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PrePARED survey of pelagic and demersal fish within Inch Cape offshore wind farm

June 2023

Version: Draft 1 [Redacted] 21/12/2022

Version 2: [Redacted] 26/04/2023

Table:

1-Objectives

The PrePARED project (Predators and Prey Around Renewable Energy Development) is a four-year partnership, led by Scottish Government's Marine Scotland Directorate and co-funded by Crown Estate Scotland, that will help improve understanding of how seabirds, marine mammals and fish respond to offshore wind farms (OWF).

Year 1 surveying was completed in 2022, and the survey will be repeated in June 2023 and June 2024.

The survey described in the present document (June 2023) will provide important data on pelagic and demersal fish distributions (mainly gadoids, clupeids and sandeel) within and around OWF. The data collected is essential to account for the effect of prey distributions on marine top predators and reduce uncertainty in our understanding of the effects of OWF on marine food-webs and therefore improve confidence in environmental impact assessment.

Fisheries acoustic data will be collected using a scientific echo sounder equipped on MRV Alba na Mara. The data will be collected along a predefined transect based on a regional grid (**Figure 1**). Within the OWF, the operation will consist of recording echotraces (fish marks) with the echo-sounder while traveling at a constant speed along the transect.

To validate the fish marks, occasional pelagic tows (in agreement with marine control) will be done along the transect. Fishing will be opportunistic as fish marks are not static/predictable and therefore the location of the tow cannot be given in advance of the survey.

The abundance of demersal fish will be assessed using demersal tows at fixed stations in the vicinity of the acoustic transect (see **Figure 1**).

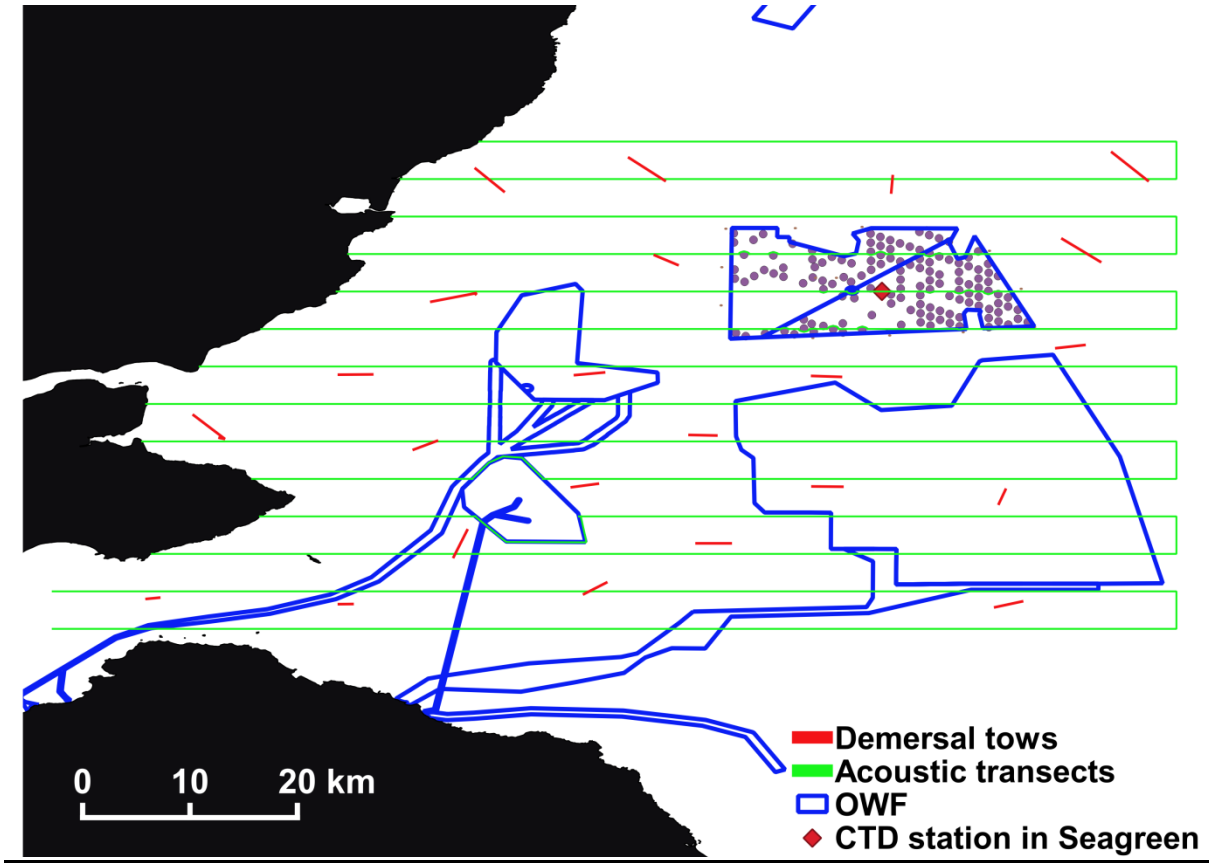


Figure 1: Regional grid showing the planned acoustic transect (green lines), OWF boundaries (blue lines) and demersal tows (red lines).

2-Equipment

Acoustic survey

Alba na Mara is fitted with an EK 60 scientific sounder which operates at 38,120 and 200 kHz. The transducers for this system are mounted in a pod fitted to a shaft – enabling the pod to be deployed up to one metre below the keel in an attempt to improve acoustic performance. The Simrad EK60 is a scientific sounder with multiple frequency operation making it possible to discriminate between different fish species.

Pelagic fishing

Major concentrations of pelagic fish encountered during the course of each acoustic survey will be sampled using an using an International Young Gadoid Trawl PT154 net with a 6mm codend (station location cannot be given in advance as this will be determined by the presence of fish marks along the transect). The net will be shot by the crew of Alba na Mara which will steam at a speed of 2-4 knots for a duration of 30 to 45 minutes. The catch will be released into fish baskets on the deck and worked up according to standard sampling procedures.

Demersal fishing

Once agreed with the OWF developers, the proposed demersal station will be sampled with a Jackson rockhopper demersal trawl (BT158) with a codend of 10-mm mesh. The net will be shot by the crew of Alba na Mara which will steam at a speed of 2-3 knots for a duration of 30 minutes. The catch will be released into fish baskets on the deck and worked up according to standard sampling procedures.

3-Programme of work

The survey will take place between 19 June – 5 July. Weather permitting, Alba na Mara will depart from Fraserburgh harbour on the 19th to make passage to the Forth and Tay areas. Recording of the acoustic signal north of the regional transect will start ~ 20th June, and 3 transects will intersect Inch Cape wind farm (**Figure 1**). In order to cover the region and produce high quality data, the acoustic transect needs to be sampled at a constant speed. The aim is to follow the transect at a speed of 8-9 knots, however, speed may be reduced while getting around structure safety zones. Up to twice per day, pelagic fish aggregations will be sampled along the transect using a pelagic net (PT154). Acoustic transects and pelagic tows will be done between 22 - 23 June at the points of entry/exit shown in **Figure 2**, and times indicated in **Table 1**. Any changes to this schedule will be communicated to Marine Control.

Following the completion of the acoustic transects, Alba na Mara will go to the harbour (Montrose/Leith, ~ 27 June) for a gear change (pelagic net exchanged for a demersal net). Thereafter, fixed demersal stations will be sampled (see **Figure 1** for the station within the Inch Cape OWF) using the BT158 net. It is estimated that Alba na Mara will reach the station between 30 June – 1 July, but again, should any re-scheduling be required the vessel will inform developer Marine Control in good time.

The vessel will adhere to the safe distance (500m) from any existing OWF work and from other vessels working in the area. Contacts will be established daily with the Marine Control Coordinator as per RAMS.

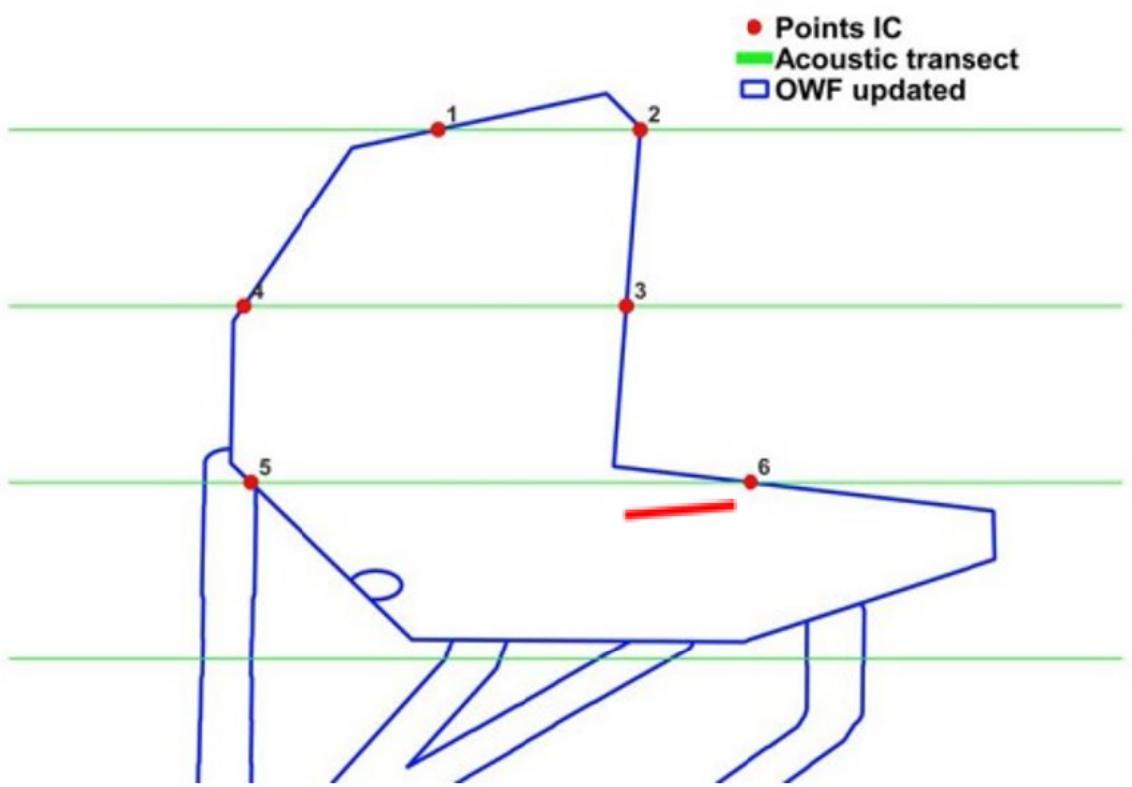


Figure 2: Acoustic transects within the Inch Cape OWF (green lines); entry (1,3,5) and exit (2,4,6) points (red dots) are chronologically numbered. Red line indicates demersal tow location.

Table 1: Date and time at which Alba na Mara is estimated to work within the Inch Cape OWF area.

Point ID	Latitude (decimal degree)	Longitude (decimal degree)	Date	Time
1	56.586095	-2.209183	22/06/23	0800
2	56.586124	-2.160504	22/06/23	0825
3	56.53057	-2.162543	22/06/23	1615
4	56.530464	-2.281213	22/06/23	1635
5	56.474907	-2.283681	23/06/23	0840
6	56.475022	-2.147963	23/06/23	0910

4-Ship details

The survey will take place on-board of the Marine Research Vessel Alba na Mara for which detailed information can be found at: Alba Na Mara.

The personel on-board will be composed of 8 crew members and 3 scientists (under current COVID-19 restrictions, 5 scientists once restrictions are lifted).

5-Mobilisation and passage plans

Crew and scientists will join Alba na Mara in Fraserburgh on the morning of departure (19 June). Alba na Mara works as a day boat (0700 to 1900), and in the evenings will either anchor in a sheltered bay near the shoreline or stay out at sea in areas clear of OWF. In any case, a constant 24h watch is in place.

Passage to Inch Cape OWF will be done along the transect provided in **Figure 1** and will enter/exit at the points detailed in **Figure 2**. Following completion of the acoustic transect, a gear change will take place at Montrose/Leith harbour on the 27th June.

6-Safety on board

Safety on board is a high priority. The crew are trained in First Aid, firefighting and the use of breathing apparatus. During the first day of the survey, a safety briefing and drill will be completed under the supervision of one of the ships officers. For all operations on the deck, appropriate PPE will be used.

Full health & safety documentation (procedural risk assessments and standard operating procedures) specific to this survey will be provided to the developer prior to the survey date. These documents will include:

- planned survey locations (GIS layers)
- gear description
- procedure – including preparation, deployment and recovery of gear
- procedural risks and control measures
- timing of planned operations
- weather windows
- OWF permissions, communications and emergency notification
- vessel and personnel contact details
- health and safety (briefings, induction, safety drills, PPE, safety certification, first aid and welfare arrangements)

7-Contacts

For further information please contact: [Redacted] (Marine Scotland Science, [Redacted]). [Redacted] @gov.scot

Appendix 4: DETAILED RISK ASSESSMENT

Directorate: Marine Scotland	Division: Science	Date of this issue: 26/04/2023

Work Activity: Conducting a pelagic and demersal fishing survey on Alba na mara
This Risk Assessment covers the procedures involved when conducting a fishing survey onboard Marine Scotland Science's MRV Alba na Mara. Q-Pulse references relate to MSS's in-house health and safety documentation management system.

Task/ Activity	Hazards	Existing control measures	People at Risk(*)	Rate (*)		Risk Rate	Significant		Adequate Control		Action to Reduce Risk
				L	S		Yes	No	Yes	No	
Pre-survey training/ health checks	*Safety* (to mitigate health issues and/or inexperience leading to accidents)	• all sea-going staff to complete a mandatory personal survival techniques (PST) training course every 5 years and familiarise themselves with the government guidance on health and safety for ships. • sea-going staff to hold an in-date seafarers medical certificate (ENG1). Inform your doctor of any pre-existing medical conditions, current medications and other factors that may affect your ability to work at sea. Any restrictions imposed on the ENG1 must be adhered to. • staff joining the vessel to be in good health (including dental health), and inform the Scientist in Charge (SIC) if they will be carrying or undertaking a course of prescribed medicines. • it is the responsibility of expectant staff to inform line management of their pregnancy. Pregnant staff should not conduct sea duties due to the additional risks being at sea and the potential delay in getting medical treatment if required. • cruise programme completed and reviewed appropriately, including pre-cruise meeting with skipper and fishing mate to discuss protocols and safety concerns. • authority to work within Offshore Wind Farm (OWF) areas to be granted by Marine Control of the installation (preferably 2-3 months in advance of survey start date). Procedures to obtain permits to work (if required) should be agreed at this time. • when joining Alba na Mara, staff to read the handbook provided and note the list of prohibited items for the vessel.	S, O, C, V, M	1	1	LOW		X	X		Not required
Working with others during the COVID-19 pandemic	Increased risk of SARS-Cov-2 transmission	• make use of provided COVID-19 test kits. Do not board if you test positive. • use good hygiene and respiratory etiquette (e.g. sneezing/coughing into the crook of your arm; washing hands regularly). • inform the SIC should you develop symptoms while onboard, and	S, O, C, V	1	1	LOW	X		X		Not required

		remain in your cabin until further instruction.									
Embarkation/ disembarkation	*Safety* (slips/trips and falls from using a ladder/ gangway leading to serious injury or death; hypothermia or drowning if fall is into water)	• staff should only board/disembark the vessel when advised to do so. • staff should be suitably rested before boarding, and not under the influence of un-prescribed drugs or alcohol. • stay clear of any shore-side operations active at the time of boarding, e.g. loading heavy equipment using cranes and winches. • grip the hand rail with one hand at all times. • the vessel and gangway may move suddenly, take careful note of the surrounding water and vessel movement before boarding. • check for any hazards at the top or bottom of the gangway that may impede your route. • if boarding at night, ensure the gangway is sufficiently illuminated before stepping on. • ensure you are wearing suitable footwear for boarding (i.e. with non-slip soles), especially in inclement weather. • keep personal baggage light to avoid becoming unbalanced. Place heavier gear with the scientific gear for loading using lifting equipment.	S, O, C, V	1	3	MED	X		X		Not required
Living and working at sea	*Safety* (crush injuries from falling equipment; slips, trips and falls leading to serious injury or death; man overboard leading to hypothermia or death).	• the SIC will arrange for a mandatory vessel familiarisation tour and safety briefing as required. • whilst moving around the vessel, maintain at least one point of contact with the vessel. Keep to main walkways where possible. • under advice of the SIC and Master, cease operations if the sea state becomes too rough to conduct work safely. Constant re-assessment of operating conditions in line with weather forecast reports. • the deck environment can be potentially wet at times (not only with water but also from spillage of oil and grease) creating a significant risk of slipping. Wear appropriate PPE on deck at all times; including hard hats, lifejackets (ISO 12402-2 rated), fitted with a PLB, and non-slip safety boots (EN ISO 20345, ideally rated SRC). Rigger type gloves (BE EN388) to be worn when handling heavy equipment. • staff planning to work in the inside labs/containers on their own should let the SIC or shift leader know. Regular checks should be made to ensure their well-being (either by visual confirmation or by regular phone contact). • no lone working should be carried out on deck at any time.	S, O, C, V	1	3	MED	X		X		Not required
	Physical	• sea sickness is usually confined to the first few days at sea. If you are prone to travel sickness, take medication with you prior to									

	(inclement weather conditions leading to cold stress, sea sickness)	sailing. Cease work if sickness and/or the effects of its medication are compromising awareness and co-ordination. • if conditions are extremely cold, ensure clothing is waterproof and thermally insulated, take regular breaks and drink warm fluids.									
Shooting and hauling heavy gear (e.g. PT154 and BT158 trawls) using cranes, winches, ropes and wires	*Safety* -slips/trips and falls; -man overboard: hypothermia or drowning; -vessel instability or loss; -exposure to wires under strain: entanglement, serious injury or death; vessel grounding/ coming fast; collision damage – to vessel and/or wind farm installation/ cables	• use of trained and experienced scientists and crew only, following established SOP (i.e. RAMS; see Q-Pulse 239). During gear shooting and hauling only essential staff should be on deck. • prior to entering/leaving an OWF site, contact the Marine Control Co-ordinator (MCC) of installation - details within Fishing Survey RAMS – with route/path plans. Maintain regular radio contact on pre-agreed frequencies whilst working in the area, and adhere to any advice given by the MCC on areas not to access. • any required OWF Permits To Work should be in place before commencing the survey. • operations to be carried out only after permission granted by the bridge. Advise the bridge if conditions on deck (at times not observable to bridge staff) are compromising safety (e.g. increasing wind gusts causing gear to pendulate). • crew on watch have overall responsibility for safety decisions regarding all vessel operations. Staff should follow all instruction and maintain clear communication between the winch operator and deck staff over and above the noise of the gear. • bridge staff to be on watch for any markers of static gear or marine mammals visible on the fishing line. • vessel speed to be low during fishing, up to 4 knots. • stay clear of machinery in use (e.g. winches/net and drums/cranes) to avoid entanglement. Staff to pay close attention to the gear as it is shot/hauled, and make adjustments to their position accordingly. • vessel transponder to be fully operational to allow accurate tracking. • scientists to use GIS to plan a safe transect route through any known areas of rough ground, or fixed obstacles (e.g. turbines - in collaboration with OWF reps). • vessel to position itself to take into account wind and tide direction forecast so if the engine loses propulsion, the vessel will drift clear of any obstacles. • maintain a safe distance (500m) from any OWF physical structures and other vessels working in the area. If the fishing haul location falls within this safe distance, the vessel to stop fishing operations,	S, O, C, V	1	3	MED	X		X		Not required

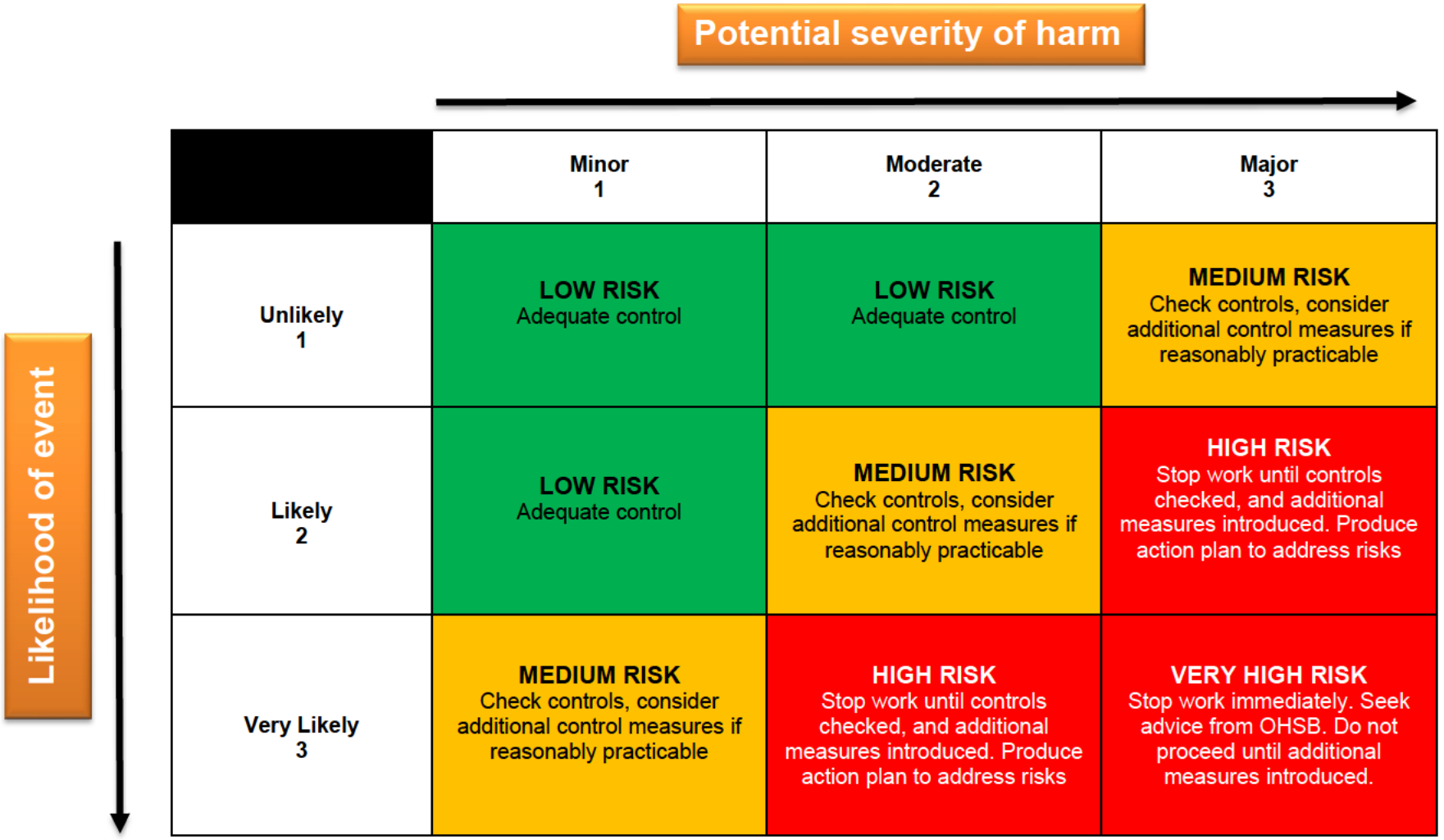
		steam further away, and resume the survey when safe to do so. • operations to be suspended in low visibility and/or high swell weather conditions. • frequencies used by the vessel for navigation purposes (50 kHz), to be communicated to the installation owner. • vessel crew to adopt standard nautical procedure in the event of an emergency (e.g. loss of propulsion or steering) and has emergency contact details including the local coastguard. • display screen equipment (DSE) users to follow established procedures to avoid eye strain. • staff planning to work in the inside labs/containers on their own should let the SIC or shift leader know. Regular checks should be made to ensure their well-being (either by visual confirmation or by regular phone contact). • no lone working should be carried out on deck at any time.									
Use of SCANMAR	*Safety* (risk of electrocution and electrical burns to the skin	• conduct all charging and fixing operations only with express permission of deck officer. • only trained, experienced staff should attach the sensors to the net on deck. Ensure that the attachment points/shackles/ropes are not entangled in staff clothing. • visually inspect the plug before each use and ensure it is PAT tested annually. Do not use any charger that does not display a current test sticker. • mains electricity is not to be used on the deck unless a dedicated protected supply (within a waterproof housing) has been provided for that purpose. Only work with a low voltage (12V or 24V) DC supply and ensure it is isolated before connecting the sensors. • dry the connection points on the unit thoroughly before attaching the chargers. The charger should only be connected and disconnected when the switch is in the off position. An indicator light shows the state of the charger. • If leaving the unit charging unattended, ensure that it is properly secured and is well away from any source of water.	S, O, C, V	1	3	MED	X		X		Not required
Sorting and sampling the fished catch	*Safety* (cuts and puncture wounds by sharps)	• use of trained and experienced staff only. • do not undertake sampling when unsafe to do so in rough sea conditions (weather limits to be determined by the Captain in liaison with the SIC) to avoid personal injury. • use instruments (e.g. forceps/knives) with dry hands where possible to prevent slippage and use those as blunt as permissible for the procedure (or use plastic forceps). • dispose of any rusted or unclean equipment safely in a sharps bin.	S	1	2	LOW		X	X		Not required

		Use disposable scalpels when possible. Dry thoroughly after use to prevent rust developing on the metals. • use hand protection such as cut-resistant gloves or nitrile gloves (double layered) for increased mobility.										
	Ergonomic (muscle strain or injury when manoeuvring heavy loads e.g. fish baskets; postural problems, standing for long periods of time)	• follow manual handling training and guidelines (HSMS11) and complete the Manual Handling e-learning module (available on Pathways). • do not carry loads beyond your personal capability (~ 25kg at waist height for a male, 16kg for a female). • if loads are above personal carrying capacity, use an appropriate container with handles on two sides, and adopt a two-person lift. • make sure your path is clear before lifting bulky equipment that may block your view of the ground • take plenty of breaks (a few minutes every half hour) which involve moving around and stretching. Clerks should periodically stretch their fingers to avoid cramps in the hand. • a stool of appropriate height may be used when sampling as long as it can be sited securely on the floor.										
	Biological (stings, cuts, bites, puncture wounds and/or contamination through sample and water contact)	• inform the SIC and your ENG1 doctor if you have any existing allergies to fish/shellfish tissue to ensure the availability of appropriate PPE and/or anti-histamine medicine. • staff to be made aware of the risks posed by biological agents/contaminated water and how they can be handled safely. Leptospirosis bacteria are low risk at sea, as they are unable to survive in salt water conditions. • clean and disinfect any wounds and cover with a plaster/bandage. • wear thick, protective gloves (e.g. 'mapa' gloves) when sorting the catch, especially from tows with jellyfish/spiny urchins/fish/crabs/elasmobranches with sharp body parts, rough skins, pincers and/or barbs, to prevent damage to your skin and to restrict bacterial or microbial contact. If a tow is heavily contaminated with jellyfish, use protective eyewear (e.g. safety goggles) to prevent any sting entering the eye area. • wash hands thoroughly with an antimicrobial soap before eating and drinking.										

KEY: (*) **'People at Risk' - S** (Staff at work), **V** (Visitors), **O** (Others working nearby), **C** (Contractors at Work), **M** (Mothers - new & expectant), **Y** (Young people)
'Rate' – 'L' Likelihood 'S' Severity

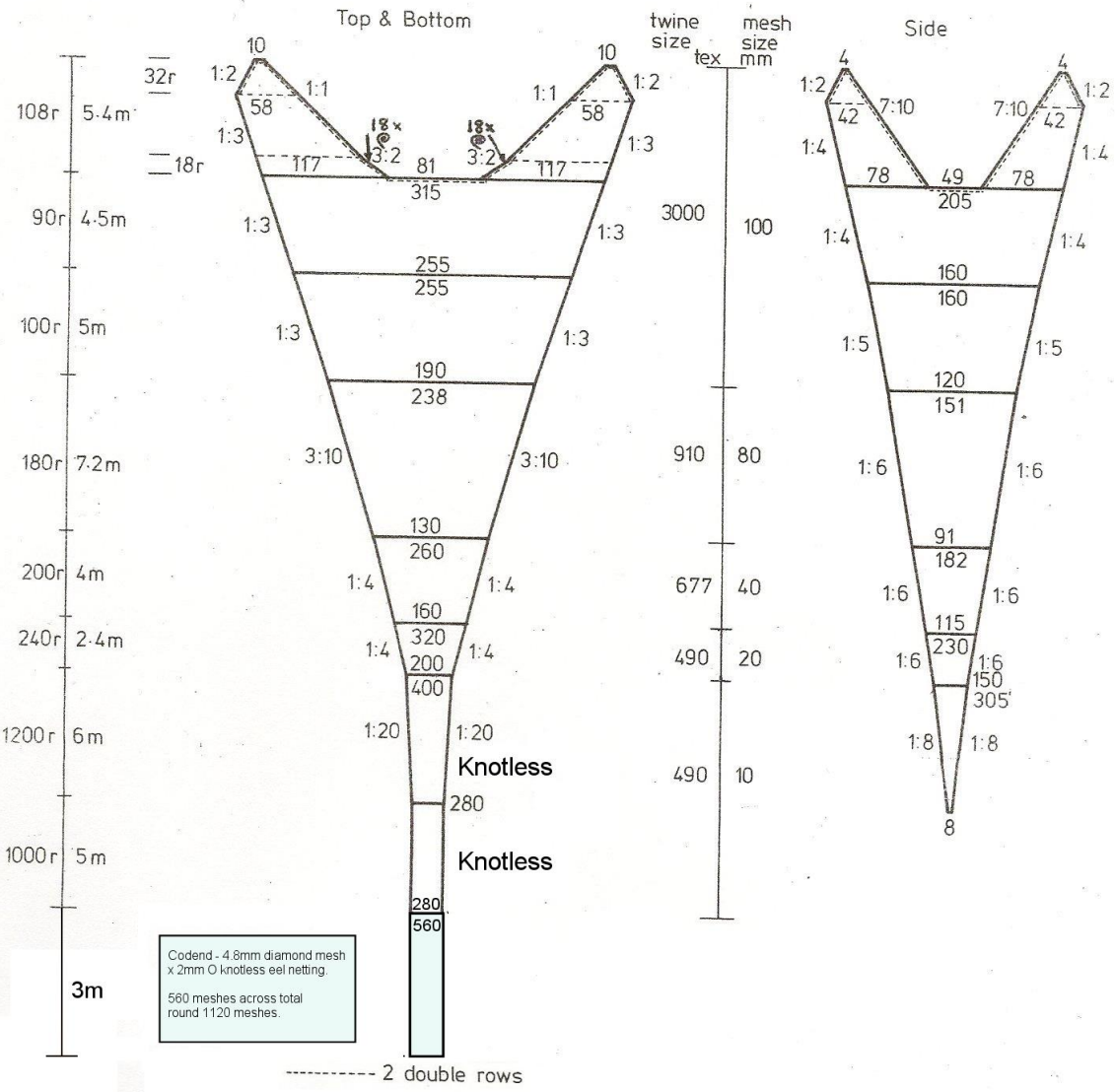
Risk Assessment Team	**Name:** [Redacted] **Sign:**	**Name:** [Redacted] **Sign:**	**Name:** [Redacted] **Sign:**
	Name: **Sign:**	**Name:** **Sign:**	**Name:** **Sign:**

ALL RISK ASSESSMENTS MUST BE RECORDED AND COMMUNICATED WITH ALL AFFECTED PERSONS. IDENTIFIED TRAINING SHOULD BE COMPLETED



Risk rate = Likelihood of event x Potential Severity of harm

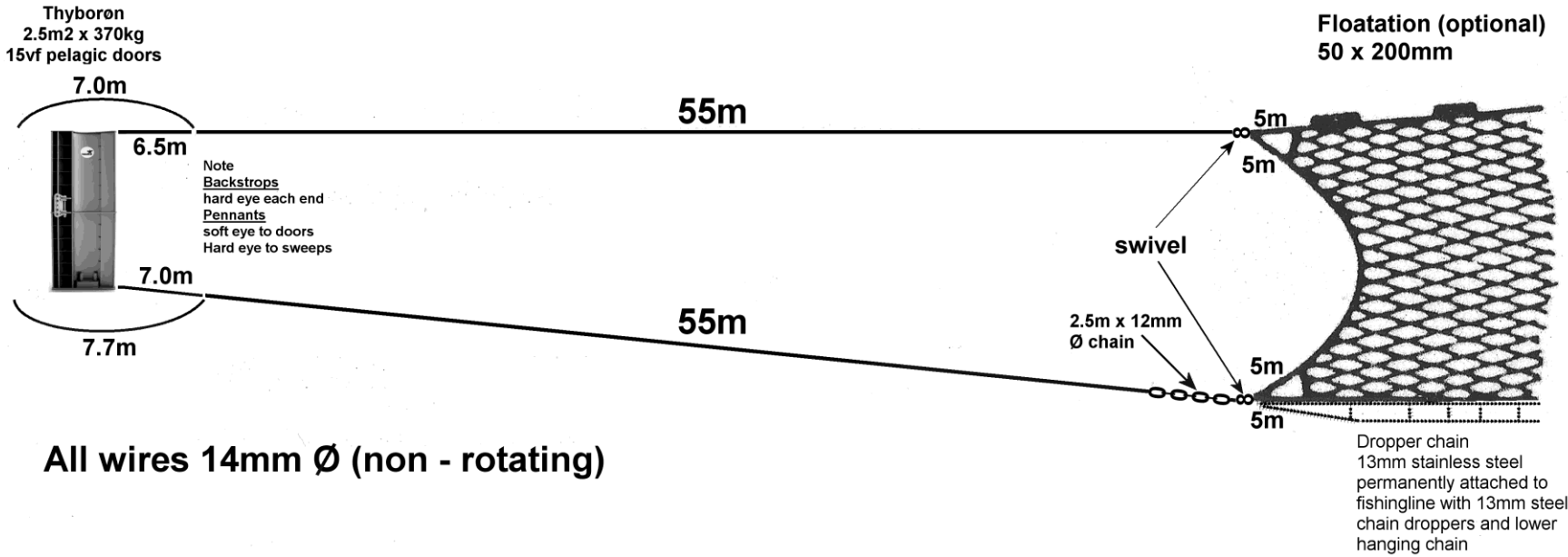
DRAWING No.
PT 154



Headline & Footrope	17·5 m (5·7+1·35+3·4+1·35+5·7)	16mm Ø pre stretched terylene
Side Panel Lines	14·5 m (6+2·5+6)	16mm Ø pre stretched terylene
Sidelines	3·2 m (1·6+1·6)	16mm Ø pre stretched terylene
Selvedge strengthening ropes		12mm Ø nylon

Checked	MATERIAL	PROTECTIVE FINISH	TOLERANCES	COI
Traced	NYLON			
Drawn			DIMENSIONS IN Metric	TIT
			SCALE 1:200 FOR NET	Y

Alba PT154 pelagic wire rig



All wires 14mm Ø (non - rotating)