



**BLOCK IONIAN LEASE AREA  
ENVIRONMENTAL REPORT 2022 – 2023**

**Contents**

1. Introduction..... 3

2. Applying Best HSE Practices while conducting the 2D Marine Seismic Acquisition ... 4

2.1. MMO/PAM effort and final results ..... 4

2.1.1. Executive Summary ..... 4

2.1.2. Project Summary / Mitigations Measures and Results ..... 5

2.1.3. Sonar Signal ..... 9

2.1.4. Compliance..... 9

2.2. Acoustic Monitoring (Background Noise Measurements and Verification of Exclusion Zone) ..... 10

2.2.1. Executive Summary ..... 10

2.2.2. "Monitoring of the 4 predefined locations with spot measurements – “prestart phase – during seismic – post phase” of the Block Ionian Acoustic Monitoring Project. .... 12

2.2.3. Verification of Exclusion Zone ..... 13

2.2.4. Coastal and Aerial Surveys ..... 13

3. Environmental Monitoring and Recording of Critical Biodiversity Indicators 2022 final results – 2023 onwards ..... 16

4. Seismicity Monitoring 2022 results and 2023 onwards ..... 17

5. Environmental Studies for the 2<sup>nd</sup> Exploration (EAP Update / Technical File for 3D Marine Seismic Acquisition) 2022 -2023 ..... 19

5.1. Marine Seismic HSE & HSE Seismic Project Plan 3D MSS ..... 22

## BLOCK IONIAN LEASE AGREEMENT AREA – ENVIRONMENTAL REPORT 2022

### HSE Policies & System, Environmental Studies and Implementation

#### **1. Introduction**

Hellenic Petroleum Exploration & Production of Hydrocarbons Ionian Single Member S.A. (HELPE IONIAN acting as 100% operator) owns exclusively hydrocarbons exploration and exploitation rights for Block Ionian in the offshore area of Ionian Sea. The Lease Agreement was ratified by the Greek Parliament on October 3rd 2019 (Act of Law 4629/10.10.2019).

HELPE IONIAN, acting as Operator, is fulfilling its commitments and planning of the first phase of the exploration work program by implementing the most up-to-date, safe and environmentally friendly technological methods and practices with the outmost respect to local societies and socioeconomic activities.

According to the Provisions of Article 12 for «Environmental Protection» «The Lessee shall include in each Annual Work Program and Budget to be submitted to the Lessor, an environmental report on the work to be undertaken as provided in that document, as well as on the work undertaken in accordance with the preceding Annual Work Program and Budget».

In the first quarter of 2022 HELPE Ionian fulfilled the acquisition of 2D seismic data in block Ionian. The project produced high quality data, in a record time and in a safe manner. Seismic acquisition constitutes one of the main obligations when owning exploration rights in an area and it is the most efficient way to detect what exists in the subsurface.

HELPE Ionian contracted Shearwater Geo using their survey vessel SW Cook to acquire two blocks, Block 10 and Ionian with approximately 1210 km full fold of seismic data in Block 10 and 1628 full fold km in the Ionian Block, off-shore Greece. During the Geophysical Exploration Activities recently conducted in Block Ionian, were successfully carried out, providing the highest level of protection for the marine environment of the Ionian Sea. Geophysical Surveys are safe for the environment and marine life, while highlighting the importance of the Hellenic Trench for cetaceans and maximally protecting the biodiversity of our hydrocarbon exploration areas.

## ***2. Applying Best HSE Practices while conducting the 2D Marine Seismic Acquisition***

### ***2.1. MMO/PAM effort and final results***

#### ***2.1.1. Executive Summary***

The following are covering the Marine Fauna Observer (MFO) and Passive Acoustic Monitoring (PAM) mitigation undertaken during the 2D Seismic Survey on the SW Cook from 10 February to 03 March 2022. The survey was performed in the Ionian Block, offshore of West Greece in the Ionian Sea. The seismic data acquisition commenced on 10 February and was completed on 03 March 2022.

There were 25 soft-starts during daylight and dawn, and 25 soft-starts at night. Seismic operations were conducted over 22 days, during which 41 primary acquisition lines were completed, five (5) lines reshot, and five (5) source tests were performed. Weather conditions recorded during the survey consisted of chiefly southerly winds Beaufort 1 to 7, sea states Beaufort 1 to 6 predominating, and low and medium swell heights. The survey applied the ACCOBAMS Guidelines to address the impact of anthropogenic noise on cetaceans in the ACCOBAMS area. A team of four (4) dedicated MFOs and PAM operators were present on board to implement mitigation measures as required. Acoustic or visual pre-watches were implemented before the start of all operations.

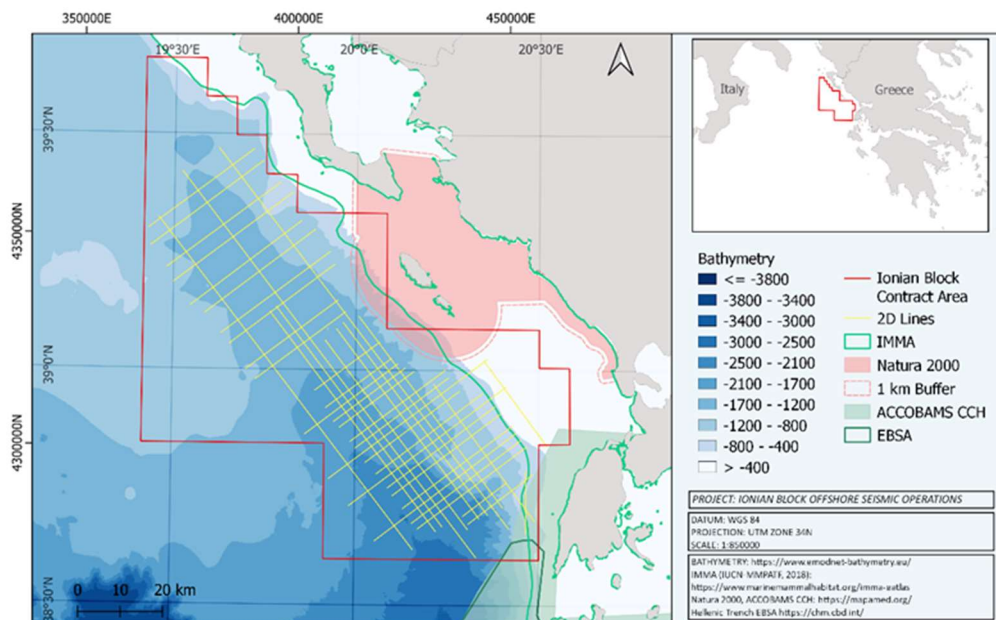
A dedicated MFO was on watch during all daylight hours throughout the survey and a 24-hour PAM watch was maintained. All the survey operations were in deep water and preceded by an MFO and PAM pre-watch period of 120 minutes. Visual monitoring for marine animals resulted in 246:39 hours of observer effort during the survey period. Acoustic monitoring for marine mammals resulted in 425:11 hours of monitoring effort during the course of the survey.

There were five (5) visual sightings and no acoustic detections of marine mammals. During the survey there were three (3) occasions where seismic operations were delayed/shutdown due to the presence of marine animals within the exclusion zone (EZ). 60.6% of monitoring effort took place while the acoustic source was active and 39.4 % took place while the acoustic source was inactive. There were 25 combined visual and acoustic pre-watches during daylight and dawn and 52 acoustic pre-watches during night, using the PAM system. There were no recorded instances of non-compliance with the guidelines during operations. Communication with the Seismic Operators and the mitigation team was professional, efficient, and effective.

The marine seismic survey area covered Hellenic's Ionian Block off the coast of NW Greece, south of the island of Corfu, at the north-eastern edge of the Ionian Sea (Figure 1). The minimum distance between the boundaries of the Concession Area and the coasts of Corfu Island is approximately 6 km. The survey area was located within Greek territorial waters in Western Greece, with water depths ranging from 100 meters to approximately 2,800 meters. There are seven areas of interest for the conservation of marine/coastal habitats and species overlapping with the Ionian Block, including one NATURA 2000 protected area.

### 2.1.2. Project Summary / Mitigations Measures and Results

A small part (3.5%) of the total seismic survey length was within the “Ionian Archipelago” IMMA and ACCOBAMS “Eastern Ionian Sea and Gulf of Corinth (Greece)” CCH.



The survey followed the Environmental Action Plan (EAP) recommendations approved by the Directorate of Environmental Licensing in the Greek Ministry of Environment and Energy, under license reference number 73695/4484, the competent national regulator body, the Ministry of Environment and Energy, the General Directorate of Environmental Policy, and the Environmental Licensing Department, Section C (Appendix A). These recommendations were designed to minimize the risk of injury and disturbance to marine mammals and sea turtles from anthropogenic noise in the Concession Area of the Ionian Block in the Ionian Sea.

The EAP measures for the project were based on the Guidelines from the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS). For those operational aspects not covered by ACCOBAMS regulations, best practice guidance provided by the Joint Nature Conservation Committee (JNCC, 2017) was used.

Table below summarizes the mitigation requirements approved for Block Ionian:

#### MITIGATION PROCEDURES SUMMARY

##### Mitigation Team

At least two dedicated Visual Observers should be on continuous watch at the same time during all seismic operations.

**24 hours PAM OPERATOR.** At least one operator should be on watch and shifts should be organized to allow 24/24h operation, unless

	automatic detection/alerting systems with proven effectiveness are available.
<b>Species covered</b>	Marine mammals (cetaceans and pinnipeds) and turtles.
<b>Exclusion zone</b>	750 m adopted by client instead of 500 m as per EAP and permit. Extended exclusion zone for Fin whales 1000 m. 1500 m extended exclusion zone for sperm whales adopted by the client (HELPE Upstream) and not included within the EAP or permit.
<b>Pre-watch period</b>	30 minutes in shallow waters (< 200 m). 120 minutes in deep waters (> 200 m) due to the presence of deep diving species.
<b>Soft-start length</b>	Minimum 20 min. Maximum 40 min from soft-start to start acquisition line.
<b>Soft-start</b>	At least one soft-start should be recorded.
<b>Soft-start delays</b>	30 minutes after last sighting. Extended to 120 minutes after last sighting of Cuvier's beaked whales and Sperm whales.
<b>Shutdown during production</b>	Immediate shutdown is required if marine mammals or turtles are detected in the EZ. Distressed behaviour is observed anywhere in the monitoring area. Aggregations of vulnerable species (Cuvier's beaked whales, sperm whales and fin whales) anywhere in the monitoring area.
<b>Airgun Testing</b>	Pre-watch must be carried out before any gun testing. If testing a single gun, no soft-start required. If testing multiple guns, a soft-start (20 min) is required. Guns should be tested in order of volume, smallest first. Test no longer than 20 min.
<b>Operation suspended</b>	Less than 10 min, ask MFO/PAM for clearance. More than 10 min, a new pre-watch must be undertaken.
<b>Line Turns</b>	Longer than 40 minutes, firing is to be terminated at the end of the survey line.
<b>Additional requirements</b>	<b>TWO VISUAL OBSERVERS.</b> At least two dedicated Visual Observers should be on continuous watch at the same time during all seismic operations. <b>24 hours PAM OPERATOR.</b> At least one operator should be on watch and shifts should be organized to allow 24/24h operation, unless

automatic detection/alerting systems with proven effectiveness are available.

**NO SEISMIC ACQUISITION IN PROTECTED AREAS.** The seismic vessel could enter Natura areas to perform turning manoeuvres, however no seismic survey activities will take place within the NATURA 2000 protected areas and a buffer of 1000 m around them.

**TURTLE GUARD.** Due to presence of sea turtles in the survey area, a turtle protection system (Turtle Guard) should be installed on the towed equipment to prevent any accidents.

**SEABIRDS.** To mitigate the impact on the seabirds, the external lighting should be limited. Furthermore, all injured seabirds must be assisted to regain consciousness and released back into the environment following the appropriate instructions.

From the first day of survey on 10<sup>th</sup> of February through 3<sup>rd</sup> of March 2022, when the project was completed, a total number of 52 active source sequences occurred, consisting of one (1) test line, 41 primary lines, five (5) re-runs lines and five (5) source tests. Of the total active source sequences, 22 were initiated during daylight hours, 25 during hours of darkness, and five (5) during dawn. In total, 272 hours 35 minutes of active source were recorded throughout, comprising soft-starts, gun tests and production lines.

On two (2) occasions, the active source was stopped due to technical issues. This occurred once during soft-start and once during an acquisition line. Seismic operations were also stopped due to Client request on 21 February 2022 at 19:14 UTC and re-established on 25 February 2022 at 19:23 UTC. Soft-starts were an average of 23 minutes, with an average of 12 minutes between the end of soft-start and the start of line on full power. Due to difficulties in getting soft-starts to a precise time, a period of 20 to 25 minutes was chosen for the soft-start, with a total period of 40 minutes between the start of soft-start and the start of line allowed. This is an area in which the ACCOBAMS guidelines do not give clear guidance; and therefore, a JNCC compliant approach was chosen. The shorter soft-start was specified in the EAP and this was adhered to as best possible.

The source was never active within the protected areas. Two (2) Shutdowns due to presence of animals and one (1) delay was required. Table below shows the operations summary.

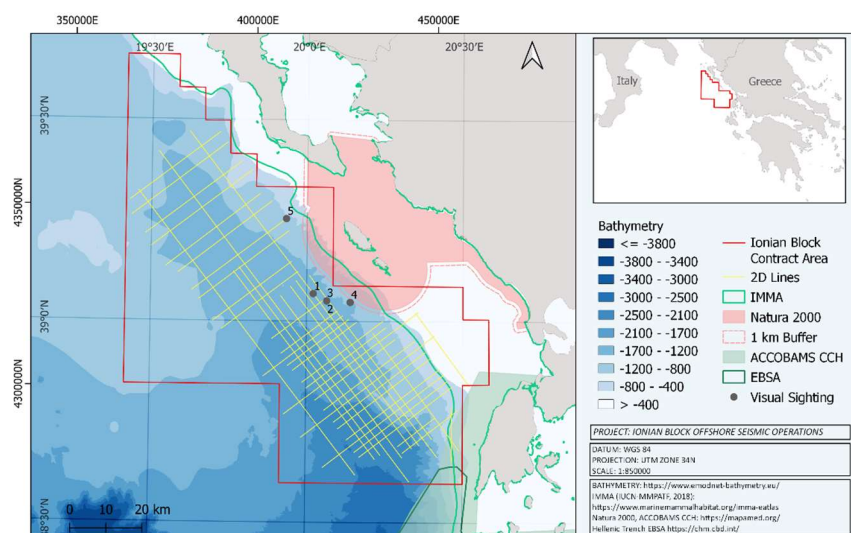
**Marine mammal mitigation effort summary**

<b>EFFORT MONITORING SUMMARY (10<sup>th</sup> February to 3<sup>rd</sup> March 2022)</b>		
<b>MONITORING EFFORT</b>	Total visual observation (hrs/min)	246:39
	Total acoustic monitoring (hrs/min)	425:11
	Total monitoring (hrs/min)	671:50
	Total effort whilst source was inactive	264:54



<b>MONITORING EFFORT</b>	Total effort whilst source was active	406:56
<b>PRE-WATCH EFFORT</b>	Nº of day/dawn/dusk Pre-watch periods	25
	Nº of night Pre-watch periods	52
	Total Nº of Pre-watches	77
	Nº of Pre-watches in shallow waters	0
	Nº of Pre-watches in deep waters	77
<b>SIGHTINGS &amp; DETECTIONS</b>	Nº of cetaceans sightings	5
	Nº of seals sightings	0
	Nº of turtle sightings	0
	Nº of acoustic detections	0
<b>MITIGATION ACTION</b>	Nº of mitigation actions initiated	3
<b>NON-COMPLIANCE</b>	Nº of incidences of non-compliance	0

The survey was conducted in the Ionian Sea, West coast of Greece, where depths varied between 91 m and over 2759 m, allowing for the possibility of encountering both deep-water and shallow-water species. In total, there were five marine mammal sightings, comprising three different species. These included two positive species identification of cetaceans, Cuvier’s Beaked Whale (*Ziphius cavirostris*) and Sperm whale (*Physeter macrocephalus*). Furthermore, a group of dolphins could not be identified due to the distance from the vessel. All species were recorded previously in the area. Species identification was also confirmed by reference to a field guide (Svensson et al. 1999).

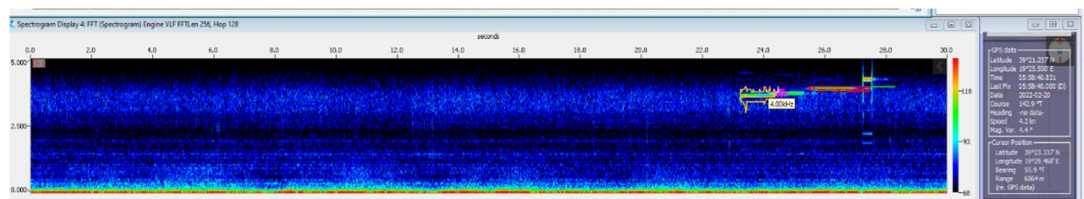


**Fig. 2: Locations of sightings during visual watches from the SW Cook during the survey**

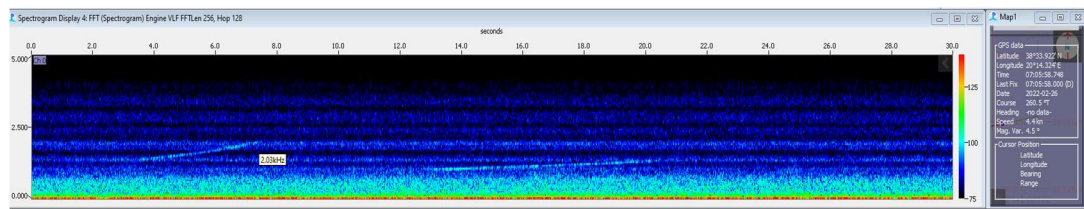


### 2.1.3. Sonar Signal

A sonar signal was detected in PAMGuard on both the low/mid-frequency and high-frequency monitoring stations. The signal was recorded almost continually from 19 to 22 February 2022. The sonar had a signal duration of approximately 5 seconds, with most energy between 3.5 and 4.25 kHz, typically repeated every 101 seconds. Sonar was additionally detected on 26 February; this sonar was a lower frequency signal below 2 kHz.



**Fig. 3: Sonar signal detection 19-22 February**



**Fig. 4: Sonar signal detection 26 February**

### 2.1.4. Compliance

For the entire duration of the 2D seismic survey, the seismic crew were diligently performing all mitigation requirements, and the procedures were in full compliance with the EAP approved by the regulator.

- The seismic survey was carried out during winter season to minimize impacts on marine mammal breeding season.
- The average speed of the vessel was 4.3 kts, which complied with the recommendation of the working group IWC-IUCN-ACCOBAMS to reduce speed to 10 knots maximum in order to minimize the strike risk with marine fauna.
- A total of 50 soft-starts were carried out before starting an acquisition line or gun-array test in accordance with procedures described.
- A 750 m radius, from the centre of the noise source (Exclusion Zone), extended to 1000 m for fin whales and 1500 m for sperm whales, were established.
- Aggregations of vulnerable species (Cuvier’s beaked whales, sperm whales, and fin whales) anywhere in the monitoring area were established.
- 120 min of visual and/or acoustic pre-watches were performed before any firing of guns, including soft-starts, acquisition lines, tests, and resuming operations after unexpected breaks.
- Soft-start duration was a minimum of 20 minutes.

- Soft-start duration and time from soft-start to SOL was less than 40 minutes as required.
- No source was active (including soft-starts and line turns) within the 1000 m safety buffer zone from the Natura 2000 protected areas.
- Good communication was maintained between the MFO/PAM team and seismic crew throughout the survey to ensure that all guidelines were implemented effectively concerning the protection of marine mammals and sea turtles within the exclusion zones.
- Turtle guards, a structure welded to the underside of tail buoy designs, aims to exclude sea turtles from becoming fatally entrapped in gaps at the front of the tail buoy undercarriage. In the event of turtle entrapment in seismic equipment, the Contractor's appropriately trained staff must intervene immediately to remove the trapped animal, weather permitting.
- There was 24-hour acoustic monitoring as required.

As per approved EAP Mitigation Measures and compliance with the ACCOBAMS Guidelines, in order to avoid any inconsistency with measures addressed and prior to the commencement of the survey, the following point regarding mitigation procedures was confirmed. For the entire duration of the 2D seismic survey, the seismic crew were diligently performing with all mitigation requirements, and the procedures were in full compliance with the EAP approved by the regulator. As per approved EAP Mitigation Measures and compliance with the ACCOBAMS Guidelines, in order to avoid any inconsistency with measures addressed and prior to the commencement of the survey, the following point regarding mitigation procedures was confirmed.

- ✓ One (1) MFO was conducting visual monitoring at the time, and one (1) MFO was 'floating on stand-by', assisting the MFO on watch during critical events such as a sighting. Also in charge of retrieving/deploying the PAM cable when Seismic Crew needed to pick-up the gears, avoid entanglements, and attend the meetings or meal breaks, always available with a UHF radio. Meanwhile, one (1) was performing the PAM role and the other was resting.
- ✓ The EAP established 20 minutes as the maximum and minimum time for the soft-start duration. This was found technically non-possible to achieve. A JNCC standard, of minimum 20 minutes soft-start and 40 minutes for the period from soft-start commencement and the start of acquisition line, was applied as a best practice approach.

## ***2.2. Acoustic Monitoring (Background Noise Measurements and Verification of Exclusion Zone)***

### ***2.2.1. Executive Summary***

Underwater monitoring was carried out by means of survey, allowing for:

- verify the actual presence of mammals;
- define the background noise level and verify the anticipated Exclusion Zone (EZ)

A research vessel was used to carry out the acoustic survey and separate portable systems provided to monitor the ambient noise on predefined locations and close to critical environmental components such as the Protected Areas of the Natura 2000 Network either/or the shores of Ionian Sea. The objectives of this acoustic study were to measure ambient sound levels as a function of sound frequency components, time and position as well as correlate acoustic anomalies to major acoustic sources within the survey areas:

1. Prestart: In general, exhibit high ambient sound levels concentrated on the top (or above) limit of the bibliographic prevailing ambient noise.
2. Post Completion: To identify significant differences in the ambient noise between the pre-start and the post completion stages of the 2D seismic survey.
3. Seismic noise monitoring & Verification of Exclusion Zone: The aim of the acoustic survey at that stage was to assess the sound pressure level of the noise induced by the air-gun seismic source to the predefined sampling locations. Additionally, field measurement of noise levels around the seismic source (air-guns) taken place and carried out during the acquisition activities in order to record and study the seismic noise attenuation levels and validate the specified mitigation zone.
4. Coastal Zone Inspection as well as Aerial Surveys and Control for marine mammals stranding.

During the marine geophysical surveys (seismic acquisition) the recording of the levels of the produced sound was carried out by an auxiliary vessel that executed the monitoring program both in remote measuring stations (5km - 60km) and closer (500m - 4km) as well as the verification of the Exclusion Zone (750m) from the seismic vessel. The acoustic monitoring was done with a special recording system that has hydrophones of different levels of sensitivity and dynamic range and which sinks to 20m below sea level. The auxiliary boat during the recordings at the measuring stations remains at a distance from the hydrophone and puts its engines out of operation so as not to produce additional noise.

The immersion of the recording system takes place with special floats and an elastic rope in order to minimize any artificial noises of the platform (self-noises) which can be indicative of: flow noise, cable support noise. In order to minimize hydrodynamic noises, the boat does not anchor so that it moves in parallel with the sea currents and the prevailing winds. In the above way the sea currents that pass through the submerged hydrophones have a lower relative speed since the whole platform (auxiliary boat) moves in the same direction. The results of the noise simulation models show that the sound propagates in good direction to the bottom and attenuates significantly both horizontally and vertically.

At a vertical distance at the depth of 100m, the noise levels are close to those of the source (210dB), but a marine mammal will have already been detected by Passive Acoustic Monitoring (PAM) and geophysical works stopped immediately. At greater depths, due to the pressure, the propagated sound is reduced very quickly at values far below those that could cause any acoustic nuisance to marine mammals. At horizontal distances of less than 1km (750m) from the source according to real-time acoustic measurements, the sound is reduced below threshold values that may cause any probable acoustic nuisance to marine mammals.

It is noted that the normal levels of environmental noise (ambient noise) are of the order of 110-140 dB). For more information regarding final reports please follow link below:

[Underwater Noise Monitoring Program \(helpe-ionian.gr\)](http://helpe-ionian.gr)

### ***2.2.2. "Monitoring of the 4 predefined locations with spot measurements – "prestart phase – during seismic – post phase" of the Block Ionian Acoustic Monitoring Project.***

The Block Ionian Acoustic Monitoring Project planned and carried out by the Oceanus-Lab (Laboratory of Marine Geology and Physical Oceanography) of the Geology Department of the University of Patras. The prestart phase (ITEM 1-A) last three (3) days from February the 6<sup>th</sup> - 7<sup>th</sup> and 10<sup>th</sup> 2022.

One portable system was used for the monitoring of the ambient noise on the four predefined stations. Each unit included a four-channel digital recorder, two hydrophones and a laptop carrying the interfaces for recording and visualizing the data. On the hydrophone were attached a high sensitivity and a low sensitivity hydrophone. Using dual sensitivity hydrophones assures that all dynamic ranges and amplitudes will be successfully recorded without any signal clipping.

Monitoring included (1) Ambient noise measurements (prestart and post completion of seismic activities) and (2) Seismic noise monitoring, at the proximity of the four (4) predefined locations.



Fig. 5: Map includes the locations of 4 predefined stations of acoustic monitoring program.

In general, high ambient sound levels due to induced high levels of anthropogenic noise (marine traffic) and other commercial activities.

### 2.2.3. Verification of Exclusion Zone

The following describe the data collection, data processing methods, and the results of ITEM 2 "Verification of exclusion zone" regarding the Ionian Gulf Acoustic Monitoring Project. The ITEM2 project survey aimed to monitor the propagation and attenuation rate of the impulse sounds around the seismic source (Airgun arrays) to validate the geometry of the predefined exclusion zone. The Kyparissiakos Gulf Acoustic Monitoring Project planned and carried out by the Oceanus-Lab (Laboratory of Marine Geology and Physical Oceanography) of the Geology Department of the University of Patras. Results presented in this report refer to acoustic data collected during February 11th and 14th of 2022.

The objective of ITEM 2 was to measure impulse sound pressure levels around the seismic source (Airguns) to record and study the seismic noise attenuation levels and validate specified mitigation zones.

During Marine 2D Seismic Survey a) Sound Pressure Levels never exceed and well below marine mammal's threshold values for temporary acoustic trauma and b) Real time monitoring verified the Simulated Exclusion Zone of 750 meters. Following figure shows the comparison of these limits to the average and maximum expected SPL at the limits of the exclusion zone, making clear that they are well below the specified risk levels.

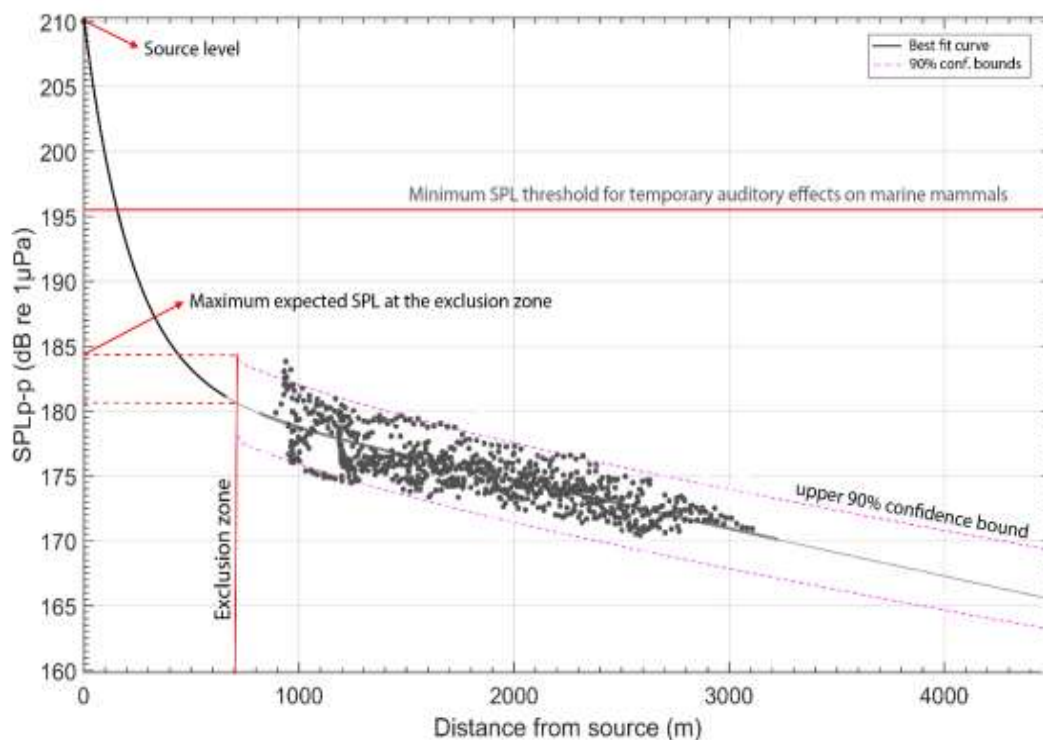


Fig. 6: Comparison of marine mammal's threshold values for temporary acoustic trauma limits to the average and maximum expected SPL in to the exclusion zone

### 2.2.4. Coastal and Aerial Surveys

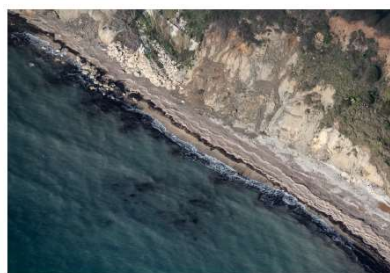


An aerial inspection of the Northern Ionian Sea coastline was conducted on the 14<sup>th</sup> and 15<sup>th</sup> of March 2022, following seismic surveys conducted in the wider marine area. The aim of the inspection was to record the existence of any stranded animal/s and especially cetaceans along the coasts of the area where the seismic surveys were conducted.



Figure 1 Map of the Survey Area

The aerial investigation was conducted on the 14<sup>th</sup> of March 2022, (see blue track on Map 1) and on the 15<sup>th</sup> of March 2022 (see red track on Map 1). A total of 325 km of coastline were inspected thoroughly, covering a zone of about 2 nautical miles from the shoreline to the open sea. During the survey no cetaceans were recorded (swimming/floating in the marine zone or stranded ashore) as well as no other species of marine megafauna (monk seals, sea turtles) along the entire coastline inspected.



In addition, from the 3<sup>rd</sup> to the 7<sup>th</sup> of March 2022 an inspection for marine mammals' presence was carried out by the Laboratory of Marine Geology & Physical Oceanography, Department of Geology, University of Patras, at the coastal zone of the two study areas. The

coastal areas, where the access was not possible, were approached and filmed by the team using the “Sea Master” vessel, while the remaining were inspected by car. Throughout the inspection, no marine mammal was detected along the coastal zone. The following map show the areas inspected, while a set of selected photographs for some of the stations is presented afterwards. Moreover, following figure presents the northern part of the survey area and in figure 3.3 the southern.

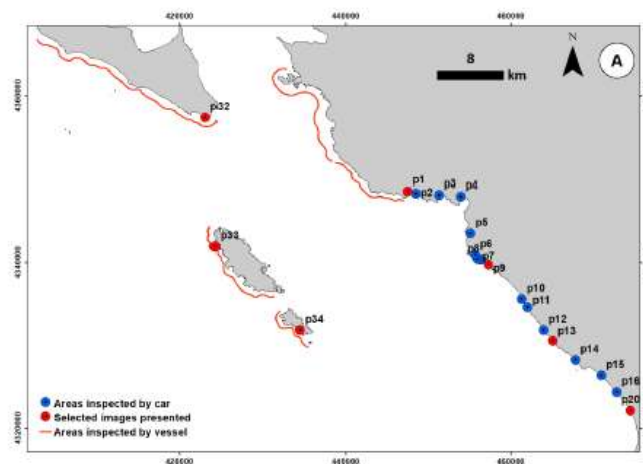
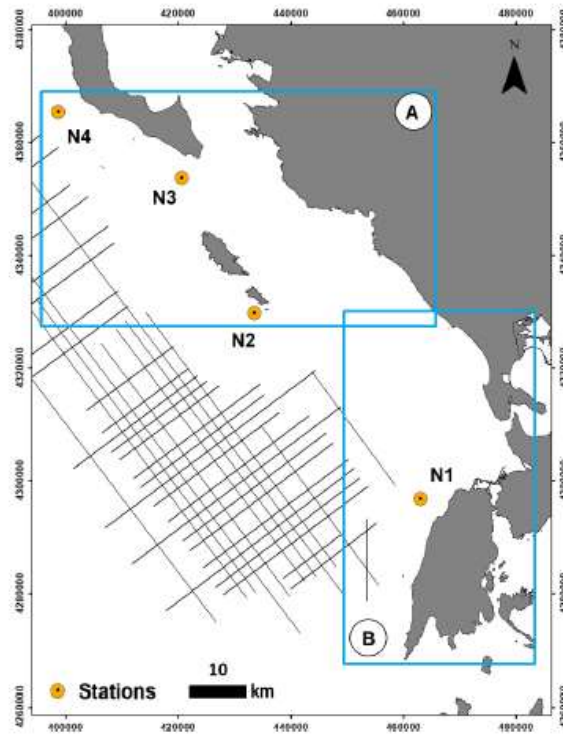


Fig. 3.2. Map of the Northern part of the Ionian Gulf survey area showing the visually inspected coastal areas.



### ***3. Environmental Monitoring and Recording of Critical Biodiversity Indicators 2022 final results – 2023 onwards***

In the context of Environmental Monitoring and Recording of Critical Environmental Indicators of Biodiversity, such as marine mammals (cetaceans and monk seals), sea turtles and seabirds, the Hellenic Petroleum Exploration and Production of Hydrocarbons Ionian Single Member Societe Anonyme (HELPE IONIAN S.A.) company has assigned to Nature Conservation Consultants (NCC) Ltd a contract for conducting the present Project, namely the “Survey of the Status of Important Fauna Species in the Ionian Block Lease area”.

The Project consists of 4 work packages:

I. Pelagic Surveys for marine mammals, seabirds, sea turtles, nearshore and in the open sea, using open water research vessels, in combination with drone surveys.

II. Aerial surveys for marine mammals, seabirds, sea turtles, nearshore and in the open sea, using a light aircraft.

III. Coastal surveys for monk seals, Scopoli’s shearwater and Mediterranean shag breeding sites in the coastal zones of the adjacent Natura 2000 sites, using open water RIB vessels in combination with drone surveys.

IV. Telemetry for seabirds at the Special Protection Area of Diapontia Islands by tagging 10 breeding individuals with GPS/GSM transmitters

More details regarding the Final Report on the field surveys carried out during 2022 and the results in each Work Package of the project could be found in the website of the Environmental Unit of HELPE IONIAN:

<https://helpe-ionian.gr/en/environment/critical-habitats-biodiversity.html>



*Figure 4-30. Common bottlenose dolphins and Cuvier's Beaked Whale during the cetacean surveys.*



*Figure 4-31. Striped dolphins during the cetacean surveys.*



Figure 4-43. Thermal camera video snapshots, showing Scopoli's flights over the Trachia colony site

#### ***4. Seismicity Monitoring 2022 results and 2023 onwards***

Given the high seismic activity in the broader area of the Ionian Sea and aiming at the safety of the future planned research, HELLENIC PETROLEUM EXPLORATION AND PRODUCTION OF HYDROCARBONS IONIAN SINGLE MEMBER S.A. cooperated with the Geodynamic Institute of the National Observatory of Athens (CONTRACT AGREEMENT 2022014/06.05.2022) regarding the monitoring of the existing seismic activity in the area of interest. The monitoring of seismicity, even at the level of microseismicity (microseismicity), was decided to be carried out in "real time" conditions by installing a local network of seismographs. The data, which will result at the end of the project, will also be particularly useful for identifying the active faults in the research area. The National Observatory of Athens (NOA), undertook the installation of a local network consisting of twelve (12) portable seismographs, as well as the operation of a local seismic array, in order to make denser the already existing national seismograph network, used by the Institute of Geodynamics of NOA for the continuous monitoring of the daily seismic activity of the Greek area. The 12 new stations are in continuous operation with simultaneous (real-time) data transmission to the Institute of Geodynamics.

The installation of the stations was performed in such a way as to achieve the maximum density of the network using, where possible, even the smallest islands of the Ionian (e.g. Strofades). Besides the geometry of the network, the selection of the station locations considered, both the soil conditions and the noise level of each location. He also considered the coverage of the mobile telephony, so that the direct transmission of the data is possible.

Figure 9 shows how the stations complemented the existing network. The stations installed by the Institute of Geodynamics as part of the project are shown in yellow color. The stations will remain in operation all along the project's duration.

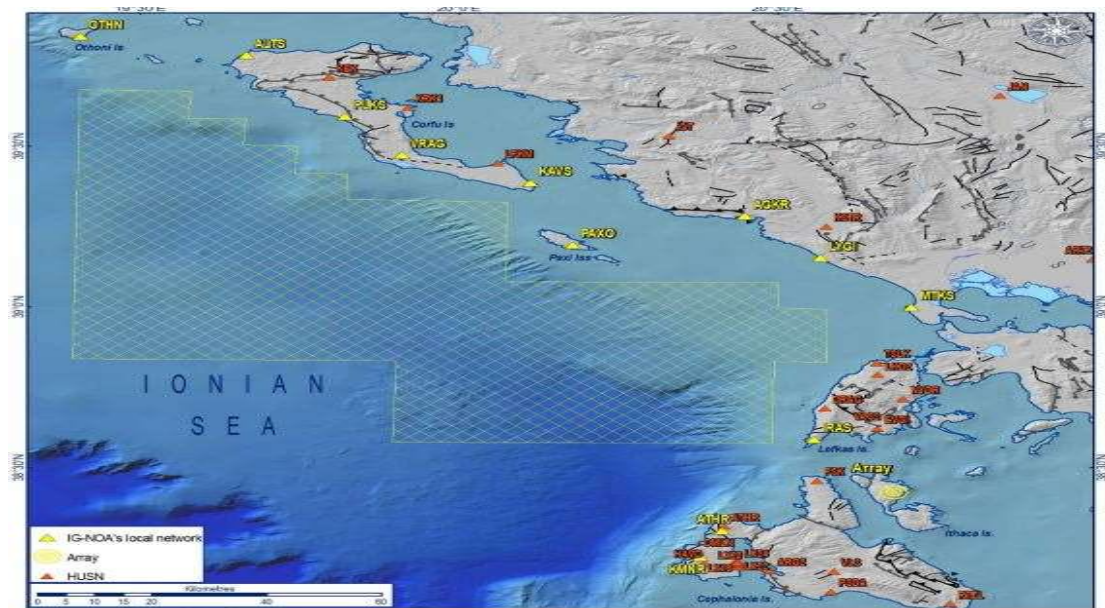


Fig. 9: The locations of the new stations of the local network that were installed for the needs of the project (with a yellow symbol) and operate with the stations of the permanent network (with a red symbol)

For the completion of the installations, eight (8) visits by technical and scientific staff were made to the areas of interest, during the period June - September 2022.

More specifically, the planning of the local seismograph network for the Ionian region was based on the complete regional azimuthal coverage from the land side in Aitolokarnania and Epirus, on the installation of several stations in smaller (Othoni, Paxos) and larger (Cephalonia, Corfu, Lefkada) islands, as well as in the operation of a seismic array in Ithaca, in the area of Anogi. Based on these three factors, this offshore area, which borders the open sea to the west, is fully covered. The large number of stations is intended to achieve dense ray coverage for the study area, so as to enable the construction of a local seismic velocity model. With this model, the seismic solutions will be redefined in the end in order to obtain highly accurate solutions that will accurately indicate the active zones.

In addition to the geometry of the network, the selection of the station locations considered both the soil conditions and the noise level of each location. The coverage of the mobile telephony was also considered, so that the direct transmission of the data is possible. The coordinates of the local network locations are presented in the table below (Table 1). Figure 1 shows how the stations complemented the existing network. The stations of the portable network of the Institute of Geodynamics are shown in yellow. The stations will remain in operation throughout the duration of the project.



Fig. 10: The locations of the stations of the local networks (in yellow) installed as part of the project are presented, as well as the operating permanent broader area of interest (in red)

Recorded seismicity from the local network Although the installation and operation of the local network started on May 2022, it was completed at the end of July 2022 and therefore seismicity monitoring under the same conditions practically started from August 2022.

The greatly increased number of events recorded by the local network compared to the national network shows the high seismicity monitoring capabilities that were achieved. However, the number of events within the specific monitoring area is not yet at a level capable of determining the magnitude of completeness in this specific area. A general evaluation of the magnitude of completeness, based on the total seismicity in the area recorded by the local network shows an improvement of about 0.5 in the Richter scale. In the first months of monitoring, the study area shows evidence of very low seismicity with a very small number of events and with small magnitudes.

### 5. *Environmental Studies for the 2<sup>nd</sup> Exploration (EAP Update / Technical File for 3D Marine Seismic Acquisition) 2022 -2023*

Prior to the commencement of 2D/3D Geophysical Surveys in Block Ionio, an EAP prepared, submitted and approved by DIPA / HHRM May 28th 2021. As per approved EAP, there is clear commitment for shooting seismic during the Winter period and avoiding Cetaceans’ breeding period (May to October). In addition, ACCOBAMS Protocol to be strictly applied during the geophysical surveys.

Points below summarizes commitments as per approved EAP:

#### **Key remarks addressed and complied**

- ✓ A compliance table with ACCOBAMS Guidelines and mitigation measures.
- ✓ West Patraikos Marine Seismic Survey Case Study mitigation measures applied and environmental results.

- ✓ Citation and comparison of cases and environmental results from previous Marine Seismic Surveys in Greece as well as from other countries (Croatia and Italy) acquiring similar Marine Seismic Surveys during hydrocarbons exploration.
- ✓ Commitment for increasing Exclusion Zone from 750m up to 1500m in case sperm whales are entering the Exclusion Zone during Seismic Acquisition activities in Block 10.
- ✓ Apply Sea Turtles (*Caretta caretta*) Telemetry for the very first time in Greek territorial waters.

***Recommendations addressed and complied***

- ✓ As part of Underwater Noise Simulation, categorization of frequency sensitivity to be applied on each marine species instead of categorizing them under low, medium and high frequency regardless Cetaceans species.
- ✓ Ballast water treatment on the vessel and mitigation measures to be applied in order to avoid entering into Greek territorial waters of invasive alien marine species.
- ✓ Clear statement of HELPE Ionian that they will carry out the Marine Seismic Acquisition Survey during the Winter period and avoiding breeding periods for the Cetaceans (May to October most dominant periods)

As per approved EAP, *“Εφόσον προκύψει η ανάγκη οποιασδήποτε αλλαγής του προγράμματος θαλάσσιας γεωφυσικής έρευνας βάσει του «ΠΣΔ\_ΙΟΝΙΟ» (π.χ. αλλαγή γραμμών έρευνας, αλλαγή μεθόδου, χρήση άλλων μέσων μεταφοράς, ή εξοπλισμού κ.λπ.), θα πρέπει να γίνεται ενημέρωση και επικαιροποίηση του, κατόπιν υποβολής τεχνικής έκθεσης, η οποία θα προετοιμάζεται και θα διαβιβάζεται προς ενημέρωση στη Διεύθυνση Περιβαλλοντικής Αδειοδότησης του ΥΠΕΝ.”* Based on the above, a Technical File has been prepared and submitted for informative purposes to Competent Authorities (HEREMA/DIPA).

The proposed program of 3D MSS within the Concession Area includes:

- ✓ 1,800km<sup>2</sup> operational area of execution of the three-dimensional (3D) geophysical survey, as depicted in the previous image (Table 1 Revised Survey Parameters - October 2022)

During the seismic acquisition, the vessel:

- Will make the necessary turns to change course outside the licensing limits, the extent of which will be determined by the coastline and islands within the Lease Area.
- Will not acquire geophysical data:
- in protected areas within it (the Lease Area) as well as,
- at a distance of 1km from their borders (buffer zone 1,000m from the borders of sensitive areas)



Παράμετρος	EAP JYLY 2020		UPDATED EAP OCTOBER 2022
	2D SCENARIO	3D SCENARIO	3D SCENARIO
TIMELINE	The proposed seismic exploration survey is tentatively scheduled to be executed between Q4 and Q1 of the first calendar year when vessel is available.	The proposed seismic exploration survey is tentatively scheduled to be executed between Q4 and Q1 of the first calendar year when vessel is available.	The proposed seismic exploration survey is tentatively scheduled to be executed between Q4 and Q1 of the first calendar year when vessel is available (November 2022-March 2023).
SOURCE ARRAYS	1	Διπλή: 2 ή Τριπλή 3	Τριπλή 3
AIR GUN TYPE	G-GUN II	G-GUN II	Bolt 1900-LLXT / Bolt 1500LL
NUMBER OF AIRGUNS	UNKWOWN	UNKWOWN	34
SOURCE VOLUME	5.590 in <sup>3</sup>	Dual: 5.590 in <sup>3</sup> / Triple: 3.750 in <sup>3</sup>	Τριπλή 3.280 in <sup>3</sup>
SOURCE DEPTH	5 to 10 m	5 to 10 m	7m
DYNAMIC RANGE	120 db @ 1 ms (sample rate)  (maximum SPL) = 250 dB re 1 μPa (pk) re 1 m)	120 db @ 1 ms (sample rate)  (maximum SPL) = 250 dB re 1 μPa (pk) re 1 m)	150 db @ 1 ms  (maximum SPL) = 260 dB re 1 μPa (pk) re 1 m)
OPERATION PRESSURE	2000psi	2000psi	2000psi
SHOT POINT INTERVAL	18,75 m	Dual: 18,75 m Triple 12,5 m	Triple 18.75m

The approved EAP is designed to:

1. Protects the listed sensitive elements of the marine environment of the MSS area with a special emphasis on marine mammals and sea turtles through the use of preventive and management measures such as monitoring by Marine Mammal Observers (MMOs) and the use of modern Passive Acoustic Monitoring systems (PAM).
2. Assesses the degree of protection offered by the proposed mitigation measures, as detailed in Chapter 12, and suggests, if necessary, improved protection measures.
3. Satisfies the requirements and instructions of the international ACCOBAMS Agreement concerning the taking of protection measures and the drafting of relevant reports in the country for the protection of marine mammals and especially cetaceans.

Considering the above, within this Technical Report it is confirmed in the most affirmative way that the international standards for the safe execution of exploration of this nature will be explicitly and irrevocably observed. Particular care is taken to fully commit to the terms of protection of marine species, implementing the requirements of the "ACCOBAMS" Agreement as well as the directions of the Joint Nature Conservation Commission (JNCC) for the protection of cetaceans.

### **5.1. Marine Seismic HSE & HSE Seismic Project Plan 3D MSS**

HELPE IONIAN being the Operator, desire to acquire new 3D Seismic Data in the Block Ionian Lease Area by executing a towed streamer 3D Marine Seismic Survey (MSS) which shall fulfil the minimum exploration work program agreed under the Lease Agreement for the 2<sup>nd</sup> exploration phase (3 years duration). The new 3D MSS data will cover an area of approximately 1.150 square kilometers (sq.km) (*Actual Operational Area following up contract award with Geophysical Contractor*).

Prior to the commencement of the 3D MSS, following HSE Consultancy Services will be provided for:

**Item 1:** Assist to the preparation of the Invitation to Tender document (including form of contract) for selecting the MSS contractor. The specific services include the drafting of the HSE aspects of the project to enable the contractors to submit a tender that will provide a crew that can fulfill the requirements efficiently and operate with an expectation of zero HSE incidents. In addition, selection criteria and check lists and questionnaires for evaluating HSE aspects of each bidder shall be prepared. **COMPLETED**

**Item 2:** Participate in the evaluation of the bids submitted for the 2D MSS in relation to the HSE aspects of each bid. Recommend preferred contractor(s) on HSE aspects. Review final proposal. **COMPLETED**

#### **Item 3:**

**3.1** - Provide support to develop HSE Bridging Documentation between HELPE IONIAN and the selected contractor and participate in the contract finalization, which is the acceptance of an HSE management process that all parties have agreed to apply.

**3.2** - Provide support to develop Project HSE Plan (including emergency response plans, Shipboard Oil Prevention Emergency Plan-SOPEP) in cooperation with the selected seismic contractor prior to the arrival of the survey vessel and other equipment. The Project HSE Plan will be initially drafted by the selected seismic contractor. **ONGOING Q4 2022**

#### **Item 4:**

**4.1** - Perform HSE Vessel Audits while the vessel is at the initial port of call in Greece and before the commencement of work (including but not limited to a compilation of an environmental audit report and a full environmental statement of the vessel's environmental performance, impacts and management). **ONGOING 4Q 2022**

#### **Item 5 (contingent) 4Q 2022 - 1Q 2023 ONWARDS**

- Perform HSE audits while the MSS is progressing,
- Investigate accidents, incidents, near misses or other unforeseeable events,
- Review of the HSE plan.