal Mohammed	RF
Shelby Tobin	RF

JT

essel #3

Vessel #5	
Name:	
Size	
Type:	
Max speed capabilities:	
Port of Origin:	
Call signs:	

essel #4

Vessel #6	
Name:	
Size	
Type:	
Max speed capabilities:	
Port of Origin:	
Call signs:	

KOM #2

KOM #3	
Date:	
Participants:	

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BASIC DATA FORM			
LDEO Project Number	MGL2306		
Seismic Contractor	LDEO		
Area Surveyed During Reporting Period	Northwest Atlantic Ocean, North Carolina coast		
Survey Type	2D seismic		
Vessel and/or Rig Name	*Marcus G. Langseth*		
Permit Number	IHA issued and BiOp issued on 05 May 2023		
Location / Distance of Source Deployment	304 meters astern from NRP in PSO tower		
Water Depth in survey area	Between 300 and 5200 meters		
Dates of project	09 May 2023	Through	03 June 2023
Total time source operating – all power levels:	497:44		
Time source operating on survey lines:	481:17		
Time source operating not on a survey line:	13:23		
Amount of time single 40 in³ element operations:	N/A		
Amount of time in ramp-up:	02:58		
Number daytime ramp-ups:	4		
Number of nighttime ramp-ups:	4		
Number of ramp-ups from mitigation source:	N/A		
Amount of time conducted in source testing:	00:06		
Duration of visual observations:	372:40		
Duration of observations while source active:	313:25		
Duration of observation during source silence:	59:15		
Duration of acoustic monitoring:	518:50		
Duration of acoustic monitoring while source active:	497:44		
Duration of acoustic monitoring during source silence:	21:06		
Duration of simultaneous acoustic and visual monitoring:	327:15		
Lead Protected Species Observer:	Cassandra Frey		
Protected Species Observers on the Langseth:	Daniela Durazo, Kristal Muhammad, Jo-Ann Sookar, Shelby Tobin		
Number of Marine Mammal Visual Detections:	1		
Number of Marine Mammal Acoustic Detections:	1		
Number of Simultaneous Visual and Acoustic Detections:	0		
Number of Sea Turtle Detections:	1		
Total Number of Protected Species Detections:	3		
List Mitigation Actions	1 Shutdown for an unidentified sea turtle		
Duration of Mitigation Actions:	00:16		

Figure 1: Unidentified shelled sea turtle, 16 May 2023 (VD02)

Figure 2: American Crow, 09 May 2023

Figure 3: Common tern, 13 May 2023

Figure 4: Brown booby, 15 May 2023

Figure 5: Tropic bird, 16 May 2023

Figure 6: Cattle egret, 18 May 2023

Figure 7: Parasitic jager, 24 May 2023

Figure 8: Cory's shearwater, 25 May 2023

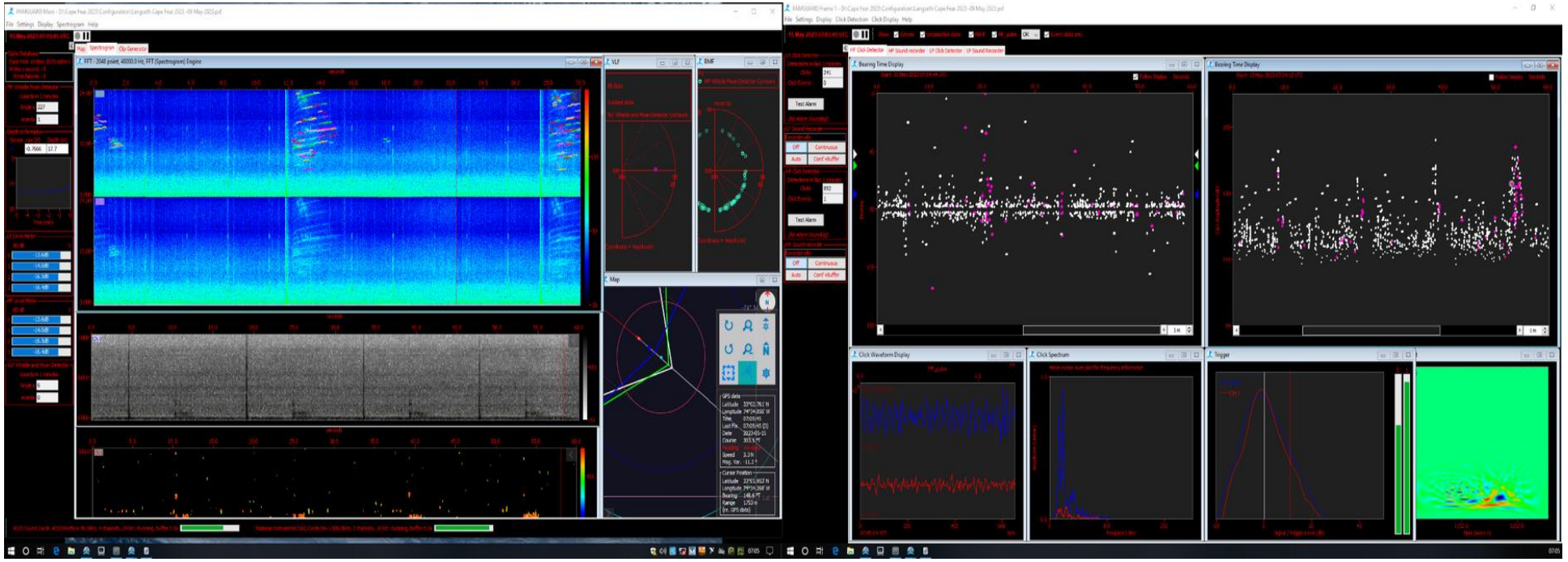

Figure 1: Unidentified dolphin, 15 May 2023 (AD 01)

Birds: Common Name	Taxonomic Identification	Approximate Number Individuals Observed	Approximate Number of Days Species Was Observed
American crow	*Corvus brachyrhynchos*	2	1
Barn swallow	*Hirundo rustica*	1	1
Black bellied storm petrel	*Fregetta Tropica*	2	1
Black-capped petral	*Pterodroma hasitata*	25	2
Brown booby	*Sula leucogaster*	5	4
Brown pelican	*Pelecanus occidentaalis*	4	1
Cattle egret	*Bubulcus ibis*	7	4
Common tern	*Sterna hiryundo*	1	1
Cory's shearwater	*Calonectris diomedea*	10	1
Double crested cormorant	*Phalacrocorax auritus*	2	1
Great black-backed gull	*Larus marinus*	1	1
Herring gull	*Larus argentatus*	1	1
Laughing gull	*Leucophaeus atricilla*	1	1
Ovenbird	*Seiurus Aurocapillus*	2	2
Parasitic jaeger	*Stercorarius parasiticus*	1	1
Tropic bird	*Phaethon aethereus*	4	4