

Report on the investigation of the
fatal man overboard from fishing vessel

North Star

16nm north of Cape Wrath, Scotland

5 February 2018



Extract from
The United Kingdom Merchant Shipping
(Accident Reporting and Investigation)
Regulations 2012 – Regulation 5:

“The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame.”

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 14(14) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

Front cover image courtesy of the Maritime and Coastguard Agency

© Crown copyright, 2018

You may re-use this document/publication (not including departmental or agency logos) free of charge in any format or medium. You must re-use it accurately and not in a misleading context. The material must be acknowledged as Crown copyright and you must give the title of the source publication. Where we have identified any third party copyright material you will need to obtain permission from the copyright holders concerned.

All MAIB publications can be found on our website: www.gov.uk/maib

For all enquiries:

Marine Accident Investigation Branch
First Floor, Spring Place
105 Commercial Road
Southampton
United Kingdom
SO15 1GH

Email: maib@dft.gov.uk
Telephone: +44 (0) 23 8039 5500
Fax: +44 (0) 23 8023 2459

Press enquiries during office hours: 01932 440015
Press enquiries out of hours: 020 7944 4292

CONTENTS

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

SYNOPSIS	1
SECTION 1 - FACTUAL INFORMATION	2
1.1 Particulars of <i>North Star</i> and accident	2
1.2 Narrative	3
1.2.1 Background	3
1.2.2 The accident	4
1.2.3 The rescue	4
1.3 Environmental conditions	6
1.4 <i>North Star</i>	7
1.4.1 General	7
1.4.2 Survey and inspection	7
1.5 Creel fishing	8
1.5.1 Assembly of a creel fleet	8
1.5.2 Vessel modifications	8
1.5.3 Creel shooting hazard	11
1.6 Crew	11
1.6.1 Manning	11
1.6.2 Qualifications	11
1.6.3 Senior skipper	12
1.6.4 Skipper	13
1.6.5 Mark Elder	13
1.6.6 Cannabis	13
1.7 Onboard safety	13
1.7.1 Health and safety general duty	13
1.7.2 Risk assessment	14
1.7.3 Emergency preparedness	14
1.8 Cold water immersion	15
1.9 Skipper/owner responsibilities	15
1.10 Previous accidents	16
1.10.1 <i>Varuna</i>	16
1.10.2 <i>Pauline Mary</i>	16
SECTION 2 - ANALYSIS	17
2.1 Aim	17
2.2 The accident	17
2.3 Entanglement	17
2.3.1 Entanglement in the gear	17
2.3.2 Dragged overboard	18
2.4 In water survivability	18
2.5 The rescue	18
2.6 Safety culture	19
2.6.1 Responsibilities	19
2.6.2 Risk assessment	20
2.7 Regulatory oversight	20
2.8 Drug use on board fishing vessels	21

SECTION 3 - CONCLUSIONS	22
3.1 Safety issues directly contributing to the accident that have been addressed or resulted in recommendations	22
3.2 Other safety issues directly contributing to the accident	23
3.3 Safety issues not directly contributing to the accident that have been addressed or resulted in recommendations	23
SECTION 4 - ACTION TAKEN	24
4.1 Actions taken by MAIB	24
4.2 Actions taken by other organisations	24
SECTION 5 - RECOMMENDATIONS	25

FIGURES

Figure 1	-	The deckhands' positions on the working deck
Figure 2	-	Plan of <i>North Star's</i> main deck level
Figure 3	-	BA Chart 002 showing the location of <i>North Star</i> at the time of the accident, with inset of location on BA Chart 2720
Figure 4	-	Image of <i>North Star</i> in the seaway taken from the rescue helicopter video footage
Figure 5	-	Creel arrangement
Figure 6	-	Former working deck layout
Figure 7	-	Modified working deck layout

TABLES

Table 1	-	<i>North Star's</i> crew qualifications
----------------	---	---

ANNEXES

Annex A	-	Extracts from The Code of Safe Working Practices for the Construction and Use of 15m Length Overall (LOA) to less than 24m Registered Length (L) Fishing Vessels
Annex B	-	Extracts from MGN 411(M+F) – Training and Certification Requirements for the Crew of Fishing Vessels and their Applicability to Small Commercial Vessels and Large Yachts
Annex C	-	<i>North Star's</i> risk assessments for 'general working on deck', 'shooting general' and 'potting'
Annex D	-	Safety Flyer to the Fishing Industry

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

CCTV	-	Closed Circuit Television
CPR	-	Cardiopulmonary Resuscitation
DSC	-	Digital Selective Calling
kg	-	kilogram
kts	-	knots
LOA	-	Length Overall
m	-	metre
MAIB	-	Marine Accident Investigation Branch
MCA	-	Maritime and Coastguard Agency
MGN	-	Marine Guidance Note
MSN	-	Merchant Shipping Notice
nm	-	nautical miles
PFD	-	Personal Flotation Device
Seafish	-	Sea Fish Industry Authority
SOG	-	speed over the ground
STCW	-	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended (STCW Convention)
UKFVC	-	United Kingdom Fishing Vessel Certificate
UTC	-	Universal Co-ordinated Time
VHF	-	Very High Frequency

TIMES: all times used in this report are UTC unless otherwise stated.



North Star

SYNOPSIS

On 5 February 2018, at approximately 1815, Mark Elder, a crewman on the 16.46m creel fishing vessel *North Star*, was dragged overboard after his leg became entangled in the fishing gear as the crew were shooting creels 16nm north of Cape Wrath, Scotland. The crew recovered him back on board about 10 minutes later; he was unconscious and unresponsive. The crew carried out cardiopulmonary resuscitation for over an hour, but they were unable to revive him.

The accident occurred because the crewman was working close to running ropes and became entangled in the back rope while engaged in toggling the creels on to the leg ropes. Although the alarm was raised quickly the skipper was unable to stop the vessel in time to prevent the crewman from being dragged overboard.

This is one of a number of recent accidents in which fishermen have died after becoming entangled in gear when the vessels' crews have been unable to either prevent them from going overboard or quickly recover them back on board. *North Star's* crew had not completed a practical manoverboard drill during their time on board and were ill-prepared for the emergency.

The MAIB investigation found that the vessel's documented risk controls did not reflect the operational practice on board, and that the crew underestimated the risks associated with a crewman becoming entangled in the back rope and being dragged overboard. Shooting operations did not follow published industry best practice to effectively physically separate the crew from the back rope and to have knives at hand. In addition, *North Star's* owner was new to fishing vessel ownership and did not take a proactive approach to ensure regulatory compliance in respect of risk assessment review, vessel inspection and crew qualifications.

North Star's owner, Scrabster Seafoods Limited, has since installed a physical barrier to reduce the risk of crew becoming entangled in the back rope. The company has also reviewed its risk assessments, ensured its crew have attended mandatory safety training, provided personal flotation devices on board, and introduced a drug and alcohol policy.

A recommendation has been made to Scrabster Seafoods Limited, which seeks to further improve the overall safety of its crews. A recommendation has also been made to the Maritime and Coastguard Agency aimed at improving the support and guidance it provides to commercial fishing vessel owners.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *NORTH STAR* AND ACCIDENT

SHIP PARTICULARS	
Vessel's name	<i>North Star</i>
Flag	United Kingdom
Classification society	Not applicable
IMO number/fishing numbers	WK 623
Type	Creel fishing vessel
Registered owner	Scrabster Seafoods Limited
Manager(s)	Scrabster Seafoods Limited
Construction	Steel
Year of build	1996
Length overall	18.2m
Registered length	16.46m
Gross tonnage	150
Authorised cargo	Not applicable
VOYAGE PARTICULARS	
Port of departure	Scrabster, Scotland
Port of arrival	Scrabster, Scotland
Type of voyage	Coastal
Cargo information	Crabs
Manning	6
MARINE CASUALTY INFORMATION	
Date and time	5 February 2018 at approximately 1820
Type of marine casualty or incident	Very Serious Marine Casualty
Location of incident	16nm north of Cape Wrath, Scotland
Place on board	Working deck
Injuries/fatalities	One fatality
Damage/environmental impact	None
Ship operation	Shooting creels
Voyage segment	Mid-water
External & internal environment	Wind: south-west 35 knots Sea: rough Tidal stream: north-west 1.5 knots Water temperature: Approximately 10°C
Persons on board	6

1.2 NARRATIVE

1.2.1 Background

There were two methods of shooting creels employed on *North Star*. The self-shooting method, which could be used in sea conditions up to sea state 6, and the manual shooting method. The manual shooting method involved Deckhand 1 moving the creels one at a time from the stow to the launching table where Mark Elder was stationed (**Figure 1**). Mark then removed a leg rope from the shooting poles and toggled the creel to it before Deckhand 2 moved the attached creel to the vessel's side ready for it to be launched. Deckhand 3 was stationed at the cutting table, processing the crabs from the previous haul. The skipper was alone in the wheelhouse monitoring the vessel's speed and the closed circuit television system (CCTV) that showed what was happening on the working deck. There was also a tannoy system that enabled the skipper to communicate with the crew and vice versa. The sixth crewman was off-watch and in the crew mess room (**Figure 2**).

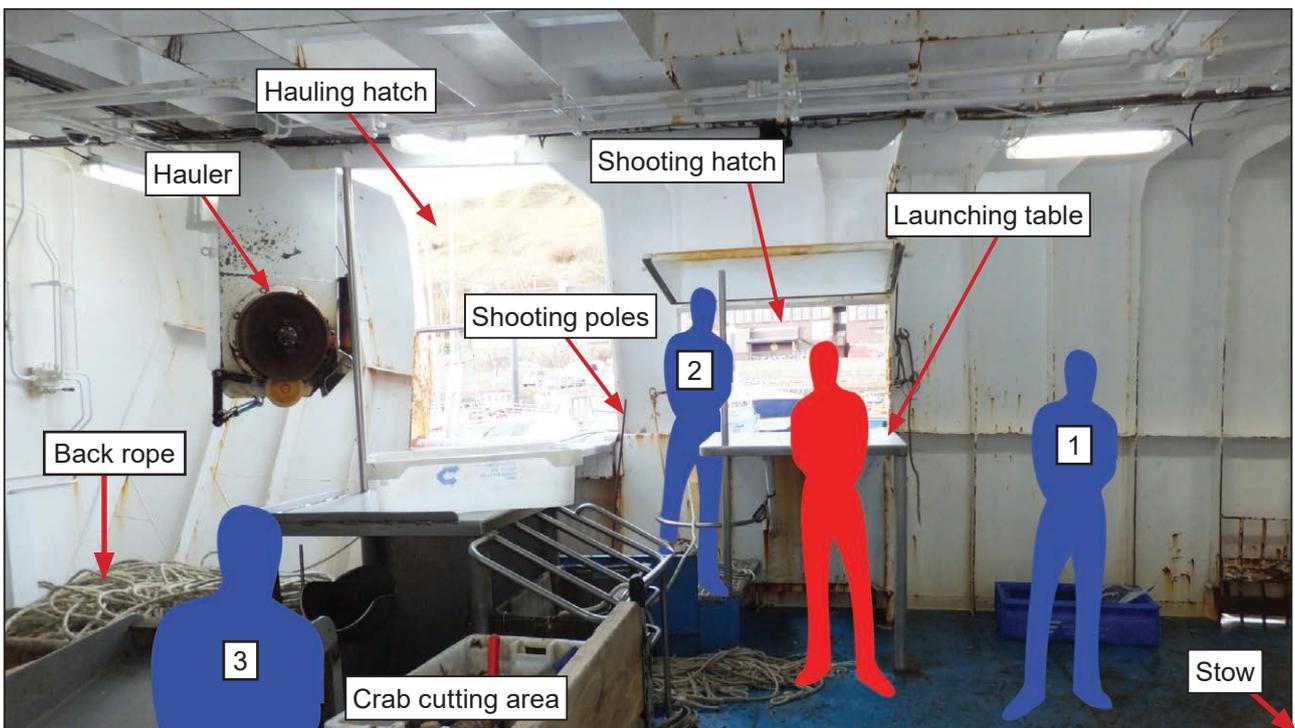


Figure 1: The deckhands' positions on the working deck

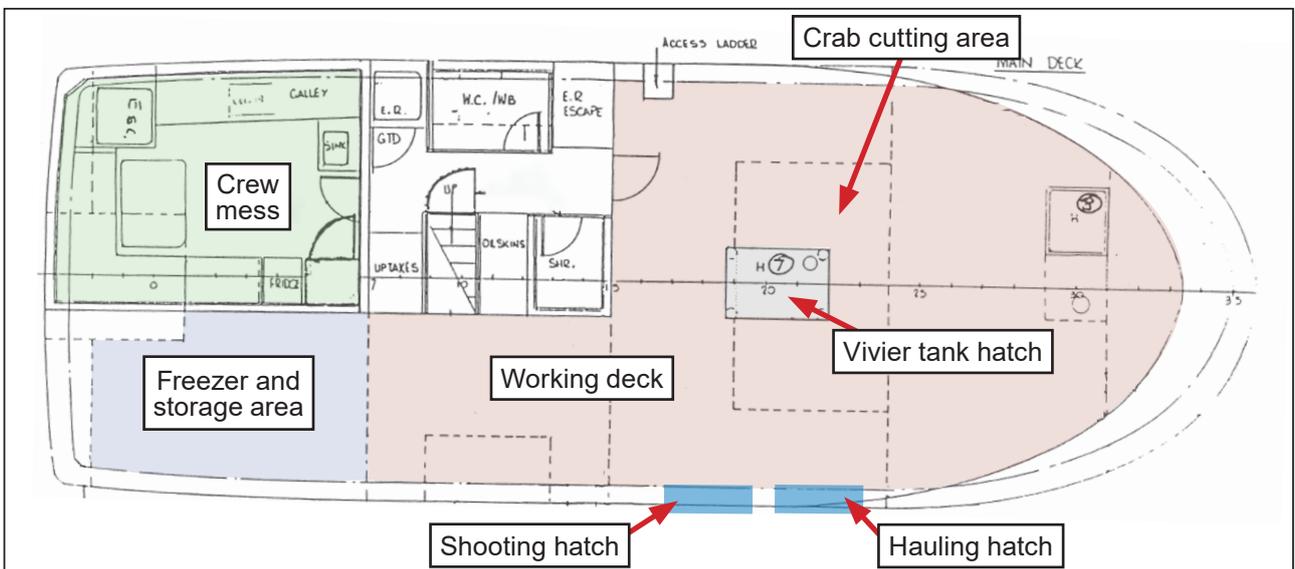


Figure 2: Plan of *North Star*'s main deck level

1.2.2 The accident

North Star departed Scrabster, Scotland just after midnight on 2 February 2018. Its six crew members expected to remain at sea for up to 10 days before returning to Scrabster to land the catch for processing.

At about 1815 on 5 February *North Star* was approximately 16nm north-west of Cape Wrath (**Figure 3**), following a north-easterly course at a speed over the ground (SOG) of 5 knots (kts). Its engine throttle was set to 'ahead'. The four deckhands were on the working deck (**Figure 2**) manually shooting a fleet of creels when the skipper heard a shout of "Easy"¹ over the tannoy. In response, he placed the engine throttle to 'neutral', and *North Star*'s SOG gradually reduced, although the vessel continued to make headway.

Shortly afterwards, the skipper heard a shout of "Stop" and he placed the engine throttle to 'astern' to stop the vessel in the water. From the CCTV display, the skipper could see that Mark had been pulled against the launching table, with his left leg entangled in the back rope, which was leading out of the shooting hatch. There was a toggled on creel on the table, ready to be launched overboard. Although Deckhand 2 had grabbed hold of Mark, he was unable to maintain his grip; Mark was dragged over the side, followed by the last creel toggled on to the fleet. Deckhand 3 immediately ran to the shooting poles, and threw three leg ropes off the poles to slacken the rope to help enable Mark to free himself from the back rope. He then ran up to the wheelhouse.

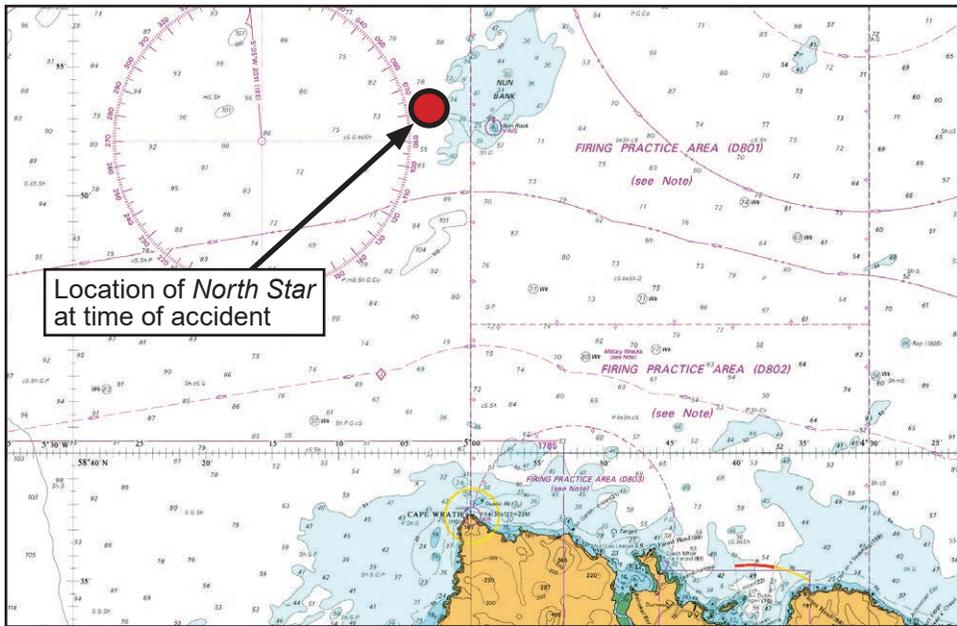
On seeing that Mark had been dragged overboard, the skipper immediately placed the engine throttle to 'neutral' to stop the propeller. He used the spotlight sited on top of the wheelhouse to search for Mark on the surface. Deckhand 3 then arrived on the bridge to assist the skipper in the search.

1.2.3 The rescue

Immediately after Mark had been dragged overboard, Deckhands 1 and 2 worked together to lead the back rope from the shooting hatch, through the hauling hatch and on to the creel hauler (**Figure 1**). They initially wound the rope on to the hauler in the wrong direction, and it took two further attempts to wind the rope on successfully. After being submerged for about 10 minutes, Mark was hauled to the surface and then recovered back on board. He was unconscious and unresponsive. Mark's left leg was entangled in the back rope a short distance from the second creel. The deckhands released Mark from the back rope and placed him on the flaked back rope. They immediately started cardiopulmonary resuscitation (CPR) and were soon joined by the sixth crewman, who had heard the commotion.

From the CCTV display, the skipper saw that Mark was back on board and clearly in need of assistance. At 1828, the skipper pressed the digital selective calling (DSC) alert button on the very high frequency (VHF) radio. This alerted the coastguard, who attempted to contact the vessel by VHF radio. At the same time, *North Star*'s skipper tried to call the coastguard using the VHF radio, but due to the distance between the vessel and the shore, he was unable to hear the coastguard responses. To alert the authorities, the skipper used the satellite phone to contact a director of

¹ 'Easy' indicated that the crew were finding the rate of shooting the creels too fast and the vessel's speed needed to be reduced.



Reproduced from Admiralty Chart 002 and 2720 by permission of HMSO and the UK Hydrographic Office

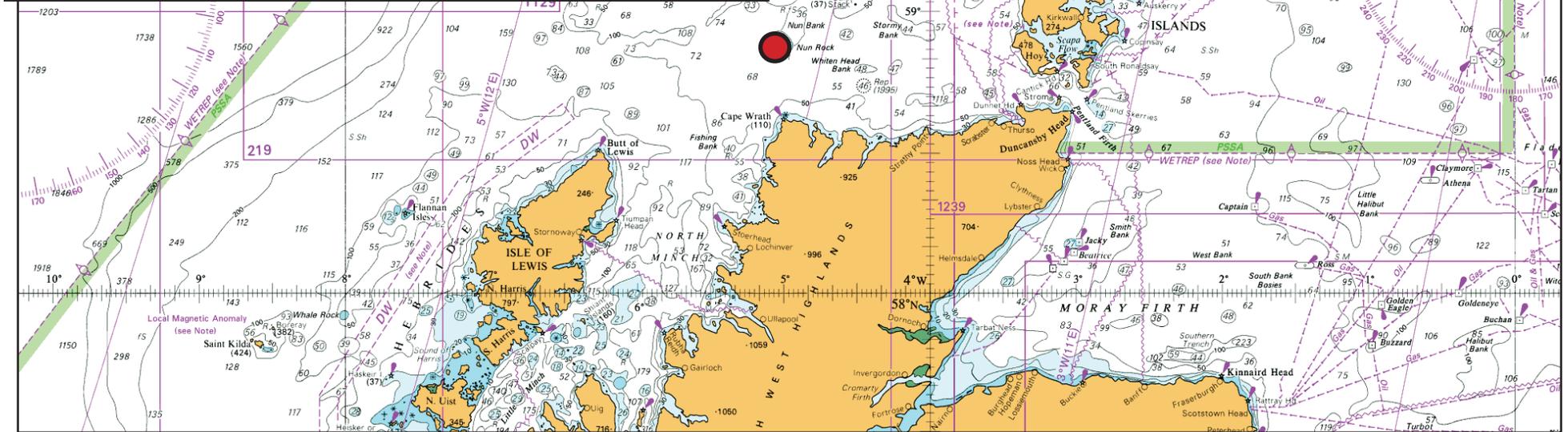


Figure 3: BA Chart 002 showing the location of *North Star* at the time of the accident, with inset of location on BA Chart 2720

Scrabster Seafoods Limited, *North Star's* owner. The skipper passed the director the details of the accident and *North Star's* position, and asked him to notify the coastguard and to request assistance from a rescue helicopter. At 1830, the director called 999 and passed details of the accident and the vessel's position to the coastguard.

At 1833, contact between the coastguard and *North Star* was established by satellite phone and the skipper gave details of the accident. He again requested helicopter assistance and, at 1834, the use of a rescue helicopter was approved and tasked to the scene.

By 1915, the rescue helicopter was on scene and, using VHF radio, *North Star's* crew were briefed on highline techniques. *North Star* was moving violently in the sea and swell (**Figure 4**), making it impossible to attempt a highline transfer and, at 1955, the captain of the rescue helicopter informed the coastguard that he was returning to base. Following the helicopter's departure, *North Star's* skipper set a course to return to Scrabster. After administering CPR continuously for almost 90 minutes without any response, and with no prospect of external assistance, *North Star's* skipper instructed the crew to cease their resuscitation efforts.

North Star arrived at Scrabster at 0312 the following day. A local general practitioner attended the vessel, and Mark was pronounced deceased at 0430.

1.3 ENVIRONMENTAL CONDITIONS

The wind was south-west 35kts, the sea was rough and there was a north-west tidal stream of 1.5kts. It was dark and the water temperature was approximately 10°C.

Image courtesy of Maritime and Coastguard Agency

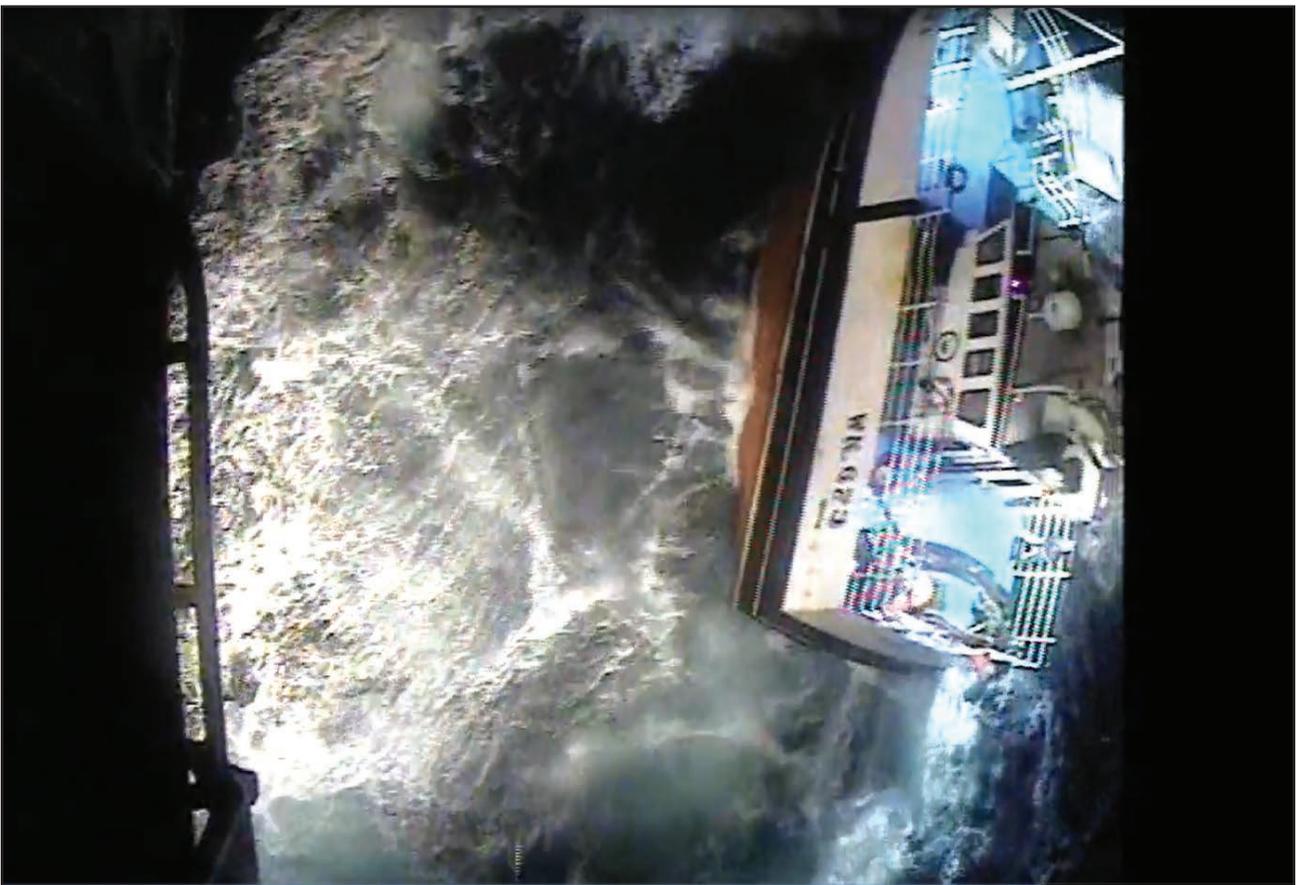


Figure 4: Image of *North Star* in the seaway taken from the rescue helicopter video footage

1.4 **NORTH STAR**

1.4.1 **General**

North Star was built in 1996. Originally named *Boy Shane*, the vessel operated out of Scrabster, Scotland, where its catch was landed and sold to the locally owned fish-handling and processing company, Scrabster Seafoods Limited.

In November 2016, Scrabster Seafoods Limited purchased *Boy Shane*. It was the company's first venture into fishing vessel ownership and its directors had no experience of operating and managing fishing vessels. The change of owner was registered with the Maritime and Coastguard Agency (MCA) and a new certificate of registry was issued on 21 November 2016.

In August 2017, *Boy Shane* was renamed *North Star*, and its owner removed the vessel from service in order that it could undergo an extensive refit. The working deck layout was modified at the same time, to replicate another vessel that *North Star's* senior skipper had seen, and whose layout he considered to be safer.

1.4.2 **Survey and inspection**

North Star was required to comply with The Fishing Vessels (Codes of Practice) Regulations 2017. The Regulations give statutory force to The Code of Safe Working Practice for the Construction and Use of 15 metre Length Overall (LOA) to less than 24 metre Registered Length (L) Fishing Vessels (the Code), the latest version of which came into force on 23 October 2017 and is contained within Merchant Shipping Notice (MSN) 1872(F). Relevant extracts from the Code are reproduced at **Annex A**.

As part of the process for renewing its United Kingdom Fishing Vessel Certificate (UKFVC), *Boy Shane* was surveyed by the MCA in Fraserburgh on 1 May 2014. The survey identified several deficiencies. As a consequence, a series of short-term UKFVCs were issued up until 31 March 2015, when a full-term UKFVC, valid until 19 April 2019, was issued. The certificate was displayed in *North Star's* wheelhouse.

The UKFVC included the notification that an intermediate inspection, to be completed by the MCA, was due between 20 April 2016 and 20 April 2017. When Scrabster Seafoods Limited purchased *Boy Shane* in November 2016, they were unaware that the intermediate inspection was due, and it was missed.

After its name change on 16 August 2017, *North Star* underwent a carving and marking survey. The survey was completed on behalf of the MCA by a Marine Scotland surveyor. The surveyor's remit did not include a safety inspection.

Following the accident, an MCA surveyor conducted an inspection of *North Star* in Scrabster on 7 February 2018. The surveyor noted a number of deficiencies, including that annual self-certification had not been completed by the owner, the vessel's risk assessments had not been reviewed, and not all crew had the required certification. He also noted that the intermediate inspection had not been completed, and consequently detained the vessel.

1.5 CREEL FISHING

1.5.1 Assembly of a creel fleet

Each of *North Star's* fleets of creels consisted of 100 creels, each weighing approximately 20kg when dry, spaced approximately 25m apart toggled on to 9m length leg ropes. At 45m from either end of the back rope there was a steel weight (Figure 5).

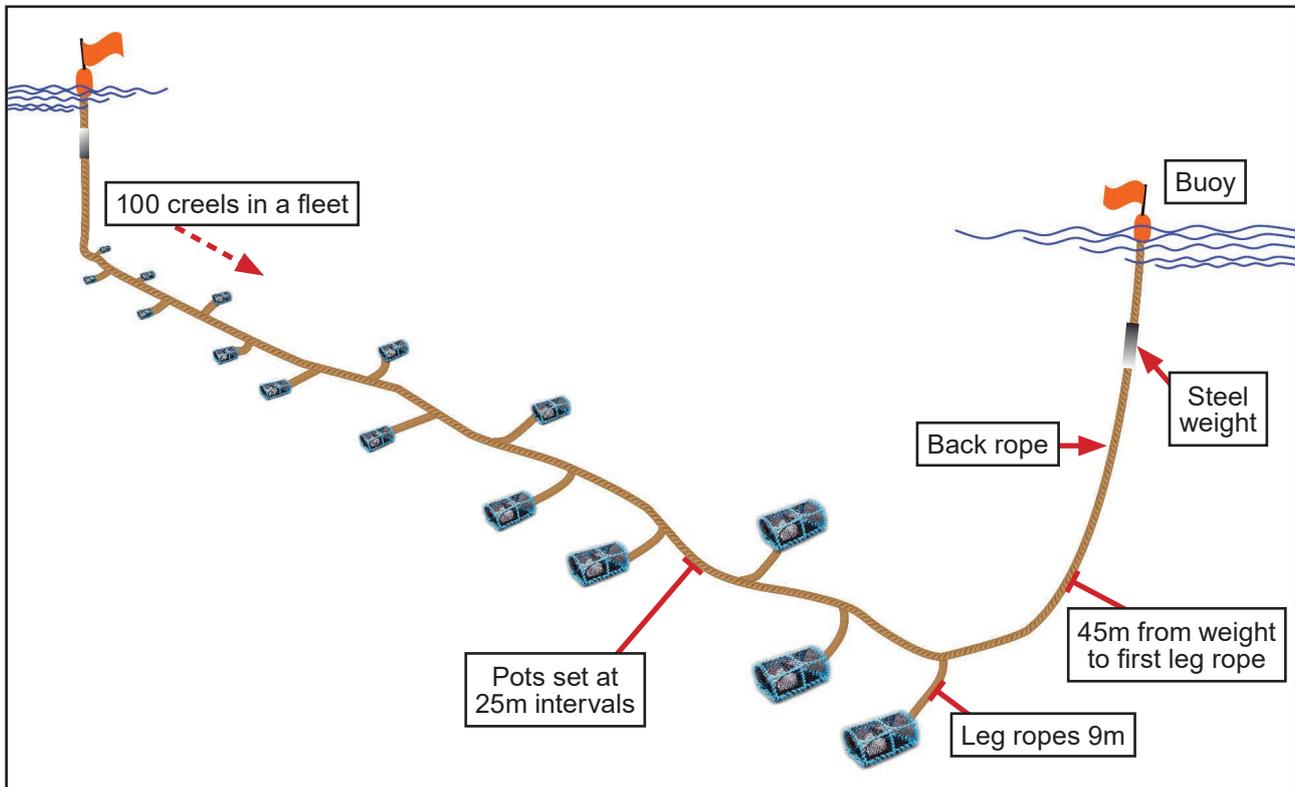


Figure 5: Creel arrangement

1.5.2 Vessel modifications

Prior to modification, *North Star* was not equipped with a self-shooting system and the creels were launched manually. The creels were stowed athwartships and the back rope, which was also stowed athwartships, was flaked on the deck between the creels and the crew (Figure 6). While stowed, the creels were toggled on to the leg ropes in series and then manhandled, one at a time, to the deckhand located at the table adjacent to the shooting and hauling hatch (Figure 6). There had been previous incidents of deckhands becoming entangled in the back rope as the creels were passed from the stow to the shooting hatch. On those occasions, either the deckhand had been able to quickly disentangle themselves from the rope or the skipper had managed to stop the vessel in the water in time to prevent the deckhand from being dragged overboard.

After modifying the working deck layout in August 2017, the back rope was stowed in a fore and aft direction, forward of the crew (Figure 7). There were no pound boards to separate the back rope from the crew; instead, the senior skipper instructed them to keep their feet on the deck to prevent their entanglement in the moving ropes. When shooting manually, a creel was placed on the table, where it was toggled on to a leg rope before being moved to the shooting hatch in readiness for it to be launched overboard. Once the shooting of creels began, the skipper varied the

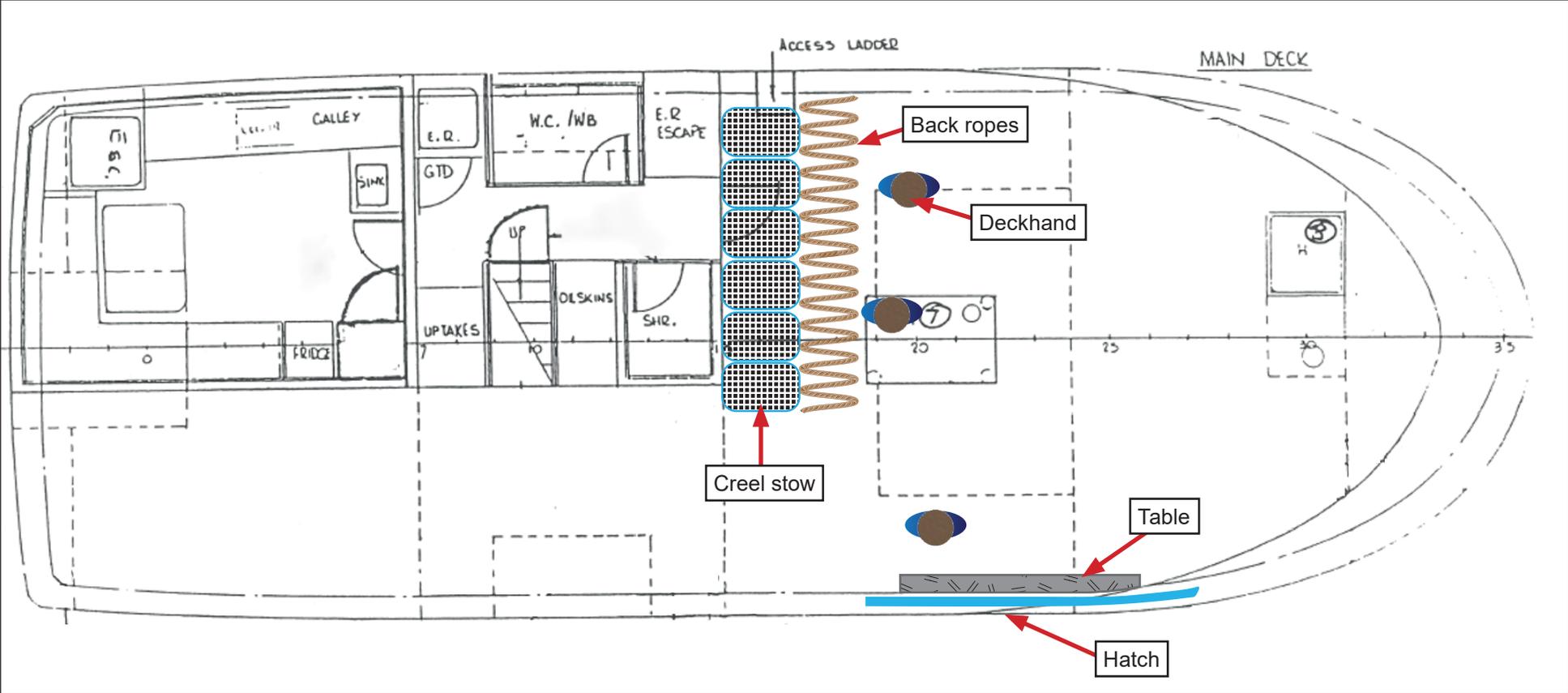


Figure 6: Former working deck layout

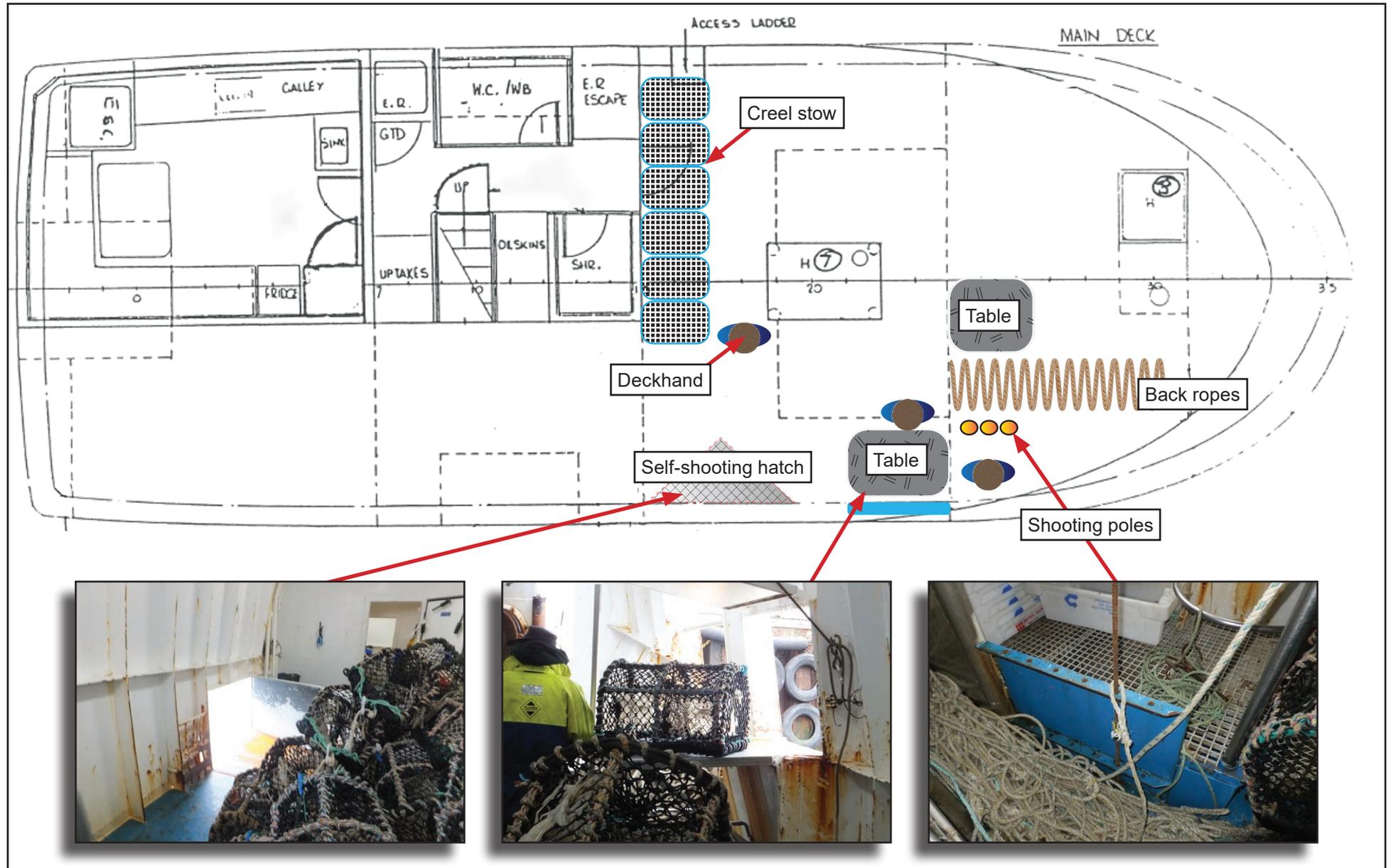


Figure 7: Modified working deck layout

vessel's speed to control the rate at which the back rope, and hence the creels, was deployed. At a SOG of 5kts, creels were deployed at a rate of one creel every 10 seconds.

The modifications to *North Star* in August 2017 included installation of a self-shooting system that could be used in weather conditions up to and including force 6 (22-27kts). Above this limit the vessel tended to ship seas across its working deck. The self-shooting system stationed the crew away from the running ropes, behind a partition. The creels were stowed in the usual athwartships position, but all were toggled on to the leg ropes in sequence before the first buoy and weight were deployed. The first buoy and weight were then deployed through the self-shooting hatch (**Figure 7**), followed by the fleet in sequence.

1.5.3 Creel shooting hazard

An industry advice notice 'Potting Safety', published by Seafish² in January 2011, offers three methods to reduce the risk of crew being carried overboard while shooting creels:

- Rope pounds or divisions to physically separate crew from the back rope.
- Detachable creels using a loop and toggle system, allowing crew to work the gear in a controlled fashion while still being separated from the gear by a barrier.
- A self-shooting system that does not require manual intervention.

The MCA publication 'Fishermen's Safety Guide' includes a section on creel fishing that discusses the layout of working decks and recommends the provision of a physical barrier between crew and the working gear.

1.6 CREW

1.6.1 Manning

North Star's six crew comprised three UK nationals, two Latvians and a Romanian. The working language on board was English. When fishing, the skipper and four deckhands usually completed 4-5 hours of work before resting, while the sixth crewman (referred to on board as the 'night watchman') helmed the vessel to the next location. The crew did not routinely record their hours of work and rest on board.

1.6.2 Qualifications

Fishermen serving on board UK registered fishing vessels must complete the mandatory safety training courses as detailed in MGN 411(M+F) – Training and Certification Requirements for the Crew of Fishing Vessels and their Applicability to Small Commercial Vessels and Large Yachts. Relevant extracts from MGN 411(M+F) are reproduced at **Annex B. Table 1** shows the training completed by *North Star's* crew.

² Sea Fish Industry Authority

	Basic Sea Survival	Basic First Aid	Basic Fire Fighting and Prevention	Basic Health and Safety ³	Safety Awareness and Risk Assessment
Senior Skipper	YES	YES	YES	YES	YES
Skipper	YES	YES	YES	NO	YES
Deckhand 1	YES	YES	YES	NO	YES
Deckhand 2	STCW basic training				NO
Deckhand 3	YES	YES	YES	NO	YES
Night watchman	STCW basic training				NO
Mark Elder	NO	NO	NO	NO	NO

Table 1: *North Star's* crew qualification

The safety training courses are provided by Seafish and, while there is equivalent training that is accepted for some of the courses, none is considered to provide equivalent competency to the Safety Awareness and Risk Assessment Course.

New entrants to fishing must complete the Basic Sea Survival training before they start work on board a UK fishing vessel. The Basic First Aid, Basic Fire Fighting and Prevention, and Basic Health and Safety Courses must be completed within 3 months of starting work as a fisherman. The Safety Awareness and Risk Assessment Course is to be undertaken by all fishermen coming from outside the UK and by UK fishermen with 2 or more years of experience.

1.6.3 Senior skipper

The senior skipper was a 37-year-old UK national. He was a career fisherman who had over 20 years of fishing experience and had first served as skipper in 2001. He had served most of his career on board *North Star*, first joining the vessel in 1998 during its previous ownership.

There were no written areas of responsibilities laid down for the senior skipper, and following the vessel's change of ownership he had carried on with his duties under the new owner as he had under the previous owner. He assumed responsibility for the day-to-day running of the vessel and liaised with the owner on maintenance issues.

³ Following the discovery that many experienced fishermen who joined the UK fishing industry after 1 January 2005 had not completed the mandatory Basic Health and Safety Course, the MCA decided:

'Fishermen who joined a UK fishing vessel for the first time after 1 January 2005 and before 1 June 2014 and did not undertake the Basic Health and Safety Course do not have to complete this course provided that they:

a) have completed the Safety Awareness and Risk Assessment Course and

b) can demonstrate the date of joining a UK vessel prior to 2014 to the satisfaction of an MCA surveyor.

Fishermen who joined a UK fishing vessel for the first time after 1 June 2014 and did not undertake the UK Basic Health and Safety Course must complete this course within a time specified by an MCA surveyor. This applies regardless of whether the fisherman holds the Safety Awareness and Risk Assessment Course.'

The senior skipper, who was not on board *North Star* at the time of the accident, shared the role of skipper with a relief skipper on an ad-hoc basis that depended on their respective availability.

1.6.4 Skipper

The relief skipper, who was the skipper on board *North Star* at the time of the accident, was a 30-year-old UK national. He had been fishing since he was 14, and did not hold a skipper's certificate. At the start of his career, the skipper had served on board *Boy Shane* as a deckhand, but he had left to join another vessel. He re-joined *North Star* as skipper in January 2017.

1.6.5 Mark Elder

Mark Elder was a 26-year-old UK national. He was an employee of Scrabster Seafoods Limited working on a zero hours' contract in the company's factory. Mark had actively sought to join the crew of *North Star*, and this was his seventh voyage on board.

Mark was health conscious, physically fit, and regularly visited the gym. He was 1.80m tall, weighed 70kg and was reportedly a strong swimmer. When Mark was dragged overboard he was wearing casual clothing, oilskins and wellington boots.

The postmortem report stated that Mark had abrasions on his limbs and, notably, an almost circumferential abrasion around his left upper leg. The report stated that the cause of death was drowning.

Mark was a recreational user of cannabis and the toxicology report stated that he had 11-Nor-9-carboxy-tetrahydrocannabinol⁴ in his urine. The pathologist noted:

'Cannabis metabolite was present in his urine although this can be detected for a number of days after use and there was no evidence of other drug use.'

1.6.6 Cannabis

Cannabis is the most widely used illegal drug in Great Britain. There are four different types of cannabis, and they vary in both strength and popularity.

Cannabis is both a sedating and hallucinogenic drug, and its effects range from making a person feel relaxed and happy, to inducing feelings of panic and paranoia. Hunger is also a common side effect. When under the influence of cannabis an individual's concentration may be poor and a lack of motivation may also be evident.

1.7 ONBOARD SAFETY

1.7.1 Health and safety general duty

In accordance with Regulation 5 of The Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997 (Statutory Instrument 1997, No 2962), an employer has a general duty to:

'ensure the health and safety of workers and other persons so far as is reasonably practicable'

⁴ The by-product of imbibed cannabis

The principles of this general duty applicable to *North Star*'s owner included, inter alia:

- Avoiding or minimising risks
- Evaluating unavoidable risks and taking action to minimise them
- Adopting safe work patterns and procedures, and
- Providing appropriate and relevant information and instructions for workers.

In practice, the skipper controlled day-to-day safety management of fishing operations on board *North Star*. When new crew joined the vessel, the senior skipper conducted a brief induction that included an explanation of the use and location of the safety equipment provided on board. No records of inductions were kept.

1.7.2 Risk assessment

MSN 1872(F) states:

'1.3.9.1 Risk assessments of the vessel are particular to each owner. When a vessel is sold, the new owner shall complete, or arrange for the completion of, a new risk assessment and new annual self-certification⁵.'

North Star had on board a Fishing Vessel Safety Policy Statement that contained risk assessments, and a statement to the effect that the risk assessments would be reviewed every 12 months or sooner if significant changes were made. The senior skipper had completed the risk assessments on 14 March 2005 and had reviewed them on 25 April 2014 prior to the renewal of the vessel's UKFVC. No further review was conducted until after the accident. The rest of the crew, including the relief skipper, were unaware of the risk assessments on board.

The risk assessments for 'general working on the deck, 'shooting general' and 'potting' are reproduced at **Annex C**.

1.7.3 Emergency preparedness

MSN 1872(F), Chapter 8 (Emergency Procedures) requires monthly emergency drills to be completed and recorded. Marine Guidance Note (MGN) 570(F) – Fishing Vessels – emergency drills – provides guidance on scenarios for different types of emergency drills. It draws particular attention to preparing for a man overboard by conducting manoverboard drills to familiarise crew with the required procedures.

MGN 571(F) – Fishing Vessels: Prevention of Man Overboard – acknowledges that although MGN 570(F) provides guidance on responding to man overboard emergencies,

'...it is clear that falling overboard is highly likely to result in death and therefore it is better to prevent Man Overboard from happening.'

⁵ Annual self-certification is a yearly written declaration by the owner on the UKFVC that, inter alia, the risk assessments remain appropriate to the vessel's fishing method and mode of operation, and that crew training and certification are valid.

MGN 571(F) provides guidance on how to assess the risk of going overboard and preventing it from happening. Where the risk cannot be removed by eliminating or isolating the identified hazards, it recommends the wearing of a Personal Flotation Device (PFD).

There was no record of safety drills maintained on board *North Star* and practical drills were not held. Safety talks were held when emergency procedures - such as manoverboard - were discussed. Crew were shown where safety equipment was stowed, although the equipment was neither used nor demonstrated. None of the crew wore a PFD when working on deck.

The MCA publication 'Fishermen's Safety Guide' warns that familiar and repeated tasks can cause lapses in concentration, and advises fishermen to have a sharp knife to hand for use in an emergency. Mark did not carry a knife and there were no knives available in the vicinity of the shooting hatch.

1.8 COLD WATER IMMERSION

Sudden immersion in cold water (under 15°C) can result in cold water shock and/or cold incapacitation:

1. Cold water shock

Cold water shock takes place within the first 30 seconds to 2 minutes and is generally associated with a gasp reflex as the body comes into contact with the cold water, along with hyperventilation and a dramatic increase in heart rate and blood pressure. If the head goes underwater during this stage, the inability to hold one's breath will often lead to water entering the lungs in sufficient quantities to cause death. The increased heart rate and blood pressure can result in cardiac arrest, especially if the casualty has an existing cardiovascular condition. Panic can cause the hyperventilation to continue even after the initial physiological effects have subsided.

2. Cold incapacitation

Cold incapacitation usually occurs within 2-15 minutes of entering the water. The blood vessels are constricted as the body tries to preserve heat and protect vital organs. This results in the blood flow to the extremities being restricted, causing cooling and consequent deterioration in the functioning of muscles and nerve ends. Useful movement is lost in the hands and feet, progressively leading to the incapacitation of arms and legs. Unless a PFD is worn, death by drowning occurs as a result of impaired swimming.

1.9 SKIPPER/OWNER RESPONSIBILITIES

At the time of writing this report the MCA was undertaking a public consultation in respect of proposed measures to implement the International Labour Organization Work in Fishing Convention, ILO 188⁶. The measures recognise that while a fishing vessel owner has overall responsibility for health and safety on board UK fishing vessels, they have limited control of day-to-day activities, and therefore must set the health and safety policy for the vessel so that the skipper is clear on what is

⁶ ILO 188 came into force internationally on 16 November 2017, but is not yet in force in the UK.

expected. In this regard, the MCA will expect skippers to have responsibility for the safety of fishermen on board the vessel and the safe operation of the vessel. This is to include:

- Providing supervision to ensure that fishermen work safely at all times.
- Managing fishermen in a manner that respects health and safety.
- Arranging regular onboard health and safety awareness training.
- Ensuring compliance with good navigation and watchkeeping standards.

1.10 PREVIOUS ACCIDENTS

1.10.1 *Varuna*

On 20 November 2017, the single-handed creel boat *Varuna* was found aground and unmanned on a small island. *Varuna* had left its mooring earlier in the day and had been seen working creel fleets.

An extensive sea, land and air search failed to locate the skipper, who had been the only person on board. His body was found washed ashore almost 3 weeks after the accident. The skipper did not routinely wear a PFD, and it is likely that he fell overboard during *Varuna*'s return passage to port.

The MAIB investigation⁷ concluded that by not wearing a PFD, the skipper's chances of survival after entering the water were significantly reduced. It also concluded that the MCA needs to adopt measures to ensure its oversight of commercial fishing is effective.

1.10.2 *Pauline Mary*

On 2 September 2016, the crewman on board the fishing vessel *Pauline Mary* was dragged overboard after becoming entangled in the gear while shooting pots. When the crewman was recovered back on board about 20 minutes later, he was not breathing and, despite the efforts of the skipper and the emergency services, could not be resuscitated.

The MAIB investigation⁸ identified that there was no physical separation between the crew and the back rope. The crewman was also neither carrying a knife nor wearing a PFD, both of which could have improved his chances of survival.

⁷ MAIB Report 13/2018:
<https://www.gov.uk/maib-reports/man-overboard-from-creel-fishing-vessel-varuna-with-loss-of-1-life>

⁸ MAIB Report 8/2017:
<https://www.gov.uk/maib-reports/man-overboard-from-potting-fishing-vessel-pauline-mary-with-the-loss-of-1-life>

SECTION 2 - ANALYSIS

2.1 AIM

The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future.

2.2 THE ACCIDENT

Mark Elder's left leg became entangled in the back rope of a fleet of creels that were being shot from *North Star*. The crew were unable to free him before he was dragged overboard. Once immersed, he was unable to free himself. By the time the crew were able to recover him back on board, he was unconscious and unresponsive, and the crew's efforts at CPR were unsuccessful in reviving him.

2.3 ENTANGLEMENT

2.3.1 Entanglement in the gear

The dangers of creel fishing are highlighted by the MCA in its 'Fishermen's Safety Guide', and by Seafish in its 'Potting Safety' industry advisory notice. Both publications illustrate the perils of standing in a rope bight, and emphasise the importance of keeping clear of moving ropes, particularly when shooting creels. Physical barriers, such as pound boards, are suggested as means of providing separation between crew and moving ropes. *North Star's* working deck modification completed in August 2017 was aimed at making the shooting operations safer. However, the modifications did not provide an effective physical separation between the crew and back rope during manual shooting operations.

Without a physical barrier to prevent Mark from becoming entangled in the back rope, he was in an extremely precarious position that relied on his ability to keep his feet on the deck. In the rough seas, *North Star* was moving violently (**Figure 4**) and, given the rate at which the creels were being shot, Mark is likely to have been more focused on toggling the creels on to the leg ropes rather than on keeping his feet flat on deck. He therefore inadvertently stepped into a bight of back rope. As the 'Fishermen's Safety Guide' warns, familiar and repeated tasks can cause lapses of concentration.

There had been previous incidents of *North Star's* crew becoming entangled in the running back rope. However, on those occasions either the deckhand had been able to quickly disentangle themselves from the rope or the skipper had managed to stop the vessel in the water in time to prevent the deckhand from being dragged overboard.

That there was no negative outcome from these incidents, together with the perceived 'safer' manual shooting arrangement, probably contributed to both Mark and the remaining crew underestimating the risks associated with the back rope.

A lack of physical separation between the crew and the back rope during shooting operations was a safety issue identified in the MAIB's *Pauline Mary* investigation, and both the Seafish Potting Safety Advice and the 'Fishermen's Safety Guide'

caution the need to effectively separate crew from the moving back rope. It is therefore a matter of concern that this essential safety guidance continues to be ignored.

2.3.2 Dragged overboard

Although *North Star*'s skipper was already reducing the vessel's speed when the crew raised the alarm, he was unable to stop the vessel in time to prevent Mark from being dragged overboard. Given the rate at which the creels were being deployed, and without a knife readily available to cut Mark free of the back rope, there was little else that Mark, or anyone else, could do to prevent him from going overboard. The 'Fishermen's Safety Guide' advises fishermen to have a sharp knife to hand for use in an emergency. However, *North Star*'s documented risk assessment did not identify knives as a risk control measure, and there were no knives available for use in the vicinity of the shooting hatch.

2.4 IN WATER SURVIVABILITY

Once Mark had entered the water, his only connection with *North Star* was the back rope that was wrapped around his left leg. This rope was weighed down on both sides by creels, and without a knife to hand it would have been difficult, if not impossible, to free himself before drowning.

Although Mark had completed six voyages on board *North Star*, he had not undertaken the mandatory Basic Sea Survival safety training course. Consequently, he was ill-prepared for sudden cold water immersion. Although Mark was reportedly a strong swimmer and in good physical health, he still might have succumbed to the effects of cold water shock.

However, had Mark survived initial cold water shock and had been able to free himself from the back rope, he would then have been at risk of drowning through cold incapacitation unless he was wearing a PFD and/or was able to be recovered quickly from the water. Contrary to the guidance provided in MGN 571(F), neither Mark nor the remaining crew of *North Star* wore a PFD when working on deck.

The MAIB's *Pauline Mary* investigation identified that the carrying of a knife could have improved the crewman's chances of survival after he had been dragged overboard. Additionally, both that and the MAIB's *Varuna* investigation concluded that the wearing of a PFD could have increased survivability in each case. Although the utility of a PFD would have been contingent on Mark's ability to free himself from the back rope, without it his chances of surviving a man overboard, into water of 10°C, were much reduced.

2.5 THE RESCUE

During the manoverboard recovery, it took *North Star*'s deckhands several attempts to correctly wind the back rope on to the hauler to heave it in and so recover Mark back on board. UK fishermen are taught the principles of manoverboard recovery when they complete the mandatory Basic Sea Survival and Safety Awareness and Risk Assessment safety training courses. However, when faced with a real-time situation, unless the initial training has been reinforced with onboard training in the form of practice drills, the crew are likely to be ill-prepared for an emergency.

Although there had been previous incidents of a deckhand becoming entangled in the back rope, either the deckhand had been able to quickly disentangle themselves from the rope or the skipper had managed to stop the vessel in the water in time to prevent the deckhand from being dragged overboard. The crew were therefore confident that a man overboard could be avoided following any future entanglements. The safety drills held on board *North Star* had been ‘discussions’ rather than practical exercises that would have allowed the crew to practise manoverboard procedures in accordance with the guidance provided in MGN 570(F). Had practical drills been held on board *North Star*, the crew would have been better prepared for the emergency.

Although there was a delay in recovering Mark back on board, the skipper was quick to alert the emergency services, and the continuous efforts of the crew to revive Mark over a period of almost 90 minutes were commendable.

2.6 SAFETY CULTURE

2.6.1 Responsibilities

North Star's owner, Scabster Seafoods Limited, was required to comply with the Code of Safe Working Practice for the Construction and Use of 15 metre Length Overall (LOA) to less than 24 metre Registered Length (L) Fishing Vessels. In particular, on taking ownership of *North Star* in November 2016, the owner or a delegated representative was required to complete new risk assessments and vessel self-certification. The self-certification was to be repeated annually to confirm, among other things, that the risk assessments remained appropriate to the vessel's fishing method and mode of operation, and that crew training and certification were valid. Furthermore, the owner was required to apply to the MCA for an intermediate inspection of *North Star* to be conducted in what remained of the period between 20 April 2016 and 20 April 2017 in which it was due.

Scabster Seafoods Limited was new to fishing vessel ownership, and so was unaware of the above requirements. *North Star*'s risk assessments and UKFVC were kept on board the vessel, and the owner left the day-to-day safety management of fishing operations under the control of the skipper. However, there were no written delegations of responsibility to the skipper, and the senior skipper had continued with his duties as he had under the previous owner. These duties were limited to the day-to-day running of the vessel and liaising with the owner on maintenance issues. Neither the owner nor the senior skipper was proactive in ensuring that the applicable regulatory requirements were met or that published industry best practice was being followed. Consequently, *North Star*'s intermediate inspection was missed, the vessel's documented risk assessments were not reviewed, annual self-certification was not carried out, and not all crew had the required safety training course certification.

The changes to UK legislation proposed by the MCA in respect of measures to implement ILO 188 should reaffirm that while the owner has overall responsibility for health and safety on board its vessels, it has limited control of day-to-day activities. Owners therefore must set out the health and safety policy for their vessels so that skippers are clear on their delegated responsibilities. However, this will still require a proactive approach to health and safety by both owners and skippers for effective policies to be established and implemented.

2.6.2 Risk assessment

North Star's documented risk assessments had been completed on 14 March 2005. The risk assessments identified a 'very unlikely' hazard of a crew member becoming entangled in rope and being dragged overboard, and required risk controls of ropes to be kept in a pound and crew to remain clear of the back rope during shooting operations. The vessel's working deck layout both before and after the modification completed in August 2017 required crew to work in close proximity to the back rope with no effective physical separation during shooting operations. Therefore, the documented risk controls did not reflect the operational practice on board, and the risk of a deckhand becoming entangled in the back rope and being dragged overboard remained high. The senior skipper's instruction for crew to keep their feet on the deck during shooting operations fell short of being an effective control measure and demonstrated an underestimation of the risks involved.

The risk assessments had been completed by the senior skipper, but they were not shared with any of the crew, including the relief skipper. They had not been reviewed after the change of ownership in November 2016 or following the working deck modification in August 2017. In fact, it is evident that the risk assessments were 'reviewed' only once before the accident, when no changes were made, on 25 April 2014 just prior to the renewal of the vessel's UKFVC.

Risk assessments have been required on board fishing vessels since 1998, and fishermen have better engaged with them in recent years. However, as is evident from the circumstances of this accident, more is needed to convince owners and fishermen that risk assessments are a valuable tool for improving safety and protecting lives.

While *North Star's* risk assessments required physical separation between the crew and the back rope, they did not identify a need for crew to carry knives or to wear a PFD during shooting operations. Without suitable and sufficient risk assessments to identify hazards, implementation of applicable risk controls to mitigate those hazards, and annual self-certification to confirm that risk assessments remain appropriate and that crew training and certification remain valid, the safety of *North Star* and its crew was compromised.

The safety culture on board a vessel is the product of individual and collective perceptions, competencies and values that determine an owner and crew's attitude to health and safety. Fishing vessels with a strong safety culture are those that are risk averse, resilient, adhere to regulatory requirements and industry best practice, and employ competent crew. As a result, they typically have fewer deficiencies, fewer accidents, and less resultant downtime.

2.7 REGULATORY OVERSIGHT

A fishing vessel of 15m or more LOA is not required to undergo an MCA safety inspection on change of ownership. Consequently, there was no requirement for the MCA to conduct a safety inspection of *North Star* following its issue of a UKFVC on 31 March 2015 until 20 April 2017, which was the latest time by when an intermediate inspection was required to be completed.

The MCA relied on a new owner completing, or arranging for the completion of new risk assessments and vessel self-certification, and applying for an intermediate inspection to be carried out. Scrabster Seafoods Limited was new to fishing vessel ownership and was unaware of the above requirements. It was not until the MCA's post-accident inspection on 7 February 2018 that it became apparent that self-certification had not been completed, the vessel's risk assessments had not been reviewed, not all crew had the required certification, and an intermediate inspection had not been completed.

The MAIB's *Varuna* investigation concluded that the MCA needs to ensure its oversight of commercial fishing is effective. In this regard, new owners, or those with limited experience of commercial fishing, would benefit from the MCA taking a proactive approach to informing them of applicable regulatory requirements and published industry best practice. Additionally, although not a mandatory requirement, a safety inspection by the MCA following a change of vessel ownership would provide reassurance that the new owner was aware of its obligations, the vessel's risk assessments had been reviewed, self-certification had been conducted, and crew training and certification were valid. Furthermore, a proactive approach by the MCA to provide a timely reminder to the owner to apply for a due survey or inspection would help ensure it was not missed.

2.8 DRUG USE ON BOARD FISHING VESSELS

Mark's use of cannabis cannot be attributed to his time on board *North Star*, however the possibility that he took it while on board cannot be eliminated. Therefore, it is difficult to state with any degree of confidence what effects, if any, Mark was experiencing from the drug at the time of the accident.

This is not the first time the MAIB has investigated an accident where drug use has been evident. Fishing vessels are potentially dangerous workplaces, and owners need to ensure, to the best extent possible, that crews are able to perform both their routine and emergency duties when required. The use of recreational drugs should be discouraged, and if appropriate a robust drug and alcohol policy adopted.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. There was no physical barrier to prevent Mark from becoming entangled in the back rope. [2.3.1]
2. Previous similar incidents on *North Star* in which a man overboard had been prevented, together with a perceived 'safer' manual shooting arrangement, probably contributed to both Mark and the remaining crew underestimating the risks associated with the back rope. [2.3.1]
3. Without a knife readily available to cut Mark free of the back rope, there was little else that Mark, or anyone else, could do to prevent him from going overboard. [2.3.2]
4. *North Star's* documented risk assessment did not identify knives as a risk control measure, and there were no knives available for use in the vicinity of the shooting hatch. [2.3.2]
5. Without a knife to hand, it would have been difficult, if not impossible, for Mark to free himself from the back rope before drowning. [2.4]
6. Mark had not undertaken the mandatory Basic Sea Survival safety training course. Consequently, he was ill-prepared for sudden cold water immersion, and might have succumbed to the effects of cold water shock. [2.4]
7. The safety drills held on board *North Star* had been 'discussions' rather than practical exercises that would have allowed the crew to practise manoverboard procedures. [2.5]
8. Neither the owner nor the senior skipper was proactive in ensuring that the applicable regulatory requirements were met or that published industry best practice was being followed. [2.6.1]
9. *North Star's* documented risk controls did not reflect the operational practice on board and, following a modification to the working deck layout, the risk of a deckhand becoming entangled in the back rope remained high. [2.6.2]
10. The MCA relied on a new owner completing, or arranging for the completion of, new risk assessments and vessel self-certification, and applying for an intermediate inspection to be carried out. [2.7]
11. It is possible that Mark's concentration was adversely affected by his use of cannabis. [2.8]

3.2 OTHER SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT⁹

1. It is possible that Mark's concentration was adversely affected by the familiar and repeated task of hauling and shooting creels. [2.3.1]

3.3 SAFETY ISSUES NOT DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. Had Mark survived initial cold water shock and had he been able to free himself from the back rope, he would have been at risk of drowning through cold incapacitation unless he was wearing a PFD and/or was able to be recovered quickly from the water. [2.4]

⁹ These safety issues identify lessons to be learned. They do not merit a safety recommendation based on this investigation alone. However, they may be used for analysing trends in marine accidents or in support of a future safety recommendation.

SECTION 4 - ACTION TAKEN

4.1 ACTIONS TAKEN BY MAIB

The **Marine Accident Investigation Branch** has:

- Issued a Safety Flyer to the Fishing Industry (**Annex D**).
- Formally responded to the consultation on ILO 188 legislation emphasising the need for the impending legislation to address safety issues identified in this report.

4.2 ACTIONS TAKEN BY OTHER ORGANISATIONS

Scrabster Seafoods Limited has:

- Installed a physical barrier (pound board) to reduce the risk of crew from becoming entangled in the back rope.
- Equipped the vessel with PFDs.
- Ensured that *North Star's* crew have attended the mandatory safety training courses.
- Reviewed the vessel's risk assessments.
- Introduced a drugs and alcohol policy for *North Star's* crew.

SECTION 5 - RECOMMENDATIONS

Scrabster Seafoods Limited is recommended to:

2018/130 Improve the overall safety of its crews by ensuring that:

- Documented risk assessments remain appropriate to the vessel's fishing operation and reflect industry best practice.
- Annual self-certification is conducted, risk assessments are reviewed at least annually, and crew training and certification remain valid.
- Mandatory vessel surveys and inspections are applied for at the required times.
- Practical emergency drills are conducted at least monthly and in accordance with industry best practice.
- Skippers are clear on their delegated responsibilities in implementing the vessel's health and safety policy.

The **Maritime and Coastguard Agency** is recommended to:

2018/131 Improve its support to commercial fishing vessel owners by:

- Providing new owners of fishing vessels with guidance on the applicable regulatory requirements and published best practice.
- Conducting a safety inspection following a change of fishing vessel ownership.
- Providing timely reminders to fishing vessel owners of the need to apply for due surveys and inspections.

Safety recommendations shall in no case create a presumption of blame or liability

