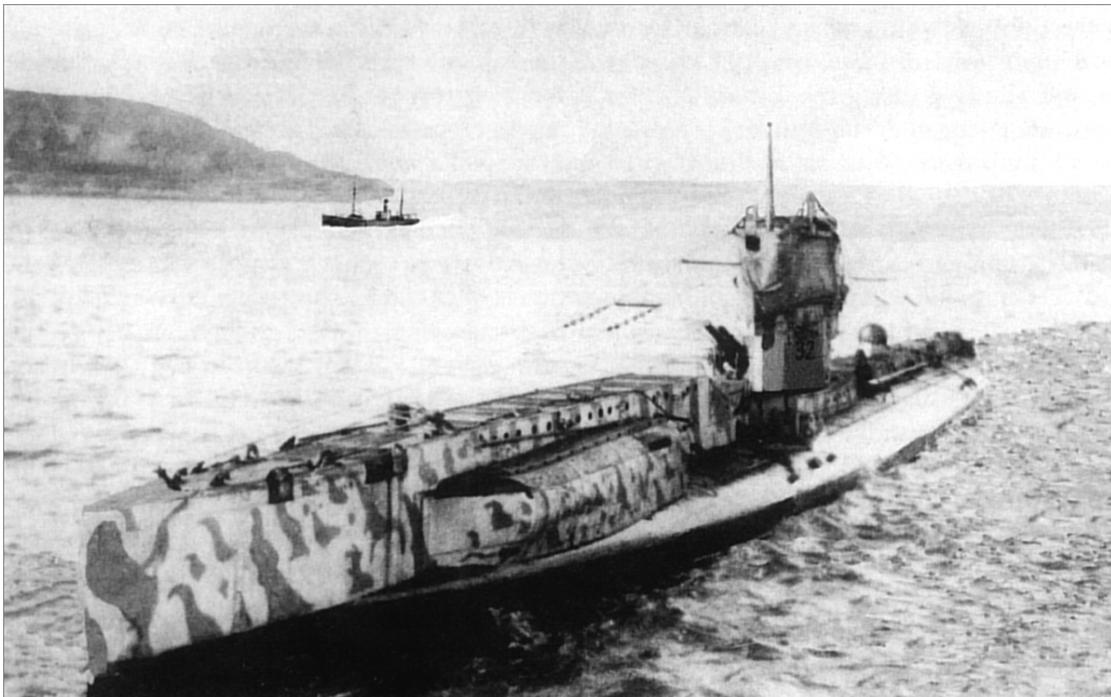


North East Remembrance Wrecks

An HLF Volunteer Project



**Prepared for Heritage Lottery Fund by HLF NE-funded
volunteers
May 2017**

NORTH EAST REMEMBRANCE WRECKS

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1 **ACKNOWLEDGEMENTS**

- 1.1.1 MAST would like to thank all the volunteers for their hard work and enthusiasm shown throughout the project. Thanks to Steve Brown - project leader, Derek Johnson – research co-ordinator, Barbara Green, Tom O'Neill, William Dunn, Stanley Hogson, Michael Warburton, Mark Hopkins, Stuart Knox, Mark Willis, Kyle Miller, Ian Porteous, Brett Murthwaite, Colin McMillan, Maggie Neary, Jean Wilkinson, Maureen Bramley, David Donaldson, Karen Johnston, Bob Hughes, Kevin Grieve and Pauline Cooksey.
- 1.1.2 MAST would also like to thank the staff at the Woodhorn archive, Northumberland who provided research training and access to their resources. Also Jessica Turner of the Areas of Outstanding Natural Beauty who provided help recruiting volunteers.

2 EXECUTIVE SUMMARY

Thanks to generous funding from Heritage Lottery Fund (HLF) in the North East, the Maritime Archaeology Sea Trust (MAST) was able to develop a pilot project with the principal aim of training diving and non-diving volunteers to get immersed, quite literally, into their maritime heritage, considering how the two World Wars affected their local region. It is a truism that increasing the access to knowledge and understanding of heritage acts as a deterrent to souvenir hunters. That which was little understood becomes appreciated and thus is afforded a far greater level of protection by the community.

Twenty-two volunteers took part in this Pilot Project, each playing a key role in unearthing the history of their local past. Divers undertook MAST's Basic Archaeological Diver (BAD) course and researchers were trained at the Woodhorn Archives in Northumbria. This particular project is now complete but its legacy lives on thanks to the training and experience they have gathered.

The document below represents the collected work of the volunteers.

3 INTRODUCTION

- 3.1.1 This document has been prepared by the Maritime Archaeology Sea Trust (MAST) alongside volunteers from Northumbria Scuba Divers, and local residents from the North East of England, sourced through Jessica Turner of the Areas of Outstanding Natural Beauty (AONB) Northumberland.
- 3.1.2 The Remembrance Pilot Project's focus was the United Kingdom's (UK) World War I and World War II underwater heritage off our North East coast. Of the most popular 100 dive sites, over half were sunk during the two World Wars. The UK has the largest and most significant collection of World War wrecks of anywhere in the world. The sheer number of vessels lost during the two wars and their survival as wrecks means that there are more wrecks from these periods than any other and, as such, approximately half of all dives in the UK are undertaken on a wreck from one of the two Wars.
- 3.1.3 There are over two million qualified divers in the UK. Should each one dive just once per year within the UK (the number is likely higher) over one million dives occur on World War wrecks from which little or no information is being disseminated. The number of divers visiting these sites is in huge disproportion to any archaeological or historical research dives that have been undertaken on the same wrecks.
- 3.1.4 This Project's aim was to train, facilitate and encourage the existing dive groups that are visiting these World War wrecks to provide valuable information to inform the historic record for the nation's underwater heritage. By providing the existing divers with the skills and means to undertake basic archaeological investigation, an understanding and appreciation of the historic and archaeological importance of the sites is greatly enhanced both locally within the relevant communities and nationally.
- 3.1.5 By being encouraged to appreciate our Nation's heritage, divers, additionally, will be deterred from souvenir hunting, a problem that has blighted many metal wrecks in the last 30 years. As stated succinctly by the UNESCO Scientific and Technical Advisory Body in a 2013 study: "Allowing or fostering public access to underwater cultural heritage helps to increase its appreciation and contribute to its increased protection and recreational value as well as the public's understanding of its significance" (UNESCO 2013).
- 3.1.6 The wrecks of North Tyneside as in many other locations around the UK have a high percentage of vessels lost during or as a result of the world conflicts at the start of the 20th century. The number of wrecks from this period is likely in the hundreds if not thousands. The conflict wrecks within this region once played a major role in maritime trade during WWII so permanent convoys were in place to protect the traders from the many threats of war. Many vessels were lost in action along the North Eastern coastline.
- 3.1.7 The archival histories and archaeological remains associated with these sites along with many of the other known wrecks within the region have been studied to tell the varied stories from the sailors serving aboard through to the wider general history of the role of the North East during the two World Wars. By studying and comparing both the written evidence and the archaeological underwater survey data it is often

possible to spot discrepancies which would not have been obvious by studying merely one or the other singly. Further, the wreck sites represent time capsules that lie relatively undisturbed from the moment following the sinking. By undertaking historical research alongside the underwater surveys will allow for a greater understanding of the two combined.

- 3.1.8 Aside from the historical and archaeological research being undertaken by the volunteers, one among them, Pauline Cooksey, is a marine ecologist and chartered marine technologist (CMarTech). From photographs taken by the divers she has studied the biodiversity and ecosystems within the marine environment that are being impacted by the presence of 'alien', non-native species, which have the potential to become invasive and over time displace native species. During the diving many images and video were collected for Pauline to review. Of the sites dived, none had any signs of invasive species (See **Appendix 1** for the full report.)

Methodology

- 3.1.9 The volunteer team consisted of 11 recreational divers and 10 researchers from the North East England and one marine biologist.
- 3.1.10 The divers were trained in basic archaeological techniques using MAST's own, internationally recognised, diver training programme, Basic Archaeological Diver (BAD). Each diver, on completion of the course, received their international PADI qualification card. The project provided an equipment pack of basic survey tools (tape measure, folding rule, underwater bag, waterproof notebook and project course work package in digital format).
- 3.1.11 The research team were all non-divers and were trained in archival research skills at the Woodhorn archive which also acted as a research base where many IT-based archives are accessible and interpreted along with many unique local documents.
- 3.1.12 MAST, with project volunteers Dave Parham, Bournemouth University and Dr Innes McCartney, Phd Marine Archaeology, Bournemouth University provided archaeological advice and support during the project.
- 3.1.13 MAST established a print media and social media platform for the Project publicity using MAST's, diver groups' websites, social media. All pages are still active and will be a place for the groups to publish and publicise any future work they do.
- 3.1.14 One volunteer provided research conducted on marine invasive species on wreck sites. This research will be able to be replicated on other wreck sites throughout the region and country. It represents the holistic approach taken by the HLF which is exemplified in its current programme "Capturing our Coast", holistically combining work on the marine environment with the historic environment. For the full report please see **Appendix 1**.

4 HISTORY

- 4.1.1 The North East of England was a major producer of raw materials like coal during WWI and WWII. The region also had one of the largest shipbuilding industries in the UK prior to the start of the First World War that continued throughout the first and Second World War. The story of shipping in the North Sea during both 20th century conflicts is one of huge production and huge loss. The circumstances in which people were killed or injured include some, simply terrifying causes, like explosion; scalding steam; fire; entrapment; cold and drowning. It was not only traumatic for those who suffered directly; surviving could mean long spells in the water or in open boats. And for all there was the sense that any of these things could happen at any instant, when in the North Sea especially.
- 4.1.2 The intent, on both sides, was to reduce the amount of food and supplies that the other side could deliver by sea. This encompassed material that contributed directly to the war effort by producing, munitions, equipment, raw materials but also goods for the general population in Britain. In this, German efforts to prevent civilian shipping from using the East Coast ultimately failed in both wars. Thousands of ships were sunk on both sides during the two wars, but many more had successful voyages and delivered their goods to the destination. The Allies made huge efforts trying to deny the use of the sea to ships serving Germany and in WWI were arguably more successful. It is estimated that 763,000 Germans died of starvation as a result of the Allies' maritime blockade in the First World War (Benbow, 2008). Maritime blockade was again a major feature of UK economic warfare against Germany throughout the Second World War.
- 4.1.3 The North East coast, like much of the British coastline, was defended heavily using a multi-layered system including both land and sea based systems.
- 4.1.4 German invasion was feared in both the First World War and especially the Second World War. In both wars, infrastructure was put in place to defend the East Coast, but again it was not used directly in maintaining civilian shipping.
- 4.1.5 Many East Coast ports were equipped with coastal batteries for defence against surface vessels (not submarines, unless on the surface themselves) (Foster 2004). Very few of the coastal batteries ever fired a shot in anger during both wars.
- 4.1.6 There is more overlap between anti-aircraft defence and coastal shipping, especially in the Second World War, because air attacks on shipping were a major cause of loss. The main focus of AA defence was on the ports rather than on shipping itself though undoubtedly ships in port were a focus for attack and had the benefit of port AA defences. It is important to bear in mind that defence of ports from the air using fighter aircraft as well as artillery was a major concern in the First World War (Benbow, 2008) as well as the Second World War because of the Zeppelin and Gotha raids that targeted East Coast towns and cities.
- 4.1.7 Large warships were active off the East Coast in both the First and Second World Wars, though in both conflicts their activities were limited. Several key engagements took place in the North Sea in the First World War, supported by extensive patrolling by RN cruisers and destroyers. The German attack on Hartlepool, Whitby and

Scarborough (Clarke 2010; Marsay 1999) is important with respect to civilian shipping because it was accompanied by minelaying that caused the loss of cargo ships and minesweepers. Following an indecisive action between elements of the British Grand Fleet and the German High Seas Fleet on 19 August 1916, it was determined that no operations of the Grand Fleet would be conducted south of the line of Horns Reef, off Denmark, because of the danger to major warships from mines and submarines (Newbolt 1931). Large warships were rare in the North Sea throughout the Second World War again because of the asymmetrical dangers of mines, torpedoes and aircraft. Germany's capital ships were few in number and did not deploy as a fleet. Although directed at civilian shipping as well as warships, they targeted convoys in the Atlantic and Arctic, accessed via the northern North Sea and from France's Atlantic coast. They did not approach the North East Coast of England.

- 4.1.8 As noted above, the Allies maintained a maritime blockade against vessels supplying Germany in both wars. Blockade involved patrols by armed vessels, which boarded merchant vessels and could impound them. The chief focus of these activities was in the south, around the Downs, and in the North, from Orkney to Norway, effectively closing off the North Sea at each end to prevent trade to and from Germany (Benbow, 2008).
- 4.1.9 Royal Navy Coastal Forces operations by small fast vessels such as Motor Torpedo Boats (MTBs) and Motor Gun Boats (MGBs) are one of the better-known aspects of the Second World War on the East Coast. In the early stages, Coastal Forces did have a direct role in trying to defend merchant vessels from German E-boats, but they switched tactics to intercepting E-boats close to their home ports on the German occupied coast, either on the E-boats' return or at their outset (Scott 2009; Frank 2007).
- 4.1.10 Civilian shipping was called upon to support various military operations, notably in the Second World War. Merchant vessels, fishing vessels and other civilian vessels were used in the evacuation of Allied personnel during the fall of France in May-June 1940, including Operation Dynamo (Dunkirk), Operation Cycle (Le Havre) and Operation Ariel (French ports on the Normandy, Brittany and Atlantic coasts). Civilian craft merchant vessels and former fishing vessels in minesweeping and patrol roles were called upon again to support invasions in North Africa (Operation Torch), Italy (Husky; Avalanche), Normandy (Neptune) and the South of France (Dragoon).
- 4.1.11 In both the First and Second World Wars, Allied commanders sought to address German military activity by attacking the bases from which German military forces operated, along with their transport and industrial infrastructure upon which every nation depended. The Allies conducted strategic offensives against Germany that were directly related to civilian shipping on the East Coast, but which took place beyond the immediate region. Bombing raids and extensive offensive mining operations were conducted against German naval and submarine bases in both the First and Second World Wars. Blockship operations were conducted against Ostende and Zeebrugge in 1918 (Prince 2010), and blockships were deployed again May 1940 immediately before the evacuation of Dunkirk (Foyne 1994). Later in the Second

World War, streams of RAF and USAAF aircraft flew over the East Coast during the strategic bombing offensive sometimes targeting E-boat pens that threatened shipping (Frank 2007) resulting in many air crash sites.

4.1.12 Some 1,300 ships were lost in the North Sea coastal waters (diveable zone) in the First World War and Second World War (Firth 2014).

	1914-18		1939-45	
Mine	378	36.8%	304	41.9%
Torpedo	209	20.3%	74	10.2%
Gunfire	75	7.3%	3	0.4%
Ran aground	70	6.8%	28	3.9%
Charges	67	6.5%	1	0.1%
Scuttled	47	4.6%	0	0.0%
Collision	43	4.2%	59	8.1%
Foundered	14	1.4%	4	0.6%
Depth Charge	3	0.3%	2	0.3%
Air Raid	1	0.1%	106	14.6%
Naval battle	0	0.0%	6	0.8%
Wrecks attributable to causes listed	907		587	
Total Wrecks	1028		726	

(Firth 2014) (sourced from wrecksite.eu)

4.1.13 WWI and WWII saw the vessels in the North Sea under attack from many different sources as can be seen in the table above. The vessels lost along the East Coast War Channels over the two wars show just how big a threat mines and torpedoes were to Allied shipping with over 50% of all losses being attributed to one of the other.

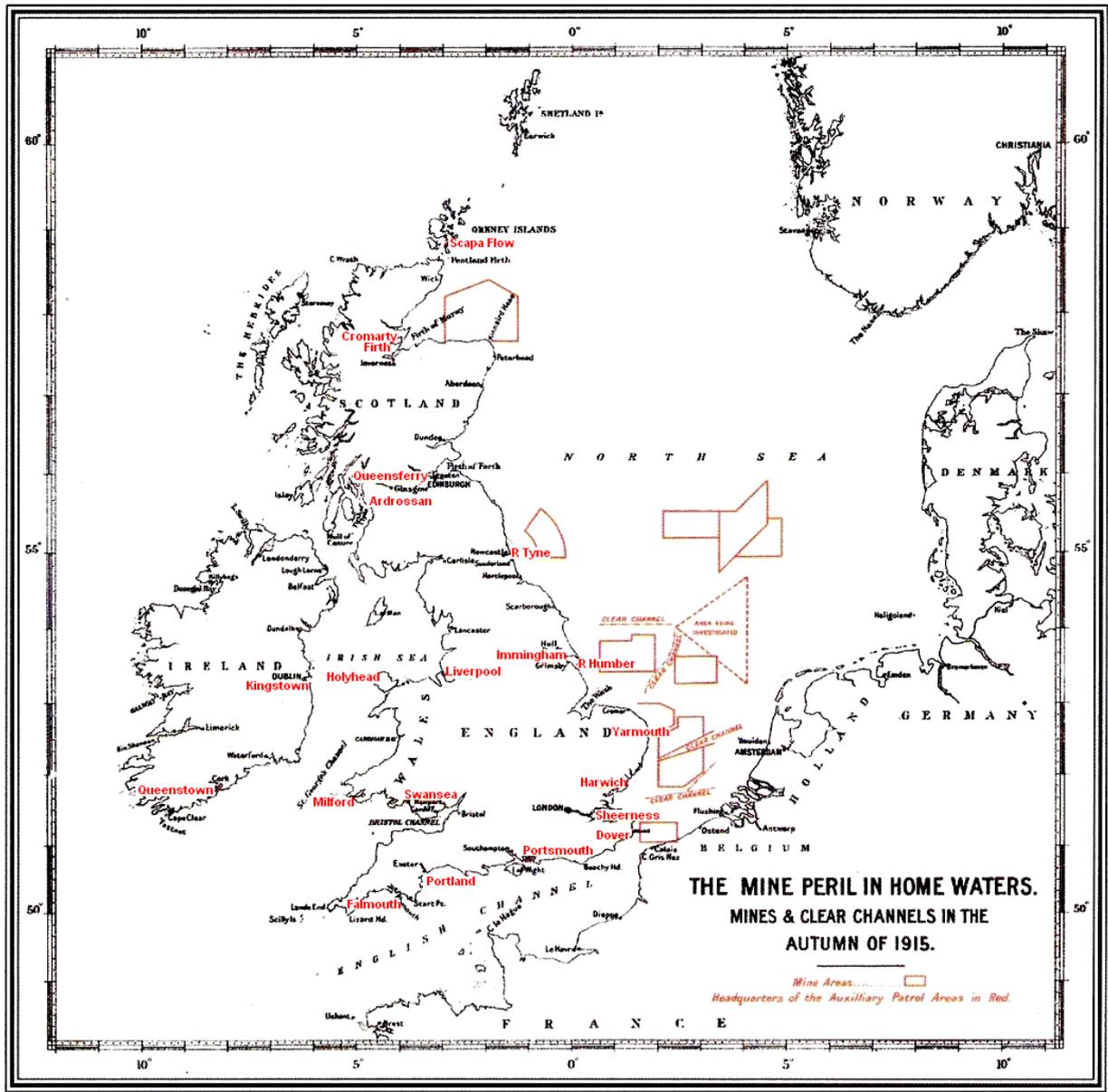


Figure 1. Image showing WWI minefield in North Sea. Note the large minefield off the coast of North East of England protecting the regions shipping. (Firth 2014)

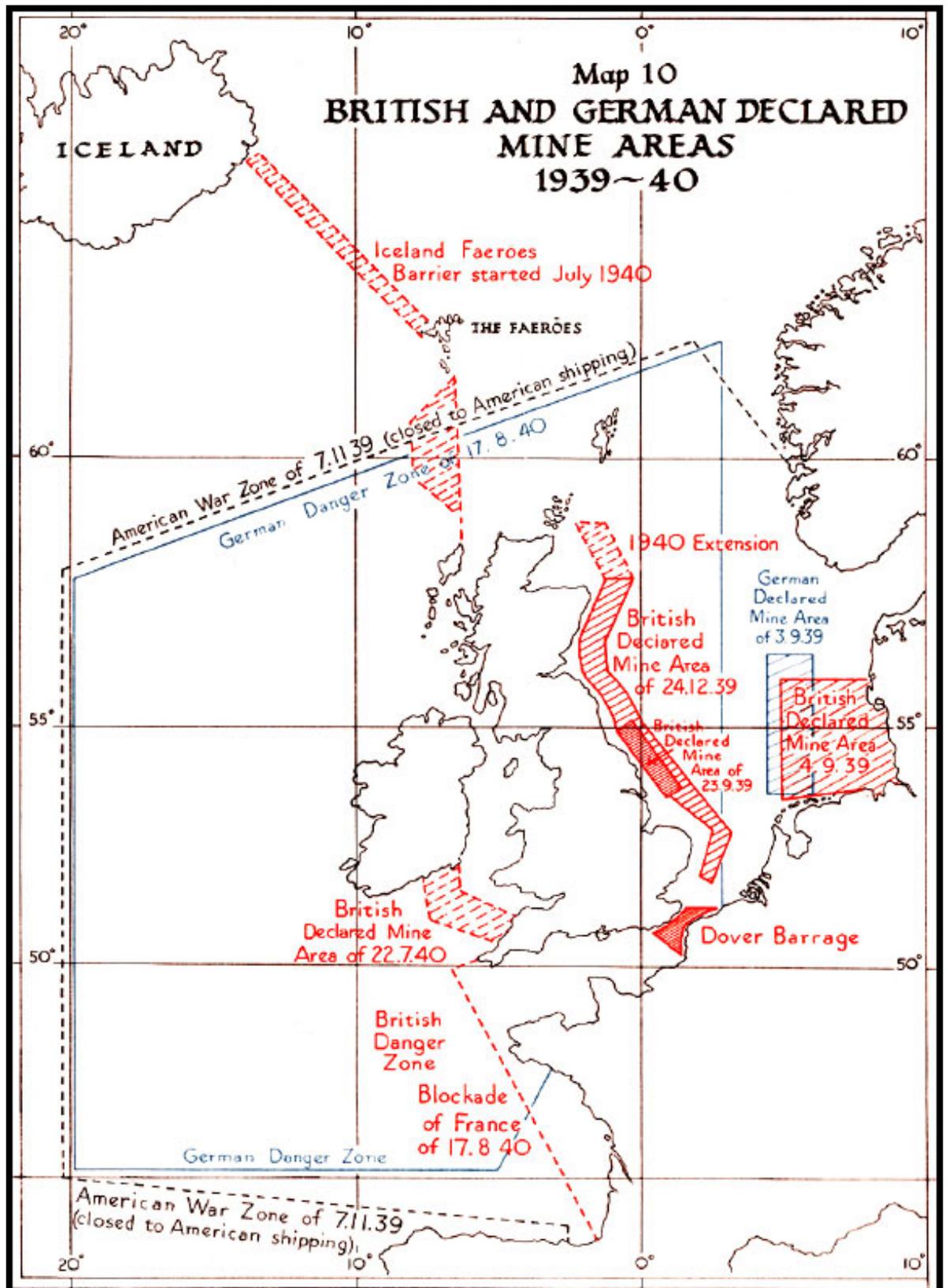


Figure 2. Image showing the declared mine zones after WWII. Note the entire east coast of Britain was subject to mine laying causing many losses around the region. (Firth 2014)

5 WRECKS

5.1.1 The number of diveable wrecks from the war periods off the North East coastline is easily in the hundreds, if not thousands. The dive team selected five main sites that included examples from both wars. Then, using the training and equipment provided, undertook general condition surveys of each of the sites over 2016/2017 dive seasons. All the wreck data collated by the research team came from a number of online sources, namely wrecksite.eu, U-Boat.net, HHTandN.org (Hartlepool then and now) and the Commonwealth War Graves Commission website cwgc.org. The non-diving researchers added other sites of interest to their tally, particularly those ships sunk by UC 32.

SS Coryton

5.1.2 Vessel for Sir J Herbert Cory of Cardiff: Northern Daily Mail. 4th August 1928. Last evening Messrs. William Gray and Co., Ltd., launched from their Central Shipyards the handsome steel screw steamer *Coryton*, built to the order for Sir J. Herbert Cory, Bart., Cardiff.

5.1.3 The vessel is of the following dimensions: Length overall 412ft. 6in.; breadth, 53ft., depth moulded to upper deck, 35ft. 1 ½ in. The vessel has open shelter deck and forecabin, and is being built to the highest class in Lloyd's. She is constructed on the cellular double bottom principle with fore and aft peaks, the framing being of the deep channel type, and has six watertight bulkheads, together with a steel centre line bulkhead, and wood shifting boards dividing the holds for grain carrying. Spacious accommodation for the officers is arranged in a steel house amidships. The engineers will be berthed in large steel houses alongside the casing, and the crew in the poop, with separate mess rooms. For the quick handling of cargo, nine powerful steam winches are provided to work ten derricks. A direct-acting steam windlass forward and steam steering gear amidships are also fitted. The topmasts will be telescopic, lowering to a height suitable for the Manchester Ship Canal Bridges. Lifeboats are fitted on deck overhead. The vessel will be completed in all respects as a first-class cargo steamer, her equipment including an efficient wireless installation with direction finder, and electric light throughout. (www.wrecksite.eu)

5.1.4 Triple-expansion engines by the Central Marine Engineering Works of the builders having cylinders 26, 42, and 70 inches in diameter by 48 in. stroke, and three boilers working at a pressure of 180lbs. per square inch, and a number of auxiliaries of the well-known "C.M.E.W." type will be installed, including a winch condenser with circulating pump, evaporator, general service pump, ballast pump, combined drain and scumming tank, and harbour feed pump. (www.wrecksite.eu)

5.1.5 The ship and machinery were built under the supervision of Messrs. Alex. B. Coull and Co., Newcastle-on-Tyne, on behalf of the owner, and the ceremony of naming the steamer *Coryton* was gracefully performed by Lady Cory, wife of Sir J. Herbert Cory, Bart. At an informal gathering after the launch Sir William Gray, Bart., proposed success to the *Coryton* and at the same time welcomed Sir Herbert and Lady Cory.

He said he understood that the *Coryton* was to be Sir Herbert's own ship, and he hoped that he would never regret his ownership of her. (www.wrecksite.eu)

- 5.1.6 Sir Herbert Cory, Bart., in reply spoke very highly of Messrs. William Gray and Co., Ltd. They had built several ships for the firm of which he was a member, and all of them had given great satisfaction. The *Coryton* was the first ship he had had built on his own behalf, and he had sufficient confidence in the future of shipping to think that he had been right in ordering her.
- 5.1.7 The *Coryton* was a steel 4,550 ton British steamship built in 1928. She was on passage to Hull when the ship was bombed by German aircraft on 16th February 1941 and the Captain of the ship decided to beach her on Ross sands. The wreck lies to the north west of the Farne Islands, and is close to Holy Island or Lindisfarne just off Ross Sands. The dive site has a maximum depth of 10 metres at high tide. A huge boiler, propeller shaft, winches and structure are spread out over a sandy bottom making this an enjoyable dive. Velvet Crabs and Lobsters can be found under steel plates. With good light penetration and a sandy floor, this is ideal for photographers, trainees or even a second dive. (www.wrecksite.eu)

SS *Eston*

- 5.1.8 The SS *Eston* was a British transport cargo ship built in 1919 by Goole Shipbuilding and Repair Company Limited, Goole. She had a 3-cylinder triple expansion steam engine rated at 172 nhp driving a single shaft and screw. She weighed 1,487 tons and had a speed of 10 knots. Her dimensions were length 73m, beam 11m and draught 4.8m. (www.wrecksite.eu)

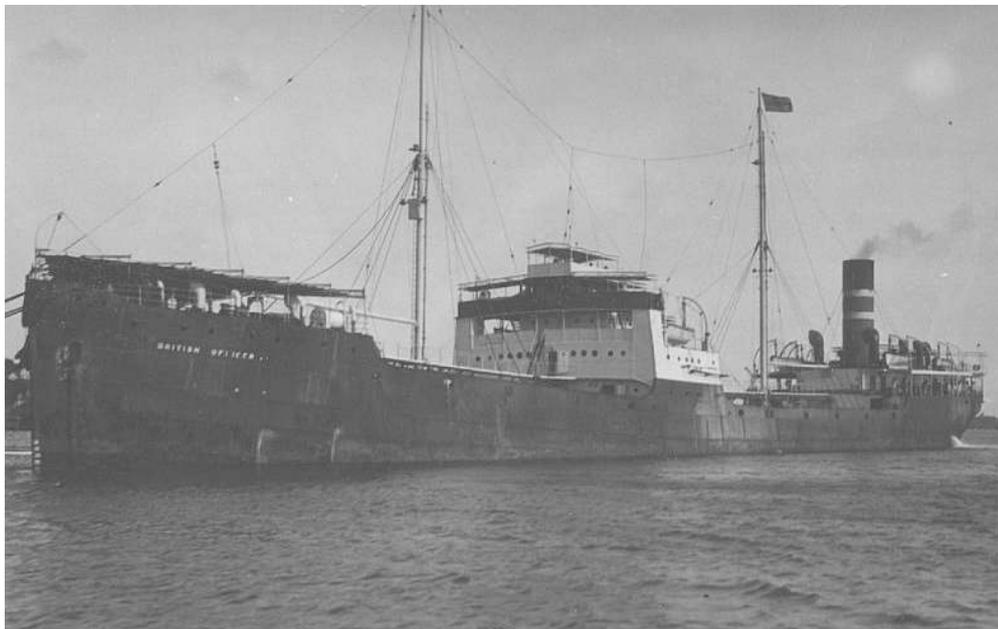


Figure 3. Image of SS *Eston*. www.wrecksite.eu

- 5.1.9 The *Eston* left Hull on January 26 1940 on passage from Blyth in Northumberland and two days later she was sighted at sea just off her destination, but then she just disappeared. Several days later a man's body and one of the ship's boats was found

washed ashore near Tynemouth and it was suspected that the *Eston* detonated a mine and sank. However now no one knows positively why the vessel foundered. On 28 January 1940, the *Eston* (Master Herbert Roser Harris), a straggler from convoy FN-81, struck a mine laid on 20 December, 1939 by U-22 and sank near Blyth. The master and 17 crew members were lost. The 48 year old Master, Herbert Roser Harris is remembered with honour at the Tower Hill memorial. He left a wife, Agnes Harris of Sidcup, Kent. (www.wrecksite.eu)

- 5.1.10 Some reports tell of the SS *Eston* having a crew of 17 and one report believes there were 18 men on board, and all were lost. Including the ship's Master, Herbert Roser Harris as mentioned above, there are details of only 15 men, as listed below. (www.wrecksite.eu)
- 5.1.11 All the crew information listed below was sourced from the Commonwealth War Graves Commission website. (www.cwgc.org)
- 5.1.12 James Bell was an Able Seaman aged 39. He was the son of Matthew and Margaret Bell and left a wife, Elizabeth Bell.
- 5.1.13 Edward John Edwards was a 38 year old fireman.
- 5.1.14 William Elphick was another fireman. He was 44. He was the husband of C.V.A. Elphick of Northfleet, Kent.
- 5.1.15 John Millar Hellens was an Able Seaman aged 47. He was the son of Robert and Elizabeth Hellens and the husband of Ann Hellens of Sunderland.
- 5.1.16 Larry Charles Hole was another Able Seaman. Aged 23 he was the second youngest member of the crew.
- 5.1.17 Frederick Kent was also an Able Seaman. Son of Robert and Harriett Kent he was 44.
- 5.1.18 George Liddle was one of the oldest members of the crew at 63. He was a Donkeyman, the person in charge of a donkey-engine, a small steam engine usually for subsidiary operations on board, such as feeding the boilers of the main engines. He was the husband of Elizabeth Liddle of Middlesbrough.
- 5.1.19 David Millar was the Chief Engineer Officer aged 59. He was the husband of Mabel C. Millar of Welling, Kent.
- 5.1.20 Laurence Porter Mitchell was the 40 year old Chief Officer. He was the son of William Porter Mitchell and Ellen Mitchell of Hatfield, Hertfordshire.
- 5.1.21 Robert Robinson. There were two men with this name on board. This Robert was the 40 year old Steward. He was the son of William and Mary Robinson of Blyth, Northumberland and the husband of Janet Stephen Robinson of 13 Victoria Street, Amble, Northumberland.
- 5.1.22 Robert Robinson. This was the second person of that name. He was the Mess Room Boy and at 14 was the youngest member of the crew. He was the son of Thomas and Ethel Robinson.
- 5.1.23 William Henry Neville Stiff was the Second Engineer Officer and at 66 was the oldest member of the crew.

- 5.1.24 Thomas Edward Ward was the Second Mate. He was 39.
- 5.1.25 John Williams was the 29 year old Boatswain.
- 5.1.26 The wreck of the *Eston*, like many wrecks of this period, consists of a mixture of collapsed structure with small sections around engines and winches surviving best. The collapsed areas have buried much of the wreckage below making assessment of any small find survival difficult. Like the *Oslofford*, below, there will likely be small finds and personal effects surviving under the collapsed structure.



Figure 4. Image of deck winch. Taken by project volunteer



Figure 5. Image showing collapsed structure, likely burying small finds. Taken by project volunteer

SS Oslofjord

- 5.1.27 *Oslofjord* was laid up in New York at the beginning of 1940 (along with *Bergensfjord*). According to the archive document above, she had arrived New York on January 2, later heading to Bayonne, NJ. In October 1940 it was decided to put her into service as a troopship and she was sent to Halifax for armament, departing Bayonne, NJ on October 26, arriving Halifax on the 28th. While there, she was fitted out with bridge protection and degaussing, as well as a 4" gun, a 12 lbs anti-aircraft gun, 8 Colt Marlin machine guns and 4 Lewis guns. On November 21 she left Halifax for the U.K., where she was to be further fitted out for troop transport, and sailed across alone. She had 3,374 tons general cargo, 1,775 diesel oil, 299 tons other oils, 13,734 bags of mail, 188 crew, 150 passengers (troops), 1350 tons drinking water and provisions for 350 people for 18 days. She arrived Gourock Bay on November 28 where the troops disembarked. Everything was made ready for the mail and cargo to be discharged, but the next day she was ordered by the Admiralty to go to Newcastle-on-Tyne, escorted by the destroyer *Vimy*, and she departed that same afternoon (November 29). (www.wrecksite.eu)
- 5.1.28 *Oslofjord* followed behind the destroyer, and was about 2 ship lengths behind it when at about 08:20 on Dec. 1 she struck a mine about 2 n. miles east/southeast of the entrance to the River Tyne, 220° 0.5 miles from T2 Buoy. On the bridge at the time were the captain, the chief mate, the 3rd mate, 4th Mate Roaldkvam and helmsman Yngvar Halvorsen, all of whom, except the chief mate were knocked down by the

explosion. The latter ordered the engines stopped, then found the captain and the helmsman unconscious on the deck. The captain soon regained consciousness, but was injured and bleeding. All the lifeboats were launched; the captain and the helmsman were assisted into one of them by some of the able seamen (helmsman Halvorsen died from his injuries on board a mine sweeper that morning). (www.wrecksite.eu)

- 5.1.29 When the chief mate later realized that *Oslofford* was not in danger of sinking, though she was listing heavily to starboard, he went forward and called for assistance from nearby vessels through a megaphone, and at about 08:45 towing commenced. The captain also came back on board, though injured and still in shock. Several tugs came to, and some of her deck crew returned to help, a pilot had also arrived (by the name of Duncan). However, after conferring with the Admiralty the pilot refused to tow her to port because she could block the inlet to the Tyne. The engine room was rapidly flooding, and after further examinations it was eventually agreed there was nothing else to do but follow orders and beach *Oslofford* south of Tynemouth South Pier. Some of her crew had been taken ashore by the Cullercoast lifeboat Westmorland, others by the Tynemouth lifeboat John Pyemont. In the next few days about 9,000 bags of mail were rescued by volunteers. The captain, meanwhile, had been admitted to a hospital with a crushed vertebra in his back. (www.wrecksite.eu)
- 5.1.30 After she had been beached, she dug deeper and deeper into the sand. Some members of her crew remained on board until December 8 at which time the situation was such that she had to be abandoned, she had already started to break at that time, and cabins and saloons were flooded, as were her holds. Those who were on board were taken ashore by John Pyemont, under extremely hazardous conditions and a strong gale. *Oslofford* finally broke in two and capsized in bad weather on January 21/22, 1941, becoming a total loss. Had it been peace time she most probably could have been saved. (www.wrecksite.eu)
- 5.1.31 An inquiry was held in Newcastle on December 18 1940 with the chief mate, the 1st and 3rd mates, 4th mate Roaldkvam, Able Seaman Antonsen (lookout), the 2nd engineer, 4th Engineer Aarseth and 4th Engineer Lerstad appearing. (The captain was still in hospital at that time.) (www.wrecksite.eu)
- 5.1.32 The captain later said that *Oslofford* should not have been where she was (on the east coast); the condition of the requisitioning for use as troopship was that she would only go to the west coast ports. On this her last trip, she was supposed to go to Glasgow only, but according to the captain he was more or less forced by the Royal Navy to take her around the east coast, though he had protested the orders several times. After the mine explosion he would have preferred to have taken her into port, but was denied access to the Tyne harbour by the commanding admiral of the fleet in the Tyne area, a decision he understood to be due to a fear of her sinking and blocking important British units in the harbour. A lot of rumours were going around regarding the loss of *Oslofford*, but although the captain readily agreed there were many occurrences that could and should have been avoided, he defends the British decisions and actions and is understanding of the difficult situation they were in at this stage of the war at sea. The Germans in Norway took full advantage of the

situation in their radio propaganda broadcasts, by trying to convince Norwegian sailors that this just proved how silly and useless it was to sail for Britain. (www.wrecksite.eu)

- 5.1.33 The wrecksite is partially intact, with only small sections of structure surviving along with the engines. The remainder of the site has collapsed into itself with large areas of small artefacts surviving in-situ. A huge amount of material survives on the site however the condition is poor for most and is actively corroding.



Figure 6. Image of engine structure. Taken by project volunteer



Figure 7. Image showing mound of live ammunition and various elements of collapsed structure. Taken by project volunteer



Figure 8. Image showing example of collapsed structure. Taken by project volunteer

SS Kamma

- 5.1.34 There seems to be a lot of confusion over the ship (or ships) with the name *Kamma*. Wrecksite.eu gives details of a ship built in 1910 and lost in 1914 and owned by Dampskibsselskabet Heimdal of Norway. It was built by Wood, Skinner and Co. Ltd. of Newcastle upon Tyne and had a tonnage of 1270 grt. Its engine, built by North Eastern Marine Engineers Ltd. of Sunderland, was a 3-cylinder triple expansion steam engine of 139 horse power and drove a single shaft and screw. It was sunk by a mine on 1 September 1914 with, apparently, no casualties.
- 5.1.35 According to www.wrecksite.eu, *Kamma* was on a voyage from Odense to Newcastle in ballast. At 0815 hrs a mine exploded under hatch near 1, destroying most of the forepart. The crew got off without mishap. *Kamma* sank 1100.
- 5.1.36 However, Wrecksite.eu also gives information of another *Kama*. This was a Swedish owned transport cargo ship. It was built in 1883 by Palmer's Shipbuilding and Iron Co. Ltd. The single engine, a 2-cylinder compound steam engine with one boiler, drove a single screw and was rated at 150 nhp. This engine was built by the same company. The ship was launched on 20th August 1883 and completed in November that year. At launch it was known as the York Minster and owned by Thompson and Patterson of Newcastle but later in November 1883 it came under the ownership James Knott of North Shields and was renamed Black Prince. In 1895 this firm became known as "Prince Line (1895) Ltd. (James Knott), North Shields." In 1896 the ship was renamed *Kamma* when under the ownership of D/D Heimdal (M. Carl), Copenhagen. It retained the name *Kamma* when subsequently owned by Rederi A/B Henckel (NP Helsingborg) in 1907 and finally in 1916 Rederi A/B Hallandia (Oscar Thorstenssen), Halmstad.

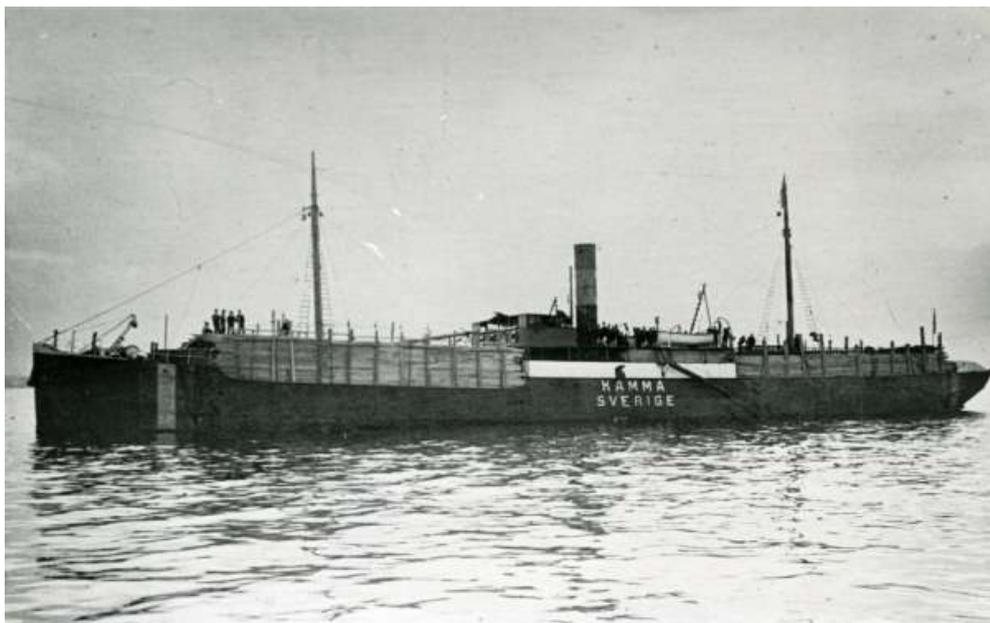


Figure 9. Image of Swedish owned *Kama*. www.wrecksite.eu

5.1.37 On 22 January 1917 it was sunk after being mined in Blyth Roads while on a voyage from Gävle (Gefle) to Rouen with a cargo of timber. There were no casualties.

SS Bullger

5.1.38 The SS *Bullger* started life as the *Cartmel*. A 304 ton tug it was built for the Furness Railway Company of Barrow, by Vickers, Sons and Maxim Ltd., also of Barrow. It was completed in 1907 measuring 39m in length with a beam of 7.86m. It had two compound steam engines driving two shafts and screws and in 1923 was owned by the London, Midland and Scottish Railway. In 1934 it was renamed *Bullger* by the Leith Salvage and Towage Co., Ltd, Leith. (www.wrecksite.eu)

5.1.39 On 13 March 1941 it was sunk by a mine, probably laid by a plane, in Druridge Bay, near Amble, Northumberland. No loss of life occurred and as such no further research was undertaken.

UC 32

5.1.40 UC 32 was ordered on 29 August 1915. It was built at the Vulcan Yard, Hamburg and launched on 29 August 1916. Commissioned on 13th September 1916 it had only one commander, Oblt. Herbert Breyer, during its short life. It was on patrol only three times, between 27th November 1916 and 23rd February 1917, when it was destroyed by one of its own mines. In that time it was responsible for the sinking of six merchant ships with a total 9,083 tons and the loss of 30 merchant seamen as well as 19 members of its own crew. This account of the sinking was found in a letter addressed to the mother of survivor Reinhard Schirm: (www.uboot.net)

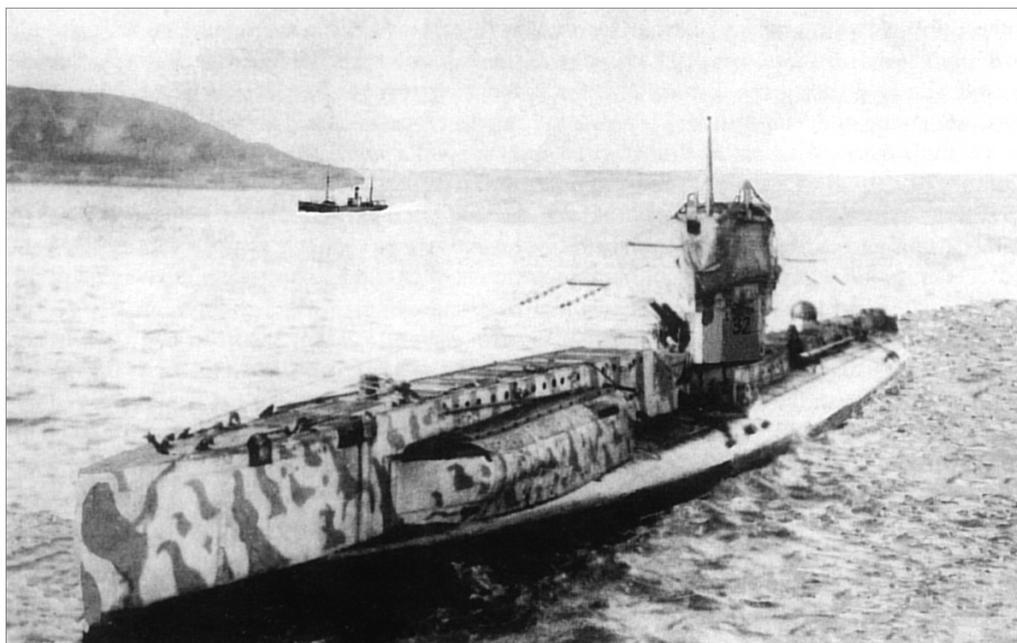


Figure 10. Image of UC32 on the surface. www.wrecksite.eu

5.1.41 “Friday 6.15 I was in the Control Room. The explosion extinguished the lights immediately and I was hurled forward owing to the pressure of the water flooding in (for the boat had been torn in half). I was driven upwards. I held my breath. At the

same moment the bottles containing compressed air burst and I was thrown into the conning tower. As for the moment the pressure was greater from inside than outside, I could take breath again. The boat in the meantime had sunk to the bottom. I let go and was thrown out.

- 5.1.42 “I swam on the surface 200 metres from the boat. I shouted for help and found my strength failing me (I had not slept for some 28 hours) and had swallowed a good deal of oil. I also had my heavy leather clothing and sea boots on. I took my boots off and managed to pull one leg out of my leather breeches but swallowed a great quantity of oil in the process; now for the other leg. Because my hands were quite numb I could not get my knife out, but somehow I managed to get my remaining leg out of the leather breeches with some difficulty. I felt my limbs stiffening with the cold. I shouted for help again.
- 5.1.43 “At last I saw a light and soon after a second one. The first was the Sunderland (sic) lighthouse, the second the light of an English patrol boat. I swam towards it and when I was about 20 yards off someone threw me a lifebelt. An English sailor handed me an oar and pulled me into his boat. I heard a voice "Hullo Schirm, you here too?" I recognised the captain. There were only three of us.
- 5.1.44 “We were very well looked after on a steamer and the English sailors were kind to us. They must have felt sorry for us because they kept giving us their cigarettes. My English helped a bit. We were given dry clothes and in the evening taken to hospital. Again we were kindly treated and well fed, but we were strictly guarded. On Sunday we were taken to the station. We were not exactly looking at our best, but you should have seen the curiosity of the crowd, particularly the women.”
- 5.1.45 The UC 32 was so close to shore and shallow that it allowed for a top secret group of navy salvage vessels and divers to dive the newly sunk vessel. Much about these men was unknown for many years becoming the things of myth and legends. They became known as the ‘Tin Openers’, referring to their diving on and penetration of German submarines during WWI (McCartney 2016).
- 5.1.46 The divers who visited the then recently sunken U-boats did so for the sole purpose of intelligence gathering. Intelligence came mainly in the form of charts, codebooks, call signs, technical and personnel data. The intelligence war against the U-boats was secret. Little except hearsay emerged until 1969-70 with the release of much of what is now known as ADM 116 and ADM 137 at the National Archives, within which is a rich source of data.
- 5.1.47 Dives by naval divers in March off Sunderland recovered items from UC 32, including a torpedo (McCartney 2016). Also an Intelligence Division translation of UC 32’s “Machinery History” was published in May 1917. The original could only have come from the wreck, either by divers or as flotsam. Perhaps this further indicated the potential for papers to be found within sunken U-boats (McCartney 2016).
- 5.1.48 The UC 32 had a short but successful career before the accident, sinking a total of six vessels in a matter of months including one after its own sinking. (See wrecks described below for more details.)

5.1.49 Images of the UC 32 were shown to the project volunteer Dr Innes McCartney who noticed some interesting features. The condition of the wreck is, in his opinion, very poor. This is for a number of reasons. Firstly, the site was involved in an explosive end at the hand of its own mine. Secondly the site underwent at least one salvage operation where material was recovered from the site, clearance of underwater obstruction by authorities along with the natural corrosion processes. Prior to the dive team visiting the site for the first time, the Navy made an unscheduled attempt to clear an unexploded torpedo, an attempt that failed to detonate the torpedo. The small explosion that occurred instead of the larger one that would have if the attempt was successful, meant that very little, if any, damage appears to have been done to the site. This was confirmed visually by the project dive team.



Figure 11. Image showing keel of UC 32, laying at an extreme angle on the seabed. Taken by project volunteer.



Figure 12. Image showing damage from mine explosion causing the sinking (right hand edge of photo). Taken by project volunteer.



Figure 13. Image showing part of the steering plane, showing heavy corrosion levels. Taken by project volunteer.

SS Burnhope

- 5.1.50 On 14 December 1916 the SS *Burnhope* detonated a mine laid the very same day by German u-boat, UC 32. The steamer had just left Hartlepool carrying 2,600 tons of coal and was turning to starboard in Hartlepool Bay. The explosion was so great that it smashed the glass in the wheelhouse windows, and even cracked the glass in the ship's compass binnacles. (www.uboat.net)
- 5.1.51 A second explosion beneath the port bow soon followed causing such serious damage the vessel began to settle by the bows. The starboard lifeboat was made ready to launch and the captain ordered the vessel to port in order to reach shallow water. After some 20 minutes the vessel had grounded by the bow. (www.uboat.net)
- 5.1.52 A minesweeper came to her aid was trying to tow the stern around when the steamer took on heavy list to port. The vessel was quickly abandoned and soon after 10 o'clock the list was so bad that she went over on her side. The captain was picked up out of the sea by the mine-sweeper but had suffered a heart attack and died soon afterwards. (www.uboat.net)

SS Hildawell

- 5.1.53 The SS *Hildawell* was a British transport steamer of 2494 tons, built in 1892 by W. Gray and Co. Ltd. of West Hartlepool and in 1903 owned by T.W. Willis, also of West Hartlepool. It was sunk by a mine off Sunderland (laid by UC 32 under the command of Herbert Breyer), while on route from Bilbao to Middlesbrough with a cargo of iron ore. There were 22 casualties.
- 5.1.54 The casualties were listed as: (www.uboat.net)

CAPSEY, J	(25/01/17)
CLARKE, John Stephen Lloyd	(25/01/17)
HANSELL, Robert Ernest (H)	
HELLAND, M	(25/01/17, born in Norway)
HENDERSON, Benjamin	(20/01/17)
INGRAM, Henry	
KAJU, Joseph	(25/01/17, born in Estonia)
KOHN, Ole	(25/01/17, born in Norway)
LEE, Thomas Wallis (H)	
PARKIN, Richard Jefferson	
PATTERSON, Robert Masters	
PETERSON, Alexander	
PRENTICE, Robert (H)	
PULLI, Jacob (Born in Russia)	
ROWLANDS, Harold	

SCREETON, George Robert	
SMALL, F	
STUBBERND, H.C	(Born in Norway)
WARREN, David Stewart (H)	
WHEELER, George William,	
WILMSHURST, Walter	
WITTEN, Richard Arthur (H)	

N.B the five with (H) after their name were from the Hartlepool

Some of SS Hildawell's crew

- 5.1.55 **Hansell, Robert Ernest:** Rank(s) : 1st Mate, Address : 47, Grange Road, West Hartlepool, Town/Country of birth : West Hartlepool, Date of birth: 24/5/1889, Date of death: 20/12/1916. Robert Ernest Hansell was born in West Hartlepool on May 24th, 1889, to parents Robert Smith (born Hartlepool, 1858), and Ellen (born West Hartlepool, 1861). He was baptised at the Wesleyan Methodist Chapel, Cambridge Place, West Hartlepool, on June 12th, 1889. The 1891 Census lists Robert Smith's occupation as a Mechanic Engineer; this Census also records his son's name as George E. Robert Smith Hansell is not recorded on either the 1901 or the 1911 Census Returns; as his wife Ellen is still listed as 'married', he was perhaps away at sea at the time of both of these censuses. The 1911 Census shows Robert Ernest's occupation as Apprentice Sea-going Engineer, and residing with his mother at No.47, Grange Road, West Hartlepool (www.HHTandN.org).
- 5.1.56 **Lee, Thomas Wallis:** Rank(s): Steward, Address : 43, Roman Road, South Shields, Town/Country of birth : West Hartlepool, Date of birth: 22/3/1890, Date of death: 20/12/1916. Thomas Wallis (or perhaps Walter) Lee was born at West Hartlepool, on March 22nd, 1890, and baptised at Cambridge Place Wesleyan Methodist Church, on April 10th. His parents were Thomas (born at Elwick), and Lizzie (Elizabeth, born at Hart) Lee. The 1891 Census shows Thomas, Lizzie and children Robert W. (aged 15, Contractor's Clerk), Harold (13), Thomas W. (11), Norma (?),8), Matthew (5), John (3), and 10-month old Elizabeth May, living at No.50, Sheriff Street, West Hartlepool. Thomas Wallis married Ellen Humble (date unknown), and their address at the time of Thomas' loss is given as No.43, Roman Road, South Shields (www.HHTandN.org).
- 5.1.57 **Prentice, Robert:** Rank(s): 2nd Engineer Address: 16, Topcliffe Street, West Hartlepool, Town/Country of birth: West Hartlepool, Date of birth: 24/1/1884, Date of death: 20/12/1916. Robert Prentice was born at West Hartlepool on January 24, 1884, and baptised at St.James' Church on February 24th. His parents, William Henry (a Seaman), and Mary Prentice, were living in Lower Reed Street, West Hartlepool, at this time. The 1901 Census shows William (now a Master Mariner), and Mary living at No.94, Sandringham Road, West Hartlepool, with their children William H.

(aged 19, Engine Minder at a local Engine works), Robert (17, Apprentice Engineer), Thomas (14, Telegraph Messenger), Frederick (13), Albert (10), Evelyn (6), Clifford (4), and Gordon (1). On July 26th, 1909, Robert (now listed as a Marine Engineer), married Elizabeth Lord at St. Paul's Church, West Hartlepool, their address being given as No.16, Tankerville Street, West Hartlepool. The 1911 Census records Robert away at sea, and Elizabeth living at No.83, Sheriff Street, West Hartlepool. At the time of Robert's loss in 1916, their address is given as No.16, Topcliffe Street, West Hartlepool. (www.HHTandN.org).

5.1.58 **Warren, David Stewart:** Rank: Messroom Steward, Address: 27 1/2, Arthur Street, West Hartlepool, Town/Country of birth: West Hartlepool, Date of birth: 1/5/1899, Date of death: 20/12/1916. David Stewart Warren was born at Hartlepool on May 1 1899, to parents Alexander and Mary Warren. He was baptised at St. Hilda's Church, Hartlepool, on May 17th. The family's address at this time was 27½, Arthur Street, West Hartlepool. The 1901 Census shows Alexander (a General Labourer), and Mary now living at No.9, Ropery Lane, Hartlepool, with their children Annie (aged 6), Ellen (4), Margaret (2), David (1), and new-born Elizabeth. (www.HHTandN.org).

5.1.59 **Witten, Richard Arthur:** Rank(s) : 1st Engineer, Address: 83, Milton Road, West Hartlepool, Town/Country of birth: Ipswich, Date of birth: 9/1875, Date of death: 20/12/1916. Richard Arthur Witten was born (with twin sister Sarah Jane), at Ipswich in 1875, to parents William and Sarah Witten, and was christened at St. James' Church, West Hartlepool, on September 12th, 1875. The 1891 Census shows the family living at No.42, Murray Street, West Hartlepool. In 1902 Richard married Elizabeth Dossett, of Seaham Harbour, and the 1911 Census shows them living at No.21, Milton Place, West Hartlepool, with five children, Richard Arthur (aged 9), Edward (7), James Henry (5), Elizabeth (4), and Harrison (1), together with Elizabeth's sister Ada Dossett (aged 23). (www.HHTandN.org).

SS Edda

5.1.60 The *Edda* was a Swedish coaster sunk in the North Sea on 29th January 1917 by the German submarine UC 32. *Edda's* crew were rescued. As no loss of life occurred and as this was not a diving target no further research was undertaken. (www.uboaat.net)

ST Ida Duncan

5.1.61 The Tug Boat *Ida Duncan* was originally a deep sea trawler named *The Sturgeon* constructed in Iron it was built by Rennoldson and Sons of South Shields and completed in June 1891. Between 1891 to 1897 the trawler was owned by Steam Trawling Co and from 1897 to 1913 it was owned by Boston Deep Sea Fishing and Ice Co. It was purchased on the 26th June 1913 by William Chrystle Duncan (manager Charles William Duncan). At a cost of £775.00 and converted into a tug renamed the *Ida Duncan* (www.uboaat.net).

5.1.62 *Ida Duncan* operated from the River Tees meeting vessels in the Tees Bay either taking them in tow or escorting them to their loading or unloading berths, assisting them in mooring (www.uboaat.net).

- 5.1.63 On January 31st 1917 whilst on route from Middlesbrough to the Tees Bay approximately one and half miles from the South Gare Lighthouse she struck a mine laid by the German Submarine UC 32. The subsequent explosion lifted the *Ida Duncan* out of the water. The Steam Tug then sank stern first all six crew members were killed in the explosion or drowned. It is now believed that only one crew members body was later recovered (Harry Charles Scott's). The remaining five crew members' bodies were lost to the sea. In February 1921 the Tees Conservancy Commissioners of Middlesbrough engaged the services of Frederick J. Riddle who carried on business as F. J. Riddle and Co., blasting and salvage contractors of 13 Ayresome Road, Middlesbrough. His services were engaged for the breaking up and removal of the *Ida Duncan* as its wreck was laid in shallow water and a danger to other vessels using the shipping lane. The wreck of the Steam Tug was blown apart using explosives by the contractors. Some parts of the wreck were recovered; the remainder was dispersed on the seabed by the blasting operations (www.uboaat.net).
- 5.1.64 The six crew members of the *Ida Duncan* who lost their live on that fateful day are listed below: (www.uboaat.net)
- 5.1.65 **Master Lionel Duncan:** Tug *Ida Duncan*. (Middlesbrough), Mercantile Marine, Lionel died age 29 on 31 January 1917, Lionel was the son of Charles William and Dora Duncan, of 65, Borough Rd., Middlesbrough; and the husband of Tabitha May Duncan (nee Shutt). (The couple married in Middlesbrough in 1913.) His widow Tabitha married Edward Charlton in 1920 and later resided at of The Huttments, Seaton Carew, West Hartlepool (Tower Hill Memorial, London).
- 5.1.66 **Engineer Charles Chrystal Duncan:** Tug *Ida Duncan* (Middlesbrough), Mercantile Marine, Charles died age 30 on 31 January 1917. He was the son of Charles William and Dorothy Duncan. Charles was the husband of Beatrice Duncan, (nee Hill) of 104, Clarendon Rd., Middlesbrough. The couple married in Middlesbrough in 1914. Born Middlesbrough (Tower Hill Memorial, London).
- 5.1.67 **Deck Boy James Gibson:** Tug *Ida Duncan* (Middlesbrough), Mercantile Marine, James died age 16 on 31 January 1917. He was the son of Robert, a Hairdresser, and Harriet – Jane Gibson, of William St., Middlesbrough. James can be found on the 1911 Census aged 11 residing with his parents and Siblings at 27 Cleveland Street Middlesbrough. Born at Middlesbrough (Tower Hill Memorial, London).
- 5.1.68 **Fireman Henry (Harry) Charles Scott:** Tug *Ida Duncan* (Middlesbrough), Mercantile Marine, Harry died aged 19 on 31 January 1917. he was the son of Mathew H (Harry), a Tug Boat Fireman, and Margaret Jane Scott, of 80, Wilson St., Middlesbrough. Henry (Harry) can be found residing with his parents and Siblings a Schoolboy aged 11 on the 1911 census. At 80 Wilson Street Middlesbrough (Tower Hill Memorial, London). (Buried Middlesbrough Linthorpe cemetery.)



Figure 14. Image of headstone for Harry Scott. Taken by project volunteer

- 5.1.69 **Mate Robert Tinmouth:** Tug *Ida Duncan* (Middlesbrough), Mercantile Marine, Robert died age 56 on 31 January 1917. Born at Sunderland (Tower Hill Memorial, London).
- 5.1.70 **Fireman Thomas Walker:** Tug *Ida Duncan* (Middlesbrough), Mercantile Marine. Thomas died age 47 on 31 January 1917. He was the husband of Helena Walker, of 48, Feversham St., Middlesbrough. Born at Darlington (Tower Hill Memorial, London).

SS Jerv

- 5.1.71 The *Jerv* was a Norwegian cargo ship sunk in the North Sea 10 nautical miles north of Flamborough Head, Yorkshire, on 1st February 1917. The entire crew survived and were rescued. As all crew survived the wreck no further research was undertaken (www.uboot.net)

SS Apollonia

- 5.1.72 SS *Apollonia* was Hamburg America Line's flagship vessel. She was a 2,822 gross ton ship, length 320ft x beam 40ft, one funnel, two masts, single screw and a speed of 12 knots. Accommodation for 30-1st and 800 3rd class passengers. Built by Reiherstieg, Hamburg, she was launched on 30 July 1891 and sailed on her maiden voyage from Hamburg to New York on 12 October 1891 (www.uboot.net)
- 5.1.73 On 7th March 1893 she started her first voyage from Stettin to Helsingborg, Gothenburg, Christiansand and New York and commenced her last sailing on this route on 18th November 1896, having made 20 round voyages on this service. Sold to the Sloman Line of Hamburg in 1900, she was renamed *Bellagio* and in 1905 she was

sold to Deutsche Levante Line and named Paros. Renamed *Galata* in 1906, she went to Italian owners in 1913 and was renamed *Apollonia*.

- 5.1.74 On 1 March 1917 the *Apollonia* foundered and lost after striking a German laid mine 1 mile off Flamborough Head. The Flamborough lifeboat was launched and was able to save seven lives. Interestingly the loss of the SS *Apollonia* is occurred six days after the loss of UC 32 that laid the mine responsible some time prior to its sinking.

6 CONCLUSIONS

- 6.1.1 The underwater cultural heritage from the two World Wars is abundant in the North East and all over Britain. Of the thousands of shipwrecks only a handful could be studied by the team. The selection process included a mixture of interesting/important sites along with some which are easy to dive in varied weather conditions.
- 6.1.2 A major issue that was noted by the volunteer team is that even though wrecks from this period are numerous, every site is suffering from huge levels of environmental corrosion to the extent that many are unrecognisable. This corrosion is only worsening, and due to the nature of metal vessel construction, does not allow for easy preservation either in situ or if recovered. This is such a large problem that many of the sites will not last another 100 years before they corrode to an unrecognisable pile of metal features on the seabed.
- 6.1.3 The corrosion levels on the shallower wrecks is alarming and many of the identifying features are already gone. Therefore if World War wrecks are to be accurately recorded and that survey tested against the recorded history only have a limited time remains. Many more projects like this will be needed along with the help, support and likely volunteer work from the recreational diving community.
- 6.1.4 Recent work completed by Dr Innes McCartney into the submarine wrecks of the English Channel and North Sea proves that a lot of the recorded history around wrecking events was wrong, with some wrecksites being located hundreds of miles from recorded losses. The only way to check the accepted history of many of the World War wrecks is to dive and inspect the sites, and then compare that survey to the historical data. This is a daunting task for the heritage community alone and could only be achieved with the help of recreational divers around the UK. This project shows how successful working with volunteer dive groups can be and should be encouraged around the country.
- 6.1.5 The training provided to the volunteer team has provided transferable skills that can be used on future projects that many have expressed an interest in doing both with MAST and other NGOs.
- 6.1.6 The divers received the equipment and skills needed to survey any wrecksite they may find, from early periods through to modern wrecks. The dive team have also all received an internationally recognised Basic Archaeological Diver Course qualification which could help any who wish to volunteer on other archaeological diving projects.
- 6.1.7 Many of the research team came to this project with previous volunteer experience. The project benefited greatly from the experience of the team with members able to pass on great resources as well as tips and tricks during the training. The skills and resources they learnt from a maritime perspective were new to many and will benefit any future projects they volunteer on.

7 BIBLIOGRAPHY AND SOURCES

- Abbatiello, John J. 2011. *Anti-Submarine Warfare in World War I: British Naval Aviation and the Defeat of the U-Boats*. London: Routledge.
- Anon. 1981. *Clerget Netted*. FlyPast, no. May/June: 66.
- Beesly, Patrick. 1982. *Room 40: British Naval Intelligence, 1914-18*. London: Hamilton.
- Behrens, C.B.A. 1955. *Merchant Shipping and the Demands of War. History of the Second World War: United Kingdom Civil Series*. London: HMSO.
- Benbow, Tim. 2008. *Naval Warfare 1914-1918: From coronel to the Atlantic and Zeebrugge*. Amber Books
- Breemer, Jan S. 2010. *Defeating the U-Boat: Inventing Anti submarine Warfare*. Newport, R.I.; Washington, DC: Naval War College Press.
- Cant, Serena. 2013. *England's Shipwreck Heritage: From Logboats to U-Boats*. Swindon: English Heritage.
- Clarke, Bob. 2010. *Remember Scarborough: A Result of the First Arms Race of the Twentieth Century*. Stroud: Amberley.
- Corbett, Julian S. 1920. *Naval Operations: Official History of the War. Volume I*. London: Longmans Green.
- D'Enno, Douglas. 2010. *Fishermen against the Kaiser*. Barnsley: Pen & Sword Maritime.
- Firth, Antony. 2014. *East Coast War Channels*,
- Foster, Joe. 2004. *Guns of the North-East: Coastal Defences from the Tyne to the Humber. Battlefield Britain*. Barnsley, South Yorkshire: Pen & Sword Military.
- Foynes, J. P. 1994. *The Battle of the East Coast (1939-1945)*. Isleworth, Middx: J.P. Foynes.
- Francis, Paul, and Graham Crisp. 2008. *Military Command and Control Organisation. Volume 1 The Royal Navy*. Unpublished Report for English Heritage.
- Frank, Hans. 2007. *German S-boats in action in the Second World War*. Barnsley: Seaforth.
- Gardiner, Ian. 2009. *The Flatpack Bombers: The Royal Navy and the "Zeppelin Menace"*. Barnsley, Eng: Pen & Sword.
- Grant, Robert M. 2002a. *U-Boat Intelligence, 1914-1918*. Penzance: Periscope Pub.
- Grant, Robert M.. 2002b. *U-Boats Destroyed: The Effect of Anti-Submarine Warfare 1914-1918*. Penzance: Periscope.
- Grant, Robert M.. 2003. *U-Boat Hunters: Code Breakers, Divers and the Defeat of the U-Boats, 1914-1918*. Penzance: Periscope Pub.
- Grove, Eric. 1997. *The Defeat of the Enemy Attack on Shipping, 1939-1945*. Publications of the Navy Records Society vol. 137. Aldershot, Hant ; Brookfield, Vt: Ashgate for the Navy Records Society.
- Hallam (PIX), Theodore Douglas. 2009. *Spider Web: Royal Navy Air Service Flying Boat Operations during the First World War*. Leonaur Ltd.
- Hawkins, Nigel. 2002. *The Starvation Blockades*. Barnsley, South Yorkshire: Leo Cooper.

- Hewitt, Nick. 2008. *Coastal Convoys 1939-1945: The Indestructible Highway*. Barnsley: Pen & Sword Maritime.
- King-Hall, Stephen. 1936. *A North Sea Diary 1914-18*. London: Newnes.
- Lake, Deborah. 2009. *Smoke and Mirrors: Q-Ships against the U-Boats in the First World War*. Stroud: History.
- Lane, Tony. 1990. *The Merchant Seamen's War*. Manchester; New York: New York, NY, USA: Manchester University Press; Distributed exclusively in the USA and Canada by St. Martin's Press.
- Lund, Paul, and Harry Ludlam. 1972. *Trawlers Go To War*. London: New English Library.
- Marsay, Mark. 1999. *Bombardment: The Day the East Coast Bled: Accounts of the German Naval Raids on Scarborough and Whitby on Wednesday, 16th December 1914, (with details of the Raid on the Hartepools), and the German Submarine Attack on Scarborough on Tuesday, 4th September 1917*. Scarborough: Great Northern Pub.
- McCartney, Innes, 2016. *Jutland 1916, The archaeology of a naval battlefied*, Bloomsbury Publishing, UK.
- McNeill, Ross. 2003. *Royal Air Force Coastal Command Losses of the Second World War. Volume 1 Aircraft and Crew Losses 1939-1941*. Hinckley, England: North Branch, MN, USA: Midland Pub.; North American trade distribution, Specialty Press Publishers & Wholesalers.
- Monsarrat, Nicholas. 2000. *Three Corvettes*. Cassell Military Paperbacks. London: Cassell.
- Naval Staff. 1973. *British Mining Operations 1939-1945*. Naval Staff History BR 1736(56)(1). Ministry of Defence.
- Newbolt, Henry. 1931. *Naval Operations: Official History of the War. Volume V*. London: Longmans Green.
- Owers, Colin A. 2004a. *Killingholme Diary. Part 1*. Cross and Cockade International Journal 35 (3): 169–95.
- Owers. 2004b. *Killingholme Diary. Part 2*. Cross and Cockade International Journal 35 (4): 211–32.
- Porter, David. 2010. *World War II Data Book: The Kriegsmarine 1933-1945: The Essential Facts and Figures for the German Navy*. London: Amber Books.
- Prince, Stephen. 2010. *The Blocking of Zeebrugge: Operation Z.O. 1918. Raid 7*. Oxford: Osprey.
- S.E. Limpenny, C. Barrio Frojan, C. Cotterill, R.L. Foster-Smith, B. Pearce, L. Tizzard, D. Limpenny, et al. 2011. *The East Coast Regional Environmental Characterisation*. Cefas Open Report 08/04.
- Savage, C.I. 1957. *Inland Transport. History of the Second World War: United Kingdom Civil Series*. London: HMSO.
- Scott, Peter. 2009. *The Battle of the Narrow Seas: A History of the Light Coastal Forces in the Channel and North Sea, 1939-1945*. Barnsley: Seaforth.
- Smith, Peter Charles. 2005. *Into the Minefields: British Destroyer Minelaying 1916-1960*. Barnsley, South Yorkshire: Pen & Sword Maritime.

Sutherland, Jon, and Diane Canwell. 2010. *The Royal Naval Patrol Service in World War II*. Pen & Sword Aviation.

Thomas, Roger J. C. 1999. RAF Bawdsey, Bawdsey, Suffolk. Historic Building Report. Unpublished report for RCHME.

Toghill, Gerald. 2003. *Royal Navy Trawlers. Part One: Admiralty Trawlers*. Cornwall: Maritime Books.

Toghill. 2004. *Royal Navy Trawlers PartTwo: Requisitioned Trawlers*. Liskeard: Maritime Books.

Turner, John Frayn. 2008. *Service Most Silent: The Navy's Fight against Enemy Mines*. Barnsley: Pen & Sword Maritime.

White, John F. 2008. *Endgame: The U-Boat Inshore Campaign*. Stroud: History Press.

Websites:

www.wrecksite.eu

Commonwealth War Graves Commission www.cwgc.org

UNESCO, 2013,

http://www.unesco.org/fileadmin/MULTIMEDIA/HQ/CLT/pdf/UCH_development_study_2013.pdf

8 APPENDIX I

Environmental report by volunteer Pauline Cooksey. Note the wreck of the *Engine Chandris* was not included in the final project but due to the close proximity of the two wreck sites to each other and using old photographs taken by the dive group prior to the project commencing Pauline covered both sites with her assessment. This is why we do not refer to the wreck of the *Engine Chandris* within the project report.

Background

The SS *Oslofjord* and SS *Engine Chandris* lie in position 55 00 161N 001 23 917W, south of the mouth of the River Tyne and 2.3 nm north of the recently designated St Mary's to Coquet Island Marine Protected Zone (MPZ) (Figure a). Traditionally sunken shipwrecks have been considered as ecological assets, providing new habitats and refuge for many marine organisms.

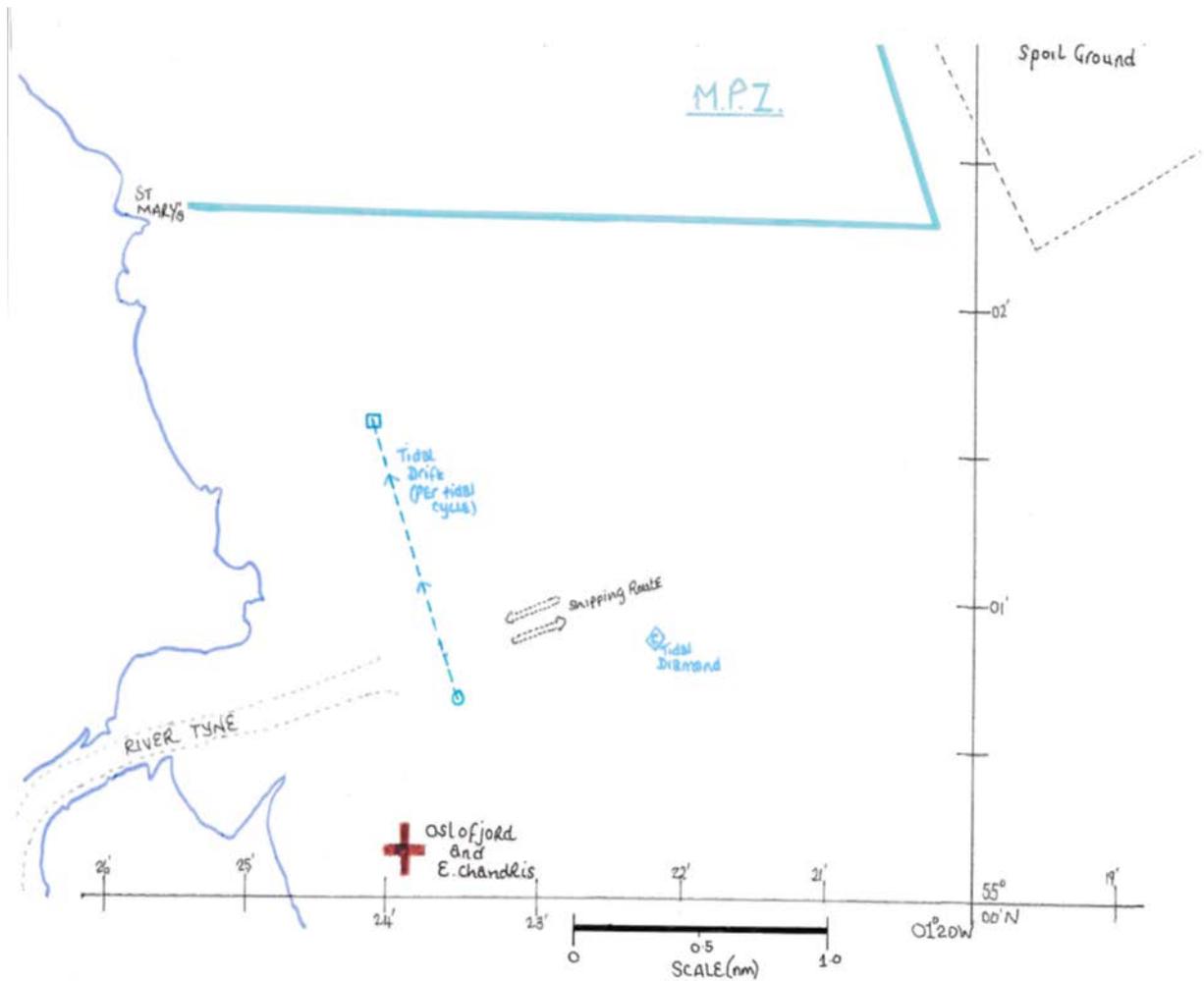


Figure a: Map showing location of *Oslofjord* and *Eugene Chandris*, St Mary's MPZ, River Tyne and Tidal drift

Lying at depths of 10 to 30 metres, the highly diverse coastal area between St Mary's to Coquet Island MPZ was designated a conservation zone in January 2016.

The seabed within this area represents a mosaic of intertidal and sub-tidal rock and sediment habitats. The extensive reef systems provide habitat for a wide range of sessile species such as soft corals, anemones, sea squirts and bryozoans; some species being rare and/or unique to

this area (including the rare sea spider *Copidognathus reticulatus*). Within the sediment areas, a large number of artificial reefs have been created owing to the existence of many shipwrecks, these provide diverse wildlife habitats for many mobile and sessile marine species. The coast itself is nationally important for its populations of breeding seabirds while the intertidal zone is used by many birds (including Arctic and Common Terns, Puffins, Fulmars, Kittiwakes and many species of Gulls) as a year round feeding area.

The environment around the mouth of the River Tyne supports a diverse range of habitats, including mudflats, saltmarshes and mud, sandy and rocky habitats. The caves, wrecks and reefs in this area are covered with a diverse array of marine species including biomes consisting of soft corals, sponges, bryozoans, sea squirts, anemones, crabs and lobsters. Within the water column leopard spotted goby, lumpsucker fish are to be found, along with migratory salmon and sea trout. In recent years the quality of water within the River Tyne, owing to huge clean-up activities, has greatly improved; however the consequence of the river's industrial heritage has left pollution within both the water column and underlying sediment.

Oslofjord, a converted WWII troop ship, sank when in ballast whilst on passage from Liverpool to Newcastle, on 1 December 1940, after her back was broken following a collision with a German acoustic mine. At 179 meters (590 feet) long, *Oslofjord* is the largest shipwreck along the North East coast of Britain. She now lies on her port side with the bow towering some 4 metres up from the seabed.

SS Eugene Chandris sank on 15 March 1943 following an initial collision with the steamer *Exmouth* and then subsequently colliding with the *SS Oslofjord*. *Eugene Chandris* now lies, on the seabed, perpendicular to the *Oslofjord*; over time the two vessels have become merged to the extent that today it is hard to determine where one vessel ends and the other begins. Furthermore the effects of winter storms and salvage attempts (1989 and 2002) have taken their toll on the remaining structures of these two wrecks.

Ecology

Since the sinkings, over time both wrecks became encrusted with a rich covering of soft coral, sponges, corals and Deadman's fingers (suggesting that this part of the wreck was swept by nutrient rich currents) and other marine organisms (Figure b); however, today much of this marine encrustation has all but disappeared. Given the lack of information from earlier (pre 2016) dives on these wrecks it is impossible to ascertain, whether in 2008 and 2009 the wreckage had reached its maximum level for sustaining the community of soft corals, nor when the decline in marine life on the two wrecks and mass accumulation of sedimentation in the area began.



Figure b: Small Section of the Soft Coral and Deadman's Fingers that colonised SS *Oslofjord* in 2009 (note the lack of sedimentation on the wreck site)

Today, all the horizontal surfaces of both SS *Oslofjord* and SS *Eugine Chandris* are heavily covered in a thick layer of very fine sediment and ecologically the wrecks are well covered in a very fine, branched 'sea' like grass, which is suspected to be a member of the Cladophora family. Similar green algae are also to be found around St Mary's Island, some 3nm north of this location.



Figure c: Fine branched green algae found growing on SS *Oslofjord* (possibly spp Cladophora)

In addition, there are some small crabs and starfish on the surface of the wrecks (and buried in the sediment), any movement from these organisms easily disturbs the sediment, which then settles back out of the water column leaving any marine life quickly covered in sedimentation. Around the wreck are some young (small) fish; the presence of only small individuals suggests that perhaps this wreck is providing a safe and secure 'nursery' habitat for young species. The presence of, what appears to be, a dominance of young organisms suggests that the considerable sediment on and around the wreckage is non-toxic; but the change in marine life attached to the wreck and the increase in sedimentation in the area (Figure d) does raise a number of environmental and ecological concerns, especially given the close proximity of

these two wrecks to the River Tyne, spoil ground for dredged river material (5 nm to the north east of the wreck site) and the St Marys' to Coquet MPZ.



Figure d: Section of SS *Oslofjord* clearly illustrating the amount of sediment on (left hand side) and around (right hand side) the wreck; note the lack of marine life growing on the wreck.

While the water quality in the River Tyne has greatly improved in recent years, the legacy of shipbuilding and other industrial activity along the river means that there is still tri-butyltin (TBT) contamination in the river's sediment. Correspondence with a number of interested organisations does indicate that severe winter storms early in 2016 led to massive plumes of sediment being discharged from the River Tyne. The close proximity of the wrecksite to the mouth of the River Tyne means that this could certainly account for the considerable amount of easily disturbed sediment in and around the wrecks (Figure d). Further research (outside of the scope and capability of the study) will be needed to determine whether the sediment contains any industrial contamination. However, an analysis of rainfall data for the North East area of England does support the suggestion that the sediment has been washed out of the River Tyne during levels of high rainfall, recently during high rainfall during November 2015, December 2015 and January 2016. Furthermore (given concerns over the impacts of climate change) the rainfall data clearly shows that mean annual rainfall in this area has increased by 5% over the last 20 years, increasing from 851.3mm/yr to 899.4mm/yr during 2015 (Figure e).

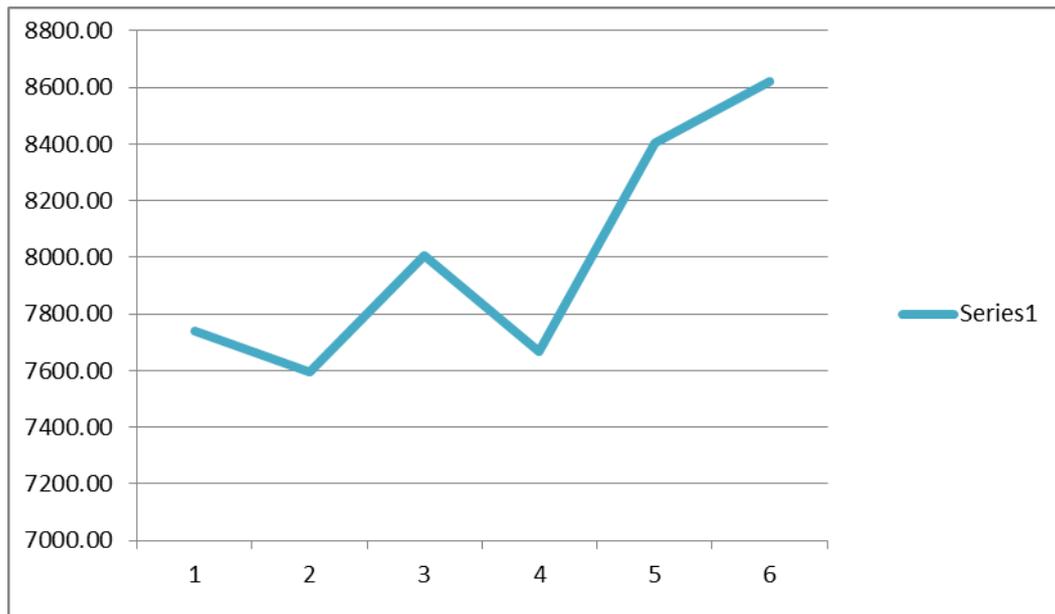


Figure e: 10-Yearly Rainfall Totals (mm) for the period 1956-2015

Interesting (and of concern) is that the UK Climate Change Programme is predicting that between 1990 and 2100 the average annual rainfall in the North East of England will increase between 5 to 10%, with the greatest increase being during the months of November to January. These projections are consistent with the analysis of historic rainfall data; it could be that along with the increase in rainfall greater amounts of sedimentation will be discharged from the River Tyne into this coastal area.

Given the tidal flows outside of the mouth of the river there is no possibility that this sediment could have been moved by the tidal currents from the spoil ground to the area of these wrecks. Over any single (approx 13 hour) tidal cycle, any material within (or suspended in) the water column would have been transported in a north westerly direction some 1.5nm (see Figure a). However, should seasonal rainfall increase and the associated plumes of sedimentation leaving the River Tyne continue there may be some negative consequences for marine life inhabiting the southern edge (St Mary's) of the MPZ. A further consideration may also be the transportation of species expanding their ranges of occupancy due to the warming of the seas (a subsequent consequence of climate change). Furthermore, as the shipwrecks continue to age, and assuming that the sediment continues to accumulate, it is probable that both wrecks will, over time, become more buried and integrated into the seabed.

It is feasible that this increase in sedimentation on and around the wrecks has smothered any previously resident soft coral and encrusting algae. The level of sedimentation and its associated reduction in light and nutrients to the wreckage could inhibit any future growth and colonisation by native and/or invasive marine organisms. Had the time and resources been available it would have been extremely useful to have analysed the content of this sediment, both in terms of determining whether any contamination was held within the sediment and equally important the presence (or not) of any micro-flora and fauna.

In terms of *SS Oslofford*, the *SS Eugene Chandris* and the future ecology of these two wrecks, a concern is the level of acidity being recorded at the site. The recorded pH of 6.8 at the sea surface and 7.6 immediately over *Oslofford* show this wrecksite to be fairly acidic. High levels of acidity have major implications for the sustained preservation of steel shipwrecks, the containment of any polluting substances (oil; chemical; ordnance etc.) they may have been carrying at the time of the accident (although the amount of these materials within the shipwreck will also depend on the nature of the disaster). Acidity can also negatively impact

on marine life, particularly those which have calcium carbonate shells. Any deterioration in the structural integrity of these two shipwrecks may result in the release of any substances that could remain onboard. It is recorded that at the time of her sinking SS *Eugine Chandris* was carrying 4,874 drums of Trichloroethylene; 573 cases of ordnance as well as assorted aluminium ingots and copper. Furthermore, should the sedimentation continue to accumulate, it is feasible that any deterioration in the structure of these wrecks (possibly due to acidification of the waters) may conceal any leakage of contaminated material into the sediment and thereafter its release, (due to local tides, currents and possible increased outflows from the River Tyne) into the water column and maybe thereafter to the area around St Mary's.

